

Case Name: Rock-cut rooms, Georgian era rope-haulage groundworks in Wapping Railway Cutting at Edge Hill Liverpool

Case Number: 1463899

Background

We have been asked to consider part of the original terminus of the Liverpool and Manchester Railway, opened 1830, for addition to the National Heritage List for England. We have considered that this is most suitably assessed as a potential Scheduled Monument under the Ancient Monuments and Archaeological Area Act 1979, rather than as a Listed Building under the Planning (Listed Buildings and Conservation Areas) Act 1990.

Asset(s) under Assessment

Facts about the asset(s) can be found in the Annex(es) to this report.

Annex	Name	Heritage Category
1	Liverpool & Manchester Railway: Edge Hill Engine Station	Scheduling

Visits

Date	Visit Type
none	No Visit / Data from other sources

Annex 1

The Draft List Entry are being assessed as the basis for a proposed addition to The National Heritage List for England.

Draft List Entry

Name: Liverpool & Manchester Railway: Edge Hill Engine Station

Location

Land, with the enclosing boundary at ground surface level, including the western end of the Wapping railway cutting, west of the Chatsworth Drive overbridge, Liverpool. The mapped area is shown larger to include the rock-cut chambers in the sides of the cutting and 20m sample lengths of the three tunnels at the western end, surface features above (that lie outside the boundary to the cutting) are not included as indicated at the end of the details section.

County	District	District Type	Parish
	Liverpool	Metropolitan Authority	Non Civil Parish

History

The opening of the Liverpool and Manchester Railway (L&MR) on 15 September 1830 was a pivotal moment in history, generally seen as the establishment of the 'main line' railway which profoundly influenced the development of railway networks both in England and abroad. The L&MR was the first locomotive-hauled inter-urban public railway to operate a timetabled passenger service alongside the transport of goods. It clearly demonstrated the profitability and practicality of using steam locomotives for passengers, outcompeting rival horse-drawn stagecoach services.

Parliamentary approval for the construction of the L&MR was granted in May 1826. George Stephenson (1781-1848) was the line's chief engineer: he championed the use of steam locomotives, based on his experience with the Stockton & Darlington Railway, opened 1825. However early locomotives struggled on inclines and the authorities in Liverpool, distrustful of the new technology, had banned locomotives from entering the urban area. Edge Hill Engine Station was built as the original Liverpool terminus for locomotive-hauled trains, the station being sited at the western end of a deep cutting (known as both Wapping and Chatsworth Street Cutting), the line continuing as two tunnelled inclines that were rope-hauled by stationary steam engines sited at the station.

The shorter and gentler incline, a single track 266m long, rose to the surface to terminate at Crown Street Station, Liverpool's original passenger terminus. Trains for Manchester would descend this incline by gravity to the Edge Hill Engine Station where they were coupled up to a locomotive to proceed. Returning trains would, in turn, be decoupled at the station, to be rope-hauled up the incline to Crown Street, with horses used to shunt rolling stock and help marshal trains.

The longer tunnel, the twin-track Wapping Tunnel just over 2km long, descended steeply down to Kings Dock on the Mersey (the associated Wapping Dock opened in 1855). The incline was initially operated with a continuous rope powered by a stationery steam engine, the weight of descending trains assisting in hauling up trains from the docks, the system being designed by Stephenson. The Wapping Tunnel, identified as the world's earliest railway tunnel to be driven underneath an urban area was, like the cutting, initially engineered by Charles Vignoles (1793-1875) but disagreement with Stephenson (who identified mistakes in the surveying for the tunnel) saw Vignoles' resignation in February 1827, the tunnel being completed by Joseph Locke (1805-1860) under Stephenson's direction. Construction was underway by September 1826, the tunnel being driven from six shafts sunk along its route, being broken through by July 1828. The tunnel had its own official grand opening ceremony in July 1829, becoming a gas-lit tourist attraction until safety concerns shut it to the public as traffic in the tunnel increased following the opening of the line to Manchester in 1830.

The design of the winding arrangement for the inclines was undertaken by George Stephenson, the stationary steam engines being designed by his son Robert (1803-1859) and built at their works in Newcastle. The engines were housed in a pair of tall engine houses at Edge Hill Engine Station, built on either side of the cutting, linked by a Moorish-style arch which spanned the double tracks entering the station from the Manchester direction. Boilers were housed in rooms cut into the sides of the cutting, the end of the cutting above the tunnel entrances being crenulated and flanked by tall, ornamented boiler chimneys. The embellished design of the station in the cutting, by Liverpool's then most prominent architect John Foster (1787-1846), formed a grand entrance to Liverpool for railway passengers and featured in illustrations published in the early 1830s.

