



1892 CASTLEFIELD VIADUCT  
STATEMENT OF HERITAGE SIGNIFICANCE  
ISSUE 01  
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On behalf of Purcell ®

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*The National Trust*



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# 1892 CASTLEFIELD VIADUCT: STATEMENT OF HERITAGE SIGNIFICANCE

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## EXECUTIVE SUMMARY

In many ways, Castlefield is the heart of Manchester and, for a time, was also the beating heart of the industrialising world. This pivotal role began with the establishment of the Roman fort of Mamucium in 79AD. It rose to prominence once again in the 18th century, with the construction of the Bridgewater Canal (1763), the first great achievement of the canal age and the Industrial Revolution, followed by the structures of the 'Railway Mania' that criss-crossed the basin, enabling international trade. Over a hundred years of innovation, prosperity, engineering marvels and commercial success are visible at this confluence of transport infrastructure, offering a tangible reminder of Manchester's position as a global force in the 19th century.

Railway Mania began with the Liverpool & Manchester Railway in 1830. By 1845 over 35 new railway lines have been constructed in Britain and in 1846 the Manchester South Junction and Altrincham Railway was built in Castlefield, followed by the first Cheshire Lines Committee railway and 1873 viaduct. The 1892 viaduct was the second to be built by the Cheshire Lines Committee in Castlefield, expanding on their existing lines from Central Station to Salford Quays.

From atop the viaduct, one gains an impression of the grandeur, affluence and power the Cheshire Line Committee and citizens of Manchester were keen to promote. One has a birds-eye view of unrestrained growth from the 18th century onwards. Robust structures of the Victorian age, such as Manchester Town Hall and Manchester Central vie for prominence with glazed 21st century skyscrapers and squat apartment blocks. The rhythmic sound of trains thundering past reminds the viewer of the original purpose of the viaduct and how it once contributed to this metropolis, although now unused, serving a monumental role as a reminder

of former power. The length of the viaduct (370 yards over 56 arches), with its repetitive latticework and bracing, combined with the self-seeding brambles, weeds and briars that are steadily reclaiming the structure, brings a sense of awe to the visitor.

Returning to the ground, the character changes immediately to a more enclosed and intimate setting, although there is nothing domestic or comfortable about it. The built environment beneath the viaduct is one of contrasts, with the monumental cast-iron columns and fish-bellied track looming over the more human-scale waterways and boats of the earlier canal. The grit, grime and decay often associated with historic industrial structures is one characteristic of the space, although the quiet cobbled streets and reflections in the water also provide a sense of tranquillity that is not found elsewhere in the city. There is much to recommend this area to a wider audience.

The adjacent Merchant's Bridge (1995) offers pedestrians a place to view this collision of infrastructure, with water below and rail above, surrounded by its historic industrial setting of warehouses, roads and docks. Gazing up at the three viaducts above, the visitor can read the evolution of Manchester in their successive fabric. The early and diminutive scale of the red brick and cast-iron Manchester South Junction and Altrincham Railway viaduct (1849) speaks of a time before mass production and transportation. Next, the CLC Cornbrook Viaduct (1877), with its wrought-iron lattice girders, illustrates a transitional period between the use of traditional materials and innovative feats of engineering, sometimes with less-than-ideal results. Finally, the 1892 CLC Castlefield Viaduct, represents a culmination of Victorian confidence and prowess at the pinnacle of the Railway Age, with an early use of carbon steel and architectural embellishment that proclaims its importance.

The 1892 Castlefield Viaduct has an iconic status as a landmark structure in a city already saturated with industrial heritage. It is instantly recognisable in the fictitious city of Motostoke in the 2019 Pokémon games, where its monumental scale dominates its surroundings. The viaduct has an architectural honesty and functionality, with its materials and construction loudly proclaiming its use. It epitomises many of the features of the late Victorian period, it is striking, self-confident and dominant. Innovative engineering solutions were proudly displayed and the CLC could not help embellishing their structure with architectural detailing typical of the High Victorian period.

The 1892 viaduct is an early example of latticed-girder bridge construction, with only circa 30 earlier examples known to have been constructed in the UK. This made use of typical construction methods of the time, which involved riveting pre-fabricated metal trusses together, but allowed stronger and lighter structures to be built more quickly. Well-established materials were used for the brick arches (including the stronger, blue engineering bricks) and cast-iron columns working under compression. What was innovative about the 1892 viaduct (in comparison to its earlier 1873 sister) was the very early use of carbon steel for the girders. The Forth Rail Bridge of 1882-1890 was the first major structure in the world to be constructed in steel and the use of steel less than a decade later by CLC puts their engineers at the forefront of technology.

Beyond its physical presence, the viaduct continues to tell us much about past human experiences, activity and values. The archival collection of Network Rail offers fascinating insight into the construction of the structure and there is much more to be learned from an engineering perspective. We know about the company who commissioned the viaduct, CLC, their chief engineer, W.G. Scott and the manufacturers Heenan & Froude and M.W. Walmsley & Co. The lives of those who helped turn the blueprints into reality are more opaque. Who were they? How did they live and what motivated them? There is much to be learnt by researching and telling their stories.

Overall, the Castlefield area has long represented the innovative, industrial heart of Manchester and is, if not unique in its individual components, certainly of the highest heritage interest for its significance as a group and the contribution it makes to our understanding of Manchester at the heart of global industrialisation. From the 1830s railway station to the 20th century Metrolink, each piece of infrastructure contributes to this story, as well as having its own story to tell. The CLC railway has national interest for connecting north-west industrial towns, and by extension, the wider British empire. The 1892 and 1873 viaducts are an important part of this story and illustrate how quickly technology was developing at the time. It is interesting to note that reliance on new technologies was not always beneficial, as the carbon steel of the 1892 viaduct has fared much worse than the earlier cast iron on the 1873 viaduct due to corrosion. In 2021, the condition of the 1892 viaduct has deteriorated. There is great potential for imaginative new proposals to be put forward that would restore the structure to a beneficial new use and return it to its former glory.



## KEY FACTS:

The Cheshire Line Committee Railway, including the Castlefield Viaduct, carried over 11 million passengers and 8.5 million tons of goods each year by 1939.

The CLC Manchester to Liverpool Express took 45 minutes for the 34-mile route, compared to times of between 40 minutes to over an hour by other operators. The trains averaged a speed of 51.5 mph and became known as ‘the punctual route’.

In 1887, the CLC average construction cost per mile of track was £88,000, and, with the exception of the London Metropolitan line, was the most expensive per mile in the country.

The 1892 viaduct is an early example of the use of carbon steel in bridge construction, replacing cast and wrought iron. The Forth Rail Bridge of 1882-1890 was the ‘world’s first major steel structure’, and the 1892 viaduct was built only a few years later.

The 1892 viaduct was designed by the Chief Engineer of CLC, William George Scott.

It was manufactured and constructed by Heenan & Froude and M.W. Walmsley & Co. Heenan & Froude were also responsible for Blackpool Tower the same year, constructed with rivetted carbon steel girders.

**The total weight of the steel and iron used in the construction of the viaduct is over 7000 tons.**

The drum columns are cast-iron and the lattice girders are carbon steel. It also required 6 million rivets and 14,000 cubic feet of concrete.

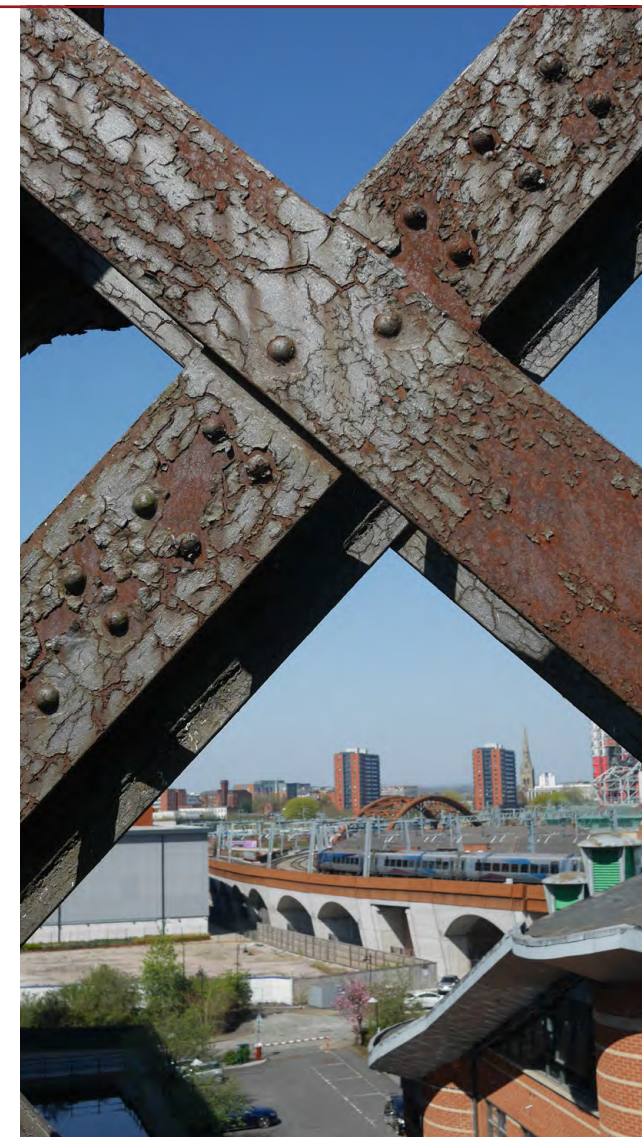
**It was completed at a cost of £250,000 (about £20.5 million in today’s money).**

The viaduct sits within a dense landscape of heritage designations including seven listed buildings and one Scheduling. Transport infrastructure includes four railway lines, two canals, two main roads and the site is adjacent to four stations (two disused).

Locally, the viaduct is seen as a positive asset that is linked to the development of the national rail network across the UK and is a strong visual representation of Castlefield’s history.

*“This splendid example of fine engineering symbolises Manchester’s resilience, growth and progress on all fronts. It’s one of the sleeping giants that linked key markets.”*

*“It is perhaps the epitome of the Manchester industrial spirit and heritage in this great city and as such, of global significance.”*

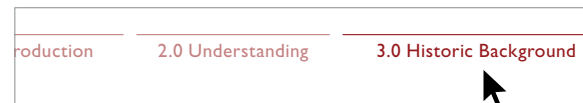


# HOW TO USE THIS DOCUMENT

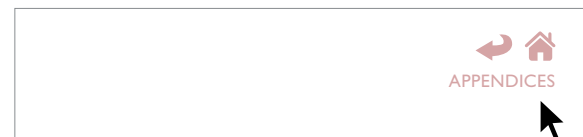
This Statement of Heritage Significance has been designed as a smart PDF, allowing the reader to interact with it as you would a website.

## Navigation

The buttons along the bottom of each page allow you to jump to a specific section. Once you've clicked on a section, it will turn bold so you know which section you are in.



You can also use the buttons in the top right hand corner to jump to the contents, appendices, or back to the page you were previously on.



Manchester provided plenty of traffic and the line between Liverpool and Manchester carried considerable goods traffic. At the Manchester end Britain's first and largest industrial estate at Trafford Park contained a great range of manufacturing industries. Nearby the CWS built a large soap factory served by the CLC and

## Accessibility

The colours used in this document are accessible for some people with colour blindness.



## Weblinks

A number of guidance documents referred to in the text can be clicked on for further detail. Anything underlined in black will take you to an external website.

## Contents

The contents page allows users to navigate directly to the required section by clicking on the section heading.

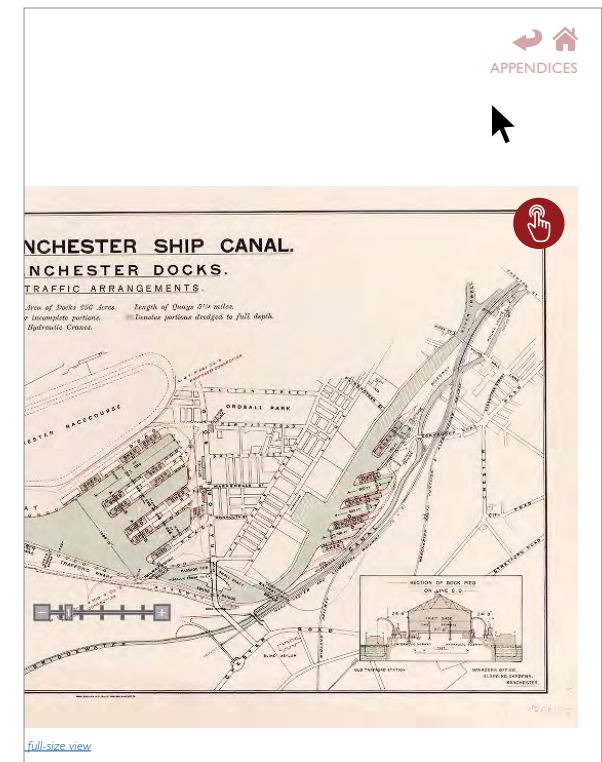
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## Plans



When you see this icon, the plan is interactive and components are hyperlinked.

You can return to the page you were previously on by clicking the back button in the top right hand corner of the page.



# SECTION 1.0

## INTRODUCTION

### 1.1 AUTHORSHIP

This document has been prepared by Purcell, a firm of conservation architects and heritage consultants, specialising in the conservation of the historic environment. Specifically, it has been prepared by Mark Clifford (Bsc. (Hons), MA, IHBC), Senior Heritage Consultant, Purcell and Rebecca Burrows (BA. (Hons), MSc, IHBC, AssocRTPI) Associate, Purcell on behalf of the National Trust. An archaeological gazetteer was produced by Chris Wilde of the University of Salford and technical notes on the structure's construction have been provided by Greg Hardie of Arup.

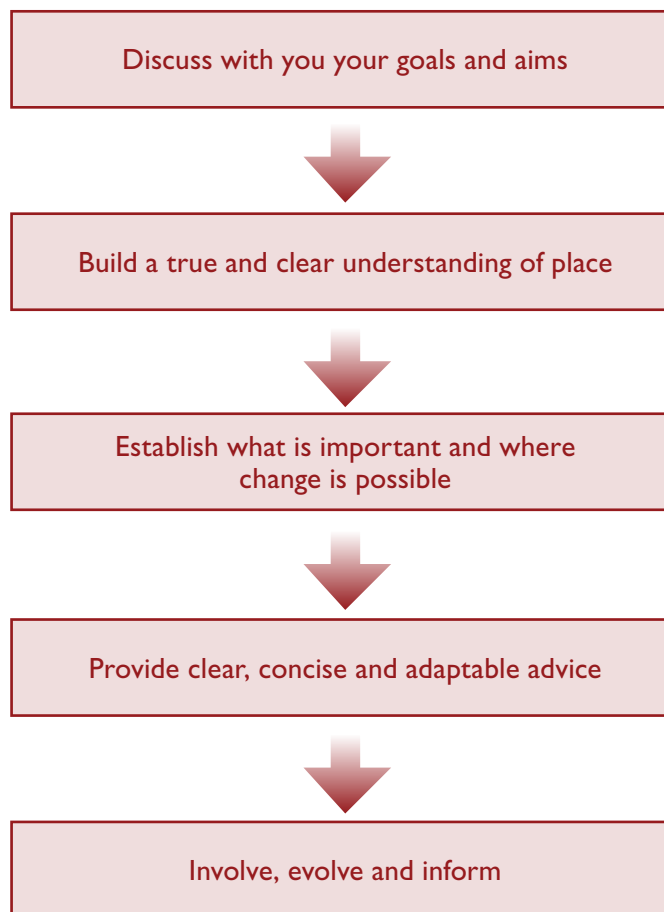
### 1.2 AIM OF THIS REPORT

This document is a strategic document, intended to guide the future development and conservation of a heritage asset by setting out a framework for its management, maintenance and safeguarding, based on a foundation understanding of its history, significance and the issues it faces.

This document has been commissioned by the National Trust for the 1892 Castlefield Viaduct to inform potential future uses for the site. It highlights those areas requiring attention and is completed by a conservation framework of policies, to inform the future management of change.

The report draws on other best practice guidance documents from Historic England such as Conservation Principles (2008) and Historic Environment Good Practice Advice in Planning Note 3 - The Setting of Heritage Assets (2017) whilst complying with the tests and requirements of the National Planning Policy Framework (NPPF), specifically paragraphs 189 and 190, under which a description of the significance of a site, including any contribution made by their setting, must be provided to support any planning applications.

### THE PROCESS



The assessment follows the staged approach to decision-making set out within *Historic England Advice Note 12 - Statements of Heritage Significance: Analysing Significance in Heritage Assets* (2019):

- 01 Understand the form, materials and history of the affected heritage asset(s), and/or the nature and extent of archaeological deposits
- 02 Understand the significance of the asset(s)
- 03 Understand the impact of the proposal on that significance
- 04 Avoid, minimise and mitigate negative impact, in a way that meets the objectives of the NPPF
- 05 Look for opportunities to better reveal or enhance significance

### 1.3 VISION OF THE NATIONAL TRUST

The National Trust was born of a desire to protect the elements of environment that people value. Since its foundation in 1895 they have been caring for places of historic interest or natural beauty. The fundamental purpose – to promote the long-term care of places of historic interest and natural beauty for the benefit of the nation – is set out in the National Trust Act of 1907.

The project vision is to reimagine the viaduct as an iconic urban park destination providing nature and greenspace amenity for the local community and attracting visitors from further afield, all whilst respecting the heritage fabric of the listed structure, complementing existing plans and initiatives in the city and supporting active travel across a wider network.

The National Trust are currently undertaking feasibility work in order to plan for the reimagining of the viaduct as an elevated urban park and linked active travel hub. Development and delivery of the park will follow two stages - the first a 'micro' park on a small section of the viaduct to test and pilot ideas followed by full design of the main scheme drawing on lessons learned.

### 1.4 METHODOLOGY

*The National Trust shall be established for the purpose of promoting the permanent preservation for the benefit of the nation of lands and tenements (including buildings) of beauty or historic interest and as regards lands for the preservation (so far as is practicable) of their natural aspect, features and animal and plant life.*

- Section 4.1 National Trust Act, 1907

This report will contribute to the successful future management and use of the viaduct. It can be used to provide baseline information that contributes to an overall understanding of the place, as well as highlighting areas that could be improved; not only as part of the forthcoming works but as part of longer term future management. It can be converted into a conservation plan for the site and is intended to be updatable and will be used to inform a heritage impact assessment as proposals are developed.

The report analyses the historic development of the site, its setting, context, management, use and what makes it important: its heritage value or significance. This overall understanding of the site provides evidence and helps set precedents for the future management, maintenance and development of the viaduct, helping to ensure that the overall vision for the site is fully understood, appreciated and maintained by all stakeholders.

