CIVIL AND STRUCTURAL ENGINEERING SERVICES

inertia
consulting

We have a strong track record of finding innovative solutions to difficult engineering challenges' – like the construction methodology we developed for this foot bridge in Northampton.

Inertia Consulting are a multi-award-winning firm providing civil and structural engineering consultancy services to public and private sector clients.

The company was founded in 2006 with a vision of offering a personalised service that we can tailor to meet the needs of both small to medium sized businesses and large corporations.

Over time, Inertia has diversified our offering from bridge design and advanced analysis to include non-destructive testing and inspection of civil engineering structures. We've continued to expand our portfolio into the comprehensive suite of services we provide today.

A fresh, client-focused approach
Inertia Consulting offers a genuinely client-focused service. Combining industry-leading civil engineering skills and expertise with the latest systems, software and equipment, we can offer high quality, safe and sustainable solutions tailored to the precise needs of each individual project.

All our services are managed in-house and delivered by the Inertia Consulting team and our partners. This means we can offer a fully integrated 'one stop shop' service that represents genuine value for money and frequently exceeds our clients' expectations.

Multi-award winning designers

Our work has earned us a number of prestigious awards, notably for our sympathetic restorations of heritage structures including Wilford Suspension Bridge in Nottingham and the 1889 Ferry Bridge at Burton-on-Trent.

Our success story
Since our inception, we've developed a professional team operating nationwide and overseas. We're proud to have worked on many high profile projects, including the Olympic Park, Docklands Light Railway, Derwent Valley aqueduct, Spaghetti Junction and the Channel Tunnel Rail Link.

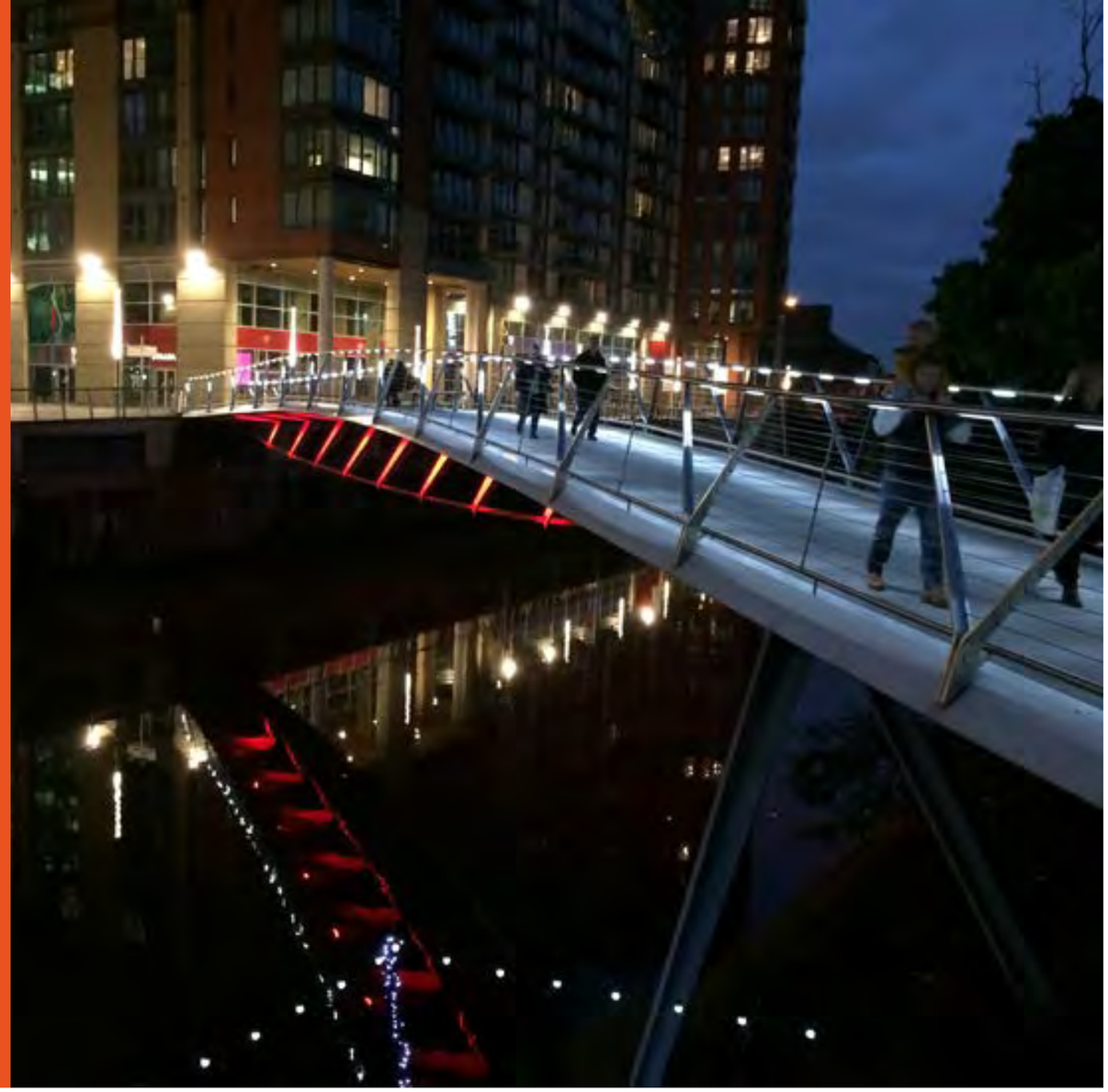
We work with a wide range of clients in the water, highways, railway, energy and commercial and residential construction industries. Organisations' whose infrastructure we work on or who we've worked with include:

- **Network Rail**
- **Highways England**
- **National Grid**
- **Cadent Gas**
- **Severn Trent**
- **Anglian Water**
- **Southern Water**
- **JCDecaux**
- **Kier**
- **Amey**
- **Tarmac**
- **Barratt Homes**
- **Bovis Homes**
- **Bellway Homes**
- **Taylor Wimpey**
- **GF Tomlinson**

QUALITY THROUGH COMPETENCE

Our degree-qualified and chartered engineers always work in line with the latest industry guidelines and regulations, such as Highways England and Network Rail Standards and Bridge Condition Indicator Methods.

Several members of our team hold LANTRA Bridge Inspection Competence Scheme (BICS) certification, whilst our specialist access credentials include Confined Space Entry and Control, Confined Spaces Search and Rescue, IPAF Powered Access Licences, IRATA Level 3 access and PASMA membership.



SECTORS

- Highways
- Rail
- Commercial & Residential
- Water
- Energy
- Legal

Our award-winning restoration design work on the 1889 Ferry Bridge at Burton-on-Trent.

