

Tees Cottage; Waterworks and Pumping Station

April 2018

AE-0181-2018

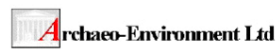


**Funding raised by
The National Lottery**

and awarded by the Heritage Lottery Fund



LOTTERY FUNDED



Archaeo-Environment Ltd
Marian Cottage
Lartington
Barnard Castle
County Durham
DL12 9BP

Tel/Fax: (01833) 650573
Email: info@aenvironment.co.uk
Web: www.aenvironment.co.uk

Archaeo-Environment Ltd
is registered in England
and Wales Registered
number 04727850

Tees Cottage.

Cover illustration. The front cover shows and extract from drawings by T & C Hawksley and Co. for the works of 1900-04 and the construction of the great beam engine. Copyright Durham Record Office.

Version Control.

While every care has been made in the researching and writing of this document it is inevitable that new information or insights will come to light regarding the history of Tees Cottage Pumping Station. So that any such 'new' information is not lost or held separately, it is recommended that it be integrated into future versions of this report and noted in the references/bibliography sections. This report should therefore be seen as a living document to be enhanced and built upon as the years go by. It is essential that this process is overseen by a single responsible individual and that edits are recorded where possible. This will prevent the unfortunate and confusing circumstance of their being more than one version of the report. Ideally the definitive version of the report should be held digitally on a shared drive accessible on the internet for all to read, but with edit rights restricted to the nominated individual. The table below should be completed when changes are made to the document.

Version	Date	Author	Summary of any Changes
1.0	2018-04-27	Niall Hammond	Original Document as supplied to the TCPS

Copyright Declaration:

Archaeo-Environment give permission for the material presented within this report to be used by the Tees Cottage Pumping Station (TCPS) and any public archive/repository with which it is deposited, in perpetuity, although Archaeo-Environment retains the right to be identified as the author as specified in the Copyright, Designs and Patents Act 1988 (chapter IV, section 79). The permission allows TCPS to reproduce material, including for use by third parties, with the copyright owner suitably acknowledged. Where copyright on images and material belongs to other than Archaeo-Environment every effort has been made to note this in the text and captions. TCPS and any public archive within which it is deposited has permission to use and disseminate the report in paper and electronic forms.

Tees Cottage.

Summary

Archaeo-Environment were commissioned by The River Tees Rediscovered landscape partnership to research and provide a history of the Tees Cottage Pumping Station and set its history within the broader history of public water supply and the history of Darlington and the valley of the River Tees.

Tees Cottage is situated on the north bank of the River Tees and on the western fringe of the town of Darlington in the historic county of Durham in North-East England. The post medieval expansion of Darlington from a significant market town to a dynamic industrial centre along with other towns in the lower Tees Valley, created a demand for clean drinking water which could not be met by the town's existing provision of water largely from wells.

This local story at Tees Cottage and Darlington is set against the wider changes in the economy and population of England in the 19th century. Developing industrialisation in the 18th century was further fuelled and enabled by the advent of the railways from 1825 with the opening of the Stockton & Darlington Railway, a few miles from Tees Cottage. The nationwide spread of railways began a transport revolution which increased the rate of industrialisation, the growth of the population of towns and inadvertently put huge pressure on the quality of workers housing, sanitation and water supply. Even though the link between disease, sanitation and water quality was not fully understood, this resulted in growing concerns over public health with regular and lethal outbreaks of cholera and typhoid.

Concern at the highest level on the state of the country's rapidly growing towns and cities led by the 1840's to legislation providing powers and responsibilities for local boards of health and the creation of water companies to improve sanitation and water supply. As a result of this many of the leading families and industrialists of Darlington formed the Darlington Gas and Water Company in 1847 and petitioned for the creation of a Local Board of Health. At a time before there was a Darlington Corporation or Council, it was the initiative of people such as the Pease, Backhouse and Kitching families which saw capital raised and Thomas Hawksley, the preeminent British water engineer of the 19th century, employed to design the new water pumping station at Tees Cottage. Hawksley was also responsible for the neighbouring Broken Scar Water Treatment Works which supplies water to Teesside and with major rebuilding is still in use today .

From 1850 when the first water was pumped to the closure of Tees Cottage in 1980, the site played its part in supplying Darlington and the wider area with clean drinking water. During this time the pumping technology used on the site evolved through stages of pumps powered by steam beam engines, gas engines and electricity. In 1973 The Water Act was passed creating 10 regional water authorities in England and Wales in April 1974 with responsibilities for water treatment and supply, sewage disposal, land drainage, river pollution and fisheries. In 1989 these authorities were privatised and Tees Cottage came into its present ownership of Northumbrian Water PLC.

In 1980 after acting for several years as a reserve engine for the more modern facilities at Broken Scar, Tees Cottage was closed and the continued preservation and care of the site placed into the hands of a dedicated group of volunteers constituted as the Tees Cottage Pumping Station (Darlington) Ltd in 1980 and known colloquially as the TCPS. The TCPS continue to care for the site with financial assistance from Northumbrian Water Ltd (NWL), and to open the site to the public on several occasions each year. NWL support continues in the form of buildings repairs such as recent replacement of timber window frames with appropriate consents from Historic England.

Tees Cottage.

The historic significance, quality of preservation and the survival of three different types of engine led to the site being designated as a scheduled monument by English Heritage in 1984. This study provides a chronological narrative of Tees Cottage set against the broader picture of public water supply and the emergence of Darlington from a medieval market town to a major industrial centre. The report ends with a series of resources identified from various archives and collections and which will be of value in taking forward telling the story of Tees Cottage and water supply in Darlington.

The report also brings together a number of historic maps and images to illustrate the history and development of the site and identifies physical structures of historic significance.

Contents

Summary

Introduction

Acknowledgements

Tees Cottage's place in the world.

The Bones of the Earth

Ancient Times

Beer and Water

Medieval Wells and Water in Darlington

Disease and Public Health

Health Acts and Public Health Legislation

Darlington and the Emergence of Local Government

The Darlington Gas & Water Company

The Darlington Local Board of Health

The Stockton & Middlesbrough Board

The New Engine and Works of 1900-04

The Gas Engines

Redundancy, Conservation and Preservation.

Moving Forward and Telling the Story

ANNEX 1 Source Material

- Bibliography
- Archives
- List of consented works since 2007 from Historic England
- Photographs, Films and Images
- Websites
- Water Acts

ANNEX 2 Tees Cottage Timeline

ANNEX 3 Large copies of maps and drawings referred to in the text.

Historic Mapping

Figures 49-67 Tithe Map (1843) and Ordnance Survey mapping 1855 - 1986

Science Museum Archive

Figures 68-84 HAWK2 Archive consisting of T.C. Hawksley and Co. drawings 1849-1902

Durham Record Office

Figure 85 Ref: Da/UT 5/4/1. Section views of the engine house, 26 October 1918 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

Figure 86 Ref: Da/UT 5/4/2. Horizontal layout of installations in the engine and boiler house, 30 October 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

Figure 87 Ref: Da/UT 5/4/3. Sections of the boiler house, 30 October 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

Figure 88 Ref: Da/UT 5/4/4. Sections of 24 inch valve, 1 November 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster 1.5 inch to 1 foot [1:8]

Figure 89 Ref: Da/UT 5/4/5. Sections of the boiler house, 9 April 1902 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster 0.5 inch to 1 foot [1:24]

Reference

Figure 90 Site Plan of Tees Cottage, showing Main Buildings and features referred to in the text.

Figure 91 Locations of reservoirs and Tees Cottage.

Introduction.

Archaeo-Environment were commissioned by The River Tees Rediscovered Landscape Partnership, run by Groundwork North East and funded by the Heritage Lottery Fund, to provide a narrative history of Tees Cottage Waterworks and Pumping Station. This was to be set in context with a broader understanding of a number of themes including a wider history of the area, the River Tees, the emergence of modern Darlington and the importance of fresh water and sanitation provision. The objectives of this report were to provide a clear, concise narrative of the site to act as a resource for future management of the site and the development of interpretation to engage the public.

While there are other examples of both preserved pumping stations and beam engines elsewhere in the country, Tees Cottage provides a unique example of evolving technology from steam to gas to electric pumps on a site easily accessible and with an excellent documentary history. It's potential for engaging school groups, specialist and popular audiences in the fascinating history of the site, British engineering and the wider story of how clean water and sanitation have been essential to creating our modern world is very clear.

The initial fund raising and development of the site in the 1840's involved notable figures of the industrial revolution amongst them the Pease family of pioneering railway fame, and the Backhouse family whose banking interests would be the foundation of today's global Barclay's Bank. The design of the site and much of its plant was by the nationally important firm of Thomas Hawksley and Co. of Nottingham, the preeminent water engineers of the 19th century. The story of industrial pioneers, campaigners for clean water and workers' rights and the emergence of modern local government all add a local angle to the story the site has to tell. All of these 'ingredients' make the historic significance of Tees Cottage and its story of the highest value. This is recognised by its designation as a Scheduled Ancient Monument.

A wide variety of material was made available by the members of the TCPS and other interested parties from their own private and personal archives to inform this report. To this was added a comprehensive search of historical archive material from a variety of local and national archives, historic mapping and newspaper accounts. Particular credit needs to be paid to Mr Jim Prentice, formerly of Northumbrian Water who allowed access to his copious notes and 'ramblings' regarding Tees Cottage and the water industry associated with the River Tees compiled over many years; and to the late H. Cedric Devonshire whose research has previously been reproduced in a series of guides of the Tees Cottage site. Mr Devonshire's work in particular appears to have been possible due to a number of personal conversations with past employees and access to correspondence contained in council records. Sadly there are no recordings or transcripts of these conversations with past employees apart from Mr Devonshire's recollections. Similarly, several pieces of information quoted by Mr Devonshire are based on council archives contained in a report by P. Anwyll dated 1988, this report is itself only partially referenced and ultimately its veracity cannot be confirmed as only some of the council archives mentioned in it could be found and checked during production of this report. Information referenced to Devonshire, 2012 should therefore be treated with a small amount of caution and opportunities taken as they arise to add confirmed references. With regard to council records, thanks also need to be made to Margaret Wood and other volunteers at Tees Cottage for transcribing many original notes and making the author's life much easier.

Niall Hammond/AE 2018-04-27

Acknowledgements.

Christine Corbett and Lucy Chapman of River Tees Rediscovered, Brian Hills, Jim Eason, Jim Prentice, George Beautyman, Dave Smart, Margaret Wood, Anne Sutherland, Phil Doran, Marian Ward and all the other members of the TCPS. Northumbrian Water Ltd, Claire Botham of Historic England, Amanda John of The Science Museum Library & Archives, staff of the Durham Record Office and Darlington Local Studies Library.

Note

Previous authors writing and publishing on the Tees Cottage site have identified various buildings, the rooms within them and the various engines used by what has become an established system. This is continued in this report to avoid confusion.

Tees Cottage's Place in the world.

Tees Cottage lies on the west side of Darlington in the Tees Valley in North East England. Darlington is a former borough of historic County Durham and today a unitary authority in its own right. Tees Cottage is located at Ordnance Survey National Grid reference NZ 25530 13910, immediately adjacent to the south side of the A67 approximately 2 miles (2.5 Km) west of the centre of Darlington.



Figure 1. Location of the Tees Cottage Pumping Station. © Archaeo-Environment, Crown copyright 2018. All rights reserved. Licence number 100042279.

Designation.

Tees Cottage Pumping Station is a 'designated historic asset', a Scheduled Monument designated under the 1979 Ancient Monuments and Archaeological Areas Act. It was added to the schedule on the 11th of June 1984. It's designation references are List Entry Number: 1002300. Old County Number DA139. Any works to the building internally or externally save for regular maintenance and basic like for like repairs require consultation with Historic England and may require an application for scheduled monument consent (SMC). At the time of writing there is no fee to apply for SMC and the purpose of the process is to make sure that any changes are made in full knowledge of the buildings significance so that important parts of the fabric or character are not changed, altered or lost without appropriate levels information and consideration.

The current scheduling description is a product of its time and by modern standards very brief. It might be expected that in due course Historic England will review this and make it more detailed. It is important to note that unless specifically excluded by the scheduling description, all fabric, buildings, machinery and below ground archaeological deposits comprising the Tees Cottage site are considered to be a part of the scheduled monument. The identified boundary of the scheduled area is unlikely to alter but it should be expected that the level of detail and relative significance of structures within it will be expanded on when HE review the designation at some point in the future.

Tees Cottage.

AA 12113/1

DEPARTMENT OF THE ENVIRONMENT

COPY - to be retained

ENTRY IN THE SCHEDULE OF MONUMENTS COMPILED AND MAINTAINED BY THE SECRETARY OF STATE OF THE ENVIRONMENT UNDER SECTION 1 OF THE ANCIENT MONUMENTS AND ARCHAEOLOGICAL AREAS ACT 1979 AS AMENDED BY THE NATIONAL HERITAGE ACT 1983.

NAME OF MONUMENT CONNISCLIFFE ROAD WATERWORKS
(or brief description)

	ORDNANCE SURVEY MAP REFERENCES
COUNTY: .. Durham	1 inch (1: 50,000) Sheet No
DISTRICT: Darlington Borough	6 inch (1: 10,000) Sheet No
PARISH: .. Darlington	25 inch (1: 2,500) Sheet No
COUNTY NUMBER: 139	NATIONAL GRID REFERENCE .. NZ 258 139
CLASSIFICATION:	

FULL DESCRIPTION OF MONUMENT AND ASSESSMENT OF ITS IMPORTANCE:

A complex of buildings from various dates with adaptive re-use. The oldest dated building is a former beam engine house of 1849 with a presumed boiler house and duplicate engine house alongside to the west. This block terminates in an electric pumphouse and a chimney. Behind is a boiler house with two Lancashire boilers by Teesdale Bros. of Darlington dated 1902, formerly providing steam for a compound rotative beam engine. The "new" engine house stands alongside the 1849 house and the Teesdale Bros. engine, which has not run regularly since about 1926, is in very good condition (being occasionally steamed for public display). Further to the east, another beam engine and boiler house now has two gas engine driven pump sets complete with producer gas plant, presumably supplied as standby plant for the 1904 beam engine. They have only rarely, if ever, been used. All pumps were to raise water from the River Tees, which runs alongside, to depositing tanks and service reservoirs.

The compound rotative beam engine may be the latest surviving engine of its type in a waterworks, also it is the only one manufactured by Teasdale Bros. The suction gas pumping plant at the station is unique.

The monument is shown on the attached map outlined in red.

MONUMENT INCLUDED IN SCHEDULE ON 11 JUNE 1984

SIGNED *P. Payne* DATE 11 June 1984

Figure 2. Scheduling Documentation from Historic England.

Tees Cottage.

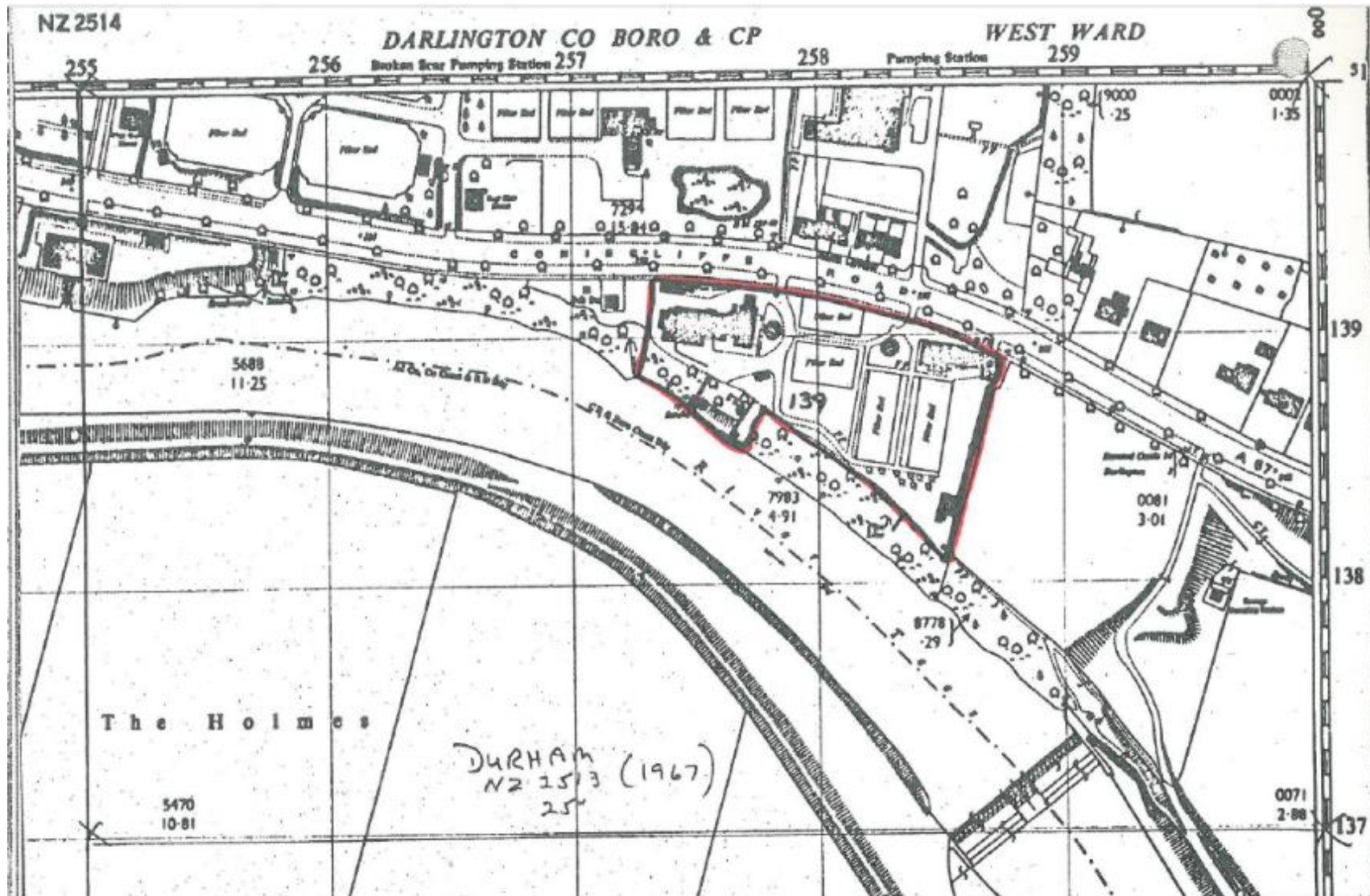


Figure 3. Scheduling Map (1984) held by Historic England showing the boundary of the scheduled area.

The Bones of the Earth.

While the great Beam Engine at Tees Cottage is perhaps the lasting image that many come away with, the story of the site is much more complex for those with curious minds and inquiring natures. The story in many ways starts a very long time ago and can be seen in the stone and brick the building is made of, in the coal and gravels the water works needed to function and in the River Tees and its water which it pumped and gave it its purpose.

Our story of geological processes and the immense age of the Earth are often difficult grasp. At around four and half billion years old, life more complex than single celled creatures has only been around for a little over 500 million years. During most of this distant history the surface of the Earth was in constant change as the giant 'plates' which cover the surface of the planet and the continents on top of them gradually move, merge and break apart. This is a process which continues right up today and explains why many of the rocks beneath our feet and the animal fossils within them were first created hundreds of miles to the south in warmer and tropical climates.

Deep down beneath the landscape of Northern England and under Tees Cottage lie rocks of around 400 million years ago from the Carboniferous period, a time which saw the Earth begin to resemble its present state. Insects roamed the land and would soon take to the skies; sharks swam in the oceans as top predators, and vegetation covered the land, with seed-bearing plants and forests soon to flourish. Much of this organic life when it died would wash into slow tropical rivers and sink to the bottom, becoming compressed over millions of years into coal which in the 18th and 19th centuries was to power the steam engines and furnaces of the industrial revolution. Over these coal bearing rocks lie other, younger sandstone deposits of the Permian and Triassic periods including Bunter and Keuper deposits of between 298-220 million years ago, some of which make fine building stones and can be seen used around the windows and doors at Tees Cottage.

These ancient rocks provide the bare bones of the landscape we are familiar with today in views from our windows and in the materials of many of our buildings, especially the older ones. Today's landscape is however in large part a product of more recent geological time and the power of ice and water. This geological period covering the last 2.6 million years or so is known as the Quaternary. In Britain, successive glaciations have seen thick ice sheets spreading out over the landscape, originating from the high, mountainous areas of Scotland, Wales and Northern England. Over a kilometre thick in places, these mighty ice sheets and their meltwaters scoured the landscape, changing the course of rivers and carrying away vast quantities of rock debris and depositing it elsewhere as sand, gravel or boulder clay. The boulder clays have been used in recent times to make bricks, often individual in colour to their local area and seen at Tees Cottage; and the gravels and sands were key to the work of water treatment, being used as filters to purify the river water.

Successive glacial periods by capturing water as ice and then releasing it again as the weather warmed caused the fall and rise of sea levels changing Britain at one point to be a peninsula of Europe, at others such as today, an island. The power of ice and the erosional power of escaping melt water from glaciers and lakes changed the landscape. Evidence has been found for warmer periods in between these 'ice ages' and fossil remains of bison, hippopotamus, elephant, rhinoceros and hyena identify a time when the climate was several degrees warmer than today.

Tees Cottage.

The scouring effect of each glacial episode removed most, but not all, evidence of earlier glacial and interglacial periods including most traces of early people. As a result, the majority of the glacial deposits and landforms we see today date from the last major glaciation, which was at its height about 22,000 years ago and is known to geologists as the 'Late Devensian Glaciation'. Even after the ice melted, the landscape was further modified by processes associated with arctic-like conditions, such as repeated freezing and thawing. In more recent 'Holocene' times the landscape has been affected by coastal and river processes of erosion and deposition in milder conditions, which continue to this day. The whole range of Quaternary deposits are often referred to as 'drift' or 'superficial deposits' to distinguish them from the bedrock or 'solid', on which they lie.

The last glaciation gradually eased its icy grip from around 15,000 years ago. While the earlier ice-ages had created the cut of the Dover Strait, the capture of so much water into the polar icecaps meant that sea levels were much lower, and so England was joined with Europe allowing animals, plants and people from the south to colonise the country as conditions improved. As the ice melted, sea levels gradually rose once more, until by a little after 6,000 BC Britain was once more an island.

All of these geological and climate process are not confined to the past, the Earth continues to be a dynamic planet and while some process are not evident during a human lifetime others are such as the erosion and deposition caused by rivers such as the Tees.

Ancient Times; a Short History of the origins of Darlington, the River Tees and the Tees Cottage.

While there is no direct evidence of prehistoric activity on the Tees Cottage site, its location next to the River Tees makes it a likely location for the exploitation for food and travel in prehistoric times. This would have been part of a wider exploitation of the valleys of the Rivers Tees and Skerne. Archaeological excavations have found small clusters of late Mesolithic¹ or early Neolithic² flint tools made from struck and sharpened stone such as flint, all the way from the coast right to the headwaters of the Tees in the Pennines. These clusters of finds may identify short lived camp sites of communities of hunter-gatherers who would follow migratory herds of deer, or Salmon as the seasons changed. Deep organic deposits such as peat by the rivers have also preserved the remains of ancient animals such as an elk jaw bone on the banks of the River Skerne near Haughton dated to between 8,000 and 4700 BC. A few hundred metres north of the Tees Cottage site there has been a find of a stone axe dating from the Neolithic or Bronze Age³, again showing the area was occupied in prehistoric times.

It may well be it was the communities of the Bronze and Iron Ages in the period from around 1800 BC to the coming of the Romans to northern Britain in the late 1st century AD who gave the name Tees to the river. These ancient Britons spoke a language similar to present day Welsh and 'Tees' is thought to be related to the ancient Welsh 'Tes' meaning 'sunshine and heat' and is likely to refer to the boiling, surging water, perhaps a description of the many waterfalls and rapids found in the upper parts of the river and its tendency to spectacular flash floods after heavy rain in the hills and known as the 'Tees Roll', a phenomena largely calmed since the building of reservoirs in the late 19th and 20th century.

Along with its name these ancient Britons may be the origins of one of its oldest mythic inhabitants of the River Tees, Peg Powler. Sometimes known as 'Peggy Powler the nice nan', she is a wicked water spirit or faerie with longhair and big teeth who is said to inhabit the River Tees and bite the ankles of those who wander too close to the water's edge, especially nice children, and pulls them under the water and drowns them. The brown, scummy bubbles seen on the surface of the river, especially after a flood, are known as Peg Powler's suds.

The historic town centre of Darlington town some two miles east of Tees Cottage, has no known archaeological sites of the later prehistoric or Roman period, although a few miles west of Tees Cottage is the significant Roman town and fort at Piercebridge sitting on the north-south road from York to Hadrian's Wall and known to the Romans as Dere Street. A little to the north at Faverdale, recent excavations have found evidence of a Roman Villa and organised estate agriculture.

The first traces of a permanent settlement at Darlington, which may have been a precursor of the modern town have been identified in the Greenbank area, approximately 1km northwest of the town centre. Here Anglian burials of the 5/7th century were discovered in 1876, and indicate the presence of an early medieval settlement in the vicinity. The Angles were immigrant settlers from northern Europe and their language and culture were to form the basis of modern English and England. There are also indications that an early medieval church of perhaps the 10/11th century was present near

¹ 8000BC to 4,000BC

² 4000BC to 2300BC

³ 2300BC to 800BC

Tees Cottage.

the centre of Darlington, suggested by the discovery of early architectural fragments on the site of St. Cuthbert's church during 19th century restoration work⁴. The discovery of a series of graves during excavations in the 1990's at the southern end of the Market Place and which were on a different alignment to those associated with the current Church, also supports the notion that an early medieval church was present in the Market Place area.

Darlington itself first appears in written records in a land grant by a man called Styr, son of Ulphus, to the diocese of Durham in 1003-1016; this was licensed by King Ethelred the Unready, and referred to "Darlington and its dependencies". The place name Darlington' has Anglo-Saxon origins; early references suggest spelling of 'Dearthingtun' or 'Dearnington' which may come from the word 'Derne or Derning', an alternative for the River Skerne. The term 'gate', a common suffix for road names around the centre of Darlington e.g. Blackgate, Priestgate etc, derives from the Scandinavian for street.

The Bishop of Durham, William de Carileph, began the building of St. Cuthbert's in 1084; it was a collegiate church to provide for the secular priests he transferred there when Durham Cathedral became exclusively for Benedictine monks after the Norman Conquest. The original building was replaced by the present church which was founded by Bishop Hugh de Puiset in 1192. Work continued under his successors and was completed around 1250 under Bishop Richard Poore. Darlington claimed to be a County Borough because of the presence and influence of the Bishop although there is no formal charter. Nevertheless, the town was from medieval times onwards an exceptionally important market centre and well connected, not just with the Great North Road passing through, but also east and west, where the road to Barnard Castle passed the Tees Cottage site.

While the road would have been busy, there is no evidence for any buildings or occupation of the Tees Cottage area before the 18th century. A short distance west lies the village of Low Coniscliffe which is of Anglo-Saxon date, and the Baydale Bridge public house which although a relatively modern building, may well sit on much older foundations, not just as an inn but as the site of a Leper Hospital in medieval times and closed by the 16th century.

⁴ Wooler & Boyd 1913, 115-119

Beer and Water.

Contrary to many popular stories which suggest beer or ale was the drink of choice for all, the most common drink in medieval England was water, for the obvious reasons that it is both free and easily available. Medieval villages and towns were built around sources of fresh water be it rivers, springs or in many cases, wells. More often than not these could easily enough provide fresh, disease and impurity-free water as long as some obvious careful precautions were followed including boiling if needs be.

Where water was likely to be contaminated in larger towns by cess pits or by industry such as tanning, slaughtering, or dying. Allowing for only a basic understanding of how disease was spread, medieval people still took obvious precautions such as local laws or 'ordinances' on where tanners and dyers could operate so that water for domestic use could be drawn to ensure the water was clean. Fines were often imposed for contaminating streams used for drinking water. Water sources such as wells also need to make sure they weren't downhill of any burial ground, fortunately at Darlington St Cuthbert's was at the bottom of the hill!

In larger cities, more wealth allowed water-supply infrastructure to be built to ensure public access to clean water. In medieval London, for example, the City Council began construction on what was called "the Great Conduit" in 1236. This was a complex of pipes that brought water from a large fresh spring at Tyburn to a pumping house with cisterns at Cheapside. This fed local cisterns all over London. Wealthy Londoners could apply to have a private pipe or "quill" run from the conduit system to their house, giving them running water. This was expensive, and citizens who illegally tapped into the conduits were severely punished. Most people either drew their water from the nearest conduit cistern or paid a "cob" or water-carrier to bring them their day's water supply in three-gallon tubs, which they carried through the streets on a yoke. Public celebrations, such as the return of Edward I from Palestine or the coronation of Richard II, saw the city stop the water flow and fill the conduits with wine for the day, with people able to drink as much as they wanted. Many monasteries developed complex water supply systems to provide fresh water for drinking and washing during the Medieval period, the Cistercian Order of monks in particular were skilled water engineers and examples of their work can be seen at several monastic foundations in North Yorkshire such as Fountains Abbey. At Mount Grace Priory also in North Yorkshire the Carthusian Monastery had an elaborate supply of drinking water with three springs on the hillside above the priory tapped by well houses which in turn supplied an octagonal water tower in the Great Cloister from which piped water ran to each of the monks' cells.

Beer and ale were consumed in large amounts, but not only because the water was so bad. The brews in question, often called 'small beers', were much weaker than their modern equivalents but had the effect of providing much-needed calories to laborers and farmers, as well as being thirst-quenching and re-hydrating in hot weather or when working hard and losing sweat. Given the long days medieval workers put in, ale and beer were a major and necessary part of a labourer's daily energy intake.

Wine was the drink of choice for the upper classes and anyone who could afford it. It was produced all over medieval Europe and, due to the Medieval Warm Period that prevailed over western Europe until the 14th century, the climate meant it could be produced as far north as northern England. Wine was however expensive and buying a small barrel was beyond the means of most people. But

Tees Cottage.

English soldiers campaigning on the continent during the 100 year's war with France (1337 to 1453), developed a taste for it and inn-keepers bought it in bulk and sold it by the cup, so for a penny or even a halfpenny, relatively poor people could on occasion enjoy a Bordeaux red.

Water however remained an essential for life and across the country during the 17th and 18th centuries, growing towns and cities were taking steps to improve their water supply from obviously limited and often dirty wells and rivers. On the grandest scale the City of London obtained a Royal Charter to construct the New River. This was an artificial waterway opened in 1613 taking fresh drinking water from the River Lea and from Chadwell, Amwell and other springs and wells along its course. Using gravity only it falls just five inches per mile (8 cm/km) along its 32Km length and is still partially in use today.



Figure 4. The New Gauge House where water leaves the River Lea at the start of the 32 Km long New River, opened in 1613 to supply the City of London with clean water.

The City of Durham had, and still has to some extent, its own natural water supply at a depth of 30 feet or so below ground. The castle and cathedral had their own wells, and most of the Bailey houses had theirs. As with all wells they proved unreliable and in 1450 water was brought by pipe to the market place from Crook Hall, and a pant or fountain was erected. Around 1540 Bishop Tunstall extended the supply to cathedral and castle from beyond the river and in 1753 the fine 'Little Conduit House' in the new Gothick style close to the Cathedral further improved this. Only in 1844, shortly before Darlington was a water company formed in Durham and the medieval system replaced.

Tees Cottage.



Figure 5. The City of Durham relied on wells until the 16th century when piped water was brought into the Peninsula to the Cathedral (left Conduit House of 1753), and the Market Place 'pant' (right).

Even more locally to Darlington, Richmond in North Yorkshire only 12 miles away had built in 1771 a giant cistern beneath the new market cross to provide a water supply for the town. This was fed by various natural springs and provided water by gravity to other well heads around the town. In 1812 the Richmond Corporation further improved this by building a reservoir at Aislabeck a few miles above the town from which lead pipes provided a reliable supply. Both structures still survive and are listed buildings.



Figure 6. Richmond North Yorkshire, The Butter Cross of 1773 sits on top of a huge water cistern built to feed well head around the town by gravity. The water comes from natural springs and a purpose-built reservoir of 1812 in the hills above the town.

Medieval Wells and Water in Darlington.

As with many towns across the country, water supply in medieval and early modern Darlington depended to some degree on what the water was intended to be used for. The town's industries and trades such as the woollen mills by the River Skerne used river water for both motive power and for washing. Many smaller streams, now culverted or covered over beneath modern streets, were used for washing away waste from homes, butchers' shops and leather workers such as those in Skinnergate. Drinking water came from wells or made use of rainwater collected in barrels from roofs. Place names in the town still give some obvious clues to the more significant sites such as 'Tubwell Row' which was previously known as 'Le Wellgate' and was one of the town's two principal wells (figure 7), the other being in Skinnergate. From as early as the 17th century, and most likely earlier, there are records which note that each year two overseers were appointed whose job it was to ensure the wells were maintained and kept clean⁵. Medieval land grants and charters also make reference to other wells, including one in Houndgate mentioned in a document of 1312 and which gave the Dean of St Cuthbert's church a right of access along a narrow lane or vennel from his residence on Feethams to the well ⁶.



Figure 7. The 'Tub Well' on Tubwell Row in Darlington, a modern feature over the original well, one of the town's two principal sources of water which was rediscovered during building works in the 1990s.

Wells were however unreliable and in times of drought could and did run dry. The most dramatic example of this in Darlington was in 1585. On the 7th of May of that year, still early in the summer and before a drought might have been expected, a fire swept through the closely packed medieval houses of largely wooden construction. All along High Row and Skinnergate properties burned and some 273 houses were reported as destroyed in a pamphlet published shortly afterwards entitled '*Lamentable Newes from the Towne of Darnton*'. Attempts to fight the fire were severely hampered by a drought which meant the town's wells were depleted and the residents were forced to use any liquid which came to hand including milk, beer and ale or to run back and forth to the River Skerne with buckets.

The drinking of 'safe and hygienic' beer rather than water, and the very occasional use of water to bathe amongst many people is exemplified by one Thomas Reed of Darlington, a Quaker born around 1748 and who died in 1828 and who reputedly had... '*no great love of water as a beverage, and was a narrow economist in its use for personal ablutions*' ⁷

⁵ Longstaffe, 1854, 37

⁶ Cookson, 2003, 23

⁷ Longstaffe, 1854, 353-4

Disease and Public Health.

During the 18th and 19th centuries, the country began to change and industrialise which saw a migration of rural workers to the new manufacturing towns amongst them Darlington where textile mills, railways and iron foundries were to develop. Population growth and the demand for an increased and regular water supply for people and industry became necessities.

In the first half of the 19th century it was still unclear just how diseases like Cholera were spread. While science had moved on from bizarre medieval explanations of disease such as evil spirits or unbalanced humours, the 'miasmatic theory', in which disease is transmitted by airborne pollution, was popular and gained credence due to severe outbreaks of disease during hot summers which coincided with piles of stinking rubbish in the streets. We now know thanks to the work of a number of scientists that disease is caused by a wide range of microscopic organisms. Many of these organisms are transmitted in water which has been contaminated often by human waste. Clearly the removal of obvious visible contamination was desirable as well and the first documented use of sand as a filter to purify the water supply dates to 1804, when John Gibb the owner of a bleachery in Paisley, Scotland, installed an experimental filter, selling his unwanted surplus water to the public⁸. This method was refined in the following two decades by engineers working for private water companies, and it culminated in the first treated public water supply in the world, installed by engineer James Simpson for the Chelsea Waterworks Company in London in 1829. This provided filtered water for every resident of the area, and went on to be widely copied throughout the country including at Tees Cottage. Slow sand filters have the benefits of being both low cost and very efficient and their working method is described later in this report.

The increasingly cramped and poorly sanitised expanding towns of early 19th century industrial Britain were perfect breeding grounds for disease, amongst them dysentery, typhoid and perhaps most feared cholera which first affected Britain in 1831 and was to become the country's biggest killer. Subsequent serious outbreaks in 1832, 1848, 1853 and 1866 resulted in thousands more deaths across the country. While Barnard castle, Stockton and Middlesbrough were affected during these epidemics, Darlington for no clear reason largely avoided the disease.

What is Cholera?

Cholera has been known about since ancient times, but was mainly a disease of the middle east and India. Major epidemics first came to Europe in the early 19th century, first to Russia in 1817 and quickly afterwards to the rest of the continent. Cholera is an infection of the small intestine by some strains of the bacterium *Vibrio cholerae*. The bacteria appear to originate in certain marine shell fish, but once in humans are transmitted by human waste contaminating water supplies often in overcrowded living conditions.

