

APPENDIX B

LIST DESCRIPTION OF THE 1892 VIADUCT

CASTLEFIELD RAILWAY VIADUCT FROM G-MEX TO
DAWSON STREET

Heritage Category: Listing

Grade: II

List Entry Number: 1292315

Date first listed: 14-Feb-1988

Date of most recent amendment: 06-Jun-1994

SJ8297NW 698-1/18/115 04/02/88

MANCHESTER DEANS GATE

Castlefield Railway Viaduct from G-Mex to Dawson Street
(Formerly Listed as: DEANS GATE Castlefield Railway Viaduct
from Central Station, dividing into 2, rejoining an) II

GV

Railway viaduct. c.1880. Cast iron and wrought iron (?); red brick to east of Duke Street. Runs south-west from former Central Station, then westwards, dividing into two over Castlefield and rejoining 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 Dawson Street.

Listing NGR: SJ 83220 97620

[Read it online here >>](#)

APPENDIX C

LIST DESCRIPTIONS

THE GIANTS BASIN

Heritage Category: Listed Building

Grade: II

List Entry Number: 1247068

Date first listed: 06-Jun-1994

MANCHESTER

SJ8297 POTATO WHARF 698-1/18/319 (East side) The Giant's Basin

GV II

Circular weir. Probably 1765, by James Brindley, for Duke of Bridgewater, altered in C19. Coursed squared sandstone. Circular structure approx. 10m in diameter, with 2-course sloped lip. Part of hydraulic system by which the Bridgewater Canal terminus basin exploited the course of the River Medlock, which was diverted through a culvert running from east of Deansgate at Knott Mill to Potato Wharf, and the canal overflow was returned to the river via this weir. Simple structure of national historical importance. Forms group with canal basin at Potato Wharf (q.v.), and with Castelfield Railway Viaduct (q.v.), and Culvert arches, New Elm Road (q.v.); associated with Floodgate, Deansgate (q.v.).

Listing NGR: SJ8298097679

[Read it online here >>](#)

PAIR OF CULVERT ARCHES OVER RIVER MEDLOCK AND ASSOCIATED OVERFLOW CHANNEL

Heritage Category: Listed Building

Grade: II

List Entry Number: 1283003

Date first listed: 06-Jun-1994

SJ8297 NEW ELM ROAD 698-1/18/245 (East side) Pair of culvert arches over River Medlock and associated overflow channel

GV II

Pair of culvert arches. Probably 1765, by James Brindley, for Duke of Bridgewater. Coursed squared sandstone. Two low segmental spans at an angle, over the outflows from the River Medlock culvert and the overflow culvert from the Giant's Basin, that on the right lower and with a plain arch-band. Part of hydraulic system by which the Bridgewater Canal terminus basin exploited the course of the River Medlock, which was diverted through a culvert running from east of Deansgate at Knott Mill to this position, and the canal overflow was returned to the river via a circular weir at Potato Wharf known as the Giant's Basin. Simple structure of national historical importance. See also Giant's Basin, Potato Wharf, and Floodgate, Deansgate.

Listing NGR: SJ8294997716

[Read it online here >>](#)

ROCHDALE CANAL LOCK NUMBER 92 AND CASTLE STREET BRIDGE

Heritage Category: Listed Building

Grade: II

List Entry Number: 1270858

Date first listed: 20-Jun-1988

Date of most recent amendment: 06-Jun-1994

SJ8397NW ROCHDALE CANAL 698-1/30/364 Lock No.92 and Castle Street Bridge 20/06/88 (Formerly Listed as: CASTLE STREET, CASTLEFIELD "Canal Bridge and over Rochdale Canal adjoining lock walls with 2 pairs.gates")

GV II

Canal bridge with attached ramp on west side and lock on east side. c.1804, altered. Coursed squared millstone grit, wooden gates. The bridge has a single segmental arch with rusticated voussoirs, keystone and arch-band, a plain band above, slab-wall parapets curved round at the outer ends, and a ramp at right-angles to the north-west corner. Lock of 14-foot width, with pairs of gates at both ends; overflow tunnel with circular brick-lined shaft to south side of Castle Street. The lock is the last in a series of 9 on the extension linking the Rochdale and Bridgewater Canals.

Listing NGR: SJ8311797566

[Read it online here >>](#)

MERCHANTS WAREHOUSE

Heritage Category: Listed Building

Grade: II

List Entry Number: 1197778

Date first listed: 20-Jun-1988

MANCHESTER, CASTLE STREET (West side), Merchants Warehouse

20.06.88

GV II

Former canal warehouse serving Bridgewater Canal terminus, offices from early C21. Dated 1823 on pier between shipping holes; altered, fire-damaged and derelict when surveyed: Brown brick in English garden-wall bond, with some sandstone dressings, slate roof (damaged). Rectangular plan of 6 structural bays occupying whole of west end of north quay. West facade (to the canal) 4 storeys and 1:2:6:2:1 windows separated by former loading slots. The centre has two semi-circular arched shipping holes rising into the 1st floor, with a cylindrical sandstone pier and responds which have concave caps brought to a square, that in the centre inscribed "1823", timber lintels and wooden screens in the arches above; the loading slots have doorways at ground floor but are otherwise bricked-up, and those to the right have wooden gabled hoist-canopies; small round-headed windows with glazing bars and tilting casement openings in the lower half, all damaged. Moulded stone cornice with blocking course. The east facade is 3-storeyed, with similar windows and 4 surviving 3-stage loading slots (only partly bricked up) but the top floor of the northern half and its roof are

missing. INTERIOR: not inspected, but reported to have timber beams, and remains of winding gear in roof. Distinctive feature of Bridgewater Canal terminus site, of considerable historical interest.

Listing NGR: SJ8309997526

[Read it online here >>](#)

BRIDGEWATER CANAL BASIN AT POTATO WHARF

Heritage Category: Listed Building

Grade: II

List Entry Number: 1246959

Date first listed: 06-Jun-1994

POTATO WHARF (East side), Bridgewater Canal basin at Potato Wharf

GVII

Canal basin. Probably c.1760-5, by James Brindley, for Duke of Bridgewater: Branches off north side of Bridgewater canal near Castlefield terminus. Lined with stone blocks. Forms group with the circular overflow basin slightly to the east (known as Giant's Basin) and with Castlefield Railway Viaduct.

Listing NGR: SJ8290497624

[Read it online here >>](#)

REMAINS OF EASTERN WALL OF THE ROMAN FORT

Heritage Category: Scheduled Monument

List Entry Number: 1001953

Reasons for Designation

Not currently available for this entry.

History

Not currently available for this entry.

Details

This record has been generated from an "old county number" (OCN) scheduling record. These are monuments that were not reviewed under the Monuments Protection Programme and are some of our oldest designation records. As such they do not yet have the full descriptions of their modernised counterparts available. Please contact us if you would like further information.

[Read it online here >>](#)

MANCHESTER SOUTH JUNCTION AND ALTRINCHAM RAILWAY VIADUCT

Heritage Category: Listed Building

Grade: II

List Entry Number: 1200837

Date first listed: 06-Jun-1994

Date of most recent amendment: 26-Feb-2013

Summary

Railway viaduct for the Manchester South Junction & Altrincham Railway Company, 1846-9, constructed by David Bellhouse Jnr. Red brick with some small sections of blue brick, sandstone dressings and cast-iron bridges.