The great success of the railway quickly showed that the facilities at Crown Street Station were inadequate and inconveniently located for passengers. This led to the construction of a new line that opened in 1836, dividing off from the original route 0.5km east of Edge Hill Engine Station. This included a new station (Edge Hill which remains in use and is listed II*) and another tunnelled, rope-worked incline to the new terminus at Lime Street, closer to the heart of Liverpool: this route remains the main line into Liverpool, with Lime Street Station (listed Grade II) being the city's principal station. The original Edge Hill Engine Station ceased to be used for passenger trains but maintained its original function for goods traffic, being the interchange between the inclines and the locomotive-hauled line. The boiler houses also initially supplied steam for the new stationary engines for the incline to Lime Street Station via pipework laid through a newly cut passage through the rock, but this proved to be highly inefficient and was soon replaced with new boilers closer to the engines at Edge Hill.

With the opening of Lime Street Station, Crown Street remained in use as a goods station, being further enlarged as a goods yard and coal depot in the mid-C19. The L&MR was absorbed into the Grand Junction Railway in 1845 and then into the London & North Western Railway (LNWR) in 1846. Around this time the southern-most opening in the west end of the Wapping cutting (originally a locomotive shed) was extended and enlarged as a new double-track tunnel for locomotives to enter Crown Street. By 1849, new engine houses at Edge Hill Station to the east were winding longer trains up the Wapping Tunnel incline, Stephenson's original arrangement at the Moorish Arch being redundant. The original engine houses and the Moorish Arch were demolished sometime after the survey for the 1864 1:1056 Ordnance Survey plan, probably when the cutting was enlarged with the south face being cut back by up to around 3m to allow for a new track layout to increase capacity as shown by the 1890 1:2500 map.

Sometime in the later C19, wire cables replaced ropes for winding until eventually being replaced by locomotive haulage in 1896 following the completion of a series of five large ventilation chimneys designed to vent smoke from the tunnel. The foot of the incline was extensively modified at the same time, accommodating an enlarged Wapping Goods Station. This was renamed Park Lane Goods Station by the London Midland & Scottish Railway after 1923, and, although extensively damaged in the Second World War, continued in operation as part of British Railways until closure in 1965, caused by the terminal decline in the use of the adjacent docks. Crown Street Goods Station continued in use a little longer (as a coal yard), eventually closing in 1972, subsequently being landscaped as a public park, the western portal of the original incline being blocked.

In 1976-79, Edge Hill Engine Station was investigated by the North Western Society for Industrial Archaeology and History (Rees, 1977 and 1980), researching the C19 documentation and descriptions of the site, surveying the cutting with its rock cut rooms and passages, and archaeologically uncovering the remains of the northern engine house and the associated pits for the winding gear. The remains were recorded and left in situ, backfilled with inert sand. The southern engine house was not investigated as its site lies beneath two railway lines that remain in use as sidings, these extending through the twin-track tunnel that was opened to Crown Street in the mid-1840s, this being the southern-most of the three tunnels. The area around the cutting at ground surface level, including the boundary walling and the ground between this and the edge of the cutting, was also not investigated.

Details

PRINCIPAL ELEMENTS: railway cutting including various tunnel openings and chambers cut into the walls; built structural elements including a wall and chimney base built on the ground surface above the cutting; buried archaeological remains of two winding engine houses and associated structures in the base of the cutting.

DESCRIPTION: the railway cutting is around 12m deep and 20m wide, cut nearly vertically, its western end being about 90m from the Chatsworth Drive overbridge. The bottom 7-8m of the cutting is through sandstone bedrock, the faces above generally being lined with dressed sandstone blocks. There are also numerous areas of later brickwork patching, mostly using blue engineering brick. The base of the southern side of the cutting has been cut back by up to about 3m, although the upper part is still faced with sandstone blocks and is considered to be original. The top of the cutting is fully enclosed by a boundary, mainly consisting of a high wall, parts of which are considered to date to around 1830. This includes the walling at the western end of the cutting that, although now heightened, retains the crenulations shown in an illustration dating to 1833, along with the base of the northern boiler chimney.