Strangely humans are the only animals which appear to be affected by Cholera. Symptoms may range from none, to mild, to severe when large amounts of watery diarrhoea, vomiting and muscle cramps lasts for a few days. The diarrhoea can be so bad that it leads within hours to severe dehydration and electrolyte imbalance with sunken eyes, cold skin, decreased skin elasticity, and wrinkling of the hands and feet. Without medical attention it is often fatal.

⁸ World Health Organisation. http://www.who.int/water_sanitation_health/publications/ssf2.pdf



Poorer parts of the world without clean water and sanitation still suffer from Cholera today where despite the availability of vaccines it affects an estimated 3–5 million people worldwide and causes 58,000–130,000 deaths a year as of 2010. In the early 1980s, death rates are believed to have been greater than three million a year.

An investigation into a cholera outbreak in Newcastle-upon-Tyne in 1854 revealed that half of all working families lived in a single room, and had no independent water supply or toilet facilities. Between 1845-52, The 'Grand Experiment' was carried out in London involving 300,000 people, half of whom drank water from the Thames, often contaminated with sewage, and half drank clean water from the Lambeth Waterworks Company. Mortality patterns by water source were compared, and this strengthened the hypothesis of a man called John Snow who saw a link between cholera transmission and water. Snow was to provide a famous case study the following year in 1854.

John Snow and the 1854 Broad Street Pump Incident

500 deaths occurred in Soho, London within ten days in 1854, of people of all classes. John Snow mapped out these cases, thereby implicating a single, contaminated well in Broad Street. When the pump handle was removed, the spread of cholera stopped.

Snow also demonstrated that water drawn by suppliers from downstream in the Thames, into which many sewers flowed, caused a death rate 14 times that of water from companies drawing upstream. Snow's report of 1855 was however largely ignored at first.

Public concerns were also being raised about the health of the working classes with appalling housing conditions reported by journalists, social commentators and writers such as Dickens, Gaskell and Engels. Improved record keeping by doctors, parishes and councils provided clearer statistical evidence that the poor were increasing in number, while their life expectancy was decreasing.

More was learned about the causes of water and sanitation-related disease. Public awareness was raised about issues such as drainage, safe water, air, light and housing, with the emergence of many Health and Sanitation Associations acting as pressure groups and petitioning Parliament for improvements. This saw Royal Commissions set up by the government to investigate the living conditions of the poor and carrying out numerous investigations during the 19th century.

Growing public fear of disease and the attentions of the press to horror stories of cholera outbreaks also came against a background of political unrest across Europe before 1850.

Action on public health by government was therefore sadly not always philanthropic but based on concern over political unrest and the economic benefits for the nation of having fit and healthy workers compared to the costs of investment in improved water and sanitation. Improvements in the nation's health would also reduce Poor Law costs for the unemployed and homeless, which would in turn offset the increase in water and sanitary expenditure. The initial costs of connecting to a water supply were often placed on the householder and as far as the poor were concerned, they were rarely in a position to make this investment. They were not well informed about the benefits, and drainage and water supply required neighbourhood cooperation, their tenancies were short term and in any case, many were simply too poor. Ultimately, the economic benefit derived from a fit workforce was more persuasive than any moral obligation to the needy. If the initial investments offered improved health, then this made good economic sense. Fewer deaths of labourers also reduced the burden of support to their families. The trade unions were also active in the sanitary reform movement, they too having economic motives which would benefit workers' earning power.

Health Acts and Public Health Legislation.

Due to the sanitary reform movement, and based on the findings of the various Royal Commissions, Parliament was to pass a series of acts in an attempt to improve conditions in the growing urban areas. Central government achieved the transition from permissive to compulsory legislation by establishing measures to replace local municipal decision making with the imposition of legal duties on local authorities. Darlington as we shall see was perhaps near the front of these improvements when compared to many English towns, however, improvement nationally was slow and patchy, and it was not until the latter half of the 19th century that significant reductions in mortality and morbidity were seen. Although legislation required there to be household connections to water and sewerage systems, the effect was limited as there was no direct Treasury funding and householders themselves often had to bear these costs.

Some of the main legislative measures were:

- *1844 Metropolitan Buildings Act.* This required that all newly constructed buildings within 30 feet of the common sewer had to have connections to it, with improved drain construction.
- *1847 Town Improvement Clauses Act.* This legalised the discharge of sewage into rivers and the sea, and allowed its sale for agricultural purposes. It also encouraged drainage, paving, cleansing and lighting.
- *1848 Public Health Act.* This was the first of its kind and created a national General Board of Health with powers to supervise street cleaning, refuse collection, water supply and

sewerage disposal. The act was only mandatory in towns where the death rate exceeded 23 per thousand. Householders were obliged to pay for sewer connections. Progress was slow: after only 30 years 12% of houses had water closets. *1852 Metropolis Water Act* required water filtering by water company suppliers at a cost of £7 million.

- *1866 Sanitary Act.* This was a response to the failure of previous legislation and allowed action to be taken against local authorities providing inadequate sewer services and water supply. It called for comprehensive sewerage and water connection of all houses, street cleaning and legislated against overcrowding, to be enforced by Sanitary Inspectors.
- *1872 Public Health Act.* This divided England and Wales into Health Authority districts, having responsible sanitary authorities with an appointed Medical Officer of Health and an Inspector of Nuisances.
- *1875 Public Health Act.* This was the most comprehensive legislation to date, covering housing, sewage, drainage, water supply and contagious disease. All new sewers were public and the property of the local authority. All new housing had to have 'self-contained sanitation and water services'.
- *1890 Housing of the Working Classes Act.* This aimed to rationalise and strengthen existing legislation, providing housing standards, slum clearance and council house building.
- *1936 Public Health Act.* This exemplified the slow pace of change, as this 20th century legislation empowered local authorities to require that water closets replaced privy, pail and earth closets. Householders had to pay half the cost of conversion and were responsible for emptying cesspools and providing water closets with water.

Darlington; The Emergence of Modern Local Government.

By the 19th century there were great changes occurring not just in Darlington but on the national stage regarding public health and local government all of which would have major impacts on the supply of water and sanitation.

It wasn't to be until as late as 1st of October 1867 that Darlington was granted a Royal Charter allowing it to form a council to run its affairs, and the first elections to the new council were held in December of that year, when Henry Pease was elected as the first Mayor.

Before this in the early 19th century the affairs of the town were controlled under a confused system of medieval origin of half-yearly Borough and Halmote Courts under a Bailiff appointed by the Bishop of Durham, while the county court of quarter sessions met traditionally at four set times each year. The quarter sessions had some civil jurisdiction over such matters as road repairs and the granting of planning consents for major works such as railways and county buildings. This continued until the 1880's and the establishment of county councils.

Modernisation began in 1823 with an Act of Parliament entitled "*An Act for lighting, cleansing, watching and otherwise improving the town and borough of Darlington in the county of Durham*". This saw the appointment of some commissioners to put in force the powers granted for lighting,

cleansing, watching and improving the town. There were some 127 Commissioners named in the Local Act for carrying out its provisions and as vacancies were to be nominated and appointed by existing Commissioners they were largely self-elected. There was great difficulty in obtaining a proper attendance of Commissioners, even of five the required quorum. Many of the Commissioners named in the Act did not even reside in the town and had never been qualified.

Nationally political reform continued with the 1832 Reform Act which extended the franchise to non-property owners and created seats of Parliament in some but not all of the new emerging industrial towns. The reform acts were administered by the middle classes who favoured low rates and supported an inefficient and unjust taxation system, producing inadequate sources of revenue. Consequently, these changes did not impact positively on the low levels of spending on drainage and water supply.

As we have seen from the national picture, the nationwide cholera epidemics of the early 19th century eventually lead to a Royal Commission in 1843 to investigate their causes. After several more years of campaigning by amongst others Edwin Chadwick, the Public Health Act of 1848 was passed by Parliament which created the General Board of Health.

The General Board of Health had the power where local death rates were high (in excess of 23 per thousand population), to undertake their own investigations and establish a Local Board of Health which would have wide reaching powers of water supply, drainage, sewage and others, in effect becoming the local authority. Elsewhere there needed to be a petition from ratepayers before the General Board would commission an investigation. The death rate in Darlington was below the 23 per thousand, but this was an average and hid areas of high mortality in parts of the town. The push for a Local Board of Health came from the town's merchant classes in particular the Quaker families such as the Peases and Backhouses.

While the motives of Edmund Backhouse, Joseph and Henry Pease to provide clean drinking water and healthy sanitary living conditions for Darlington were no doubt sound, as major employers they also had every reason to do all in their power to foster a healthy work force. Their enthusiasm to create the Local Board also needs to be seen against their other business interests which included the creation of the private Darlington Gas and Water Company at almost the same time that the petition for the Local Board was being raised. This meant that many of the same people were going to be in effect the local authority with a remit to provide clean water, and also the directors of a company who could sell that very water. Despite other philanthropic work such as the formation of a committee to establish public swimming and bathing baths in 1848⁹, this was to lead to vast profits and accusations of if not corruption then unsavoury business practice.

The petition to the General Board of Health for an inquiry at Darlington was to come from J.S Peacock, the solicitor for the Darlington Gas & Water Company in 1849. This was only after there had been a heated debate in the town between a reported minority wanting an inquiry and clean water, and what became known as the 'Dirty Party' who saw no need for an inquiry. The required percentage of more than a tenth of the 1,710 eligible ratepayers supported Peacock and beginning on 24th October 1849 William Ranger, the superintending inspector of the General Board of Health, began the first of six sittings of evidence and the inspection of streets, factories and the town.

Ranger's report was completed in March 1850 and in June some 280 copies were circulated or sold around the town. The report recommended the creation of a Local Board of 18 members who would

⁹ Darlington & Stockton Times 1848, 3rd of June

be elected by those voters eligible in the town due to owning property of sufficient value, democracy this certainly wasn't!

The position of the leading industrial and merchant families of the town, many of them Quakers or Methodists, was a self-interested one in that they needed a fit and healthy workforce, but also seems to have been a very philanthropic position as well. Joseph Pease was reported to have believed that the frequent use of water to be helpful to morals and religion as well as health and comfort¹⁰. The Darlington & Stockton Times itself was a leading campaigner for sanitary improvements and reform and in a leader article of October 19th, 1849 wrote under the heading 'Influence of Masters on the Physical and Moral Condition of the Working Class', of the duty of masters (factory and property owners largely), to stamp out intemperance (drunkenness), discourage all forms of sexual association except in marriage and promote personal cleanliness. Clean water was seen as so much more than improved sanitation but a means to improve the morals of the town!

The new Local Board of Health was monopolised by the Quakers, and in particular by members of the Pease family, a plural and cumulative voting system gave eleven members of the Pease family 115 votes, thus ensuring their continued service on the Board. The first board of 18 members included 11 who were directors and shareholders of the very recently established Darlington Gas and Water Company, compounding the position of the wealthy industrialists of the town who despite clear moral and philanthropic motives for improving the water and sanitation of the town, clearly had obvious vested interests as they were major manufactures and employers.

On the creation of the Local Board of Health Dr. Stephen Piper was appointed as their Chief Medical Officer, Piper had previously served for 10 years as the Poor law Union medic and was to serve for another 31 years with the Board of health and its successors. A member of the Royal College of Surgeons and an energetic pioneer, his initial detailed and hard-hitting report on local health in the town so shocked the Board that they prevented its publication. Modest death rates of 10 per thousand in the better off areas of the town were found in comparison with 44 to 56 per thousand in the crowded and squalid conditions elsewhere with 10 or 12 people sharing one room. In Punch Bowl Yard, Skinnergate he found two small rooms occupied by 15 Irish, all suffering with typhus

The Darlington Gas and Water Company (DG&WC)

In 1845, some five years before William Ranger's inquiry and three years before the General Board of Health had been established an advert appeared in the London Gazette noting the intention to incorporate a new company;

*'the Darlington Gas & Water Company, with power to light with gas and supply with water, the several townships of Darlington, Blackwell, Cockerton and Haughton-le-Skerne'*¹¹.

Prior to this when water companies had been set up it had more often than not required a specific Act of Parliament, a complicated and potentially expensive business but one with precedent such as the Sunderland and South Shields Water Company of 1778. To get around the need for new Acts of Parliament every time a water company was set up, in 1847 the Water works Clauses Act was

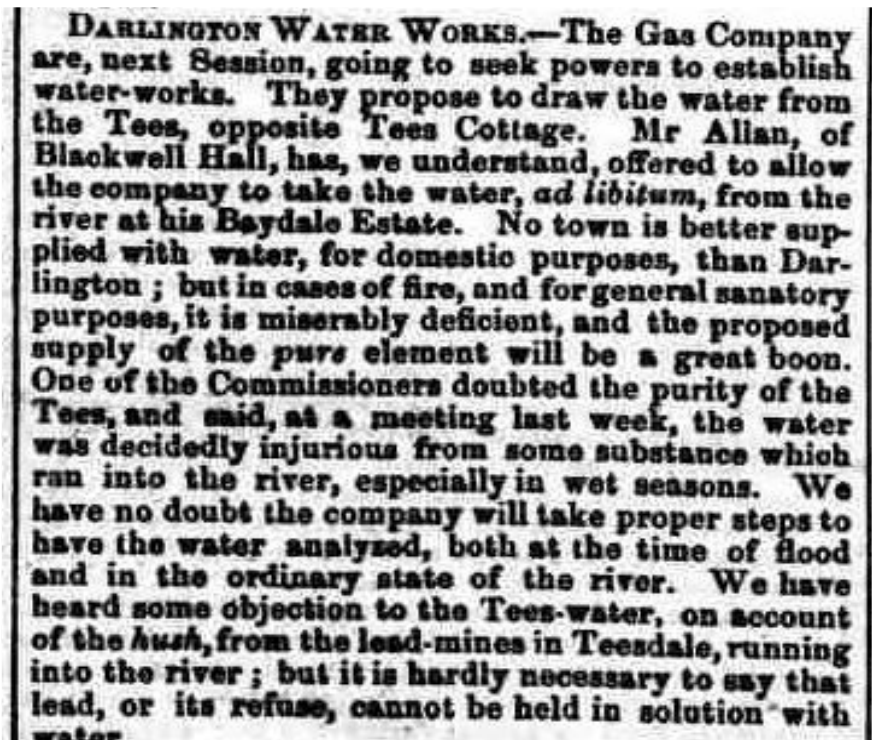
¹⁰ Darlington & Stockton Times, 1855, April 28th

¹¹ The London Gazette, 1845, Part 6, p173.

passed. This placed a duty on local authorities where they existed to supply water, and for companies to be created with a straight forward Act of Parliament provided they kept to broad standards and procedures identified in and allowed by the Act of 1847.

In 1848 the Durham Chronicle of Friday 1st of December reported that the Gas Company were to seek powers in the next session of parliament to establish a water-works and that Mr Allan of Blackwell Grange was to allow the company to take the water *ad libitum* (for free) from his Baydale Estate. Although concerns were expressed about the purity of the water from the River Tees, concerns which were to be raised again in the near future.

Figure 8. Durham Chronicle - Friday 01 December 1848



DARLINGTON WATER WORKS.—The Gas Company are, next Session, going to seek powers to establish water-works. They propose to draw the water from the Tees, opposite Tees Cottage. Mr Allan, of Blackwell Hall, has, we understand, offered to allow the company to take the water, *ad libitum*, from the river at his Baydale Estate. No town is better supplied with water, for domestic purposes, than Darlington; but in cases of fire, and for general sanitary purposes, it is miserably deficient, and the proposed supply of the pure element will be a great boon. One of the Commissioners doubted the purity of the Tees, and said, at a meeting last week, the water was decidedly injurious from some substance which ran into the river, especially in wet seasons. We have no doubt the company will take proper steps to have the water analyzed, both at the time of flood and in the ordinary state of the river. We have heard some objection to the Tees-water, on account of the *hush*, from the lead-mines in Teesdale, running into the river; but it is hardly necessary to say that lead, or its refuse, cannot be held in solution with water.

The site chosen for the new water works was adjacent to the River Tees and upstream of its confluence with the River Skerne and so not polluted by the town's waste. The earliest depiction of the site is on the Tithe plan of 1843 (figure 9). Here it is shown as open agricultural land, plot 92 and which was under arable cultivation at the time of the survey.

Despite the reported good will of George Allan to allow the water to be abstracted for free, the DG&WC had to buy the site from another member of the family, Ann Allan who at this point appears to have been the owner of the Tees Cottage Estate. The name Tees Cottage comes from the former house on the north side of Coniscliffe Road, known as Tees Grange and which was built in the early years of the 19th century. The Allan's appear to have tried to sell the house and estate lands at least three times previously in 1842¹², in 1846¹³, and again in July 1849¹⁴ (figure 11). It might therefore be imagined that a sale to the DG&WC would be welcome but there does appear to have been some disagreement over the price which had to be resolved through a compensation claim at the Durham County Sherriff's court in December 1849 when Ann Allan was awarded £300 for the land and a further £250 for the inconvenience of the severing of parts of her estate¹⁵. From the dates of the different documents it appears the land for the Water Works was sold independently of the remainder of the Allan estate, much of the rest of which north of Coniscliffe Road opposite the Tees Cottage

¹² York Herald 29/01/1842

¹³ Newcastle Guardian and Tyne Mercury 6/6/18

¹⁴ Durham Chronicle 27/7/1849

¹⁵ Durham record Office DRO Q/D/US 4/1 (3)

Tees Cottage.

works was in a relatively short space of time to become the Broken Scar Works of the Stockton and Middlesbrough Water Company.



Figure 9. Tithe plan of 1843 showing the location of the water works site shortly before it's construction. The site now occupies field 92 (outlined). The Tees Cottage house of the Alan family with its stables and policies can be seen to the north-east.

As late as 1848, water supply in the town was still a problem and often being taken from the Skerne and transported by cart for general town cleaning purposes as a short item in the Darlington & Stockton Times of 29th April 1848 reveals (figure 10).

DARLINGTON.—SUPPLY OF WATER FOR WATERING THE TOWN.—Edward Pease, Esq., with his usual liberality, has given directions for laying down pipes to convey water from the mill dam at the bottom of Priestgate down by the mill, to enable the water cart to be supplied with water without pumping, and only making a small annual charge for the same.

DARLINGTON FIRE ENGINES.—We are glad to have the authority to state that the Committee for procuring a new and efficient Fire Engine are at present in treaty for one, with a sufficient quantity of hose and bucket, and we hope to be able to state in our next number that they have concluded the contract.

THE WAX FIGURES.—The Central Hall still continues attractive and has become a fashionable promenade.

Figure 10. D&S Times April 29th 1848, notes the supply of water for general purposes such as street cleaning, still being taken from the River Skerne

**TEES COTTAGE ESTATE,
NEAR DARLINGTON.**

**TO BE SOLD BY AUCTION,
BY MESSRS BOWMAN AND WATSON,**

*At the house of Mr Turner, the King's Head Inn,
in Darlington, in the County of Durham, on
TUESDAY, the 31st day of July, 1849, at Three
o'clock in the Afternoon,*

Subject to such Conditions as shall be then and there
produced, and either altogether or in Lots, as
may be agreed upon at the time of Sale,

ALL that truly-valuable ESTATE, situate on
the Banks of the River Tees, and about two
miles West of the Town of Darlington, consisting
of a Mansion House, called "Tees Cottage," with
Garden, Coach-house, Stable, and other requisite
Outbuildings, now in the occupation of George
Thomas Allan, Esq.

ALSO, all those TWO COTTAGES, with all ne-
cessary Farm-buildings, now in the occupation of
Messrs Brack and Farthing, and the following
CLOSES of Arable, Meadow, and Pasture Land,
known by the several names, and containing the
several quantities hereinafter ment oned, be the
same, or any of them, more or less,—namely:—

	A.	R.	P.
Low Leazes (including the Garden and site of the Mansion House, and other Buildings)	3	3	23
Middle Leazes	7	0	26
High Leazes	4	3	3
East Badle	6	1	12
West Badle	4	0	9
North Badle (including Two Planta- tions therein)	8	0	0
Winter Leazes	6	2	25
Another Winter Leazes	3	2	1
Another Winter Leazes	3	3	27
Bank Close	3	2	30
Another Bank Close	0	2	35
Part of Blackwell Holme (including part of the Plantation on the North side thereof)	3	0	30

Total, 60 3 21

About 39 Acres of the above Estate are Freehold,
and the remainder is Copyhold of the Manor of
Bondgate, in Darlington, the Fine being small and
certain.

The Mansion-House contains spacious Dining and
Drawing Rooms, Breakfast Room, and 7 Lodging
Rooms, Kitchens, and other requisite Offices, and is
most delightfully situated, commanding extensive
views of the River Tees and the adjoining Country;
and to a Gentleman fond of Field Sports the Estate
offers a favourable opportunity for Investment, being
within easy distances of the Raby, Hurworth, and
the County of Durham celebrated Packs of Stag and
Fox-Hounds.

For further Particulars, and to see a Plan of the
Estate, apply to Mr GEORGE ALLISON, Solicitor,
Darlington; or to Messrs UPTON & CLAPHAM,
Solicitor, Leeds.

Figure 11. Sale notice for Tees Cottage house and estate from the Durham Chronicle 27/7/1849

Tees Cottage.

On the 6th of January 1849 the York Herald reported a subsequent meeting of the company where the draft of the proposed Act was debated and Short Bushel Hill identified as the site of a reservoir to store the water and provide sufficient height to supply the town (figure 12).

WATER-WORKS.—On Tuesday last, a special meeting of the shareholders in the Darlington Gas Company, was held at the King's Head inn, for the purpose of hearing read over the draft of a proposed act "for lighting with gas and supplying with water, the town and borough of Darlington, and the suburbs thereof." Mr. John Buckton took the chair. J. S. Peacock, Esq., read the clauses of the act, and explained the effect of each, after which a resolution, approving of the bill, was carried by 16 to 5. The water is to be drawn from the Tees near Tees Cottage, and conveyed to the service reservoir on Short Bushel hill, which is at a sufficient elevation to send the water to the top of the highest house in the High-row.

Figure 12. York Herald - Saturday 06 January 1849

Clearly confident the required Act of Parliament would be passed without undue delay; the DG&WC placed a tender advert in the Darlington & Stockton Times on 10th of March 1849 for the provision of metal pipes with which to deliver water to the town (figure 13).

**DARLINGTON GAS AND WATER WORKS
COMPANY.**

TENDERS FOR WATER PIPES.

THE DIRECTORS of this Company are ready to receive TENDERS for the SUPPLY of 550 TONS of CAST METAL PIPES, according to Specification.

The Tenders to be lodged at this Office (sealed up, addressed to the Secretary, and marked "Tenders for Pipes.") on or before Saturday the 17th day of March, 1849.

The Directors do not bind themselves to accept the lowest Tender.

Tenders will not be received upon any other than the printed official form, which, with the Specification may be had on application at this Office; or at the Office of Mr GEORGE MASON, C.E., on or after Monday the 12th inst.

HENRY ROBINSON, SECRETARY.
Darlington Gas and Water Co.'s Office,
Central Buildings, Darlington.
March 9th, 1849.

Figure 13. Darlington & Stockton Times 10th March 1848; The DG&WC invite tenders for the supply of water pipes.

The Darlington Gas & Water Company (DG&WC), was incorporated by an Act of Parliament in 1849 and which cleared the Houses of Parliament on the 11th of May. The original shareholders shown in the Act of Parliament were Edmund Backhouse, William Backhouse, John Buckton (d), Edward Kipling, Alfred Kitching (d), Henry Pease, John Pease (Chairman) and Joseph Pease.

It would seem that the company moved swiftly on from this to commissioning designs from Thomas Hawksley and Company of Nottingham, arguably the most notable designers and engineers of water works in 19th century England. At the first general meeting of the company held on the 9th of June 1849 in the Central Buildings, Darlington, Hawksley addressed the board and shareholders recounting that they could expect a good return on investment but only if they had buildings and engines of the highest quality¹⁶.

Four drawings/plans survive in the archive of the Science Museum showing the external elevations of the proposed buildings and cross sections illustrating the internal arrangement of boilers and beam engine¹⁷. The drawings are dated June 1849. This is presumably early in June as on the 16th of June 1849 an advert appeared in the Newcastle Journal, signed by the DG&WC secretary Henry Robinson, requesting tenders for the supply of a 27inch double powered condensing engine of 5 feet stroke with boilers, pumps, air vessels and other apparatus and appendages complete. Tenders were to be submitted by 6pm on Monday 25th of June. The advert also asked for prices to erect an engine house, boiler house, chimney, two filter beds, tank and other works at Tees Cottage as well as a service reservoir and other works at Short Bushell Hill (figure 14). Tenders were to be received by 6pm Monday 9th of July. The advert confirms that Mr Mason was the resident engineer and Thomas Hawksley of Nottingham the Engineer.

Beam engines had by this time been reliably used for many years for pumping and powering machinery, draining mines and for water supply. As early as 1791 John Kendrew had installed a Boulton & Watt beam engine in his Darlington mill. This together with the growing success of steam locomotives and stationary winding engines on the Stockton & Darlington Railway since 1825 would have meant there was a local work force with experience of such machines. The size of the engine at Tees Cottage was modest by international standards, in the same year it was being built the 'Cruquius engine' in Holland had started work draining the Haarlemmermeer, built by Harvey & Co, of Hayle, Cornwall this was perhaps the largest beam engine ever built with a piston of 144 inches (3.7 m), dwarfing the first Tees Cottage engine.

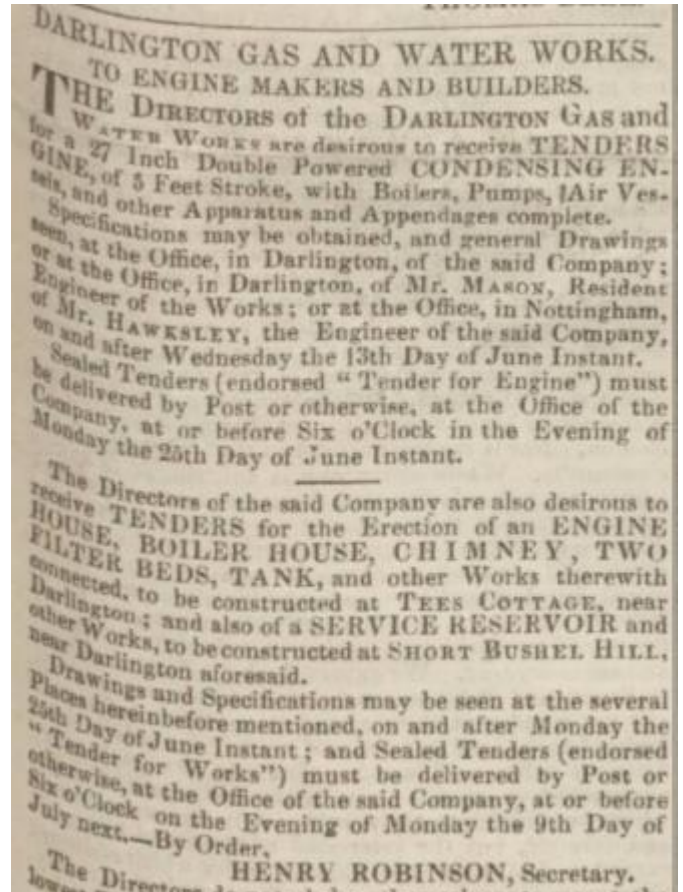


Figure 14. Newcastle Journal - Saturday 16 June 1849.

¹⁶ Darlington & Stockton Times 16th June 1849.

¹⁷ Science Museum Archives, HAWK2, E19, E20, E21, E22

Thomas Hawksley (12 July 1807 – 23 September 1893)



Mention has been made several times in this history of Tees Cottage of Thomas Hawksley as the engineer and designer for both the DG&WC and for the Local Board of Health. Hawksley was born in Arnold, Nottinghamshire and as a young man working for the Trent Waterworks Company in 1831, he designed the country's first water system that provided a supply at constant high pressure, so preventing any contamination from entering the mains. He was a remarkable figure in British 19th century civil engineering, and through the company he founded was hugely influential across the country in the design and construction of water supply and coal gas engineering projects. Hawksley was, with John Frederick Bateman, the leading British water engineer of the nineteenth century and was personally responsible for upwards of 150 water-supply schemes in the British Isles and was honoured overseas in Sweden, Denmark and Brazil for solving their water distribution and storage problems. He

was elected president of the Institution of Civil Engineers, Institution of Mechanical Engineers and Institution of Gas Engineers and in 1878 he was elected as a Fellow of the Royal Society¹⁸. Thomas moved his practice from Nottingham to London in 1852 and in the process founded what has become a global company with over 6,000 employees. His son Charles joined him in 1866 creating T&C Hawksley, followed by his grandson Kenneth and his great-grandson, Thomas Edwin, who headed the company until 1972. Following a merger with public health engineers J.D. and D.M. Watson, the company became, in 1978, Watson–Hawksley, Montgomery–Watson–Hawksley in 1992 and finally MWH in 1997. The Institution of Mechanical Engineers still holds an annual lecture in his memory.

Hawksley and his company were to be long term advisors and engineers at Tees Cottage being responsible for the design of not only the works of 1849, but the major expansion of the early 20th century. Sets of plans by the Hawkley Company are held as part of the Science Museum's archive. The 1849 plans held by the Science Museum in the Hawksley Archive appear to have been part of the tendering process and to have been returned signed by a number of people bidding for the work, including Mark Temple, Robert Duck and Robert Graham (figures 15, 17, 18). The plans do however raise a few questions as while being similar the buildings shown do not appear to be identical to those which were built.

Both drawing E19 and E20 show the North and East elevations of the proposed water works building. These are clearly parts of the building now known as the West Engine House on site today. It appears clear however that the building as constructed varied from both of the original proposals and has of course been altered several times since.

¹⁸ https://www.gracesguide.co.uk/Thomas_Hawksley

Tees Cottage.

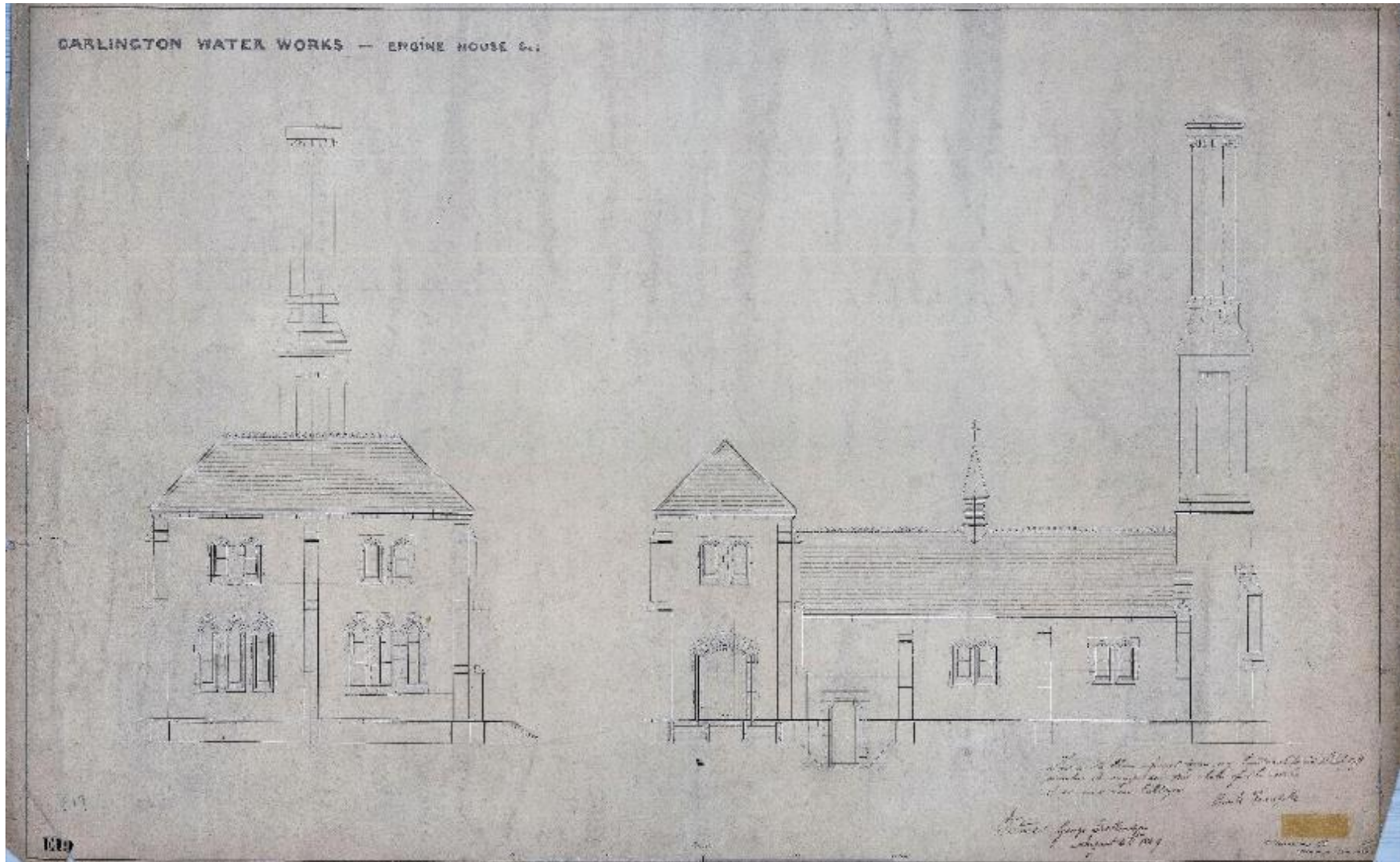


Figure 15. Drawing E19 by Hawksley & Co. dated 1849 and showing the east and north elevations of the proposed West Engine House. Together with drawing E20 (below), these appear to have been issued as tender documents. The buildings as constructed were adapted and included elements of both drawings. Original drawings are copyright the Science Museum and held in their Wroughton archive ref HAWK2- E19.

Tees Cottage.

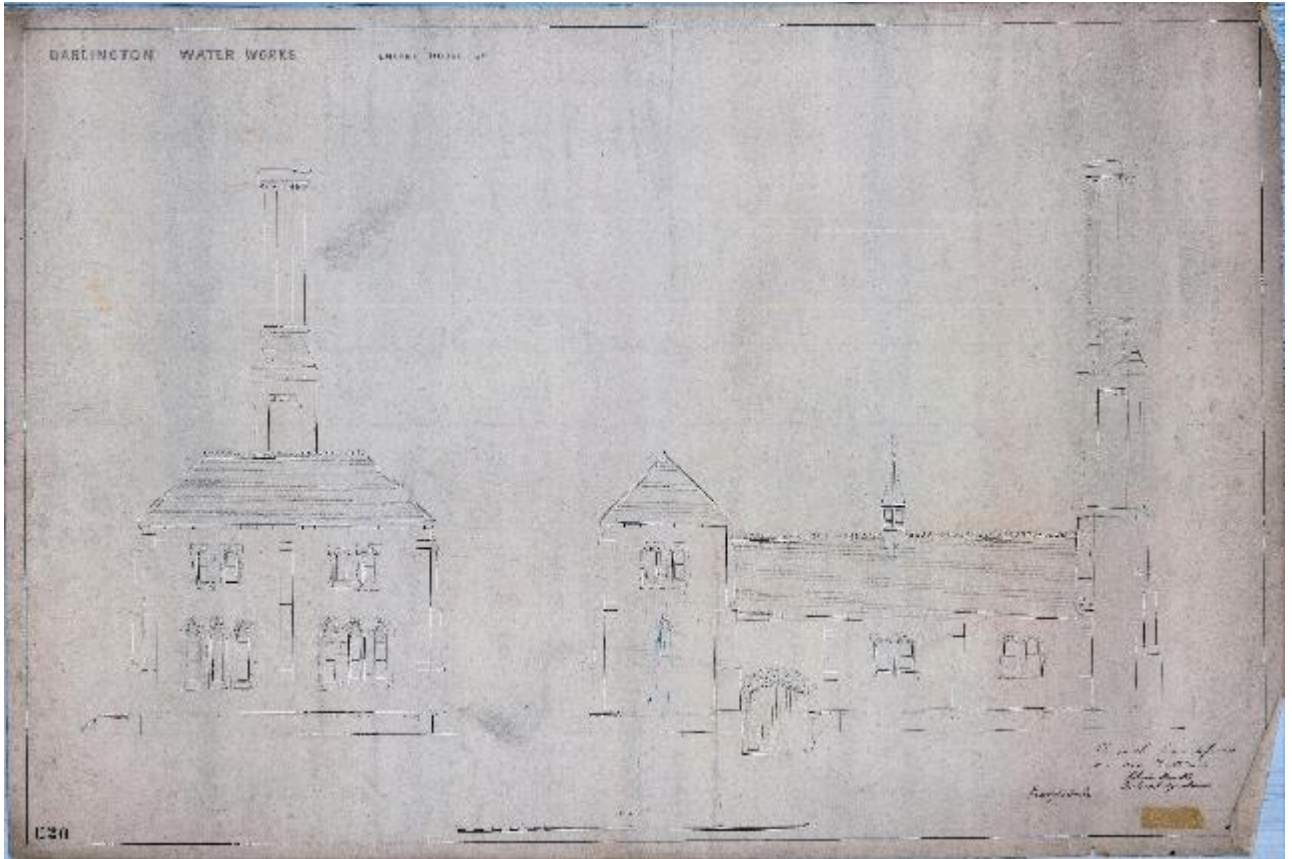


Figure 16. Drawing E20 by Hawksley & Co. dated 1849 and showing alternative proposals of the east and north elevations of the proposed West Engine House. Together with drawing E19 (above), these appear to have been issued as tender documents. The buildings as constructed were adapted and included elements of both drawings. Original drawings are copyright the Science Museum and held in their Wroughton archive ref HAWK2- E20. Below are views of the north elevation as built which includes detailed differences from the Hawksley drawings E19 and E20 above, the main being an additional engine house at the east end.



