Panel for Historical Engineering Works

Newsletter

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Contents:

Chair's column

By Gordon Masterton

ASCE Convention, Seattle

I was honoured to attend the ASCE Convention and AGM in Seattle (8-11 October 2025) representing the ICE President, Jim Hall. I gave presentations in two sessions of the Convention which formed part of the ASCE/CSCE/ICE Triennial Conference embedded within the larger convention. The format had plenary sessions interspersed with Parallel sessions giving delegates nine options to attend. One has to admire the logistics of preparing speakers and facilities to accommodate such a demanding schedule.

Each session had contributions from participants from beyond the UK, US and Canada, appropriately for these global organisations, all playing leading roles in resilience and sustainability programmes worldwide.

The Convention also had a number of History and Heritage presentations, a few of which I was able to attend (but missed three because I was speaking in a parallel session!). But many of the talks had already been on topics broadcast on the New TransAtlantic Cable series of online talks, preserved on YouTube - a good demonstration of the added value of that initiative. One new presentation that clashed with my schedule was Paul Giroux's talk on the Building of the Forth Bridge, but he gave me a special preview.

Gordon Masterton with Paul Giroux sporting similar ties

Paul includes animated sections within his Powerpoint slides and speaks with a construction engineer's insight into the challenges of tackling major projects which really brings the period and conditions alive. He plans to bring a large party of Engineering History and Heritage enthusiasts to Scotland in August 2026, and we have arranged to host an open event in South Queensferry at the Forth Bridges Education Centre overlooking all three bridges crossing the Forth estuary. What better venue to feature Paul's Forth Bridge presentation?

At the AGM of the ASCE, a charter on sustainability was formally signed by the three Presidents at which I also stood in for Jim Hall.

Signing the ASCE/CSCE/ICE Triennial Charter - Courtesy Jason Dixson photography

This was followed by the Awards presentations, and I was delighted to accept the ASCE Civil Engineering History and Heritage Award for 2025 from outgoing ASCE President Feniosky Peña-Mora and retiring CEO Tom Smith - a fine plaque with a very nice citation.

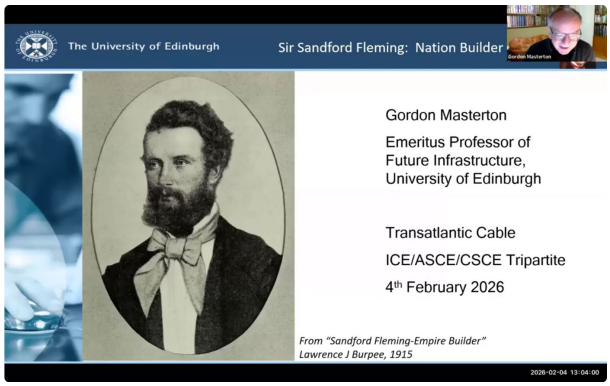
Gordon Masterton receiving the ASCE Civil Engineering History & Heritage Award: Courtesy Jason Dixson photography

I am indebted to friends and colleagues in the ASCE History and Heritage Committee for supporting the nomination put together by Howard Thomas. Previous winners include David McCullough, Henry Petroski, Samuel C Florman, and our own Roland Paxton, Mike Chrimes and Ron Cox. I was delighted to meet incoming ASCE President Marsha Anderson Bomar

ASCE President Marsha Anderson Bomar with Gordon Masterton

The History and Heritage community were well represented in Seattle, and we gathered for a group dinner with David Gilbert, Mike Bartlett, Larry Magura, Jonathan Upchurch, Reuben Hull, Jim Talian and Paul Giroux.

New TransAtlantic Cable – Sir Sandford Fleming



On 4th February, I gave a talk on Sir Sandford Fleming for the series of Tri-partite ASCE/CSCE/ICE online talks. Fleming was recently inducted into the Scottish Engineering Hall of Fame and it would be hard to find a more influential engineer working in the British Empire

in the second half of the 19th Century. Born in Kirkcaldy, Fife, he emigrated to Canada at the age of 18 and became a critical enabler of the nation emerging from the provincial governments. He had multiple credentials for eminence in many fields. As a railway engineer, he was responsible for Canada's Inter-Colonial Railway from Quebec to Halifax, and then as the first Chief Engineer of the Canadian Pacific Railway.

As a scientist, he was responsible for devising the system of world time zones that introduced a universal standard time, to the great benefit of the railway passengers and others. As an enthusiast for knowledge-sharing and the value of institutions, he founded the Canadian Institute (now the Royal Canadian Institute for Science) and as an enthusiast for the British Empire, he campaigned actively and succeeded in his goal for a trans-Pacific telegraph cable from Canada to New Zealand and Australia.

As an educationalist, he served as Principal of Queen's College (later Queen's University, Kingston.

The talk was recorded and can be viewed on YouTube.

This Newsletter

You will next read about the excellent commemorative seminar for the 120th anniversary of the Talla Water scheme, enhancing Edinburgh's water supply. It was hosted by Scottish Water and organised by David Rankine, a member of our Scottish PHEW group of enthusiasts.

In my closing words of thanks I said that we tend to think of water supply as an entitlement, even a human right. But what the speakers had revealed was the hard-worked and hard-earned privilege of having clean water to drink. Affordability meant that the largest and wealthiest cities were the first to respond to the need. Enlightened town councils saw this as a virtuous cycle. Cleaner water in abundance kept workers and families healthy, added to the economic productivity of the towns, which attracted more industry, which enriched the town.

But the complex system feeding economic prosperity needed the water to flow. Water was the transformational lifeblood for fast growing towns and cities. Without it, general health would have declined, and the concept of the city as a place to live and work may even have failed. London came perilously close to failing in the 1850s.

Once one town provided water and sanitation for all, others had to follow. It was a public health, social and economic imperative, driven by civic pride and peer pressure. Now, to most people, we just take it for granted. "The stories of the heroic efforts of engineers and labourers who made cities healthy, often with risk to their own lives, deserve to be more visible, and PHEW Scotland has done that rather well today".

And with articles on the recent replacement of the M6 Clifton Bridge on Britain's first motorway, George Overton's contribution to canal engineering being celebrated, the excellent Scottish PHEW tour of Glasgow and the West of Scotland, reviews of the latest books on engineering history, and the snapshots of engineering heritage artefacts in the news, this Newsletter also does rather well in raising the visibility of the importance of understanding our engineering past..