The western end of the cutting retains three brick-built tunnel portals, all three being nearly semi-circular arched. The northern portal is around 4.6m wide by 5.2m high and was the original tunnel to Crown Street station, the far end now being infilled. Close to its portal there is an 1829 datestone and a spring-fed water stoop. The middle portal is larger, 5.6m high by 7m wide, and is that of the original twin-track Wapping Tunnel that descends 2km to the docks. This tunnel remains open. The base of the southern portal is set 1m higher than the rest and is also larger, being 6.5m high and 7.6m wide, this being the twin track tunnel to Crown Street enlarged from a locomotive shed in the late 1840s. This tunnel remains open and in use for a pair of railway sidings.

Centred around 50m east of the tunnel portals, the northern side of the cutting retains a wall of the winding engine house that formed the northern side of the Moorish Arch, the grand station entrance feature that was demolished in the later C19. Ironwork and various recesses in the side of the cutting provides evidence of the engine house and its internal arrangement. The full footprint of the building also survives in situ in the base of the cutting. This was identified in the archaeological investigations in the late 1970s which also recovered evidence that the engine house has a basement at least 3.5m deep, infilled with the demolition rubble from the upper parts of the building. The southern engine house was not investigated in the 1970s as its site lies beneath a pair of railway sidings, however as the trackbed on the south side of the cutting is slightly raised, the entire footprint of the southern engine house is also thought to survive in situ, although its southern wall was lost when the cutting was enlarged in the later C19. Between the two engine houses, also still surviving in the base of the cutting, are further original structural remains including features identified as part of Stephenson's tensioning arrangement for the incline's rope haulage system.

The north side of the cutting, to the west of the engine house, retains the remains of the stone staircase shown in early illustrations that provided access between the station in the base of the cutting and the surface above. Excavated into the cutting's side below the stairs are a pair of original, round-arched boiler houses, each being around 4m wide, 4m high and extending nearly 14m northwards. To the east of the engine house are three further round arched openings excavated into the cutting's side, the first being nearly 3m above the base of the cutting, this thought to have been used for a storage tank for steam-heated water for locomotives. The other two openings may have been for coal storage. Opposite, cut into the southern side of the cutting, are two larger, inter-connected chambers which are traditionally thought to have been excavated as locomotive sheds, although there is also evidence that they may have been (or possibly converted into) additional boiler houses for the stationary engines at the Moorish Arch. The south side of the cutting does include two rock-cut chambers which are more certain to have been boiler houses, these matching and sited opposite to those beneath the stairs on the north side of the cutting. All of these southern chambers are connected to a flue that extends westwards, presumably to the southern chimney that rose above the western tunnel portals. A fifth chamber in the southern side of the cutting, which is not connected to this flue, lies just over 20m east of the tunnel portals. This chamber is not shown in 1830s illustrations and may have been designed as a refuge when

the cutting was enlarged in the later C19. It was subsequently modified with brickwork, including a fireplace, to form an office or staff accommodation.

Excavated into the northern cutting side opposite, around 25m east of the tunnel portals, is another chamber that does not appear in early 1830s illustrations. This chamber is brick lined and is thought to date to about 1836, being an additional boiler house installed to supply steam to the winding engines at Edge Hill that initially wound the new incline to Lime Street Station, the new passenger terminus that replaced Crown Street in 1836. This chamber (around 6.5m wide, 7m deep and 5.4m high) is connected to the flue serving the original northern boiler houses that leads to the base of the chimney above the west end of the cutting. It is also connected via a hole in the ceiling to a tunnel that extends eastwards, this originally being for the pipework supplying steam to Edge Hill. Between this boiler house and the western end of the cutting are three further rock-cut rooms, each with a round-headed, domestic-scaled doorway, the rooms having ceilings between 2.25 and 2.8m high. These have been used as staff accommodation, effectively similar to lineside huts, although the western two are thought to have originated as stables for horses employed in shunting rolling stock.

AREA OF ASSESSMENT: this includes the full extent of the railway cutting from its western end eastwards as far as the overbridge carrying Chatsworth Drive (formerly Chatsworth Street). It extends to include the full extent of all of the chambers and openings cut into the north and south sides of the cutting. It also includes the first 20m of the tunnels at the western end of the cutting to provide a sample of their constructions together with buried remains of any ropeways, pits for pulleys or other features that may have been located close to the tunnel portals. The boundary line including these underlying rock-cut features has been simplified and drawn to extend between identifiable points and boundaries on the ground surface above, this being designed to ensure that the full extent of the underlying features is included together with an additional margin, whilst also aiding identification. The area of assessment also includes the land at ground level around the top of the cutting that is defined by the wall and fence line that encloses the cutting, this also including the boundary wall itself as well as the chimney base that forms the north western corner. Outside of this boundary, although included within the mapped area designed to include the rock-cut features below, the upper 4m of ground, along with all features within this layer (such as services and foundations) as well as all structures built above (such as domestic properties and that part of the school which falls within the mapped area) are not included in the assessment. Within the railway cutting, the railway sidings with their associated ballasting and lineside equipment are also not included in the assessment.