Tees Cottage.

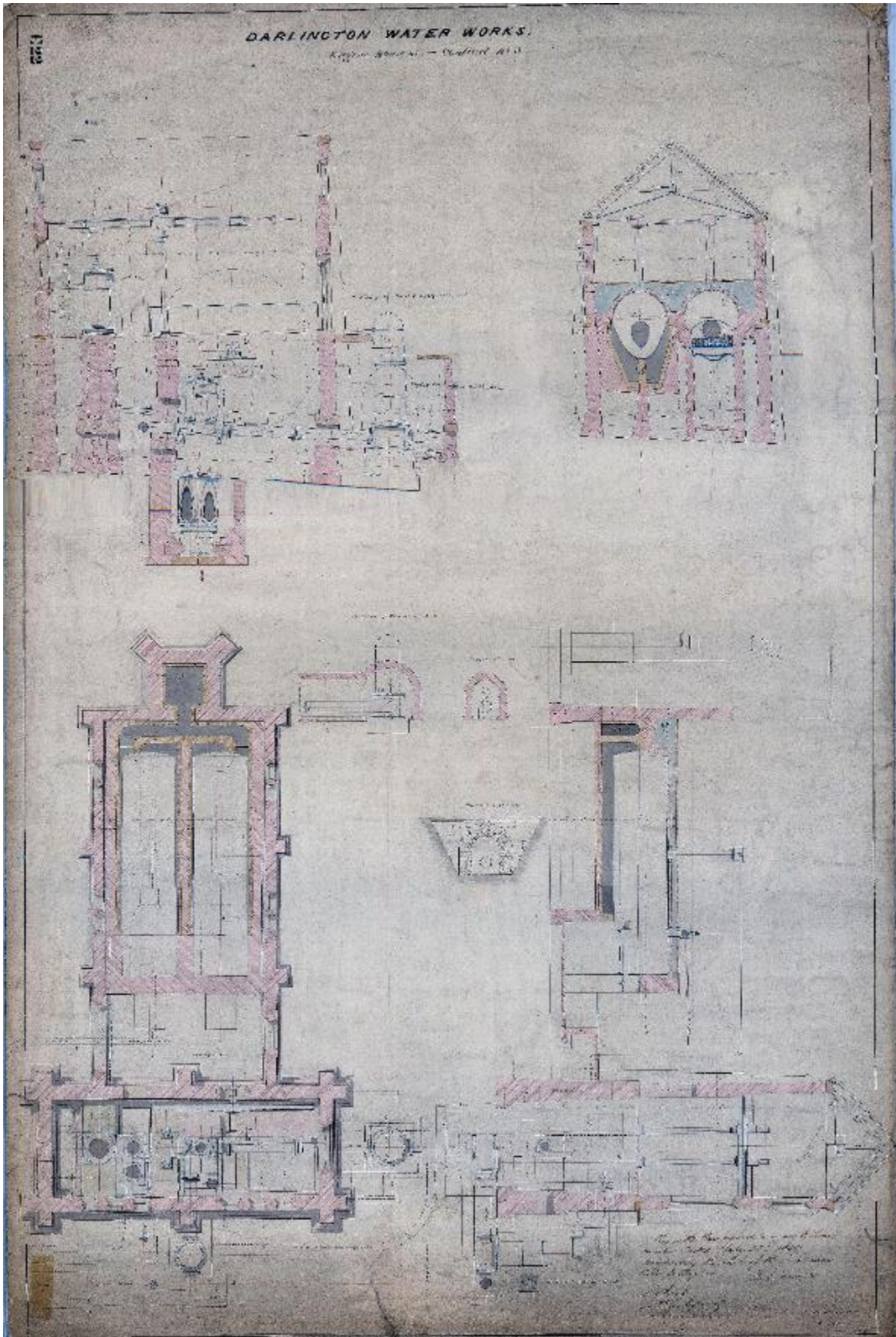


Figure 17. Proposed plan E22 of June 1849 West Engine House by Hawksley & Co. Contract No. 3. witnessed by Henry Robinson 23 Jul 1849, secretary of the DG&WC. Original drawings are copyright the Science Museum and held in their Wroughton archive ref HAWK2- E22

Tees Cottage.

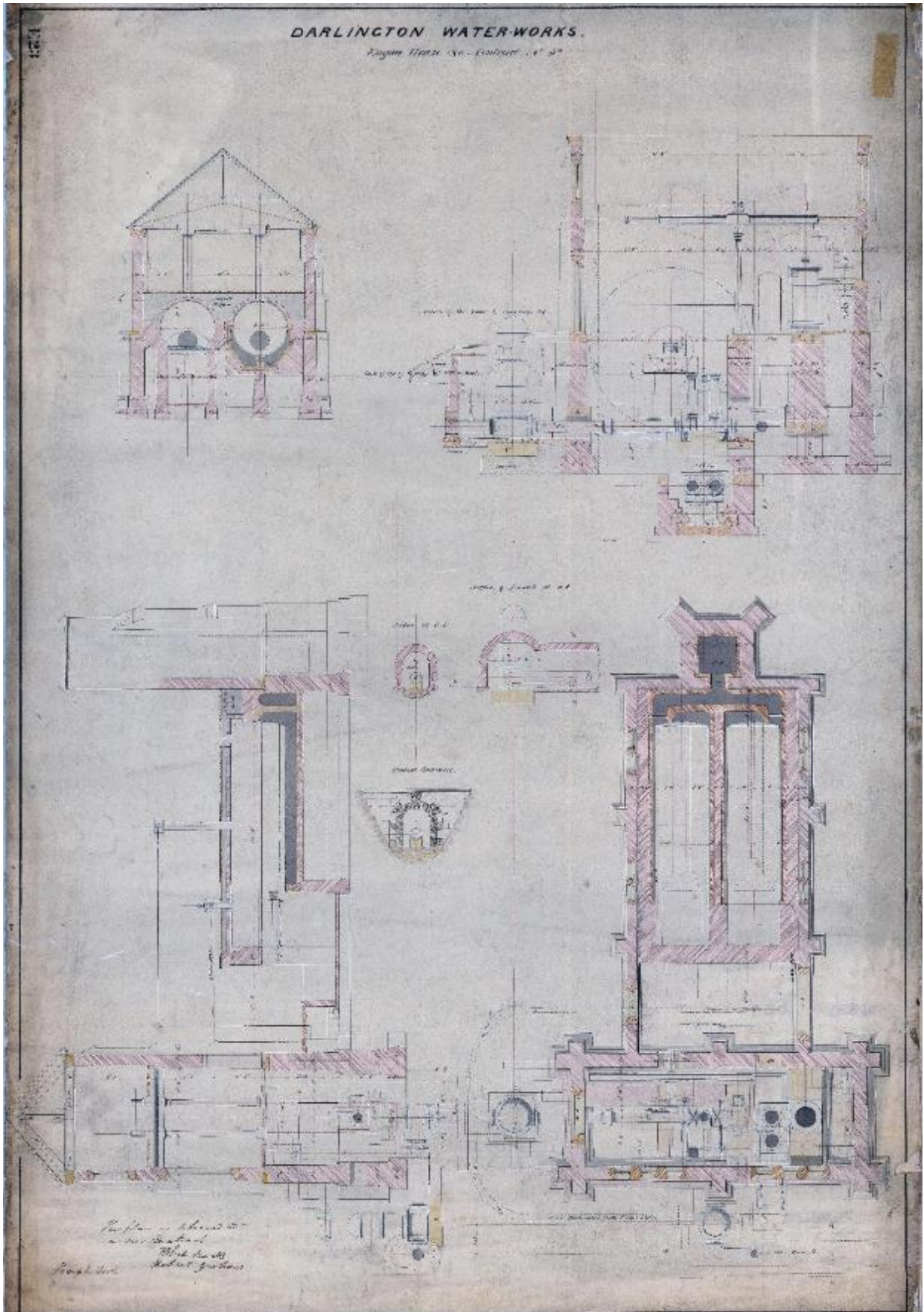


Figure 18. Proposed cross-sections E23 of June 1849 West Engine House by Hawksley & Co. Contract No. 3. witnessed by Henry Robinson 23 Jul 1849, secretary of the DG&WC. Original drawings are copyright the Science Museum and held in their Wroughton archive ref HAWK2- E23

Sand, Filter Beds and Reservoirs

The tender issued by the DG&WC in 1849 aside from the engine and engine house also required the construction of 'filter beds' and a reservoir. The filter beds were essential to purifying the water drawn from the Tees to make it potable. Slow sand filters were first used at Paisley in Scotland around 1804 and on a larger scale at the Chelsea Waterworks of 1829. Slow sand filters work by using a complex biological film that grows naturally on the surface of the sand. The sand itself does not perform any filtration function but simply acts as a substrate.

Slow sand filters work through the formation of a gelatinous layer (or biofilm) called the hypogean layer or *Schmutzdecke* in the top few millimetres of the fine sand layer. The *Schmutzdecke* is formed in the first 10–20 days of operation and consists of bacteria, fungi, protozoa, rotifera and a range of aquatic insect larvae. As the epigeal biofilm ages, more algae tend to develop and larger aquatic organisms may be present including some snails and Annelid worms. The surface biofilm is the layer that provides the effective purification in potable water treatment, the underlying sand providing the support medium for this biological treatment layer. As water passes through the hypogean layer, particles of foreign matter are trapped in the mucilaginous matrix and soluble organic material is adsorbed. The contaminants are metabolised by the bacteria, fungi and protozoa. The water produced from an exemplary slow sand filter is of excellent quality with 90-99% bacterial cell count reduction.

Slow sand filters slowly lose their performance as the biofilm thickens and so reduces the rate of water flow through the filter and eventually it is necessary to refurbish the filter. Two methods are commonly used to do this. In the first, the top few millimetres of fine sand is scraped off to expose a new layer of clean sand. Water is then decanted back into the filter and re-circulated for a few hours to allow a new biofilm to develop. The filter is then filled to full volume and brought back into service. The second method, sometimes called wet harrowing, involves lowering the water level to just above the hypogean layer, stirring the sand and so precipitating any solids held in that layer and allowing the remaining water to wash through the sand. The filter column is then filled to full capacity and brought back into service. Wet harrowing can allow the filter to be brought back into service more quickly. Today slow sand filters are often preferred technology in many developing countries because of their low energy requirements and robust performance.

Slow sand filters as their name implies produce potable water slowly and so to cope with fluctuating demand, the cleaned water needs to be stored and hence the need for a reservoir as part of the original Tees Cottage scheme. This was built to the north of Tees Cottage at Bushell Hill on land belonging to Pease family. Water pumped up to the reservoir could then feed by gravity into the town.

Figure 19. Bushell Hill Reservoir from the collection of local historian George Flynn. Image © from the Darlington Local Studies picture collection reference 'E820061371',





Figure 20. 1896 Ordnance Survey map, showing the position of the Darlington Gas & Water Company's original circular reservoir at Bushell Hill west of the town centre and north of the Tees Cottage works. Built in 1849, at 200ft above sea level, Bushell Hill was ideal for a reservoir and held 800,000 gallons of water. The land is now covered by the Mowden Park housing estate built after the land was sold in 1961 and the reservoir drained in 1971. Mowden Park was the residence of John Beaumont Pease who bought the land in the 1840's and had the house built in 1862, only to be enlarged by his son Edwin to the designs of the architect Alfred Waterhouse.

Elsewhere in the UK

The number of water companies increased during the early 19th century, with provision transferring to the private sector in many cities. Although these companies sometimes improved and extended service provision, private enterprise failed to provide adequate supply to the poor. In Bath in 1845, seven companies supplied the city's water as well as the Corporation, but there were only three stand pipes for use by the poor at certain times. Prior to the Waterworks Clauses Act (1847), charges paid to water companies were unregulated. This legislation standardised some practices and charging for domestic and industrial purposes. Although water meters were installed in the late 1800s, universal metering was never carried out. However, things turned full circle as the 1835 Municipal Corporations Act and later Improvement Acts allowed the compulsory purchase of private companies by civic authorities.

Published in 1854 William Langstaffe's History of Darlington runs to several hundred pages and provides much information on both the important and the trivial in the town's history. Langstaffe was however researching and writing at just the time Tees Cottage had begun its life and he reports on many of the issues being argued over by the town regarding the quality of their drinking water. Many of these fears over using or consuming 'Tees water' as opposed to that from wells or pumps clearly have little scientific basis, but show the concerns of the time. Clearly the Local Board of Health and their advisor Dr. Playfair were keen to show the benefits, even noting that Tees water was less hard or softer than local supplies having less lime in solution from underlying rocks, and so would require less soap.

Tees Cottage.

'The degrees of hardness in the springs of Darlington vary from 38 to 70. Of the water in the rivulets, the following report from Mr. Mason to the Board of Health gives the most intelligible idea. Dr. Playfair has stated that ten gallons of water of fourteen degrees of hardness requires three ounces of soap to make it detergent or of a cleansing quality; whereas the softest public pump water in Darlington is thirty-eight degrees, or nearly three times harder. Skerne water contains about eighteen degrees, Cockerbeck twelve degrees, and Tees water three and a half degrees; so that for every ten gallons of water used for washing, pump water will require eight ounces of soap, Skerne three and three quarters ounces, Cockerbeck two and a half ounces and, Tees water three quarters of an ounce; or in money value, with soap 6d per lb, the cost for soap for ten gallons would be with pump water 3d per lb, Skerne 1 ¼ d, Cockerbeck nearly 1d, and Tees little more than a farthing. Infusions of tea, brewing, &c., have given similar results.

The spring water of the town is pleasant to the palate; but the public pumps are insufficient Soft water cannot be obtained in any large quantity. The Darlington gas and water company obtained an act, 12 and 13 Vict. c.73 under which they supply water from the Tees. They take it from near the head of Baydales. Their engine will lift 500 gallons per minute. Their service reservoir is situated in the Hill Close House estate, and will hold 800,000 gallons Another company, formed in 1861, take water hence along the Darlington and Yarm road, and the railway, and supply Yarm, Stockton, and Middlesbrough. They have a second reservoir at Fighting Cocks.*

Many veterans shook their heads at the Tees water when its introduction was mooted. They said that cattle became diseased in the lungs after crazing by the side of the Tees: that cattle imported from Middleton in Teesdale, and the ripe of Swale were a bad speculation, for they, became "balloned," or short winded; that the water was frequently charged with lead by the practice of hushing, and killed the fish; and now were men also to be diseased in the lungs, and balloned, and poisoned. Therefore foot-races would be known only by report of more favoured parishes, and by Stratt's Sports and Pastimes; the gush of melody would be no more heard from the sweet voices of men; but after being a bad speculation to their neighbours, the majestic bipeds would, like the fish, turn upon their backs and perish with uplifted and distorted eye. Others reported that they would be happier and cleaner and healthier: that the beer would be better, and the tea stronger: The fishermen near the lead never saw their joy damped, nor were the cattle balloned so long as they kept at Middleton Teesdale: and mysterious analysts. Professor Playfair among them, found no lead in the inkiest water. They thought the people might still delight in the brisk water from the springs as far as their throats were concerned; and although it is not right for a man to be all white without and corrupt within, there seemed to be no reason why he was to be white within and corrupt without. There seemed no valid objection to fires being extinguished at Darlington, the people were not all fatalists, nor was it clear that an absence of water cleansed the streets and at last opinion began to grow favourable to the Tees water, and another idea arose, that small houses were not quite the places to disport in the water. More room and more Tees water would be better. So, with a subscribed capital of £630, and various munificent donations, some £1,000. was gained, no bad beginning for a convenient array of Public Baths. There is another step in the ladder, men of Darlington! there are institutions called Public Washhouses.¹⁹

¹⁹ Langstaffe, 1854, 331

Langstaffe also notes that by the early 1850's the Board of Health had contracted with the water company for the use of water for firefighting and for cleansing the streets, not just for drinking water supply.

The first beam engine supplied in response to the tender of June 1849 appears to have been built by Gilkes, Wilson & Co of Middlesbrough, this engine is referred to in this report and in earlier studies of the site as **B1**. This must have been in place within the new engine house in remarkably quick time as the first supplies of water to the town appear to have taken place in late 1850. Clearly the engine house to house the engine was completed earlier and is marked by a date stone of 1849. The water supply process followed Hawksley's experienced formula with water drawn from the River Tees, through an intake and culvert, to a 29 ihp steam driven beam engine. This raised the water to slow sand filter beds on the site and then delivered the filtered water through a system of pipes and service reservoirs to the town, which by the census of 1851 had a population of 11,582. The laying of most large pipes during the 19th and early 20th centuries used cast iron with run lead joints. The making of such joints is a complex and skilful operation and often the contractor was required to excavate pipe trenches and support them, supply and lay the pipes, and then wait for the client's engineer or personnel to either make or inspect each run lead joint before the contractor could backfill.

Gilkes, Wilson & Co of Tees-Side Engine works, Middlesbrough

Gilkes, Wilson and Co appear to have provided two of the early beam engines at Tees Cottage. In 1843 Edgar Gilkes was appointed manager at Middlesbrough of a branch establishment of the Stockton & Darlington Railway for the repair of rolling stock, under the name of the Tees Engine Works. The following year together with Isaac Wilson, Gilkes established the company as the Tees Engine Works, pioneers of the engineering trade in North East England. In 1847 Locomotive building commenced largely for the Stockton & Darlington Railway. By 1852 the Partnership involved several notable engineers such as William Bouch, Edgar Gilkes, Isaac Wilson, and Charles Albert Leatham and were trading as Gilkes, Wilson, and Company, at Middlesbrough, Engine Builders and Iron Founders at Lower Commercial St, Middlesbrough. In 1865 Gilkes, Wilson and Co merged with Hopkins and Co and the name became Hopkins, Gilkes and Co. The firm undertook design, construction and manufacture of the ironwork for the Deepdale viaduct on the Stainmore Railway Company to a design of Thomas Bouch and Robert Henry Bow. In 1875, the name changed again to the Tees-side Iron and Engine Works Company Limited, having built 351 locomotives in total. Subsequently the firm worked with Bouch on the Tay Bridge, and had their reputation very badly damaged as a result of the Tay Bridge Disaster. The 1870s Long Depression forced several Cleveland iron firms out of business including Hopkin Gilkes and the company closed in 1880.

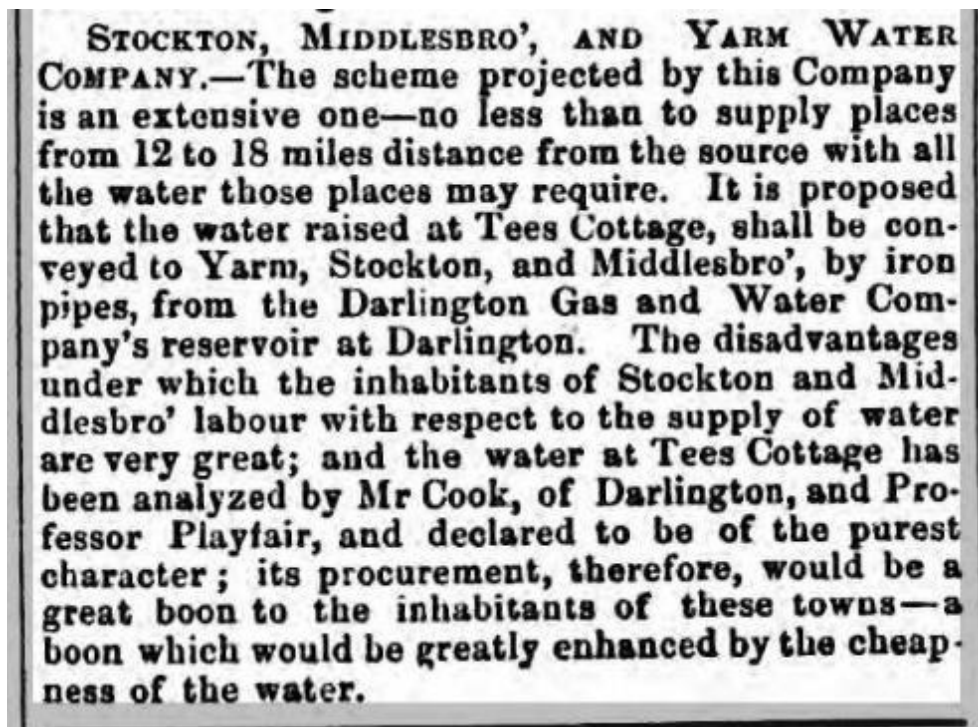
The charges for water for domestic use were based upon the yearly rental value of a property, and ranged from the lowest, those with rents below £3 per year, who paid 1d per week, through those of £4 to £5 paying 1/6d per quarter, up to those with yearly rent of £100 or more, who paid 15/- per quarter for their water supply. There was an extra charge for "each water closet or immersion bath" which varied from 1/6d each for the cheaper houses up to 2/6d each for the dearest houses, reflecting in part the social status and distinctions between households. There were also strict conditions for all those receiving a supply as to the quality of pipes and cocks which had to be used in all premises, to minimise any water losses.

Tees Cottage.

As Langstaffe had reported in his history of the town, the people of Darlington didn't at first care much for the new water because it had a peaty colour, coming as it did straight from the River Tees, which is fed by upland streams from the peat moorland. After one year's operation only 230 customers were connected to the new supply although this did include not only domestic but industrial customers such as the Stockton & Darlington Railway, Pease's Mills and several other mills and forges, so whilst numbers were low the demand was much higher than 230 domestic customers might suggest. Nevertheless, the original **B1** 29 hp beam engine was only required to work for 40 hours per week to supply them.

Public opinion did however quickly change when it was observed that "*the beer was better and the tea stronger*", due to the new water being softer than the well water. This clearly fitted in with local priorities for water use and very soon there was wide acceptance of the new water supply. The number of connected customers increased rapidly in Darlington, especially when drought periods depleted the other sources.

As early as December 1850, the Stockton, Middlesbrough and Yarm Water Company (SM&YWC) was reported in the Durham Chronicle proposing to run pipes from Tees Cottage to Teesside, declaring that the water had been analysed by a Mr. Cook and a Dr. Playfair and found to be of the 'purest character'.



STOCKTON, MIDDLESBRO', AND YARM WATER COMPANY.—The scheme projected by this Company is an extensive one—no less than to supply places from 12 to 18 miles distance from the source with all the water those places may require. It is proposed that the water raised at Tees Cottage, shall be conveyed to Yarm, Stockton, and Middlesbro', by iron pipes, from the Darlington Gas and Water Company's reservoir at Darlington. The disadvantages under which the inhabitants of Stockton and Middlesbro' labour with respect to the supply of water are very great; and the water at Tees Cottage has been analyzed by Mr Cook, of Darlington, and Professor Playfair, and declared to be of the purest character; its procurement, therefore, would be a great boon to the inhabitants of these towns—a boon which would be greatly enhanced by the cheapness of the water.

Figure 21. Durham Chronicle - Friday 27 December 1850

Despite a clear need for clean water, the proposal for an Act of Parliament to establish the SY&MWC was not met with wholehearted support in Stockton where a public meeting was held on 14 July 1851 to express dissatisfaction with the "Stockton, Yarm and Middlesbrough Water Bill" currently passing through Parliament, and proposed that a new company be formed to supply the town with water, one that was based in Stockton rather than the 'distant' Darlington (figure 22).

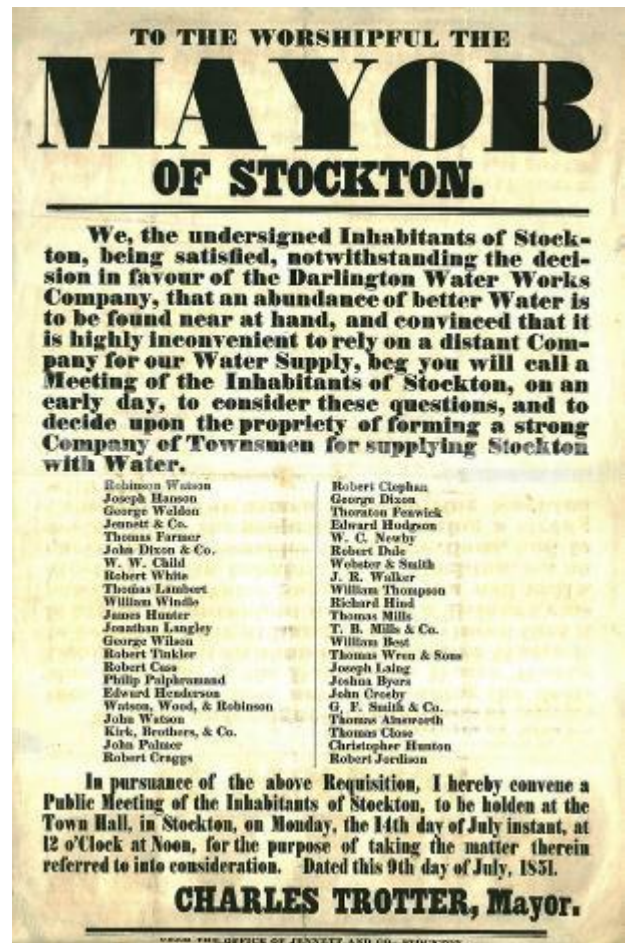


Figure 22. Poster for an unsuccessful attempt to create a more 'local' water company rather than the SY&MWC of 1851, disliked in Stockton because its offices were in Darlington!

Despite these objections, the new SM&YWC received an Act of Parliament in 1851²⁰ which gave them powers to raise money, lay water mains, and buy water from the Darlington company in order to supply it to their own area, on a capital of £22,500. The power of the rapidly expanding railway companies at the time, many of whom had similar if not related directors to the water company, can be seen in the wording of the Act as an extensive part is devoted entirely to protection of the Stockton & Darlington Railway, should it be necessary to lay mains near, under or across railway land.

The 1851 Act contains both extensive provision for a possible merger with the Darlington Gas and Water Company or for either one to buy the other; it also makes no independent provision for the new company to abstract water from the River Tees, or anywhere else. These factors together with the shared site and directors appear to clearly point to an anticipated merger, but one that was as we shall soon see to be frustrated and lead to different paths.

This began in December 1851 when George Mason, the Surveyor for the Local Board of Health had produced a report²¹. In this he clearly stated that the price the Board were paying for water from the DG&WC was too high if they were going to succeed in making the people of Darlington use clean water. His suggestion was that they either needed to build a rival water works or buy Tees Cottage. Clearly as many of the same people or members of the same families were both directors of the DG&WC and sat on the Local Board of Health this presented a serious conflict of interest. The conflict of interest is even more remarkable when it's recalled that George Mason was not only the surveyor

²⁰ The Stockton, Middlesbrough and Yarm Waterworks Act, 1851

²¹ Durham Chronicle 1852, Jan 2nd

to the Board of Health, but also the resident engineer for the DG&WC. In its first years the company appears to have made handsome profits with half yearly dividends for shareholders reported in 1851 of 7% and 10%. These substantial profits and a feeling that the town owed them a debt as entrepreneurs with a right to a profit meant that the Board of the DG&WC were not anxious to sell.

George Mason (1781-1858)

Mason was born in Lanchester on 28th of July 1758. He married Elizabeth Langstaffe of Witton-le-Wear in 1808. He became darlington's first Borough Surveyor in 1811 and was by 1848 the surveyor to the Local Commissioners of Darlington in their work regarding public health and sanitation. He continued this role with the Board of Health when appointed by them, but only on a retainer of £40 per year allowing him to undertake other private practice work, which included being the engineer to the DG&WC. In his private practice he worked with Thomas Hawksley at Bishop Auckland, Durham, Middlesbrough, Hartlepool and Redcar. He also owned a chemical works in Darlington. He and his family lived in Skinnergate in 1841, but by 1851 had moved to Cleveland Terrace reflecting his success and status in the town. He died on the 6th of March 1858

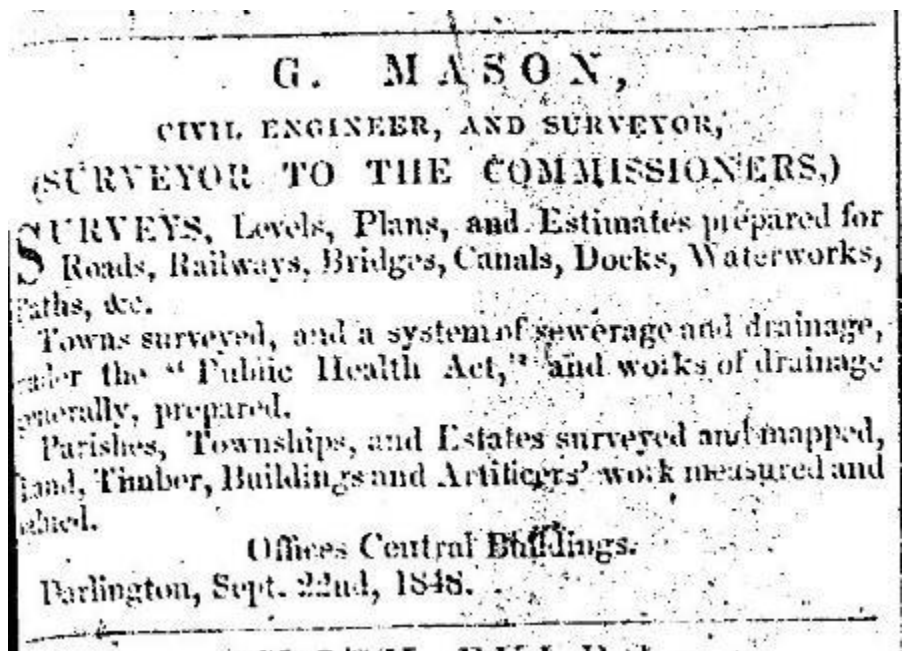


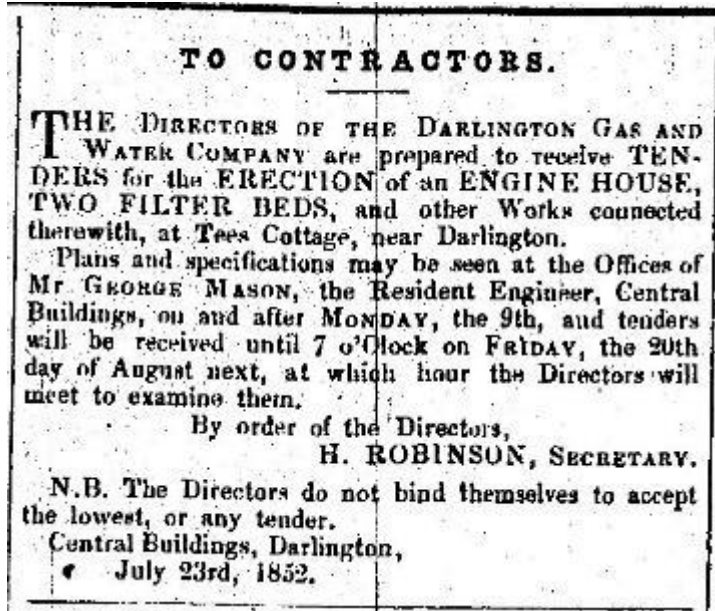
Figure 23. Advert for the practice of George mason civil engineer from the Darlington & Stockton Times of 7th October 1848.

The over capacity of the **B1** engine soon became an under capacity when the success of the new water supply in Darlington created a demand in Stockton and the rapidly developing industrial town of Middlesbrough. Largely the same directors of the DG&WC, many of whom had industrial interests on Teesside, were also directors of the new Stockton, Middlesbrough and Yarm Water Company²². The demand for water from the growing towns and industries of Teesside continued to increase, especially after Bolckow & Vaughan discovered iron ore in the Cleveland hills in the early 1850s.

By June 1852 the first Tees Cottage engine **B1**, and filters were supplying both Darlington and the new company, which had laid mains to Stockton, Middlesbrough and Yarm. In July 1852 the half yearly meeting of the SM&YWC noted that their reservoir at Fighting Cocks with a capacity of one

²² The original shareholders of the Stockton company were, in alphabetical order, H W F Bolckow (d), J H Bowman (d), J Buckton (d), A Kitching (d), C A Leatham (d), T Maclachlan (a), J Middleton, J S Peacock, H Pease (d), J W Pease (d), A Perkins, W Robinson (a), H Robinson, R Thompson (d), W Thompson, and I Wilson (d). Those marked (d) were the original directors of the company, and those marked (a) were two of the three auditors of the company, it can be seen that the company had at least four shareholders in common with the DG&WC.

million gallons of water, was nearing completion²³. This reservoir incorporated a filter to remove atmospheric debris before the water exited, an apparently unique feature²⁴. A tender was also advertised in the Darlington & Stockton Times for the erection of what was to become known as the East Engine House, although sadly the plans referred to in the advert do not seem to have survived



(figure 24). The half yearly meeting of the DG&WC held on the 4th of August 1852 with John Pease Esq. presiding, reported that the Directors had contracted for the erection of another pumping engine at Tees Cottage to meet increased demand from the Stockton, Middlesbrough and Yarm water company. Half year profits were £700. Commissioners of the Poor law had upped the valuation of the companies works from £600 to £1,600 which was noted as “absurd”²⁵.

Figure 24. Darlington & Stockton Times 24th July 1852.

Tragedy was to strike the site and one of the company’s main employees Mr Naisbett, the Engineman only a few weeks later when on the 20th of July a ‘child of two years old’ belonging to Naisbett was reported in the Durham County Advertiser as having drowned in one of the filter beds²⁶.

The problems of digging up and repairing roads and paths to lay water pipes around the town are nothing new, in February 1853 there was a heated argument at a meeting of the Darlington Board of Health on the very issue. The Board who were expending considerable energy and expense paving and cobbling paths and roads in the town were adamant that compensation be paid to make good those paths and roads disturbed for the new water pipes²⁷. The meeting seems to have devolved into an argument of thinly veiled accusations over whether those with interests in both the Board of Health and the Water Company cared more for one than the other! (figure 25).

In April 1853 a new pipe was reported as being laid from the ‘new engine in the course of erection at Tees Cottage’ with the intention of providing an independent pipe to Stockton and Middlesbrough which had until then taken their supply off the Darlington main. The minutes of the DG&WC in August 1853 report a great demand for water from amongst others the Stockton & Darlington Railway at this time and it being supplied by the ‘Westwork and Weigh-house Engine’ presumably **B1**. They also express ‘Hope that the new engine will be at work early next month’. By September 1853 the new works were nearing completion and the new engine **B2**, was steamed for the first time on the 15th of September 1853²⁸. Situated in the East Engine house, this was almost a mirror image of the West Engine House, and in the same architectural style, together with its own filter beds. This was

²³ Durham County Advertiser 20/8/1852

²⁴ J. Prentice, pers comm.