The Talla Water Scheme at 120 Years

By Mitchell Stevenson & David J. Rankin

Photo of the Intake Tower at the Talla Reservoir. Credit: David Rankin

The Talla Water Scheme was the Edinburgh & District Water Trustees (E&DWT) grand solution to water shortages that plagued Scotland's capital in the latter

part of the 19th Century. Edinburgh struggled with erratic supplies and outbreaks of waterborne diseases due to its exponential growth causing an unprecedented demand for water. The delivery of The Scheme marked a turning point, ensuring a reliable source of fresh water for generations, and the fundamental success of the City.

Comparisons between England and Scotland showed that Scottish cities used more water per capita, even when measured against the major manufacturing cities of northern England. Edinburgh was no different in this regard, with its consumption occasionally exceeding 40 gallons (151 litres) per head a day.

This is partly attributed to the vastly different character of the housing, with "Dunediners" enjoying plumbed baths, water closets, hot water & sanitary appliances, as early as the latter part of the 19th Century. What was commonplace in Edinburgh in 1880, would be considered as luxury to the majority within the British Isles at this time. The scheme's significance lies not only in its scale, but in the ingenuity behind its construction.

Work began on the railway on the 28th September 1895, and it was 10 long years to the day until the completion of the scheme (28th September 1905) whereupon the first waters were sent to the City. The final cost of the scheme was £1.96m, approximately £208.6m today (Dec 2025). The designers for the scheme were J. & A. Leslie & Reid of Edinburgh, and the contractors responsible for the delivery of principal parts of the scheme were, James Young & Son, and John Best, both of Edinburgh, and Robert McAlpine & Sons of Glasgow.

The 4 principal parts of the scheme are as follows:

1. 8.5 miles of standard gauge railway, from Broughton in the Scottish borders, up to the foothills of the River Tweed, near the village of Tweedsmuir;

2. The reservoir and dam, 1050ft (320m) long and standing 80ft (24.3m) above the valley floor, impounding 2.8 billion gallons (12.7 billion litres) of water;

3. The aqueduct, traversing 35miles of countryside into Edinburgh, to the reservoir of Glencorse (originally designed by Telford), and water treatment works at Fairmilehead & Alwickhill;

4. The Victoria Lodge, a grand keepers' house, which had accommodation for 3 permanent "sluice-keepers" plus meeting space, a grand dining hall for the trustees.

The scheme was delivered in its totality by over 50 separate contracts and multiple smaller contractors. These covered all aspects of the construction and enabling works, road diversions, fencing, keepers' house, valves, inlet tower, bridges etc. Of note were the contributions of Messrs. Glenfield & Kennedy, of Kilmarnock who were responsible for the provision for all the valve works on the scheme but also contract 36A, which was for the provision and erecting of the of the upstand intake pipe at the outer and inner towers plus the innovative hydraulic valves.

Image 2. Construction at the Talla Dam site, circa 1904. The Victoria Lodge and the embankment are prominent features high in the background. In the foreground we have the temporary village that was constructed for the 300 men that were employed at the height of the construction.

Credit: This image is taken from a series of postcards that featured local landmarks.

The dam is of a Peninne style featuring a puddle clay core and cut-off trench. Over 100,000 tonnes of Clay was imported to the site by rail from the South Lanarkshire town of Carluke. Historically, Carluke was known for its brick & tile works with six shown on the first edition of the OS map of 1859. The Carluke clay was deemed far superior to deposits in the nearby village of

Broughton. The reservoir works made up £251,000 of the overall cost of the project.

Image 3. Construction at the Talla Dam site, circa 1900. The photo shows the method for cutting the layers of clay in the puddle trench. A skip lowered from "The Blondin" (a cableway) can be seen in the background. The Clay was placed in layers; the compaction of the clay (known as puddling) was completed by hand.

Credit: This image is taken from the 1905 visitor Guidebook.

The 35 miles aqueduct was built on an average gradient of 1/4000, consisting of 9 miles of tunnels, and 12 miles of built aqueduct in cut and cover, the remaining being cast-iron piped syphons. Altogether 21 tunnels were needed for the aqueduct driving through hard & soft rock, clays and running sand. The diameter of the aqueduct was oversized for the initial required flows, such that it could accommodate a possible future flow of up to 7.6 million Gallons Per Day (35MLD), which it did in later years.

Here lies the ingenuity in the Talla Watter Scheme, it was planned as early as the inception of the project to draw water from multiple catchments in the surrounding area. The designers knew that the City would continue to grow and that one day the demand would surpass the volume of rain collected within the Talla catchment. It was therefore planned to tap the rivers in the adjacent valleys of Menzion and Fruid. This work didn't commence up until 1948 when drought and growth started placing unprecedented demand on the Talla. The waters of the Menzion and Fruid were impounded by two smaller dams and diverted into the Talla Reservoir via a 6.2 x 5.6ft (1.9 x 1.7m) "D" shaped tunnel, 1.4miles (2.3km) in length. This was completed in 1952, the designers responsible for the works was George Baxter and the contractor Messrs W. & J.R. Watson Ltd. of Edinburgh.

The impoundment on Fruid was increased in 1968, by the construction of a 1968ft (600m) long and 60ft (18.3m) tall Earth Embankment Dam, with a reinforced concrete core and cut off, impounding a further 2.5 billion gallons (11.2 billion litres), almost doubling the total storage. The dam was designed by Robert H. Cuthbertson & Associates, of Edinburgh, and the contractors were Messrs. Thysson Ltd, of Llanelly, Messrs. F.J.C. Lillcy Ltd, of Glasgow, and Messrs. J. Miller & Partners Ltd, of Edinburgh. The impoundment and supporting works were completed at a cost of £1.4 million (£21.6 million Dec 2025).

To celebrate the 120th anniversary of the scheme in 2025, Scottish Water's Fairmile head office hosted a remarkable event to commemorate a structure that has been pivotal in shaping Edinburgh's water supply, with collaboration from the Panel for Historic Engineering Works (PHEW). The celebration brought together over 40 attendees, including members of the Institution of Civil Engineers (ICE), colleagues from across Scottish Water Engineering and Reservoir Teams, representatives from Glenfield Invicta, DWQR, Scottish Government and many others who share a passion for our civil engineering heritage.

The event, which was sponsored by Glenfield Invicta, formally Glenfield & Kennedy, and was delivered in a series of speeches, by subject area experts.

Greg Morris (Business Development Manager for Dams, Reservoirs and Hydro, Glenfield Invicta), explained how the valves and infrastructure have been integral to Talla's operation and shared Glenfield's historic contributions as well as their continued commitment in refurbishing and restoring these vital elements, reinforcing the collaborative spirit that has sustained this scheme for over a century.