Reasons for Designation

The Manchester South Junction & Altrincham Viaduct is designated at Grade II for the following principal reasons:

* Design interest: it is an impressive 1 3/4 mile long urban viaduct incorporating a series of well-detailed bridges; some with highly decorative Gothic-style ironwork;

* Date: it is an early example of a railway viaduct dating from the second phase of railway development - the period from 1841-50 often referred to as 'railway mania' - in which commercial speculation and competition for routes led to the rapid construction of lines and expansion of the railway network;

* Historic interest: the viaduct forms an important and integral component of the Manchester South Junction & Altrincham Railway, which was one of the country's earliest suburban railways, and Manchester's first; helping to bring this form of transport to the hinterlands;

* Group value: the viaduct has strong group value with neighbouring railway structures (both contemporary and later), including two other railway bridges crossing the River Irwell (the 1830 Grade I listed stone bridge and the 1869 Grade II listed girder bridge) and their associated viaducts, the Grade II listed Castlefield Viaduct (c1880), the Grade II listed stations of Manchester Oxford Road (1958-60) and Deansgate (1896), and the Grade II listed former goods offices (c1850-60) and train shed (c1881) at Manchester Piccadilly Station.

History

The Manchester South Junction & Altrincham Railway viaduct was constructed in 1846-9 by David Bellhouse junior for the Manchester South Junction & Altrincham Railway (MSJ&AR) Company; Bellhouse was also responsible for laying the track. Several of the cast-iron bridges situated along the viaduct were built by his son, the engineer and iron-founder, Edward Taylor Bellhouse, along with others by the line's Chief Engineer, William Baker, and William Cubitt.

The MSJ&AR line is one of the country's earliest suburban railways and was the first in Manchester. It was started as a joint venture between the Manchester & Birmingham Railway (later the London & North Western Railway, LNWR) and the Sheffield, Ashton-under-Lyne & Manchester Railway (later the Manchester, Sheffield & Lincolnshire Railway, MS&LR) which operated London Road Station (known as Manchester Piccadilly Station since 1960). The aim was to create an extension of their lines, known as the South

Junction line, that would be carried along the southern boundary of the city centre on a viaduct and then join the Liverpool and Manchester Railway at Ordsall Lane in Salford, providing access to the lucrative port and city of Liverpool. A branch line, leaving the South Junction line at Castlefield, would also follow the Bridgewater Canal to Altrincham. The Manchester South Junction & Altrincham Railway Act received Royal Assent on 21 July 1845.

300,000 cubic feet of stone (91,440 cubic metres), 50 million bricks and 3000 tons (3048 tonnes) of cast iron were used in the viaduct's construction. The MSJ&AR line opened on 20 July 1849, although sections of the viaduct were not opened until 1 August 1849. The line ran for 8 1/2 miles from London Road Station via Oxford Road and Deansgate Stations to Altrincham, with the viaduct forming a 1 3/4 mile (2 3/4 km) long stretch: the northern branch terminating at the north-west bank of the River Irwell, and the southern branch terminating at the east side of Dawson Street.

Details

LOCATION: The viaduct runs from Manchester Piccadilly Station via Oxford Road and Deansgate, following approximately the route of the River Medlock (crossing it at a number of points), and then branches into two at Castlefield, with the northern branch terminating on the north-west side of the River Irwell, and the southern branch terminating at the east side of Dawson Street.

ARCHITECTURE: The viaduct is approximately 1 3/4 mile (2 3/4 km) long and incorporates 224 brick arches that average a span and height of approximately 30ft, and a width of 28ft; many of the arches, particularly those near to Manchester Oxford Road Station and Deansgate Station, have been in-filled and converted into commercial premises. The tallest arches can be found in the section between Manchester Piccadilly and Oxford Road stations where the ground level is lower. A brick parapet has been altered

and rebuilt in places and later repairs have been carried out to some of the arches.

The viaduct incorporates a series of predominantly arched, cast-iron bridges by Edward Taylor Bellhouse, William Baker and William Cubitt that cross various streets, the Rochdale Canal, and the Bridgewater Canal. The bridges have an average span of 70ft, although one of Baker's bridges, which spans the Rochdale Canal has a span of 105ft. A number of the bridges incorporate highly decorative Gothic-style ironwork and detailing and castellated towers (referencing the location of a Roman fort at Castlefield), whilst others, such as a bridge over Gloucester Street are more classically detailed. A bridge over Egerton Street by William Baker was replaced in steel in 1976. Some of the viaduct's brick arches and bridges are skewed. The Irwell Bridge at the north-west end of the viaduct is of brick with two segmental arches, each of approximately 65ft span, with a central pier and cut-water. Rusticated stone voussoirs and pilaster strips exist to the central pier and abutments, and the parapet above the western arch incorporates cast-iron panelling.

Following electrification of the line in the C20 the viaduct now incorporates a series of C20 and early-C21 gantries along its course. Also along the viaduct's course are a number of attached or abutting buildings, most of which are later in date and are un-related to the viaduct's use; all are excluded from the listing, which relates solely to the viaduct. Manchester Piccadilly Station, Deansgate Station and Manchester Oxford Road Station (the two latter stations being constructed on top of and to the side of the viaduct) are all separately listed at Grade II.

[Read it online here >>](#)

FORMER CANAL FLOUR MILLS, EGERTON STREET

Heritage Category: Listed Building

Grade: II

List Entry Number: 1200858

Date first listed: 09-Nov-1992

Details

MANCHESTER

SJ8297 EGERTON STREET 698-1/18/123 (East side) 09/11/92
Former Canal Flour Mills

GV II

Flour mills, now warehouses, etc, and partly unoccupied at time of survey. 1896, by William Waddington. Red brick (part now painted), 4-span slate roof. Irregular plan within a square, on structural axis parallel to Egerton Street, with north end to Bridgewater Canal and integral canal basin entered through shipping hole. Utilitarian style with Italianate features. Four storeys over basement, plus a tower and campanile-style chimney; with pilastered facades of 6 unequal bays to Egerton Street and 4 unequal gables at the south end. Each bay has a Lombard frieze, the first 5 to Egerton Street with pairs of windows and the 6th bay with 3 windows, mostly segmental-headed except for a single round-headed opening from ground to 1st floor of the 1st bay and all those at top floor which are square-headed and shorter; all basement openings and most ground floor windows now blocked. South return wall has a wide 3-bay gable with central flat, then a 2-bay gable, and two single-bay gables, all completely altered at