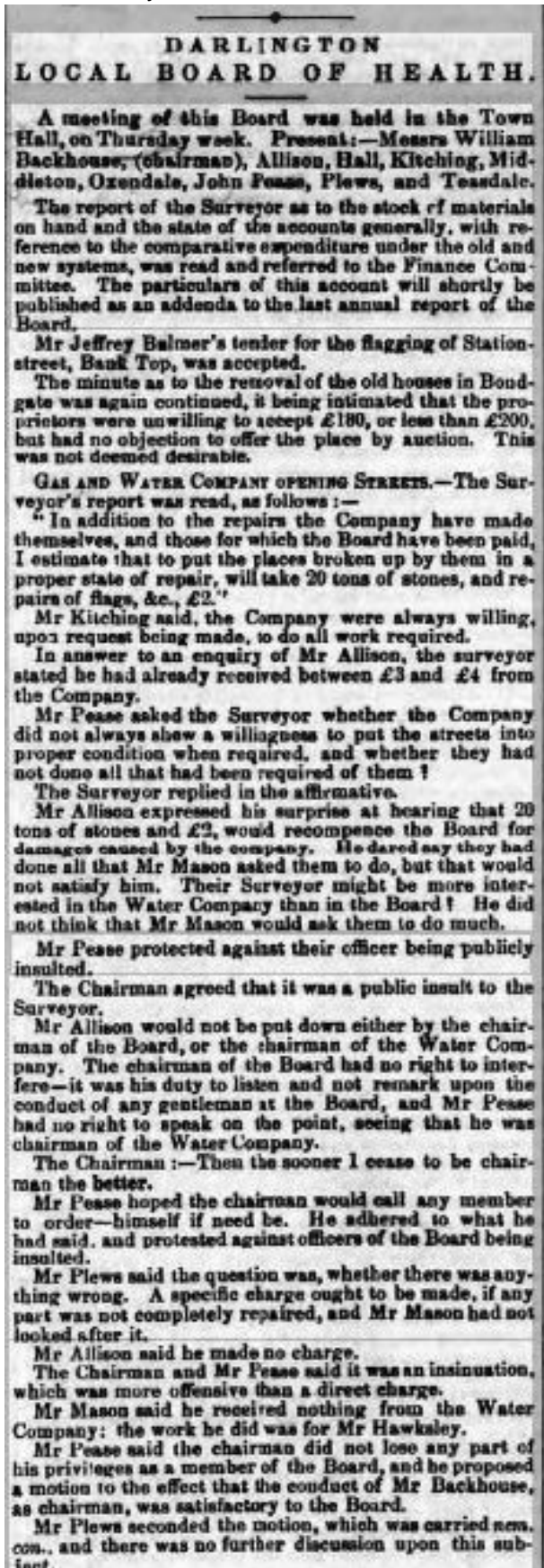
²⁵ Durham Chronicle 6/8/1852

²⁶ Durham County Advertiser 20/8/1852

²⁷ Durham Chronicle 11/2/1853

²⁸ DRO DA/A 3/2/1 Minutes of the DG&WC

equipped with a new beam engine supplied once again by Gilkes, Wilson & Co of Middlesbrough who were paid an interim sum of £500. Gilkes and Co. were to be paid a further sum of £1497 and 8s in January 1854 as final settlement for the **B2** engine. During 1853 Gilkes and Co. also undertook



repairs to the **B1** engine in the West Engine House for which they submitted a claim in December 1853.

The company minutes of 1853/54 also describe some of the more mundane but nevertheless essential expenses to keeping the water works functioning day to day. On the 22nd of September 1853 approval was given to build the Blacksmith's shop, clearly essential for running repairs, in October and again in February 1854 sand and gravel were purchased for the filter beds. A tender was advertised for the supply of coal for the engines in January 1854 with two prices received, one from coal merchants on the Tyne, the other from the more local collieries of Joseph Pease; both priced at 7/6d per ton, but the Pease price included delivery...contract to Mr Pease!

Figure 25. Durham Chronicle 11/2/1853. Account of a rather heated meeting on the damage caused by the laying of water pipes around the town and the sensitivities of some of the same people being on the Board of Health and the DG&WC.

In February 1854 the company reported a healthy profit of £1130.17s which was a 5% return on investment, and despite the looming take over by the Local Board of Health, planned to issue 200 more shares. Substantial continued investment is shown throughout the year when in March of 1854 the laying of a new 8" watermain down Northgate at a cost of £570 was approved, followed by further works in April. The contract for the Northgate works went once again to Gilkes Wilson and Co. in May who appear to have become the company's go to firm for most engineering works. Thomas Hawksley's involvement did continue however and as late as August 1855 his services were being retained for the sum of £280 in connection with the 'last engine and brakes', although the minute book does note that this was in settlement of his final account against the company.

Tees Cottage.

Recruitment of staff continued with a new engineer appointed in September 1854 (possibly an R Thompson?), and in April of that year Thomas Hall jr aged 16 had been taken on as Office Assistant on what appears to have been the very favourable terms of a five-year contract with set annual pay increments rising from £10.8s per annum aged 16, to the grand sum of £35 per annum aged 21. In October 1854 a Mr. Lampton was also appointed on fee of 2s per day as the company's collector of water rates. In April 1855, Mr Naismith the long serving engineman received a pay rise to 7s.7d per week.

All through the period of the construction of the new East Engine House and the laying of pipes to the town, tough negotiations went on through 1852-4, when pressure was brought to bear by the general Board of Health in London on the DG&WC to sell to the Local Board of Health. The added impetus of a Cholera outbreak in 1853, led eventually to the 'Darlington Local Board Act' of 1854 which empowered the Local Board to purchase the lands, plant and effects of the DG&WC. This did however come at a price with the Local Board of Health having to pay £25 for each share which only five years earlier at the start of the company had been valued at £12.10s. The company did not give in easily though and the minute book for 16th of November 1853 notes 'appeal costs' of £240.11.4d, presumably for legal fees to oppose the enforced sale?

On the 8th of December 1854 the board of the DG&WC agreed to sell to the Local Board of Health for the sum of £54,000 less an insurance tax of £7.17.6d. However by the 19th of January 1855 the conveyance had still not been received and it wasn't until August the 8th 1855 that the Board had its final meeting²⁹. At the same time the Board of Health bought the West Engine House, the East Engine House and its filter beds, supplying Stockton and Teesside was sold to the SM&YWC.

In Darlington the impression that the Pease family and their allies had made a killing at the expense of the town was to leave a long lasting sour note. The same issue was to arise again less than 20 years later when largely the same families and directors who were also investors in the Stockton & Middlesbrough Water Company which was to develop the adjoining Broken Scar water works, resisted attempts to buy them out here by the councils of Stockton and Middlesbrough until as late as 1876. Even when they did sell after a hard struggle before Parliament they received £800,000 some £300,000 more than the town corporations expected to pay and £200,000 more than the sum the company had been prepared to sell at³⁰!

The development of the Tees Cottage site at this time is captured in the first edition of the Ordnance Survey which was surveyed in 1855 and published in 1859 (figure 27). Here can be clearly seen the two engine houses, the filter beds and the Engineman's Cottage which at this point appears to not have been extended to the west yet. What aren't apparent are the Blacksmiths' workshop and the Weigh House (not the current but an earlier one), both referred to in company minutes of 1853 as either being approved to be built or in place. Inaccuracies in mapping may account for this, but more likely is that both were built very shortly after the survey of 1855. Coniscliffe Road is still at this date more of a country lane and will in future years be widened and straightened. To the north of the road the farmhouse at Broken Scar can be seen amongst open fields shortly before the development of the SM&YWC works.

²⁹ DRO, Minute books of the Darlington Gas & Water Company, DA/A 3/2/1

³⁰ Smith, 1967, 7

Tees Cottage.



Figure 26. Blacksmith's Shop, north and west elevations and interior. The building was authorised by company minute of 22/9/1853 but seemingly not built till after the 1st Edition OS survey of 1855.

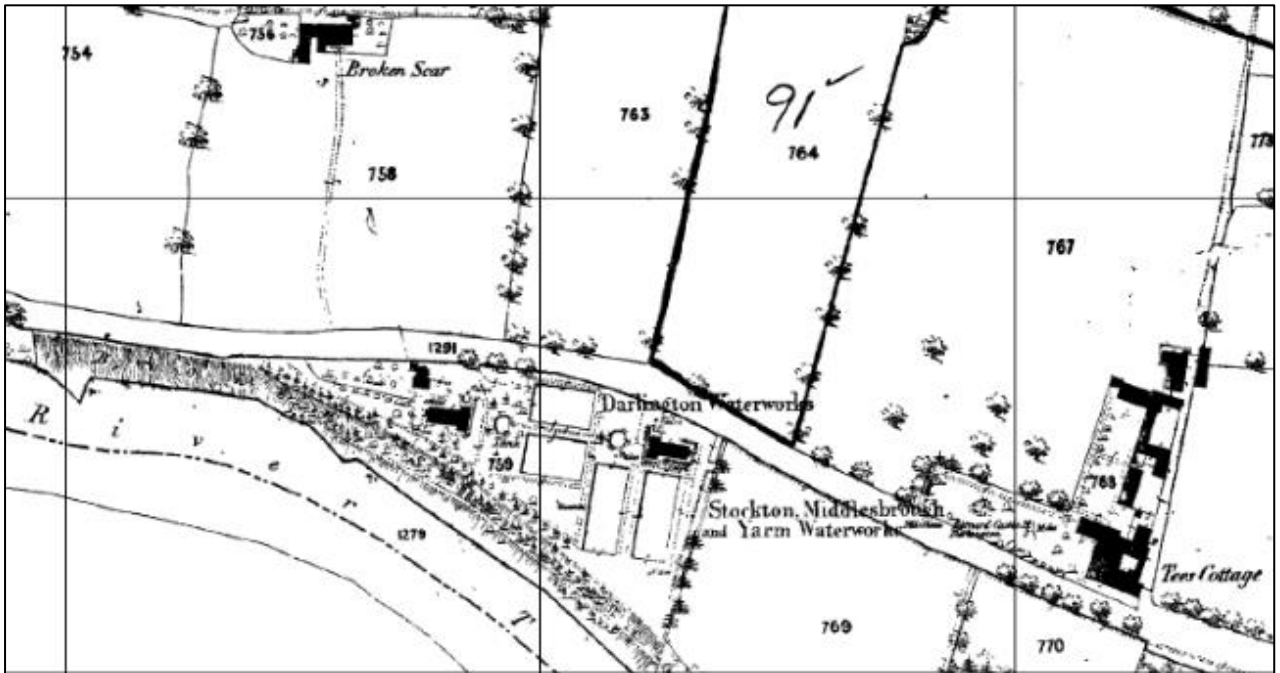


Figure 27. 1st edition Ordnance Survey mapping. Surveyed 1855, published 1859

The SY&MWC had been experiencing significant increasing demand for water since 1851 from the growing towns of Teesside and in 1854 obtained a new Act of Parliament '*The Stockton, Middlesbrough and Yarm Waterworks Act*' which extended the supply area of the company to include Norton, Coatham and Redcar. The wording of the Act also suggests it gave the company powers to construct a reservoir in the parish of Dinsdale, near the Middleton and Dinsdale Station of the Stockton & Darlington Railway, but without any specific indication of the location, type or size of this reservoir. Worthy of note is that there is still no provision for abstraction of water from the Tees or any other source and the Act confirms that the SY&MWC shall continue to have the right and duty to buy its water from the Darlington company, and the latter shall have the right and duty to supply the same, unless and until the two companies shall at some future time merge. Clearly

Tees Cottage.

despite the forthcoming purchase of the DG&WC by the Board of Health, the two companies still shared many interests and aspects of ownership.

Following the purchase of the DG&WC by the Board of Health in 1854, clearly the affairs of the two water companies needed further separation and in particular the SY&MWC needed its own rights to abstract water rather than buying from Tees Cottage. In 1858 '*The Stockton and Middlesbrough Waterworks Act, 1858*' was passed. The preamble to this Act makes reference to the sale of the Darlington company and notes that the Stockton Company had to raise a further £10,000 in share capital to buy the East Engine and filter beds supplying Teesside at that point. The 1858 Act also very helpfully notes that the company had been unable to complete all the works of previous Acts within the set three year time limit and because of this, and the increasing demand for water in the distribution area, there was going to be a need for additional works at Tees Cottage and additional pipe lines to the supply area, via the reservoir at Fighting Cocks. The new works to be constructed were identified as;

- A filter tunnel ... near the south bank of the river Tees, in Cleasby, opposite the Tees Cottage works.
- A pipe or conduit from the above to works on lands lately belonging to William Myers, near to the Tees Cottage works.
- A pipe or pipes from the above to the existing mains.
- New mains from Tees Cottage via Fighting Cocks to the supply areas.
- The Act gave the Company rights to abstract from or divert the waters of the River Tees, for supply purposes, without any stated limit upon quantity or statement of rights of other riparian owners.

The Act, at Schedule A, also gives a "List of works and property already constructed or purchased by the Company' as;

- A reservoir, with filtering beds, engine houses, pumping houses and other works at or near Tees Cottage ...
- Two reservoirs and other works at or near a place called Fighting Cocks ...
- Two lines of main pipes from ... Tees Cottage ... to Fighting Cocks
- One line of main pipe from ... Fighting Cocks to ... Middlesbrough and thence to Stockton, ..." and various other unspecified pipes, etc., clearly for distribution purposes.

Although there is no identified documentation, the new works at Broken Scar appear to have been once again to the designs of the Thomas Hawksley company. The Durham Chronicle reported in February 1860 on the half year meeting of the SY&MWC at their offices in Darlington and noted that the new works at Tees Cottage (Broken Scar), were '*progressing*', so presumably not yet complete, and to have been largely complete by 1860 when the Tees Cottage East Engine House and its filters once more became part of the Darlington system. Darlington bought the now seven-year-old **B2** engine and filters back from the SY&MWC, after some rather stressful bargaining, for £6,580 compared with a quote for a new system of £8,600.

To the detail of the 1855 OS survey can be added two delightful water colours by the Hawksley company and still it is understood in the ownership of the successor firm of MWH (figure 28). These show two views, one looking east over the Broken Scar works towards Tees Cottage dated 1859, and a second looking west across the Broken Scar site dated 1864. The images should be viewed

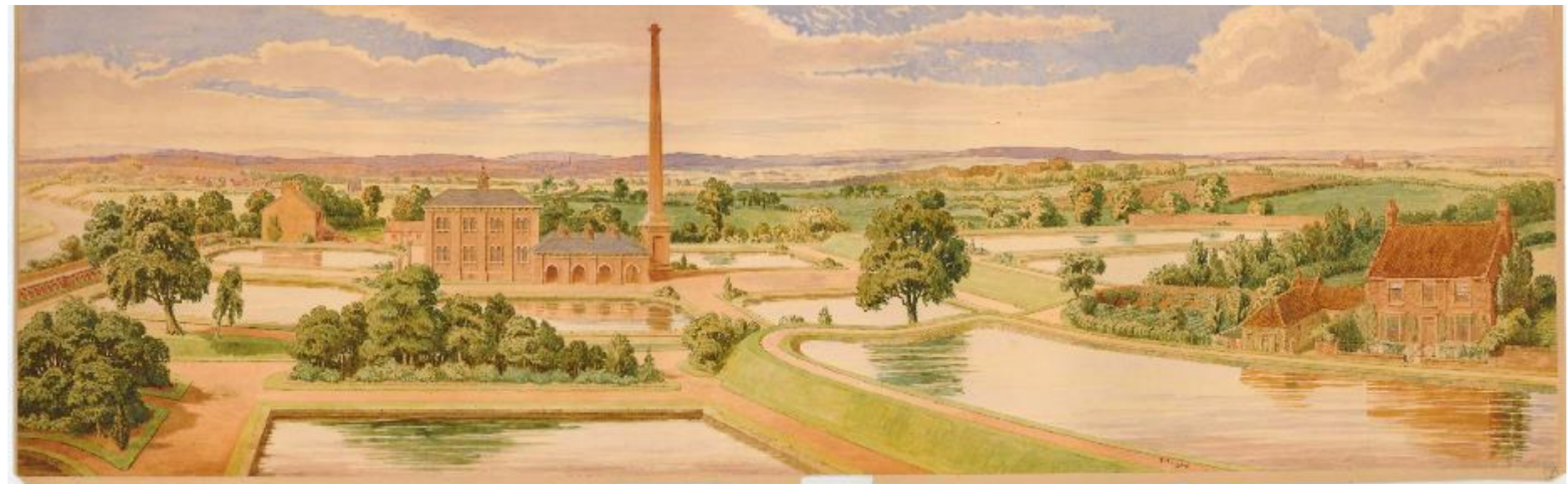
Tees Cottage.

with a little caution as while they appear accurate when compared to known progress and map evidence they may have been produced as much to show the client of what was to be built, as much as what had been built. The originals are believed to be in the possession of MWH, but copies were on display at the Broken Scar Works until around the year 2000.

Tees Cottage.



Figure 28. Water Colours by T.Hawksley and Co. of the Broken Scar Works in 1859 looking east with the twin chimneys of Tees Cottage in the trees to the top right (above); and in 1864 (below), looking west towards the Pennines and Teesdale with the pre-existing Broken Scar farm to the right.



Tees Cottage.

Taking a closer look at an extract from the Hawksley painting which takes in Tees Cottage (figure 29 below), the chimneys of the East and West Engine Houses can be clearly seen. The West Engine House can be seen in more detail prior to its expansion to the west in 1901-4 and it appears largely as can be seen on the site today with roof lines, ranges and features such as the cupola vent on the east-west range, rather than in keeping with the plans of 1849. The chimney itself is different from that which survives on site today, the lower stages up to the second stone string course appear the same, but above this it takes a different form and is taller than today. It can also be noted that the Engineman's House is still without its pitched roof extension on the west side.



Figure 29. Extract from the Hawksley & Co. water colour of 1859 showing the Tees Cottage site.

The Local Board of Health.

Following the final board meeting of the DG&WC which occurred at 12 noon on the 8th of August 1855, Tees Cottage became managed by the Local Board of Health. With many of the same staff and management still in place it was however business as usual. In 1857 there was an outbreak of typhoid in Darlington and while there was no full understanding of where the disease came from, concerns were expressed on the cleanliness of water coming down the Tees from Barnard Castle.

Typhoid.

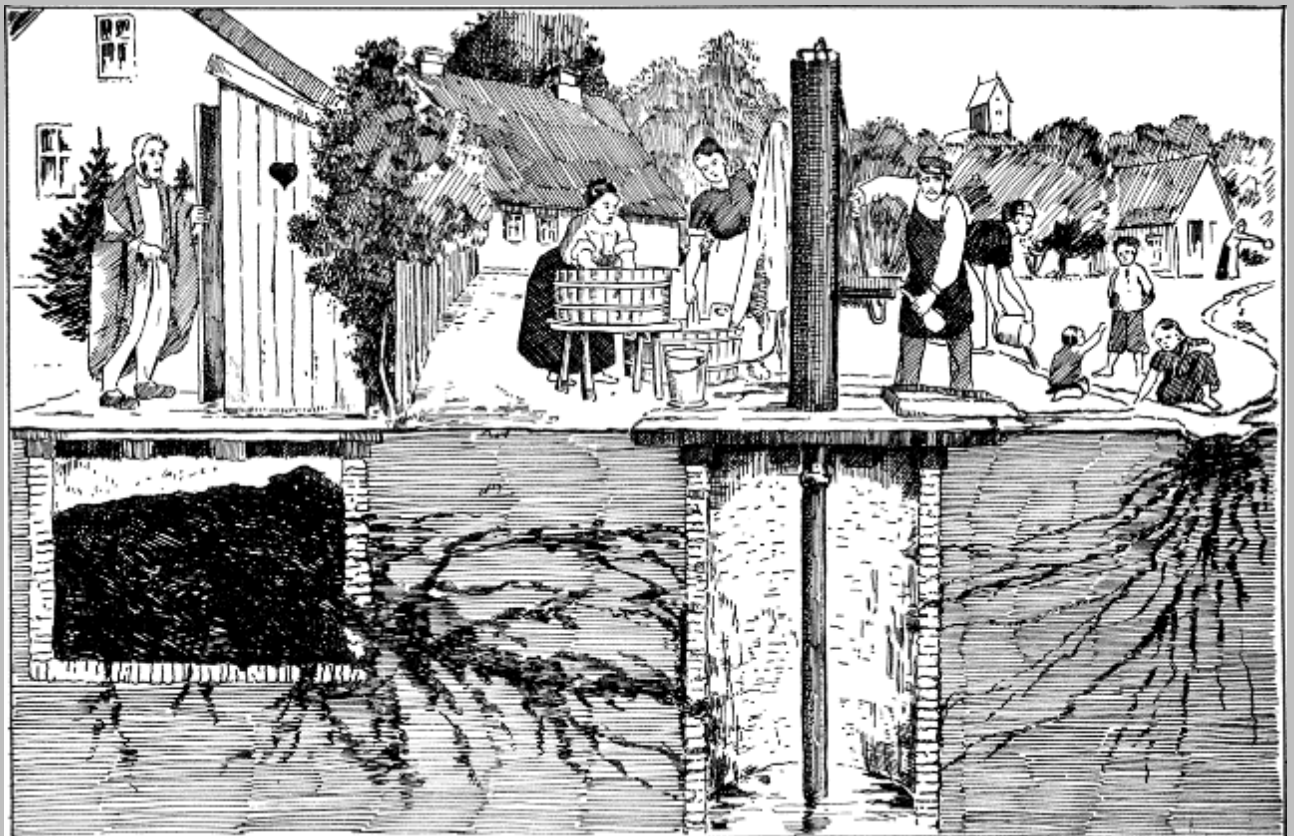
While Cholera was the great disease fear of the 19th century, crowded conditions and poor sanitation could lead to outbreaks of other diseases amongst them Typhoid a disease known about since classical times. The cause is the bacterium *Salmonella typhi*, which is spread by eating or drinking food or water contaminated with the faeces of an infected person. Today there are vaccinations to prevent the disease, but even so in the year 2000, typhoid fever caused an estimated 21.7 million illnesses and 217,000 deaths around the world, most often in the crowded areas of Africa and Asia.

The understanding of disease evolved quickly during the 19th century. During the course of treatment of a typhoid outbreak in a local village in 1838, English country doctor William Budd realised the "poisons" involved in infectious diseases multiplied in the intestines of the sick and were present in their excrement and could be transmitted to the healthy through contaminated water. He proposed strict isolation or quarantine as a method for containing such outbreaks in the future. The medical

Tees Cottage.

and scientific communities did not identify the role of microorganisms in infectious disease until the work of Louis Pasteur. In 1880, Karl Joseph Eberth described a bacillus that he suspected was the cause of typhoid. In 1884, pathologist Georg Theodor August Gaffky (1850–1918) confirmed Eberth's findings. The British bacteriologist Almroth Edward Wright first developed an effective typhoid vaccine at the Army Medical School in Netley, Hampshire. It was introduced in 1896 and used successfully by the British during the Boer War in South Africa. At that time, typhoid often killed more soldiers at war than were lost due to enemy combat.

In the 1860's the treatment process for water at Tees Cottage and elsewhere still relied on settlement and slow sand filtration, a standard process at this time. The treatment was not sufficient for reliable removal of the Typhus organisms and outbreaks of typhoid were recorded in 1890, 1891 and again in 1895. The pollution was eventually traced to Barnard Castle as at this time it had an isolation hospital but no sewage works so all effluents entered the Tees without proper treatment. The sewage treatment works was constructed at Barnard Castle by 1896.



A drawing from 1939 which shows how human excrement and pollution could affect water supplies and lead to outbreaks of waterborne diseases such as cholera and typhoid.

Perhaps because of a general feeling of reform in the country, perhaps because of the lasting sour taste of the actions of the Pease family and their allies in the sale of the DG&WC to the Local Board of Health in 1854, there was a demand for a new system of local government, one which was more open and accountable for the rapidly growing town. Between 1861-71, the population increased by 10,000 from 15,789 to 27,729. Although the first request to Westminster for an enquiry to be held in the town as to a change in the way Darlington was governed, was blocked by members of the board. A subsequent application found overwhelming support for incorporation and a Royal Charter was granted on 1st October 1867. The first election in December of that year saw a marked victory for the

old leaders of the Town. Seven of the ten Board of Health candidates and five members of the Pease family were elected, the first Mayor being Henry Pease. The population of Darlington now had the opportunity to take a more active part in the election of a Council of local administration. As Darlington was not amongst the new boroughs in 1836 proposed by Gladstone, pressure was renewed when Disraeli's Conservative Government came to power in June 1867. The Town also took an active interest in the 1867 campaign for Parliamentary reform and a local Enfranchisement Committee had been set up to obtain an M.P. for Darlington, which was still part of the South Durham Constituency. The Constituency for Darlington comprising of the Township of Darlington, including Cockerton and Haughton was set up in 1868 and the first elected member of Parliament for Darlington was Edmund Backhouse, whose family was involved in Banking (est.1774); their Bank on the High Row, Darlington opened in 1864. The wishes of the people of the town to become a County Borough added pace when Disraeli's Bill gave voting rights to all men in the boroughs but restricted rights according to property qualifications to those in County constituencies.

Against this background of political reform, the more practical necessities of the Waterworks continued and in February 1864 the two engines **B1** and **B2** installed respectively in 1849 and 1853 were reviewed³¹. The Engineer's report suggested up-rating the 1849, engine by increasing its power output, with its speed raised from 18 strokes per minute (9 r.p.m.) to 23 strokes per minute (11.5 r.p.m.) and increasing the steam pressure to 40 psi. New Lancashire boilers were to be installed to replace the boilers of 1849 and a new boiler house and chimney were proposed.

The 1853 engine (**B2**) was to be overhauled as it "*looked very uneasy*", the engine was only 11 years old and should have been in better condition. This was the only engine in use while **B1** was overhauled and uprated. However, the adjacent Stockton, Middlesbrough and Yarm installation was interconnected to the Darlington system so a short-term pumping failure would not have been catastrophic. This was not always so as in 1888 the engine pump rod failed and a request for an emergency 9" connection from the 24" main was refused (just a few hours work) and the higher parts of Darlington were without water for several days as the pump rod was replaced. These works were completed by October 1865 and the power of the **B1** engine had been increased from 29 horse power to 65 horse power. New horizontal pumps were installed and geared to operate at 23 strokes per minute, the same speed as the engine but, the gearing allowed variation in output while steam engine speed remained as designed.

Apart from the overhaul of the engine which does appear to have taken place, what evidence is there of a new boiler house, chimney and installation of Lancashire boilers as recommended in the Engineer's report? Well with some confidence it seems that the upper part of the chimney above the second stone coursing was rebuilt and it also appears that horizontal pumps were installed, perhaps bought second hand and at a reasonable price from the Cornish Tin industry which had collapsed at this time, flooding the market with inexpensive engines and pumps. The Hawksley plans of 1900 showing the major works of 1900-04 (figures 85-89), do also show existing building fabric and it seems clear from these that the existing boiler house of 1849 at the west end of the building stayed in use in 1864 and was not replaced. The boilers may however have been replaced but not until another round of significant works in 1873/74 when the Waterworks Committee of the Darlington Corporation advertised two tenders in the Northern Echo (figures 32/33).

While the work to improve the **B1** engine were on going, The **B2** engine was held as a standby engine for some time and eventually it too was overhauled in 1868 and new Galloway boilers

³¹ This description of the works of 1864 is from notes supplied by Jim Prentice

Tees Cottage.

installed in 1874³². It is thought that steam for the B2 engine was from its original boilers until 1874 although there is no indication of the boiler pressure rating.

1865 was to see a dramatic burst at Bank Top in newly laid pipes to Stockton, with a messenger sprinting the three miles to Tees Cottage to get the pumps switched off so the flood could be stopped and pipes repaired.

BURSTING OF A WATER PIPE.—About ten o'clock on the night of the 20th inst., one of the 24-inch main pipes lately laid down through Darlington by the Stockton and Middlesbro' Water Company, for the purpose of conveying water from their reservoir, at Tees Cottage, near Darlington, to Stockton and Middlesbro', burst near to the Bank Top cut, and the water flooded all that part of the town. The pent-up element gushed forth for a considerable time like a fountain, casting up the earth and fragments of the pipe; and the street drains being totally inadequate to carry off the immense body of water, it rushed into the cellars and dwellings of those near to it. A messenger having been despatched to the reservoir, the water was turned off, and a number of men set to work to remove the fractured pipe and to replace it by a perfect one. After working all night and the next day, the water again flowed in its proper course.

Figure 30. York Herald - Saturday 28 October 1865

To ensure a good continued water pressure in the town, especially along the rapidly expanding North Road, a new reservoir was built at Harrowgate Hill in 1872³³ consisting of a 5 million gallon tank on top of a substantial brick structure. It stood as a notable landmark for many years until removed in the 1990s.



Figure 31. Harrowgate Hill Reservoir built in 1872 to provide adequate supply and water pressure to the northern part of the town. (above left looking up North Road © Northern echo); above right the 5 million gallon reservoir demolished in the 1990s © Darlington Local History Library.

The tenders advertised in 1873 and 1874 were for two major pieces of work to increase capacity to meet the rapidly rising population of Darlington which had increased from 11582 in 1851, to 15789 in 1861, to 27729 in 1871. Demands from industry were rising also. The 1873 tender (figure 32), was to extend to the north of Coniscliffe Road and triple the filter area. While the 1874 tender (figure 33) was for the construction and fixing of two high pressure steam boilers. It seems likely these boilers were for the East Engine House but they may have been installed in the West Engine House

³² Prentice, notes

³³ Unknown author, British Waterworks Association Journal. March 1955.

following on from the engineer's recommendations of 1864. Certainly, the Hawksley drawings of 1900 (figures 85-89), show two long Lancashire/Galloway style boilers in-situ in the West Engine House.

BOROUGH OF DARLINGTON.—WATERWORKS EXTENSION.—TO CONTRACTORS.—The Corporation of Darlington is prepared to receive TENDERS for CONSTRUCTING and COMPLETING a DEPOSITING TANK, to contain about 1½ million gallons of water; Three FILTER BEDS, each containing an area of 1,450 superficial yards; and other Works in connection therewith, on land near the present Waterworks, at Tees Cottage, Darlington.

Plans and Specifications can be seen at the Office of Mr. Hudson Reah, C.E., Borough Engineer and Surveyor, Town Hall, Darlington, on and after Monday, the 14th instant. Quantities will be supplied on a deposit of 2l. 2s. being paid, which sum will be returned to persons sending in bona fide Tenders.

Tenders properly filled up, on the forms provided, sealed, and marked "Tender for Waterworks," to be sent to me not later than 12 o'Clock at Noon on Monday, the 29th inst.

N.B.—No pledge is given that the lowest or any Tender will be accepted.—By Order,
HUGH DUNN, Town Clerk.
Darlington, 8th April, 1873.

Figure 32 . Northern Echo - Saturday 12 April 1873

TENDERS WANTED.

BOROUGH OF DARLINGTON.—The Waterworks Committee of the Darlington Corporation are prepared to receive TENDERS for the CONSTRUCTION and FIXING of Two High Pressure STEAM BOILERS, at the Pumping Station, Tees Cottage, Darlington.

Persons wishing to Tender can see the Specification and obtain particulars at the Office of Mr Hudson Reah, C.E., Borough Engineer and Surveyor, Town Hall, Darlington, to whom Tenders must be sent, properly sealed and endorsed "Tender for Boilers," on or before Saturday, the 28th instant.

The Corporation do not bind themselves to accept the lowest or any Tender.

(By Order) H. DUNN, Town Clerk.
Darlington, 9th March, 1874.

Figure 33. Northern Echo - Thursday 12 March 1874.

The sand in the slow filter beds collects sediment and impurities from the water, and clearly this material must then be removed from the filters, usually by some form of washing of the sand with clean filtered water. Anecdotally until 1926 at Tees Cottage this would have been done by skimming off the top 3 inches of sand and passing it through a sand washer, then returning it to the filter. Clearly new sand was on occasion still required and in 1875 tendered for the supply of 2,000 tons of suitable sand³⁴. Prices were required for delivery to Tees Cottage and also the railway depot at Merrybent a short distance to the west where the A1 now runs.

³⁴ Northern Echo, 22/07/1875

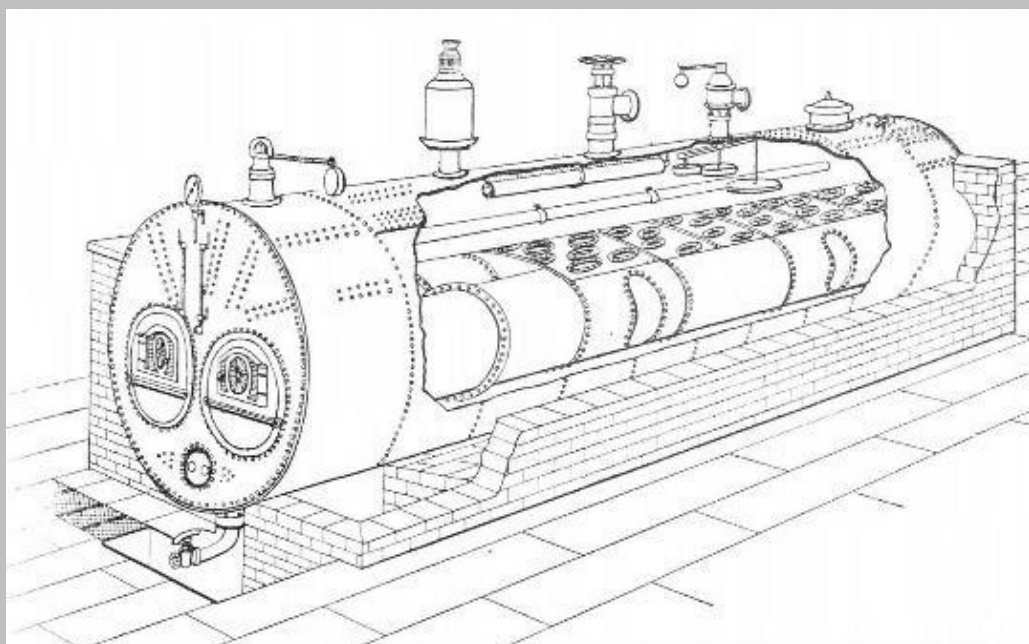
Galloway or Lancashire Boilers?

Any steam engine needs to be supplied with steam to work and large beam engines such as those at Tees Cottage had large coal powered boilers to provide them with that steam. There were many different designs of steam boiler depending on the type of steam engine, but at Tees Cottage two particular designs were used.

The **Lancashire Boiler** is similar to the Cornish Boiler but has two large flues containing the fires instead of one. Considered to be the invention of William Fairbairn in 1844, his patent was for the method of firing the furnaces alternately, so as to reduce smoke, rather than the boiler itself. Fairbairn had made a theoretical study of the thermodynamics of more efficient boilers, and it was this that had led him to increase the furnace grate area relative to the volume of water. A particular reason for this was the so-far poor adoption of the Cornish boiler in the cotton mills of Lancashire, where the harder local coal couldn't be burned satisfactorily in the smaller furnace, in favour of the older low-pressure wagon boiler and its large grate

The patent showed another advantage of twin furnaces. By firing them alternately and closing the firebox door between firings, it was also possible to arrange a supply of air past the furnace which would encourage the flue gases produced by the fire to burn more completely and cleanly, thus reducing smoke and pollution. A key factor in this was the distinctive shuttered rotating air damper in the door, which became a feature from the 1840s.

The **Galloway Boiler** is a development of the Lancashire Boiler and was invented by W & J Galloway and Sons, a British manufacturer of steam engines and boilers based in Manchester, England. The firm was established in 1835 as a partnership of two brothers, William and John Galloway. It ceased trading in 1932. In 1848, Galloways patented the 'Galloway tube', a tapered thermic syphon water-tube inserted in the furnace of a Lancashire boiler. The tubes are tapered, simply to make their installation through the flue easier. These were followed in 1851 by the Galloway boiler. The flues beyond the two furnaces of the Lancashire boiler were merged into a single wide flue. This widened and flat-topped flue was stayed by the use of many conical vertical Galloway tubes being riveted into it, improving the circulation of water and increasing the heating surface.



Cut away drawing of a Galloway Boiler (c.1910), showing the inner flue.

