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River Thames

CASE STUDY

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Thames

Location: 51N 0W (England); length 250 km (150 miles); drainage basin: 10,000 sq km (4000 sq miles).

Tributaries of the Thames

Cherwell, Kennet, Lea, Loddon, Medway, Mole, Wey, Windrush.

The Thames

The Thames, sometimes described as 'London's River' is a modestly-sized river in southern England. Its source is a spring in the Cotswold hills. From here it flows on an easterly course to Oxford, (where it is locally called the Isis) then south to the Goring Gap. Here it cuts through the chalk hills that surround the London Basin. The river then resumes its eastward route, joined by the Kennet, its major tributary, at Reading. London is the lowest bridging point of the river and has been important since Roman times.

Like the Seine in France, the importance of the Thames is not so much as a navigable river – it is really only navigable as far as London except for small barges – but in the way that the Thames and its tributaries have cut gaps through the rings of hills that enclose the London Basin. Thus routes are able to move out from London to the rest of England, like spokes in a wheel.

The Thames is tidal to just above London (at Teddington weir). The Thames floodplain was excavated in the 19th century to make a complex of docks just downstream of Tower Bridge, however, the river is not deep enough to make it navigable for modern seagoing vessels, and these docks are now closed and redeveloped as the industrial and housing

▲ The Thames near Goring in Oxfordshire. Here the river is flowing across the Vale of Oxford before cutting through the chalk at the Goring Gap.

complex known as London Docklands. Europe's tallest building – Canary Wharf – lies beside the river in the centre of Docklands. The modern docks are 40 km (25 miles) downstream of London, at Tilbury on the northern side of the Thames estuary. On the southern side of the estuary lie the industrial regions and refineries of the Medway towns and Gravesend.

The funnel-shaped Thames estuary is very prone to tidal surges, when storms may drive water from the North Sea and cause great flooding in London. The famous London Embankment is a raised wall built in the 19th century to try to prevent flooding. However, the embankment is no longer a satisfactory safeguard, and so to protect London, levees have been built along both sides of the river, and a barrage – the Thames Barrage – has been built across the river at Woolwich. The gates of the barrage are sunk in the bed of the river to allow normal navigation and only raised when there is a flood risk.

The first bridge over the Thames (near the site of the present London Bridge) was built by the Romans soon after they founded London. At that time the river was three times the width it is today. Over the centuries the river has been narrowed dramatically as people have sought to reclaim the banks for valuable building land.

▼ The Thames at Reading. The Thames here is wide and thick beds of gravel lie under the floodplain soils. This land has always been too flood-prone for easy building and much remains as recreational space. You can see this at (1). The old Reading Abbey was built close to the junction of the Thames and the Kennet (2). Reading was built around the Kennet, not the Thames, because the Kennet was less liable to flood and easier to ford. Modern Reading sprawls across both banks of both rivers.

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Places on the Upper Thames

▶ **The Thames near Abingdon, Oxon where the floodplain has been used for riverside housing.**

▶ **The Thames at Henley, Oxon. Henley grew up as an important bridging point of the Thames. This picture looks northwest across the town centre. The regatta site is to the right of the bridge.**

▶ **The Thames at Windsor castle. Notice how the castle is built high on a bluff overlooking a great bend in the river. It was the ideal place to guard the Thames valley against river-borne attack.**

▶ The Magna Carta – the English constitution – was signed between King John and his nobles near this spot at Runnymede on the floodplain of the Thames just down river from Windsor.

Using the Thames headwaters

The Thames and Severn canal

The Thames provides a tantalising opportunity to follow a westerly route and connect to the great river of western England, the Severn. The barrier between the two is the Cotswold Hills.

During the great canal-building age of the 18th century, the chance to link these rivers was taken. The first step consisted of building a canal between the Severn and Stroud, still on the western slopes of the Cotswolds. This canal was called the Stroudwater Navigation and it was opened in 1779. It was a great success, taking coal from the Severn to the mills in the western Cotswolds.

The success of the Stroudwater spurred the canal-builders on to build a link to the Thames. This was to be one of the wonders of the 18th century because, in order to get over the Cotswolds, a tunnel 3.5 km (2 mi) long had to be dug through the Cotswold limestone. Known as the Sapperton Tunnel, it was on completion, the greatest civil engineering work ever undertaken in Britain.

When the Severn-Thames canal was opened in 1789 its 60 km (37 mi) length provided the only canal link across the Cotswolds and it was a success for over a half a century, until the arrival of the railway. Yet even with competition from the railway, it only finally closed in 1933.