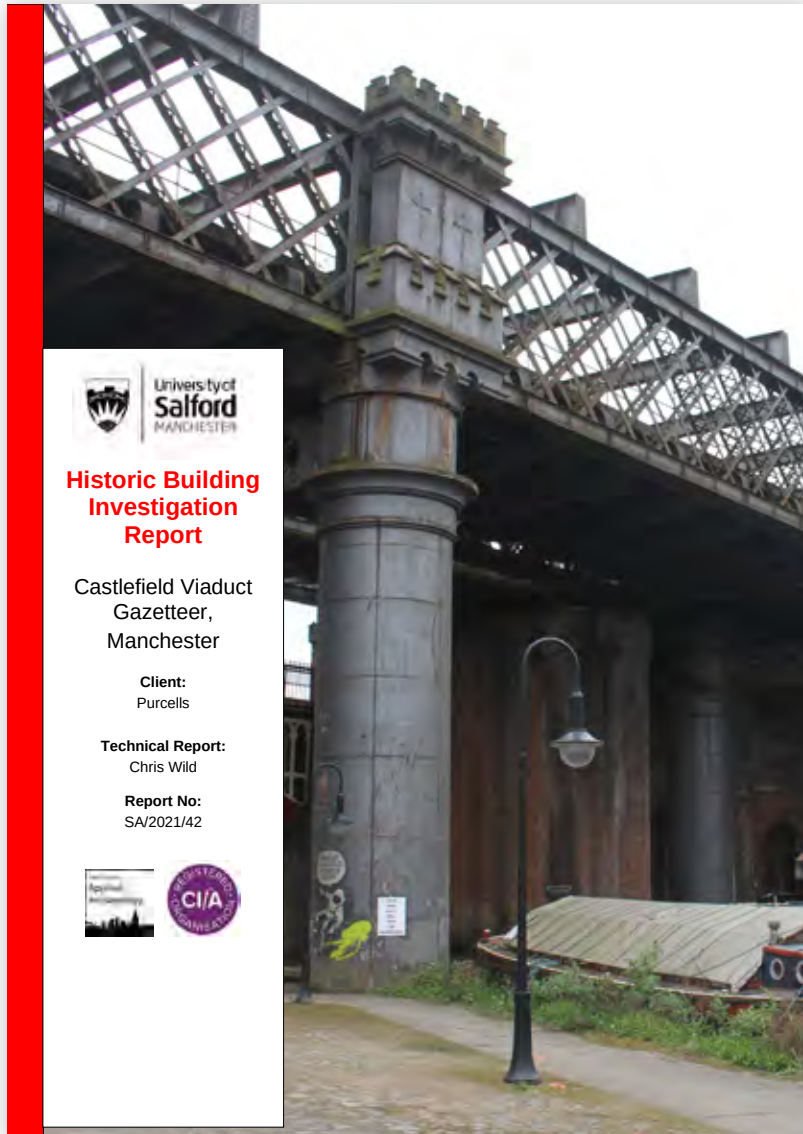
ground floor but otherwise with fenestration like that at the front except the top floor which has stepped round-headed windows. The north end has (inter alia) a large shipping hole; and a square sprinkler tower with narrow 2-bay sides which have round-headed lancets and corbel tables, a machicolated parapet (enclosing the water tank), and a square chimney at the north east corner in similar style. Interior (as reported by GMAU 1989): intact loading and unloading facilities for canal boats; timber floors supported by steel beams and cast-iron columns; disused pump in basement for artesian well. Included as unusually complete example of flour mill related to canal.

Listing NGR: SJ8286797461

[Read it online here >>](#)

APPENDIX D

GAZETTEER



Location: Castlefield, Manchester

NGR: Centred at NGR SJ 83220 97620

Project: Castlefield Viaduct Gazetteer, Manchester:

Internal Ref: SECL2101

Report No: SA/2021/42

Prepared for: Purcells

Document: Historic Building Investigation Report

Version: Version 1

Author: Chris Wild
Position: Project Manager
Date: May 2021

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1. Introduction

1.1 Project Background

In April 2021, Salford Archaeology was commissioned by Purcells to produce a technical heritage gazetteer for Castlefield Viaduct, Manchester (centred around SJ 83220 97620; Plate 1). This will form part of a Statement of Historical Significance for the Grade II Listed structure, being produced by Purcells for the National Trust as part of a scheme to regenerate the disused viaduct into a public open space

The Viaduct was designed in 1890 and built by Heenan & Froude on behalf of the Cheshire Lines Company, being completed by 1893. The large lattice girder bridge represents the earliest known use of carbonised steel within railway bridge construction, and represented a widening of the exiting viaduct from Central Station to Cornbrook to serve the Great Northern Railway’s Warehouse that was under construction on Deansgate by this date.



Plate 1: Google Earth® model view from the north

2. Gazetteer of Features

2.1 Introduction

A site visit was undertaken by Salford Archaeology on 28th April 2021. The on-site recording comprised a brief description of the monument and the compilation of a gazetteer of the individual features that formed the bridge and any phasing that occurred throughout its period of use from 1893 to c1960. This was accompanied by a photographic record, taken using a high resolution digital SLR camera. A rapid 3D laser scan was also made of the structure, as it may prove useful to illustrate features within the gazetteer during a future phase of the project, and also to allow the accuracy of existing drawings of the site to be checked.

2.2 General Description

The northern of the three 'Castlefield Viaducts' comprises a high-level lattice girder bridge, largely of carbonised steel and cast-iron construction, with brick and stone approach viaducts. The deck is up to 60' (18.29m) above ground level, carried on 15 cast-iron columns, for a total length of 1105' (336.8m). It has an approximate east/south-west alignment, curving gently along its length (Plate 2). Either end of the lattice girder bridge is accessed via an approach viaduct of brick construction, with sandstone copings, carried on round-headed arches. The bridge is of eight double-lattice spans, with an extra span at the eastern end of the southern side, onto the approach viaduct.

Each span comprises a double web of flat steel lattice bars, which vary in width within each span, being wider at the ends and narrowing towards the centre. All joints are riveted into each other and onto a diamond lattice of flat bracing bars joining the two webs onto T-sections beams. The upper girder rail of each span is of I-section steel, and of 20' (6.10m) length, comprising two channel-section rails forming the web below a 3'6" (1.07m) wide top flange to the upper rail, and a similar width lower flange forming the bottom of the girder. All members are jointed with rivetted plates on the web faces, and both flanges and with three T-section beams bracing the web to the upper and lower flanges. Additional L-section brackets to the upper flange are placed on more irregular spacings.

The end of each span comprises four vertical panels above deck level, with two below, all riveted onto the inner face of the lattice beams and braced with T-section vertical and horizontal members, creating the six panels. Within several spans additional flat beams have been riveted onto the inner face of the main inner lattice beams, generally set below deck level and rising up to c1m above, either with angled or pointed upper ends. It is unclear whether these represent original strengthened or later additions, although the rivets appear similar to those used in the original construction.

The two lattice girders of each span are laterally braced across the viaduct by solid-web I-section steel portals, placed on short I section upstands, and representing mid-20th century replacements of original lattice-web girders shown to have been still in place on aerial photographs from the 1940s. These are also placed on 20' (6.10m) centres,



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comprising 53 members in total. The sixth portal from the eastern end of the viaduct has a gantry platform installed with an access ladder on the southern side, and is presumed to be contemporary with the portal replacement.

The western span of the viaduct has an additional vertical steel panel placed approximately 4m from the western end on both the north and south spans. These comprise a channel-section beam to either face, bolted onto the crossing point of the lattice bars, rather than rivetted, demonstrating them to be of later date. Each houses two short channel-section brackets on the outer east and west faces, parallel with the joints in the adjacent lattice beams, possibly carrying the ends of bars, either fixed or removable, across the viaduct.