The Stockton and Middlesbrough Water Board

In 1876 the competition between the Stockton and Middlesbrough Water Company and the councils of Stockton and Middlesbrough over a new water act and vastly expanded water supply for Teesside came to a conclusion. Competing acts of parliament had been put forward by each party but in the end the decision was in favour of the councils with the **Stockton and Middlesbrough Corporations Waterworks Act, 1876**. Initially within this Parliamentary Bill Darlington was included in the area of supply and a clause set out the merger of the two undertakings. A petition was organised, the Bill was changed and Darlington remained in control of its own water supply. Darlington Council had initially objected to the act on the grounds of fears that capturing all the river's water in reservoirs would reduce the flow and make the water reaching Tees Cottage more polluted³⁵ (figure 34)

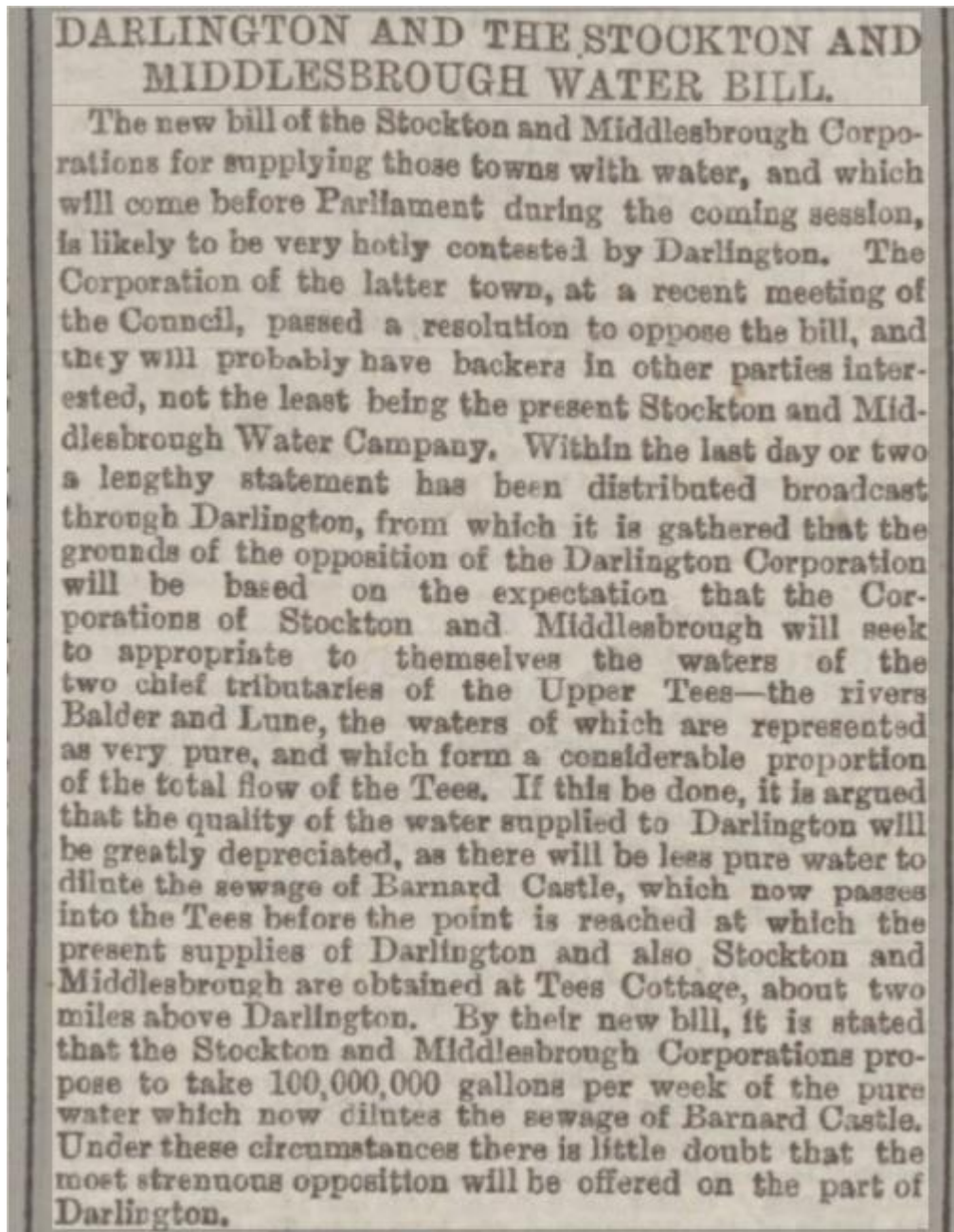


Figure 34. Yorkshire Post and Leeds Intelligencer - Saturday 15th January 1876 reported the opposition of Darlington Council to the new bill

³⁵ Yorkshire Post and Intelligencer 1876/01/15

Tees Cottage.

The Act established Stockton and Middlesbrough Water Board and transferred all the responsibilities and assets of the old Stockton and Middlesbrough Company to The Board, which was to be under the joint control of the Stockton and Middlesbrough Councils. The new board was eventually to become The Tees Valley and Cleveland Water Board, one of the largest water undertakings in Britain.

The amount of compensation the Company were paid for the transfer of their facilities is quoted in one source as £18,647 and in another £800,000! The higher figure appears accurate and was allegedly the largest sum ever paid by cheque at that time (Jim Prentice pers comm.)

The Act empowered the new board to build on a mighty scale including works on the upper reaches of the River Tees and its tributaries;

- Grassholme Reservoir on the river Lune,
- A conduit or tunnel from the river Lune to Rokehole Sike or Hill Gill,
- Blackton Reservoir on the river Balder,
- Hury reservoir on the river Balder,
- The Lartington Tank,
- Whorley Reservoir, in Whorlton and Gainford,
- Sadberge Reservoir
- Normanby Reservoir

The Board was given up to 10 years to complete these extensive, and expensive, works. The Act also made provision for the protection of landowners' sporting rights on and around the reservoirs, and with respect to Tees Cottage set specific quantities of compensation water to be discharged at all times into the Lune and Balder, and gave powers to various parties, including Darlington Corporation, to monitor the same to make sure the intake at Tees Cottage didn't run dry, a real fear expressed at the time. The Act required that a measuring weir should be constructed, at The Board's expense, downstream of the Tees Cottage intake, in order to prove that the required flow was being provided from the reservoirs that The Board was building in Upper Teesdale. At no expense to Darlington rate payers this meant the Borough of Darlington enjoyed for a century, a guaranteed flow in the River Tees at the Tees Cottage intake. In the drought of 1887 the intake to the **B1** engine was exposed and supplies were maintained by using the **B2** engine as apparently the dam had still not been built across the river, a forerunner of the present weir, still referred to as a dam.

Further water acts were to be passed over the following century, providing more and more power for the construction of reservoirs and pipelines to meet Teesside's insatiable demands for water (see ANNEX 1 at the end of the report for a full list).

Teesside was not the only area to see Corporation takeovers of private water companies, this also took place in Manchester (1847), Leeds (1852) and Bradford (1854). The Edinburgh Water Company was superseded by a Water Trust for the city and district in 1869. The Nottingham Waterworks Company remained in private hands until 1880, when it was compulsorily purchased under the 1879 Improvement Act. The nine London water providers remained in place, despite frequent debate about buying them out, and it was not until 1902 that London's water finally passed into the hands of the Metropolitan Water Board. As major works continued over the road at Broken Scar, on Teesside and in Teesdale, Tees Cottage continued on still independently supplying water to the growing population and industry of Darlington, with its two beam engines. In 1883 on the 3rd of August

the death was reported of the Waterworks longest serving employee the Engineman, Joseph Nesbitt (figure 35).

DEATH OF THE MANAGER OF THE DARLINGTON WATER WORKS.—On Thursday Mr Joseph Nesbitt, one of the oldest servants of the Darlington Corporation, died at the Tees Cottage. Since the construction of the Water Works thirty-five years ago Mr Nesbitt has held the position of manager through all the various proprietaries. The deceased had been confined to his room for the past sixteen weeks by an affection of the liver, but had so far recovered as to be out on Saturday. A change, however, set in on Saturday, and he died on Thursday.

Figure 35. Daily Gazette for Middlesbrough 3rd August 1883

Regular maintenance carried on at Tees Cottage and in 1885 the Waterworks Committee advertised a tender for the painting of the wood and ironwork at Tees Cottage (figure 36).

BOROUGH OF DARLINGTON.—The Waterworks Committee invite **TENDERS** for **PAINTING** the Wood and Iron Work in connection with the Buildings at the Pumping Station, Tees Cottage. The Specification may be seen and Form of Tender can be obtained on application to the Waterworks Engineer, Town Hall, on and after Friday next, the 10th inst. Sealed Tenders (which must be on the form provided) to be sent to my Office not later than Twelve o'Clock Noon on Monday, the 20th inst. No pledge is given that the lowest or any Tender will be accepted.—
(By Order) H. DUNN, Town Clerk.—Darlington, 6th April, 1885.

Figure 36. Advert in the daily Gazette for Middlesbrough 10th April 1885

The New Beam Engine and Works of 1901-04



As the 19th century came to an end and Darlington's population approached 44,000 it was clear that the **B1** and **B2** engines now approaching 50 years old needed replacing. The Waterworks Committee of Darlington Council turned once more to the Hawksley Co. who produced drawings for a new engine house to be added to the east end of the West Engine House, a new and larger beam engine and new boilers. A series of fine plans, elevations and sections were produced of the new building, five of which survive in the Durham Record Office³⁶. A further series of 13 drawings is held by the Science Museum archive at Wroughton³⁷. All of these drawings are reproduced at large scale at the rear of this report (Annex 3 figures 68-84).

A bill of quantities and a printed copy of the specification also survives dated November 1900. This was reported by H.C. Devonshire in the 5th (unpublished) edition of his guide book to the Tees Cottage site dated 2012. Devonshire reports on these two documents as follows;

'There exists an un-priced hand-written edition of the "Darlington Corporation Water Works, Contract No 1, Tender for Engine House, Etc., November 1900" Bill of Quantities, and a printed copy of the Specification, presumably as it was sent to those contractors bidding for the work. There may be copyist errors in the Bill of Quantities we have considered. For example, the term "extra over", normally used at that time for certain items, is written in our copy as "extra only", which may, or may not, be indicative. This document has been studied with that in mind. The Specification, however, is printed and in good condition.

While the Bill of Quantities was clearly carefully and extensively taken off, and most routine items are clearly described, there are some major items which could have caused a careful contractor some distress if priced as written. For example, in the preliminaries there are items of attendance upon the Engineer which are open ended and ambiguous. Some contractors no doubt sought clarification of these items, as occurred quite normally in the whole of the 20th century, but if priced as an item as written then they could indeed have caused confusion and consequent dispute as the contract developed. A wise contractor would have sought to have attendance of such type on an hourly rate, i.e. as Daywork, rather than as a single sum, and perhaps this has some relation to the change of contractor. For example, an item "2 No. Assist boiler smith in fixing boilers 28 ft long and 7'6" dia., and all fixings, pipes, etc. in connection therewith" could mean many different things, and would be the subject of much disagreement. There are a number of items of this level of ambiguity

³⁶ DRO Da/UT 5/4/1-5

³⁷ HAWK2 E174/E175/E176/E178/E179/E180/E193/E194/E195/E208/E209

in the tender documents. The goodwill of even the most amenable contractor can wear thin after a time when treated in this fashion.

Another matter which could have caused distress, to both the Contractor and the supervision of the Corporation workers, concerns pipe joints. Most large pipes were, at that time, cast iron with run lead joints. The making of such joints is a complex and skilful operation, and the tender provided that the Contractor was to excavate pipe trenches and support them, supply and lay the pipes, and then wait for the Corporation personnel to make each run lead joint before the Contractor could backfill. Much of this early pipe-laying would probably have taken place in the early stages of the contract, and since the first Contractor withdrew after only three months, the pipe-laying delays may have contributed to the site problems. With bad weather from January to March, the time concerned, there could have been delays while the lead joints were run, since this activity is very weather sensitive, as this author has found many times from bitter experience! These delays would have been entirely outwith the control of the Contractor, and are the type of problems which do bring high levels of distress to this type of work.

The Specification and Bill of Quantities for the 1901 - 1904 engine house and boiler house yield some interesting information, as follows :-

- 1. All bricks were to be without frog or any other indentation, and to be laid in Old English bond.*
- 2. The stone for the foundations of the engine and machinery must come from High Quarry, Heweth Burn [in the vicinity of Low Burn Quarry and Heworth Burn, Heworth, 1 mile South of the River Tyne and 2 miles East of the Great North Road at the time, and close to a now abandoned mineral railway which connected to the main East Coast line. Heworth is about 30 miles from Tees Cottage]. The stone for windows, doors, copings, mouldings, etc. must come from Dunhouse Quarry, near Barnard Castle, a distance of about 12 miles, but the quarry was adjacent to a railway line [now abandoned] from Carlisle to Darlington, with a small branch line only ½ mile from Tees Cottage. All stone flagging must come from Bradford Quarries in Yorkshire, nearly 60 miles away, and the stone for the principal floor of the engine house, the entrance steps, and all internal steps and stairs from Wingerworth Quarries, near Chesterfield, 100 miles away. The roof slates were to come from Bangor Quarries, 190 miles away. Given the amount of stone in these buildings, this must have been a substantial transport task in its own right, even though probably most of the stone came by train, for although we have no evidence on this, Wingerworth is only 3 miles from Chesterfield station, on the same main line as Darlington Bank Top station, also 3 miles from Tees Cottage, making rail transport a likely choice. Some of the stones for the engine bed are very large, for example 5'0" x 4'9" x 2'1", weighing almost 3 tons each, making haulage and lifting into position a major effort.*
- 3. "Except as otherwise directed, all timber shall be clean, sound and well-seasoned red Memel, Riga [Russian port, H C D] or Dantzig, and the deals and battens shall be well seasoned Christiania [the Victorian name for Oslo, Norway, ref. 30 H C D] and Geffle. The pitch pine shall be of the best quality, good figure and well-seasoned. The pitch pine shall be twice sized and twice varnished with the best copal spirit varnish, and all other wrought woodwork, unless otherwise directed, shall be knotted, stopped, primed and four times painted in oil." [Many commodities, including timber, sometimes become known by their apparent region of origin or port of shipment, rather than their true type or species. H C D].*

Tees Cottage.

4. *“The window frames shall be solid fir, with oak cills, glazed with best British plate glass secured by waincot [sic] beads and brass countersunk screws and cups, and in the engine house bedded in wash leather.”*

5. *The roof of the engine house is built from carefully selected pitch pine, except for the king posts, which are oak, the whole fastened with wrought iron fittings. The wrought and stop chamfered lifting beams, to run the entire length of the engine house in not more than two pieces properly chamfered together, shall have wrought iron protecting angle plates secured by countersunk screws.*

The Bill of Quantities ends “... the Contractor is to add here 1¼ % of the Contract Sum for the Quantity Surveyor’s charges.”, which, on a Contract Sum of about £10,000, amounts to about £125/-, for what must have been little more than two week’s work in taking off the Bill. In July 1901 the Council raised the wages of an engine-man to 4/6d per day, amounting to £1..11..6d for the seven day week they were generally working at that time, compared to the 15/- per week minimum wage then recently set by Parliament for agricultural workers³⁸.

The contract to supply the boilers and beam engine was won by Teasdale Brothers and whose name is cast or placed on them. How they obtained the contract and the role of others involved is best explained by reference to the Waterworks Committee minutes for 1900-04.

On the 20th July 1900 the committee noted that;

*‘Tees Cottage Pumping Station Extensions. The plans and specifications prepared by Messrs T and C Hawksley * for the additional engine, pumps, boilers and machinery, and the buildings to contain them, required in connection with the extensions at Tees Cottage Pumping station are to be submitted and approved, and it is recommended that the town clerk be authorised to advertise for tenders to carry out the work and to apply to the Local Government board for sanctions to borrow the sum of £13,500, the amount which it is estimated will be required to provide the various work, and it is also recommended that Mr N Neilson be engaged to take out the quantities in connection with the building.’*

On the 23 November 1900 it was recommended that the tenders for the waterworks extension be sent to T and C Hawksley, who reported on the 3rd of December that the lowest tenders, that of Teasdale Bros for the engine and boilers, and Blakett and Son for the construction of buildings and filter beds etc were *‘satisfactory in every detail’*. However at the same meeting a letter had been received from Teasdale Bros

To The Darlington Corporation Waterworks Committee, Darlington

Dear Sirs,

With reference to our tender for Engines, Pumps, &c., Contract no 2, we find that we have made an omission I our estimate of the amount of £800, and we ask to be allowed to revise our offer adding the above amount , making our tender £10,550 0s 0d. In the event of not being allowed to amend our tender as above, we shall have to request to be allowed to withdraw our Tender.

Yours faithfully, Teasdale Bros.

³⁸ Devonshire, 2012, 36.

Tees Cottage.

The Committee considering the matter an important one, and involving a matter of principle, requested Messrs. Teasdale to meet them that very day, which they did, and after their books were thoroughly examined the Committee came to the conclusion that so far as Messrs Teasdale Brothers were concerned a genuine mistake had been made. After some debate the tender was accepted and on 28th January 1901 The Water Committee were sanctioned to borrow £21,490 from the Local Government Board for the extension.

Trouble with contractors continued however when Messrs Blackett and Sons withdrew their tender for the building works and on the 22nd of March 1901 the tender of Mr G M Marshall was accepted for the extension work. On the 24th May 1901 expenditure of £21,490 was authorised, but only a few months later on the 25th October Mr Marshall was explaining to the committee reasons for delay in progress (sadly the precise reasons aren't recorded).

By the 20th May 1904 the Water works Engineer had submitted his report upon the extensions which and his proposals with regard to the construction of the new filter beds and which were approved. Only a few days later however in the 24th Mr Marshall's Contract was being debated again following the receipt of a letter from Messrs T & C Hawkesley regarding the delay in the completion of the work included in his contract for the erection of the Engine and Boiler Houses. It was recommended that the Town Clerk and Borough Accountant obtained information and convene a special meeting.

The Committee paid a visit of inspection to the Works on the 26th July and had an interview with Mr Marshall regarding the cause of the delay in completing his contract, and it was arranged that he should furnish a statement in writing with regard thereto, and in the meantime the consideration of the matter is adjourned. On the 13th September Mr C Hawkesley and Mr George Marshall attended the meeting when the question of the cause of the delay in completing this contract was discussed, and, pending the qualities of the engine house being checked and ascertained, the consideration of the matter is adjourned. So presumably everyone was happy in the end, but the causes of the delays remain unknown.

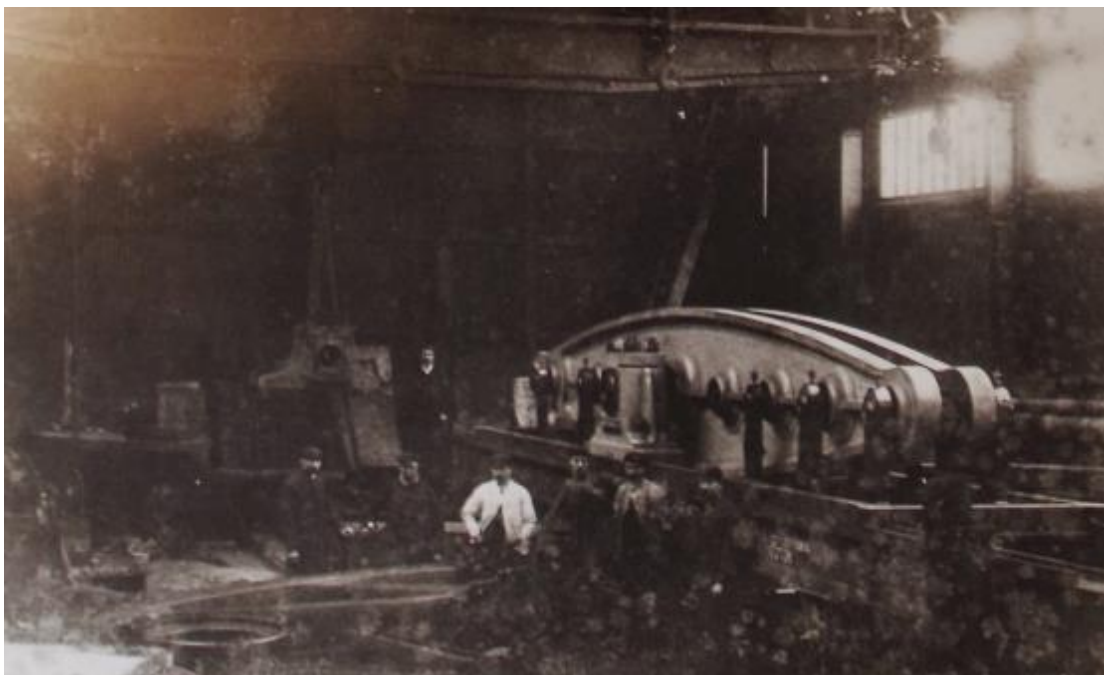


Figure 37. Copy of an unprovenanced photograph held in the archive room at Tees Cottage and thought to be the beam of the 1904 engine in its place of casting. This is most likely to be Goodfellow Engineering of Manchester. Teasdale Brothers foundry in Darlington acted as main contractor for works on site.

Tees Cottage.

Allowing for all these delays it is understood that the boilers in the new boiler house were in place by 1902 and being used to provide steam for the venerable **B1** engine. The new beam engine **B3**, the current preserved engine, was commissioned in 1904 where it worked to provide the 'baseload' and when needed in parallel with the two older engines **B1** and **B2** to satisfy times of peak demand.

The **B3** steam engine as specified in T & C Hawksley's drawings was to a design by Glenfield and Kennedy of Low Glencairn Street, Kilmarnock³⁹. Two long standing firms and producers of beam engines who had amalgamated in 1897. It has been suggested⁴⁰ that while Teasdale Bros. cast and produced various parts of the plant including the boilers, they bought in components such as the beam, flywheel, engine cylinders and boiler shell from elsewhere, in particular Goodfellow of Manchester, and then arranged for their erection on site. Goodfellow Engineering of Hyde, near Manchester had a good reputation for the manufacture of beam engines dating back to around 1840. Tees Cottage appears to have been one of their final engines with the firm being placed into liquidation in 1905⁴¹. There exists a note by John Glithero (a heating engineer from the Midlands), to the TCPS describing an engineering drawing held at the Museum of Science and Industry (MOSI) in Manchester from Goodfellows showing a beam of exact size and description to the one installed at Tees Cottage. Also while the front of the Lancashire Boilers display the name of Teasdale Brothers (figure 38.) the curved/domed ends not easily visible against the flues, are marked with the name of Goodfellow⁴².



Figure 38. One of the two Lancashire boilers installed in 1902. Although these bear the name of Teasdale Brothers of Darlington, their construction was in part down to Goodfellows of Manchester, with Teasdale Bros. acting as a main contractor for the new beam engine and associated works of 1900-04

³⁹ https://www.gracesguide.co.uk/Glenfield_and_Kennedy_by_William_S._Murphy

⁴⁰ Prentice, J. unpublished notes.

⁴¹ https://www.gracesguide.co.uk/Benjamin_Goodfellow

⁴² George Beautyman, pers comm.

The engine as built is a 140IHP two cylinder compound with an underfloor spray condenser taking steam from two 28ft long, 7ft 6in diameter manually stoked Lancashire boilers at up to 100p.s.i. The Porter governor acts as an overspeed control by advancing the valve cut-off (reducing the period the inlet valves are open) at about 15 1/2rpm and eventually tripping in the overspeed control when valves do not open and stopping the engine from 16r.p.m. Manual adjustment of the trip mechanism sets the base engine speed by regulating the steam cut-off, roughly 1/5 stroke at full load, (under present load conditions 1/10 stroke with 60p.s.i. steam pressure). Initially after preservation the Porter governor was weighted to control overspeed at 14r.p.m. this weight has since been removed⁴³. The engine drives two main pumps, a 1900 gallon per minute river abstraction lift pump and a 1700 gallon per minute town delivery double acting bucket and ram pump (at 16r.p.m.).

How was the beam installed?

The question of how the 25 ton cast beam was installed into the new engine house has tasked several minds and never been conclusively identified and agreed. H.C. Devonshire in his guides to the site explores a number of options;

“Many visitors quite reasonably ask how the 25 ton main beam was lifted up to its working position, bearing in mind that it is heavy, 30’ 3” long and 5’ 0” deep at the centre. The beam was cast in two halves, each weighing about 12 tons, and brought to site on a heavy duty transporter, probably pulled by a “traction engine”. (In a personal comment Jim Prentice recalls that the railway delivery note for the beam moving it from Goodfellows of Manchester to Merrybent siding was sent to TCPS from John Glithero, a researcher into the industry in Manchester, at the time of writing this report the note couldn’t be found (NH/2018)

The beam was lifted in two halves, after the central column and cross beam were in place, placing loads not exceeding 6 tons on the roof beams at any one time. The front doors and the steps leading up to them were not in place when each half beam arrived, so that the transporter was placed at the door cill, and the nearest end of the half beam placed onto a small trolley and drawn into the engine house, along the very heavy beams to be seen running from the doors. One end of the half beam, a 6 ton lift, was slowly raised by winch, using the crabs still to be seen running on the stout timber beams in the roof. As the inner end went up, the outer end slowly followed into the engine house on another trolley. When the first end got to upper floor level it could be placed on a trolley running on the very heavy beams to be seen at that level, and thus taken into the house and up over the main cross beam at the head of the main column. At the same time the second end was raised by the crab system until it too was at upper floor level, when the complete 12 ton unit could be moved slightly to one side and supported on one of the heavy upper beams. The process was repeated for the other 12 ton half beam and the two were then slid into their working position, bolted together and mounted on the central main bearing. From that time the weight was safely supported on the main column and the crabs and winches were no longer needed, although the whole lifting system was left more or less complete, probably in case the beam ever needed to be removed, dismantled, or replaced.

Once the beam was safely in place the rest of the engine components could be installed, and after the pump rods and pistons were attached to the beam then the balance weight could be fixed into the main beam. The balance weight, which can be seen at the steam end of the beam, is needed so

⁴³ Jim Prentice, pers comm

Tees Cottage.

that the complete system of beam and rods is well balanced, otherwise, if one end were significantly heavier than the other then, when the engine is stopped, the beam would gradually sink to the heavy end of its stroke, making it impossible to start the engine without having to turn the flywheel by hand, which is a very strenuous task, needing several men in order to do it. With the beam balanced it is normally possible to stop the engine in mid stroke and keep it there, making starting the engine straightforward, though if an engine man does allow the beam to stop on dead centre then he becomes rather unpopular!

This erection method not only minimises the loading upon the roof timbers and accounts for the design of the main doorway, but it also agrees with what little is known about erection of Cornish beam engines during the immediately preceding years, and a report, quoting material from the Darlington Council Archives, says: "Much of this machinery - including the twin sections of the beam - were winched into position from pulleys in the roof." Note the term "twin sections of the beam" and "pulleys in the roof".

It was indeed fortunate that the main beam never needed to be removed, because inspection of the cross beam at the front door, and inspection of the longitudinal beams at upper floor level, show in both cases that notches had to be cut in these beams to allow room for parts of the engine to move. It is clear that the building was designed and built from the early engine drawings, which probably did not detail the bearing adjusters or the fact that the main pump rods were tapered, with a larger diameter at the centres than that shown on the early drawings, so that, when the engine was erected it was clear that there was not enough clearance for these items, but since the beams concerned had already passed through their heaviest loading, lifting the two halves of the main engine beam, and henceforth would merely carry floor loading, it was satisfactory to cut out parts of these beams to allow the engine components room to move. It was also necessary to cut spaces for some parts of the parallel linkage at upper floor level as well⁴⁴.

This method of installing the beam is supported by the reminiscence of a former superintendent of Tees Cottage Mr Willis who witnessed the installation as a child of about 10 years old and recounted the story shortly before his death in 1982. *'The beam was manufactured and assembled in Manchester by Goodfellow, dismantled and brought to site (via the railway to Merrybent), before the building shell was complete and none of the beam support column, beams and floor was constructed. The beam was transported in its two halves individually through the "front" door and lifted, with the beam horizontal, to roof height by block and tackle located at either end of the beams to spread the load and each half held in place as the column and beams were installed along with the bottom halves of the white metal bearings. The beam halves were then lowered onto the bearings and re-assembled and the rods and floor installed. The present winch was installed along with the floor after the beam was installed⁴⁵.*

While the method described by Mr Willis seems the most likely, one final method of possible installation is worthy of mention. This was to use a temporary but substantial wooden scaffold and mole to lift and move the beam into position during construction of the engine house. This method had been used by Hawksley at the Ryhope pumping station in the late 1860s (figure 39). The circumstances at Ryhope were different as here the beam engines and their house form an integrated structure. Not only did the foundations have to serve as foundations for most of the engine components, as well as provide support for the well heads, but also the massive rocking beams had

⁴⁴ Devonshire, 2012, p19.

⁴⁵ Prentice, J. 2012.

to be supported at some twenty-two feet above ground level, therefore engine and engine house construction had to proceed together.

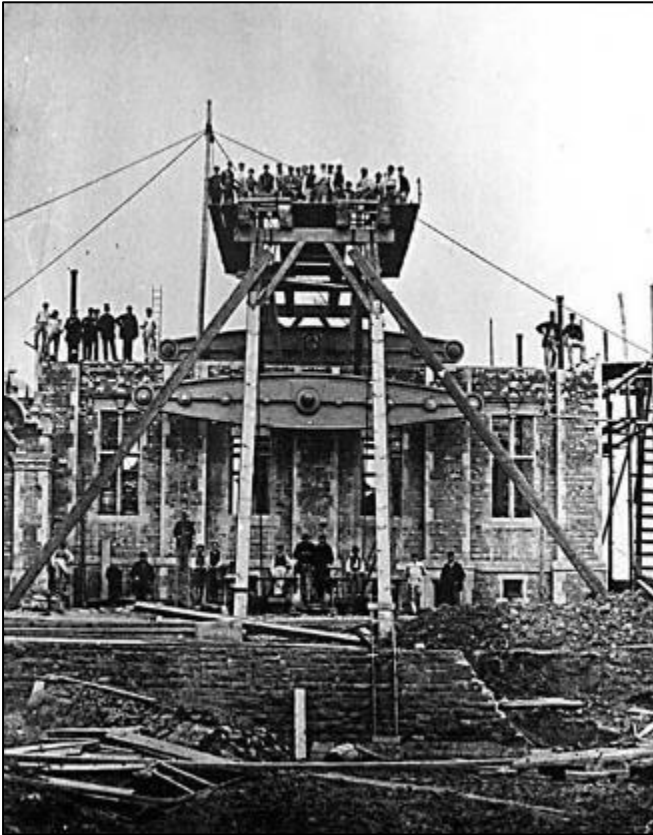


Figure 39. Erection of the second beam at Ryhope Pumping Station, Sunderland c.1868 showing how a travelling scaffold rig can be used to move the engine beam into place prior to completion of the building.

Teasdale Brothers.

Teasdale Brothers of Thomas Street, Bank Top, Darlington was founded by two brothers John T. Teasdale and Robert Thomas Teasdale. They appear to have had additional premises at Bridge Road, Stockton. It's unclear as to when the business started, but they are listed in Whellan's Directory of County Durham in 1894 as;

'Teasdale bros. (Robt & John Thos.), engineers and iron founders, Bank Top Ironworks'.

The foundry at Bank Top first appears on the 1896 Ordnance Survey map (figure 40), had grown considerably by the 1919 (figure 40) mapping and remains shown as an industrial facility until the 1960s.

The firm are listed at various times as manufacturers of beam engines and agricultural equipment such as hay rakes and seed drills (figure 40). From 1906 they also appear to have been producing small internal combustion engines. In 1910 the engines ranged from 3 to 40 hp, and in 1915 introduced the 'New Improved Teasdale Oil Engine' in sizes of 3 to 35 hp

Tees Cottage.



Figure 40. Ordnance survey 6" to 1 mile mapping, surveyed in 1896 and Published 1899, showing the location of Teasdale Brothers Iron Works at Thomas Street, Bank Top. The similar OS mapping of 1919 (below) suggest the foundry and business had grown considerably. The bottom image shows an advert of 1906 for one of their products.



THE NEW MANURE DISTRIBUTOR
J. T. Teasdale's Patent.
 FITTED WITH ROLLER BEARINGS.
 This new invention is designed for sowing either broadcast or in rows.
 It will sow one cwt. to twenty cwts. of artificial manures per acre, distributing it over a width of ten to twelve feet without any change of wheels. It will effectively distribute Basic Slag, Super Phosphate, Compound and Mixed Manures, Dissolved Bones, Nitrate of Soda, Kanite Guano, Soot, and all kinds of artificial manures. This machine takes a much lighter draught than any other on the market.
AGENTS WANTED.
 Price Lists and all information free on application.
TEASDALE BROS., LTD.
 Bank Top Iron Works, DARLINGTON

Councillor Wooler's 'Inquisition' of 1905.



Figure 41. Edward Wooler, Darlington Councillor and Alderman

Edward Wooler (1851-1928), was an interesting character, a solicitor of the firm Wooler and Wooler whose offices were at 36, Priestgate, Darlington. He was an antiquarian and collector and a Councillor on Darlington Borough Council, being Chairman of the School Board and, later, Alderman. He was also a Fellow of the Society of Antiquaries and wrote several articles on history and at least two works: "Historic Darlington" and on the Roman Fort at Piercebridge. After the pumping station extension designed in 1900 was completed in February 1905, Councillor Wooler wrote a tirade of questions and accusations to the Waterworks and Baths Committee. While there doesn't appear to have been any fallout from his inquisition, the questions and answers do provide an interesting insight into the technology of the time and how it had been applied at Tees Cottage.

Councillor Wooler's Letter, 1905.

Councillor Wooler's thoughts are *in italics*, and the edited replies, from a Waterworks sub-committee set up to deal with the matter, consisting of W M Pease, T M Barron, J Wilkes, and T. Stairmond, are in normal text.

1. *"No economisers have been fixed. This would have effected a saving of from 15 to 25 % of coal consumed, which represents from £130 to £217 per year."*

"... the cost of an economiser would have been about £300, and might have necessitated the erection of a new chimney, which would have cost between £2,000 and £3,000 ... according to the maker's estimate there would be a probable saving of 10% about £40 per year for the total consumption of coal ... the cost of a second economiser for the No 2 boiler house [the East Engine House] would have to be taken into account...the saving would not be sufficient to pay the interest and redemption on the extra capital cost."

2. *"No mechanical stokers have been provided, ... which would have effected a minimum saving of 10% in coal with 20% increase in evaporation."*

"The main purpose of mechanical stokers is to lessen the cost of labour ... but ... at Tees Cottage, where only two boilers are employed, ... no saving in attendance is practicable. It is not clear what is meant by saving of 10% coal and 20% increased evaporation... the cost of stoking would be increased by the interest and redemption, and by the upkeep of the stokers."

3. *"The boilers are not provided with tubes, which again would have saved considerable fuel, the water being in every way suitable."*

"... It is not a fact ... that the boilers are deficient in heating surface."

4. *"The engines ought to have been triple expansion."*

"... will be dealt with by us in his ground of complaint No 9 ..."

5. *"The engines are of insufficient capacity for the work required to be done."*

"... the Committee at that time, after much consideration, did not consider it necessary to expend the amount of money which would be involved ..."

6. *"It was stated at the Local Government Board Enquiry, held on 22nd January 1902, that the maximum daily demand was two and a half million gallons per day, and, therefore, no proper provision has been made for the growth of the town. Alderman Barron (acting Chairman of the Committee), at the November Council meeting, admitted that the town had grown so rapidly that more water was required than had been anticipated, and that a second engine was necessary at times to keep the storage tanks full."*

"... we ... require 125,000 gallons of water per hour during 17 and a half hours per day, and our present pumping capacity is 212,000 gallons [per hour] a fact which will show in itself that there is no cause for alarm."

7. *"In my opinion, it is the special province of Consulting Engineers to verify details received from local officials, and not to blindly accept them as correct. For what other reason are they called in?"*

"The Committee have no reason to believe that there is any truth in the suggestion contained in this question... the figures supplied to the Engineer were prepared by Mr Smith (the late Borough Surveyor and Waterworks Engineer) and fully discussed by him with Messrs. Hawksley, and the Committee have every reason to believe that they were correct in every detail."

8. *"That the coal consumption last year amounted to 1,640 tons, which is equal to 31 and a half tons per week. This shows that the engine is wasteful and obsolete, as an up-to-date engine would not consume more than from 12 to 15 tons per week."*

"The figures are entirely erroneous, and, therefore, of no value. The actual coal consumption of the new engine cannot yet be ascertained, as the engine has not been working a year, and the 1,640 tons referred to in this complaint is evidently the total of all the three engines for the year, of which the new one was only running about four months. So far as we can see from a further experience of the working of the engine, we are able to say that there will be a considerable saving of the coal used."

9. *"That a beam engine has been fixed instead of one with direct action. The Committee would do well to visit some of the newest London Waterworks, and compare their pumps with our antiquated though new plant. The most approved modern type is triple expansion with direct action."*

“With regard to this complaint the Committee are bound to be guided by the advice of their Engineers, and the following is an extract from a recent report ...:-

‘The experience of many years has been uniformly favourable as regards the employment of beam pumping engines for waterworks purposes, where freedom from breakdowns and interruptions to the regular working for the purposes of effecting repairs is of the utmost importance, unless ample standby power exists, and skilled workmen and tools are immediately available for the purpose of quickly effecting renewals and replacements. We are distinctly in favour of the type of machinery employed at the Tees Cottage Pumping Station, which although not modern, has yet been found to give complete satisfaction during many years of actual trial, an experience not yet obtainable in regard to the modern class of machinery referred to.’ [In the London waterworks, to which Councillor Wooler might be alluding, space and land cost were of the essence, while at Tees Cottage the Council already owned the land concerned, so space was not a problem. Moreover, the men at Tees Cottage already had many years’ experience of operating and maintaining beam engines, whereas to introduce high speed vertical engines would have needed significant re-training of the workforce. Indeed, since the first recorded beam engine in Darlington was installed by John Kendrew in his mill in 1791, there was a valuable reservoir of experience of this type of machinery, and other water undertakings installed them until at least 1906.