Today remnants of this canal are being rebuilt as part of the Cotswold Water Park.

Cotswold Water Park

The Cotswold Water Park is an area between the source of the Thames and Lechlade that has been extensively quarried for sand and gravel. Vast beds of valuable building material cover much of the area to the east of the Cotswolds and in the 1920s and 30s huge amounts were extracted from shallow pits.

The pits have since become flooded and 5700 ha of them have been designated as the Cotswold Water Park. It contains 1000 ha of open water used now for water recreation as well as for wildlife preservation. Access to the headwaters of the Thames – here a clear, gurgling and meandering stream – are most easily gained via the Water Park.

◀ The Thames at Teddington, West London. This is the location of the weir and locks that separate the tidal and no-tidal parts of the river. This picture was taken in summer when little water flows in the Thames. The weir at Teddington keeps a good level of water in the river for shipping, even at low water. The picture is looking up river, the weir plate is in the foreground.

The changing Thames

When the Romans first saw the Thames, they saw a wide shallow tidal river with many channels split by islands. This is why they were able to ford it. The old centre of Southwark was built on an island.

The shallow tidal Thames was suited only to small boats. They would beach themselves on the banks and the cargoes would be loaded and unloaded at low tide. Carts would be drawn up against the beached boats.

London became the world's greatest nineteenth century port, but only through considerable effort. In the previous centuries ships had sailed up river to dock in the wharves near the Tower of London. This was why no one had allowed a bridge to be built downstream of London Bridge.

No-one seriously believed that the wharves of the Pool of London could cope with London's rapidly increasing trade. In any case, the river at the Tower is too shallow for large vessels. And this is why the foul cold marshes to the east of London, so long avoided by all but smugglers, were scooped out and made into docks and closed off by lock gates. Ships could now sail in at high tide, unload their cargoes and sail out on another high tide. London Docks were the pride of the capital and the largest in the world.

St. Katherine's Dock designed by Sir Thomas Telford and opened in the early years of the 19th century, was the first of many artificial docks excavated from Thames muds to allow ships to be loaded and unloaded at all states of the tide. By modern dock standards, St. Katherine's is tiny, covering about the same area as the Tower of London. But in its day it was a major engineering feat.

Its usefulness long since over, modern St. Katherine's Dock is a marina. It has many of its original warehouse buildings, supported on cast iron pillars. It has been skilfully refurbished to make an exciting place to visit, eat and shop, or just to look at the boats. A lightship is kept in the dock.

The Thames embankment

Meanwhile the Thames was also being used as an open sewer. As London grew bigger, the sewage problem was getting so out of hand that even the members of the government sitting in the riverside Houses of Parliament could no longer tolerate the stench.

In 1858 a particularly hot summer brought The Great Stink up from the Thames (which

by then was simply an open sewer) and Parliament had to be abandoned. The man who was commissioned to come to the rescue and build the world's first city-wide sewerage system was Sir Joseph Bazalgette in 1875. In his way, he revolutionised London just as much as John Nash had done half a century earlier, except that most of the things Bazalgette built were underground.

Now you might be asking how did a sewer alter the appearance of the Thames. Well it did. Poor old Bazalgette's problem was that a sewer for London is big, very big. He couldn't think of anywhere to put it that wouldn't mean digging up half of the city. Then he had a bright idea. Why not put it in the bank of the river, then cover the sewer over and make gardens and a promenade on top.

As it also happened, London was building its first underground railway to try to ease the congestion of the millions that now lived and worked there. So why not put the underground railway and the sewer in the same trench?

Today Victorian Gardens on the embankment is underlain by the London main sewer and part of the Metropolitan Lines.

Ever more tunnels were needed as London grew and grew. First there were water mains, then sewers, then underground railways (beginning in 1863). This was where Londoners were especially lucky. The tunnels could all be excavated out of the soft London clay. As most of the underground railways were built with a circular section, the system quickly became nicknamed 'the tube'.

The Victorians were the first to realise that they could make more use of the river edge if they reclaimed land. They also knew that, from time to time, London was liable to be flooded by a high tide. So they built a promenade cum flood barrier, added a walkway and seat, put up some nice street lighting and called it the Embankment. The Embankment runs both sides of the Thames through Central London, but it wasn't extended to East London, after all, who in Victorian times worried about the poor?