The deck is of riveted steel plates exposed in several areas, but generally covered by ballast with a bitumen sealing below ballast. The ballast and c25mm of bitumen waterproofing have been removed in one area to reveal the steel plate sheeting of the deck. The individual sheets are riveted onto joining plates beneath the deck, but additional members on the deck, of both L-section and flat bar are joined with hexagonal bolts, possibly representing later strengthening. Parts of an external lip to the deck can also be seen in places, formed using an L-section edge rail. The deck is perforated by many drainage holes that lead into channels beneath the viaduct. Given the extensive covering of ballast and vegetation, it is presently difficult to establish how many of these are original and how many have been inserted more recently, but in the penultimate eastern span of the viaduct, a row of five round steel grates are visible above hoppers that carried rainwater through the deck into a drain channel below. A further two drain grates were observed within the eastern span, and presumably survive extensively below the ballast, as several drainage channels can be seen on the underside of the viaduct. The channel section web of the lower girder of each span also retained water in the trough formed by its construction, but there appears to have been no mechanism for draining water that accumulated here.

The deck of the bridge is carried on solid web, I-section cross beams of 18" (0.46m) width, that are bullnosed at either end, where they project beyond the deck to the flange of the lower girder. Each beam is fish-bellied, to a maximum depth of c4' (1.22m), with the beams being placed on 13'4" (4.06m) centres. Six longitudinal I section beams span from the base of the top flange, carrying the 6 x 4' (1.83 x 1.22m) deck plates above, supported by short I-section upstands to the lower flange, riveted to both the beam and the web of the main cross members.

The lower rail of each lattice girder is clasped by the square head of one of the 15 cast-iron columns. Each column is 10'6" (3.20m) diameter and comprises cast-iron panels around a poured concrete centre. Panels are typically 6' (1.83m) square, but diminish in height below a 14'6" (4.42m) wide, flat-topped astragal that carries a lattice web tie-girder between opposing columns on either side of the viaduct. The square-section capital has decorative flanges and carries a cap moulding to the external face that masks the junctions between spans. These are also of cast-iron sheet, and have a similarly moulded, decorative capital below crenelations. The column cap is not attached to the lattice girder of the bridge itself, standing proud of the lattice web face. Brick piers at the end of each approach viaduct have similar sandstone mouldings, below a pedimented capping, rather than a crenelation. The brick is of Staffordshire Blue type, largely in Flemish Bond, but with instances of Flemish Garden Wall Bond also observed.



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Concrete ducting runs along the northern side of the viaduct, on the inner face of the northern lattice girder, placed on the deck plates and obscured in part by the track ballast. It comprises a channel section pre-cast base with square concrete flag cappings, and would have housed electrical cables, dating from the mid-20th century. A plastic electrical fuse box was also observed, attached to the northern lattice girder, and was associated with halogen lighting affixed to the outer face, presumably of late-20th century date.

Late edge protection has also been installed along the majority of the viaduct, against the internal face of both the north and south lattice girders, comprising scaffolding poles and timber planked toe boards. These were probably installed in the early 21st century, to all but the western and two eastern spans, and is shown in the report of 2010. The western span is without any protection, whilst the eastern end of the viaduct has painted aluminium sheet panelling against the inner face of each girder, to approximately the mid-height of each lattice, and presumably post-dates the 2010 inspection.

Several fragments of broken structure are visible on the deck bed including a few remnants of flat steel bars that may have formed part of the lattice beams that originally spanned across the viaduct between the two girders. Large quantities of much smaller undiagnostic fragments are possibly of similar origin, and lie within the ballast throughout the viaduct. One large channel-section beam lying on the surface of the ballast is of unclear function, and may not have formed part of the viaduct structure, instead having been left following the removal of the tracks. One baseplate for track fastening to a sleeper was also observed, and this appeared to have the broken end of a pandrol clip attached, suggesting a date of post-1957.



2.3 Gazetteer

Feature Number: **01**

Name: Eastern Approach Viaduct

Significance: High

Description: Brick-built approach viaduct in Staffordshire Blue brick. Single span with wide round-headed brick arch, that returns into eastern pier and has two diminishing arches within its northern side (Plate). Externally faced in Flemish bond, with a sandstone impost to the external arch and a sandstone string course at deck level. A projecting pilaster at its junction with the bridge is also of Staffordshire Blue brick, with recessed panels in the outer face above and below a decorative sandstone capital at the level of the bridge deck. Above this, the pilaster narrows, and rises above the lattice girder bridge where it has decorative sandstone corbels to a triangular sandstone pediment.

To the east of the pilaster, the approach viaduct has a 2' (0.61m) high parapet wall, capped with iron railings, with a short section of wall at its western end, translating wall height from deck parapet level to that of the height of the lattice girder. This is in similar brickwork, but in English bond, and with a convex quadrant between the two heights, capped with sandstone copings. The upper wall is also recessed from the parapet wall below, with a chamfered brick offset.



Eastern approach viaduct from the north





Eastern approach viaduct: detail of decorative pilaster



Eastern approach viaduct: north internal face



Feature Number: **02**

Name: Western Approach

Significance: High

Description: The western approach forms part of the adjacent six span contemporary viaduct that continued the new line to the west. This was also constructed in Staffordshire Blue brick with sandstone copings, with a dated ornate arch over the crossing of what is now the A57 Mancunian Way. The datestone reads C.L.C. 1892, demonstrating it to form a contemporary construction to the lattice girder viaduct. The approach lies entirely beyond the study area but has an internal parapet similar to that of the eastern approach on its northern side.



Western approach viaduct: north internal face

Feature Number: **03**

Name: Lattice Girders

Significance: High

Description: The north and south lattice girders for the main element of the viaduct, and are of carbonised steel construction. Each comprises several spans (eight on the northern side and nine to the south), made up of several components, which have been ascribed suffixes within the gazetteer as elements of the larger lattice girder structure.





Double-webbed lattice girders forming both sides of the viaduct

Feature Number: **03a**

Name: Lattice Girders: Top Girder

Significance: High

Description: The top rail of the lattice girder is formed of carbonised steel beams of 20' (6.10m) length. It comprises two channel-section beams forming the double web and lower part of the flange, below a 3'6" (1.07m) wide flat plate that forms the top flange. This comprises between one and six plates in thickness, depending on the position within each span, being thicker towards the centre.

All members are rivetted together, with the top and bottom rails of the channel-section beam comprising L-section steel bars that are rivetted onto the web. The web and flanges are strengthened at ¼ intervals (6'8" (2.03m)) with T-section vertical bracing bars (**03g**), and are jointed together with rectangular fishplates across the web (**03h**).



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Top girder of the north elevation of the viaduct

Feature Number: **03b**

Name: Lattice Girders: Bottom Girder

Significance: High

Description: The bottom girder of the viaduct is of similar construction to the top girder, but is placed at deck level, obscuring much of the detail. As with the top girder, the flange comprises a separate 3'6" (1.07) wide flat steel sheet, joining the two channel section beams that form the double web. This forms a drainage channel on the outer edges of the viaduct, large sections of which retain water. This was probably unintended in the original construction and may relate to blockage of drains, or build up of sediment preventing flow out of the channels. As with the upper flange of the top girder, the bottom flange comprises between one and six steel plates to give additional strength to the centre of each span.