Stephen Horne, Civil Engineer/Team Leader Scottish Water (Retired), delivered an insightful and comprehensive historical overview of Edinburgh's Historic water supply, covering nearly 350 years in a mere 40 minutes.

Dougie Scott, Principal Reservoir Engineer Scottish Water, and Panel appointed Supervising Engineer, meticulously explored the scheme's evolution and engineering milestones in detail, also reflecting on Scottish Waters and his own custodianship, supervision, and a steadfast commitment to safety.

Gordon Masterton, Chair of PHEW, closed the event with a poignant speech highlighting the value of water infrastructure, honouring those who built it, and stressing the need to preserve and learn from our engineering heritage.

This event was planned by two of the Scottish Branch Volunteers and Scottish Water employees, David J. Rankin (Snr. Civil Engineer, Technical Support & Assurance (TSA)), and Mitchell Stevenson (Grd. Civil Engineer, Reservoir Safety Team), who put in a monumental effort to ensure the Talla Scheme received the celebration it truly merited. They were supported by other PHEW Scotland Volunteers, Stephen Cardwell (Grd. Civil Engineer, TSA), and Greta Harris (Specalist Grd.).

The room showcased historic photos, drawings, and artefacts from the original construction. A standout feature was the Transit Instrument used to set out the aqueduct, kindly loaned by the ICE Museum Team at Heriot-Watt University, thanks to John Andrew and David McGuigan for supporting the event.

A special thanks is also due to the Workplace Southeast Team at Scottish Water, especially Iain More, for setting up the room and guiding our volunteers.

One of the Displays of the historic artifacts that were gather for the event, in the foreground is the brass Transit Instrument that was used to set out the Aqueduct.

Credit: Harriet Watson, Glenfield Invicta.

Thanks to the Team at Biggar & Upper Clydesdale Museum for their support, use of the reading rooms, and access to the archive. Finally, thanks to Cheryl & Matthew Toomey, who's book, In The Press, The Story of the Talla Water Scheme, was pivotal jumping off point in reaching the history of the construction.

Clifton Bridge M6 Replacement

by Ian Anderson

In preparation for the Preston Bypass M6 motorway, British Railways organised the construction of three railway bridges, all prestressed concrete, including Clifton Bridge, plus one further north-south-west of Penrith station and another over the A66. Each was built alongside the railway and moved into position before the motorway/road was built.

Spanning the M6 motorway at 45 degrees Clifton Bridge comprises three spans of post-tensioned concrete box girder circa 100+190+100ft spans, circa 290ft overall. It was constructed in a field alongside the West Coast Mainline. Over the weekend of 29-30 April 1967, the railway embankment was removed and the 2500 ton bridge was slid 59ft into place using four diesel winches on stainless steel tracks. The construction of the Penrith Bypass M6 could then commence.

With spalled concrete, exposed reinforcement, widespread cracking and corroded bearings, discovered during an inspection in June 2022, the bridge had been reduced to single track running with speed restrictions, and it was decided to replace it. Skanska were awarded a £43m scheme to design, build and install a new 130m three span weathering steel girder bridge. The scheme is part of Skanska's five year North West and Central Framework for Network Rail (April 2024-March 2029).

In January 2025 an area on the west side of the M6 and south of the west abutment of the existing bridge was chosen as a site compound to construct the new three-span weathering steel bridge, complete with its own slip lane off the M6. Lane closures of the M6 between junctions 39 (Shap) and 40 (Penrith) and a 40mph speed limit were brought in on both carriageways to carry out work on both abutments and piers in preparation for the new bridge.

In August 2025 five steel sections totalling 3000 tonnes arrived from Glasgow to construct the new bridge in its compound, to be followed by transverse precast concrete deck sections afterwards. Over the weekend of Friday 2nd to Monday 5 January 2026, the motorway was completely shut with traffic diverted elsewhere in order to demolish the existing bridge. This was carried out by laying protective mats over the existing M6 carriageway and placing hydraulic jacks on top of shipping containers placed under each span as temporary supports to carry the bridge weight after the tendons had been de-tensioned. The bridge was then demolished and the concrete crushed ready for removal offsite using about 12 hydraulic excavators as breakers/crushers.

Over the following weekend Friday 9th to Monday 12th January the new 4200 tonne bridge was transported by four Mammoet self-propelled modular transporters from its compound into place on the strengthened columns and abutments successfully. Following the installation of new track, restoration of overhead power lines and reconnection of signalling, the West Coast Mainline was reopened on 15 January 2026.

Aerial of the new bridge in final position with four SPMTs underneath. Credit: Skanska

The 250th anniversary of George Overton

By Stephen K Jones

THE 250TH ANNIVERSARY OF GEORGE OVERTON

On the 8th December 2025 ICE Wales Cymru and the Canal & Railway Trust unveiled an information plaque to George Overton (1775-1827) and his works on the canal towpath opposite Overton's Wharf at Talybont on Usk. It marked the culmination of a year-long celebration beginning with a celebration of his birthday at nearby Llandetty Church on the 250th anniversary of his birth, 16th January 2025. 2025 is a year which was being celebrated as the year of the railway – RAILWAY 200, a nationwide celebration marking 200 years of the modern railway, from the Stockton & Darlington Railway (S&DR) of 1825 to 2025, and hopefully inspiring a new generation of young pioneering talent to choose a career in rail.

Working with the Canal and River Trust we unveiled an information panel with content written and images supplied (except the main illustration by Michael Blackmore) by myself and financially supported by ICE Wales Cymru. This was temporarily placed on the canal towpath near the wharf associated with the Brinore tramroad at Talybont signposting Llandetty Hall and the churchyard where he is buried. Five George Overton

talks were given this year which also included a presentation in Darlington for Railway 200.

South Wales figures strongly in this journey starting with Richard Trevithick's famous run of 1804, the world's first working steam locomotive running on the Merthyr Tramroad, a line engineered by George Overton. Then there was the first fare-paying passengers carried by a railway with the Swansea and Mumbles Railway in 1807, George Overton carrying out surveys between Stockton and Darlington, his 1821 survey enabling the Stockton & Darlington Railway to obtain its first Act of Parliament. It was however, the first part of a journey that George Stephenson and others would take forward and result in the birth of the modern railway 21 years later with the utilization of steam power.