High quality services from qualified engineers

Our bridge and civil engineering services include geotechnical investigation, structural investigations, inspection, testing, design, capacity assessment, asset management, and refurbishment and strengthening works.

In addition, we offer engineering consultancy; approval and appraisal services; construction supervision for our own and third party projects; and inspection support services to third parties wishing to carry out their own bridge and civil engineering inspections and surveys.

Specialist services

Inertia Consulting offers a range of specialist and niche services to our clients. These include:

- Bridge inspections for trunk roads, rail and local authority structures
- Non-destructive testing to ascertain the condition of bridges & civil engineering structures
- Confined space medium & high risk space entry and control
- Bridge & civil structure design and capacity assessment
- Temporary works and construction methodology design
- Category II and III checks on Department for Transport structures
- G17 and G35 approval and appraisal works
- Principal Designer under the CDM Regulations 2015
- Innovative problem-solving techniques for complex projects
- Stock management for bridges and civil structures
- Forensic engineering and expert witness services

SERVICES

- Engineering Consultancy
- Temporary Works
- Approval & Appraisal
- Bridge Inspection
- Construction Supervision
- Non-Destructive Testing
- Structural Monitoring
- Capacity Assessment (kN)
- Inspection Support

TRUST, INTEGRITY AND HONESTY

We believe it's our personalised service, combined with our ethical approach and commitment to the highest standards, that sets us apart from the crowd.

Attention to Detail
When investigating a problem for a client, we don't adopt a one-size-fits-all, 'tick-sheet' mentality. Instead, we take a comprehensive approach that's customised to the project in hand, carried out by experienced and qualified engineers who are committed to doing a thorough job.

Philosophy and Approach
Our philosophy can be summarised very simply: 'Bring us a problem and we'll bring you a solution.' Whether we're providing a single service or a bespoke integrated package, our clients can be confident we'll deliver the works on time and on budget. By taking this approach, we can build strong client relationships based on trust.

Corporate Social Responsibility
Another core aspect of the Inertia Consulting ethos is 'People not Profit'. We support our staff in their career paths by funding apprenticeships and helping them become chartered or incorporated. We also work with local schools and universities to encourage the next generation of engineers, and support community projects and charities in the Derby area.

Quality, Health & Safety and Environment
These are three areas that we take very seriously. All our projects are undertaken by qualified and experienced engineers with extensive skills and knowledge in their fields. Our credentials include ISO 9001:2015 for our Quality Management System, ISO 14001:2015 accreditation for Environmental Management and ISO 45001:2018 for Occupational Health & Safety Management. We also operate our own in-house design risk policy.

"We're proud of our reputation for providing the highest quality services to our prestigious client base. Our engineers regularly score in the high 90%s in client satisfaction surveys – which is testament to our client-focused approach and attention to detail.

"Our clients know they can rely on the Inertia Consulting team and our partners to provide the highest standards of quality and workmanship every time."

David Roome, Director

FACTS AND FIGURES

- Successfully delivering over 700 projects in the UK and overseas since 2006
- Managing numerous pipeline structures on the Severn Trent strategic pipeline network, safeguarding the water supply for thousands of homes in the East Midlands
- Saving our clients millions of pounds by developing innovative solutions for engineering and asset management projects
- Reducing construction costs by 30% on a project to renovate a Victorian culvert in Blackburn
- Inspecting and testing bridges and other civil engineering structures over an area covering more than 30% of the Highways England network (Areas 6, 7, 8 and 9)
- Rapid deployment of teams and equipment worldwide to assess and overcome engineering challenges
- Through sympathetic and innovative design, restoring historical structures from dilapidation to their former glory whilst meeting the needs of future generations

Constructionline Gold Member

smas WORKSAFE

BMTRADA BMTRADA bmtrada

CASE STUDIES

The Challenge

For 300 years, the River Eamont was spanned in Pooley Bridge, Cumbria by a masonry arch bridge which collapsed during Storm Desmond in 2015. A replacement landmark bridge was commissioned by Cumbria County Council. Construction commenced in 2019.

Inertia Consulting Ltd were chosen to undertake the independent CAT III checking of the complex new stainless steel bridge design to modern standards .

The project began with us undertaking detailed 3D finite element modelling and analysis of the superstructure, substructure and ground to check the structures suitability to support highway loading.

The structure is a novel new design comprising shallow arches and stainless steel details acting compositely with concrete to achieve full design strength. We worked as part of the project team to agree staged construction methodologies, temporary works geometric and stress limits, and temporary support requirements to enable safe construction of the bridge.

The structure is sensitive to settlement, therefore we undertook advanced geotechnical analysis to predict immediate settlement and consolidation settlement limits and ensure that these were within acceptable structural limits.

Due to the complex nature of the design, our checkers liaised regularly with the designers to agree construction details.

The construction is currently ongoing with the superstructure being constructed off line. The structure is due to be lifted into position on its bearings in 2020 using crawler cranes.

The Project Team

- Client-Cumbria County Council
- Architect-Knight Architects
- Engineer-GHD Livigunn
- Inertia Consulting Ltd-CAT III Checker
- Principal Contractor-Eric Wright Civil Engineering
- Steel Fabricator-WEC Group

The Outcome

We completed independent checking in December 2019 . The structure construction is currently progressing on programme with a planned completion date of Summer 2020.

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Northumberland Park Railway Station, Tottenham

Designing steelwork elements, construction methodology and temporary works for a mainline railway station superstructure in London

The Challenge

Northumberland Park is a mainline railway station on the Lee Valley line, which forms part of the West Anglia Main Line. It serves the ward of Northumberland Park in Tottenham, providing a direct link into London Liverpool Street Station.

In 2017, Network Rail launched its £170 million Lee Valley Rail Programme, which includes upgrade and improvement works to Northumberland Park Station as well as other stations located along the Lee Valley Corridor. Inertia Consulting Ltd were appointed to work on the steelwork designs for Northumberland Park Station.

The project involved:

- Design services for steelwork connections and details for ramps and stairs for a new footbridge, the footbridge itself, a concourse and canopies for the new island platforms
- Improving the buildability of a pre-existing design scheme to move it into with the fabricator's construction methodology
- Designing temporary works to facilitate construction within the station's tight urban location and minimise disruption to residents and rail services.

The Project Team

- Client-Network Rail
- Steelwork Sub Consultant-Inertia Consulting Ltd
- Principal Contractor-VolkerFitzpatrick
- Principal Designer-Atkins
- Fabricator-Briton Fabricators

The Outcome

The new bridge was successfully installed in 2018 using a 350 tonne crane. Safe, step-free access to the station and the Lee Valley area is now available for parents with buggies, people with mobility problems and other rail users including football fans attending football matches at White Hart Lane.