The National Trust's conservation principles are the following –

- **Principle 1: Significance**  
We will ensure that all decisions are informed by an appropriate level of understanding of the significance and 'spirit of place' of each of our properties, and why we and others value them.
- **Principle 2: Integration**  
We will take an integrated approach to the conservation of natural and cultural heritage, reconciling the full spectrum of interests involved.
- **Principle 3: Change**  
We will anticipate and work with change that affects our conservation interests, embracing, accommodating or adapting where appropriate, and mitigating, preventing or opposing where there is a potential adverse impact.
- **Principle 4: Access and engagement**  
We will conserve natural and cultural heritage to enable sustainable access and engagement for the benefit of society, gaining the support of the widest range of people by promoting understanding, enjoyment and participation in our work.
- **Principle 5: Skills and partnership**  
We will develop our skills and experience in partnership with others to promote and improve the conservation of natural and cultural heritage now and for the future.
- **Principle 6: Accountability**  
We will be transparent and accountable by recording our decisions and sharing knowledge to enable the best conservation decisions to be taken both today and by future generations.<sup>01</sup>

<sup>01</sup> <https://www.nationaltrust.org.uk/features/our-conservation-principles>

|                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EXECUTIVE SUMMARY</b>                                          | This provides an overview of the document; including overarching aims and conclusions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>01<br/>INTRODUCTION</b>                                        | This section sets out the basic information regarding the background to the report, such as the scope of the study, existing information and methodology.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>02<br/>UNDERSTANDING THE SITE,<br/>ITS SETTING AND CONTEXT</b> | This section provides an understanding of the viaduct by setting out the known information about the site. This includes a summary of the statutory designations and legislative frameworks that relate to the site and a description of the site.                                                                                                                                                                                                                                                                                                                                                      |
| <b>03<br/>HISTORICAL DEVELOPMENT</b>                              | This section provides a more detailed understanding of the building through the chronology and interpretation of the history of the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>04<br/>SIGNIFICANCE</b>                                        | This section sets out why and to what extent the site is important and valued, both culturally and with regards to its heritage. The National Planning Policy Framework (NPPF) defines significance as 'the value of a heritage asset to this and future generations because of its heritage interest'. Such interest may be archaeological, architectural, artistic or historic' and it may derive 'not only from a heritage asset's physical presence, but also from its setting'. Significance is what conservation sustains, and where appropriate enhances, in managing change to heritage assets. |
| <b>05<br/>CAPACITY FOR CHANGE</b>                                 | This section will identify the high-level conservation and design parameters for the viaduct to inform future develop, based on an understanding of the site, its history and significance.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>APPENDICES</b>                                                 | The Appendices comprise further information which is relevant to the report but not necessary for inclusion in the main text. This includes a bibliography of published and unpublished sources which have been consulted in the preparation of this document.                                                                                                                                                                                                                                                                                                                                          |

## 1.5 EXISTING INFORMATION AND SOURCES

A literature review has been undertaken researching relative material relating to the Cheshire Lines Committee (CLC) principally 'The Cheshire Lines Railway' by R.P. Griffiths (1978), 'The Cheshire Lines Committee: Then and Now' by Nigel Dyckhott (1984) and 'Portrait of the Cheshire Lines Committee' by Nigel Dyckhott (1999).

The [Science and Industry Museum](#) (SIM) and the [National Railway Museum](#) (NRM) were both approached for archive information, but both held no records relating to this structure. Archive documents were viewed at the Manchester Central Library and drawings have been provided by the Network Rail archive. The historic newspaper catalogue, aerial photography and historic cartographic sources were also consulted.

## POTENTIAL FURTHER RESEARCH

The [Cheshire Record Office](#) holds a series of records and plans relating to the CLC (Reference - D 4883) which were not accessed as they were not deemed immediately relevant to the viaduct. The records and minutes of the CLC and their constituent companies may also hold further information on the viaduct, these will be held across various archives with some at the National Archives.

Records relating to the manufacturer Heenan and Froude are held at Worcester archives (reference: 705:411). They were not accessed due to the time constraints and scope of this report but may warrant further research in the future. It is also highlighted later in this report that relatively little information is known about the workers who built and used the structure and further volunteer led research in this area is recommended for when the viaduct is interpreted.

## 1.6 MANAGEMENT AND USE

The viaduct is currently not in use. There are some signs of woody vegetation growth on the track bed but it appears it is being managed and maintained to some extent. The viaduct is owned by the Department for Transport and managed by Highways England.

## SECTION 2.0

### UNDERSTANDING THE SITE, ITS SETTING AND CONTEXT

#### 2.1 LOCATION

The 1892 Castlefield Viaduct<sup>01</sup> sits across Castlefield Basin which is just to the south of Manchester City Centre. The structure meets the carpark of Deansgate Metrolink station to the east and runs linear to the Metrolink line running towards Cornbrook, it crosses over the canal and various other rail viaducts below. At lower level the viaduct is supported on a series of columns that both sit within the canal and around it. The extent of the listing (as defined by an email from John Whyard, Manchester City Council, Urban Design & Conservation Team see appendix A) extends past Deansgate car park to the convention centre, however, this is outside the scope of this report.



The location of the viaduct (© GoogleEarth 2021) [Click on the viaduct to find it on Google Maps.](#)



<sup>01</sup> A date stone on the bridge over Egerton Street dates the line to 1892 and the viaduct is therefore referred to by this date, however, it was load tested and opened in 1893.

## 2.2 DESIGNATIONS

The structure itself is grade II listed and sits within the Castlefield Conservation Area with the conservation area boundaries extending a further 200m south of the viaduct towards the ring road and a further 600m north past the Science and Industry Museum, the western boundary is defined by the River Irwell and to east the boundary runs along Deansgate. The viaduct is listed as CASTLEFIELD RAILWAY VIADUCT FROM G-MEX TO DAWSON STREET (see appendix B). There are several other designations in the immediate vicinity listed below and shown on the plan opposite with their list descriptions included as appendix C.

The listing description provides a basic description of key features:

*"Railway viaduct. c.1880. Cast iron and wrought iron (?); redbrick to east of Duke Street. Runs south-west from former Central Station, then westwards, dividing into two over Castlefield and re-joining west of River Medlock. Cast iron drum piers rising to square castellated towers supporting metal lattice parapet. Castellated brick piers with stone dressings to Gothic style skew bridges over River Medlock and roadways. To east of Duke Street viaduct is of brick with segmental arches and castellated brick piers. At western end a blue brick bridge over Dowson Street."*<sup>02</sup>

The 1892 viaduct is within the Castlefield Conservation Area, designated on 13 October 1979. The Conservation Area Appraisal notes that there is great opportunity for improvement and enhancement, "as Castlefield has always been a centre of innovation, imaginative new proposals for development [and] are likely to receive a warm welcome."<sup>03</sup>

<sup>02</sup> <https://historicengland.org.uk/listing/the-list/list-entry/11292315>

<sup>03</sup> [https://secure.manchester.gov.uk/info/5111/conservation\\_areas/972/castlefield\\_conservation\\_area/7](https://secure.manchester.gov.uk/info/5111/conservation_areas/972/castlefield_conservation_area/7)



The location of nearby designated assets © GoogleEarth 2021

- |                                                                                                |                                                                               |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 01 <u>Castlefield Railway Viaduct from G-Mex to Dawson Street: Grade: II</u>                   | 05 <u>Merchants Warehouse: Grade II</u>                                       |
| 02 <u>The Giants Basin: Grade: II</u>                                                          | 06 <u>Bridgewater Canal Basin At Potato Wharf: Grade: II</u>                  |
| 03 <u>Pair Of Culvert Arches Over River Medlock And Associated Overflow Channel: Grade: II</u> | 07 <u>Remains Of Eastern Wall Of The Roman Fort: Scheduled</u>                |
| 04 <u>Rochdale Canal Lock Number 92 And Castle Street Bridge: Grade: II</u>                    | 08 <u>Manchester South Junction and Altrincham Railway Viaduct: Grade: II</u> |

This plan is not to scale



## 2.3 SETTING AND VIEWS

### 2.3.1 CRITERIA FOR ASSESSMENT

The NPPF details the requirement to describe the significance of any heritage assets including any contribution made by their setting.

*'Elements of a setting may make a positive or negative contribution to the significance of an asset and may affect the ability to appreciate that significance or may be neutral.'*<sup>04</sup>

Originally produced in 2011 by Historic England, *Historic Environment Good Practice Advice In Planning, Note 3: The Setting Of Heritage Assets (Second Edition) (2017)*, has been revised to reflect changes resulting from the NPPF and now takes the form of a *Good Practice Advice note (GPA 3)*. The document sets out how the significance of a heritage asset derives not only from its physical presence and historic fabric but also from its setting – the surroundings in which it is experienced. The careful management of change within the surroundings of heritage assets therefore makes an important contribution to the quality of the places in which we live.

### 2.3.2 SETTING

The viaduct sits on the outskirts of Manchester City Centre and central to the Castlefield Conservation Area. Deansgate, one of the main routes through Manchester, lies approximately 100m from the eastern edge of the viaduct with the secondary road Liverpool Road approximately 100m to the north.

#### LOWER LEVEL

Adjacent to the viaduct to the north is a small urban park, formed around the remains of the Roman Fort which was reconstructed in several areas in 1982. Within the park, next to the blue brick arch of the viaduct, is a late 20th century stair and lift tower allowing access to the upper level. Along Duke Street the cobbled road passes under an earlier brick-built rail viaduct (1843) and the road follows the line of the 1892 viaduct directly beneath it. Off Duke Street and north of the viaduct is an open area of land bordered by the canal, known as the Castlefield Bowl which is a popular events and music venue. At Castlefield Bowl, the viaduct passes over the canal basin with several of its columns sitting directly in the canal. At the junction between Castle Street and Duke Street, a second

viaduct (1873) runs within meters of the 1892 viaduct, this viaduct of a similar design is of red brick with lattice metalwork at track level. Continuing along Castle Street the road crosses a stone bridge and lock over the Rochdale Canal leading to a series of former canal warehouses now converted to bars and restaurants. Views of the viaduct are limited from this location due to the other viaducts blocking the view.

At ground level the setting retains much of its historic industrial character with traditional stone, brick and iron structures criss-crossing the area at ground and high level. The density of structures gives a sense of industry and busyness, although today's leisure uses of the bars and canals make it difficult to imagine the noise and grime that would have characterised the area in the 19th century. The immediate setting remains relatively quiet with little pedestrian or vehicle movement and due to the abundance of viaducts overhead it becomes almost an enclosed space. There is a regular rumble of trains overhead on adjacent viaducts creating a regular rhythm that can almost be felt as vibrations.

<sup>04</sup> Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework. London: Ministry of Housing, Communities and Local Government, p. 71.



*The viaduct at lower level from near Duke Street*



*The viaduct from the Roman fort*



*Beneath the viaduct on Duke Street*

# UNDERSTANDING THE SITE, ITS SETTING AND CONTEXT

## HIGH LEVEL

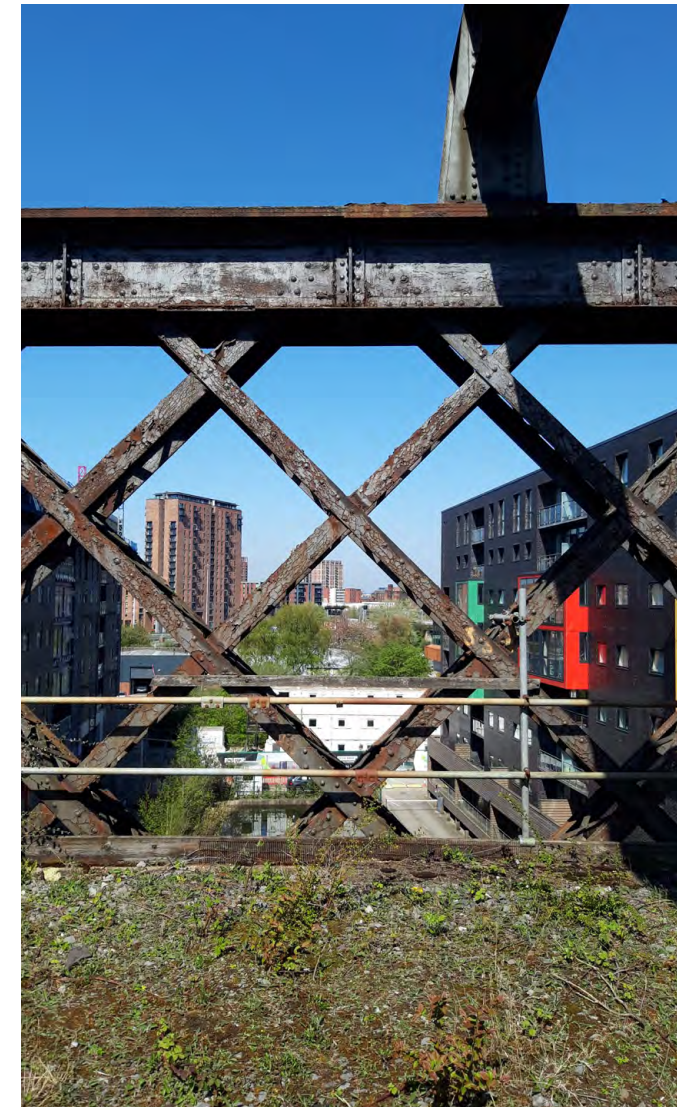
The viaduct is accessed from a car park built on what would have been part of the route leading to Central Station (now the convention centre). This car park has staircase and lift access and continuing c.100m east leads to the Deansgate Metrolink stop. At the car park entrance to the viaduct (east end) the height of the viaduct affords views across much of Castlefield and Manchester with views as far as Manchester Town Hall and Cathedral. Continuing along the viaduct westwards views north become more limited as a series of late 20<sup>th</sup> / early 21<sup>st</sup> century apartment blocks are built close to the viaduct, most with their rear elevations

facing the structure. When looking south the view is again partially blocked by the Metrolink line viaduct, although there are partial views towards the canal warehouses to the south.

The experience when on the viaduct is primarily industrial due to trains running past on adjacent lines which rumble past at frequent intervals. Views from the viaduct extend for several miles across the city with modern tall buildings dominating much of the skyline in contrast with the former industrial nature of the site when glimpsed through the latticework sides.



The view looking south from the viaduct across the canal basin



The view looking north from the viaduct

### 2.3.3 THE EXTENT OF SETTING

Setting is defined as the surroundings within which the viaduct is experienced and need not be a visual connection. There are currently three main components to the setting of the 1892 viaduct, although this may change as the built environment evolves and our understanding of it changes:

Firstly, there is the setting of the viaduct within its historic industrial surroundings, which includes Central Station, Liverpool Road Station, the other viaducts, canals and warehouses. This group is immediately adjacent to the viaduct but also extends beyond what is visible towards important structures that add to our understanding of the viaduct. This industrial character and setting is of the highest importance.

Secondly, the immediate setting of the viaduct is important, as this allows the visitor to appreciate the sheer scale and proximity of the viaduct from below. This also includes the dynamic experience people have of traveling towards and past the viaduct on national rail or the Metrolink, appreciating the site as originally intended.

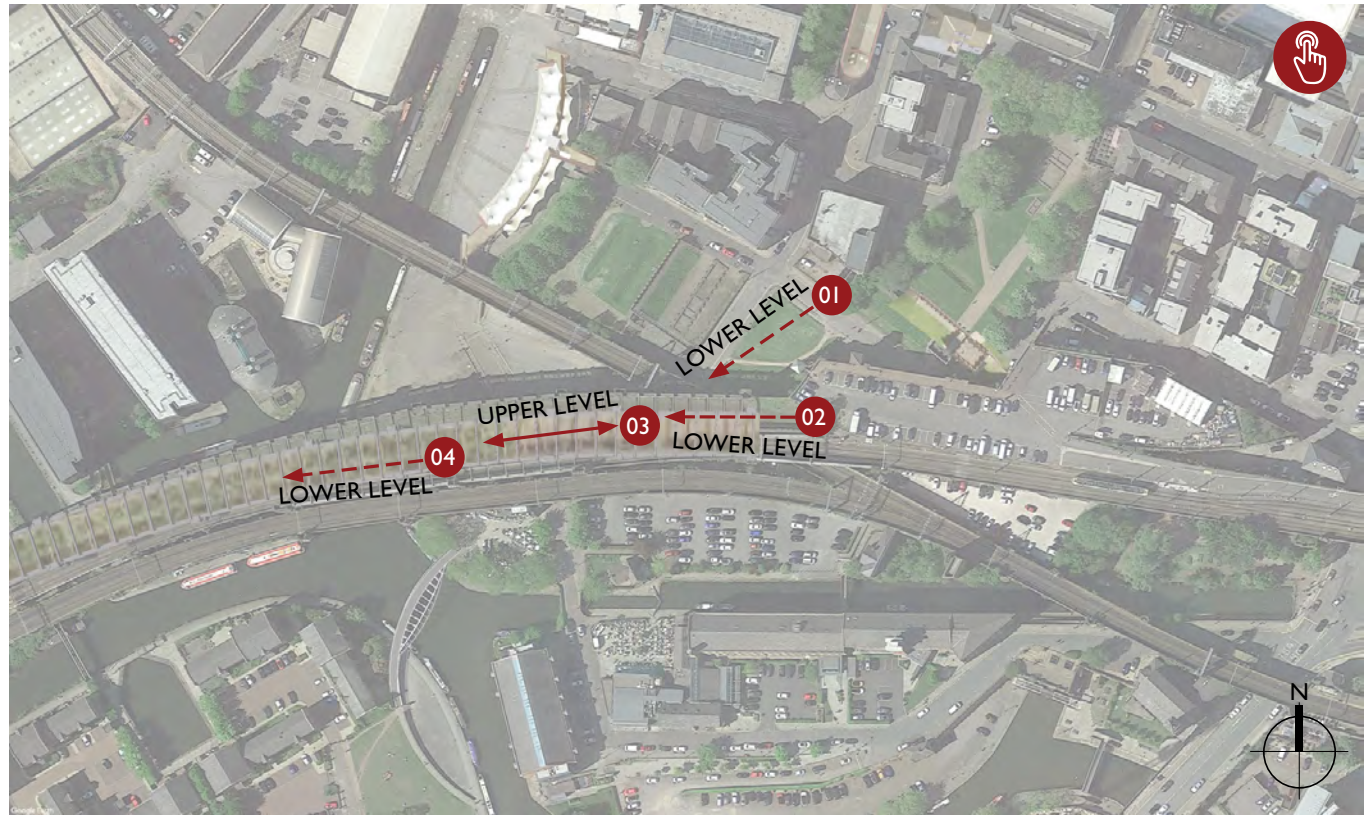
Thirdly, and to a lesser extent, are longer distance views towards the viaduct from elsewhere in the city. The visibility of the viaduct is restricted due to other high-level structures but can be seen from the ring road (Egerton Street) and glimpsed from other areas such as the Deansgate metrolink station. Conversely, views from the viaduct across the city are arguably also part of its setting.



*The view looking south as a train passes below*

## 2.3.4 KEY VIEWS

Views of the viaduct from south to north are limited due to earlier railway structures almost completely obscuring the 1892 viaduct. Where access is available, views on the viaduct itself are impressive due to its scale in both length and width. However, the viaduct is also viewed from the lower level with the key views those from the urban park towards the structure, on Duke Street passing beneath and near Bar Ca looking along the structure crossing the canal. Each of these views gives a scene of the scale of the structure. Other views not shown include the dynamic moving views of the structure when approaching the city by train or Metrolink and views outwards from the structure over the canal and along the evolving city skyline.