Who was George Overton? well he was one of Wales' most important early civil engineers, who for the latter part of his life, lived in the village of Llandetty near Talybont-on-Usk. Overton's early work focused on the development of tramroads and infrastructure for horse-drawn trams, of which he engineered many such early railways in south Wales. The Llwydcoed Tramroad in 1802 on which the tram bridge at Robertstown near Aberdare is the second oldest surviving iron railway bridge in the world. In 1803, Overton was a partner in the Hirwaun Ironworks and built the Hirwaun to Abernant tramroad between 1806 and 1808.

Nearer to what would become his home was the Brinore Tramroad, which linked the Brecon and Monmouthshire Canal at Talybont-on-Usk with the Tredegar iron works and Trefil limestone quarries. Around 1815 he bought Llandetty Hall which is right behind the canal, fitting in with the work he was doing on the Brinore at the time. Today, the wharf associated with the tramroad at Talybont is still known as 'Overton's Wharf' and walkers can follow the route of the Brinore Tramroad along a right-of-way for 8 miles to Trefil.

Despite spending much time on the Stockton and Darlington work from 1818. His second survey was used by the S&DR to submit a Bill that received its Royal Assent on 19 April 1821, its first Act of Parliament. It was also on that date that George Stephenson met with Edward Pease at his home in Darlington. Despite personal connections, he found he did not have the full support of Pease and the rest is history.

His final project was Rumney Railway, a plateway from the Rhymney Ironworks to the Monmouthshire Canal tram road, on this was the Bassaleg masonry viaduct, built over the Ebbw River in 1826. It remains the oldest operational railway viaduct in the world.

VIEWS (visiting Interesting Engineering Works in Scotland) : Glasgow

By Sandra Purves

For many years the PHEW Scottish Group organised a weekend visit to look at HEWs in different parts of Scotland but the pandemic put a stop to these visits. In 2025 as part of Glasgow 850, the celebration of Glasgow's 850th birthday, two of the regular participants of the visits, Robin Sutherland and Jenny Bruce, decided to organise a VIEWS trip on 26th September by coach along the river Clyde starting in Glasgow. Robin gave a comprehensive commentary on the sites as we passed them in the coach.

Starting from Hanover Street outside Queen Street Railway Station the party travelled down to the River Clyde passing Albert Bridge, City Union Bridge, Victoria Bridge, South Portland Street Suspension Bridge, Glasgow Bridge, Central Station Bridges, George V

bridge, Tradeston Bridge, Kingston Bridge, the Finnieston Crane, Bell's Bridge, Princes Dock, the south Rotunda, Govan graving docks and Govan Subway Station on the way to our first stop at Govan. All these structures except Tradeston bridge are HEWs.

For many years there was a ferry at Govan to allow people and vehicles to cross the river between Govan and Partick. It ceased to operate in1965 leaving the Subway between Govan and Partick being the only method of crossing the Clyde at this point. In 2011 the Riverside Museum (Glasgow's Transport Museum) which was built on the site of Pointhouse quay on the north bank was opened. The stop at Govan was to look at the new Partick- Govan foot bridge which was opened in September 2024. It is a swing bridge and the main swing span rotates to align with the south (Govan) shore and spans between Water Row Govan and Pointhouse Quay.

Back on the bus the party continued via the Clyde Tunnel to view another new bridge over the river Clyde at Renfrew. This road bridge opened on 9th May 2025 and superseded the Renfrew vehicle Ferry which operated from Renfrew to Yoker. This is the first road bridge over the Clyde that opens and is 184 metres long. It has a twin-leaf design, with each leaf opening and closing horizontally and uses a cable stay system similar to the Queensferry Crossing. In recent years the ferry had become a passenger ferry which ceased operation not long after the opening of the bridge.

Our journey continued passing the Titan crane at Clydebank which was designed and built by engineer Adam Hunter and Clydebank Townhall architect James Miller who was also the architect for Wemyss Bay Station and One Great George Street ICE's headquarters in London among many other structures. We stopped at Bowling basin the western end of the Forth & Clyde Canal to have a look around. The basin was opened in 1790 but has been altered over the years due to the building of the railways at Bowling. One of them the Lanarkshire and Dumbartonshire railway was responsible for the building of the swing bridge which crosses the canal between the upper and lower canal basins. This railway is now disused but has been converted to a cycle and walkway.

It was then onwards over the Erskine Bridge to Greenock for a stop at the Wyllieum which is an art gallery and community space celebrating Scottish artist George Wyllie. He created in a straw locomotive in 1987 which hung from the Finnieston crane for several months. Many of the group also visited Scott's restaurant which sits above the Wyllieum for refreshments.

Back on the road we travelled through Gourock past the Cloch Lighthouse to Wemyss Bay Station and ferry terminal. In 1903 engineer Donald Matheson, engineer for the Caledonian Railway, and James Miller were responsible for rebuilding the station to cope with an increasing number of holidaymakers making for Rothesay and Bute. The design included a covered way to the steamer berths. The party then made their way back to Glasgow finishing point for the visit.

As part of Glasgow 850 four members of the PHEW Scottish Group, David Rankin, Mitchell Stevenson, Stephen Carwell and myself were involved in leading a walk along the river between the Millennium Bridge beside the Science centre upstream to South Portland Street Suspension Bridge. The walk highlighted the bridges and other Engineering structures on the route including the Finneiston crane, the Rotundas which housed the lifts to the Glasgow Harbour tunnel crossing which consisted of three tunnels, two built for horse drawn vehicles and the middle one for pedestrians, which are now no longer in use and the part of Princes Dock which hasn't been filled in. The section which was filled in became the site of the Glasgow Garden Festival in 1988.

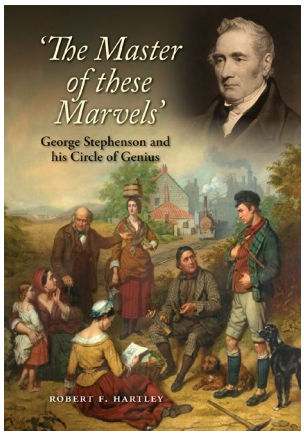
Many thanks to Robin & Jenny for putting together the excellent Views visit and to David, Mitchell & Stephen for their help on the Glasgow 850 walk.

This year we are planning a day's visit to Laigh Milton Viaduct on the Kilmarnock to Troon railway and other structures in the area. The viaduct is the world's oldest surviving railway viaduct and was restored in 1995-6 by the Laigh Milton Viaduct Conservation Project led by Roland Paxton.

Book reviews

'The Master of These Marvels': George Stephenson and his Circle of Genius. Robert F. Hartley. (2024).