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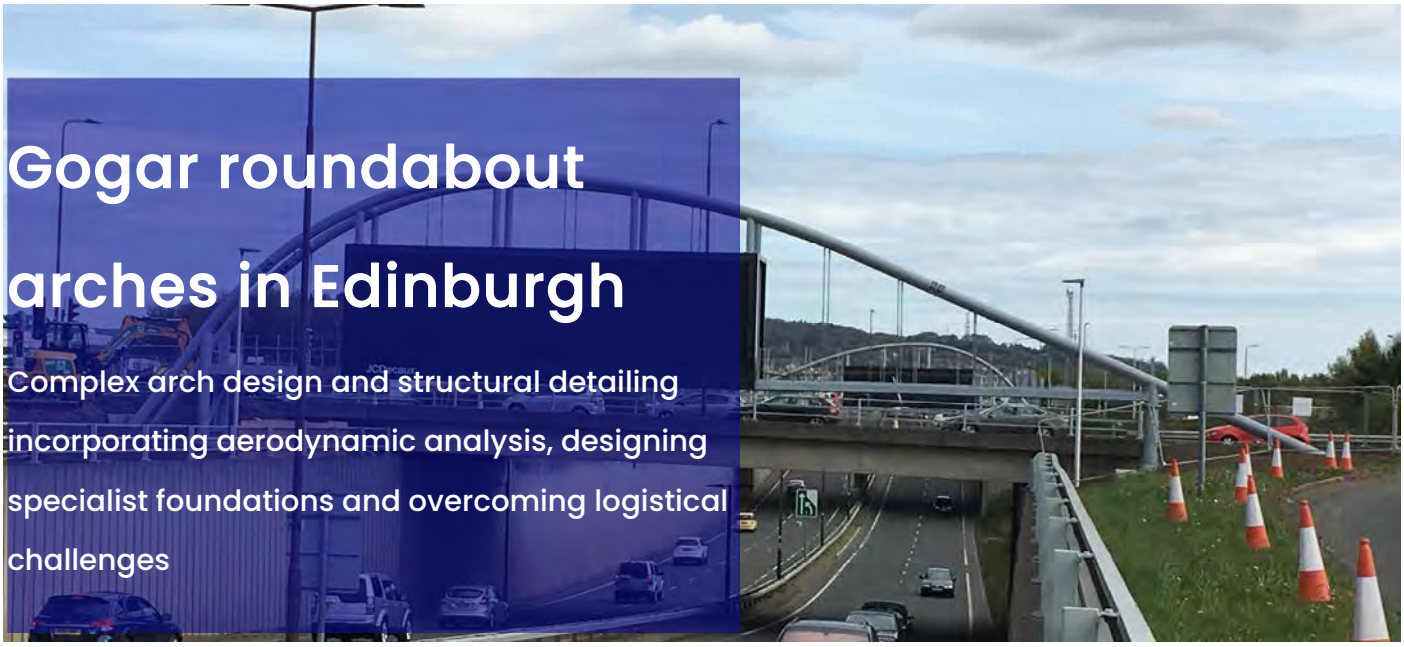

Gogar roundabout arches in Edinburgh

Complex arch design and structural detailing incorporating aerodynamic analysis, designing specialist foundations and overcoming logistical challenges

The Challenge

Inertia Consulting Ltd was appointed by JCDecaux to create a complex and iconic design for the Edinburgh arches on the Gogar roundabout on the A8. We were required to merge architectural aesthetics with structural ingenuity, as well as incorporate giant video advertising screens into our designs.

The finished structures are 37m wide and 8.7m tall. The main structural members are constructed using curved circular hollow sections, to give the impression of a continuous arch.

Key challenges and solutions included:

- Designing and carrying out an aerodynamic testing case study, using an analytical wind tunnel simulator to ascertain the effect of wind turbulence from each arch on the other arches and surrounding existing structures.
- As the use of 'spread' foundations wasn't possible due to lack of space and the risk of surcharging existing retaining walls the design opted for reinforced concrete piles.
- Designing the project to install the superstructure over a weekend and have it showing adverts on Monday rush hour. To do this we designed modules containing the large screens so that they could be assembled complete with all electronics and tested off-site before being installed as a plug and play structure.

The Project Team

- Client– JCDecaux
- Principal Designer-Inertia Consulting Ltd
- Principal Contractor-8Point8 Construction
- Steelwork Fabricator-Briton Fabricators Ltd

The Outcome

Our innovative approach meant that the project met all the various stakeholders' requirements. Concerns around how the new and existing structures would interact with each other were successfully addressed by the engineering solution we proposed.

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Salthouse Footbridge – Petts Wood, London

Designing a 34 metre footbridge spanning 7 railway lines at the Petts Wood Junction in London

The Challenge

Salthouse Footbridge is located just north of Petts Wood Station and provides a public footpath over the South Eastern Main Line. The footbridge is part of a local route between green spaces and provides access to a school.

Inertia Consulting Ltd were chosen to design a new bridge to modern standards to replace the original footbridge which was in poor condition.

The project began with us undertaking a comprehensive survey and capacity assessment of the existing bridge abutments. Our engineers then designed new, precast concrete abutment cills to modern standards to enable re-decking, as well as a lightweight superstructure for the 34m bridge. All designs were made to the latest Network Rail standards, with our engineers undertaking Form F001, F002 and F003 designs and acting as CRE.

Petts Wood Junction is one of the busiest junctions in the country, which meant the entire project had to completed – including removing the failed bridge and installing the new abutments and bridge deck – within a 52 hour window. This was complicated by the weight of the old bridge exceeding the capacity of the rail cranes used due to access preventing use of road cranes, so our engineers designed temporary works to enable it to be removed in two sections. The new bridge was then lifted into place in one piece due to its lightweight design.

The Outcome

The new Salthouse Footbridge was successfully installed in 2018 and will provide safe passage over this busy stretch of railway line for decades to come.

The Project Team

- Client-Network Rail
- Inertia Consulting Ltd-Scheme Designer & Contractors' Responsible Engineer
- Principal Contractor-Costain
- Steel Fabricator-Briton Fabricators

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Nottingham Enterprise Zone Footbridge

Bespoke design of a 50m footbridge featuring weathering steel main span and mild steel approach ramps

The Challenge

Inertia Consulting Ltd were appointed by Briton Fabricators Ltd to carry out structural design, including detailing, of a new 50m footbridge in Nottingham. The bridge features a weathering steel Vierendeel main truss, which crosses two railway tracks, and two sets of mild steel approach ramps, measuring 70m and 72m respectively.