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Detail of bottom girder channel, with and without water infilling

Feature Number: **03c**

Name: Lattice Girders: Lattice Bars

Significance: High

Description: The main part of the bridge elevation comprises a double web of diagonal lattice bars. These are rivetted to the inner face of the channel section beams of the top and bottom girders, and to four perpendicular lattice bars, all on an angle of 45° and placed at 4'8" (1.42m) centres. Within each span of the viaduct, the lattice bars reduce in width towards the centre, and increase towards the outer edges, from 13" (0.33m) to 5" (0.13m).



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Detail of flat lattice bars



North elevation of lattice web, with reducing thicknesses of lattice bars towards the centre of the span



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Feature Number: **03d**

Name: Lattice Girders: Inter-web Tie Bars

Significance: High

Description: The double web of lattice girders are jointed together by a transverse lattice of small flat bars, similarly arranged on a diagonal alignment. Each is 2½" (0.06m) width, and placed on 10½" (0.27m) centres, and rivetted onto alternating faces of an L-section rail (**03e**) on the rear of the main lattice bar (**03c**).



Tie bars (03d) between the two faces of the north elevation, rivetted to L-section rails (03e)



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Feature Number: **03e**

Name: Lattice Girders: L-Section Rails for Tie Bars (**03d**)

Significance: High

Description: 2½" (0.06m) wide L-section steel rails rivetted onto the inner faces of the lattice bars (**03c**) for attachment of the tie bars between the two lattice webs (**03d**). They are arranged in an alternating pattern, fixed above and below the projecting rail.

Feature Number: **03f**

Name: Lattice Girders: Span End Panels

Significance: High

Description: The curved viaduct is made of numerous straight section spans, placed at an angle to each other to follow the curve of the viaduct alignment. At the end of each span is an end panel that gives stiffness to the lattice bar structure. These comprise four vertical panels above deck level, with two below, all rivetted onto the inner face of the lattice beams and braced with T-section vertical and horizontal members, creating the six panels. Gaps between the end panels of each span allow for the differing alignment of spans. The end panels of the northern elevation have identification lettering for each span, ranging from A to G.

The panels and gaps between are obscured externally by large cast-iron decorative pilaster (**08**), placed atop the supporting columns of the viaduct (**07**)



End panels of lattice web spans on the north elevation



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Feature Number: **03g**

Name: Lattice Girders: Top/Bottom Girder Bracing Bars

Significance: High

Description: The members of the top girders are braces at $\frac{1}{2}$ intervals (6'8" (2.03m)) with T-section vertical bracing bars. These are moulded around the L-section joint between the web and flanges of the channel-section beams that make up the girder. They are of 8" (0.20m) width, and are rivetted onto horizontal T-section beams of similar thickness, that brace between the two channel-section beams of the girder to for the lower flange. A similar arrangement on the lower girder is not visible, due to the position of the deck, but the bracing between the two channel-section beams are visible, forming the upper flange of the girder.



Vertical T-section bracing bars on web of top girder (03a), bolted to horizontal bracing bars forming the lower flange



Horizontal T-section bracing bars between webs of bottom girder (03b), forming the upper flange



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Feature Number: **03h**

Name: Lattice Girders: Top Girder Jointing Plates

Significance: High

Description: Each span comprises several 20' (6.10m) within the top and bottom girders. They are jointed with rectangular plates of 2' (0.61m) width, with three columns of four rivets to the end of each beam web.



Rectangular jointing plates on the web of the top girder (03a)

Feature Number: **03i**

Name: Lattice Girders: Top Girder L-section and Flat Plates

Significance: High

Description: Additional bracing of the girders was provided at what appear to be irregular intervals by the use of an L-section rail between the web and upper flange, with a pair of flat bars clasp the flange of the lower web immediately below. The upper rail is of 4' (1.22m) length, with a shorter 2'6" (0.75m) bar below.



Bracing rail and plates to upper and lower flanges



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Feature Number: **03j**

Name: Lattice Girders: Lattice Bar Fishplates

Significance: Medium

Description: Several of the flat lattice bars (**03c**) have short length of additional bars rivetted to the lower part of the internal web face. Some have chamfered ends, whilst others have simpler angled ends, and all are of thinner section than the original lattice beams and are fixed by better-preserved rivets, suggesting that they formed a fishplate repair at a significantly later date than the original structure.



Steel fishplate with chamfered head attached to lattice beam of the north elevation



Steel fishplate with angled head showing thinner section and less corroded rivets



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Feature Number: **03k**

Name: Lattice Girders: L-shaped brackets

Significance: Medium

Description: Two L-shaped brackets of cast-iron or steel are attached to lattice bars of the eastern span of the northern elevation, placed approximately 2m above deck level. Both are rivetted into the bar, but using larger, flatter-headed rivets than those within the adjacent bar, suggesting they represent an addition, although the use of a rivet rather than a bolt may suggest that this was undertaken relatively early.



L-shaped bracket rivetted onto the inner face of the north elevation

Feature Number: **03l**

Name: Lattice Girders: Additional vertical panels

Significance: Low

Description: The western span of the viaduct has an additional vertical steel panel placed approximately 4m from the western end on both the north and south spans. These comprise a channel-section beam to either face, bolted onto the crossing point of the lattice bars, rather than rivetted, demonstrating them to be of later date. Each houses two short channel-section brackets on the outer east and west faces, parallel with the joints in the adjacent lattice beams, possibly carrying the ends of bars, either fixed or removable, across the viaduct.



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Additional panel at the western end of the north elevation of the viaduct

Feature Number: **04**

Name: Viaduct Deck

Significance: High

Description: The deck of the viaduct was primarily formed of $\frac{3}{8}$ " (0.01m) thick steel plates, but has been sub-divided within the gazetteer into its various component parts.

Feature Number: **04a**

Name: Viaduct Deck: Deck Plates

Significance: High

Description: The deck surface is formed of seven longitudinal plates, each of 13'4" (4.06m) length. The central plate is 5' (1.52m) wide, and is flanked by wider 6' (1.83m) plates, with the two outer plates of each side of the viaduct being of 5' (1.52m) width. They are jointed with L-section bars (**04b**) and flat plates (**04c**) and were sealed with asphalt waterproofing (**04f**).



Varying widths of deck plates seen from below



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Two deck plates butting above beam below, into which they are rivetted

Feature Number: **04b**

Name: Viaduct Deck: L-Section Plates for Sleepers

Significance: High

Description: Original engineering drawings for the viaduct show that the rails were laid on longitudinal sleepers on the viaduct, as well as the other bridges within the scheme. In order to provide lateral stability, the sleepers were braced between L-section brackets, rivetted into the deck plates. One full-height, and one broken example were observed within the area of exposed deck plate, strongly suggesting that more such plates survive elsewhere below the ballast.



L-section rails rivetted onto deck plate for attachment of longitudinal sleeper



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Feature Number: **04c**

Name: Viaduct Deck: Deck Plate flat joining bars

Significance: Medium

Description: Within the exposed section of deck plates, a transverse flat bar was observed on the surface, spanning two deck plates. It did not form a joint between lengths of deck plates, and was attached with a mixture of rivets and hexagonal bolts, suggesting that it formed a repair to the deck.