Review by Professor Gordon Masterton, Emeritus Professor of Future Infrastructure, University of Edinburgh, Chair, ICE Panel for Historical Engineering Works



Robert Hartley tackles the life and times of George Stephenson in time for the nationwide Railway 200 celebrations, although Hartley's research prompts genuine questions on why the Stockton and Darlington railway has been singled out as the birth of modern railways. Stephenson would have been surprised at our retrospective adoption of that route as the iconic game-changer that it is portrayed to be. However, had he been alive today, one suspects he'd have been happy to eschew the robustness of the justification to celebrate one of his minor projects – especially if that gave him the opportunity to showcase railways and the contributions of the Stephenson family, not necessarily in that order.

Biographers of great engineers must decide whether to extract the stories of their projects, or to follow the day-to-day diary of the engineer. I'm pleased that, even without the benefit of an extant diary, Hartley decided on the latter. It gives us a far better insight into the competing demands on Stephenson's time and his ability (or not) to juggle priorities and manage expectations.

Stephenson can only lay claim to mixed success in client satisfaction, and Hartley's structure reveals the parallel development of multiple projects and the quirks of the personalities involved. His reconstruction of Stephenson's life draws meticulously from published sources, fully annotated, a refreshing improvement on Smiles' and Rolt's more journalistic approach. It requires concentration from the reader to recall the state of play of multiple schemes as they wax and wane through their phases. But this helps us empathise with just how challenging it was for Stephenson and his circle.

Hartley's research is deep with sources thoroughly annotated, yet he maintains the narrative flow and character insights that allow us to form our view of Stephenson the man. His family, friends and associates (the 'Circle of Genius') are portrayed in sufficient detail to flesh out Stephenson's influences and conflicts. The author clearly has an affection for his subject but deals openly with the less appealing aspects of Stephenson's character, not least his tendency to bear grudges against those unlucky enough not to find their way into the 'circle'. His treatment of Charles Vignoles is a case in point. Vignoles, later to be President of the ICE, left behind some barbs of his own about Stephenson's style, his dislike of London-based competitors and his tendency to build his delivery teams from northern grit in preference to southern sophistication.

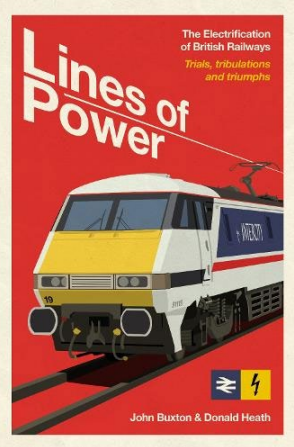
Through the lens of today's standards of governance and transparency, it would be difficult to reconcile the clear conflict of interest with Robert Stephenson & Co as suppliers of rolling stock for the projects managed by George. But the past is a foreign country that shouldn't be judged by today's standards. The Stephensons benefitted from their close association with George Hudson, the Railway King, later ignominiously deposed, and Hartley recognises how close they came to reputational damage, fortuitously avoided.

Hartley deals with his subject as a good biographer should, and these personal and corporate conflicts add tantalising spice and zest to this new and definitive account.

'The Master of These Marvels': George Stephenson and his Circle of Genius. Robert F. Hartley. Railway & Canal Historical Society, 2024. Hardback ISBN 9781068687402 RRP £30

Lines of Power: The Electrification of British Railways by John Buxton and Donald Heath (2025)

Review by Stephen K. Jones



Written by John Buxton and Don Heath, two experienced rail professionals, with over a century of railway industry experience, gained through an involvement with major national electrification and high-speed projects, heritage railways and international metro systems. Lines of Power delivers a comprehensive timeline of the stuttering progress of electrification and modernisation of Britain's railway network, revealing the manoeuvring by competing factions within the railway industry during the 1950s. As such it is a comprehensive account of Britain's railway electrification history, which surprisingly no one has done before.

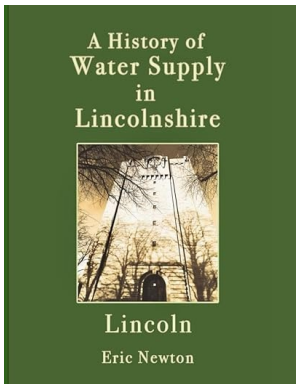
Highly critical of the excessive scepticism of the Department of Transport and its successor departments, the book highlights the frequent interventions made by politicians and other vested interests, which have collectively thwarted progress of a more comprehensive and cost effective 'rolling programme' of electrification. It also makes the case for a long-term rolling programme to deliver future schemes more efficiently and effectively.

Primarily aimed at present-day practitioners, railway management, stakeholders and politicians, it is also of interest to rail enthusiasts, it was interesting to read that R A Riddles, who had come from the L&NWR to become chief mechanical engineer of the Railway Executive, was pushing hard for a comprehensive electrification plan and the eventual phasing out of steam with a rolling programme in the early 1950s. He believed that the introduction of diesel traction, even as an intermediate step, would defer if not kill outright, the approach he supported. Anyone seeking information and technical explanations of civil engineering projects such as the electrification of the Severn Tunnel, Crossrail and the current South Wales Metro.

Lines of Power: The Electrification of British Railways. Trials, Tribulations and Triumphs, John Buxton and Donald Heath, Unicorn, Lewes, (2025) ISBN: 9781917458108 RRP £30.00

"A History of Water Supply in Lincolnshire : Lincoln" by Eric Newton (2025)

Review by Barry Barton



The second volume (Lincoln) of Eric Newton's series of "A History of Water Supply in Lincolnshire" books was published at the end of last year (paperback, 131 pages). The first volume in the series (Grantham) was published in 2024.

This detailed historical account begins with the Roman's piped supply to their Lindum Colonia and continues through the medieval period with the municipalisation of the city's monastic supply system, diverted to public conduit houses, and then to the city's heroic response to the disastrous typhoid outbreak of 1904/5 (131 deaths) - piping water in bulk to Lincoln from a Nottinghamshire aquifer on the far side of the River Trent in a fully comprehensive scheme. Construction began in 1908 and was completed in 1911, within the

set budget. The scheme even had its own primitive telemetry scheme. Much of the original Edwardian infrastructure is still in use today.

The book's author, Eric Newton, CEng, MICE, who died in 2013, was a senior engineer and manager with the Lincoln Water Division (later part of the multifunctional Lincoln Division) of Anglian Water and had an extensive knowledge of Lincolnshire's water supply, treatment and distribution systems throughout the county.