The project posed multiple challenges, including:

- Bespoke design and construction of weathering steel grade hollow rectangular sections that would form the main deck of the bridge to meet the requirements of the brief whilst complying with industry standards BS EN 1983-1-1 and BS EN 1983-1-8.
- Ascertaining the right order in which to assemble the deck panels, bearing in mind that welded rectangular hollow sections need to have similar design characteristics to hot-formed ones.
- Using an advanced FEM shell model to provide the required curve effect for the approach ramp elements, which needed to be curved in plan and sloping at the same time.
- Carrying out a Human Induced Vibration Check using advanced design methods such as FEM shell/strut modelling and time history analysis to ascertain the level of vibration caused by pedestrians and whether this could be tolerated by the bridge and approach ramps.

The Project Team

- Client-Nottingham City Council
- Substructure Designer-Inertia Consulting Ltd
- Principal Contractor-Eurovia
- Substructure Designer-Nottingham City Council

The Outcome

The project was a success, with a key benefit being the use of weathering steel for the main structure, as it avoids the need for maintenance – and associated disruption – during the bridge's designed 'in service' life.

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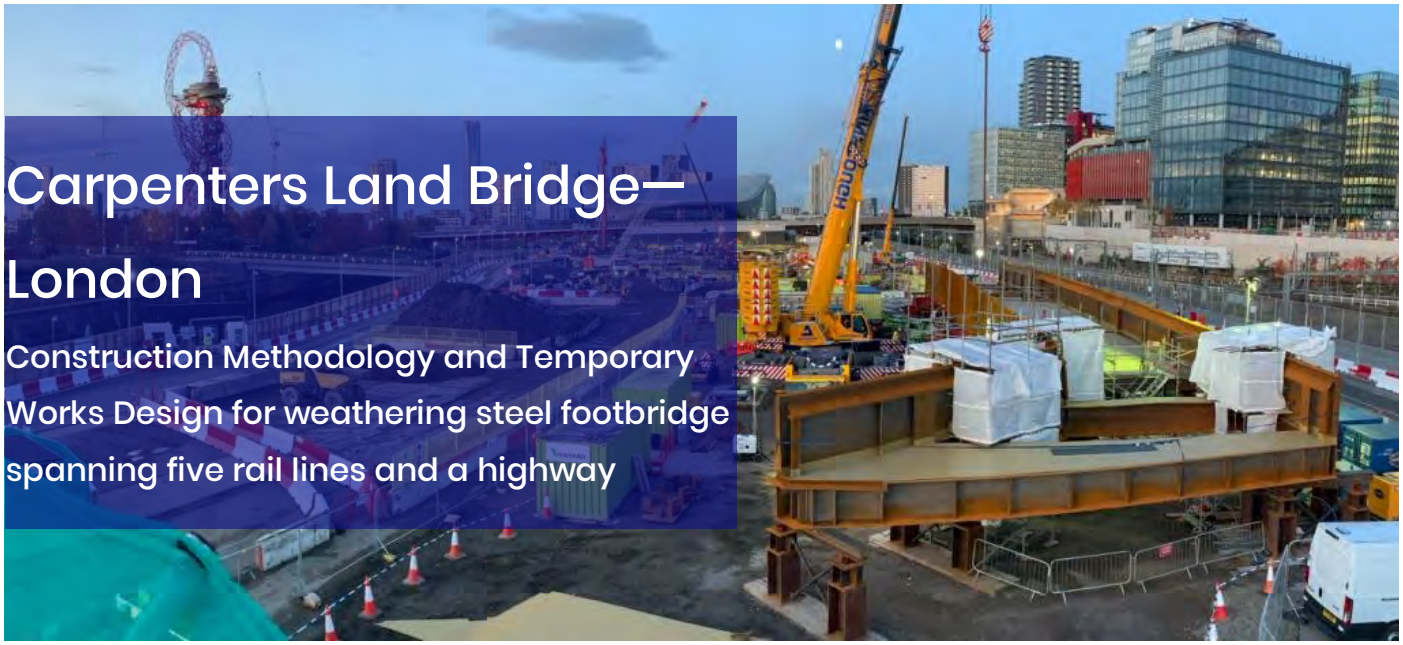


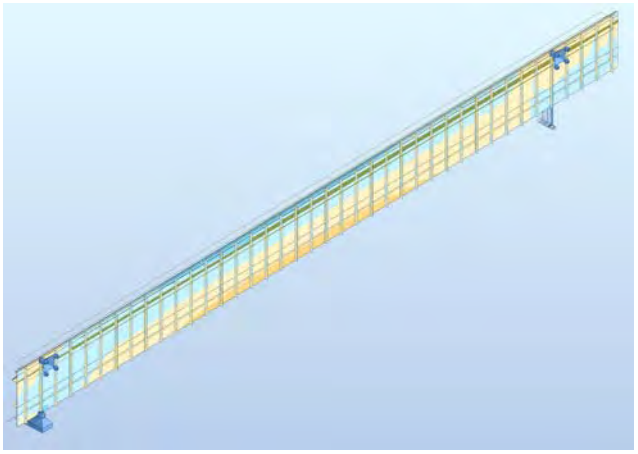
Carpenters Land Bridge— London

Construction Methodology and Temporary Works Design for weathering steel footbridge spanning five rail lines and a highway

The Challenge

As part of the London Olympics Legacy project, a new £1.1 billion cultural and educational district is being constructed on the Queen Elizabeth Olympic Park. A bridge was required to span 66 metres over three Network Rail lines, two Docklands Light Railway lines and a local road to link the site to a new business district at International Quarter, London.

Due to access restrictions on the railway, the 350-ton steel Carpenters Land Bridge needed to be pre-fabricated on site before being rotated into position on one railway possession.



Due to the weight, length and width of the structure, it could not be transported from the fabricators factory in Nottinghamshire to site in one piece. Inertia Consulting Limited were therefore appointed to design the temporary works necessary to transport all elements to site, and construct the bridge off line before the bridge was installed using a self-propelled modular transporter.

Inertia designed bespoke transport cradles for the 3m high 25m long individual girders having previously rationalised the optimum transport lengths by undertaking finite element buckling analysis of the individual slender girders in the transport case. We then designed the installation sequence to minimise on site connections and maximise buildability before designing a bespoke trestle support system. The trestle system needed to minimise ground bearing pressures whilst ensuring stability of the structure in all stages of construction. We incorporated jacking systems to allow fine tuning of the bridge profile before on site welding was undertaken.

The Project Team

- Client-London Legacy Development Coropration
- Project Manager-MACE
- Engineer-COWI
- Inertia Consulting Ltd-Temporary Works Design
- Principal Contractor-GRAHAM
- Steel Fabricator-Briton Fabricators

The Outcome

The bridge was successfully constructed offline during December 2019 before being transported and rotated into position over the railways on Christmas Day 2019.

The bridge will form a key link within the new development and ensure the future economic prosperity of the area.

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Spinningfields Footbridge – Manchester

Design and supervision of temporary works for a new footbridge in Manchester

The Challenge

Inertia Consulting Ltd was appointed to design and supervise the temporary works for the Spinningfields Footbridge, a 52m curved inverse arch catenary footbridge spanning the River Irwell in Manchester in a tight urban location.