The key views of the structure © Google Earth 2021



**VIEW 01**  
From the Roman fort across the urban park



**VIEW 02**  
From Duke Street looking along the length of the viaduct



**VIEW 03**  
From on the viaduct looking along its length



**VIEW 04**  
From beneath the viaduct near Bar Ca looking along the structure and across the canal

## 2.4 SITE DESCRIPTION

A full gazetteer of features can be seen in [Appendix D](#).

### SUMMARY DESCRIPTION

The Castlefield Viaduct was constructed from 1890, opening in 1893. This 370yard (330m) long viaduct has eight steel lattice girder spans and masonry arches at the approaches. The steel elements were constructed by Heenan and Froude and the masonry by M W Wormsley to the designs of W G Scott, chief engineer for the Cheshire Lines Committee.

The main structural elements of which are:

- Longitudinal girders supporting the rails typically spanning 13ft. 4in. (4m) between transverse 'fish belly' girders,
- Fish belly beams span transversely 38ft. (11.5m) to the inside face of the lattice trusses, across the full width of the viaduct on to lattice girders,
- The lattice girders are 20ft (approx. 6m) deep and span up to 175ft. (53m) onto cast iron cylinders, some 60ft. high,
- The cast iron cylinders are 10ft. 6in. (2.7m) diameter in the shaft and 13ft. 6in. (4.1m) at the base and are filled with masonry,
- Overhead, bracing links to the tops of the lattice girders together,
- Steel deck plates with waterproofing complete the structure.

### LOWER LEVEL

The western extent of the designated viaduct reaches the Deansgate Metrolink car park, from which it continues approximately 500m as it curves to the south. At Egerton Street the metalwork structure finishes and a series of blue engineering brick arches carry the line over the road where it continues following the active line between Deansgate and Cornbrook Metrolink stops. The structure stands approximately 20m high (from lower ground to the top of the overhead bracing) and below deck it is supported on a series of cast iron columns that rise to a castellated top. The crenelations are of two tiers with a pair of blind arrow slits as decoration. Beneath the structure the deck is fish-bellied and consists of a series of plates with riveted supports. At the head of each column, but below the track bed, is a riveted and latticed cross support running across the structure between each column. The structure continues with a regular pattern with the only exception where it meets the Deansgate Metrolink car park. Here the structure changes to blue engineering brick with a gabled pier with stone dressings marking the end of the structure. Beyond this, the structure has three concentric arches (all filled with blue brick) before disappearing behind a retaining wall also of blue brick.

### TRACK LEVEL

At track level the site is accessed through modern palisade fencing, upon entering on the blue brick structure a railing of uprights with three horizontals forms a historic (although possibly not original) edge protection. Continuing onto the viaduct, the first few bays have a modern solid screen across the latticework as a form of edge protection whereas the remainder of the structure has a series of clamped scaffold bars forming a crude protection from the edge. The rail track has been removed with the surface consisting of ballast and other rubble. Regularly spaced across the structure are a series of cast iron drainage covers. Across the structure are various self-seeded vegetation growth including some woody shrubs and trees. Also of note are various pieces of scrap iron latticework visible from the ground that appears to be from the original overhead supports.



Beneath the viaduct showing the fish bellied deck

The sides form a regular metal latticework all riveted together, across eight bays. Some sections show spliced repairs also undertaken with rivets, however, there are few examples of this, and the regular pattern is repeated throughout with little or no variation. The steelwork lattices become slightly thinner towards the middle of each bay to reduce the weight of the structure.

A series of metalwork plates rivetted together run horizontally across the viaduct approximately every 5m. One cross beam has a small gantry with ladder access. The eastern end of the structure terminates in a modern palisade fencing beyond which the active rail line merges with the viaduct. The metalwork is painted in a thick grey paint and views outwards from the structure over the canal and along the evolving city skyline.



*The lattice work on each side of the viaduct*

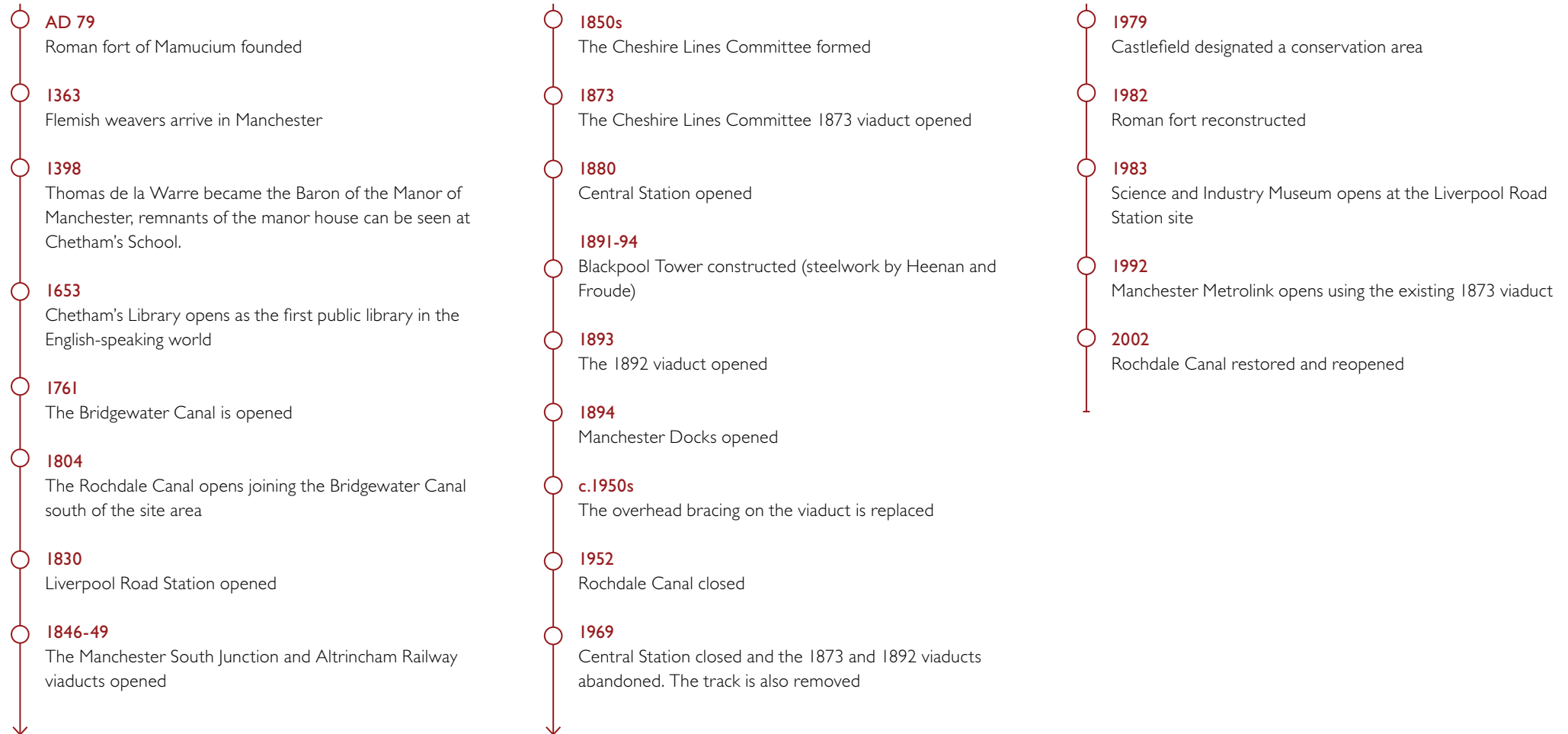


*The overhead bracing and ladder access in one location*

## SECTION 3.0

### HISTORIC BACKGROUND

#### TIMELINE SUMMARY



## 3.1 MAP PROGRESSION

Before the arrival of the Bridgewater Canal in 1761 the area was still on the outskirts of Manchester and relatively undeveloped. William Green's plan of Manchester and Salford (1787-1794) shows the Bridgewater Canal and Potato Wharf now in place with the large daisy-shaped weir by James Brindley in the centre. The surrounding field is known as 'Castle Field', clearly a reference to the Roman fort either through anecdotal history or visible physical remains.

By the 1845 survey (1848 OS map) the area has developed rapidly, with Deansgate Ward showing various canal warehouses around Potato Wharf and the Liverpool Road Station to the north opened in 1830, providing Manchester's (and the world's) first intercity rail link, connecting Manchester and Liverpool. The Rochdale Canal of 1804 is also shown joining the Bridgewater Canal just south of the viaduct site. The site of the Roman fort is identified and is still undeveloped. None of the various rail viaducts are yet constructed.

By 1883, Slater's New Plan of Manchester shows the area has continued to develop with the Roman fort now occupied by terraced housing. Potato Wharf is now crossed by three railway lines all entering the city from the west. Central Station has been constructed to the east of the site with one of the lines shown approaching the city along the River Irwell to the south. The site of the 1892 viaduct is now partially occupied by buildings that would be cleared for the line's construction. The 1891 OS Town Plan shows a similar situation to 1883.

The 1894 survey (1896 OS Map) shows the 1892 viaduct for the first time with its line running north along the River Irwell following the existing route before terminating into Central Station. The 1908 OS County Series shows a further development of the railway infrastructure around the site as additional lines now run to the goods station next to Central Station. The situation remains largely unchanged into the 20<sup>th</sup> century.

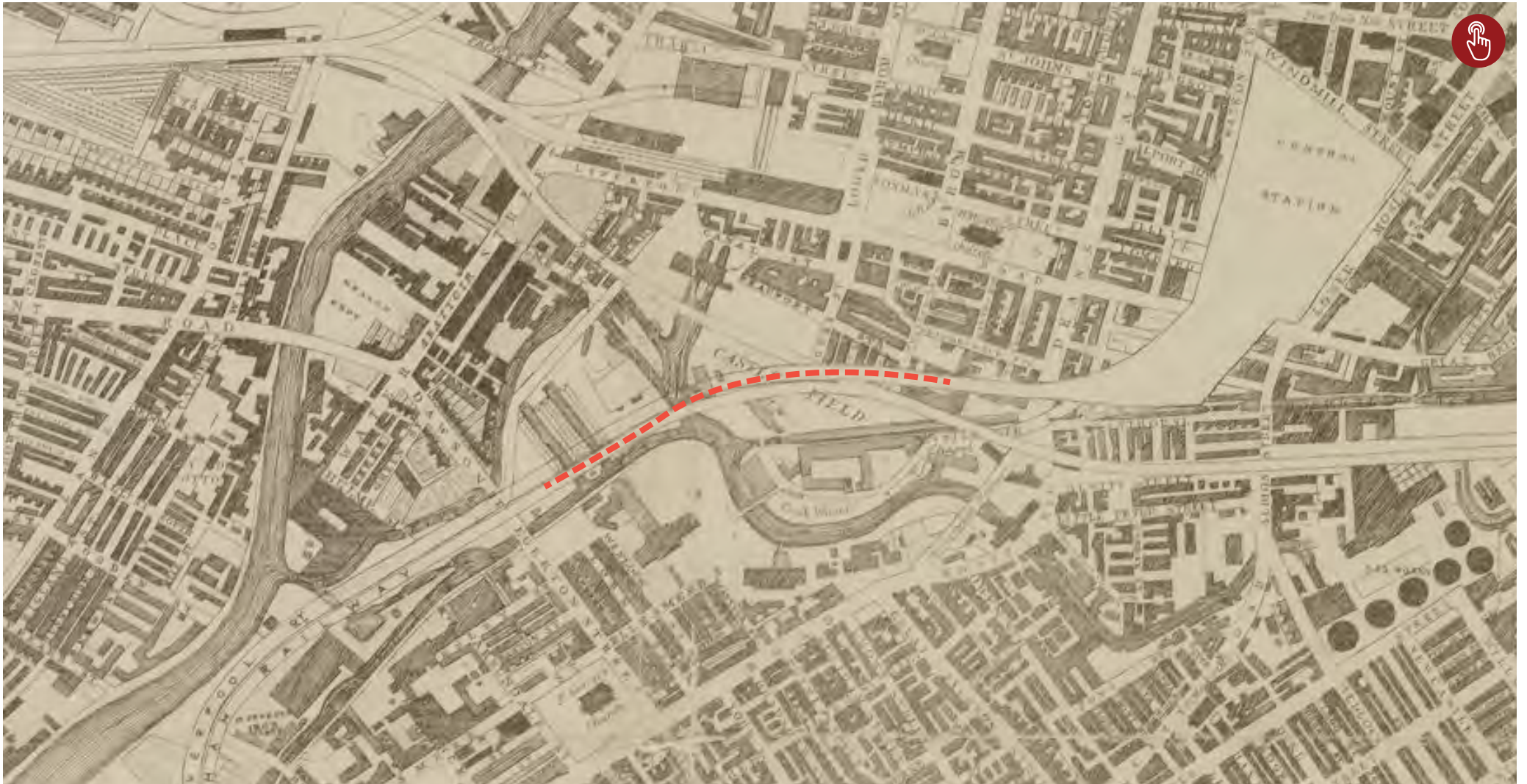
Each of the following maps show an approximate location of the viaduct site in red



William Green's plan of Manchester and Salford (1787-1794) [Click on the viaduct for a detailed view](#)



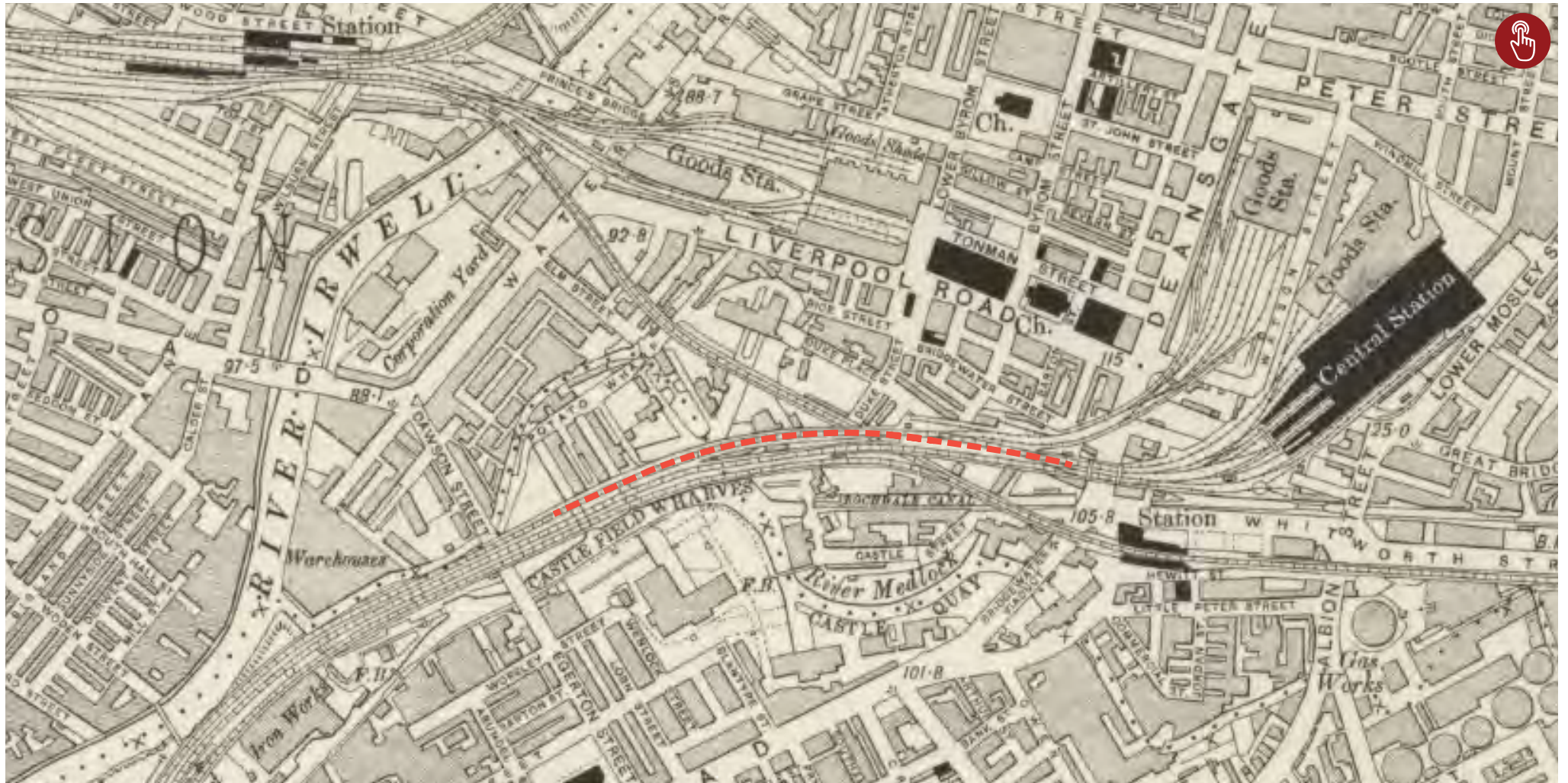
1848 OS plan of Manchester (surveyed in 1845) [Click on the viaduct for a detailed view](#)



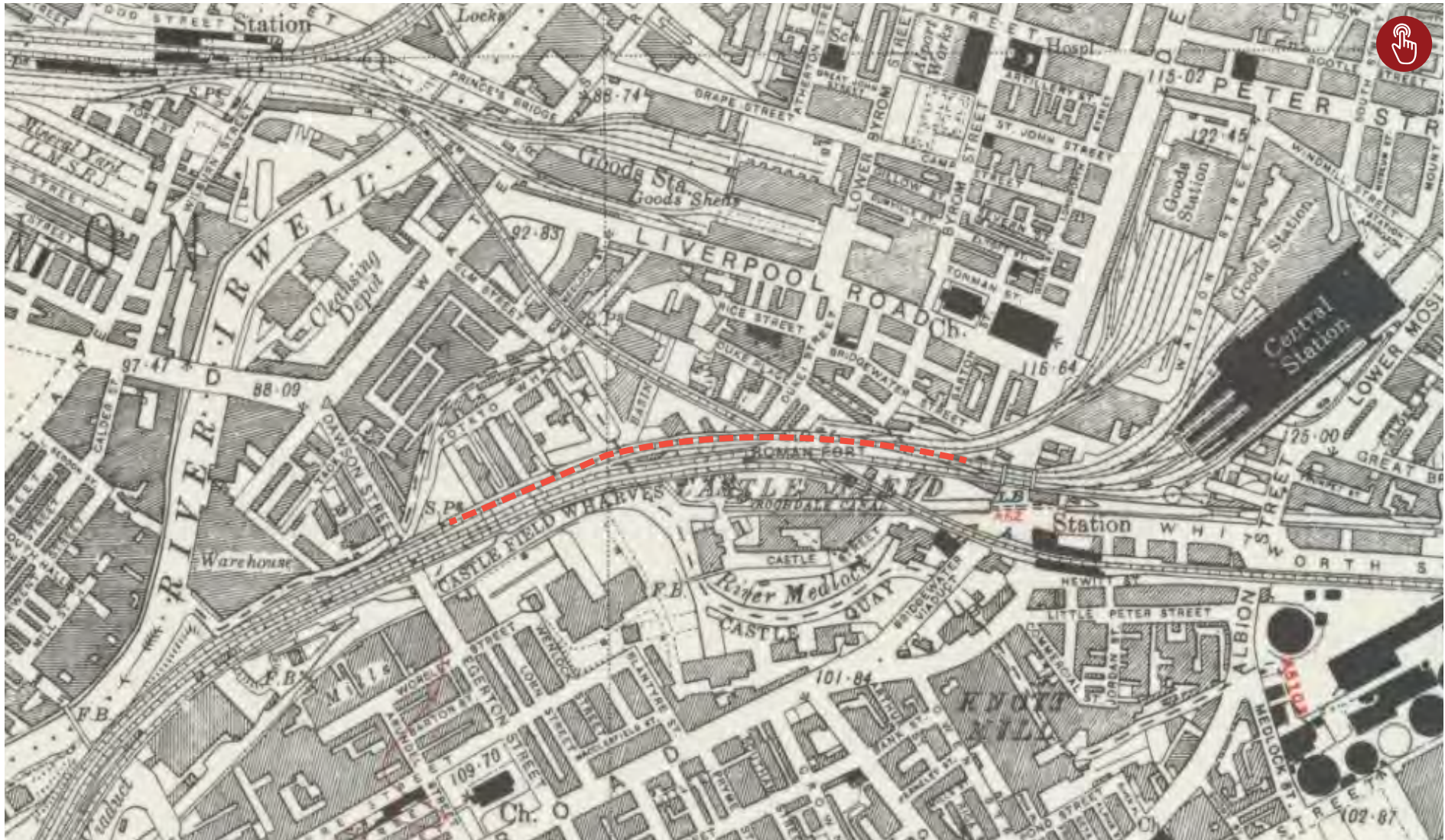
Slater's New Plan of Manchester from 1883 [Click on the viaduct for a detailed view](#)