Fall and Rise of London Docks

The decline of London Docks was one of the greatest changes to come over the city for more than a century. The ships were getting too big to reach as far up the Thames as London and instead they were unloading their cargoes at Tilbury near the Thames Estuary. At the same time, labour relations were bad and so the old London docks simply could not compete.

By the end of the 1970s London Docks were derelict.

It was a disaster for London, but at the same time it represented a vast development opportunity, for it was quite simply the biggest building site in Europe.

▶ The Thames embankment opposite the Houses of Parliament. The embankment is literally a wall built as a flood protection measure. The wall had to be increased in height in the 1950s and so the seating had to be raised as well. Look at the way the seat in the foreground is raised on a plinth.

The transformation that has occurred in Docklands since that time is one of the great unsung heroic changes of the century. Not seen by most tourists, the Docklands development is now a serious rival to the City of London as a centre for business. At its heart is the tallest office building in Europe, the Canada Tower on Canary Wharf.

London Bridge

The present London Bridge is not old. So you have to use your imagination to think about the Roman bridge.

What we are thinking of though, is the site that the Romans chose, and while we are at it, we will also think about what the old London Bridges were like as well.

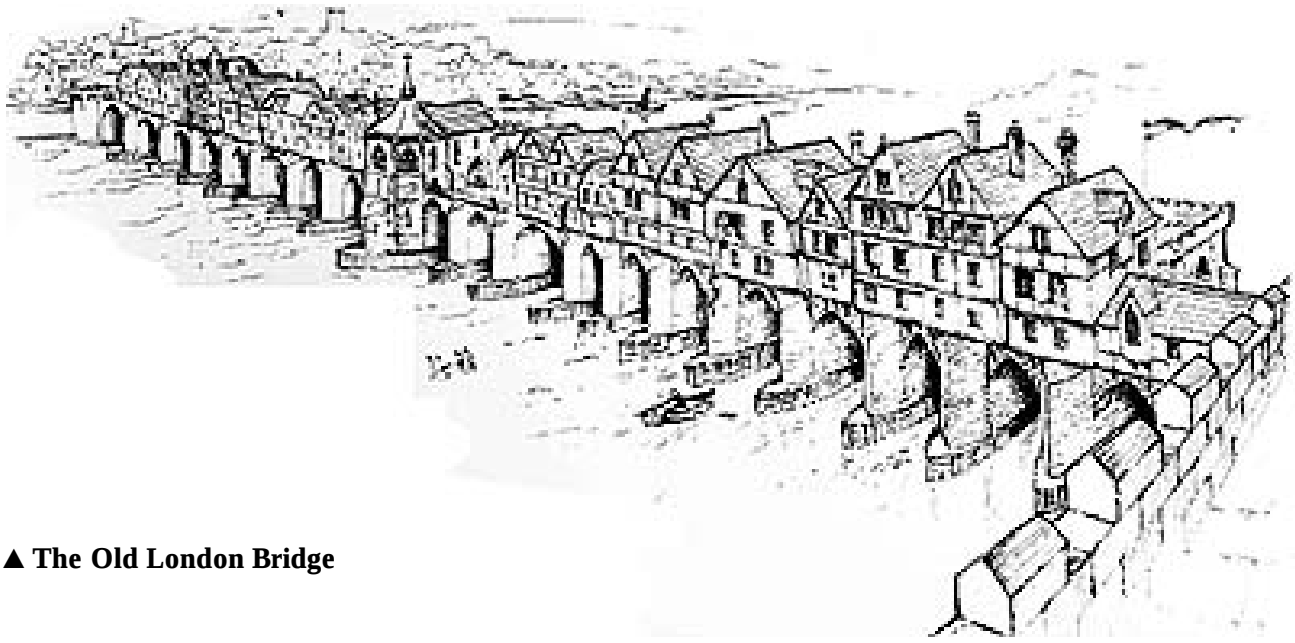
There has been a "London Bridge" across the River Thames for two thousand years. The first bridge was completed by the Romans some time in the first century AD. It was sited about 60m / 200 ft downriver of the present bridge where there was good firm gravel on both banks. It was made from wood and had a drawbridge in the centre to allow sailing ships to get up and down the river. The Romans did not build skimpily and it lasted for hundreds of years, and would have lasted for much longer if it had not been pulled down during one of the Viking raids a 800 years later.

The early bridge was not a simple affair. The river was about 1000 m wide (ten times the present width!) at high tide, although it was much shallower than it is today. The built from the North bank to an island near the south bank, and on the island they founded Southwark to protect the approaches.