Copies of the book (ISBN 978 0 903582 71 1) published by the Society for Lincolnshire History and Archaeology, of which Eric was a member of the Industrial Archaeology committee, are available from the SLHA Bookshop at Jews' Court, 2/3 Steep Hill, Lincoln, LN2 1LS

tel. 01522 521337 or 01522 532280

e-mail info@slha.org.uk

Talks

North East panel member Niall McKay gave a presentation on the Tees Transporter Bridge to the Cleveland Institution of Engineers (CIE) on Tuesday 2nd December. Niall provided some interesting insight into the design and construction of the Tees Transporter Bridge. Designed by Cleveland Bridge and Engineering Co with notable input from renowned French Engineer, Georges Camille Imbault, the bridge was constructed by William Arroll and Co and opened to traffic in 1911. Historic England have marked the Grade 2* listed bridge as a “Heritage at Risk” Structure and works are underway on the design of a full refurbishment and restoration project. See HEWs in the News for more.

Hews in the News

Titan Crane (HEW)

The Titan crane was restored and opened as a visitor attraction in 2007. However, the need for repairs forced it to close in 2018 and it has not reopened.

Quotes for repairs and repainting in 2024 ranged from £1.1 million - £7.4 million.

Clydebank and Milngavie MSP Marie McNair is calling for the council to commit to investing in the Titan Crane’s reopening.

STV News 11 February 2026

Clydebank Post 13 February 2026

Spey Bridge, Garmouth (HEW 2524)

In an update to our news in December, the Scottish Government has announced £113,000 in funding for engineering assessments, planning and the putting an alternative route in place. Further funding will be required for repairs or a replacement bridge.

Evening Standard January 2026

Press & Journal 21 January 2026

Forgotten Relics Facebook page

Corrieshalloch bridge (HEW 1556/02)

The bridge across Corrieshalloch gorge closed late last year after an essential part broke. It was expected to be closed for 6 weeks whilst a replacement part was obtained.

The National 11 December 2025

Middlesbrough Transporter Bridge

The Middlesbrough transporter bridge closed in the summer of 2019 and hasn’t reopened. However, work is being carried out behind the scenes, assessing and monitoring the bridge.

The Northern Echo 29 November 2025

Haweswater Aqueduct (HEW 2045)

The Haweswater Aqueduct Resilience Programme (HARP) is a £3 billion project by United Utilities to replace six critical, ageing tunnel sections linked by siphons, of the 68 mile (110km) aqueduct, which transports drinking water for 2.5 million people from the Haweswater Reservoir in the Lake District to Cumbria, Lancashire, and Greater Manchester. Constructed between 1933 and 1955, with construction interrupted by WW2, the original 68-mile (110km) pipeline was a major feat of engineering when it was originally built and uses gravity to carry 125m gallons (570m litres) of water every day.

The programme, set to begin construction in 2026, will utilize advanced tunnelling machines to replace the hand-dug, single-point-of-failure tunnels. The project is pioneering a Direct Procurement for Customers (DPC) model, where a private consortium, Cascade Infrastructure, comprising Austrian-led STRABAG, Equitix, and GLIL Infrastructure, will design, build, finance, and maintain the new sections, with work planned to start in 2026. The existing tunnels are difficult to inspect and maintain without shutting down the entire system. The construction contract has been awarded to a consortium. Turner & Townsend have been appointed as the Independent Technical Adviser to provide assurance and certification for the project. The National Wealth Fund are providing a £300 million credit enhancement guarantee to support the programme.

United Utilities HARP

Oulton Broad Swing Bridge (HEW0744)

Major works to replace the Slew Motor began in February on Oulton Broad Swing Bridge. The bridge carries the East Suffolk Line over Lake Lothing (sea water) near Lowestoft. While this work is going on the bridge will not be able to open to allow vessels over 4,57m/15ft height to pass. The bridge dates back to 1907 and is similar to two other bridges in the region at Reedham and Somerleyton, which have undergone similar works to replace ageing components from 2022.

Scarborough Station Roof (HEW0454)

Network Rail is carrying out a £14m upgrade of Scarborough Station seaside terminus, beginning in 2021 and involving a 'new roof' and drainage, repairing stonework and a refurbished waiting room and ticket office. The original roof comprises glass and timber on lightweight wrought iron trusses supported by intermediate cast iron columns and stone wall perimeters. The clock tower is also being conserved with the Railway Heritage Trust contributing £203,000 for these works to repair the clock face, restore the mechanism and regild the clock hands.

https://www.newcivilengineer.com/latest/14m-scarborough-station-upgrade-sees-clocktower-restoration-23-02-2026/

Whorlton Suspension Bridge (HEW0356)

Work to reconstruct the Whorlton Suspension Bridge in County Durham has moved into the re-erection phase after an extensive design review found many components were no longer structurally sound. Opened in 1831 Whorlton Bridge over the River Tees is said to be the oldest suspension road bridge using its original iron chains. Contractor VolkerLaser dismantled the bridge in 2024, removing 1800 components to catalogue and store on site with the intention to reuse as many as possible. Some were beyond reuse so will be replicated, while allowing the historic wrought iron chain arms to be retained as

non-loadbearing. Work will soon begin to re-erect the bridge on site.

https://www.newcivilengineer.com/latest/work-to-rebuild-uks-oldest-road-suspension-bridge-moves-into-re%e2%80%91erection-phase-after-redesign-20-02-2026/

Albert Bridge, London (HEW0205)

The Albert Bridge across the River Thames in London was closed to motor traffic on 9 February after a routine inspection revealed a cracked cast iron component at one of the abutments. Pedestrians and cyclists are still able to cross and sensors have been installed to monitor the cracks while engineers from the Council assisted by bridge specialists FM Conway and Arcadis assess the structure, including checks on all similar components. The bridge is expected to reopen after repairs within a year.

https://www.newcivilengineer.com/latest/albert-bridge-should-be-fixed-within-a-year-as-early-inspection-reveals-no-further-visible-damage-19-02-2026/

Sizewell C rail branch upgrade

The first engineering train for the Sizewell C power station project arrived at the site on Monday 23 February with a delivery of aggregates, reaching the new ancillary construction area using the Sizewell branch line off the East Suffolk line. The branch line has recently undergone substantial upgrades by Balfour Beatty Rail for the developers including 7km of new continuously welded rail to cut noise, improving level crossings and new signalling. The intention is to take 60% of construction materials off the road network with up to four freight trains a day.

https://www.newcivilengineer.com/latest/first-engineering-train-arrives-at-sizewell-c-via-upgraded-branch-line-25-02-2026/