1896 OS plan of Manchester (surveyed in 1894) [Click on the viaduct for a detailed view](#)



1908 OS County Series of Manchester [Click on the viaduct for a detailed view](#)

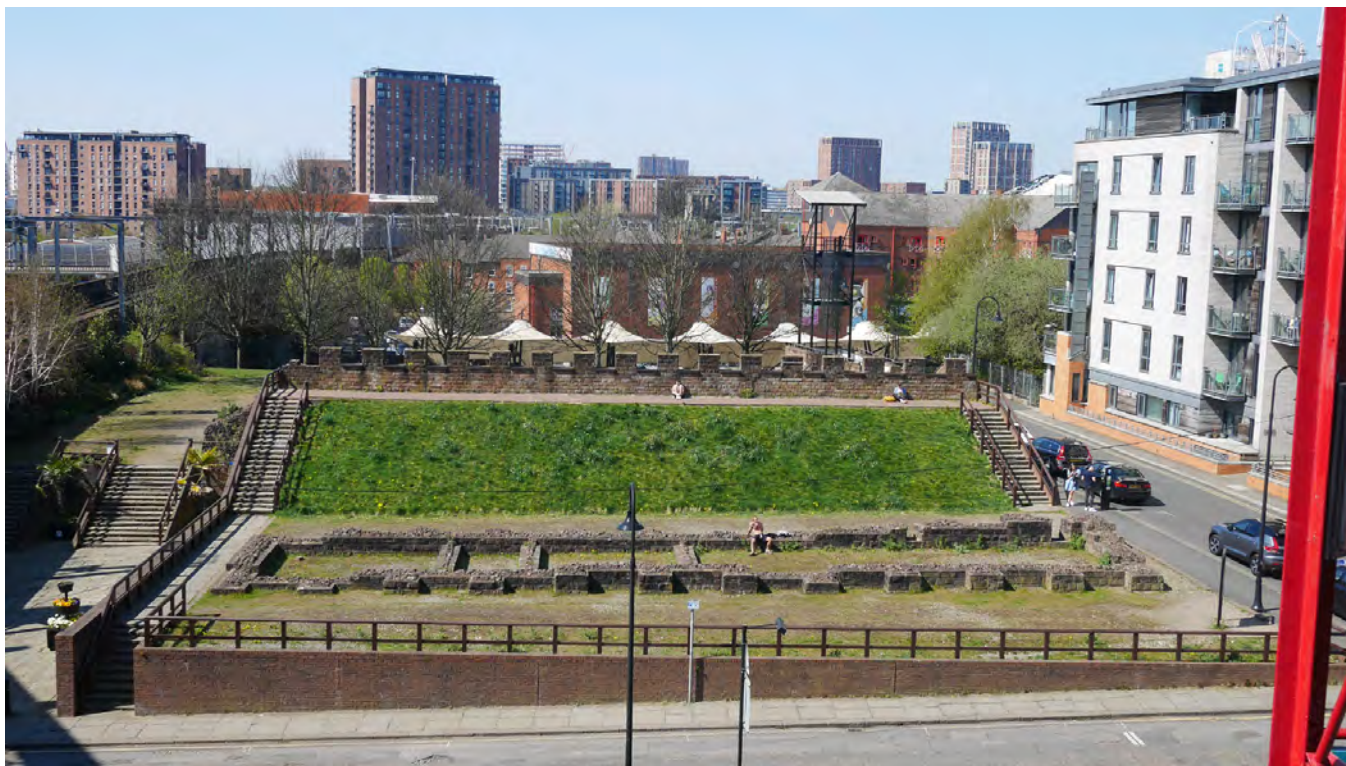


1946 OS plan of Manchester (surveyed in 1938) [Click on the viaduct for a detailed view](#)

## 3.2 CASTLEFIELD

### 3.2.1 EARLY HISTORY (AD 43 TO AD 410)

The name Castlefield refers to the settlement's position below the former Roman fort. It is a contracted version of the earlier name Castle-in-the-field. A Roman fort (castra), Mamucium, was established in what is now Castlefield around AD 79 near a crossing place on the River Medlock<sup>01</sup>. The fort was sited on a sandstone bluff near the confluence of the River Medlock and Irwell in a naturally defensible position. It was erected as a series of fortifications established by Gnaeus Julius Agricola during his campaign against the Brigantes, who were the Celtic tribe in control of most of northern England<sup>02</sup>. It guarded a central stage of the Roman road, between Deva Victrix (Chester) and Eboracum (York). Built first from turf and timber, the fort was demolished around 140AD. When it was rebuilt around 160AD, it was again of turf and timber construction. Around the year 200AD, the fort underwent another rebuild enhancing its defences by replacing the gatehouse and facing the walls with stone. Mamucium is generally considered to be the origins of the current city of Manchester including its name.



*The reconstructed remains of the Roman fort*

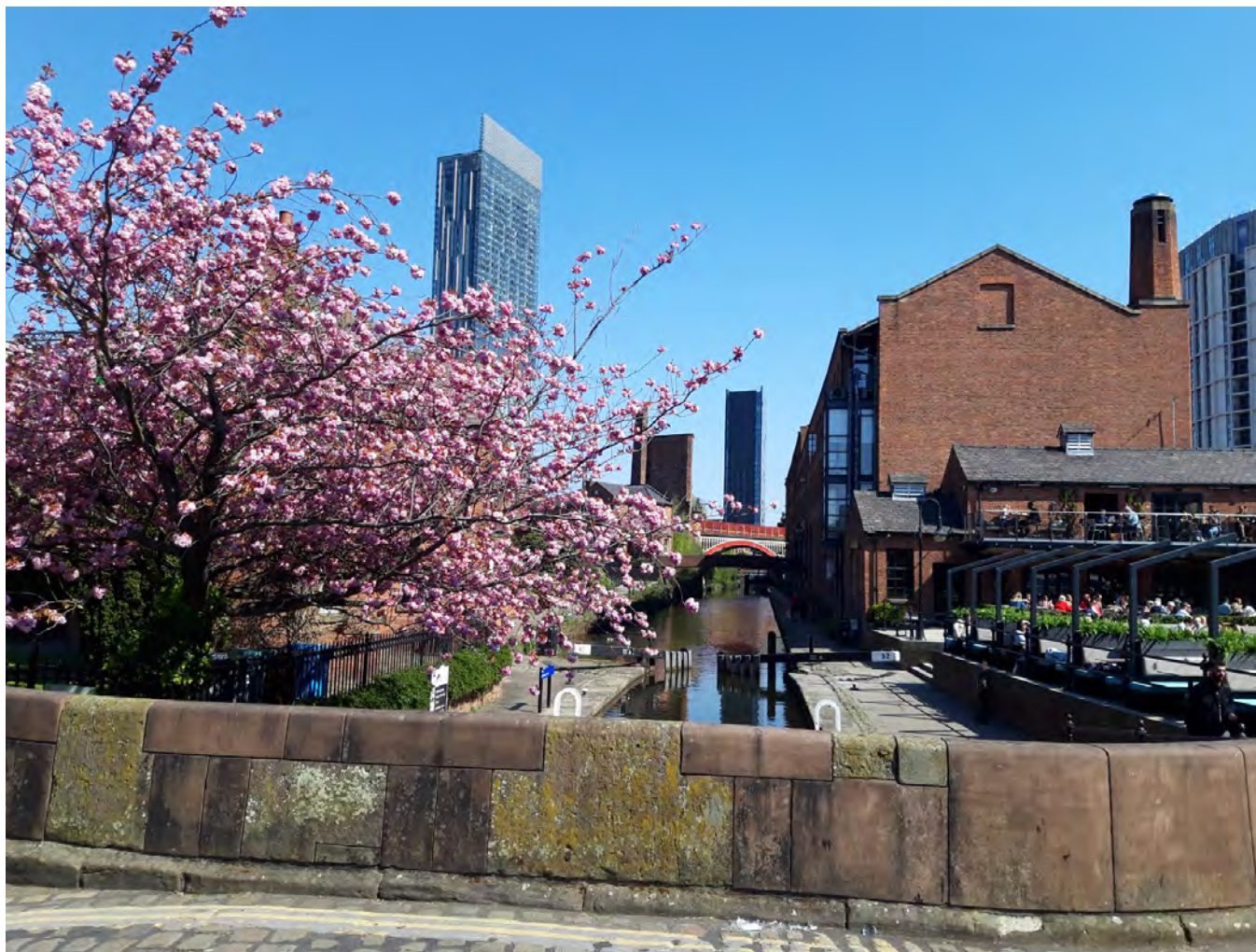
<sup>01</sup> Gregory, Richard A. (2007). Roman Manchester: the University of Manchester's excavations within the Vicus 2001–5. Oxbow Books.

<sup>02</sup> Ibid

## 3.2.2 THE CANAL AGE (1700s-1830)

The River Irwell was made navigable in the 1720s, leading to the construction of a quay in the area for loading and unloading of goods (vessels of up to 50 tons could dock here and ply between Manchester and Liverpool).<sup>03</sup>

The Bridgewater Canal was opened in Castlefield in July 1761. It terminated at the canal basin known as Potato Wharf in a giant 'cloverleaf' weir at a junction with the river Medlock (the Giant's Basin, grade II listed). The weir took the overflow from the canal into the river and is of 'national historical importance as the first such canal weir'.<sup>04</sup> Although not technically the first canal (the Sankey Canal opened earlier in 1757) the Bridgewater Canal is considered the first great achievement of the canal age. It captured the public imagination because of its engineering feats and led to a boom in canal building in the following decades. The first canal warehouse, Duke's Warehouse (1769-1771), was also built in Castlefield, it has since been demolished but has been partially reconstructed. The Rochdale Canal (1804), joined the Bridgewater at Lock 92 in Castlefield connecting Manchester with Yorkshire and the Pennines.



Lock 92 of the Rochdale Canal at Castlefield

<sup>03</sup> Frangopulo, N. J., ed. (1962) Rich Inheritance. Manchester: Education Committee; p. 33

<sup>04</sup> <https://historicengland.org.uk/services-skills/education/educational-images/the-giants-basin-potato-wharf-manchester-8422>

## 3.2.3 THE RAILWAY AGE (1830-1900)

Goods traffic was at an all-time high between Liverpool and Manchester in the 1820s. Liverpool was the country's main port for raw cotton which was sent to Manchester, then known informally as 'Cottonopolis' due to the large number of cotton mills.<sup>05</sup> Manchester would send finished textiles back to Liverpool and out across the world but journeys between these two hubs of manufacturing and trade were expensive and slow. The canals that had revolutionised transport 50 years prior were now holding up production and roads were bumpy and equally slow.<sup>06</sup>

As a solution to this, it was in Castlefield just north of Potato Wharf where the Liverpool and Manchester Railway opened as the world's first steam powered, inter-urban railway designed to transport both passengers and goods. Its Manchester terminus was Liverpool Road Station, now home to the Science and Industry Museum which survives as a collection of grade I and II listed buildings.

Passengers and goods could now travel between Liverpool and Manchester much more quickly, boosting trade and industry and helped fuel Manchester's growth into a booming manufacturing centre. Between 1830 and 1845, over 35 lines sprung up all over Britain, in

<sup>05</sup> The cotton industry, vital to the economy of Manchester and other northern towns, had far reaching, global consequences. See: Slocombe, E. Industrialisation and the import of Cotton in: Huxtable, S et al. Eds, (2020) Interim Report on the connections between colonialism and properties now in the care of the National Trust pp 56 -58 <https://nt.global.ssl.fastly.net/documents/colonialism-and-historic-slavery-report.pdf>

<sup>06</sup> <https://www.scienceandindustrymuseum.org.uk/objects-and-stories/making-the-liverpool-and-manchester-railway>

a period known as 'Railway Mania'. The success was reported abroad, and the Liverpool and Manchester became the blueprint for hundreds of new railways around the world.<sup>07</sup>

As the 19<sup>th</sup> century progressed the canals gave way to the railways and Castlefield became dissected by a network of railway lines carried on a series of viaducts.

*"[The engine] goes upon two wheels, which are her feet, and are moved by bright steel legs called pistons... The coals, which are its oats, were under the bench, and there was a small glass tube affixed to the boiler, with water in it, which indicates by its fullness or emptiness when the creature wants water... This snorting little animal, which I felt rather inclined to pat, was then harnessed to our carriage, and, Mr. Stephenson having taken me on the bench of the engine with him, we started at about ten miles an hour... When I closed my eyes, this sensation of flying was quite delightful, and strange beyond description; yet strange as it was, I had a perfect sense of security, and not the slightest fear."*

— A letter by Fanny Kemble on riding on the Liverpool to Manchester line (1830)<sup>08</sup>

Preceding the 1892 viaduct, The Manchester South Junction and Altrincham Railway built a series of brick viaducts in Castlefield between 1846-49 and the Cheshire Lines Committee built the extant neighbouring viaduct in 1873 forming their route to Liverpool.

<sup>07</sup> ibid

<sup>08</sup> <https://blog.scienceandindustrymuseum.org.uk/fanny-kemble/>



Liverpool and Manchester Railway, titled 'Entrance into Manchester across Water Street' engraved by H. Pyall (1831)



A satirical print showing horses made redundant by the advent of the railway

## 3.2.4 20TH CENTURY (1900-PRESENT)

Gradually both the railways and canals declined during the 20th century due to a fall in passenger numbers and freight. Manchester and Castlefield also suffered due to the loss of the industrial base of the area after the 1950s. Manchester's industries were largely based on the cotton trade which plummeted after World War One as production ramped up in countries closer to where the raw material was grown.

Overall, Manchester employment declined by 22% between 1951 and 1981. Jobs in engineering and electrical goods almost halved and textile industry jobs fell by 86%. The rail network that carried these goods also declined and continued to suffer from competition from road and rail.

The Bridgewater Canal remained open to traffic although the Rochdale Canal closed in 1952 (to be reopened in 2002). Castlefield was defined by dereliction until the 1980s when the Science and Industry Museum opened on the former Liverpool Road Station site which was long abandoned.



The viaduct and canal network in 1972

Regeneration of the former station coupled with designation as a conservation area in 1979, the creation of an urban park and the recreated Roman fort in 1982 were all heritage-led catalysts for change that kick-started a revival of the area. Tourism and leisure are now growth industries which have transformed Castlefield from a neglected corner of the city to a popular area for visitors and tourists.<sup>09</sup>

*'At Castlefield, they were busy creating yesterday's city today, cleaning up the old brick viaducts and warehouses, recobbling the quaysides, putting fresh coats of glossy paint on the old arched footbridges and scattering about a generous assortment of old-fashioned benches, bollards and lampposts. By the time they have finished, you will be able to see exactly what life was like in nineteenth century Manchester - or at least what it would be like if they had wine-bars, and cast-iron litter bins and directional signs for heritage trails and the G-Mex Centre'.*

- Notes from a Small Island by Bill Bryson (1996)



The then abandoned Liverpool Road Station in 1985

<sup>09</sup> [https://secure.manchester.gov.uk/info/511/conervation\\_areas/972/castlefield\\_conservation\\_area/2](https://secure.manchester.gov.uk/info/511/conervation_areas/972/castlefield_conservation_area/2)

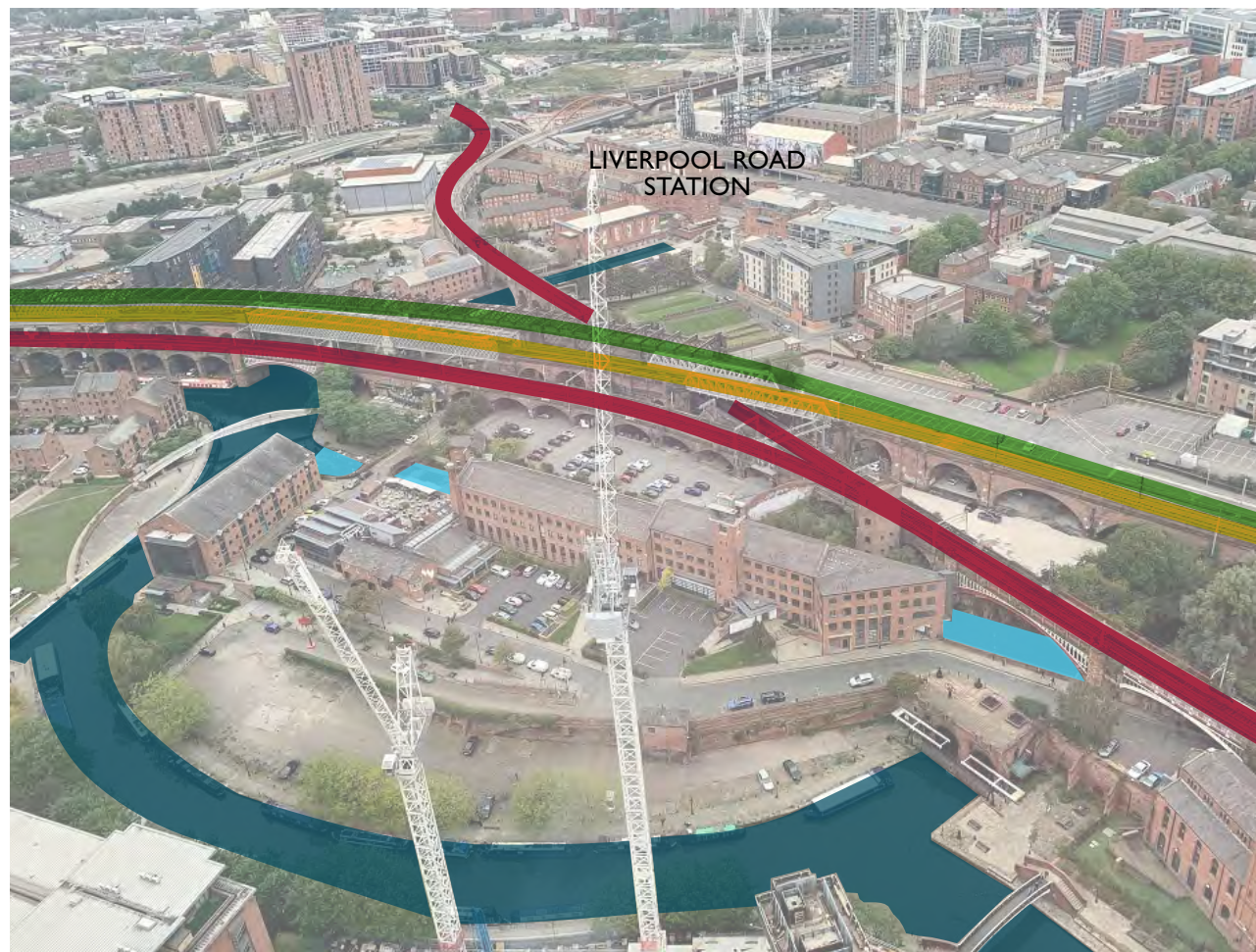
## 3.3 DEVELOPMENT OF THE 1892 VIADUCT

### 3.3.1 THE CHESHIRE LINES COMMITTEE (CLC)

The 1892 viaduct was built by the Cheshire Lines Committee (CLC) and the following gives a brief overview of the company and their involvement in Manchester.