10. *“If the engines had been up-to-date they would have done at least double the work for the same consumption of coal.”*

It was felt this had already been answered

11. *“No guarantee as to coal consumption was required by the Specification as is usual.”*

A lengthy reply was provided and can be summarised that such guarantees apply if, and only if, the Contractor is also to design the engine, but in this case the Engine was designed under the supervision of the Engineer.

12. *“The cost of executing the new work has been excessive.”*

“The work was let after tenders had been publicly invited, and as competition is usually very keen, there is little doubt but that the Corporation have received full value for the money expended.” [A vague reply to an ill-considered question. Also this was a “prestige scheme”, with much civic pride involved, so that an apparently high price was inevitable.

13. *“Certain eminent firms of Engineers, who had their reputation at stake, declined to tender on the antiquated specification submitted, but offered alternative designs which were refused.”*

“We are not aware of any alternative designs having been offered, and we must trust there are few (if any) ‘eminent firms of engineers’ who would act in a manner so un-professional as that alleged by Mr Wooler in this complaint.”

It would appear that Councillor Wooler did not produce any evidence or professional opinions to support his allegations and assertions. In the case of Questions 2 and 3, about economisers and mechanical stokers, while it is true that at the time of these works the Claymills station, for example, was being fitted with mechanical stokers, it must be noted that Claymills had 5 boilers, with several in use at any one time, such that either several boiler men were needed or mechanical stokers, while Tees Cottage Western building had one boiler in use at any one time, so no saving of labour would

occur. Claymills was not fitted with economisers until much later. Mechanical stokers, such as chain grates, could theoretically offer better combustion relative to hand stoking with low skill, but only really in larger boilers, such as American practice, and indeed later on the Darlington Power Station on Haughton Road itself had chain grates, but firing 20 MW units, i.e. massive compared to Tees Cottage.

On the 23rd March 1906 the Waterworks Committee reviewed tenders received for a new weighbridge and recommended that Messrs W & T Avery Ltd of Newcastle be accepted. This replaced an earlier weighing machine nearer the gates on to Coniscliffe Road and shown on the 1897 OS map and marked as 'W.M' for weighing machine (figure 53). The function of the weighbridge was to monitor the amount of coal being brought on to site to supply the beam engines. Although the weighbridge itself has since been removed, the Weighman's cabin of 1906 still stands.

The First Gas Engine.

On the 28th December 1906 the Waterworks Committee received a report from their engineer on the condition of the old No 1 Pumping Engine at the Waterworks, which showed that according to his estimate, it would take £300 to put it into a satisfactory state of repair. The Engineer then provided some figures pointing out the advantages of providing a new suction gas plant in the place of the old engine and stated that with an expenditure of £850 a saving of £123 per annum would be made. After due deliberation the Committee recommended that the suggestion of the Waterworks Engineer be adopted, and the Gas Plant provided. On the 19th April 1907 a tender from the National Gas Engine Co. for the supply and erection of a suction Gas Plant at the Water Works was accepted, but there were problems in agreeing the contract and instead the tender from Messrs Fielding and Platt of Gloucester was accepted in late June. By the end of 1907 the Fielding and Platt 65Hp gas engine **G1** was installed and replaced the Western Beam Engine **B1** of 1849. The horizontal pump arrangement was retained. This gas engine occupied the space in the Western Engine House intended for a third beam engine but which had never been installed. Following the removal of the 1874 Galloway Boilers, the gas producer plant was installed within the old boiler house now replaced by Hawksley's new building to the south with its Lancashire boilers.

With the new plant in place the 1849 **B1** engine was now surplus to requirements and the Committee decided on the 21 February 1908 that *the old Beam Engine at the Waterworks (now disused) be sold.*

The Second Gas Engine

In 1911 attention was paid again to the future demands of water supply in Darlington and the need for further pumping equipment. Replacement of the **B2** beam engine in the Eastern Engine House with a new steam engine was considered but at this time the cheapness of gas engines also encouraged consideration of replacement of the 1907 65HP engine with a 100HP gas engine and new pumps. The final decision was to replace the **B2** beam engine, pumps and boilers and in its place install a 220HP gas engine, **G2**, with associated gas producer and pumps; the Fielding and Platt engine in the West Engine House was retained. The 1914 gas engine, **G2**, was built by Richard Hornsby & Sons, Ltd, of Grantham, the new pumps, by Hathorn, Davey & Co. Ltd of Leeds and the gas producer plant, originally by Richard Hornsby and Sons, Ltd. Altogether with the appropriate

building alterations the new plant cost around £6,500. The existing beam engine **B2** and boilers were sold to Teasdale Brothers as scrap. A tube of blueprints dated November 1913 for the gas engine is held by Darlington Local Studies Library at Crown Street.



Figure 42. The 1914 gas engine, G2, built by Richard Hornsby & Sons, Ltd, of Grantham and located in the East Engine House.

Making and Supplying Gas.

Today we take for granted the supply of natural gas, piped to our homes and factories from the North Sea or other naturally occurring deposits elsewhere in the world. At the time the gas engines were installed at Tees Cottage, gas had to be made by the controlled burning of coal or coke. Most towns, Darlington included, had a town gas works, indeed the DG&WC had begun life as gas supplier back in the early 19th century, but from a plant on the other side of the town.

Gas for the 1914 engine **G2** was made in the producer plant located inside the East Engine House. This was not without danger and a number of explosions were recorded, the final one being as late as 1955⁴⁶. This was apparently caused by a bird's nest in the vent pipe which prevented air release and created an explosive mixture when the test cock was ignited without a gauze⁴⁷.

The 1904 beam engine and 1914 gas engine were taken off standby duty following a pipe failure in the gas producer plant. Options of piping town gas to the engine were investigated but not progressed until 1985 when the engine was brought back to life as part of the preserved site.

During the First World War it was recommended that the hours worked by the engine men should be reduced by 6 hours a week to enable them to have one day's holiday per week. In 1913 the

⁴⁶ Devonshire, 2003, p29

⁴⁷ Prentice, 2012 unpublished notes

Tees Cottage.

Council Waterworks Committee minutes books recount that on 28th of April the Waterworks Engineer identified a need for three new cottages, on the 23rd of May tenders were invited for the building of the cottages (tenders for the painting of the interiors of the Jubilee Cottages were accepted also), and on the 23rd of June tenders were accepted for the building of the three new cottages. Between 1914 and 1926 the site had a short time of relative stability with the beam engine **B3** and the two gas engines driving their pumps and supplying the demand for water. The number of slow sand filters had been increased over the years to allow for treated water demand but it was decided in 1923 to replace these with chemical treatment and rapid pressure sand filters.

At the same time the duties performed by the steam and gas engine driven pumps would be replaced with centrifugal pumps driven by electric motors. The 1904 steam powered beam engine **B3** and 1914 gas engine **G2** were retained as standby and were used to supply all the water needs for one week each year until 1955 (the electric powered pumps being switched off). The new electric motors and pumps were placed in the space formerly occupied by the 1907 Fielding and Platt **G1** engine and plant. By 1927 the works had been completed and Darlington became one of the first towns in the country to have chemically clarified water using Aluminium Sulphate as a coagulant, rapid pressure sand filters and chlorination. The filters themselves were across the road at the broken Scar site where more space was available. There were some 63 pressure filters in the treatment process - and these were riveted vessels. Jim Prentice has photographs of these taken around 1980 prior to their demolition, as well as rivets from the pressure vessels (Jim Prentice 2017 pers comm)

The waste Alum from this process appears for a while to have been dumped into the old filter beds at Tees Cottage, possibly causing damage to the brick work which by the 1970's caused some collapse and partial infilling. Anecdotally much of this chemical waste was disposed of into the River Tees in the 1930's and 40's by so called 'midnight valves' which would open late at night releasing the effluent into the river. In 1938 Frank Donald Woodhall visited the site and took photographs and which is described in his book 'Steam Engines and Waterwheels'.

These works had taken place against the background of the Great Depression, the decline in industry of the time is perhaps reflected in that Broken Scar ceased having to pump and supply water for several months, all the water that industry and domestic customers needed being supplied by gravity alone from the Lartington Waterworks further up Teesdale⁴⁸. The Water Works remained an important part of the town's civic infrastructure and records show that through the 1930's and 40's large groups of school children visited the site as part of their education along with other significant employers and institutions in the area⁴⁹. Prior to World War II and the creation of the National Health Service in 1948 workers on the site had to largely look out for their own welfare. This included a holiday club where staff members could save a small amount from their wages each week towards the costs of an annual holiday (figure 43); and in 1941 12 workers at Tees Cottage were paying 1d per week into the Darlington Queen's Nurses Association Provident Scheme which allowed them access to very basic nursing care should they be taken ill.

⁴⁸ Prentice, 2012 unpublished notes

⁴⁹ Notes on these are kept in a folder in the archive room at Tees Cottage

Tees Cottage.

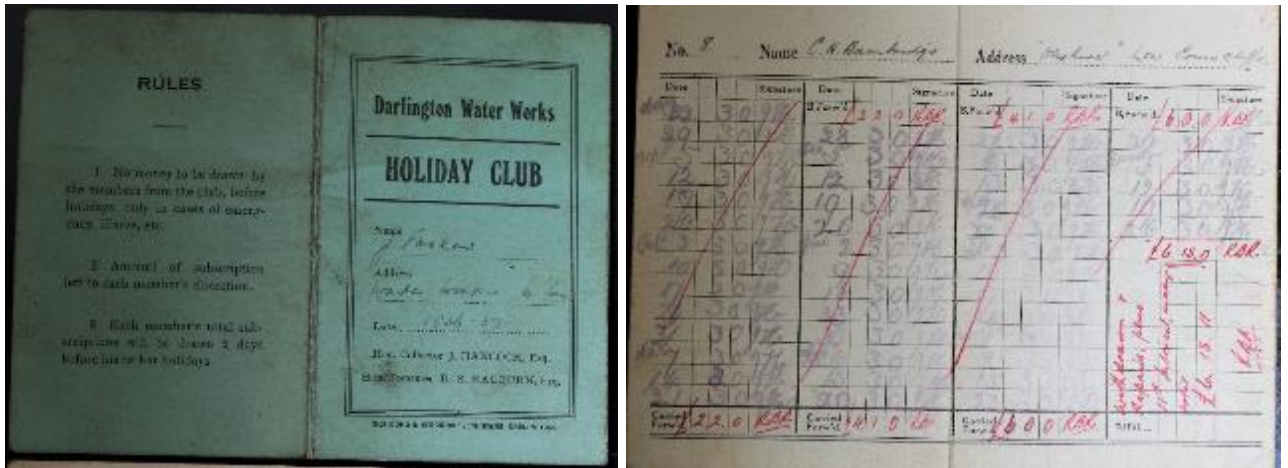


Figure 43. The workers at Tees Cottage looked to their own welfare in the 1930's with savings schemes such as a holiday club.



During the Second World War brick blast walls were built to protect the external air receivers from German bombing (figure 44). Scheduled Monument Consent was granted in February 2010 to remove these, but only after a long debate to consider two sides of a conservation debate; one side would argue that all additions to a historic building have some worth and help to tell its story, the other would undertake an informed restoration back to how it once looked when first built or at an important time in its life. The lower course of the blast walls were left in-situ with re-set copings to reflect the WWII history. Following the work consent was granted on the 16th June 2015 for re-decoration of the now revealed water cylinders with the same colour paint (red) as previously approved for the rainwater goods in order that there is continuity in the colours of all these elements.

Figure 44. Reduced height WWII blast walls around the 1904 engine air receivers, an interesting question on conservation and telling the story of Tees Cottage

As a key piece of infrastructure, the waterworks were of high value to the town and local industry during World War II and as such had an almost constant Home Guard fire watch presence to ensure should they be targeted by German bombing that a fast response could be ensured. A thick green file held at Tees Cottage in the archive room contains a large body of original material and correspondence regarding the events and people of this period and would warrant further study and transcription.

In addition to requirements by factory inspectors for the boilers and machinery on the premises, original documents in the archive room at Tees Cottage also provide evidence of regular inspections of cranes and lifting appliances such as that of 1942 sent to the Waterworks manager Mr Raeburn by the Leeds office of the Scottish Boiler and General Insurance Company Ltd of Glasgow. (figure 45).

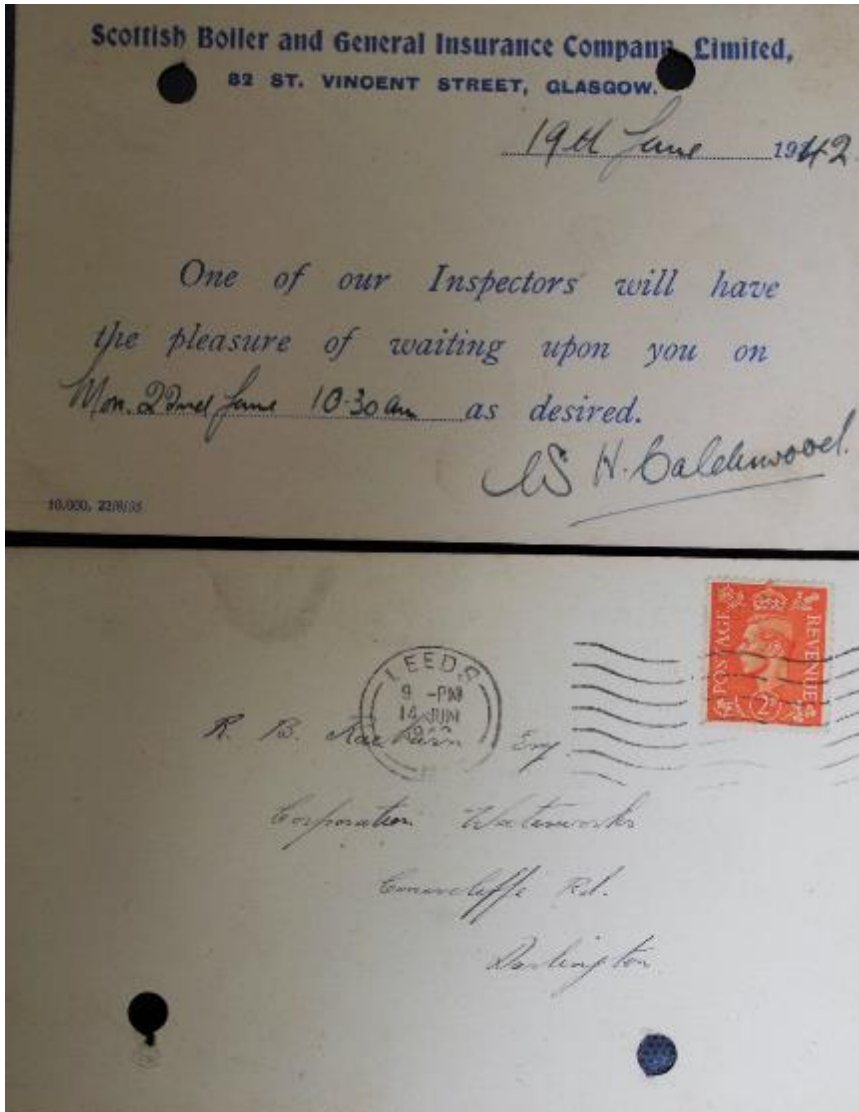


Figure 45. From the Tees Cottage Archive Room, an appointment card to the manager Mr Raeburn in 1942 arranging inspection of plant and machinery.

The move to electric pumps and chlorination of water supply allowed the site to supply water until 1972 when, to allow more water to be supplied, a new pump house was built to the north of Coniscliffe Road. This was only a short lasting expensive facility as the legislation to form the new Water Authorities was already progressing and in 1974 Darlington Waterworks joined with other local water undertakers to form Northumbrian Water Authority. The two sites' operation of Tees Cottage and Broken Scar, come together again, by this time the previous Tees Valley and Cleveland Water Board's site accommodated a modern plant compared to the uprated 1926 plant of the Darlington Waterworks. The phasing out of the Darlington works took place over a very short time period, indeed just a few weeks in 1979 by installing a supply pipeline and control valve from Broken Scar pumps to the 1972 pump delivery and so bypassing the whole of the Tees Cottage treatment and pumping apparatus⁵⁰.

⁵⁰ Jim Prentice, pers comm.



Figure 46. Tees Cottage (bottom right) and Broken Scar Water Works seen from the south, probably in the 1960's before major work began which would see new buildings north of Coniscliffe Road and the demolition of the beam engine houses on the Broken Scar site as well as the original pre-water works farm house (centre).

Redundancy, Conservation and Preservation.

The **B3** Beam Engine had been brought into steam in 1975 as part of the Stockton & Darlington Railway 150th celebrations and this began an interest in preservation with the obvious approaching redundancy of the site. At some point between 1975 and 1979 the top of the West Engine House chimney was reduced in height for safety reasons⁵¹ and by 1980 the site was no longer needed to treat or to pump water and the Tees Cottage Pumping Station became a preserved site but still in the ownership of Northumbrian Water Ltd (NWL).

After a number of months of informal activity, The Tees Cottage Preservation Society was established in 1980 and has since managed the site, cared for the various engines and boilers and opened to the public. NWL have continued to support the costs of the maintenance of the buildings on the site. A number of individuals have been active over the subsequent years and a fascinating and on-going story remains to be told of the numerous people who have ensured the site's continued life. Jim Prentice, formerly of NWL has provided a written recollection of those early days and which is reproduced as follows;

⁵¹ Jim Prentice, pers comm.

‘The engines ceased pumping into Darlington when the ‘one week per year’ operation of the steam beam engine and gas engine into supply without use of the electric pumps had failed following the explosion of the gas producer plant as it was being prepared for the 1955 operation.

The beam engine was then operated for occasional show purposes and was so operated in 1975 under Northumbrian Water Authority as part of the celebrations for 150 years of steam centred at Shildon. I went to see it operating and was not alarmed by the plumes of wet air that emanated from the pump glands (as at that stage I knew no better!). The pumps had been rendered semi-pumping by removal of three sets of valves from each piston and the glands had been slackened to allow air ingress on the downstroke and egress on the upstroke. The water spray ‘jet’ reached roughly to the top of the handrails accompanied by compressor-like noise.. The engine was operating at about 12rpm (which can be checked from the cine film taken) but I do not remember the heavy steam noise at the bottom of the stroke that we had on ‘our’ first start up. The engine had (by rumour) considerably oversped on the 1975 first operation before the steam valve was emergency shut, the governor was not working. The No101 boiler was used and had vary lazy fires of considerable depth using Welsh steam coal in ‘big’ lumps. The boiler men said they would close the boiler house doors at lunchtime, clean the fires and remove ash, re-load the fires with steam coal and that would last until their closing time at 16.30! The gas engine house was open but no-one there to talk to.

My next visit to the DCCW site was to carry out pump tests on the electric pumps and was able to ‘closely’ observe the manual star-delta starting of each pump. The star position gave high torque but low power to get the pumps moving and delta position to bring the motor up to full speed. The change-over was quite sensitive and a few times the delta position was not able to pick up speed and the start-up procedure had to be repeated. The pumps and motors were in good condition and close to 1970’s efficiencies. I do not know if my old documents are still kept by Northumbrian Water but when I retired the pump tests were still available.

After the re-organisation of the water industry in 1974 with the formation of the Water Authorities, DCWW and Tees Valley and Cleveland Water Board (TVCWB) were amalgamated along with the more northerly water undertakings with the exception of the Newcastle and Gateshead Water Company and Hartlepool Water Company. In 1978 a re-organisation of the Tees Division management took place as the structure had become populated with many long-serving people due to retire by the late 1970s / early 1980s. The roles of Supply Engineer and Distribution Engineer were created reflecting a need to have more engineering input into the Authority’s management role. The Supply Engineer managed all points west of Broken Scar, all treatment works and untreated water supplies to industry as far as BSC Redcar, the Distribution Engineer managed the potable water distribution after the first in-line reservoir from the treatment works. I was fortunate to be appointed Supply Engineer.

One item in my job description was ‘to have due regard for the historic engines formerly in the DCWW’. So I *was* allowed to spend time there!!

However another item was that the DCWW treatment works and associated pumping plant was to be abandoned and Darlington supply taken from the TVCWB systems. This was achieved during 1979 by connecting the ‘Lartington’ system to supply the higher and easterly Darlington areas, with

Tees Cottage.

a new pipeline from Broken Scar to DCWW pump outlets supplying 'central Darlington' so bypassing the entire DCWW treatment system. This reduced the DCWW manpower as the pump houses and treatment works each had shift manning. The de-manning of the river and treatment pumps meant that there was no security manning of the present Tees Cottage site and action had to be taken to prevent the site becoming a vandal and scrap target.

John Roddis was a member of the Newcomen Society and for many years had been gathering support for preservation of the DCWW pumping installation and was in communication with Northumbrian Water to find a way to achieve this. After some internal discussion with Tees Division management I arranged an 'out of work' meeting with John Roddis, and Mike Jones (Mechanical Engineer), Geoff Woolley (Broken Scar Superintendent), Dick King (DCWW supervisor), (NW personnel), and Kevin Boland (NW and Stokesley), Tony Wormald, Alan Bailey, Keith Brown, Alan Snape (Stokesley). (Attendees to be checked as this was early winter 1978 and memory may have included some that were not there, or missed some that were there!). From this first meeting Kevin Boland became Chairman, Tony Wormald (secretary), Alan Bailey (Insurance) with the NW personnel taking their own roles. Kevin Boland's brother was a solicitor in Darlington and he undertook the necessary legal advice. The initial name was Broken Scar Preservation Society but this was soon changed to Tees Cottage Preservation Society as the Broken Scar name was a TVCWB site.

We had to decide what to do with the site –

- Should it be static and steam and gas free?
- Should it involve steam production and rotate the beam engine without pumping water?
- Should the beam engine pump water?
- Should the gas engine be operated?
- Should the gas engine pump water?
- Then all the thoughts about open days, school visits, articles of association, constitution etc.

It was decided quite early (late 1978) that the boilers should be inspected and if suitable returned to steam and the beam engine should operate with the engine pumping normally. The 1975 steaming had been successful but there were rumours that boiler No 101 was close to the end of its insurable life, there was no comment about No 102. Gordon Luhrs (Boiler Inspector) was contacted and he said that, to the contrary, the boiler was in good condition for its age. There was a feeling that some senior staff within NWL would have preferred a negative report and so prevent the beam engine operating. Based on Gordon Luhr's positive comments both boilers had their fittings overhauled including the stop valves during 1979. The boiler flues were cleaned of the accumulated soot and crows nests that had dropped down the chimney with many bags full of soot removed. (Only when the chimney base was reached was it realised that bricks had previously been removed to allow direct removal of soot) (The opening remaining from the flue to the chimney was about 18", there was about 5ft depth of accumulated soot. In 1975 the boiler did not create a draught and a paraffin fire was started at the base of the chimney to destroy the accumulated crows' nests and to create a draught, but no debris removal was carried out.)

Tees Cottage.

The pipework from the boilers to the beam engine main steam valve did not form part of the pressure vessels regulations in 1979 and was not tested but assumed to be in a condition similar to successful operation in 1975.

Attempts were made to rotate the beam engine, ultimately using hydraulic jacking on the flywheel spoke without success. The engine was heavily oiled. The expectation was that the beam engine would operate and pump pipe routes were determined to allow the river pump to pump into the now abandoned filter tanks and for the town pump to use abandoned pipes within the DCWW site and return the pumped water to the Tees Cottage site.

By late summer 1979 sufficient work had been carried out on the boilers with boiler fittings replaced to get a new inspection arranged.

In October 1979 (I think – I'll check – it was probably early October) Gordon Luhrs had carried out the thorough internal inspection and the boiler was tested to 150psi and passed without problem. The boiler was partly drained to operating level with the access manlid removed to allow inspection of the water in case scum formed as the water warmed. John Roddis had been in contact with Deerborn Chemicals for boiler treatment and a simple tannin based treatment was deemed sufficient, he obtained supplies courtesy of Aycliffe Plastics.

The fire was lit in late afternoon by Mark Woolley (Geoff's son) with Geoff, Kevin Boland, Stan Whitfield, me and others watching and boiler heating commenced. After gentle heating the water eventually boiled and no scum was observed, the manlid replaced and bolted down – a bit warm!

Arrangements were made with Gorgon Luhrs to carry out the full 100psi steam test and boiler pressure was increased over the next day or two. On the day of the test several Tees Cottage members were helping but as the pressure increased so they found other jobs to do and at 95psi Geoff and I were the only ones in the boiler house, then there was just me sitting on the boiler house bench watching the boiler front!! Gordon arrived soon after and laughed saying that 100psi was not high pressure and he checks boilers where the steam pipes glow red! I brought the boiler up to 98psi and Gordon got me to lift the dead weight valve with a suitable length of wood, it then feathered and Gordon was happy! We lifted to Duad valve by raising the boiler pressure to 102psi, the dead weight valve was lifting more at that stage. The steam issuing from the Duad drain attracted others, Geoff being one of the first ones to re-appear and the 100psi steam test was successful. The boiler pressure was dropped by slow release of steam through the Duad valve to prevent temperature shock to the boiler and at about 80psi the boiler drain was opened and the Duad again operated correctly with the water level at about 1" in the glass when it commenced to rapidly open. The boiler feed pump restored water level, the Duad valve shut and all done!

So now we had a boiler full of lovely hot water and steam!

We commenced to feed steam through to the beam engine and commenced pre-heating the engine with the jackets first for a considerable time before steam applied to the inside of the cylinders. We had Jack Christon (DCWW Superintendent who had operated the beam engine in 1975), Tees Cottage members and visitors from Ryhope and Papplewick who we invited to give advice - some stayed overnight. Jack took a lead role to give advice but unfortunately his health had deteriorated

and he remained sitting near the pumps. However he suggested 60psi was a normal starting pressure for the engine and this was tried. He had told us incorrectly to pull levers (top steam and bottom exhaust) which would rotate the engine with the pumps on the up-stroke. However the engine had been stopped on the pump downstroke close to bottom dead centre so we agreed with him and pulled the opposite pair of levers! At 60psi the engine did not even groan in protest. To help the nerves Geoff and I were operating the levers until Geoff's finger got trapped against the steam chest and the finger split – off he went to A and E. At 80psi the engine groaned and moved – all levers were returned and the engine stopped. We were able to reverse the engine and it groaned less and moved 'up' the downstroke. We then rotated through bottom dead centre and onto the pump upstroke and again stopped. Gradually we moved it over top dead centre and so completed a full revolution without any nasty noises, we did a few more revolutions under control of the hand levers and the main inlet steam valve throttled. The engine eventually was rotated normally but then had a loud metallic noise at the bottom dead centre – Jack said this was the engine's normal noise and the engine was allowed to continue operating and settle down – but the noise continued. Eventually after about ½ hour the engine was stopped, it was operating and pumping water.

We discussed the noise with Jack, members of Ryhope and Papplewick. Jack maintained that was its normal noise, Ryhope member said the piston rods had stretched and with wear the piston was hitting the bottom cylinder 'head', neither option we thought was correct. A quiet member from Papplewick said the noise was due to steam hammer and suggested that the bottom low pressure exhaust valve was stuck open, the noise being when steam was admitted when there was no cushion steam and so making the noise as the pressure hit the piston and then all the slack was taken up. We preferred this option and took the valve plate off, the valve was indeed stuck open, a tap with hammer on wood and the valve dropped, it was lubricated and boxed up. When we operated the beam engine the next day the noise had disappeared and Jack said we had broken his engine.

The engine had been left overnight with boiler pressure against the closed engine house main steam valve and the hand levers in operating position– not good but we had not sorted out properly how we should operate the engine and this was how it had been left overnight in 1975. An unknown member from Ryhope decided by himself to open the engine house main steam valve when he got up (they were sleeping in the beam engine house), the engine started to rotate and he was not seen again! As normal the engine would not start fully without use of the hand levers and stopped on the upstroke much to the relief of other visitors from Ryhope.'

Files in the archive room at Tees Cottage recount further information on early meeting and firings of the boilers and would merit transcription. On Thursday 7th of April 1981 at the Crown Hotel, Kirklevington the first open meeting of the TCPS was held. Present were J Prentice, M Jones, J Roddi, A Wormald, A Bailey, G Adamson, R King, Ray Anderson, Mrs Hewitson, G Woolley, K Brown, K Boland, H Turley, R Anderson, P Hewtison, Stan (no surname given) and apologies were received from K Fellows and A Snape. The first public steaming seems to have been in November 1981 and a rota (complete with coffee stains!) is amongst the many papers in the Tees Cottage Archive room. (figure 47)

TEES COTTAGE PUMPING STATION

JFP

PROVISIONAL ROTA FOR FIRST STEAMING (1981)

AT THE LAST WORKING DAY (19/11/81) IT WAS AGREED THAT THE BOILER SHOULD BE STARTED ON TUESDAY EVENING (24/11/81) WITH A VIEW TO HAVING THE BOILER SAFETY VALVES CERTIFIED O.K. BY FRIDAY (27/11/81) WHEN THE PRESS WOULD HOPEFULLY BE ABLE TO BE SHOWN THE BEAM ENGINE WORKING. IF EVERYTHING GOES WELL ON FRIDAY THEN IT WILL BE ANNOUNCED VIA THE PRESS THAT THE BEAM ENGINE WILL BE OPEN TO THE PUBLIC ON SATURDAY AND SUNDAY (28-29/11/81)

JIM, GEOFF AND STAN WILL BE WORKING FROM THE EVENING OF 24/11/81 ONWARDS, THE ACTUAL TIMES WHICH THEY WILL BE WORKING DEPENDING UPON THE TIMES AT WHICH OTHER MEMBERS CAN ATTEND. THE PRESENT ROTA IS AS FOLLOWS:-

WEDNESDAY 25/11	KEN HARRY PETER H.	10.00 am - 6.00 pm AS REQUIRED DURING DAY EVENING IF REQUIRED
THURSDAY 26/11	ERIC RON ALLAN S. HARRY PETER H. MIKE	9.00 am - 6.00 pm IF REQUIRED DURING DAY 9.30 am - 5.00 pm AS REQUIRED DURING DAY EVENING IF REQUIRED FROM 9 pm ONWARDS
FRIDAY 27/11	KEVIN KEN MIKE PETER S. KEITH ALAN B. TONY	9.00 am - OVERNIGHT IF REQ'D 10.00 am - 6.00 pm ALL DAY ALL DAY AND OVERNIGHT IF REQ'D EVENING (ALL?) 11 pm ONWARDS

Figure 47. The hand-written rota for the first public steaming after the formation of the TCPS in 1981. The original is in the Tees Cottage archive room.

Tees Cottage.

On the 11th of June 1984, English Heritage (now known as Historic England), designated the site using powers under the 1979 Ancient Monuments and Archaeological Areas Act. Unless specifically excluded from the scheduling description this means everything within the red line boundary (figure 3) including the buildings and historic machinery is legally protected.

In 1999 celebrations were held on the 11/12th of May to mark the 150th anniversary of the passing of the Act of Parliament which created the Darlington Gas & Water Company (DG&WC), was incorporated by an Act of Parliament on the 11th of May 1849. The Northern Echo on the 11th of May reported;

CELEBRATIONS to mark the 150th anniversary of a pumping station on the River Tees in Darlington continued yesterday, when schoolchildren called in for a history lesson. The Tees Cottage Pumping Station, at Broken Scar, Darlington, held festivities throughout the weekend, including visits from traction engines, a fairground organ and old cars.

The station's 1904 beam engine and rare gas-powered engine were also on display. More than 1,500 people visited the pumping station to enjoy the celebrations marking 150 years since an Act of Parliament saw the inauguration of the Darlington Gas and Water Company on the site.

The act was incorporated on May 11 1849 - exactly 150 years ago today. Although the station is no longer in full-time use, it still pumps water and is open as a working museum for about four days a year. Sue Stahl, treasurer and honorary trustee of the station's preservation society, said: "It still does work, but it doesn't supply water to the town any more because it's only run by the preservation society. "It has been a wonderful weekend," she said.

Members of the preservation society dressed in period costume to add atmosphere to the celebrations. The station's blacksmith's shop was operated by staff from Little Newsham Forge, and members of the public were also able to see a miniature steam railway. Yesterday, 150 pupils from Abbey Junior School and Mowden Junior School, in Darlington, also visited the station. The celebrations will continue tonight with a party at which the special guest will be Fred Dibnah, TV's star steeplejack, who will talk about his exploits.

The Northern Echo of the 12th of May reported on the celebratory dinner;

Fred's visit is a high point in 150-year celebrations.

BRITAIN'S best known steeplejack Fred Dibnah got revellers steamed up at celebrations to mark the 150th anniversary of a pumping station on the River Tees in Darlington last night. He was guest speaker at the event attended by numerous guests and local dignitaries. Mr Dibnah talked of his exploits, many of which have been captured on TV after the BBC turned him into a star with a documentary 20 years ago about his life. One programme featured a visit to the Tees Cottage Pumping Station, at Broken Scar, where he returned last night. More than 1,500 people have visited it over the weekend to enjoy the anniversary celebrations and see the station's 1904 beam engine and rare gas-powered engine, as well as the 1914 gas engine and traction engine. On May 11, 1849 an Act of Parliament saw the inauguration of the Darlington Gas and Water Company on the site. It was decommissioned in the 1970s and fell into disrepair before being renovated by the station's preservation society. Although the station is no longer in full-time use, it still pumps water and is open as a working museum for about four days a year.

Tees Cottage.



Figure 48. From the Northern Echo of 12th May 1999 'Return visit: Fred Dibnah back at the Tees Cottage Pumping Station last night' as part of the 150th celebrations. Picture courtesy of The Northern Echo.

From January to April 2002 a major building refurbishment contract was carried out by Hodgson & Allon, of Burnopfield, on the roofs, gutters and downcomers of the main buildings to return them to a weather-tight condition, to replace a small number of window frames and to do some external and internal painting to windows and downcomers, all funded jointly by English Heritage and Northumbrian Water Ltd. Further works.

In 2008 MWH UK Ltd, an international water and environmental engineering services company and the successor company to T.C. Hawksley & Co, published a book on the career of Thomas Hawksley which included a short ref to Darlington and Tees Cottage.

In May 2014 Tees Cottage was closed by NWL for safety reasons⁵². A report in the Northern Echo of May 23, 2014 noted that;

A PIECE of the region's industrial heritage has been closed for the foreseeable future due to serious safety and structural issues. Entry to Tees Cottage Pumping Station, near Darlington, has been banned and all upcoming events have been cancelled. The site is expected to be closed for the rest of the year, and members of the Tees Cottage Pumping Station Preservation Society, the group of dedicated volunteers who maintain the Coniscliffe Road site, have also been banned from entering the property to carry out regular maintenance work.

A spokesman for Northumbrian Water, which owns the site, said: "As part of a routine inspection of all our sites, serious safety and structural issues were identified at Tees Cottage Pumping Station and we had to take the difficult decision to temporarily stop all access. "We are currently in discussions and working with volunteers to restore access as soon as we can.

"We really appreciate the valuable work of the volunteers over many years and are keen to continue that partnership in the future. "We appreciate how disappointing it is that events have had to be cancelled, but as a responsible business, people's safety must be the priority."

The pumping station was built in 1849 to pipe water from the River Tees to households in Darlington and Teesside, which previously relied on wells and rainwater tubs. The site holds regular open days

⁵²http://www.thenorthernecho.co.uk/news/11234511.Historic_Darlington_pumping_station_closed_due_to_safety_and_structural_concerns/

Tees Cottage.

for visitors to see the historic steam-powered beam engine and gas engine. John West, chairman of the preservation society, said the group was absolutely devastated at the closure.

He said: "We are not allowed onto the site - we have been quoted health and safety but have not been told what. "We thought we were working towards a refurbishment but now we have been told they are closing the site with immediate effect.

"The whole team is very upset about it. We see it as part of Darlington's heritage and we are only interested in opening it for the public. "We cannot do anything – it is all in Northumbrian Water's hands. "We are frustrated, disappointed and upset."

A rally featuring more than 100 classic Jowett cars had been due to take place at the site on bank holiday Monday (May 26). This is now expected to be held at the National Railway Museum in Shildon. A vintage vehicle machinery rally due to be held on October 12 has also been cancelled.

The People of Tees Cottage

While the eye is naturally drawn to the great beam engine and the dramatic Victorian buildings of Tees Cottage, there is also a wonderful, and on occasion tragic, story to be told of people as well as engineering. From the great and 'good' of the town such as the Pease and Backhouse families, to more humble characters such as Mr Naismith the engine man, his apprentices and the more recent volunteer effort since the 1980s there is a rich seam of information and stories to be told about the people of Tees Cottage. The story of these individuals and families is recounted within the archive room at Tees Cottage in a manuscript called '*The Workmen of Tees Cottage*'. Herein can be found the stories of the Dodds and Anderson families who worked for many years at Tees Cottage, and individuals such as Arthur Harker of Jubilee Cottages who worked at Tees Cottage in 1914 but joined the army only to die in Iraq where he is buried. The family stories of labourers, engineers and their kin tell a local story, but one touched by world events. Researched and written by volunteers at TCPS (although the manuscript has no date and author). This is an excellent piece of work and deserves publication and inclusion in the interpretation regarding the site.