Flat bar with bolts and rivets placed across the deck plates

Feature Number: **04d**

Name: Viaduct Deck: Edge Plates of Deck

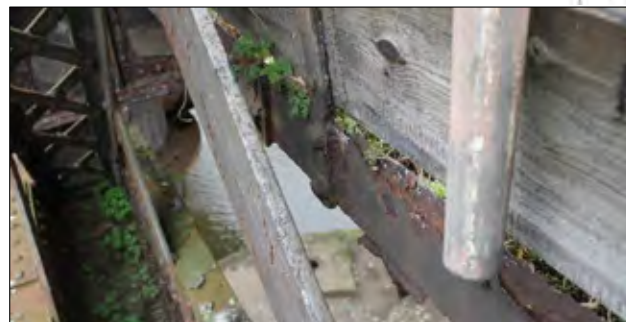
Significance: High

Description: The edge of the deck is formed by an L-section member that forms an upstanding edge to retain the ballast. This was largely obscured by both the bottom girder, and by ballast, although it was visible on its outer face, where it was typically heavily corroded, and was of approximately 6" (0.15m) height.



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Corroded edge plate of deck, with attachment for later boards

Feature Number: **04e**

Name: Viaduct Deck: Drainage Hoppers

Significance: High

Description: Drainage of the deck was provided at each span junction, with five vertical hoppers through the deck feeding gutters below. Many of the drains are visible only as depressions within the ballast, but a row of five round steel grates are visible above hoppers in the penultimate eastern span of the viaduct, with a further two drain grates exposed within the eastern span. The grates are of 1' (0.30m) diameter, and placed on 5'6" (1.68m) centres.



Grate above drainage hopper in deck plate at span joint



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Feature Number: **04f**

Name: Viaduct Deck: Asphalt / Bitumen waterproofing

Significance: High

Description: The majority of the deck retains a layer of bitumen waterproofing. This is almost entirely obscured by the ballast, and has also been removed in several places for inspection of the deck plates beneath. An inspection of 2010 reported that 25mm of tar survives above the deck plates (Jacobs 2010), and the original engineering drawings for the construction of the viaduct specified '½" of asphalt covered with fine sand'. It is unclear whether the majority of the extant covering is original 19th century tar, or represents more modern renewal, replaced during maintenance.



Exposed bitumen on the deck

Feature Number: **05**

Name: Transverse Girders

Significance: High

Description: The deck of the bridge is carried on solid web, I-section transverse girders of 18" (0.46m) width. These are bullnosed at either end, where they project beyond the deck to the flange of the lower girder, which carries either end of the beam. Each beam is fish-bellied, to a maximum depth of c4' (1.22m), with the beams being placed on 13'4" (4.06m) centres.



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Fish-bellied transverse girders carrying the deck



Bull-nosed outer end of fish-bellied transverse girder



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Feature Number: **06**

Name: Deck Plate Jointing Beams

Significance: High

Description: Six longitudinal I-section beams span from the base of the top flange, carrying the seven deck plates above. They are supported by short I-section upstands to the lower flange, riveted to both the beam and the web of the main cross members. They are braced by T-section cross beams (**06a**) across the base of the deck, of apparent similar 8" (0.20m) to those of the upper and lower girders of the double-lattice web spans.



*I-section beams carrying the joints of the deck plates, with lateral T-section bracing bars to the deck plates (**06a**)*

Feature Number: **07**

Name: Viaduct Columns

Significance: High

Description: The

The lower rail of each lattice girder is clasped by the square head of one of the 15 cast-iron columns. Each column is 10'6" (3.20m) diameter and comprises cast-iron panels around a poured concrete centre. Panels are typically 6' (1.83m) square, but diminish in height below a 14'6" (4.42m) wide, flat-topped astragal that clasps the lower flange of the bottom girder of two spans of the double-web lattice girder above. The square-section capital has decorative flanges and projects beyond the external face of the double-web lattice above, carrying a decorative pilaster above (**08**). The flat upper edge of an astragal to the base of the capital forms an offset to carry the lower flange of transverse tie girders (**09**), that span between columns across the viaduct.



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Columns carrying the viaduct



Detail of column



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Feature Number: **08**

Name: Column Pilasters

Significance: High

Description: The square-section capital of the column carries a cap moulding to the external face of the viaduct that masks the junctions between spans. These are also of cast-iron, and have a similarly moulded, decorative capital below crenelations. Further crenelation form a chamfer to a narrowed central shaft, that has two indented crosses, representing arrow loops, rather than religious motifs, and presumably designed to reflect the name 'castle' within Castlefield. The pilasters are not directly attached to the lattice girder of the bridge itself, standing proud of the lattice web face, but have latterly been attached with steel cables and bolts.



Detail of decorative pilaster atop column



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Late steel cables securing free-standing pilaster on its internal face

Feature Number: **09**

Name: Cross Tie Lattice Girders

Significance: High

Description: The columns are braced laterally by substantial I-section lattice-web girders, placed on an offset above an astragal at the base of the column capital, and clasping the shaft of the column above. The girders are 6' (1.83m) tall at either end, and have a slight concave profile to the lower flange, raising it's midspan by 6" (0.15m). The web of the beam represents an open casting, but is braced on either face by a lattice of channel-section 4" wide beams. Each flange comprises three lengths, jointed by rivetted plates.



Lattice web Tie Girders spanning between columns across the viaduct



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Detail of tie girder

Feature Number: **10**

Name: Cross Viaduct Portal Beams

Significance: Low

Description: The original engineering drawings for the viaduct show overhead bracing beams of double web lattice construction, as do aerial photographs from the 1940s. These were replaced c1960 with solid web steel portal beams. These are placed on 20' (6.10m) centres, comprising 53 members in total, and whilst they perform a functional role of bracing between the north and south elevations of the viaduct, their unsympathetic design detracts from the visual significance of the viaduct.



Late steel portal beams that replaced original lattice beams across the viaduct



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Feature Number: **11**

Name: Drainage Gutters

Significance: High

Description: The drainage hoppers within the deck of the viaduct (04e) feed into conical pipes that fall into square-section gutters. Several original examples survive, but others have been replaced in full or in part, having been observed as dangerously corroded during the inspection of 2010 (Jacobs 2010). They feed into cast-iron down pipes that follow the contours of the column of each span on the southern side of the viaduct, except for where the viaduct is adjacent to the earlier viaduct to the south, where a short square-section length of gutter feeds into the downpipe on the northern face of the earlier structure.



Replaced hoppers and gutter, with original downpipes on the southern columns



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Square-section gutter feeding into downpipe of earlier viaduct to the south

Feature Number: **12**

Name: Ballast

Significance: Medium

Description: The majority of the viaduct is covered with varying thickness of railway ballast. This has probably been renewed or augmented at various times, but not only serves to protect the deck, but also gives good visual representation of the viaducts use as a railway. Undulations within the ballast may form an indication of the three track arrangement of the viaduct, but this was difficult to ascertain given the vegetation and disruptions within the levels of ballast.



General view of the viaduct looking east, with possible mounding of ballast between the three tracks



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Feature Number: **13**

Name: Concrete Cable Ducting

Significance: Low

Description: Concrete ducting runs along the northern side of the viaduct, on the inner face of the northern lattice girder, placed on the deck plates and obscured in part by the track ballast. It comprises a channel section pre-cast base, generally with square concrete flag cappings, although several areas had two-piece rectangular cappings. It would have housed electrical cables relating to the electrification of signalling and points, rather than overhead electrification of the lines, which may not have happened prior to its closure. The ducting dates from the mid-20th century.