The CLC was formed in the 1850s as a loose affiliation of the Manchester, Sheffield and Lincolnshire Railway and the Great Northern Railway (and later joined by the Midland Railway) in a common struggle against the monopoly of the London and North Western Railway around Lancashire and Cheshire. Sir Edward Watkin (1819-1901) became Director and part owner and was the driving force behind the early years of the company. Watkins, sometimes known as the 'Railway King', was chairman of nine railway companies, constructed the Metropolitan Line in London and pioneered a failed attempt to build a channel tunnel. Under Watkin's influence the CLC grew to serve Liverpool, Manchester, Stockport, Warrington, Widnes, Northwich, Winsford, Knutsford, Birkenhead, Chester and Southport. By 1939 over 11 million passengers and 8.5 million tons of goods were carried by the CLC each year<sup>10</sup>. Dyckhott (1999) described it as a railway of local and national significance due to the connections it created between the industrial towns of the north west.<sup>11</sup> It was the only railway to remain under its own ownership up to 1947 and when it was nationalised it had been in existence for 82 years, the second longest running railway company after Great Western.

- The Manchester South Junction and Altrincham Railway (1846 - 1849)
- CLC 1893 Line
- CLC Liverpool Railway (1873)
- Rochdale Canal (1804)
- Bridgewater Canal/Potato Wharf (1761)



The historic infrastructure around the site

<sup>10</sup> Dyckhott, N. (1999) Portrait of the Cheshire Lines Committee.

<sup>11</sup> Ibid

Completion of the direct Manchester to Liverpool line provided the partners with access to Liverpool without going through Manchester. The CLC Manchester to Liverpool Express took 45 minutes for the 34-mile route<sup>12</sup>, comparable to the times of between 40 minutes to over an hour by other operators. Averaging a speed of 51.5 mph, it was considerably quicker than the existing route and became a byword for speed and reliability known as 'the punctual route'.<sup>13</sup> The CLC was also the first company to introduce cheap fares between Liverpool and Manchester; in 1877 return tickets were 8s for 1<sup>st</sup> class, 6s for 2<sup>nd</sup> class, 4s 6d for 3<sup>rd</sup> class<sup>14</sup>. In 1887, the CLC average construction cost per mile of track was £88,000 and, with the exception of the London Metropolitan line, was the most expensive per mile in the country.<sup>15</sup>

Facilities at Oxford Road Station, Manchester soon proved inadequate for the growing transport requirements and a new station was built. Designed by Sir John Fowler, Central Station (now the Central Convention Centre or GMEX) was opened in 1880 by the CLC. The building has a distinctive arched roof with a 64-metre span, the second-largest railway station roof span in the United Kingdom<sup>16</sup>, and was granted grade II\* listed building status in 1963. Central Station became one of the busiest stations in the country, in 1905 it had more than double Euston and St Pancras' passenger numbers.<sup>17</sup>

The CLC had high overheads as they did not own any locomotives instead renting them from other companies but made comfortable profits of £21,000 in 1874, £145,000 in 1886, £218,000 in 1908 with a gradual decline from 1925 and a loss of £41,000 in 1932.

The CLC handled a lot of freight; there were steelworks at Irlam near Manchester and on the river Dee near Chester; large chemical works were built around Northwich in central Cheshire and at Widnes on the bank of the Mersey. All of these generated traffic and received considerable quantities of Lancashire coal and broken limestone from the Peak District. The docks in Liverpool

and Manchester provided plenty of traffic and the line between Liverpool and Manchester carried considerable goods traffic. At the Manchester end Britain's first and largest industrial estate at Trafford Park contained a great range of manufacturing industries. Nearby the CWS built a large soap factory served by the CLC and in 1922 an oil refinery opened at Stanlow on the south bank of the Manchester Ship Canal.



Central Station c.1900

<sup>12</sup> Ibid

<sup>13</sup> Griffiths, R.P. (1978) The Cheshire Lines Railway.

<sup>14</sup> Dyckhott, N. (1984) The Cheshire Lines Committee: Then and Now.

<sup>15</sup> Dyckhott, N. (1999) Portrait of the Cheshire Lines Committee.

<sup>16</sup> Manchester Central Station (G-MEX) roof, Engineering Timelines, <http://www.engineering-timelines.com/scripts/engineeringItem.asp?id=603>

<sup>17</sup> Ibid

## 3.3.2 LOCOMOTIVES USED BY THE CLC

The only engines the CLC ever owned were four Sentinel passenger steam rail-cars which operated from 1929 until about 1945. Locomotives were originally supplied exclusively by the MSLR (Manchester, Sheffield and Lincolnshire Railway) but from the 1880's the MR (Midland Railway) and GNR (Great Northern Railway) began operating their locomotives on the line.

The locomotive works for the MSLR were situated at Gorton, Manchester, opened in 1849. Locomotive building began at Gorton in 1858 with the completion of 0-6-0 No. 6 Archimedes.

Over the next sixty years the works constructed many of the MS&LR locomotives with some loaned to the CLC.<sup>18</sup>

In 1922 the CLC owned about four and a half thousand goods and mineral vehicles with a small number of horse boxes and carriage trucks in passenger livery. The line owned about a hundred and fifty service vehicles.<sup>19</sup>

What would later become part of the 1892 viaduct line had 16 trains each way daily (between Manchester and Liverpool) in 1874 and by 1877 they were hourly in each direction at half past the hour from 8.30am to 9.30pm.<sup>20</sup>



Advertisement showing a locomotive marked "CLC" despite the company not owning any locomotives showing some artistic licence. It appears to be an ex-Great Eastern "D-15" Class 4-4-0 belonging to the number series 8810-8819.



Charles Sacré's Class "6" 4-4-0 No. 440, built at Gorton Works in 1881 used by the MSLR



A sentinel passenger steam rail-car

<sup>18</sup> Larkin (1988), The Railway Workshops of Britain: 1823-1986 p. 72

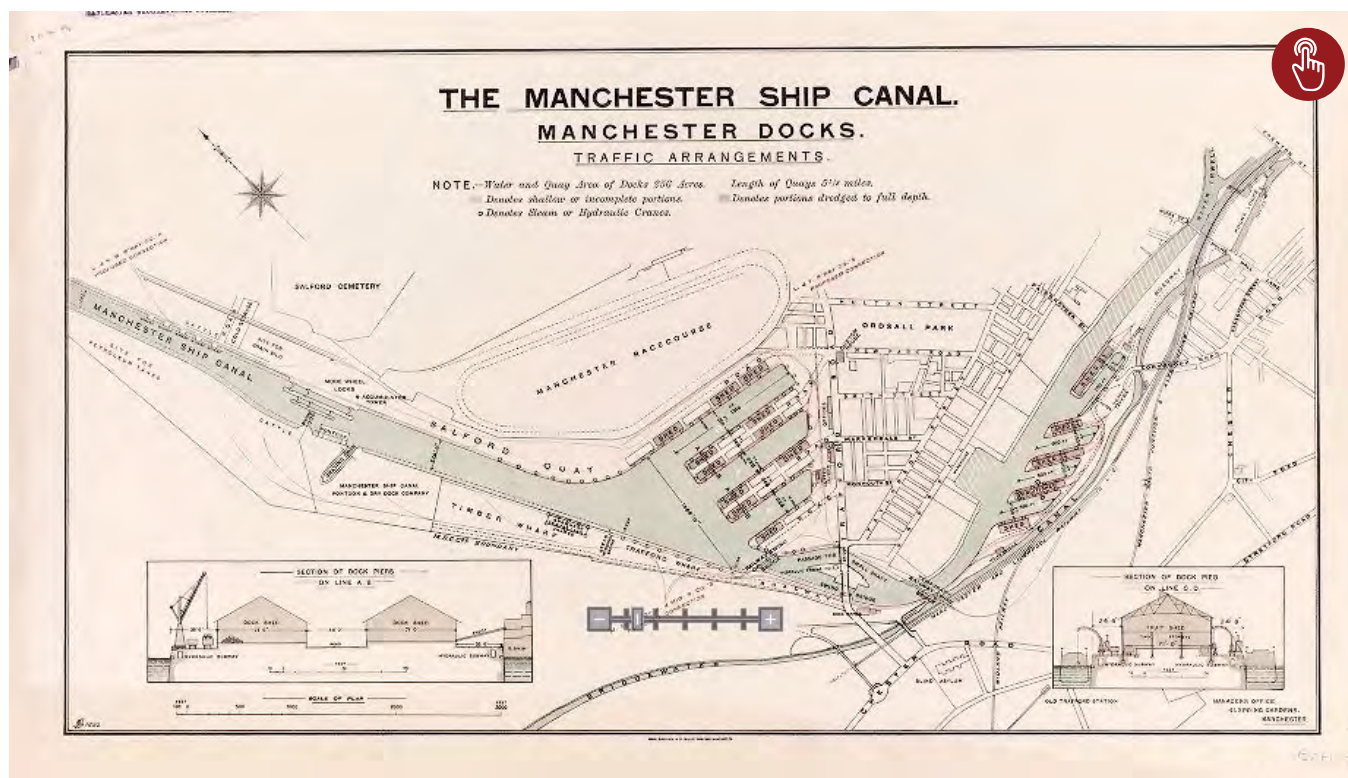
<sup>19</sup> <https://www.igg.org.uk/rail/00-app2/joint/clc.htm>

<sup>20</sup> Griffiths, R.P. (1978) The Cheshire Lines Railway.

## 3.3.3 THE 1892 VIADUCT

The 1892 viaduct line was part of a route from Central Station to Cornbrook Goods Station and the docks at the Port of Manchester (now Salford Quays) to assist the contractor in the supply of material for the dock's construction<sup>21</sup>. Dyckhott (1999) suggests the line was intended as 'temporary' and was built on wooden trestles but remained in use after the opening of the docks in 1894<sup>22</sup>. No source is given by Dyckhott (1999) for the temporary nature of the route and it seems somewhat at odds with the monumental design of the viaduct.

A series of detailed engineering drawings for the viaduct survive within Network Rail's archives dated March 1890 by the CLC's Chief Engineer G.W. Scott (appendix E). The contractors are listed as Heenan and Froude and M.W. Walmsley and Co. The designs show the viaduct as extant today with the only exception being the overhead bracing being latticed. Rusted fragments of metal found in the undergrowth of the viaduct deck are likely to relate to this original bracing. The date of the current bracing and why it was replaced is not clear, aerial photographs of 1938 show the viaduct but the image quality does not allow the bracing to be identified. Jacobs (2010) suggests the latticework would have been susceptible to blast damage by locomotive exhausts and this may explain why they were replaced with solid web sections also suggesting they probably date from the early 1950s<sup>23</sup>.

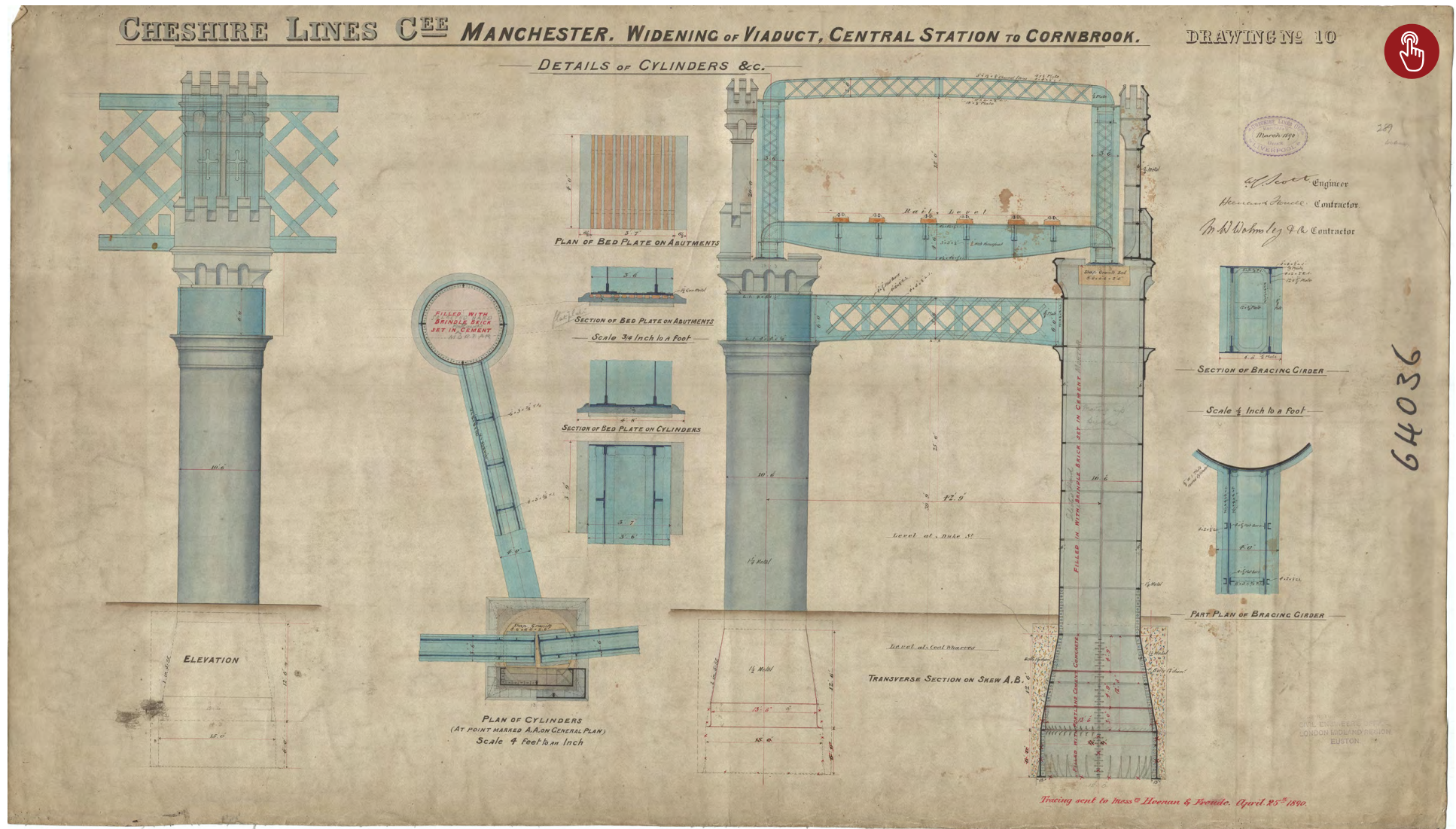


A plan of the proposed Manchester Docks in 1893 [Click on the diagram for a full-size view](#)

<sup>21</sup> Dyckhott, N. (1999) Portrait of the Cheshire Lines Committee.

<sup>22</sup> Ibid

<sup>23</sup> Jacobs (2010) Castlefield North Viaduct, Manchester BRIDGE REF: MAJ/289 Assessment of Principal Structural Members.



Engineering sketch from 1890 showing the proposed viaduct, part of the archive records of engineering drawings held by Network Rail [Click on the diagram for a full-size view](#)

Testing by Jacobs (2010) confirms the lattice work to be carbon steel with the columns of cast iron. The Forth Rail Bridge of 1882-1890 (category A listed and World Heritage Site) is the 'world's first major steel structure', representing a key milestone in the history of the modern railway to employ steel throughout.<sup>24</sup> Therefore, the use of carbon steel on the viaduct must be an early use of this material (although not the first) which would later become commonplace in bridge building around the world.

The 1893 CLC Plan of the Railway Estate produced by Chief Engineer William George Scott (held at Manchester archives) shows the viaduct had three lines of track that converge with the existing line leading to Central Station. The Roman fort is also identified on the plan although it would appear no physical remains were extant at this point.



A plan of the CLC estate in 1893 showing the 1892 viaduct [Click on the diagram for a full-size view](#)

<sup>24</sup> <https://www.tandfonline.com/doi/pdf/10.1179/1758120613Z.00000000037>

Several local newspapers ran with the opening of the viaduct as a major story, such as *The Manchester Courier and Lancashire General Advertiser* on Saturday 6th May 1893 giving a detailed account of the opening of the line with a ceremony involving the installation of a copper rivet. The full article is included in appendix F with a paraphrased excerpt here. The various articles include a sketch of the viaduct.

## THE 1892 VIADUCT<sup>25</sup>

- Built by the CLC Chief Engineer William George Scott
- Constructed by Heenan and Froude and M.W. Walmsley and Co.
- Total weight of iron and steel is over 7000 tons
- Made with 6,000,000 rivets
- 14,000 cubic feet of concrete.
- Cost - £250,000

<sup>25</sup> Manchester Courier and Lancashire General Advertiser - Thursday 22 June 1893.