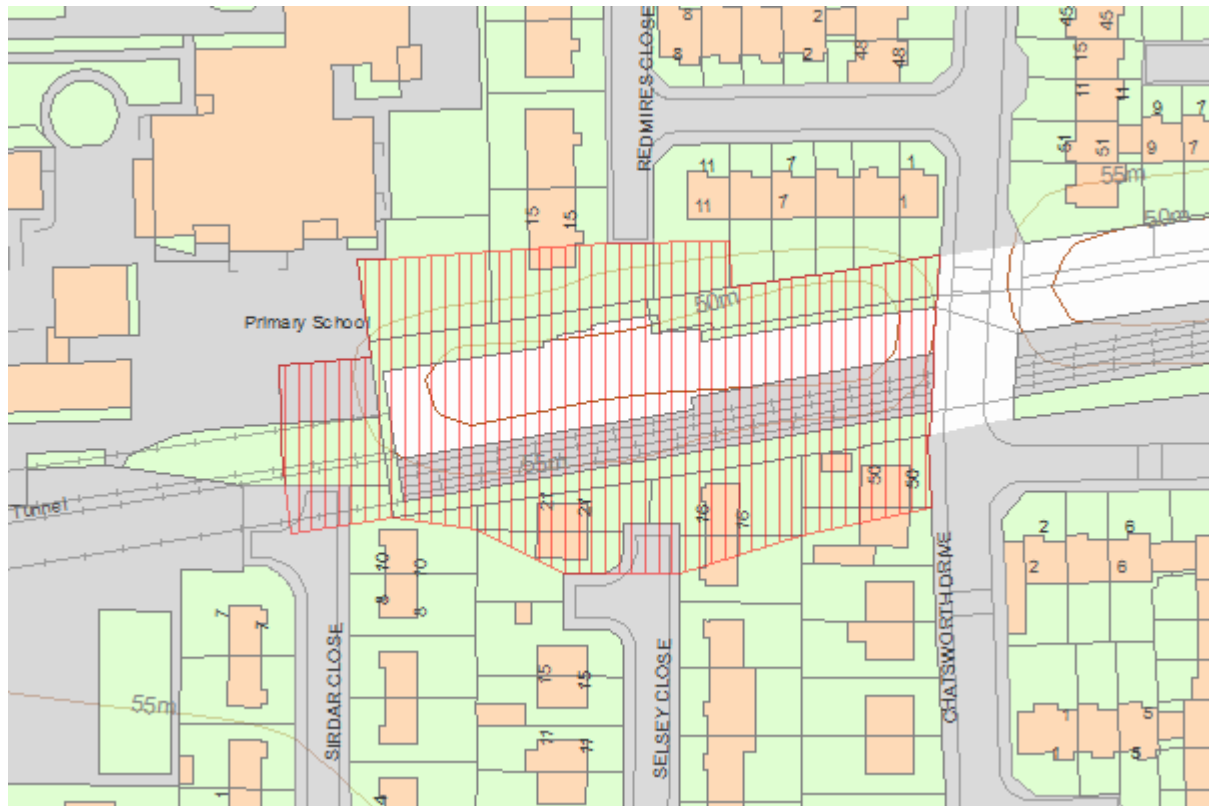
Selected Sources

Books and journals

Skeat, WO, George Stephenson the engineer and his letters, (1973), 98-101

Rees, P, 'Chatsworth Street Cutting, part of the original terminus of the Liverpool & Manchester Railway' in *Industrial Archaeology Review*, Vol Vol 2 Part 1, (1977), 38-51

Rees, P, 'Excavations at Chatsworth Street Cutting, part of the original terminus of the Liverpool & Manchester Railway' in *Industrial Archaeology Review*, Vol Vol 4 Part 2, (1980), 160-170

Map**National Grid Reference:** SJ3680389818

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The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF – 1476078_1.pdf.