Portishead Railway

VolkerFitzpatrick are due to start on site to reinstate the Portishead to Bristol railway in April after the line was closed to passengers in 1964. Funded by the Department for Transport, West of England Mayoral Combined Authority and North Somerset Council the overall cost is £152m. Roughly 4.8 km of track between Pill and Portishead will be rebuilt, the section that presently exists for freight to Royal Portbury Docks, as well as two new stations at Portishead and Pill. Services are expected to begin in 2028, running along the Avon Gorge under the Clifton Suspension Bridge to Bristol Temple Meads in 25 minutes.

https://www.newcivilengineer.com/latest/main-construction-on-portishead-line-restoration-to-start-in-april-25-02-2026/

Borders Railway

Plans to investigate the feasibility of extending the Borders Railway from Tweedbank to Carlisle are going ahead after agreement between UK and Scottish Government to allocate £10m in funding. The original 158km Waverley Route between Edinburgh and Carlisle closed in 1969, with the Edinburgh to Tweedbank section reopening in September 2015. Meanwhile, work to electrify part of the Borders railway has now begun with preparatory piling for the mast and cantilevers on two stretches, Newcraighall to Shawfair and Bowshank Tunnel to Tweedbank station.

https://www.newcivilengineer.com/latest/piling-for-electrification-of-borders-railway-to-start-this-week-17-02-2026/

Tilbury 3 Port upgrade

Thurrock Council have approved plans to expand the Port of Tilbury by 143 acres/58ha. The new Tilbury 3 site will be used for container operations, vehicle

storage and warehousing on the north bank of the Thames estuary in Essex. Owner Forth Ports is expected to begin work later in 2026, to become operational on the site of the former Tilbury Power Station by 2030. Included in the plans is a new rail terminal.

https://www.bbc.co.uk/news/articles/czr0pvyr1pno

Tyne Bridge Refurbishment (HEW 0091)

The final £6m needed to complete the restoration of the Tyne Bridge has been confirmed by the government after it was put on hold last year. Funding had been announced by the previous Conservative government but was subsequently placed under review after the 2024 general election. The cash will enable the refurbishment in time for the bridge's centenary in October 2028. The Tyne Bridge, together with the Central Motorway, were part of a bid of £41.4 million that Newcastle City Council submitted to the Department for Transport in 2019 as part of their Major Road Network, confirmed in Summer 2022. The Department for Transport provided the initial £35.3 m towards repair works, with the remaining £6.2m coming from Newcastle and Gateshead Councils to cover upgrading the grade II* listed bridge and the Central Motorway. Contractors are Esh Construction based in County Durham. Maintenance and refurbishment of the bridge includes painting the bridge, which was last done in 2001. The full programme includes steelwork repairs, full repainting, concrete repairs, drainage improvements, stonework and masonry repairs, bridge deck waterproofing, and resurfacing, parapet protection and bridge joint replacement. The work on the towers had to be done outside of the kittiwake breeding season, with nesting provision maintained on the surrounding scaffolding during the works. The initial works began in September 2023 involving the erection of scaffolding below the bridge after the kittiwakes had departed. Renovation work on the main bridge deck began in April 2024. The Central Motorway works are mainly on the elevated viaduct leading to the Tyne Bridge, including waterproofing and joint replacement on the top of the deck and concrete and drainage repairs on the underside and its supports.

Tyne Bridge website

Newcastle-upon-Tyne council website

Birnbeck Pier, Weston Super mare (HEW 0434)

Birnbeck Pier (HEW 0434) is to be refurbished after the National Heritage Lottery Fund provided a crucial £5.5m lifeline in September, which had put the project in jeopardy. Work will repair landside buildings, provision of essential services and infrastructure to the whole site from July 2025 to Spring 2026, with the pier restoration from summer 2025 to summer 2026. Earlier work in late 2024 included stabilising the island's sea wall, stabilisation of the 1888 boat house , clock tower pavilion and landside cliff face, which is complete. North Somerset Council bought Birnbeck Pier and island in July 2023 for £400,000, funded by the RNLI (Royal National Lifeboat Association). The RNLI's ambition was for a lifeboat station to operate again from the island and submitted a planning application, using Studio Four Architects and engineers, for a new lifeboat station in October 2024. They withdrew its £5.5m funding pledge in June 2025 due to concerns about the financial viability of the project, which led to potential cancellation.

Designed by Eugenius Birch, the Grade II* Listed Birnbeck Pier opened in 1867 and is the only pier in the UK to link to an island. In past times it was a popular visitor attraction with steamer ferries. During World War II it was taken over by the Royal Navy as a secret base for weapons testing. Post war it never recovered it popularity and passed through a series of owners. The lack of maintenance caused the pier to be become unsafe and in 1994 I was

closed to the public. The RNLI had operated from a station on the island since the pier opened but were forced to leave in 2014 as the pier was deemed too dangerous. The RNLI is presently operating from a temporary base at Marine Lake. It has been on Historic England's National Heritage at Risk Register since 1998, and North Somerset Council have been working with Historic England since 2003 and RNLI since 2013 to develop a sustainable future for the site. The Council began the Compulsory Purchase Order in 2020, and a public inquiry was due to take place in August 2023 but on 13 July 2023 the owner agreed to sell the pier to the Council.

Before the additional National Lottery Heritage Fund £5.5m, North Somerset Council had previously secured over £20m funding, including £10.2m from the National Lottery Heritage Fund (awarded Oct 2024), £5.4m from the UK Government (previously Levelling Up Fund), £3.55m from the National Heritage Memorials Fund (via the UK Government Cultural Assets Fund), and £1m from Historic England. In addition, local people have been important in keeping the project alive including the Birnbeck Regeneration Trust and Friends of the Old Pier Society.

North Somerset Council website

The Cobb, Lyme Regis (HEW0414)

The Cobb in Lyme Regis, Dorset, is a historic curved stone sea wall 900ft long with a 400ft berthing pier and a 300ft breakwater, providing both a protective breakwater for the harbour and a safeguard against erosion and flooding along the Lyme Bay coastline.

Originally oak piles with boulders floated in between them, it was placed to form a harbour for Lyme Regis. Storms repeatedly damaged it, sweeping it away in 1377, as well as destroying boats and 80 houses. It was then rebuilt in timber and stone and finally joined at the shore in 1756. It was rebuilt to its present form in Portland stone between 1793 and 1825, with the Victoria Pier added 1842-1852. It has featured in two novels: Jane Austen's Persuasion, and John Fowle's French Lieutenant's Woman, as well as the films of same name.