Sketch from 1893 of the opening of the viaduct from the Manchester Times [Click on the image to see the full article](#)

## 'IMPORTANT RAILWAY EXTENSION IN MANCHESTER. THE NEW CHESHIRE LINES VIADUCT

*'No more certain or reliable evidence of the increase of business and general progress of any centre of industry can be obtained than that which is afforded by the extensions which take place from time to time of our railway systems...*

*.... The two lines were sufficient for the requirements for a considerable time, but the traffic has during the past six or seven years been so great that it was found absolutely necessary to widen the viaduct. In 1888 plans and designs were furnished by Mr. W. G. Scott, chief engineer of the Cheshire Lines. In due course the designs were approved by the Cheshire Lines Committee and the Midland Railway Company, and parliamentary powers to raise the necessary capital and proceed with the work were obtained. In 1890 the contracts were let, and the big undertaking was commenced.*

*The result will be to facilitate the traffic, and prevent the delays which have unavoidably taken place in running trains into the station, owing, as already indicated, to the great increase which has taken place the traffic.*

*'The viaduct may fairly be described as a triumph of engineering skill. It has been constructed on a principle which makes it almost, if not quite, unique. Some notion may be formed of the nature and importance of the extension from the fact that the total cost has amounted to £250,000. Extensive blocks of buildings had to be demolished to make room for the viaduct, and foundations of great depth and solidity had necessarily to be put in to bear the great mass of iron and steel employed in the building, not to mention the weight of the trains that will pass over it.*

*'The new viaduct carries three new sets of rails from a point near the engine shed at Cornbrook to the Central Station, the distance covered being three-quarters of a mile. There are 56 arches, several girder bridges, and a steel latticed viaduct 370 yards long.*

*'Another difficulty lay in the fact that in making the excavations the men came upon an old culvert or tunnel constructed in years long gone by, probably for the purpose of diverting the River Medlock when the Bridgewater Canal was made. A thick brick arch was built over the tunnel, and upon this one of the cylinders supporting the viaduct was placed, being firmly embedded in concrete.*

*'The contractors for the masonry and brickwork were Messrs. M. W. Walmsley and Co., of Manchester and Southport, and for the steel and ironwork Messrs, Heenan and Froude, of Newton Heath.*

*'The contracts may be said to have been finally completed on Wednesday, and in the afternoon of that day a pleasing little ceremony took place on the viaduct at the point where it crosses the Manchester South Junction and Altrincham Railway. This was the fixing and clinching of the last rivet by Mr. W. G. Scott, C.E., and Mr. Heenan. Mr. Onbridge, on behalf of Messrs. Heenan and Froude, presented Mr. Scott with a handsome mahogany case lined with satin, and containing two silver-plated hammers, and two rivets, one gold and the other silver, as a memento of the occasion. A copper rivet was placed in the only remaining slot, and this was duly clinched by Mr. Scott and Mr. Heenan, amid loud cheers.*

## 3.3.4 THE ENGINEERS AND CONTRACTORS

### William George Scott (1839-1914)

Scott was born in Manchester in 1839, and died at Liverpool on the 15th May, 1914. After serving his pupillage on the Manchester, Sheffield and Lincolnshire, and South Yorkshire Railways, he was appointed, in 1862, Resident Engineer on the former system, and subsequently acted in a similar capacity on other lines in the Midlands and Cheshire. In 1874, he was appointed Engineer to the CLC, a position which he held for nearly 30 years, when he retired through ill-health. During this period he carried out a number of important local and regional works, including diversions, extensions, widenings, bridges and other buildings. Scott was elected an Associate of The Institution of Civil Engineers on the 6th December 1870, and was transferred to the class of Members on the 30th October, 1877<sup>26</sup>. Other works undertaken by Scott include the Cadishead viaduct of 1892, built in a similar lattice design to that of the Castlefield Viaduct; it is surprisingly not listed.



The Cadishead Viaduct

<sup>26</sup> <https://www.icevirtuallibrary.com/doi/pdf/10.1680/imotp.1914.16327>

### Heenan and Froude

The company started as a partnership formed by engineers Richard Froude and Hammerley Heenan, originating as Heenan Construction Company of Manchester. The company undertook several significant late-Victorian engineering projects, including supplying and constructing the steelworks for Folkestone Pier (1887) and in the same year supplying a 1,600 feet (490m) girder bridge to Empresa de los Ferrocarriles del Estado, the national railway of Chile. The company had wide ranging interests as broad as designing torpedoes for the admiralty. At the same time as the viaduct's construction, in 1892 Heenan and Froude won the contract for the steelwork of Blackpool Tower as well as the electric lighting and steelwork for the fish tanks in the aquarium. The structure is grade I listed and is the firm's most notable work. Blackpool Tower built at the same time also uses steelwork girders fixed with rivets. At the time of construction it was Britain's tallest building and in 1919 commentator Thomas Luke celebrated Blackpool Tower as 'one of the wonders of the world'.<sup>27</sup> The iron and steelwork for both Blackpool Tower and the 1892 viaduct would have been made at the company's works at Newton Heath Ironworks, Manchester. The factory no longer survives.



Blackpool Tower

### M.W. Walmsley and Co.

The contractors for the masonry and brickwork were Messrs. M. W. Walmsley and Co., of Manchester and Southport.

### The Workforce

Relatively little is known about the workforce, their lives and their time building and assembling the structure and this is an area of potential further research.

<sup>27</sup> <https://heritagecalling.com/2020/05/14/eight-things-to-know-about-blackpool/>

## 3.3.5 DECLINE AND ABANDONMENT

It appears unlikely the 1892 line and viaduct were ever electrified. The neighbouring Altrincham line was electrified in 1931 but an article from Railway Wonders of the World from 1935 states the CLC was still hauled by steam traction.<sup>28</sup> The main line between Manchester and Liverpool has still not been electrified as of 2021 despite various government proposals.<sup>29</sup>

Manchester Central Station closed in 1969 and would eventually find a use as a convention centre following a period of dereliction, and has most recently been used as a nightingale hospital during the Covid-19 epidemic of 2020/21.<sup>30</sup>

The 1892 viaduct was abandoned at the same time as Central Station, along with the neighbouring CLC viaduct which would eventually become part of the Manchester Metrolink in 1992. The 1873 Cornbrook Viaduct was chosen for the Metrolink as it was considered at the time to be in a better condition than the later 1892 Viaduct. The tracks were removed in 1969 after closure of the line.<sup>31</sup> In 2009, Jacobs were contracted to carry out repair and maintenance work on the structure. With Coronation Street filmed at nearby Grenada studios, until 2015 the viaduct was occasionally used as on location filming. Although not implicitly identified as such, a grey steel viaduct with castle turrets features in the Pokémon Sword / Shield games (2019) for the area of 'Motostoke' which is loosely based on Manchester.



Aerial photo from 1934 showing the viaduct at the bottom of the image

<sup>28</sup> <https://www.railwaywondersoftheworld.com/joint-railways.html>

<sup>29</sup> <https://www.railwaygazette.com/infrastructure/electrification-priorities-in-northern-england/40612.article>

<sup>30</sup> <https://www.bbc.co.uk/news/uk-england-29816152>



Aerial photo from 1938 showing the viaduct to the right of the image

<sup>31</sup> <http://www.forgottenrelics.co.uk/bridges/castlefield.html>



*'Motostoke' as seen in the Pokémon Sword and Shield games.*

## 3.4 CONTEXTUAL ANALYSIS

*This section is grateful for the contribution of Greg Hardie at ARUP.*

The 1892 viaduct was completed towards the end of the 'Railway Mania' of the mid-19th century and by this point much of the UK was crisscrossed with various rail lines, bridges and viaducts. The Castlefield Viaduct made use of established 19th century construction methods, which included riveting prefabricated metal trusses together, allowing stronger and lighter structures to be built more quickly. Recently improved materials such as blue engineering bricks were used for the brick arches, as well as traditional cast-iron columns working under compression. What was innovative about the 1892 Viaduct (in comparison to its earlier 1873 sister) was the early use of carbon steel for the girders. This section seeks to place the 1892 viaduct within this wider context, both nationally and internationally, in terms of its structural and architectural design, engineering innovation and materiality. We are grateful to Greg Hardie of Arup for his contribution to this section.

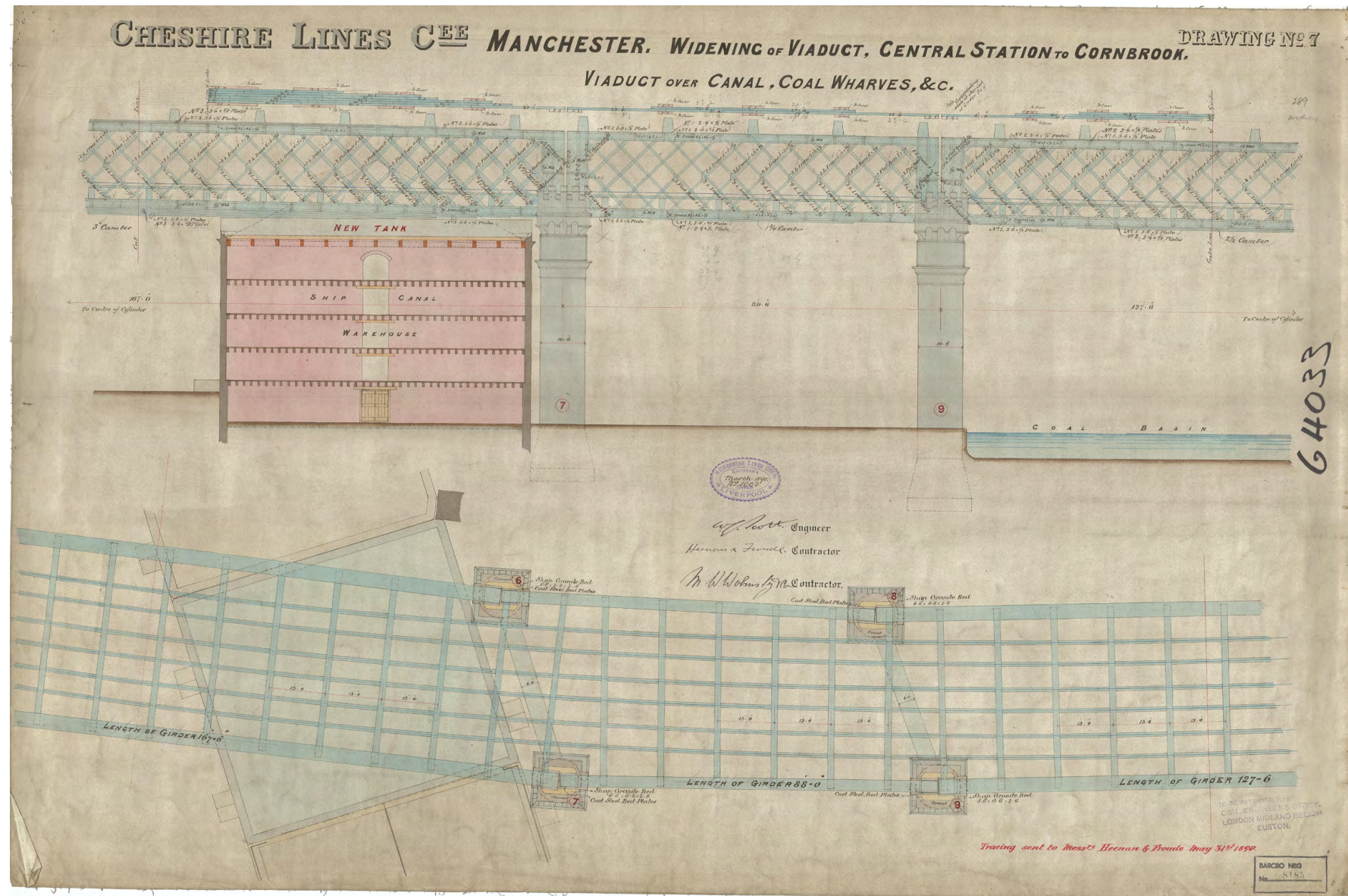
### 3.4.1 ENGINEERING DESIGN

#### Lattice Girder Bridges

The 1892 viaduct is an example of latticed-girder bridge construction, which was a common structural system for the time, connecting smaller pieces of flat steel plate to carry heavy loads over longer distances. In the case of the 1892 viaduct, up to 175ft (53m). For context, a list of 19th century UK examples of bridges and viaducts constructed using this method has been included in this section.

The 1892 Viaduct is an early example of a lattice girder bridge of which the following examples have been identified:

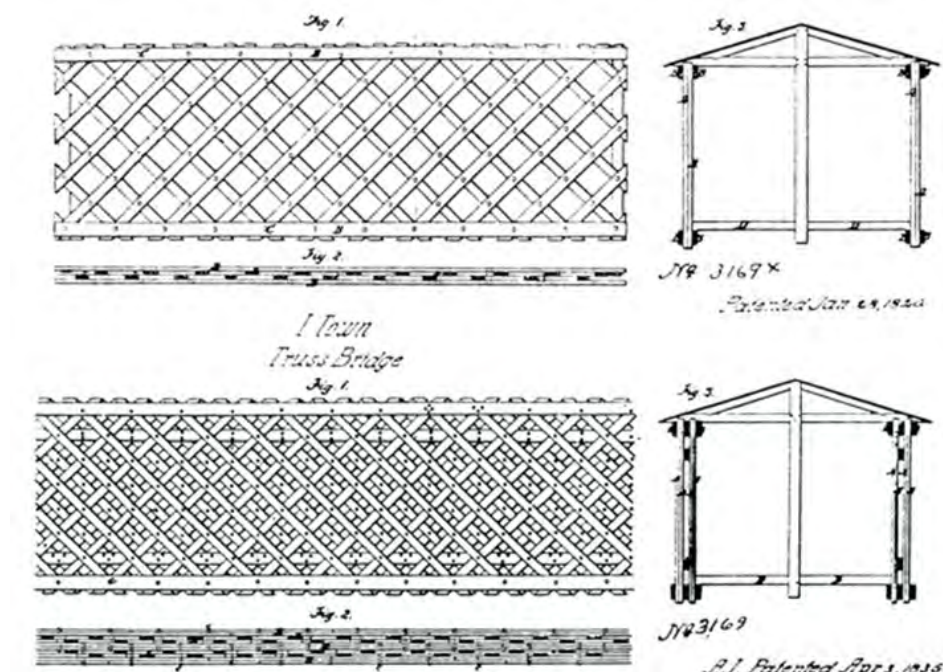
|                                                        |                                              |
|--------------------------------------------------------|----------------------------------------------|
| 1847 - Darwen Street Bridge, Blackburn                 | 1870 - Gallowgate Railway Bridge             |
| 1848 - Darcy Lever Railway Bridge (rebuilt 1883)       | 1873 - Wandsworth Bridge (replaced 1937)     |
| 1848 - Dutch River Bridge, Goole                       | 1873 - Irlam Viaduct                         |
| 1849 - Bowshank Railway Bridge                         | 1874 - Wick River Bridge, Sibster, Caithness |
| 1849 - Wishaw Railway Bridge                           | 1874 - Halkirk Bridge                        |
| 1851 - Marton Junction Bridge                          | 1874 - Kinbrace Railway Bridge               |
| 1852 - Llandeilo Railway Bridge                        | 1877 - Bennerley Viaduct                     |
| 1863 - Cragganmore Railway Bridge                      | 1878 - Bath Station Railway Bridge           |
| 1864 - Waterloo Railway Bridge                         | 1880 - Montrose Viaduct                      |
| 1865 - Logierait Bridge                                | 1882 - Fortyfoot Bridge, Lincolnshire        |
| 1866 - Llangefni Railway Bridge                        | 1882 - Oxford Gasworks Bridge                |
| 1867 - Pont Goed Bridge, Pentre Berw, Isle of Anglesey | 1888 - Burntisland Viaduct                   |
| 1867 - Brixton Railway Bridge                          | 1889 - Fulham Railway Bridge                 |
| 1868 - River Trent Bridge, Melbourne, Derbyshire       | 1892 - Cadishead Viaduct                     |
| 1868 - Runcorn Railway Bridge                          | 1892 - Castlefield Viaduct                   |
| 1869 - Kew Railway Bridge                              | 1898 - Coatbridge Railway Bridge             |
|                                                        | 1891 - Rochester Railway Bridge              |
|                                                        | 1900 - Partick Railway Bridge                |



Engineering drawing from 1890 showing the constraints of the site from existing structures and infrastructure.

The lattice truss bridge was patented in 1820 by architect Ithiel Town of Connecticut America. Originally designed to allow a substantial bridge to be made from planks employing lower-skilled labour, rather than heavy timbers and more expensive carpenters, this type of bridge has also been constructed using many relatively light iron or steel members. It was known as Town's Lattice Truss or Town Truss and responded to the expanding railway networks need for bridges to be built quickly from readily available material and by unskilled labour. Loads on the diagonals alternate between compression and tension (approaching the centre), with no vertical elements, while elements near the centre must support both tension and compression in response to live loads. This configuration combines strength with economy of materials and can therefore be relatively light. The girders being of equal length, it is ideal for use in prefabricated modular bridges. Individual elements are more easily handled by the construction workers and a simple lattice truss will transform the applied loads into a thrust, as the bridge will tend to change length under load. This is resisted by pinning the lattice members to the top and bottom chords, which are more substantial than the lattice members, but which may also be fabricated from relatively small elements rather than large beams. Structural members commonly made using a combination of structural sections connected with diagonal lacing allows a strut to resist axial compression and a (tie) to resist axial tension. A lattice girder, like any girder, primarily resists bending.

In response to increasing loads and spans the lattice system was doubled forming a slender box in cross section. This development was patented in 1840 and retained the roof and roadway running within the depth of the girder. This design was imported to Europe where it was adapted for use with wrought iron and steel flats. Rather than having the flat elements vertical for the top and bottom flanges these were laid flat, the connection formed with a small angle thus forming a wider, more stable box.



Lattice Truss bridge, Ithiel Town

On the 1892 viaduct, the lattice girders form the sides of the viaduct and collect loads from the fish belly beams below and transmit them to the cylindrical piers. At Castlefield, obstacles such as the Bridgewater canal, coal wharves, warehouses and the Manchester South Junction main line necessitated locating the girders at the same level as the trains rather than below it. The lattice girders are 20ft. (6m) deep and 36in. (0.9m) wide beams with stacked steel plates forming the top and bottom or 'flanges', diagonal flats forming the sides connecting the two, all riveted together. The top and bottom flanges were made up from stacked plates riveted together. Where the force in the flange was greatest, at mid span, more plates were used. To minimise the use of material, the lattice members vary. Towards the support, as the vertical load is progressively collected the diagonal members become wider in response to the increasing force.

The ends of each lattice girder are seated on a lab of Shap granite to evenly distribute the concentrated load from the girder into the cylindrical pier. The Network Rail drawings show each girder is separate from its neighbour. The gap presumably allowing for thermal movement in this 270yd (330m) long structure.

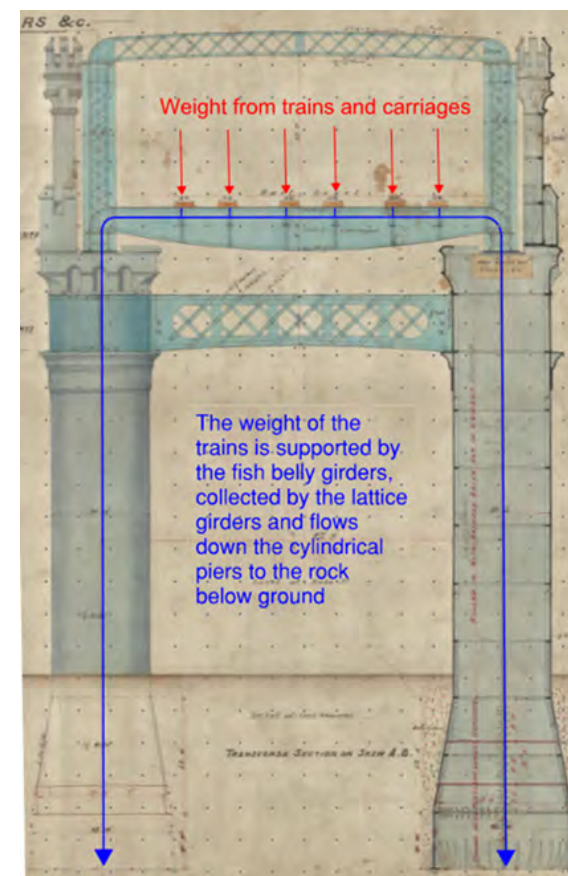
## Overhead bracing

Over the track on the 1892 viaduct there is bracing linking the lattice girders together. In the latter part of the 19th century Timoshenko notes in his History of Strength of Materials that 'several failures of open bridges occurred in Western Europe and Russia'. In this context, 'open' means a bridge where the tops of the trusses are not connected. The original latticed bracing has been replaced (c.mid-20th century) but it performs the same function – preventing the tops of the lattice girders from twisting and the top chord from buckling. This enables the lattice girder to support a higher load.