Our brief was to design:

- Crane foundations for a 1,000 tonne crane lift and bridge support system to be used during assembly
- A temporary steelwork splice, tie and counterweight system for the bridge's inclined support piers
- A support trestle, jacking and lifting system to support the lightweight bridge sections during transportation, on-site assembly and cable stressing, and which could also be used as lifting beams during installation.

Before developing our designs, our team attended the site to carry out detailed investigations into existing structures, including the location of services and buried tunnels underneath the site, so we could ascertain the precise requirements for temporary support and the best construction methodologies to be used.

As the existing arch structures and near-surface ground deposits were unsuitable for spread foundations to be laid, we designed piled foundations to the site's bedrock that were capable of bearing the load.

For the trestles, our team designed a system that could be jacked and slid to accommodate changes in the bridge's profile during catenary stressing, to avoid the development of locked-in forces in the trestles. And for the lift, we designed the trestles to unbolt at the top to release the lift beams, with the lift arrangement designed so that the curved structure didn't rotate during installation.

Throughout the project, our team were onsite to provide construction supervision services, manage Health & Safety and ensure compliance with specification and statutory requirements.

The Outcome

Our experience in off-site element construction and the design of complex temporary works meant we could save our client money by adopting innovative construction methodologies to deliver complex temporary works in a logistically difficult location.

The Project Team

- Client-Salford City Council
- Inertia Consulting Ltd-NDT Contractor& Temporary Works Designer
- Principal Contractor-Eric Wright Civil Engineering
- Steel Fabricator-Briton Fabricators
- Developer-Allied London

"...this new bridge will unlock the economic potential of this area of Salford, setting the scene for further jobs, ready to develop much needed business and commercial space in New Bailey."
Cllr. John Merry, Leader of Salford City Council

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Heads of the Valleys Footbridges – South Wales

Designing temporary works for six footbridges

The Challenge

Built in the 1960s, the A465 Heads of the Valleys Road joins together the northern heads of the South Wales Valleys. In 2014, work began to convert the road into a dual carriageway requiring the construction of several new road bridges, footbridges and retaining walls.

Inertia Consulting were tasked with designing major temporary works for six weathering-steel footbridges spanning the section of the road between Gilwern and Brynmawr. The project included the design of the support structures and appropriate lifting methodology.

Due to the challenging logistics of the site location in the narrow Clydagh Gorge, our engineers spent 18 months designing temporary works that would enable the curved bridges to be constructed using temporary bespoke trestle towers and lifting systems.

The project required careful planning to protect the environment as the locations we were working in included conservation areas, World Heritage Sites, Sites of Special Scientific Interest (SSSIs) and scheduled ancient monuments. Our environmental credentials, which include ISO 14001:2015 for Environmental Management, therefore came into play.

The Project Team

- Client –Welsh Government
- Inertia Consulting Ltd-Steel Footbridge Temporary Works Designer
- Main Designers-Atkins & Costain
- Architect-Knight Architects
- Steelwork Subcontractor-Briton Fabricators

The Outcome

The project was completed successfully. Our innovative design approach and attention to detail meant that the temporary structures and lifting arrangements were suitable for the contractor's highly restricted site and pedestrians now have safe access over the A465 in 6 strategic locations.

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Ferry Suspension Bridge Burton upon Trent

Restoration and strengthening of a Grade II listed heritage footbridge in Burton on Trent

The Challenge

In 2014, concerns were raised around the condition of this 75m three span Victorian wrought iron 'self-anchoring' suspension footbridge. Staffordshire County Council asked Inertia Consulting to carry out a complex testing, capacity assessment and strengthening design on the structure, to restore the bridge to its former glory and make it strong and durable for future generations' enjoyment.

To gather the information we needed to inform our designs, we first accessed the bridge using pontoons and a boat on the river, as well as using diving teams to inspect the underwater structures. We next designed and supervised a £1.3 million strengthening scheme to restore the bridge and make it safe for pedestrians, cyclists and river users.

The Outcome

The project was a huge success and our sympathetic approach to the restoration works earned Inertia Consulting three prestigious industry awards including the IStructE Midland Counties Prize for Footbridges, IHE Mercia Merit Award and an ICE West Midlands Project Award for Heritage Structures.

The Project Team

- Client-Staffordshire County Council
- Inertia Consulting Ltd-Designer
- Project Manager& CAT III Checker-Amey
- Main Contractors-Amey/Currall & Lewis & Martin Ltd
- Including the local support teams, fundraisers & campaigners

This project brought together many parties who worked to their strengths to collectively progress this complex scheme from establishing the problems and finding the right solution to undertaking the works in order to provide the client and all stakeholders with the best long-term solution to ensure the future of a valuable piece of heritage.— David Hughes, Senior Structures Engineer, Staffordshire County Council

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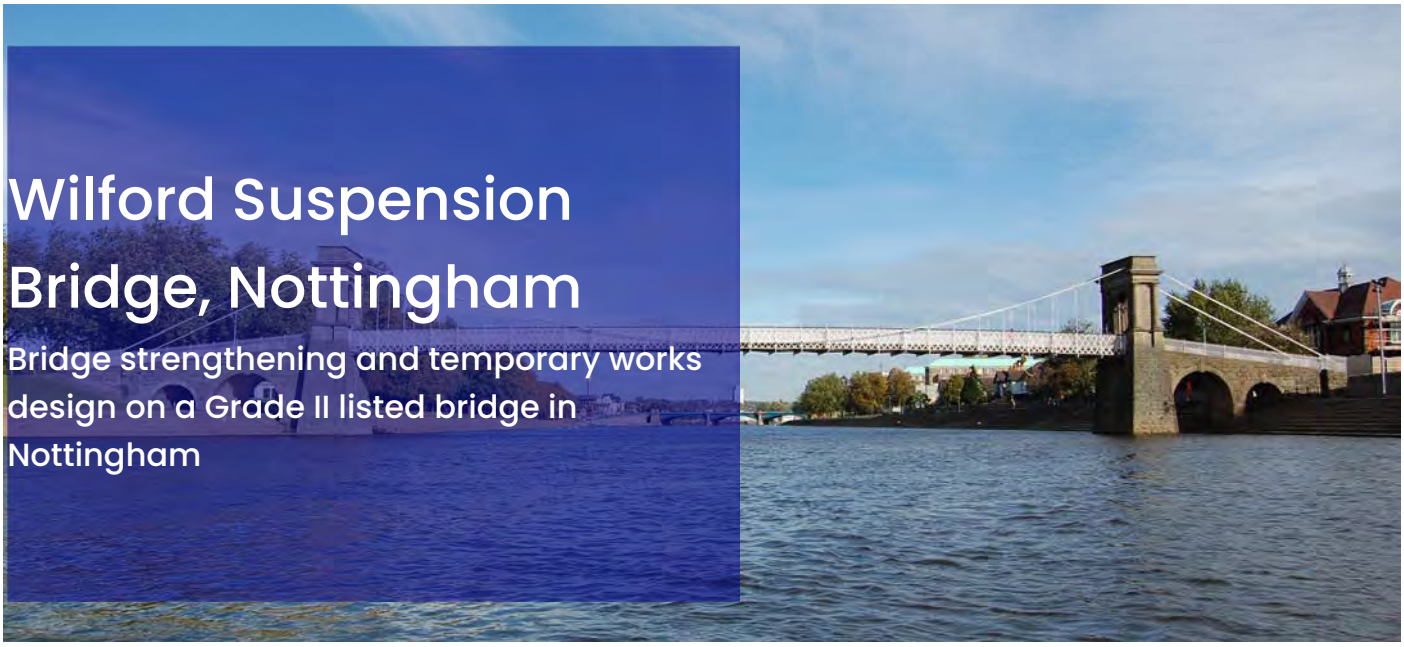