In November 2025 a void the size of a small car at the base of the Cobb was filled in with bags of rocks craned in during low tide as a temporary fix over the winter. The void, where the Cobb forks, was found during a routine inspection earlier in 2025. Dorset Council said a permanent repair, with fast-setting concrete pumped in, would be made in 2026 at the next suitable spring low tide. The works are part of phase one of a three stage repair plan for the Cobb.

Recent structural investigations have shown that the harbour is being destabilised by wave impact and sea floor erosion. The functionality of the Cobb as a breakwater is predicted to end in the 2040s unless stabilisation works are carried out. The current scheme includes stabilising the wall with a low-level concrete toe foundation along with anchoring the inner harbour walls with tension piles.

BBC 7 November 2025

Dorset Coast

For more information on the breakwater, see `Lyme's Battle with the Sea' by Richard Bull, Lyme Regis Museum

George Street Bridge, Newport, S Wales (HEW 0346)

A weight restriction of 7.5 tonnes has been introduced on George Street Bridge, Newport by Newport Council

'due to concrete degradation', while further investigations are undertaken. George Street Bridge is a cable-stayed bridge with reinforced concrete towers crossing the River Usk, begun in 1962, opened in 1964 and was the first cable-stayed bridge in the UK. It originally carried the A48 until 2004 when that was

diverted over the Newport Southern Distributor Road and the City Bridge downstream.

Pont-Y-Cafnau Bridge, Merthyr Tydfil (HEW 0656)

Work began on the restoration of Pont-Y-Cafnau bridge in August 2025, as part of a £4.5 million joint investment from the Welsh Government through Cadw and Merthyr Tydfil County Borough Council.

The bridge has been closed to the public, but it is intended to bring it back into public use as a footbridge. Regarded as the world's oldest cast-iron railway bridge, it was built in 1793 by the Cyfarthfa Ironworks Company. Featuring a cast iron A-frame with king post central support each side, it carried both water and the Gurnos tramroad across the River Taff, in a three-tier form of construction, with an upper water channel, a middle 4ft gauge tramroad deck and a lower water channel within the tramroad deck. The water channels powered the ironworks waterwheels.

Its historical significance has been recognised with a Grade II* Listing and Scheduled Monument status. The restoration forms part of the broader £4.5 million heritage project which also includes improvements to the Grade I Listed Cyfarthfa Castle.

Merthyr News 6 August 2025

Berwick Old Bridge (HEW 0694)

On 8th August 2025 Berwick Old Bridge spanning the River Tweed in Northumberland, reopened to traffic after a £3.45 m refurbishment by Northumberland County Council. Work included masonry repairs to the elevations and arch barrels, as well as below water level, as part of the final phase of work which began in 2020. Works, which needed Scheduled Monument Consent from Historic England to allow works to be undertaken, included the full reconstruction of the road down to barrel arch depth and waterproofing the bridge deck. The restoration involved stone suppliers, stone masons and other craftsmen, taking five years to complete. Samples of the replacement stone and mortar pointing had to be approved by Historic England.

Built between 1611 and 1624 by James Burrell out of red sandstone, it replaced four previous bridges. At 1,165ft long, 16ft wide with 15 arched spans, the structure had once been a key part of the Great North Road connecting London and Edinburgh. The bridge's importance reduced with the opening of the Royal Tweed Bridge (HEW 0695) upstream nearby in 1928, and today it is a one-way route from east to west.

Northumberland Council website 8 August 2025

Bewl Water/Bewl Bridge Reservoir (HEW 1636)

Bewl Water (HEW 1636), near Wadhurst, straddles the Kent/East Sussex border and is the largest reservoir in the south east of England with a capacity of 31,000m litres of water. Begun in 1973, it was impounded 1976-1978, and has a 30m high by 1800m long earth fill embankment with clay core dam. Capacity is 31.3 million litres of water. Work began in August 2025 to install better drainage infrastructure at the Kent dam with three new large hydraulic siphons. Three 30m long 1.7m diameter pipes each weighing 29 tonnes are being installed in a £45m scheme to allow Southern Water to drain up to 41m^3 a second, the equivalent of an Olympic-size swimming pool every minute from the dam, after recommendations from the Whaley bridge dam event in 2019, which saw 1500 people evacuated from the town. The new pipes would allow the water level to be lowered by 5m (16.4ft) in five days, as against its current 15cm (6in) in that time. Water would empty into the River Bewl and thence into the River Medway. The work being carried out by CMDP+ joint venture Costain-MWH Treatment is

using a 500 ton crawler crane and a team of divers. The work is due to be complete early this year.

BBC 12 August 2025

New Civil engineer 15 August 2025

Suffolk Water Recycling, Transfer and Storage (SWRTS)

Suffolk Water Recycling, Transfer and Storage (SWRTS) Project is being consulted on to secure water supplies for Suffolk. It includes a new Advanced Water Recycling Plant in Lowestoft, pipelines to move water where needed and two new storage reservoirs, one close to the existing Lodgewood Water Tower near Sibton Green (Central Service Reservoir) and one near Eye airfield (Western Service Reservoir). Some parts of Suffolk already suffer shortages and new supplies for businesses are being limited. The SWRTS Project will create a more resilient and sustainable supply. Being delivered by Essex and Suffolk Water, the consultation will result in a Development Consent Order (DCO) to the Planning Inspectorate to be submitted in 2028. Construction could follow in 2030 to be in use from 2032. The pipelines would link Lowestoft, Barsham, Sibton Green, Eye and Saxmundham. Wastewater from the existing Corton Water Recycling Centre , near Lowestoft, will go to an a new Advanced Water recycling Plant to be purified. It will travel on to the River Waveney, to be mixed with natural river water and then be treated at Barsham Water Treatment Works before being piped to Sibton Green Central Service Reservoir then either on to Eye reservoir or via Saxmundham Water Tower to Leiston and Sizewell C power station.

Suffolk Water

PHEW newsletter mailing list

We hope you enjoy reading this newsletter. Since moving to digital, we realise some people may miss some issues. We have set up a mailing list so we can circulate a link to the latest newsletter when it is posted on the ICE website.

If you would like to join the list, please send your email address to PHEW@ice.org.uk

Past copies are all available to download from the ICE Library catalogue.

Editor's Note

By Dermot O'Dwyer

Readers of this newsletter are asked, whenever they read of something which they think might deserve mention to pass it on for inclusion in the next issue.

Contributions should be sent to the ICE as soon as possible after receipt of this newsletter by post to:

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