## Piers

Cast-iron cylinders of the 1892 viaduct were made in sections, bolted together, and filled with masonry in a cement mortar. The base of the cylinders is flared to spread the load from the viaduct over a greater area. They are founded on bedrock 20ft. (6m) below ground.

All loads applied to structures from trains, people, wind etc and their own self weight make their way to the ground through the piers. At Castlefield the viaduct was tested to demonstrate it could support the required loads by parking several railway engines on it. Twelve engines were used and a contemporary newspaper report stated, 'The test was varied in severity, but under the greatest strain, far exceeding as it did anything that would fall upon the viaduct in actual practice, the structure gave great satisfaction.'



This diagram illustrates how load from the trains flow safely through the structure to the ground. The load path for the viaduct takes the weight of locomotives and carriages on the rails through the girders and down the piers to bedrock.

## Fish-belly girders

The transverse fish-belly beams can be found beneath the track bed and span across the full width between the lattice girders that form the sides of the viaduct.

Load from the rail bearers above (plates and angles riveted together to support the rails) is concentrated on 'fish-belly' girders. These girders are so named because of the distinctive and attractive curved profile like the belly of a fish. Curving the bottom of the girder makes it deeper at mid span where the forces are highest, making it an effective use of material. Like the rail bearers the girder is made from steel plates and angles riveted together. However, because load is being concentrated on a larger girder the additional expense of making a girder with a curved bottom is paid for by the material saved, by reducing the depth near to the supports.

This can perhaps be illustrated by comparing the area supported by the longitudinal girder and the fish belly girder. Each rail bearer supports 6.6m<sup>2</sup>, whereas the fish belly girder supports 46m<sup>2</sup>. This is approximately seven times as much area, and if uniformly loaded with trains seven times the load.

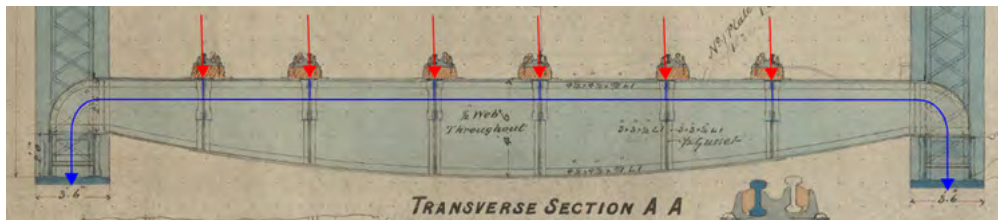
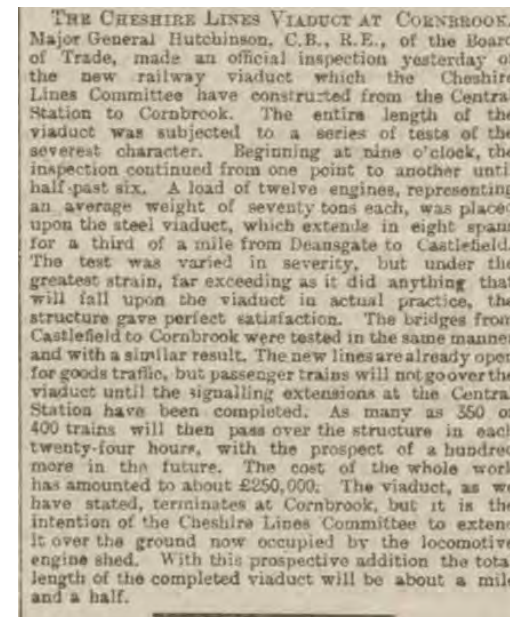


Diagram showing the load from trains onto the rail bearers and how this flows down through the fish-belly girders to the piers.

## Conclusion

Overall, the 1892 viaduct was constructed against a background of rapid structural material and technological development in the 19th century. Its structural form was also influenced by many factors including physical constraints, the materials and technology available, local economic conditions and the designers and constructors experience. The latticework, large columns and fish bellied deck were all common engineering techniques by this time used in similar structures for strength and their relatively lightweight qualities and the 1892 viaduct is an expression of the greater confidence in techniques and materials gained by the 1890s.



Article describing the load testing of the structure from Manchester Evening News, 22nd June 1893.



The Forth Rail Bridge



Logierait Bridge, Perthshire of 1875



King Edward VII Bridge, Gateshead



Rockingham Street Bridge, London (c. 1890s)



King Edward VII Bridge, Gateshead

## 3.4.2 MATERIALS

### Structural steel

While the structural components of the 1892 viaduct were relatively common for the time, its use of carbon steel rather than wrought or cast iron was a much newer innovation. The use of steel was still developing at this point and was being used on pioneering structures such as the Forth Rail Bridge of 1882-1890, which was the first major structure in the world to be constructed in steel. The use of carbon steel less than a decade later by CLC puts their engineers at the forefront of technology. In 1892, the CLC commissioned the Cadishead Viaduct, also by Scott, built a year earlier than the Castlefield Viaduct.

Following the development of the Bessemer Converter in 1856 and the Open-hearth furnace in 1867, enabling the economic production of reliable steel, the use of steel in construction became increasingly more widespread. In Britain by the 1890s, steel had largely replaced wrought iron, perhaps hastened by the Tay Rail Bridge disaster in 1879. Although around the world some significant bridges and structures, such as the Eiffel Tower, opened 1889, continued to be constructed in wrought iron for another few decades. On railways, cast-iron beams were prohibited for new construction following the failure at Inverlythan in 1882 and were steadily replaced after the Norwood Junction collapse of 1891.<sup>32</sup>

After c.1900, the use of steel in bridges and viaducts became widespread such as King Edward VII Bridge (1902-06) in Gateshead (grade II) and Queen Alexandra Bridge (1907-09) in Sunderland (grade II). Fabrication of the 1892 viaduct was by riveting which again was common until welding became commonplace in the 1930s.

Structural steel is stronger and more supple than cast or wrought iron, and allowed greater design flexibility. The last thirty years of the 19th century witnessed the phasing in of steel plates and rolled shapes, leading to the enormous production of steel trusses and plate-girder spans of ever-increasing lengths throughout the world. Steel arches and cantilevers were favoured for long spans because they better withstood the impact, vibration, and concentrated loads of heavy rail traffic. The 1892 viaduct is mostly made from flat pieces of plate riveted together into larger sections or lattice trusses. The details show some small-rolled angles have been used.

The earliest known use of steel in bridge construction was the suspension span across the Danube Canal (1828) near Vienna, Austria designed by Ignaz von Mitis. Steel halved the weight of wrought iron, but it remained prohibitively expensive for another forty years before steelmaking processes such as the Bessemer and the open-hearth were perfected. The most significant use of steel in bridge building of the 19th century was the Forth Railway Bridge in Scotland (1890) as previously discussed.

### Brick

The earlier viaducts in Castlefield by The Manchester South Junction and Altrincham Railway built between 1846-49 are of red brick arches, as was the case with most early railway viaducts. Building viaducts of brick would be relatively time consuming and labour intensive and as the 19th century continued iron and steel started to be produced on a mass scale, meaning new construction materials became available. The railways themselves also helped with the transportation of materials; before the mid-19th century handmade bricks may have been produced on site, but the railway enabled steel and iron to be transported around the country with ease. The blue engineering bricks used for the 1892 viaduct started to become common from the 1850s; they are stronger and more frost resistant than the handmade red bricks of the earlier viaducts.

### Cast Iron

The 1892 viaduct continued to make use of cast iron for the drum piers as these worked under compression, carrying the load down to the bedrock below. The piers were also decorated with castellated cast iron. This is similar to the neighbouring viaduct of 1873, also by the CLC, as they both comprise cast iron columns rising to a castellated turret which carries the rail deck. Further north of the site at the Liverpool Road Station in 1867, a similar viaduct was built, again supported on large cast iron columns although without the castellations, and here the rail deck was carried on a series of jack arches.

## 3.4.3 ARCHITECTURAL DESIGN

Many of the earliest railway structures, including viaducts, had little ornamentation or decorative interest and the neighbouring 1846-49 viaduct has simple red brick arches with stone dressings. However, it was not uncommon for earlier railways to adopt a Neo-Classical design. The Leaderfoot Viaduct (Category A listed) built in 1863 in the Scottish Borders is a tall slender structure and has the appearance of a Roman aqueduct, probably a reference to the nearby Roman fort of Trimontium.

<sup>32</sup> Dunn, Tim (26 August 2020). "Great railway bores of our time!". RAIL. No. 912. Peterborough: Bauer Media Group. pp. 42–49.

The original design intent of the CLC is not known, but there are a number of reasons why they may have chosen to use Gothic, castellated columns:

- Earlier railway structures were unembellished and functional. As they became more affluent, the companies wished to proclaim their confidence through architectural detailing.
- Fashions in the 1890s had shifted from the Classical towards use of the Neo-Gothic for infrastructure, for example the crenelated Bramhope Tunnel in Yorkshire and St Pancras station.
- Gothic architecture had a naturalising effect that historicised and softened the impact of brash modern structures in novel materials, and at the same time proclaimed liberalism, and free commerce: the powers of the guilds and the trading classes.
- The turrets may simply be a reference to the Castlefield area and a nod to its antiquity as a Roman fort.

Although the design of both viaducts is likely a reference to Castlefield itself and the Roman fort it was not unusual for railways to adopt a gothic revival design. Bramhope Tunnel (grade II), West Yorkshire, built between 1845-49 gives the appearance of a folly or medieval fortification said to be due to the demands of the local landowner.<sup>33</sup>

A comparison of the use of Neo-Classical and Neo-Gothic can be seen in practice when looking at Kings Cross Station (1854) and the St Pancras Midland Hotel (1866) in London. These two adjacent structures were constructed a decade apart yet they display entirely different concepts of revival architecture.

The viaduct also responds to its wider context of Manchester, where the Neo-Gothic was favoured in including variations such as the Italianate and Medieval. Neo-Gothic (or Gothic Revival) architecture drew its inspiration from the past. A.W.N. Pugin and John Ruskin were key advocates of the style and Ruskin's 'The Seven Lamps of Architecture' (1849) stated that the Middle Ages were a watershed in human achievement and that Gothic architecture represented the perfect marriage of spiritual and artistic values. The earliest manifestations of an interest in the medieval era were in the private domain, but by the 1820s public buildings in England were also being designed in the Gothic style. The Houses of Parliament (1840), designed by Sir Charles Barry and A.W.N. Pugin being a key example and more locally Manchester Town Hall (1877).

The influence of Frenchman Viollet-le-Duc won out over Ruskin by the 1890s, ensuring that iron (not just stone) could be used in Gothic structures and should be celebrated, not hidden. This honesty of materials appealed to industrialists who were able to celebrate their innovative materials and engineering while also conforming to the architectural ideals of the day.

The Gothic Revival was to remain one of the most potent and long-lived of the 19th-century revival styles and this influence can clearly be seen in the arrow-slits and castellations at the 1892 viaduct.



*The Leaderfoot Viaduct, Scottish Borders*



*Bramhope Tunnel, West Yorkshire*

<sup>33</sup> Dunn, Tim (26 August 2020). "Great railway bores of our time!". RAIL. No. 912. Peterborough: Bauer Media Group. pp. 42–49.

## SECTION 4.0

### SIGNIFICANCE

#### 4.1 INTRODUCTION

This section will draw on the understanding outlined in the historic background section articulating significance using the interests provided by the National Trust

The 'interests', are being used as referenced in the most recent Historic England guidance relating to statements of significance. In addition, the Trust has defined people value as a distinct area for this work, which connects to the communal value, identified in the conservation principles.

Significance can be defined as the value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. The understanding of the significance of a place is vital to inform sensitively managed change. In accordance with *Historic England Advice Note 12 – Statements of Heritage Significance: Analysing Significance in Heritage Assets* the following criteria are employed within this report to assess significance:

#### Archaeological Interest

There will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.

#### Architectural and Artistic Interest

These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skills, like sculpture.

#### Historic Interest

An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.

#### People value

What the structure means for people in the past and today. Value deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

The levels of relative significance used to inform the assessment of significance in this heritage statement are as follows:

|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very High Significance | Attributable to those themes, features, buildings or spaces which are the most valuable. These elements are considered to be essential to the understanding and appreciation of the place and are contributors to its overall character and setting, as well as its local, regional, national and international importance. Large scale alteration, removal or demolition should be strongly resisted. |
| High Significance      | Attributable to a theme, feature, building or space which has a high cultural value and forms an essential part of understanding the historic value of the site, while greatly contributing towards its character and setting, as well as its local, regional and national importance. Large scale alteration, removal or demolition should be strongly resisted.                                      |
| Medium Significance    | Attributable to a theme, feature, building or space which has some cultural importance and helps define the character and appearance of the site. These features are generally of local or regional value. Efforts should be made to retain features of this level if possible, though a greater degree of flexibility in terms of alteration would be possible.                                       |
| Low Significance       | Attributable to themes, features, buildings or spaces which have minor cultural importance and which might contribute to the character or appearance of the site. These features are generally of local value. A greater degree of alteration or removal would be possible than for items of high or medium significance, though a low value does not necessarily mean a feature is expendable.        |
| Neutral Significance   | Themes, spaces, buildings or features which have little or no cultural value and neither contribute to nor detract from the character or appearance of the site. Considerable alteration or change is likely to be possible.                                                                                                                                                                           |
| Intrusive Significance | Themes, features or spaces which actually detract from the values of the site and its character and appearance. Efforts should be made to remove these features. The significance plans provide a level of significance for both the physical fabric and the spatial characteristics of internal areas.                                                                                                |

## 4.2 ARCHAEOLOGICAL INTEREST

The viaduct itself cuts through one of the most archaeologically significant parts of Manchester. It was the site of Roman fort that essentially started the development of the city giving the area both its name Castlefield and Manchester. A small area adjacent to the viaduct is protected as a Scheduled Monument, however, the archaeological interest is likely to extend much further than this. There may also be some archaeological interest relating to the developments around the Bridgewater Canal and its associated warehouses. The viaduct itself is relatively well recorded as a structure with good historical information on its construction (Network Rail hold a collection of over 80 construction drawings) there is little further information that may enhance our understanding of the structure, although the date of the replacement overhead bracing is still unclear. Although the track has been removed the ballast has various pieces of metalwork scattered across it (probably from the original overhead support) and this has some limited archaeological interest. **The viaduct itself is of low archaeological interest but when considered in the wider context of Roman remains and the canal navigations the area is of high archaeological interest. This value relates to the local archaeological interest of the viaduct itself and the national and international importance of the Roman and early canal infrastructure.**



*Pieces of scrap metalwork found across the structure, probably the original overhead bracing*

### Contributors to Archaeological Value

- The surroundings of the structure are in a highly sensitive area of Manchester with potential for evidence of early canal warehouses and Roman activity.
- The deck consists of rubble and ballast. This has some low archaeological value through evidence of the overhead bracing seen in the rubble.

Viaduct - Low archaeological interest

Castlefield area - high archaeological interest

### 4.3 ARCHITECTURAL AND ARTISTIC INTEREST

The 1892 viaduct has an architectural honesty and functionality, with its materials and construction loudly proclaiming its industrial use. It epitomises many of the features of the late Victorian period, it is striking, self-confident and dominant. The influence of Viollet-le-Duc won out over Ruskin by the 1890s ensuring that iron could be used in Gothic structures and should be celebrated, not hidden. Innovative engineering solutions were proudly displayed and the CLC could not help embellishing their structure with architectural detailing typical of the High Victorian period. The original design intent of the CLC is not known, the Gothic turrets may simply be a reference to the Castlefield area and a nod to its antiquity as a Roman fort.

The structure also has great visual interest due to its sense of scale and how it interacts and contributes to its wider setting. The built environment beneath the Viaduct is one of contrasts, with the monumental cast-iron columns and fish-bellied track looming over the more human-scale waterways and boats of the earlier canal. The grit, grime and decay often associated with historic industrial structures is one characteristic of the space, although the quiet cobbled streets and reflections in the water also provide a sense of tranquility that is not found elsewhere in the city.

From atop the Viaduct, one gains an impression of the grandeur, affluence and power the Cheshire Line Committee and citizens of Manchester were keen to promote. One has a birds-eye view of unrestrained growth from the 18th century onwards. Robust structures of the Victorian age, such as Manchester Town Hall and Manchester Central vie for prominence with glazed 21st century skyscrapers and squat apartment blocks. From here, the scale of the structure can also be fully appreciated, both in terms of length and width, the structure is larger than it initially appears. The epic scale and impressive structure is a product of its time, designed to impress people and draw attention to the power of steam and Manchester. It draws on local features in the castellations but it is also a highly incongruous structure much higher and bigger than most of its surroundings. The views of the structure both from it and of it all add to its significance. Although the rust and degrading paintwork are a sign of a lack of maintenance they give the structure a patina and authenticity as an industrial structure that sits within the wider landscape of Castlefield and Manchester. The wider group value of heritage assets also greatly adds to the visual interest. **The viaduct is of high architectural and artistic interest as an impressive piece of transport infrastructure with important group value. This level of significance has been attributed as the structure, its design and group value are of national and international significance.**

*'The cast iron viaducts combining brute strength with romanticism are spectacular features of the landscape around the Bridgewater canal and serve as enduring symbols of the power and majesty of the railway'<sup>01</sup> - Robina McNeil and Michael Nevell (2018)*

<sup>01</sup> McNeil, R and Nevell, M. (2018) A GUIDE TO THE INDUSTRIAL ARCHAEOLOGY OF GREATER MANCHESTER.

### Contributors to the architectural and artistic interest

- The latticed 'walls' of the viaduct, the fish-belly structure beneath the deck and the crenelated drum columns are of high significance.
- The deck, having lost its tracks and purpose, and poorly repaired in the past, is of low value.
- The overhead cross beams are replacements, in a different style and are of low value.
- The brick arches and piers to either end are of medium value.
- The wider setting of heritage assets is of high significance.

### Viaduct - high architectural and artistic interest



The structure crossing the Bridgewater Canal

#### 4.4 HISTORIC INTEREST

The viaduct is an impressive piece of transport engineering and it represents the growing industrial influence of the city of Manchester. It has historical associations with Central Station in Manchester and was built by the CLC, one of longest running rail companies. The site's location spanning various modes of transport infrastructure gives associative value to the structure and a strong sense of group value. From the Roman fort through to the canal navigations and the earlier railway viaducts around the structure are all of national significance and the 1892 viaduct demonstrates a later phase of this industrialisation of Manchester. The authenticity of the landscape retains much of its former industrial character although the reconstructed Roman fort is somewhat at odds with this. Whilst still a positive contributor the authenticity and accuracy of the Roman remains is questionable. Beyond its physical presence, the Viaduct continues to tell us much about past human experiences, activity and values. The archival collection of Network Rail offers fascinating insight into the construction of the structure and there is much more to be learned from an engineering perspective. We know about the company who commissioned the Viaduct, CLC, their chief engineer, W.G. Scott and the manufacturers Heenan & Froude and M.W. Walmsley & Co. The lives of those who helped turn the blueprints into reality are more opaque. Who were they? How did they live and what motivated them? There is much to be learnt by researching and telling their stories.