Wilford Suspension Bridge, Nottingham

Bridge strengthening and temporary works design on a Grade II listed bridge in Nottingham

The Challenge

In 2008, Inertia Consulting identified that the 70m Wilford Suspension Bridge in Nottingham had deteriorated significantly from previous inspections and its load-bearing capacity had become substandard. We were therefore appointed by Severn Trent Water plc to carry out a principal inspection, dimensional survey, capacity assessment, refurbishment scheme design – including temporary works – and construction supervision for the bridge.

The Outcome

Our innovative approach to the temporary works reduced the project's duration as well as the client's costs. Thanks to our use of advanced techniques, we were able to minimise the amount of strengthening works that were required. Two key achievements were saving the structure's 100 year old suspension cables and keeping the water and gas mains in service throughout the project. In total, our approach saved Severn Trent around £500,000.

We were proud to receive three prestigious industry awards in recognition of our achievements on this project.

The Project Team

- Client-Severn Trent Water PLC
- Designer-Inertia Consulting Ltd
- Project Manager-Pick Everard
- Main Contractor– North Midland Construction Ltd
- Specialist Subcontractor-Stonbury Ltd

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Highways England

Area 9

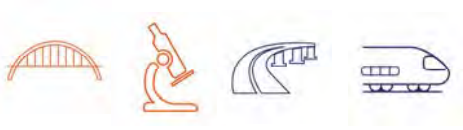
Inertia Consulting Ltd is a key framework Non-Destructive Testing (NDT), Investigations and Inspection subconsultant for Kier Highways in Highways England Area 9

The Challenge

Highways England Area 9 covers Gloucester, Shropshire, Staffordshire, Warwickshire, the West Midlands, Worcester and Herefordshire. Area 9 includes some of the UK's busiest and most complex road systems, including Spaghetti Junction and parts of the M5, M6 and M42.

As a key framework Inspections, NDT and Special Investigations Subconsultant, our role involves a wide range of inspection, testing and investigation services. The assets we work on include road bridges, footbridges, bridges over railways and water courses, overhead gantries, retaining walls, box beams and other highway structures.

To date we have worked on several thousand bridges in Area 9.The services we provide include a full suite of Principal and General inspections, NDT and Special Investigations techniques. These include Special Investigations of all structure types, inspections for assessment, petrographics, accelerated expansion testing, corrugated steel buried structure investigations to CS460 standard, strength analysis and other concrete, steel and masonry NDT. High profile projects we've worked on include: State of Bridge Infrastructure (SOBI) project, undertaking the National Half Joint Programme to all bridge joints in Area 9. Carrying out pre-refurbishment structural surveys to the M5 viaduct at Oldbury, NDT, petrographic and accelerated expansion testing to the A45/M42 link prior to upgrades and refurbishment, Deck outstand investigations for gantry upgrades on the smart motorway system and numerous Special Investigations to the concrete and steel viaducts at Spaghetti Junction. Our work often requires the regular use of specialist access techniques, including using powerboats and pontoons for waterways access, diving or roped access, and working from Mobile Elevating Work Platforms (MEWPs).



The Project Team

- Client-Highways England
- Inspection, NDT & Special Investigations Framework Subconsultant-Inertia Consulting Ltd
- Asset Support Contractor-Kier

The Outcome

Identifying the need for strengthening, repair or refurbishment works at an early stage – reducing costs and the likelihood of structural failures

Enabling a clear understanding of the condition and maintenance history of each structure

Maximising the lifespan of bridges and other structures through planned, proactive maintenance

Establishing the value of assets, and the cost liabilities and time scales for future repairs

Providing specialist testing and structural investigation services to prove the condition of a structure in the event of a third-party claim.

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Highways England Areas 6 and 8

Bridge and civil engineering structure inspection services in Highways England Areas 6 and 8 on behalf of Amey and Kier Highways

The Challenge

Highways England Areas 6 and 8 cover motorways and trunk roads in the east of England, including East Anglia. Since 2014, Inertia Consulting Ltd has worked with the main asset support contractor to inspect the many hundreds of bridges and other highway structures found within Areas 6 and 8, to assess their durability and safety.

Throughout the commission our inspectors have undertaken General Bridge Inspections and hundreds of Principal Bridge Inspections within this area. We have also supplied numerous Special Inspections. Services include concrete non-destructive testing (NDT), diamond coring for materials sampling and testing, steel NDT and ICORR coating inspections.

We carry out all inspections in line with Highways England document BD63/17. All our inspections are engineer led with our team holding LANTRA Bridge Inspection Competence Scheme (BICS) certification.

When reporting back to the client, we used both the SMIS and IAMIS databases. This builds a complete history for each structure, helping us predict, identify and manage changes in its condition during the inspection cycle.

Our work often requires the regular use of specialist access techniques, including using powerboats for waterways access, building pontoons, using diving or roped access, and working from Mobile Elevating Work Platforms (MEWPs).

The Outcome

The benefits that our work offers the client include:

Identifying the need for strengthening, repair or refurbishment works at an early stage – reducing costs and the likelihood of structural failures

Enabling a clear understanding of the condition and maintenance history of each structure

Maximising the lifespan of bridges and other structures through planned, proactive maintenance

Establishing the value of assets, and the cost liabilities and time scales for future repairs

Providing specialist testing and structural investigation services to prove the condition of a structure in the event of a third-party claim

The Project Team

- Client-Highways England
- Inspections & NDT Subconsultant-Inertia Consulting Ltd
- Asset Support Contractor (2017 onwards)-Kier
- Asset Support Contractor (2014 to 2017)-Amey

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Highways England Area 7

Bridge and civil engineering structure inspection services in Highways England Area 7 directly to Highways England

The Challenge

Highways England Area 7 covers motorways and trunk roads in the East Midlands. In 2019, Inertia Consulting Ltd was awarded two contracts by Highways England to inspect 668 bridges and other highway structures found within Area 7, to assess their durability and safety.