Concrete ducting for electric cabling



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Feature Number: **14**

Name: Overhead Gantry

Significance: Low

Description: The sixth overhead portal from the eastern end of the viaduct has a gantry platform installed with an access ladder on the southern side. This is presumed to be of contemporary date to the portal replacement in the mid-20th century



Overhead gantry with access ladder on the southern side of the viaduct

Feature Number: **15**

Name: Lighting

Significance: Low

Description: A plastic electrical fuse box was also observed, attached to the northern lattice girder, and was associated with halogen lighting affixed to the outer face, presumably of late-20th century date. Earlier round light fittings attached to the I-section deck plate beams (**06**) beneath the viaduct are probably of mid-20th century date.



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Fuse box and halogen light on the north elevation, with earlier streetlamp attached beneath the deck

Feature Number: **16**

Name: Edge Protection

Significance: High

Description: Late edge protection has also been installed along the majority of the viaduct, against the internal face of both the north and south lattice girders, comprising scaffolding poles and timber planked toe boards. These were probably installed in the early 21st century, to all but the western and two eastern spans, and is shown in the report of 2010. The toe boards are bolted onto the outer edge of the deck plates (**04d**). The western span is without any protection, whilst the eastern end of the viaduct has painted aluminium sheet panelling against the inner face of each girder, to approximately the mid-height of each lattice, and presumably post-dates the 2010 inspection.



Scaffold and metal sheet edge protection on the southern elevation



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Feature Number: **17**

Name: Vegetation

Significance: Low

Description: The deck of the viaduct is entirely covered with vegetation. This ranges from short grasses, particularly at the eastern end, to shrubs and sapling trees in the central and western parts. These appear to be managed to some degree, preventing significant root damage to the structure.

Whilst the vegetation detracts from the interpretation of the viaduct as a railway, it does possess an aesthetic value that may lend itself to the future use of the structure.



Scrub vegetation towards the western end of the deck

Feature Number: **18**

Name: Detached artefacts

Significance: Low/Medium

Description: Several fragments of broken structure are visible on the deck bed including a few remnants of flat steel bars that may have formed part of the lattice beams that originally spanned across the viaduct between the two girders. Large quantities of much smaller undiagnostic fragments are possibly of similar origin, and lie within the ballast throughout the viaduct. One large channel-section beam lying on the surface of the deck is of unclear function, and may not have formed part of the viaduct structure, instead having been left following the removal of the tracks. One baseplate for track fastening to a sleeper was also observed, and this appeared to have the broken end of a pandrol clip attached, suggesting a date of post-1957.



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Broken fragments of lattice bars on the deck of the viaduct