Castlefield along with Ancoats was on the UK tentative list to become a World Heritage Site in 1999, although it was unsuccessful and has since been removed. Primarily the entry focuses on the group value of the canal network and the Liverpool Road Station although the later rail infrastructure is noted as follows -

*'..it was soon followed by other lines, and many of these cross the Castlefield area on impressive metal viaducts which, when they are reflected in the canal basins below, impart a spectacular aspect to the area.'*

*- DCMS, World Heritage Sites: The Tentative List of The United Kingdom of Great Britain and Northern Ireland (1999)*

The viaduct played a part in the construction of the Port of Manchester which would become the third busiest port in the country<sup>02</sup>. The viaduct also has historical connections with W.G. Scott, the Chief Engineer of the CLC, which is perhaps of local interest, but more significantly the steelwork was manufactured by Heenan and Froude a contractor of significant projects worldwide. It is of interest that Blackpool Tower was under construction by the same contractor at the same time as the viaduct. The use of carbon steel in 1892 is also an early example of its use in the world with it becoming commonplace post-1900. **The viaduct has high historical value due to its connections with prominent manufacturers, its connections to other iconic structures and its pioneering use of materials making it national significance.**

<sup>02</sup> Ibid

#### Contributors to the historic interest

- Visual connections and setting of other heritage assets and other transport infrastructure.
- The steelwork lattice by Heenan and Froude is of high significance through association with the contractor.
- The cast iron columns are of medium historic interest.
- The brick piers are of low historic value.
- The deck is of low historic value.
- The overhead bracing is of low historic value.

Viaduct - high historic interest



The lattice steelwork by Heenan and Froude

#### 4.5 PEOPLE VALUE

Although not directly associated with the viaduct, the CLC helped to forge links across the cities of the north west and the southern route between Manchester and Liverpool, which the viaduct sits alongside, significantly reduced journey times making them comparable to those of today. The CLC was also the first to introduce cheap fares between Manchester and Liverpool helping to democratise transport for the masses.

The viaduct as a piece of 19th century transport infrastructure represents industrial capitalism and the global nature of supply chains at that time. It will have facilitated the supply of cotton picked by former slaves in the Caribbean and America to be transported across the rail network to the mills of Manchester.

Today the viaduct sits alongside Castlefield Bowl, a major music venue and forms the backdrop to many views around Castlefield and is the main passing point for pedestrians walking to the amenities alongside the canal. Mancunians who live in the south of the city will also be familiar with the viaduct if they commute into the city via Metrolink as the tramline runs alongside the structure framing the first views on entering the city centre. It is little visited by tourists or those outside of the city and the current lack of public access means this value has the potential for enhancement.

A short online survey was undertaken as part of this study targeting members of the Castlefield Forum and the Science and Industry Museum as local residents and businesses. The responses overwhelmingly see the structure as a positive asset to the area. Responses describe it as 'classically Mancunian' and 'a defining part of the Castlefield area'. A full breakdown of the survey is included in appendix G. **The viaduct has medium people value, it has a great deal of local interest but is not currently of national or even regional importance, however, should the structure find a new use this value is likely to increase.**

#### Contribution to People Value

- Its physical presence when seen from the Castlefield Bowl.
- Its view when seen from the urban park.
- The long view of the structure when entering the city from the southern Metrolink line.

#### Viaduct - medium people value



Crowds gathering at Castlefield Bowl for a music concert

Extracts of the survey responses when asked if they see the viaduct as a positive or negative asset to the area.

*'Very powerful and iconic structure, a visual reminder of the industrial history of Manchester'*

*'It's a positive asset that's linked to the development of the national rail network across the UK and a strong visual representation of Castlefield's history. This splendid example of fine engineering symbolises Manchester's resilience, growth and progress on all fronts. It's one of the sleeping giants that linked key markets'*

*'...features like the viaduct don't just add character to Manchester, they are Manchester and the north. They are our industrial heritage'*

*'Even in its poor current state the area around and below the viaduct is arguably the most interesting streetscape in Manchester. Along with the several other bridges and waterways this area is full of character and is such a positive asset that is unique to Manchester.'*

*'My grandfather remembers it in the 1940-50s when canal horses used to be stored/kept under the viaduct whilst barges were loaded and unloaded, and his mother made him go and get manure from there for the garden'*

*'It is perhaps the epitome of the Manchester industrial spirit and heritage in this great city and as such, of global significance.'*



The most commonly used words in the survey response. [Click the Word Cloud above to see the full survey results](#)

#### 4.6 SUMMARY OF SIGNIFICANCE

The 1892 viaduct is an impressive structure and symbolises the power, wealth and influence of Manchester in the 19<sup>th</sup> century. Today, it forms the backdrop to several views around Castlefield and much of its original industrial setting remains intact. Built by the CLC, it facilitated the movement of construction material for the Manchester Docks and improved the rail congestion entering Central Station. The structure was built by contractors of note Heenan and Froude partly using carbon steel, an early example of its use, alongside their work on Blackpool Tower at the same period (also of steel).

The significance of the viaduct is best understood as part of the group and context of wider assets. It crosses over the remains of the Roman fort with the nearby Roman road and the River Irwell both used for early transport. It passes over the Bridgewater Canal which kickstarted the canal age in 1763 and runs alongside the later Rochdale Canal of 1804. The 1892 viaduct is also 200m away from the Liverpool Road Station which was the world's first passenger railway station in 1830 and is surrounded by several railway lines and viaducts of different eras up the 20th century Manchester Metrolink station at Deansgate. The collective group value of the assets makes it one of the most significant collections of heritage assets of transport infrastructure in the country, demonstrating a range of transport modes dating back almost 2000 years to which the 1892 viaduct makes a significant contribution. There is an opportunity to bring this structure back in to use in a way that enhances its significance to the people of Manchester. Overall, the Castlefield area has long represented the innovative, industrial heart of Manchester and is, if not unique in its individual components, certainly of the highest heritage interest for its significance as a group and the contribution it makes to our understanding of Manchester at the heart of global

industrialisation. From the 1830s railway station to the 20th century Metrolink, each piece of infrastructure contributes to this story, as well as having its own story to tell. The CLC railway has national interest for connecting north-west industrial towns, and by extension, the wider British empire. The 1892 and 1873 Viaducts are an important part of this story and illustrate how quickly technology was developing at the time. It is interesting to note the difference between the adjacent viaducts. The carbon steel of the 1892 Viaduct has suffered more corrosion than the earlier cast iron on the 1873 Viaduct, something examined in structural reports outside of this statement. In 2021, the condition of the 1892 Viaduct has deteriorated. There is great potential for imaginative new proposals to be put forward that would restore the structure to a beneficial new use and return it to its former glory. **The viaduct is of high significance as a structure of national and international historic value, high aesthetic interest due to its design and wider group value and considerable public and archaeological value.**

#### Characteristics and features that define its significance

- The monumental scale of the structure.
- The large round columns and fish bellied deck when seen from below.
- The lattice steelwork by Heenan and Froude.
- The castellations.
- The demonstration of the power and wealth of Manchester and the railway industry in the 19th century.
- The wider setting and group value of industrial buildings and other transport infrastructure.



*The viaduct crossing the Bridgewater Canal*

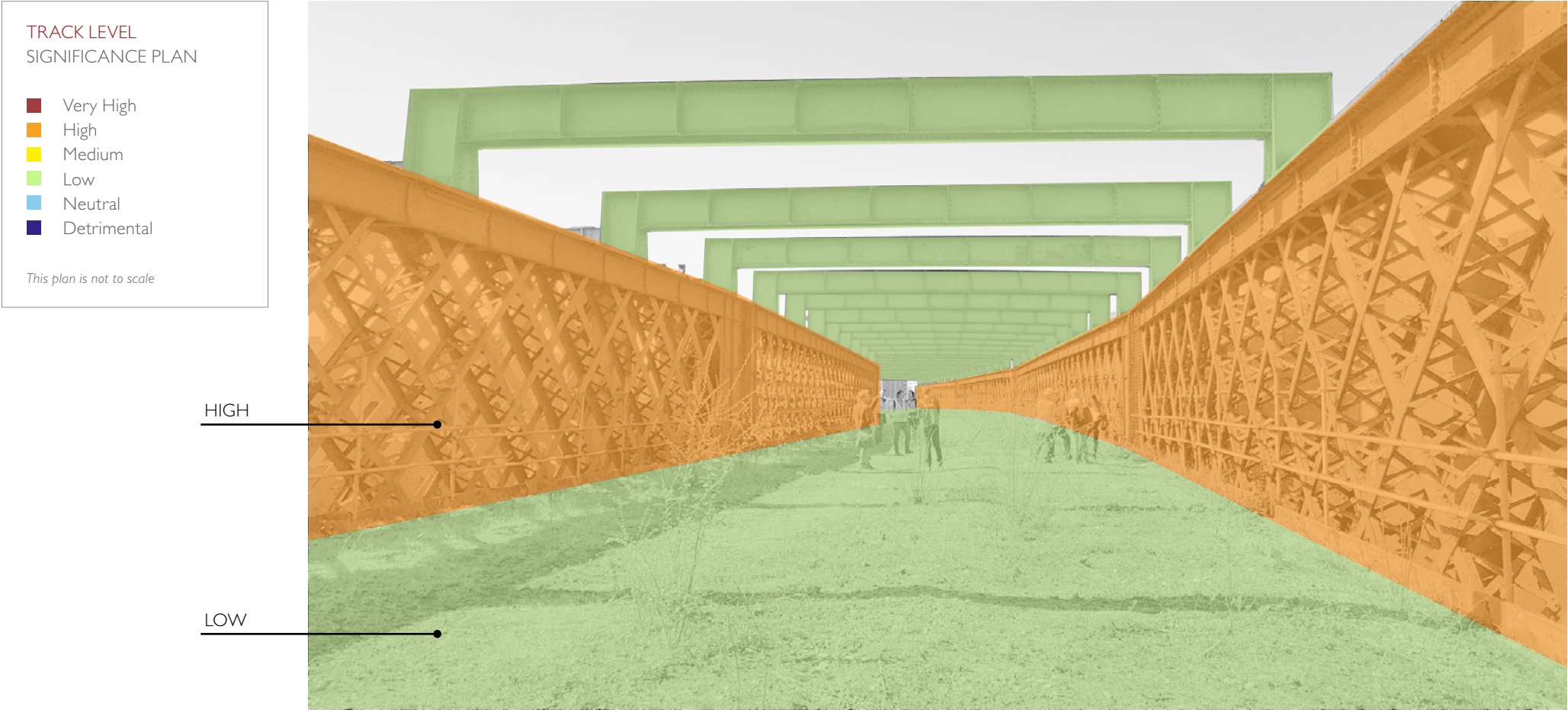
**The Viaduct is of high significance for its special architectural and historic interest**

GROUND LEVEL  
SIGNIFICANCE PLAN

- Very High
- High
- Medium
- Low
- Neutral
- Detrimental

*This plan is not to scale*





## SECTION 5.0

### CAPACITY FOR CHANGE

The original fabric of the structure is all considered to be of high significance with the material on the deck consisting of ballast and scrap metal of low significance along with the 1950s overhead bracing.

In finding a new alternative use for the structure it is likely the ballast will require replacement or removal. This will result in some low level harm, although should a suitable finish be used as a replacement, this is not considered unreasonable. The overhead bracing is a mid-20th century replacement but it is not out of character with the structure. It's removal could be considered to facilitate an alternative use, although it has some value demonstrating the later period of alteration and it imitates the existing overhead supports, therefore removal solely to restore back to a previous appearance would cause unnecessary harm that is not outweighed by the restoration and reinstatement.

Any alternative use is likely to require edge protection, which is explored later in this document. Solid barriers would create a disconnect between the viewer and the wider landscape and would be considered overly harmful. Equally a glass barrier may be appropriate, however, consideration to how this modern and shiny installation will appear on the industrial structure. A grille of tight lattices imitating the viaduct design in an industrial material such as corten steel will act as a clearly modern but not out of place addition to the structure allowing visibility through to the wider landscape.

Initial concepts consider creating a ramp at the west end of the structure allowing a circular route. This will either require the removal of a section of side latticework or a section cut through the deck of the structure. Both proposals will result in a degree of harm to the structure through the loss of heritage fabric, although the structure is formed of repetitive features and this reduces the harm somewhat. Considerable public benefits will be required to facilitate this level of harm and this could potentially be achieved through a scheme that ensures public access and the future maintenance of the structure.

Beyond the harm through loss of fabric, a challenge will be creating an accessible route across what is considered one of the key views of the structure, looking along Duke Street to where it crosses the canal. This viewpoint is where the viaduct's connection to the wider landscape is felt strongest and minimising harm and clutter at this viewpoint will be important. High quality design and material choice is vital and although a ramp may allow wheelchair access, the long deviation to achieve the required gradient may make this a significant distraction in this location and a lift breaking through the deck of the structure may be a less harmful visual addition.

A longer-term challenge will be managing the industrial patina of the structure and ensuring it doesn't become overly sanitised. A paint scheme is not only visual but also protective for the iron and steelwork and if left unchecked corrosion will mean the loss of the structure. The industrial character and patina is a positive contributor to the asset and although a full repainting of the structure may be seen as beneficial the structure will become somewhat sanitised. Given the extensive cost involved in repainting and also the loss of industrial character, it may be that a policy of 'arrested decay' is considered, involving descaling loose rust and patch painting although restoring an example bay to its original appearance would be considered acceptable. An updated condition survey should inform when the next recommended repainting should take place.

## PRINCIPLES FOR CONSERVATION

### Ensuring a heritage-led approach

- A conservation rather than restoration approach is considered the most appropriate.
- Ensure new materials are robust and fitting with the industrial structure and landscape.
- Although a later addition of low significance the overhead bracing tells part of the story of the structure and should not be unnecessarily removed.
- Decisions about change need to be reasonable, transparent and consistent, responding to a clear understanding of the significance of the site, the conservation constraints and design parameters.
- The site is currently vacant and there is an opportunity to create a viable new use for the structure that also maintains the significance embodied within the site. A viable future use should endeavour to seek the conservation and enhancement of heritage values of the site as far as possible.
- An iterative and high-quality design process should be undertaken to ensure heritage values are placed at the heart of the decision-making. An on-going assessment of impact during this process would allow harm to be identified and mitigated as far as possible.
- As part of any proposal, surviving historic features should be retained or revealed, providing this is not at the expense of a viable scheme.
- Consultation with the statutory advisors, key stakeholders and the local community should inform the proposed development of the site, undertaken at an early stage as part of an iterative dialogue to also remove risk, forge partnerships, increase understanding and manage public expectations.
- Proposals that would result in 'substantial harm' to a heritage asset or the conservation area should be avoided.

### Maintaining or enhancing setting and key views

- The viaduct's significance relates largely to its connection to the industrial landscape and disturbing or detracting from this should be avoided.
- Any proposals should seek to maintain the key views of the structure where possible, any alteration should not detract from key views, the character and setting of the site and the wider conservation area.
- New standalone buildings or extensions should respond to and relate to the forms, massing, materials, colour palette, proportions, scale, siting and footprints of the existing site and its context.
- A contemporary approach to new structures may be appropriate if it is demonstrated it will not have an adverse impact on the site or conservation area and they are industrial in character.
- New development should not replicate historic detail but should instead respond to their context in a contemporary way.

# LIST OF SOURCES

## BIBLIOGRAPHY

DCMS (1999) World Heritage Sites: The Tentative List of The United Kingdom of Great Britain and Northern Ireland

Dixon, F, The Manchester South Junction and Altrincham Railway, (1994 edition)

Dunn, Tim (2020). "Great railway bores of our time!". RAIL. No. 912. Peterborough: Bauer Media Group. pp. 42–49.

Dyckhott, N. (1984) The Cheshire Lines Committee: Then and Now.

Dyckhott, N. (1999) Portrait of the Cheshire Lines Committee.

Frangopulo, N. J., ed. (1962) Rich Inheritance. Manchester: Education Committee; p. 33.

Gregory, Richard A. (2007). Roman Manchester: the University of Manchester's excavations within the Vicus 2001–5. Oxbow Books.

Griffiths, R.P. (1978) The Cheshire Lines Railway.

Hartwell, C, Pevsner Architectural Guides: Manchester, (2001), 215-217

Hayward, A.C.G. (2014) The Construction of Railway Bridges Then and Now, The International.

Jacobs (2010) Castlefield North Viaduct, Manchester BRIDGE REF: MAJ/289 Assessment of Principal Structural Members.

Journal for the History of Engineering & Technology, 84:1, 59-87.

Larkin (1988) The Railway Workshops of Britain: 1823-1986.

Manchester Courier and Lancashire General Advertiser - Thursday 22 June 1893.

McNeil, R and Nevell, M. (2018) A GUIDE TO THE INDUSTRIAL ARCHAEOLOGY OF GREATER MANCHESTER.

Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework. London: Ministry of Housing, Communities and Local Government, p. 71.

### ONLINE SOURCES

A Guide To Civil Engineering in Manchester: Manchester South Junction & Altrincham Railway, accessed from <http://maceserv.mace.man.ac.uk/apache2-default/trail/xml/Features/msjar.html>

<https://www.nationaltrust.org.uk/features/our-conservation-principles>

<https://historicengland.org.uk/listing/the-list/list-entry/1292315>

[https://secure.manchester.gov.uk/info/511/conservation\\_areas/972/castlefield\\_conservation\\_area/7](https://secure.manchester.gov.uk/info/511/conservation_areas/972/castlefield_conservation_area/7)

<https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/heag180-gpa3-setting-heritage-assets/>

<https://historicengland.org.uk/services-skills/education/educational-images/the-giants-basin-potato-wharf-manchester-8422>

<https://www.scienceandindustrymuseum.org.uk/objects-and-stories/making-the-liverpool-and-manchester-railway>

<https://blog.scienceandindustrymuseum.org.uk/fanny-kemble/>

Manchester Central Station (G-MEX) roof, Engineering Timelines, <http://www.engineering-timelines.com/scripts/engineeringItem.asp?id=603>

<https://www.tandfonline.com/doi/pdf/10.1179/1758120613Z.00000000037>

<https://www.icevirtuallibrary.com/doi/pdf/10.1680/imotp.1914.16327>

<https://www.railwaywondersoftheworld.com/joint-railways.html>

<https://www.railwaygazette.com/infrastructure/electrification-priorities-in-northern-england/40612.article>

<https://www.bbc.co.uk/news/uk-england-29816152>

<http://www.forgottenrelics.co.uk/bridges/castlefield.html>

<https://heritagecalling.com/2020/05/14/eight-things-to-know-about-blackpool/>

<https://www.igg.org.uk/rail/00-app2/joint/clc.htm>