Our commission required our inspectors to undertake General Bridge Inspections, Principal Bridge Inspections, Special Inspections and Scour Assessments within this area.

We carry out all inspections in line with Highways England document CS450 (formerly BD63/17). All our inspections are engineer led with our team holding LANTRA Bridge Inspection Competence Scheme (BICS) certification.

When reporting back to the client, we used both the SMIS and IAMIS databases and managed the transition from one system to the other participating in workshops to agree inspection reporting standards.

As part of the commission we planned and programmed all structure inspections including Railway bridge inspections under possessions, river structures and numerous traffic management dependent inspections. A dedicated project manager liaised with Network Rail, Highways England network control and other to ensure works were well planned and executed. Work often requires the regular use of specialist access techniques, including using powerboats for waterways access, building pontoons, using diving or roped access, and working from Mobile Elevating Work Platforms (MEWPs).

The Project Team

- Client-Highways England
- Inspections Consultant-Inertia Consulting Ltd

The Outcome

The benefits that our work offers the client include:

Identifying the need for strengthening, repair or refurbishment works at an early stage – reducing costs and the likelihood of structural failures

Enabling a clear understanding of the condition and maintenance history of each structure

Maximising the lifespan of bridges and other structures through planned, proactive maintenance

Establishing the value of assets, and the cost liabilities and time scales for future repairs

Providing specialist testing and structural investigation services to prove the condition of a structure in the event of a third-party claim

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Derwent Valley Aqueduct

Bridge management services including planning and executing inspections to 74 pipe structures, high pressure pipeline testing/life assessment, asset management and strengthening design services.

The Challenge

The Derwent Valley Aqueduct is one of Severn Trent Water's most important assets, forming part of its strategic water grid it supplies more than 590,000 people with 200 million litres of treated water per day. It consists of 180km of large diameter pipeline, 16km of single 1.9m diameter tunnel, 1,000 valves, 74 bridges and culverts, and 307 other structures and chambers.

In 2014, Severn Trent Water put a team together to deliver the Derwent Valley Aqueduct Strategic Life Extension Project. Inertia Consulting Ltd was appointed as the Bridge Engineering Consultant. The project trialled a new Severn Trent strategy aimed at delivering projects 30% faster and more productively, with cost savings of 20%.

Project tasks included:

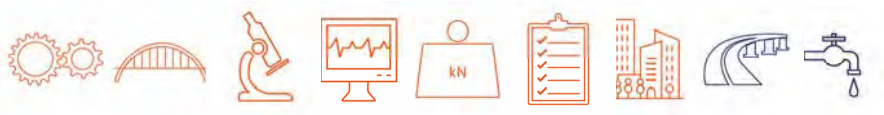
Surveying all the structures along the 180km aqueduct length to ascertain their life expectancy and condition, using standardised Bridge Condition Indicator methods.

Identifying structures requiring minor works and those needing further survey and developing work-scopes by prioritising spend to maximise efficiency and benefits.

Carrying out the minor works and surveys, which often required specialist access techniques such as roped access and the use of speedboats, pontoons and MEWPs.

For the major projects, using a traditional scoping approach to design and deliver schemes to strengthen and refurbish priority structures within tight timescales.

Many of the structures requiring major projects were in environmentally and logistically challenging locations which could have significantly increased costs. Through close collaboration and the sharing of resources, the team were able to keep costs down.



The Outcome

The timely, strategic and innovative intervention by the close-knit team enabled the project to be successfully delivered. We also achieved Severn Trent's goals of faster project delivery, improved productivity and 20% costs reduction.

Reviews carried out before and after the project's completion highlighted that our management approach considerably improved the network risk profile, revitalised the asset and increased its lifespan by decades.

The Project Team

- Client-Severn Trent Water PLC
- Inertia Consulting Ltd-Bridge Engineering Consultant
- Project Manager-Beale Engineering Services
- Principal Contractor-Bagnalls Building Maintenance

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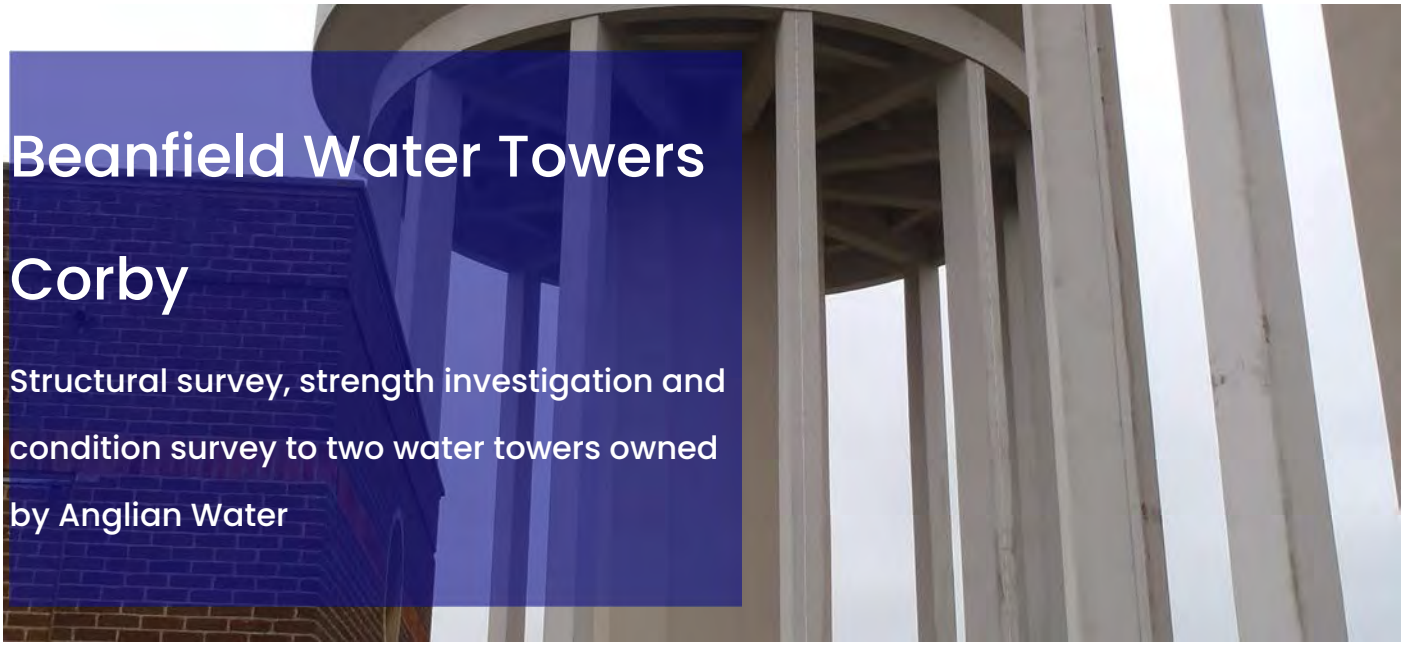

Beanfield Water Towers

Corby

Structural survey, strength investigation and condition survey to two water towers owned by Anglian Water

The Challenge

The two Beanfield Water Towers at Corby are part of an Anglian Water network which links Rutland Water to the Beanfield Reservoir and Water Towers via the Morcott and Wing Water Treatment Works. The treated water then flows into Hannington Reservoir.