Between 2016 and 2017 a number of Scheduled Monument Consents were issued by Historic England/English Heritage for improvements and repairs around the site (all noted in subsequent ANNEX 1). Dilapidated wooden fencing around the filter beds was replaced by metal 'Playsafe Bowtop railings'. Concrete and render repairs to the east well cap and road re-surfacing were approved and an extensive scheme of repair and repainting to the timber windows of both engine houses was undertaken. This involved splice repairs, epoxy resin repairs and complete replacement of the decayed timber sections to the timber windows. Also in 2016 the replacement of two rotten sections of timber walkway beneath the Beam House floor was approved in order to comply with health and safety reasons.

Volunteer activity on the site continues with much enthusiasm (and links to several local companies), especially with the regular Wednesday maintenance days. Steaming and opening days continue on a regular basis also and it is hoped that this report and the subsequent planned interpretation work will continue to increase the interest and appreciation of this amazing and inspiring industrial monument.

Moving Forward; Telling the Story, building on the past.

***'Tell me and I forget.
Teach me and I remember.
Involve me and I learn'***
Benjamin Franklin.

Engagement begins before someone arrives and continues well beyond their departure. It's about building relationships and creating reasons to return. (National Trust)

Interpretation and access to the site has a long history. The local studies archive in Darlington Library contains a long list of seasonal leaflets and editions of previous guide books.

The wealth of stories, history and events to be found in and of Tees Cottage provides a treasure chest of material to be used to involve, interest and intrigue community and visitors alike.

This study has focussed on what might be thought of as intangible heritage the stories and events associated with the harbour and held in people's memories, books, photographs, drawings and records. Time has also left behind physical evidence in the form of more substantial remains

Natural Resources

- Underlying geology, processes of deposition and erosion seen through water and ice.
- Building materials, sandstones and clay for bricks, iron for the engines.
- Fuel and consumables. Coal and sands and gravels.

Uses of Water.

- Drinking, cooking, cleaning (woollen mills), industry

Water supply before Tees Cottage in Darlington

- Wells, cess pits, disease.

National sanitation reform, science and vaccination

- Urbanisation/industrialisation,
- discovery of disease and microbes
- Water acts etc

Tees Cottage

- Technology, engines, how it all works, reservoirs

Darlington people and personalities

- From the Pease and Backhouses to Mr Naismith the engine man and his apprentices and the volunteer effort since the 1908s, Tees Cottage has a wonderful story, based on a substantial archive, to tell of people as well as engineering.

ANNEX 1 Source Material

Bibliography

Archives

List of Consented Work from Historic England 2007-2017

Photographs, Films and Images

Websites

Water Acts

Bibliography.

Anwyll, P (1988) MSC scheme report.

Anon (undated). *The Workmen of Tees Cottage*. Illustrated file of information on various staff and families through 19th and 20th centuries. TCPS Archive Room.

Anon (1955) *Darlington Corporation Water Works; A Review*. Journal of the British Waterworks Association March 1955.

Cookson, G (2003) *The Townscape of Darlington*. Victoria County History.

Devonshire, H.C. (2004) *The Tees Cottage Pumping Station Darlington, a guide and history*. Edition: 4th ed. Tees Cottage Preservation Society. Darlington Local Studies Centre Classification: U418r. ISBN: BX00125547. 52p, ill. 30x21cm. Previous versions in 2000, 2001, 2002.

Devonshire, H.C (2012). *The Tees Cottage Pumping Station Darlington, a guide and history*. Unpublished 5th edition and notes.

Ellis, Peter.J. (2008) *Thomas Hawksley, Water Engineer. 1807-1893*.

<http://www.pureandconstant.talktalk.net/>

Fisher. J and Cotton, A. (2005) *Learning from the Past; Delivery of water and sanitation services to the poor in nineteenth century Britain*. Water, Engineering and Development Centre (WEDC) Loughborough University

Longstaffe, William Hylton (1854) *The history and antiquities of the parish of Darlington, in the bishoprick*.

Lowes, Anne (2007). *Public Health and Public Water in Late Victorian England: The Typhoid Epidemics in Darlington of 1890 and 1891*. University of York BA Thesis.

Mortimer Ian, (2011). *The Time Traveller's Guide to Medieval England: A Handbook for Visitors to the Fourteenth Century*.

Ranger, William (1850) *Report to the General Board of Health on a preliminary inquiry into the sewerage, drainage, and supply of water and the sanitary condition of the inhabitants of Darlington in the County of Durham*. Darlington Local Studies library U418q. (8x5ins), 74p (ill.). ISBN: BX00299673

Parliament (1854). *An Act to enable the Local Board of Health for the township of Darlington to supply gas and water within their district, and to purchase the works of the Darlington Gas and Water Company; to establish and regulate markets and slaughter-houses, and a public park; to construct sewage works, and raise money etc*. Darlington Local Studies classification: U418f785. ISBN: X002092605

Tees Cottage.

Parliament. (1872). *The Darlington extension and improvement act 1872, an act to define and extend the powers of the Corporation and of the local board of health of Darlington in relation to gas and water supply, and other matters; to extend the boundaries of the Borough; to authorise the construction of river diversions, bridge improvements.... and for other purposes.* 18 July 1872.

Darlington Local Studies library, Classification: U418f785

ISBN: BX00293247. 10x7ins(52p)

Prentice, Jim (2012) *Preserved Historic Engines at Tees Cottage and other Interesting Items.*

Unpublished notes

Smith, H.J (1967). *Public Health Act Report to The General Board of Health on Darlington 1850.*

Durham County Local History Society.

Sack DA, Sack RB, Nair GB, Siddique AK (January 2004). *Cholera.* Lancet. 363 (9404): 223–33

Tees Valley & Cleveland Water Board (1963). *Broken Scar/Gately raw water scheme.*

Tees Valley & Cleveland Water Board. Darlington Local Studies classification: U418a180

ISBN: BX00041277. 20p, ill. ; 26x19cm

G.M. Thompson and T.S.R. Winter, Engineers. (1958). *Plans and Sections, plans and sections of intended reservoir at Balder Head and of pumping station and works, Coniscliffe Road, Darlington.*

Tees Valley and Cleveland Water Board. Map and book of reference. Darlington Local Studies

Library Classification: U424i251. ISBN: BX00308638. 27x38ins(5p)

Winter, George. (1921). *Unpublished report to the Darlington Waterworks Committee* by George Winter Borough Surveyor and Waterworks Engineer.

Archives.

Darlington Local History Library.

Images

N665 Being Cleaned and put into working order 1981 N.Echo

N674 Beam Engine 1981 N.Echo

N696 Opening of Pumping Station 1981 N.Echo

N697 Interior Shots 1982 N.Echo

N1168 1977 Pumping Engine building

490-4 1964 Beam Engine photos

645 1936 viewed from Mowden Hall School

955, 956, 957 a & b 1973 Beam Engine Photos

C132 no date outlet pipe on river bank

U415 no date civic society Darlington and District buildings

A21 c.1870 Josph Peases fire engine at waterworks

947 1973 Aerial Photo

3730 a & b 1974 Beam Engine

3757 a, b, c 1988 engine with governor, exterior view, gas engine ?

3756 a,b,c,d,e 1988 Beam engine and workshop

U418 & 59 top of cylinder photo from Darlington calendar (June)

U973b no date 'constructed by Teasdale bros, Darlington 1904. Part of steam beam engine designed by Mr T. Hawksley.

B870-873 No date, photos of beam engine and treatment plant.

4939A No date, Gas engine

B910 late 19th or early 20th C Demonstration of new fire engine

Documents

U418 f 251 L.C 66907 Tees Cottage descriptive leaflet 10 pages paper cover 8" x 5"

Tees Cottage.

U418 f 251 46851-46855 1900-1902 Darlington Corporation Waterworks, Tees Cottage Pumping Station. 5 Plans (copies, originals in DRO) 25 1/4"x38 1/2".

U418 r LC 78622 1983 Information leaflet

U418 h L.C 60490 1984 Steaming and open weekend

U418 r L C 74313 1992 leaflet

U424 a 33 L.C72648 1991 Tourist leaflet

U418h L.C 55469 1982 tourist leaflet

U418iSTE. Stephenson Brothers, Carting Contractors and Cab Proprietors, invoice to the Tees Valley Water Board, September 1st 1928, photocopy. Year 1928. 1page ; 30x21cm

U415i251. Reports and accounts for the year ended 1921 to 1939, various books
Author: Durham County Water Board. Year 1921-39. Publisher: Dodds, Darlington.
Size 13x8ins

U418f251. Darlington Corporation Water Works, Tees Cottage Pumping Station
Year 1900-1902, Map. Size 25x38ins(5p)
Classification: (Darlington Local Studies)

U424i251Tees Valley Water. Plans and sections, Author: Tees Valley Water Board
Year 1929. Map 22x30ins(23p)

Unknown Ref. Rolled tube of blueprints dated November 1913 for Gas Engine.

Durham County Record Office

Plans of Tees Cottage Pumping Station (Ref: Da/UT 5/)

Ref: Da/UT 5/4/.

Section views of the engine house, 26 October 1918 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

[View Da/UT 5/4/1 physical details](#)

Ref: Da/UT 5/4/2.

Horizontal layout of installations in the engine and boiler house, 30 October 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

[View Da/UT 5/4/2 physical details](#)

Ref: Da/UT 5/4/3.

Sections of the boiler house, 30 October 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

[View Da/UT 5/4/3 physical details](#)

Tees Cottage.

Ref: Da/UT 5/4/4.

Sections of 24 inch valve, 1 November 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster 1.5 inch to 1 foot [1:8]

[View Da/UT 5/4/4 physical details](#)

Ref: Da/UT 5/4/5.

Sections of the boiler house, 9 April 1902 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster 0.5 inch to 1 foot [1:24]

[View Da/UT 5/4/5 physical details](#)

Science Museum Archives

HAWK2. Collection of drawings of Thomas Hawksley & Co. and T. and C. Hawksley & Co. re waterworks, sewage works and gas works, chiefly in England and Wales, c.1830s-1920.

E19 - 1849 Jun [Elevations. Bears name 'T Hawksley CE, Nottingham'. Bears also ms. note re contract of 23 Jul 1849 and signature of Mark Temple, witnessed by George Dickenson 4 Aug 1849] Line drawing

E20 - [Elevations. Bears ms. note re contract and signatures of Robert Duck and Robert Graham (witnessed by?) Joseph Toole] Line drawing

E22 - 1849 Jun Contract No. 3. [Sections, plan. Bears name, ms. note and signature as E19, witnessed by Henry Robinson 23 Jul 1849] Line drawing, part with wash

E23 -Contract No. 3a. [Sections, plan. Bears ms. note and signatures as E20, (witnessed by?)

Drawings; E174/E175/E176/E178/E179/E180/E193/E194/E195/E208/E209

Tees Cottage Archive Room.

Lowes, Anne (2007. *Public Health and Public Water in Late Victorian England: The Typhoid Epidemics in Darlington of 1890 and 1891*. University of York BA Thesis.

Anon (undated). *The Workmen of Tees Cottage*. File of information on various staff through 19th and 20th centuries.

Teesside Archives

Reference: U/NWA/2/5. Title: Volume containing the following.

Railways Clauses Consolidation Act 1845

Lands Clauses Consolidation Act 1845

Companies Clauses Consolidation Act 1845

Waterworks Clauses Act 1847

Tees Cottage.

Darlington Gas and Water Act 1849

Stockton, Middlesbrough and Yarm Waterworks Act 1851

Copy of Agreement between Darlington Gas and Water Co., and Stockton, Middlesbrough and Yarm Water Co., dated 25th Mar. 1851

Stockton, Middlesbrough and Yarm Waterworks Act 1854

Stockton and Middlesbrough Waterworks Act 1858

Land Clauses Consolidation Amendment Act 1860

Waterworks Clauses Amendment Act 1863

Stockton and Middlesbrough Waterworks Act 1864

Land Clauses Consolidation Amendment Act 1869

Gas and Water Facilities Act 1870

Public Health Act 1875

Pollution of Rivers Act 1876

Stockton and Middlesbrough Waterworks Act 1876

Provisional Order (Aysgarth) 1879

Provisional Order (Bethesda) 1880

1851 Bill - Evidence before House of Commons

1851 Bill - Evidence before House of Lords 1851

List of consented works since 2007 from Historic England.

Historic England on request kindly provided a list of works at Tees Cottage for which Scheduled Monument Consent had been issued. The list only covers works from 2007 to the present day (2017). Consented works from the date of scheduling in 1984 till the end of 2006 were not available through the Historic England filing system.

- *S00001550 31 January 2007* SMC issued- General repairs to refurbish external and internal fabric to make buildings watertight- including roof repairs, repointing to walls and window repairs and updating of mechanical and electrical systems to comply with current standards.
- *S00005356 03 February 2010* SMC issued- taking down WWII blast walls surrounding two pressure vessels in front of the beam engine house to get back to the original design by T.C. Hawksley.

Tees Cottage.

- *S00010260 18 April 2011* SMC issued- replacement of lead valley troughs with a lead look alike product, due to repeated thefts of lead and damage done to slate roofing.
- *S00036839 17 May 2012* SMC issued- construction of new single storey toilet block, located to the west of the existing site.
- *S00074462 13 December 2013* SMC issued- "The electric pump house regularly floods. As a result the stairs from the mezzanine level in the cellar to the cellar floor have become severely damaged. Both side stringers have rotted and the bottom six steps have also gone. Proposed is to dismantle the set of stairs, what is in good/reasonable order, store on the mezzanine in the cellar. Timbers that have a problem are to be cleaned and dried and damaged wood removed, painted and then stored on the mezzanine.
- *S00092811 10 December 2014* SMC issued- asbestos survey of the building, removal of potentially unsafe asbestos containing materials, and where removal is not possible, encapsulation to ensure that materials are in a safe condition.
- *Variation to above SMC S00092811 issued 10 December 2014* to include amend proposals for removal around the boiler by installing a metal angle over the expansion gap, rather than timber, to encapsulate any asbestos that cannot be completely removed. The asbestos around the boilers didn't extend as far as first thought so proposal now for full removal and replacement with insulating material.
- *S00102328 16 February 2015* SMC issued- installation of new power and lighting within chain store, the supply will be derived from the existing distribution board and will require a new circuit breaker. Upgrading of emergency lighting to the whole site.
- *S00104225 06 March 2015* SMC issued- Roof repairs including repairs to both hipped and pitched roofs and to flat roofs to the Gas House, Beam Engine House and Cottage. The works will also include repairs to defective rainwater goods inc leaking gutters and rainwater downpipes. Following these repairs to the roofs and rainwater goods, where required, there will be repairs to any affected masonry wall surfaces. There will also be repair works to the front boundary wall to the site.
- *Variation to above SMC S00104225 issued 16 June 2015-* i) re-decoration of the water cylinders to the front of the Beam Engine House with the same

colour paint (red) as previously approved for the rainwater goods in order that there is continuity in the colours of all these elements; ii) provision of a fire assembly point sign externally on the site (to replace existing); iii) repairs to roof following lead theft. Both the Gas House and the Beam Engine House have recently suffered lead theft. A lead substitute is to be re-instated to deter thieves. This will be a Code 5 Lead substitute for box gutters and flashings provided by 'Nicholsons Masterform'; iv) works to the flat roof of Gas Engine House viz. provision of additional timber deck, single ply, roof covering to match roof covering on other flat roofs, formation of 1no outlet to discharge into 1no small section of cast iron down pipe, connected into plastic below ground drainage. This will connect into existing drainage in this location; v) works to valley gutter between right and left hand side Boiler House roofs to Beam Engine House. This will entail removal of existing defective covering and replacement with a new, single ply, covering to match approved covering to the other flat roofed areas of the site).

- *Variation to above SMC S00104225 issued 16 December 2015-* undertake structural repairs to the chimney stack on Tees Cottage by carefully removing the loose and defective flaunching to the chimney pots and setting aside the chimney pots for re-use. It is proposed to carefully, by hand and course by course, remove the brickwork from the south facing side of the chimney stack and remove any corroded metal and rebuild using salvaged bricks as far as possible. In the instance that the bricks were damaged and unable to be reused it is proposed to obtain a sample for approval by Historic England. It is anticipated that between 3-6 courses of brickwork may need rebuilding depending on what is found upon opening up of the area.
- *S00112113 13 August 2015 SMC issued-* Re-route the priming water line to be better protected and less hazardous to visitors and to carry out repairs to the capping of the buried tank in accordance with the outline plan attaché
- *S00114485 04 September 2015 SMC issued-* repair works to 2no external staircases including repairs to handrails and provision of additional handrails to both sides of the staircases; and to remove and replace existing timber fences to the perimeter of 3no external tanks with a powder coated metal mesh fence in black finish.
- *Variation to above SMC S00114485 issued 26 October 2016-* change design/style of metal fencing around Filter beds 1 and 2. Replace dilapidated wooden fence with metal Playsafe Bowtop railings instead of the previously agreed metal mesh fencing.
- *S00134916 03 May 2016 SMC issued-* concrete and render repairs to east

Tees Cottage.

well cap and road re-surfacing. This will entail hacking off spalled render to brickwork walls on the well-cap to well above ground level and then re-rendering. In addition, the existing road surface will be scraped back to top surface by approx. 50mm, then the surface prepared and overlain with 20 tonne of whinstone chippings where required to re-level the access road, roll, compact and make level upon completion.

- *S00135226 01 June 2016* SMC issued- Undertake repairs and replacement to the timber windows to the Beam Engine House and Gas House. Undertake splice repairs, epoxy resin repairs and complete replacement of the decayed timber sections to the timber windows, thoroughly prepare, scrape back, sand and remove all flaking, blistered and defective decorative coatings back to bare timber. Patch prime all bare timber sections, new and old, using Preservative Primer with 2 coats, thoroughly rub down between coats and remove all dust, apply 2 full coats of undercoat. Thoroughly rub down between coats and apply 2 full coats of high gloss. All colours to match existing.
- *S00148583 31 October 2016* SMC issued- replacement of two rotten sections of timber walkway beneath the Beam House floor in order to comply with health and safety reasons. One section is 12ft long and requires six 9" x 3" planks; the other is 14ft and also requires six 9" x 3" planks. The boards will be replaced on a like-for-like replacement basis.

Photographs, Films and Images.

Films

1962. Although it misses out Tees Cottage, this provides a nice period film about the river Tees from source to Teesside.

<http://www.yorkshirefilmarchive.com/film/your-heritage-river-tees>

1959. Promotional film by the Sunderland and South Shields Water Company about their work and water supply which features the Ryhope Engine (15minutes in aprox), and a rather distressing shot of a Victorian chimney at Cleadon (?) being demolished.

<http://www.yorkshirefilmarchive.com/film/crystal-clear>

1966. The Reservoirs of Teesdale. Film showing expansion of reservoirs in Upper Teesdale

<http://www.yorkshirefilmarchive.com/film/reservoirs-teesdale>

Artistic Images

Non identified

Websites

The Works of Thomas Hawksley <http://www.pureandconstant.talktalk.net/Home.htm>

Water Acts

Produced by H.C. Devonshire in 2012 and reproduced here for reference purposes.

Some Acts of Parliament Affecting Water Supply in the Tees Valley.

This appendix contains extracts from various Acts of Parliament which have some bearing upon the Tees Cottage Pumping Station or water supplies to the Tees valley.

The fact that particular works are authorised in an Act does not necessarily ensure that those works were carried out, either in whole or in part, since promoting a Bill to Parliament and the subsequent Act merely mean that the powers existed to construct works, but circumstances could, and sometimes did, change between the original Bill and the construction of the works. Several of these Acts contain a time limit clause, usually three years, after which the powers would expire if not already used. See the time taken to complete the Grassholme reservoir, below.

The Waterworks Clauses Act 1847

An act for consolidating certain provisions usually contained in acts authorising the making of waterworks.

It is interesting to note that this Act, among many others, says, at Clause 3, Words and Expressions, "Gender: Words importing the masculine gender shall include females", suggesting that political correctness is over a century behind the times.

This Act gives water undertakings not only considerable powers to enter land or premises for the purpose of building and maintaining those things necessary for a public water supply, but also specific responsibilities for compensation for costs and damage so occurring. The Act also requires specific and clearly defined provision of "Fire-plugs", the fore runner of modern hydrants, for the purpose of fire fighting, cleansing sewers, cleansing and watering the streets, and supplying public baths, etc., and shall place notices showing where they are, all at the expense of the Local Authority. In pipes to which fire plugs are fitted the undertaking must, unless prevented by frost, unusual drought or unavoidable cause or accident, maintain a supply under pressure at all times. The Act also requires the undertaking to make a supply to every part of the town and, surprisingly, it shall be under sufficient pressure "to make the water reach the top storey of the highest houses within the said limits", which suggests that already Parliament was preparing for extensive distribution of water within all dwellings.

The Act also contains clauses dealing with prevention of waste of water and prevention of pollution, which suggest considerable foresight.

The Stockton, Middlesbrough and Yarm Waterworks Act, 1851

This Act set up the Stockton, Middlesbrough and Yarm Water Company and gave them powers to raise money, lay water mains, and buy water from the Darlington company in order to supply it to their own area, on a capital of £22,500.

It is indicative of the power of the railway companies that an extensive part of the Act is devoted entirely to protection of the Stockton and Darlington Railway, should it be necessary to lay mains near, under or across railway land.

The Act contains extensive provision for a possible merger with the Darlington Gas and Water Company or for either one to buy the other, so clearly at the time such a union was being seriously considered, although it did not happen for over a century. But it is significant to note that the Act contains no powers for the Company to abstract water from the River Tees, or anywhere else, so that at the time of the Act the intention was solely to obtain water from the Darlington company.

The Stockton, Middlesbrough and Yarm Waterworks Act, 1854

This Act extended the supply area of the company to include Norton, Coatham and Redcar. There is also implied terms of power to construct a reservoir in the parish of Dinsdale, near the Middleton and Dinsdale Station of the Stockton and Darlington Railway, although there is no specific indication of the precise location, type or size of this reservoir. Note that there is still no provision for abstraction

Tees Cottage.

of water from the Tees or any other source. Indeed, the Act confirms that the Company shall continue to have the right and duty to buy its water from the Darlington company, and the latter shall have the right and duty to supply the same, unless and until the two companies shall at some future time merge.

The Stockton and Middlesbrough Waterworks Act, 1858

In the preamble to this Act it says "... the Darlington Gas and Water Company, under powers for that purpose conferred by the Darlington Local Board Act 1854, sold their gas undertaking and part of their water undertaking to the Local Board of Health of the District of Darlington and subsequently ... sold the remainder of their water undertaking to the existing company [i.e. The Stockton etc., company.] who [under powers from the Darlington Local Board Act 1854.] raised for the purpose a further sum of £10,000."

The preamble also shows that the company were unable to complete all the works of previous Acts within the three year time limit and because of this and the increasing demand for water in the distribution area, there shall be additional works at Tees Cottage and additional pipe lines to the supply area, via the reservoir at Fighting Cocks.

The Act gave the Company powers to construct the following works :-

A filter tunnel ... near the south bank of the river Tees, in Cleasby, opposite ... the Tees Cottage works

A pipe or conduit from the above to works on lands lately belonging to William Myers, near to the Tees Cottage works,

A pipe or pipes from the above to the existing mains

and new mains from Tees Cottage via Fighting Cocks to the supply areas.

The Act gave the Company rights to abstract from or divert the waters of the River Tees, for supply purposes, without any stated limit upon quantity or statement of rights of other riparian owners.

The Act, at Schedule A, gives a "List of works and property already constructed or purchased by the Company as

A reservoir, with filtering beds, engine houses, pumping houses and other works at or near Tees Cottage ...

Two reservoirs and other works at or near a place called Fighting Cocks ...

Two lines of main pipes from ... Tees Cottage ... to Fighting Cocks

One line of main pipe from ... Fighting Cocks to ... Middlesbrough and thence to Stockton, ..." and various other unspecified pipes, etc., clearly for distribution purposes.

The Waterworks Clauses Act, 1863

In all the Acts mentioned above there were extensive clauses dealing with misuse of water by consumers, powers to disconnect water supplies after abuse or non-payment, and many other issues, notably including the right of the Justices of the Peace to order the water undertaking to do remedial works where reservoirs, etc., might represent a public safety problem, and this Act consolidated all these requirements so that it would no longer be necessary to put them into each individual Act.

This shows a growing public awareness of the serious nature of water supply and that it must be protected, while at the same time a recognition of the danger to the public should a reservoir fail.

The Stockton and Middlesbrough Waterworks Act, 1864

This Act extended the distribution area of the Stockton and Middlesbrough Waterworks Company, and gave them power to abstract from Broken Scar up to 60 million gallons per week, measured from midday Saturday to midday Saturday, and to build their works within 5 years (instead of the usual 3), and implies power to build waterworks at Broken Scar, by reference to deposited plans, and reference to the building of works and laying of mains shewn thereon, though the precise location or the extent of these works is not stated in the Act.

The Stockton and Middlesbrough Corporations Waterworks Act, 1876

This Act set up the Stockton and Middlesbrough Water Board, and transferred all the responsibilities and assets of the old Stockton and Middlesbrough Company to The Board, which was to be under the joint control of the Stockton and Middlesbrough Councils, and the Company shall be paid £18,647 for the same.

The Act empowered the following works

Grassholm Reservoir, a compensation reservoir on the river Lune,

A conduit or tunnel from the river Lune to Rokehole Sike or Hill Gill,

Blackton Reservoir, a compensation reservoir on the river Balder,

Hury reservoir, a supply reservoir on the river Balder,

The Lartington Tank,

Whorley Reservoir, in Whorlton and Gainford,

Sadberge Reservoir, a service reservoir,

Normanby Reservoir, a service reservoir,

A conduit from Hury to the Lartington Tank, conduits from Lartington to Whorley, from Whorley to Sadberge, from Sadberge to Normanby and various other minor conduits and pipes, together with all embankments, dams, road diversions, filter beds, engine houses, pumps, and the

like. There was also provision for abstraction from the upland catchment of up to 13,350 gallons per minute in total, and the Act makes provision for measuring weirs in order to verify the flow rates specified. The Board was given up to 10 years to complete these very extensive, and expensive, works, and the Act made copious provision for the protection of landowners' sporting rights on and around the reservoirs.

The Act also set specific quantities of compensation water to be discharged at all times into the Lune and Balder, and gave powers to various parties, including Darlington Corporation, to monitor the same.

Thus came into being The Stockton and Middlesbrough Water Board [eventually to become The Tees Valley and Cleveland Water Board], which evolved into one of the largest water undertakings in Britain.

Note that although the Act gave The Board extensive borrowing powers, so large was the programme of capital works being undertaken that the Local Government Board's Provisional Orders Confirmation (Aysgarth Union, etc.) Act, 1879 had to extend those Stockton & Middlesbrough Water Board borrowing powers, so clearly the works in hand were more expensive than anticipated. And then it was necessary, in the Local Government Board's Provisional Orders Confirmation Act, 1880, to raise The Board's borrowing powers yet again, this time to £200,000, a considerable sum indeed.

The Stockton and Middlesbrough Waterworks Acts, 1888 and 1890

These Acts, amongst other provisions, extended the time allowed for the completion of the works already in hand, showing just how difficult and time consuming major upland reservoirs and pipelines were to build, while the 1890 Act also gave powers to build a set of filter beds at Lartington.

The Tees Valley Waterworks Act, 1899

This Act changed the name of the Stockton and Middlesbrough Water Board to The Tees Valley Water Board, empowered it to borrow yet more money, and to have yet another extension of time to build Grassholm Reservoir, which had not yet been started, and to build large new service reservoirs at Long Newton, to the East of Darlington.

Note that this Act, and several others, contained considerable provision for fish passes at some reservoirs, such as Hury, for financial compensation to landowners and others for not building a fish pass at Grassholm, and considerable requirements for stocking all the reservoirs with trout, of a quantity and species to be approved by the local landed gentry.

The Tees Valley Water (Consolidation) Act, 1907

This extensive Act not only consolidates all the previous enactments affecting Tees Valley, (but not Darlington) but it also usefully, from a historical point of view, lists all the completed and uncompleted Tees Valley works, including

Works complete and in use:-

Tees Cottage.

Fighting Cocks reservoirs (i.e. service reservoirs)

Blackton reservoir (i.e. impounding reservoir)

Hury reservoir (ditto)

Whorley reservoir (i.e. service reservoir)

Sadberge reservoir (ditto)

Eston reservoir (ditto)

Long Newton reservoir (ditto)

Lartington Filter Beds (i.e. slow sand filters)

Broken Scar Pumping Station (ditto)

Eston Pumping Station

Works authorised but not completed:-

Grassholme reservoir. (i.e. impounding reservoir)

The Tees Valley Water Act, 1923

This Act, in addition to granting powers for extension of the Tees Valley supply system and for additional abstraction from Grassholm Reservoir, states "... all water taken by the Board from the River Tees ... shall be efficiently chlorinated." This is the earliest reliable reference that this author can find to statutory chlorination of the public supply in this valley.

The Tees Valley Water Act, 1930

In addition to giving T V W B further powers to extend its trunk mains and distribution lines, this Act states "The Board may make ... such contributions as they think fit towards the cost of maintenance of the weir proposed to be authorised by the Darlington Corporation Bill now pending in Parliament ..." This weir, actually built circa 1937, downstream of the Tees Cottage site, was to enable measurement of the flow in the Tees so that Darlington Corporation raw water availability could be proved and that the River Authority could check that correct compensation waters were provided at all times.

This weir was subsequently replaced by the present Broken Scar weir circa 1957, which is still in place. The River Board required large training walls between the low flow and high flow sections of this 1957 weir, and these walls have caused objections on visual grounds ever since. Therefore new weir designs were developed for later weirs, such that training walls in the stream are no longer required.

The Water Act, 1945

“It shall be the duty of the Minister of Health to promote the conservation and proper use of water resources and the provision of water supplies in England and Wales and to secure the effective execution by water undertakers, under his control and direction, of a national policy relating to water.”

This lengthy Act was the vehicle by which society recognised the importance of public water supply and set down the basis of its provision in a country just emerging from a major and damaging war. While the Act is far too long to detail here, it should be noted that it gave water undertakings considerable powers to test for and supply water, together with major responsibilities to forecast future demand, to report these findings to the Minister, to make adequate provision for supply and distribution, both in terms of quantity and quality, to allow such tests and samples as the Minister or his representative may from time to time require and the Act set up requirements and procedures for the conservation and protection of water resources as a national asset.

Because this particular Act was so extensive in its effects and powers, so far reaching and so carefully considered, not only was it worn very close to the heart of every Water Engineer in the land but it probably, in its own quiet and unspectacular way, had an even greater beneficial effect upon our society than R A Butler's great and famous 1944 Education Act, for without a safe and adequate water supply, people simply die.

The Tees Valley Water Act, 1953

This Act gave to the Tees Valley Water Board the power to build the Selsset reservoir, on the river Lune, a tributary of the Tees, and it gave the Board specific responsibilities to maintain flows in the river Tees and gave Darlington Borough Council, the water undertaking for Darlington, powers to satisfy itself that such conditions were met, and thus sufficient water available at Tees Cottage.

The Act, and the Selsset reservoir, were the significant start of a major capital works programme by Tees Valley Water Board, to meet the demands forecast in 1941 by their Engineer, Mr T S R Winter, and their responsibilities under the 1945 Water Act.

The Tees Valley and Cleveland Water Order, 1958

This Order required the Tees Valley Water Board to take over all the assets and responsibilities of the Cleveland Water Company, and thus become the Tees Valley and Cleveland Water Board, (T V & C W B) which can be seen as another action by society to increase and improve the standard of public water supply in the region.

The Tees Valley and Cleveland Water Act, 1958

This Act gave T V & C W B powers to reduce the compensation water discharged into the Lune and Balder in drought conditions, but specifically reinforced the protection of Darlington and the Tees Cottage abstraction.

Tees Cottage.

At that time the region was in a condition of rapidly rising water demand together with a succession of drought years, which in fact continued for some three years thereafter. It was therefore important to allow a reduction of compensation water while at the same time protecting the interests of the population and industry of Darlington.

Water Act, 1958

“An Act to confer powers to meet deficiencies in the supply of water due to exceptional shortage of rain and to revoke, with savings, Defence Regulations 50A and 56.”

This Act was a realisation, by the country and Parliament, of that which T V & C W B had already identified and dealt with, namely the considerable shortage of water due to several years of drought, and thus it was a national action, albeit somewhat belated.

The Tees Valley and Cleveland Water Act, 1959

This Act gave T V & C W B the power to build the Balderhead reservoir and to build additional filter stations at Broken Scar and extend the abstraction there. But the Act also required specific discharge over the Broken Scar Weir, just downstream of the Tees Cottage Station, thus guaranteeing supply for Darlington.

The Tees Valley and Cleveland Water Order, 1962.

This Statutory Instrument required T V & C W B to take over from Barnard Castle U D C the water supply to and distribution within the town of Barnard Castle, showing a typical example of the way society at that time was moving water supply matters from minor local authorities to the major statutory undertakings, in order to assure quality and quantity of supply. In this particular case the order was in response to the fact that the existing supplier, an Urban District Council, had inadequate resources and had been obliged to buy a bulk supply from T V & C W B every summer for some years. As a direct result of this Order a 12” diameter water main was laid from the Lartington filter plant to Barnard Castle.

The Tees Valley and Cleveland Water Act, 1967

This Act not only gave T V & C W B powers to construct the Cow Green Reservoir, on the upper reaches of the Tees, in response to rapidly increasing demand by industry in Teesside, but it was also the seminal Act upon which most modern precedents for environmental impact analysis were based for many years, and in fact really until the present day.

The Tees Valley and Cleveland Water Order, 1968

This Statutory Instrument transferred the water supply for Darlington from the Borough Council to T V & C W B, so that, after just over a century of separate operation, the two waterworks, Broken Scar

Tees Cottage.

and Tees Cottage, were joined under the same ownership and control, and, at last, the crucial, in fact literally vital, matter of public water supply in the whole of the Tees Valley became an integrated effective entity.

ANNEX 2 Tees Cottage Timeline

Tees Cottage.

Date	Event	Reference
1312	Well in Houndgate mentioned, earliest reference know to public water supply in Darlington	Cookson
1801	Population of Darlington 4,670	census
1804	John Gibb of Paisley in Scotland uses slow sand filters for the first time for public water supply	
1821	Population of Darlington 5,750	census
29/01/1825	Tees Cottage House and Estate offered for sale. In possession of a Mrs Lee (could be the farmland not house?)	Newcastle Courant
27/9/1825	Opening of the Stockton & Darlington Railway	
19/9/1829	Announcement of the death of Mrs Selfe Pease aged 71, wife of late Edward Pease and mother of Thomas Pease of Tees Cottage	Durham Chronicle
9/10/1835	Tees Cottage, the residence of Thomas Pease, House and Estate of 78 acres offered for sale.	Durham Chronicle
1833	National Cholera epidemic; 60,000 deaths	Devonshire, 2003, p29
1837	Poor law Union created	
9/6/1838	Birth announced at Tees Cottage of a son to Mr and Mrs Thomas Brown	Carlisle Journal
1841	Population of Darlington 11,033	census
12/6/1841	George Welsh of Darlington dies in a horse riding accident near to Tees Cottage	Staffordshire Advertiser
15/9/1841	Tees Cottage and estate offered for sale again. Advert notes a plan and schedule are available from Allinson's solicitors.	Morning Chronicle and Newcastle Journal
29/01/1842	Tees Cottage to be sold by auction at the Kings Head Inn, Darlington on Wednesday 9 th of February 1842. Plan of estate mentioned. Messrs Mewburn and Hutchinson, solicitors of Darlington.	York Herald
1843-49	National Cholera epidemic; 130,000 deaths	Devonshire, 2003, p29
1843	Royal Commission to investigate sanitary conditions	Devonshire, 2003, p29

Tees Cottage.