The destruction of the bridge was a quick and fairly thoughtless act of desperation that was to cause an enormous amount of inconvenience (except for the ferrymen!). But all the same it took until 1176 before a new stone bridge was under way. This was completed in 1209, that is, it took 33 years to build! Perhaps they had union trouble. It was built on rings of rubble filled wooden piles driven into the river muds close to the site of the former Roman bridge.

We are used to thinking of symmetrical bridge designs and graceful curves and arches, but such things were not a concern of the medieval bridge-builders. They were much more interested in putting their foundations in the right places, and if this meant odd shaped and spaced arches, then so be it. Of the 19 arches, the largest was 10 m (35 ft) wide and the smallest just 5 m (15 ft) wide, with all manner of sizes in between.

You may think London Bridge took a long time to build. But, things being built to last in those days, London Bridge then survived for



▲ The Old London Bridge

600 years and it remained the only bridge across the Thames until the 18th century.

The bridge was not simply for travelling across. It was the salesman's dream. As people crossed, they had to go along a narrow pathways past your stall or your shop. So London Bridge grew up like a small town, with houses and shops all across it. In fact, it must have been quite a performance actually crossing the bridge through all this development.

The chapel of St. Thomas was built more or less in the middle of the bridge. This was dedicated to the former Archbishop of Canterbury (Beckett) who was murdered in his cathedral in 1170 on the orders of frustrated King Henry II and became a major tourist attraction (in those days known as a site of pilgrimage).

Old London Bridge, which appears in many famous paintings of old London, such as those done by Caniletto, was notorious as a fire hazard and for collapses that occurred as the wooden piles that supported the bridge settled into the river muds under the weight of the stone arches. It is all the more amazing, therefore, that it was not demolished until 1826. The New London Bridge was completed in 1831, when London was in the midst of great expansion. This new, wide bridge was faced with granite and designed to take vehicles.

A further replacement was completed in 1971 because the Victorian bridge was not strong enough to carry modern vehicular traffic. As New New London Bridge was being demolished, the facing blocks were sold to an American corporation who built a replica bridge in Lake Havasu City, Arizona. Thus it is possible to visit Arizona to see the Old New Bridge, and London to see the modern concrete new, new bridge, but nowhere will you see Old London Bridge.

Tower Bridge

If you are defending the city from attack by river the one thing you definitely don't want is a bridge close by. Not only does it get in the way of your archers sighting the enemy, but it gives the enemy protection and allows them to get a foothold on land so much more easily. So Old London Bridge, some distance upstream of the Tower, was a fine location, but on the edge of the marshes downstream was a definite no-go area.

As time went by there was a further problem: the reach of the river close to the Tower of London became the main harbour of the city. It was called the Pool of London. For centuries no one could solve the problem of how to put a bridge across a stretch of river that was very busy with tall masted sailing ships.

▲ This picture is of the Thames around London Bridge (the lower bridge). The old City of London, built on dry river terraces, is on the right. You can just make out the Tower of London at the bottom right. HMS Belfast is moored lower left. Look out also for St. Paul's cathedral, top-right.

The river has been put in the strait-jacket of the embankment throughout the central part of the city.

▲ However, as the Pool of London lies just upriver of this bridge, and at the time it was a thriving part of the docks, provision had to be made to allow large sailing cargo vessels to reach it. Thus the Tower Bridge has two lifting roadway sections. They were originally lifted using hydraulics.

The engineers of the Victorian Age applied their minds and came up with a truly spectacular solution involving some hundreds of tonnes of steel and a couple of vast steam-driven engines that could raise and lower bridge decks.

The Victorian engineers were not just interested in being functional. They were also interested in building grandly, and how more grand could you be than to build more towers near the Tower of London. And so the great shape of Tower Bridge came in to being with the aid of engineer Sir Horace Jones in 1894.

Tower Bridge is a magnificent monument to the engineering confidence of the Victorian Age. The structure, which is known as a double bascule bridge (that it is has two hinged lifting sections of roadway) has supporting towers made of steel and only clad in stone for decoration. The style is Gothic.

There are many other bridges over the river. One of the most interesting was built in Victorian times and one of the first to employ a suspension bridge design. It is called Albert Bridge, named after Prince Albert.

◄ The Thames bridges above the old Pool of London (next to the Tower of London) did not have to allow the passage of sailing ships and so could be fixed bridges. Many were built when this part of London was still countryside and only light traffic was expected. Nowadays they are overwhelmed. This elegant bridge is the Albert Bridge.