Anglian Water identified that some of the water towers' roof drainage pipework needed rerouting to reduce risk of untreated water entering potable water tanks in the event of drainage pipe leaks. Principal Contractor Stonbury appointed Inertia Consulting Ltd to carry out the required survey, investigation, options study and detailed design of the new pipework route.

The project involved a full structural survey and investigation to assess the condition of the structure and ascertain an appropriate route for the new pipework which would not weaken the structures. To prepare the design we undertook strength testing, cover and dimensional surveys, and a full conditional survey. The non-destructive testing methods used included concrete coring for strength testing purposes and a full hammer visual survey of the tank structure.

During the works, our engineers used their expertise and experience in confined space working and rescue to ensure team members' safety and comply with HSE requirements.

The Project Team

- Client-Anglian Water PLC
- Designer & Investigation Specialists-Inertia Consulting Ltd
- Principal Contractor-Stonbury

The Outcome

The project was completed successfully. Residents in the Corby area can continue to enjoy a supply of safe drinking water from the towers for years to come. Our structural investigations also reassured our client that the water towers were in a good state of repair.

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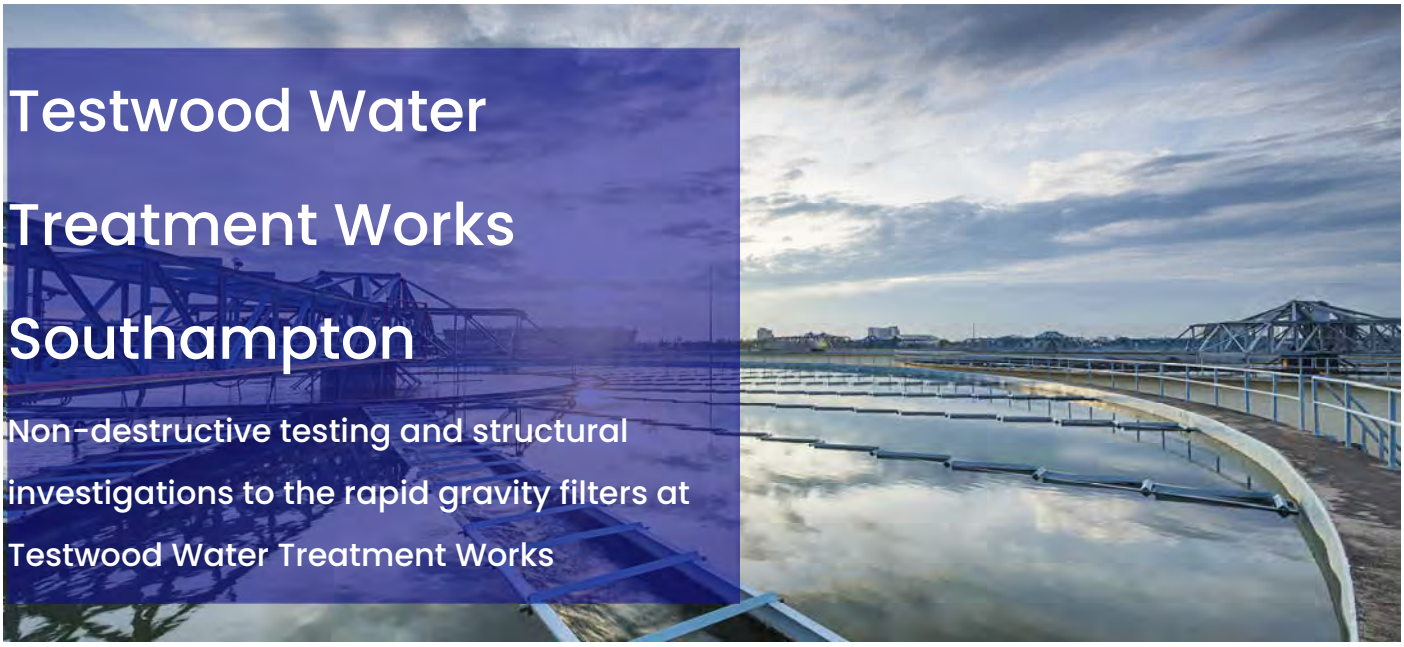

Testwood Water Treatment Works Southampton

Non-destructive testing and structural investigations to the rapid gravity filters at Testwood Water Treatment Works

The Challenge

Owned by Southern Water, Testwood Water Treatment Works is the largest in Hampshire. The Works draw 136 million litres of water a day from the River Test which are treated before supplying residents in Totton, Waterside, Southampton and the Isle of Wight. Testwood also supplies the Esso oil refinery at Fawley.

Southern Water identified that repairs needed to be made to Testwood's rapid gravity filters to make sure they could maintain the safety and quality of the water supply. These works were part of a wider project to reduce contamination risks, which should be completed in 2025.

Inertia Consulting Ltd were appointed to carry out a series of non-destructive tests and investigations to provide the data needed for the Contractor, Stonbury, to design a repair scheme for the rapid gravity filters and associated facilities.

The works spanned the full suite of non-destructive testing methods to the filters themselves and the structural elements within the filter building. This included a full hammer visual survey. Our engineers then produced a detailed report including drawings that indicated the precise location and nature of the required repairs.

Our inspection and testing works required confined space and difficult access working to access the filters and surrounding structures. The project therefore required comprehensive risk assessments for each stage of the works. The works were planned to ensure minimum disruption to the water supply to homes and businesses.

The Outcome

The project was completed successfully, helping to ensure that residents supplied by the Testwood Water Treatment Works can continue to enjoy a supply of safe, uncontaminated drinking water for years to come.

The Project Team

- Client-Southern Water PLC
- Survey & Inspection Consultant-Inertia Consulting Ltd
- Contractor-Stonbury

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Like to find out more about what we do or to discuss a project? Contact the Inertia Consulting team today. We'll always be happy to provide you with further details of projects we've worked on, as well as testimonials or references from current or previous clients.

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