21/4/1843	Reports of attempts by the landowner to stop up the public footpath along the river from Blackwell to Tees Cottage	Durham Chronicle
29/12/1843	T. Copley Esq, noted as the owner of Tees Cottage on the occasion of the Duke of Cleveland's stag hounds crossing the river from Yorkshire to Durham on 29 th of December 1843	Durham County Advertiser
29/12/1844	Edward Thomas Copley of Tees Cottage appointed as one of the poor law Guardians for Darlington	Durham County Advertiser
1845	Official advert noting the intention to incorporate a company 'The Darlington Gas and Water Company, with power to light with gas and to supply water, the several townships of Darlington, Blackwell, Cockerton and Haughton-le-Skerne	The London Gazette, part 6, page 173
6/6/1846	William Nicholson aged 13 drowned while swimming in the river at Tees Cottage with a group of other boys	Newcastle Guardian and Tyne Mercury
17/10/1846	Allisons Solicitors advertise the Tees Cottage Estate for sale once more. Article has a long description and a plan is mentioned. Property is in the occupation of George Thomas Allan Esq. and Mr John Robinson. Property to be auctioned at 3pm on Friday 23 rd October 1846 at the Kings Head Inn, Darlington.	York Herald
1847	Waterworks Clauses Act clears Parliament allowing the easier creation of local water companies without complex individual legislation	
1848	Public Health Act passed creating a General Board of Health, with powers to establish Local Boards	Smith, 1967, p4
1/12/1848	Report that the Gas Company are to seek powers in the next session (of Parliament) to establish a water works. Mr Allan of Blackwell Hall has agreed to let them use his Baydale Estate to take the water ad libitum (for free). Concerns raised over water purity and especially 'the hush' from lead mining above Barnard Castle	Durham Chronicle

Tees Cottage.

1849	Darlington Population reaches 11,000	Devonshire, 2003, p29
6/1/1849	Report that on Tuesday 1 st of January a special meeting of the shareholders of the Darlington gas Company was held at the Kings Head Inn to read over a proposed act for 'lighting with gas and supplying with water, the town and borough of Darlington and the suburbs thereof'. Water to be drawn at Tees Cottage and conveyed to the service reservoir on Short Bushel Hill which was of sufficient elevation to send water to the top of the highest house in the High-row.	York Herald
January 1849	Petition to the General Board of Health from Darlington ratepayers to create a Local Board of Health	Smith, 1967, p4
May 1849	Darlington Gas and Water Company (DG&WC) incorporated by an Act of Parliament	Smith, 1967, p4
June 1849	Drawings for the West Engine House produced by T Hawksley and Co	Science Museum HAWK2 archive
16/6/1849	Advert for a tender from the company signed by Henry Robinson, the Co. Secretary. Mr Mason named as the resident engineer, Thomas Hawksley of Nottingham named as the Engineer. Tender for a 27inch double powered condensing engine of 5 feet stroke with boilers, pumps, air vessels and other apparatus and appendages complete. Tenders by 6pm on Monday 25 th of June. Also Tenders for erection of an engine house, boiler house, chimney, two filter beds, tank and other works at Tees Cottage. Also a service reservoir and other works at Short Bushell Hill. Tenders to be received by 6pm Monday 9 th of July.	Newcastle Journal

Tees Cottage.

12/10/1849	Assessment of compensation by Durham County Sherriff and jurors for the purchase of land for the Tees Cottage site from Ann Allan. Awarded £300 for the land and a further £250 for the severing of parts of her estate.	DRO Q/D/US 4/1 (3)
27/7/1849	Tees Cottage estate offered for sale again	Durham Chronicle
October 1849	William Ranger, superintending inspector of the General Board of Health holds and inquiry of six sittings to see if Darlington should establish a local board under the 1848 Public Health Act.	Smith, 196, p4
March 1850	Ranger's report to the General Board of Health recommends that a Local Board be elected	Langstaffe, 1854, p329
August 1 st 1850	Provisional order confirmed by Act of Parliament that a Local Board of 18 members was established	Smith, 1967, p4
25/9/1850	First elections to the Local Board of Health. 11 of 18 elected are also directors of the DG&WC	Smith, 1967, p4
1850	George Mason is appointed as surveyor for the Local Board of Health.	Smith, 1967, p4
1850	Late in the year the first water is pumped to the town from Tees Cottage	
27/12/1850	Stockton, Middlesbrough and Yarm water company propose to run pipes from the Tees Cottage Reservoir to Teesside. Water has been analysed by Mr Cook and Professor Playfair and found to be of the purest character.	Durham Chronicle
1851	Population of Darlington 11,582	census
December 1851	George Mason surveyor to the Local Board presents a report clearly outlining that to make their work comprehensive they should either take over or build in rivalry to the DG&WC as the current cost of water was too expensive to compel the maximum number of consumers to accept.	Smith, 1967, p6
June 1852	Tees Cottage engine B1 now supplying water to both Darlington and Stockton	Devonshire, 2003, p29
24/7/1852	Tender advertised for the erection of an engine house, two filter beds and others at Tees Cottage	D&S Times
6/8/1852	Half yearly meeting held on the 4 th of August 1852 of the Darlington Gas and Water Company. John Pease Esq. presiding. Directors have contracted for the erection of another pumping	Durham Chronicle

Tees Cottage.

	engine at Tees Cottage to meet increased demand from the Stockton, Middlesbrough and Yarm water company. Half year profits were £700. Commissioners of the Poor law had upped the valuation of the companies works from £600 to £1,600 which was noted as “absurd”. Directors and auditor were re-elected.	
20/8/1852	A child of two years old belonging to Naisbett the engineman fell into one of the filter beds and was drowned.	Durham County Advertiser
20/8/1852	Stockton, Middlesbrough and Yarm water company half yearly meeting held at the Central Buildings Darlington. Main pipes had been laid to Stockton and Middlesbrough and residents of Stockton were ‘availing themselves of the advantages of a constant supply of good water at a moderate cost’. A reservoir at Fighting Cocks for a million gallons was nearing completion. The contract with the DG&WC is mentioned favourably.	Durham County Advertiser
11/2/1853	Report on meeting of the Darlington Board of Health. Heated argument about damage caused to streets and pavements in the town by the DG&WC when laying pipes to houses. Compensation requested.	Durham Chronicle
1853	Cholera outbreaking Newcastle 1,500 deaths, Middlesbrough grows to borough status	Devonshire, 2003, p29
15/4/1853	Report of commencement of laying a new pipe line from the ‘new engine in the course of erection at Tees Cottage’ (the East Engine House), to Kitching’s Corner by way of Salutation down Coniscliffe Lane. Intention to join the main pipe to Stockton & Middlesbrough to form an independent pipe as previously the S&M supply had come off the Darlington main	Durham Chronicle
Aug 1853	The minutes of the DG&WC report a great demand for water from amongst others the Stockton & Darlington Railway being supplied by the ‘Westwork and Weigh-house Engine’ presumably B1. They also express ‘Hope that the new engine will be at work early next month’. £500 paid to Gilkes Wilson and Co. the contractor for the current buildings works.	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company

Tees Cottage.

15th September 1853	B2 engine in the East Engine House steamed for the first time	DG&WC minutes
22/9/1853	The new works still not complete. The new or 'Stockton' engine was steamed for the first time on the 15 th and is expected to be in regular working order soon. Blacksmiths shop of two rooms agreed to be built at Tees Cottage	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
7/10/1853	Sand and gravel purchased	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
16/11/1853	'sale of works' mentioned from DG&WC to Local Board of Health . Appeal costs of £240.11.4	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
2/12/1853	Gilkes and Bouch claim for repairs to west B1 engine	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
1854	Report by John Snow on the Soho water pump in London raises awareness of disease and clean water	
13/1/1854	Gilkes and Wilson present accounts for the pumping engine no.2 for £1,497.8.0	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
26/1/1854	Tenders received for supply of coal from a Newcastle company and Joseph Pease both for 7/6 per ton but Pease costs include delivery...contract to Mr Pease.	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company

Tees Cottage.

Feb 1854	Sand and gravel costs agreed. Profit and loss for 1853 reported as £1130.17.0 a 5% return on investment, 200 new shares to be issued.	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
March 1854	New 8" water main to be laid down Northgate at a cost of £570	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
17/3/1854	Board of the DG&C Co. approve and sanction their support for the Stockton & Middlesbrough Water Companies Act.	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
April 1854	Further water mains approved. Thomas Hall jr age 16 was employed as Office Assistant for a period of 5 years on a rising salary scale subject to performance. 16 £10.8 18 £19.10 19 £26 20 £30 21 £35	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
May 1854	Gilkes Wilson given the order to construct the new Northgate watermain	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
24/6/1854	A draft bill for the Darlington Corporation/Board of Health to buy the DG&W Co was approved by the board.	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company

Tees Cottage.

Sept/1854	NER complain of lack of water	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
29/09/1854	New engineer appointed, but not named...possibly R Thompson?	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
Oct 1854	Mr Lampton (sp?), a collector of water rates is appointed on a fee of 2s a day.	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
8/12/1854	Agreement is reached to sell the DG&WC to the Darlington Board of Health for the sum of £54,000 less £7.17.6 insurance tax	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
30/12/1854	Stockton and Middlesbrough Water Co. take on all management matters	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
1854	Stockton, Middlesbrough and Yarm Water Co buy the East Engine House	Devonshire, 2003, p29
19/01/1855	Conveyance document to the BoH still not received	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
13/04/1855	L (or J?) Naiskill the engine man referred to with a pay rise of 7s.7d per week	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company

Tees Cottage.

27/04/1855	Failure to get appeal costs against the purchase of the DG&WC by the Board of Health	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
3/8/1855	Mr Hawksley's services are retained for the sum of £280 in connection with the 'last engine and brakes'	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
1855	The Snow report identifies a link between faeces and cholera but it is ignored	Devonshire, 2003, p29
8/8/1855	At 12 noon minutes note the last meeting of the board of the DG&WC before transfer to the Board of Health	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
1857	Typhoid outbreak in Darlington	Devonshire, 2003, p29
10/2/1860	S&MWC half yearly meeting at their offices in Darlington. Report on financial return and note that the new works at Tees Cottage were 'progressing'	Durham Chronicle
1860	S&MWC build two engines at Broken Scar. Darlington BoH, buy Tees Cottage East Engine, B2	Devonshire, 2003, p29
1861	Population of Darlington 15,789	census
10/06/1861	To: William Ranger, Superintending Inspector, The Local Government Act Office. From: William H Peacock, Clerk to the Local Board of Health, Barnsley [Yorkshire]. Subject Matter: Letter enclosing copies of minutes of the Local Board passed by a committee of ratepayers, a copy of Richard Reynolds analysis of water and a Queen's printer copy of the last 'Water Act' [the latter document is not included]. Peacock assumes Ranger has copies of Mr Hawksley's report and Dr Odling's analysis. He mentions in an aside that the Darlington engine has been sold.	The National Archives MH 13/16/252

Tees Cottage.

February 1864	Engineer's report on B1 and B2 engines recommends upgrading the B1 and overhauling B2. The work was complete by October 1865	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
1864	The Stockton and Middlesbrough Waterworks Act This Act extended the distribution area of the Stockton and Middlesbrough Waterworks Company, and gave them power to abstract from Broken Scar	Newcastle Daily Chronicle
1864	Collapse in Cornish tin mining sees cheap engine and pumping equipment available on the market	Devonshire, 2003, p29
1865	Tees Cottage original beam engine B1 uprated from 29IHP to 65IHP with new Lancashire boilers rated at 40psi.	Jim Prentice notes, no refs
28/10/1865	Flooding of the Bank Top cut by a burst in the newly laid down pipes to Stockton and Middlesbrough reported. Messenger sent to Tees Cottage to stop the pumps, working night and day, repaired by the next day.	York Herald
1865	Current west engine house chimney built (no refs so where was chimney before?)	Devonshire, 2003, p29
1866	Cholera outbreak in London, Snow report receives attention	Devonshire, 2003, p29
1867	Darlington receives Royal Charter and a first council is elected	
1868	B2 engine overhauled	
1869	Darlington population reaches 25,000	Devonshire, 2003, p29
1871	Population of Darlington 27,729	census
1872	New reservoir built at Harrowgate Hill of 5 million gallon capacity to help with water pressure on the rapidly expanding North Road area of the town	
12/4/1873	Tender advertised for the 'Borough of Darlington Waterworks Extension', requiring the construction and completing of a Depositing Tank to contain about 1.5 million gallons of water,	Northern Echo

Tees Cottage.

	three filter beds each containing an area of 1,450 superficial yards and others works in connection with, on land near the present waterworks at Tees Cottage. Plans and specifications are noted as being available to view at the Town Hall	
12/03/1874	Tender advertised by the Borough of Darlington Waterworks Committee for the construction of two high pressure steam boilers at the pumping station at Tees Cottage. A specification is noted as being available at the office of Mr Hudson Reah, C.E, Borough Engineer and Surveyor at the Town Hall.	Northern Echo
1874	Galloway boiler installed. (Devonshire notes engines B1 and B2 were also uprated but no ref?)	Jim Prentice notes, no refs
22/4/1875	The Stockton and Middlesbrough Water Works Bill is reported as undergoing Parliamentary scrutiny	Northern Echo
1875-6	Stockton and Middlesbrough water bill competition and act of parliament	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
22/07/1875	Tender advertised by the Borough of Darlington Waterworks Committee for the supply of two thousand tons of sand suitable for the filter beds at Tees Cottage, a sample of the sand required could be seen at the office of the Borough Engineer. Prices required for delivery both to Tees Cottage and the railway depot at Merrybent.	Northern Echo
15/01/1876	Darlington Council opposition to the S&MWC bill reported, largely due to the proposal to dam and take the water of the rivers Balder and Lune (100 million gallons a week) directly to Stockton and Middlesbrough and by so doing reduce the quality of the water reaching Tees Cottage for Darlington there being no diluting effect on the sewage of Barnard Castle	Yorkshire Post and Intelligencer
10/03/1876	Debate in Stockton and Middlesbrough on opposition to the S&MWC bill and if the Town council's should buy the water company. Pdf document saved	Daily Gazette for Middlesbrough

Tees Cottage.

1876	The Stockton and Middlesbrough Corporations Waterworks Act This Act set up the Stockton and Middlesbrough Water Board, and transferred all the responsibilities and assets of the old Stockton and Middlesbrough Company to The Board, which was to be under the joint control of the Stockton and Middlesbrough Councils	
15/1/1878	Compulsory purchase of the S&MWC by the town corporations of Stockton and Middlesbrough. Pdf document saved.	Daily Gazette for Middlesbrough
3/08/1883	The death is reported of Joseph Nesbitt one of the oldest servants of the Darlington Waterworks and manager of the works since it's opening.	Daily Gazette for Middlesbrough
10/04/1885	Tender advertised by the Borough of Darlington Waterworks Committee for the painting of wood and iron work at Tees Cottage. The specification was available from the water works engineer at the Town Hall	Daily Gazette for Middlesbrough
25- 27/01/1887	Tenders received for the erection of three cottages at the Water Pumping Station for Darlington Corporation	DRO D/Ad 1/4/46
26/03/1888	Darlington Opposition to the new S&M bill.	
1890 and 91	Typhoid outbreaks in Darlington.	Lowes Anne, 2007.
1891	Darlington population reaches 35,900	Devonshire, 2003, p29
1891	Hury reservoir completed and raw water piped to Broken Scar for treatment, through existing slow sand filters, and pumped into supply by the beam engines. The western engines were designed for this duty in 1888.	Jim Prentice notes. No refs
1894	Blackton reservoir completed to compensate the River Balder.	Jim Prentice notes. No refs

Tees Cottage.

1895	Typhoid outbreak in Darlington.	Jim Prentice notes. No refs
1896	Barnard Castle sewage treatment commenced	Jim Prentice notes. No refs
1901	Darlington population reaches 44,500	Devonshire, 2003, p29
1902	Lartington water treatment (slow sand, 55+Mld capacity) was completed by 1902/3 and Broken Scar filters returned to treating river water only. Lartington was used as base load works. The slow sand filter wash and overhead ropeway National Gas engine commenced operation and was in routine workday use until 1979. (preserved and operational).	Jim Prentice notes. No refs
1902	Lancashire boilers installed supplying engine B1	Devonshire, 2003, p29
1904	Tees Cottage beam engine(B3) installation was commissioned (current preserved engine). Operated in parallel with the two previous steam powered beam engines to provide the peak water demands of Darlington, engines were stopped as necessary to reduce flow so the storage reservoirs did not overflow.	Jim Prentice notes. No refs
1905	Barnard Castle sewage treatment works commences effluent treatment	Devonshire, 2003, p29
1906	New (current) Weighbridge installed at Tees Cottage	Anwyll, 1988
December 1906	Engineer's report to the Waterworks Committee noting a cost of £300 to upgrade and repair the B1 engine, or instead replace it with a gas engine and suction plant in the East Engine House for £850 with an annual saving of £123 in running costs	DRO DA/A 3/2/1 minutes of the Darlington Gas and Water Company
1907	Tees Cottage Fielding and Platt 65HP gas engine (G1) was commissioned and replaced the western beam engine (B1) of 1849 which had been modified in 1865. The horizontal pumps were retained but had probably been uprated since their installation in 1849.	Jim Prentice notes. No refs

Tees Cottage.

21 February 1908	Recommended that the old Beam Engine (B1) at the Waterworks now disused, be sold.	Waterworks Committee minutes
1911	Darlington population reaches 15,600	Devonshire, 2003, p29
1911	Replacement of the B2 engine and boilers with a second gas engine considered	
1913 28 th April	Water Works engineers' report for building three water works cottages approved.	Council Waterworks Committee Minutes, DRO
1913 23 rd May	Tenders invited for the building of the three new cottages. Tenders for painting the insides of the Jubilee Cottages were accepted.	Council Waterworks Committee Minutes, DRO
1913 23 rd June	Tenders were accepted for the erection of the three cottages at the Water Works	Council Waterworks Committee Minutes, DRO
1914	Grassholme reservoir was completed to compensate the River Lune allowing for construction of Selsset weir and the Grassholme to Hury water transfer tunnel.	Jim Prentice notes. No refs
1914	Richard Hornsby 220HP gas engine (G2) and pumps commissioned. (the present preserved engine). This replaced the eastern beam engine (B2) of 1853 which had been modified in 1874 and which was now sold for scrap (no ref other than Devonshire, 2003). The new gas engine G2 operated in parallel with the 1904 beam engine and 1907 gas engine and were run as needed to meet Darlington's water demand.	
1915 25 th July	It was recommended that the wages of workmen at the water Works be increased by 1 shilling a week. It was also recommended that the hours worked by the Engineman be reduced by 6 per week so that they could have one day's holiday per week.	Waterworks Committee minutes
1921	Darlington population reaches 65,800	Devonshire, 2003, p29

Tees Cottage.

1921	The chlorination of water was already taking place at Tees Cottage	Winter, G. 1921
1926	Tees Cottage chemical clarification, rapid pressure filters, electric motors and centrifugal pumps were commissioned. (Electric motors and pumps preserved.) These were placed on the Broken Scar side of the road and replaced the 1907 gas engine and were large enough to supply all of Darlington's water demands. The remaining 1904 steam powered beam engine and 1914 gas engine were retained as standby and were used to supply all the water needs for one week each year until 1955 (the electric powered pumps being switched off). Broken Scar ceased supplying water for several months during the depression - all water supplied by gravity from Lartington.	Jim Prentice notes. No refs
1931	Darlington population reaches 72,000	Devonshire, 2003, p29
1937	First Broken Scar weir constructed	Devonshire, 2003, p29
1940	Brick blast walls built to protect the external air receivers from German bombing	Devonshire, 2003, p30
1949	River water direct to Teesside industry commenced at Low Worsall.	Jim Prentice notes. No refs
1951	Darlington population reaches 84,900	Devonshire, 2003, p29
1955	Final recorded explosion in gas producer plant	Devonshire, 2003, p29
1955	The 1904 beam engine and 1914 gas engine were taken off standby duty following a pipe failure in the gas producer plant. Options of piping town gas to the engine were investigated but not progressed until 1985 when the engine was brought back to life as part of the preserved site. The 1904 beam engine could supply half the peak water demand by itself and hence taken off standby.	Jim Prentice notes. No refs
1953	Broken Scar No1 plant with chemical clarification, rapid gravity filters, electric powered centrifugal pumps (55Mld capacity) built c1953 and fully commissioned by 1955.	Jim Prentice notes. No refs

Tees Cottage.

	Immediately prior to that 4 beam engines had been working flat out for 9 years and delivered their peak flow ever achieved of 55MG per week- by then 85 and 60 years old. Slow sand filters and beam engines abandoned at Broken Scar and demolished over the next few years.	
1960	Demand for potable water increased and Lartington extended to 135Mld capacity, retained slow sand filters at 63Mld. Selsset Reservoir as a direct supply reservoir for Lartington, was completed.	Jim Prentice notes. No refs
1965	A higher grade of river water was supplied to industry, via Gately reservoir, abstraction taking place at Broken Scar. Balderhead Reservoir completed to support the abstractions as one of first major river regulatory reservoirs.	Jim Prentice notes. No refs
1968	Darlington supply including Tees Cottage passed to the TV&CWB	Devonshire, 2003, p29
1971	Cow Green completed as river regulatory only reservoir. Low Worsall river water to industry extended.	Jim Prentice notes. No refs
1972	Potable water demand continued to increase and Broken Scar No2 plant, pumps & mains completed, initial capacity 90Mld and increased in phases to 200Mld throughput available by 1994.	Jim Prentice notes. No refs
1974	The Water Authorities were formed and Broken Scar and Darlington systems were incorporated into Northumbrian Water Authority.	Jim Prentice notes. No refs
1975	Tees Cottage steam beam engine operated to celebrate 150 years of railway steam power after Rainhill trials.	Jim Prentice notes. No refs
1975-79	Chimney of West Engine House reduced in height	
1978	Boilers inspected	Jim Prentice notes. No refs
1979	Boiler repairs and new inspection	

Tees Cottage.

1979	Blackwell pumping station commissioned to abstract and deliver river water to Teesside industry through Gately reservoir. Tees Cottage preservation group started and the 1904 beam engine started in October following boiler steam test. The engine ran for public display on New Year's day 1980.	Jim Prentice notes. No refs
1980	Darlington waterworks closed down and all the "Tees" potable water supplies taken from Broken Scar and Lartington water treatment works. Low Worsall No 2 station commissioned in October allowing 180Mld to be supplied to Teesside with a stand-by pump still available.	Jim Prentice notes. No refs
1980	Tees Cottage Preservation Society formed	Jim Prentice notes. No refs
24/11/1981	First steaming of the B3 engine with public open days on 28/29 th of November 1981	
7 th April 1981	First open meeting of the TCPS at the Crown Hotel, Kirklevington	Jim Prentice notes. No refs
1985	Ruston Hornsby 1914 gas engine started after 30 years of being idle / hand barred / electric driven from 1955.	Jim Prentice notes. No refs
1981	Broken Scar No2 plant extended to give 135Mld (180Mld at full flow) nominal capacity, with No1 plant able to supply 65Mld.	Jim Prentice notes. No refs
1982	Kielder Reservoir and the transfer works operational.	Jim Prentice notes. No refs
1984	Lartington slow sand filters taken out of use and 73Mld flotation unit built using uprated existing rapid gravity filters.	Jim Prentice notes. No refs
1994	Broken Scar No2 plant extended to 200Mld and No1 plant abandoned and demolished.	Jim Prentice notes. No refs

Tees Cottage.

1995	December 1995 Northumbrian Water was finally taken over by Lyonnaise	Jim Prentice notes. No refs
1995	West Engine House chimney repointed and gas engine river pump clutch overhauled	Devonshire, 2003, p29
1996	Connection from the Gately river water system made at Blackwell to link, through the new Yorkshire Water pipeline, to the Wiske near to Birkby. Capacity initially 150Mld with design at 300Mld. Allows shortfall of Yorkshire Water's resources to be supported from Northumbrian Water resources – including Kielder scheme.	Jim Prentice notes. No refs
11/12 th May 1999	Celebrations held to mark the 150 th anniversary of the founding of the DG&WC, including a dinner within a marquee with after dinner speaker Fred Dibnah	Northern Echo
2000	Easter, Boiler No.2 and steam pipes pass latest high pressure tests	Devonshire, 2003, p29
2001	Beam Engine (B3), packing to both water pumps replaced	Devonshire, 2003, p29
2002	Broken Scar treatment uprated and incorporates Granular Activated Carbon (GAC) to reduce pesticide levels. Cost of £15 million. Tees Cottage roofs, gutters and some windows repaired costing £40 000.	Jim Prentice notes. No refs
January to April 2002	A major building refurbishment contract was carried out by Hodgson & Allon, of Burnopfield, on the roofs, gutters and downcomers of the main buildings to return them to a weather-tight condition, to replace a small number of window frames and to do some external and internal painting to windows and downcomers, all funded jointly by English Heritage and Northumbrian Water Ltd.	Devonshire, 2012
May 2002	Newcomen Society visit to Tees Cottage Pumping Station	Jim Prentice notes. No refs
December 2003	Driest summer for many years and was the driest calendar year since records in Teesdale started in 1894.	Jim Prentice notes. No refs

Tees Cottage.

	Tees Cottage boiler fittings removed to comply with Pressure Vessel Regulations and 1902 cast iron isolation valve to be replaced with steel valve. 1849 Engine House refurbished for public viewing.	Devonshire, 2003, p29
31 January 2007	SMC issued- General repairs to refurbish external and internal fabric to make buildings watertight- including roof repairs, repointing to walls and window repairs and updating of mechanical and electrical systems to comply with current standards.	S00001550
03 February 2010	SMC issued- taking down WWII blast walls surrounding two pressure vessels in front of the beam engine house to get back to the original design by T.C. Hawksley.	S00005356
18 April 2011	SMC issued- replacement of lead valley troughs with a lead look alike product, due to repeated thefts of lead and damage done to slate roofing.	S00010260
17 May 2012	SMC issued- construction of new single storey toilet block, located to the west of the existing site.	S00036839
13 December 2013	SMC issued- "The electric pump house regularly floods. As a result the stairs from the mezzanine level in the cellar to the cellar floor have become severely damaged. Both side stringers have rotted and the bottom six steps have also gone. Proposed is to dismantle the set of stairs, what is in good/reasonable order, store on the mezzanine in the cellar. Timbers that have a problem are to be cleaned and dried and damaged wood removed, painted and then stored on the mezzanine.	S00074462
23/5/2014	Historic Darlington pumping station closed due to safety and structural concerns.	Northern Echo
10 December 2014	SMC issued- asbestos survey of the building, removal of potentially unsafe asbestos containing materials, and where removal is not possible, encapsulation to ensure that materials are in a safe condition.	S00092811

Tees Cottage.

	Variation to above SMC S00092811 issued 10 December 2014 to include amend proposals for removal around the boiler by installing a metal angle over the expansion gap, rather than timber, to encapsulate any asbestos that cannot be completely removed. The asbestos around the boilers didn't extend as far as first thought so proposal now for full removal and replacement with insulating material.	
16 February 2015	SMC issued- installation of new power and lighting within chain store, the supply will be derived from the existing distribution board and will require a new circuit breaker. Upgrading of emergency lighting to the whole site.	S00102328
06 March 2015	SMC issued- Roof repairs including repairs to both hipped and pitched roofs and to flat roofs to the Gas House, Beam Engine House and Cottage. The works will also include repairs to defective rainwater goods inc leaking gutters and rainwater downpipes. Following these repairs to the roofs and rainwater goods, where required, there will be repairs to any affected masonry wall surfaces. There will also be repair works to the front boundary wall to the site.	S00104225
16 June 2015	Variation to SMC S00104225 - i) re-decoration of the water cylinders to the front of the Beam Engine House with the same colour paint (red) as previously approved for the rainwater goods in order that there is continuity in the colours of all these elements; ii) provision of a fire assembly point sign externally on the site (to replace existing); iii) repairs to roof following lead theft. Both the Gas House and the Beam Engine House have recently suffered lead theft. A lead substitute is to be re-instated to deter thieves. This will be a Code 5 Lead substitute for box gutters and flashings provided by 'Nicholsons Masterform'; iv) works to the flat roof of Gas Engine House viz. provision of additional timber deck, single ply, roof covering to match roof covering on other flat roofs, formation of 1no outlet to discharge into 1no small section of cast iron down pipe,	

Tees Cottage.

	<p>connected into plastic below ground drainage. This will connect into existing drainage in this location;</p> <p>v) works to valley gutter between right and left hand side Boiler House roofs to Beam Engine House. This will entail removal of existing defective covering and replacement with a new, single ply, covering to match approved covering to the other flat roofed areas of the site).</p>	
13 August 2015	SMC issued- Re-route the priming water line to be better protected and less hazardous to visitors and to carry out repairs to the capping of the buried tank in accordance with the outline plan attaché	S00112113
04 September 2015	SMC issued- repair works to 2no external staircases including repairs to handrails and provision of additional handrails to both sides of the staircases; and to remove and replace existing timber fences to the perimeter of 3no external tanks with a powder coated metal mesh fence in black finish.	S00114485
26 October 2016	Variation to SMC S00114485 - change design/style of metal fencing around Filter beds 1 and 2. Replace dilapidated wooden fence with metal Playsafe Bowtop railings instead of the previously agreed metal mesh fencing.	
16 December 2015	Variation to SMC S00104225 - undertake structural repairs to the chimney stack on Tees Cottage by carefully removing the loose and defective flaunching to the chimney pots and setting aside the chimney pots for re-use. It is proposed to carefully, by hand and course by course, remove the brickwork from the south facing side of the chimney stack and remove any corroded metal and rebuild using salvaged bricks as far as possible. In the instance that the bricks were damaged and unable to be reused it is proposed to obtain a sample for approval by Historic England. It is anticipated that between 3-6 courses of brickwork may need rebuilding depending on what is find upon opening up of the area.	

Tees Cottage.

03 May 2016	SMC issued- concrete and render repairs to east well cap and road re-surfacing. This will entail hacking off spalled render to brickwork walls on the well-cap to well above ground level and then re-rendering. In addition, the existing road surface will be scraped back to top surface by approx. 50mm, then the surface prepared and overlain with 20 tonne of whinstone chippings where required to re-level the access road, roll, compact and make level upon completion.	S00134916
01 June 2016	SMC issued- Undertake repairs and replacement to the timber windows to the Beam Engine House and Gas House. Undertake splice repairs, epoxy resin repairs and complete replacement of the decayed timber sections to the timber windows, thoroughly prepare, scrape back, sand and remove all flaking, blistered and defective decorative coatings back to bare timber. Patch prime all bare timber sections, new and old, using Preservative Primer with 2 coats, thoroughly rub down between coats and remove all dust, apply 2 full coats of undercoat. Thoroughly rub down between coats and apply 2 full coats of high gloss. All colours to match existing.	S00135226
31 October 2016	SMC issued- replacement of two rotten sections of timber walkway beneath the Beam House floor in order to comply with health and safety reasons. One section is 12ft long and requires six 9" x 3" planks; the other is 14ft and also requires six 9" x 3" planks. The boards will be replaced on a like-for-like replacement basis. Works undertaken in 2017.	S00148583

ANNEX 3 Tees Cottage; Large copies of maps and drawings referred to in the text.

Historic Maps

REMOVED FROM THIS COMPRESSED VERSION OF THE REPORT

Each OS Plan is reproduced showing a wider area and a detail of the Tees Cottage Water Works site.

1843 Tithe Plan

1855 Ordnance Survey 1:2500

1897 Ordnance Survey 1:2500

1914/15 Ordnance Survey 1:2500

1923/24 Ordnance Survey 1:1050

1939/40 Ordnance Survey 1:1250

1955/56 Ordnance Survey 1:2500

1955 Ordnance Survey 1:1250

1967 Ordnance Survey 1:2500

1967-76 Ordnance Survey 1:1250

1986 Ordnance Survey 1:2500



Figure 49. 1843 Tithe Plan. The Tees Cottage Water Works site occupies field 92. © Palace Green Library, Durham University

Tees Cottage.

Plans and Drawings; Science Museum.

REMOVED FROM THIS COMPRESSED VERSION OF THE REPORT

Thomas Hawksley and Co Archives

HAWK2 Archive.

E19

E20

E21

E22

E174

E175

E176

E178

E179

E180

E193

E194

E195

E208

E209

Durham Record Office

REMOVED FROM THIS COMPRESSED VERSION OF THE REPORT

Plans of Tees Cottage Pumping Station (Ref: Da/UT 5/)

Ref: Da/UT 5/4/1

Section views of the engine house, 26 October 1918 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

[View Da/UT 5/4/1 physical details](#)

Ref: Da/UT 5/4/2

Horizontal layout of installations in the engine and boiler house, 30 October 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

[View Da/UT 5/4/2 physical details](#)

Ref: Da/UT 5/4/3

Sections of the boiler house, 30 October 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster

[View Da/UT 5/4/3 physical details](#)

Ref: Da/UT 5/4/4

Sections of 24 inch valve, 1 November 1900 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster 1.5 inch to 1 foot [1:8]

[View Da/UT 5/4/4 physical details](#)

Ref: Da/UT 5/4/5

Sections of the boiler house, 9 April 1902 T & C Hawksley, Civil Engineers, 30 Great George Street, Westminster 0.5 inch to 1 foot [1:24]

[View Da/UT 5/4/5 physical details](#)



Figure 50. Extract 1886 OS 1:2500 mapping showing major site structures referred to in the text.

Tees Cottage.

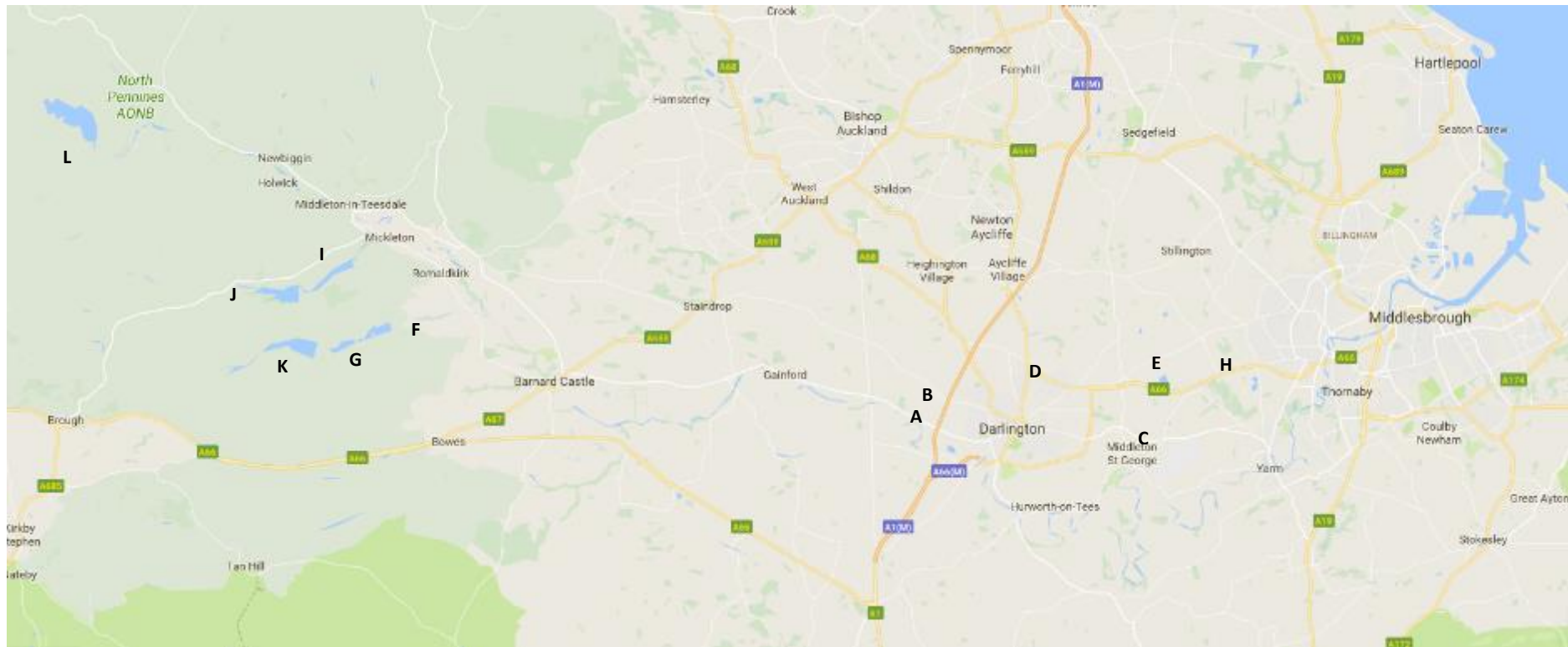


Figure 51. Locations of reservoirs and Tees Cottage.

	Reservoir/Site	Date built		Reservoir/Site	Date built
A	Tees Cottage	1849-50	G	Blackton	1896
B	Bushell Hill	1849-50	H	Long Newton	1905
C	Fighting Cocks/Middleton St George	1853	I	Grassholme	1915
D	Harrowgate Hill	1872	J	Selset	1955-60
E	Sadberge	1885	K	Balderhead	1961-64
F	Hury	1894	L	Cow Green	1967-71

Tees Cottage.