Channel section beam on the deck of the viaduct



Track baseplate discarded on the deck of the viaduct



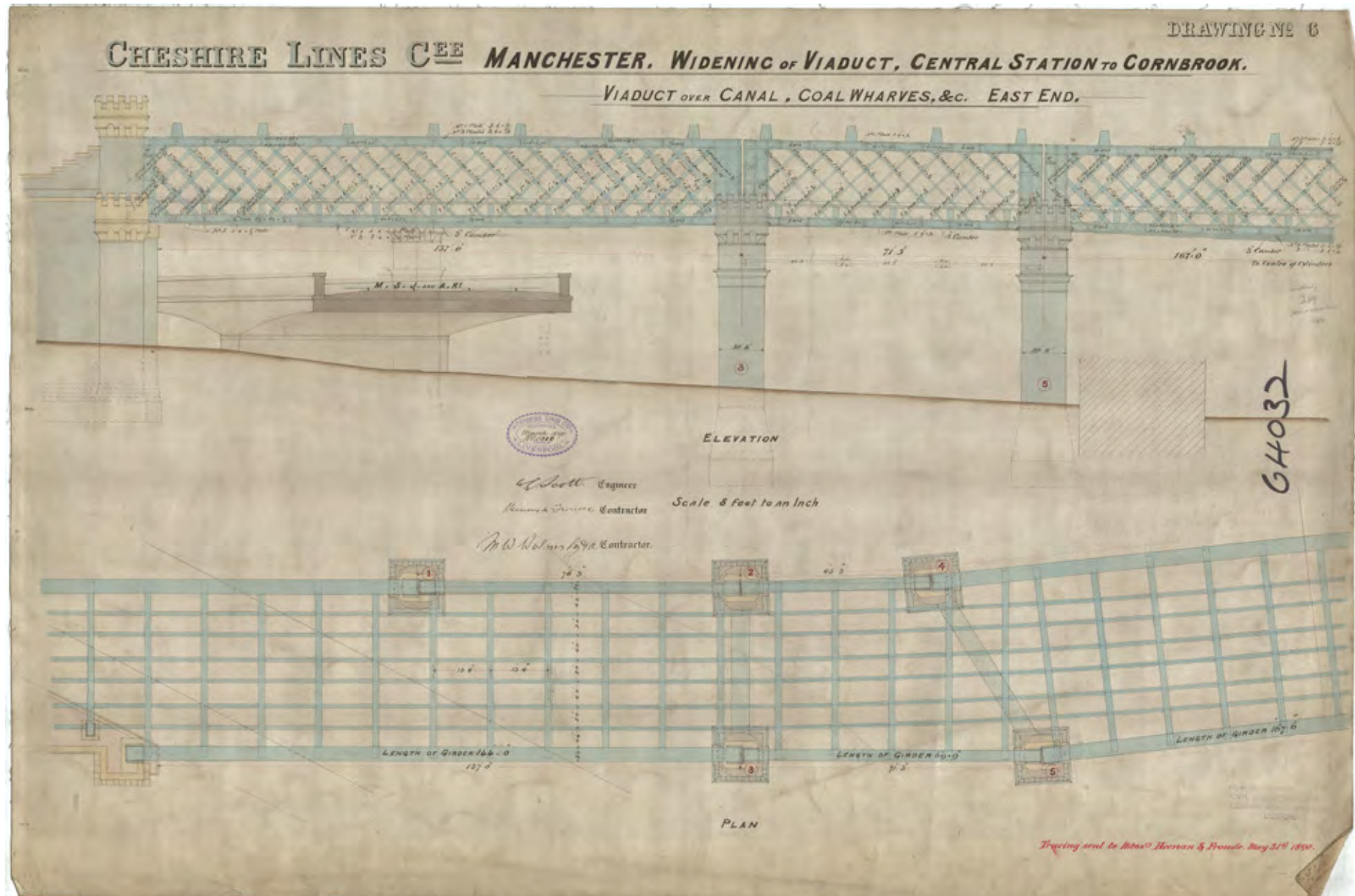
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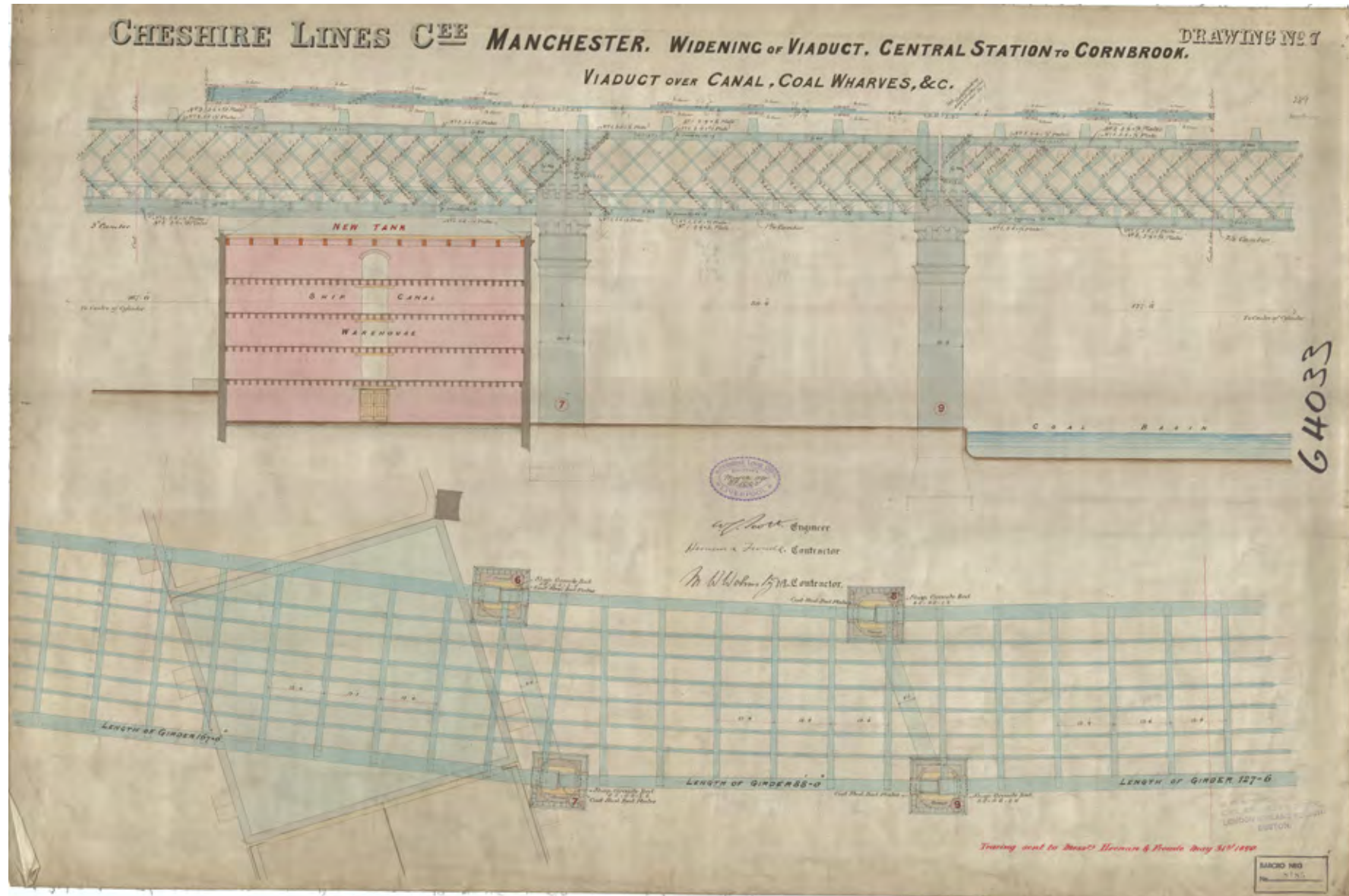
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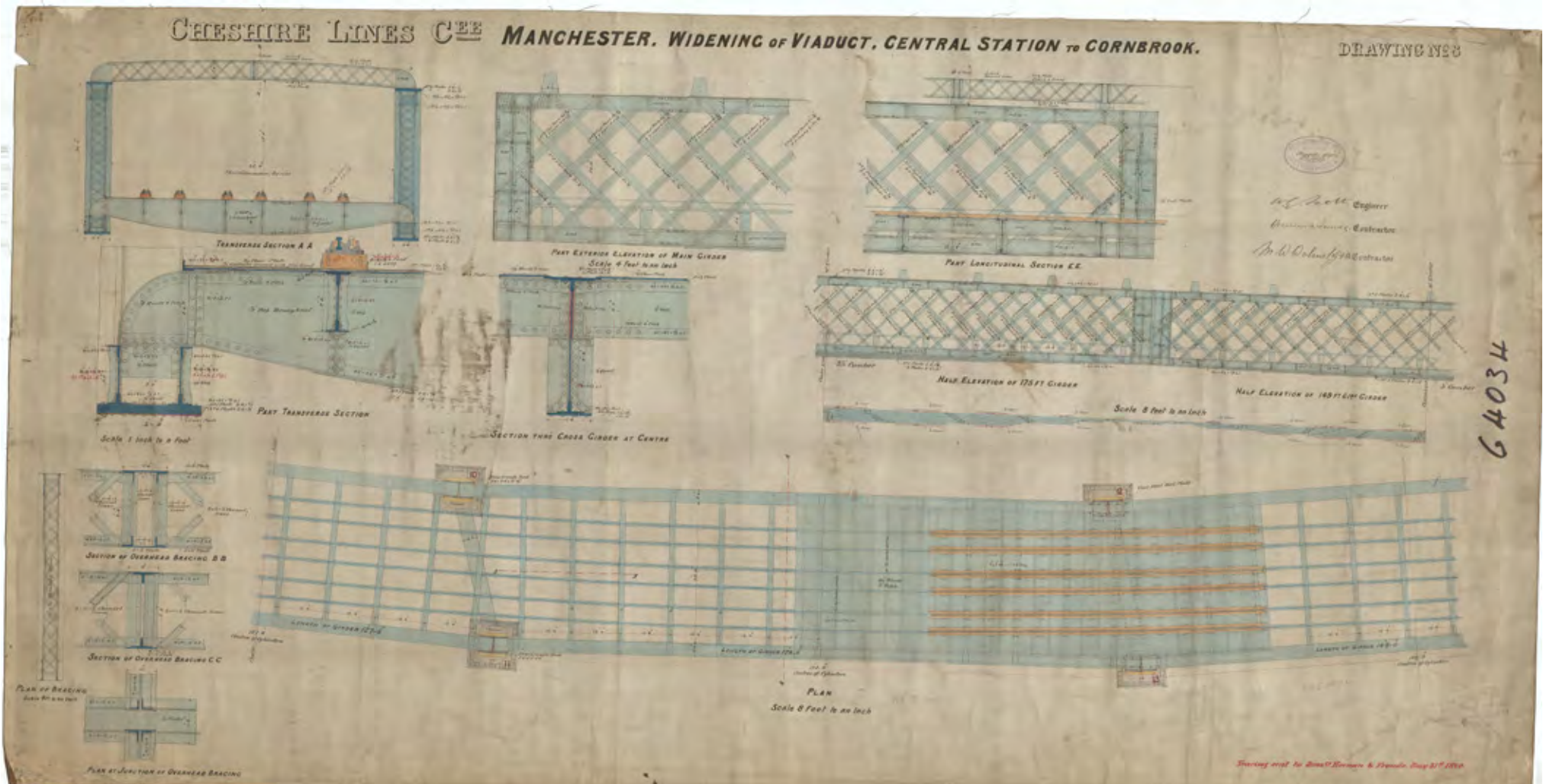
APPENDIX E

1890 ENGINEERING SKETCHES OF THE VIADUCT FROM THE NETWORK RAIL ARCHIVES

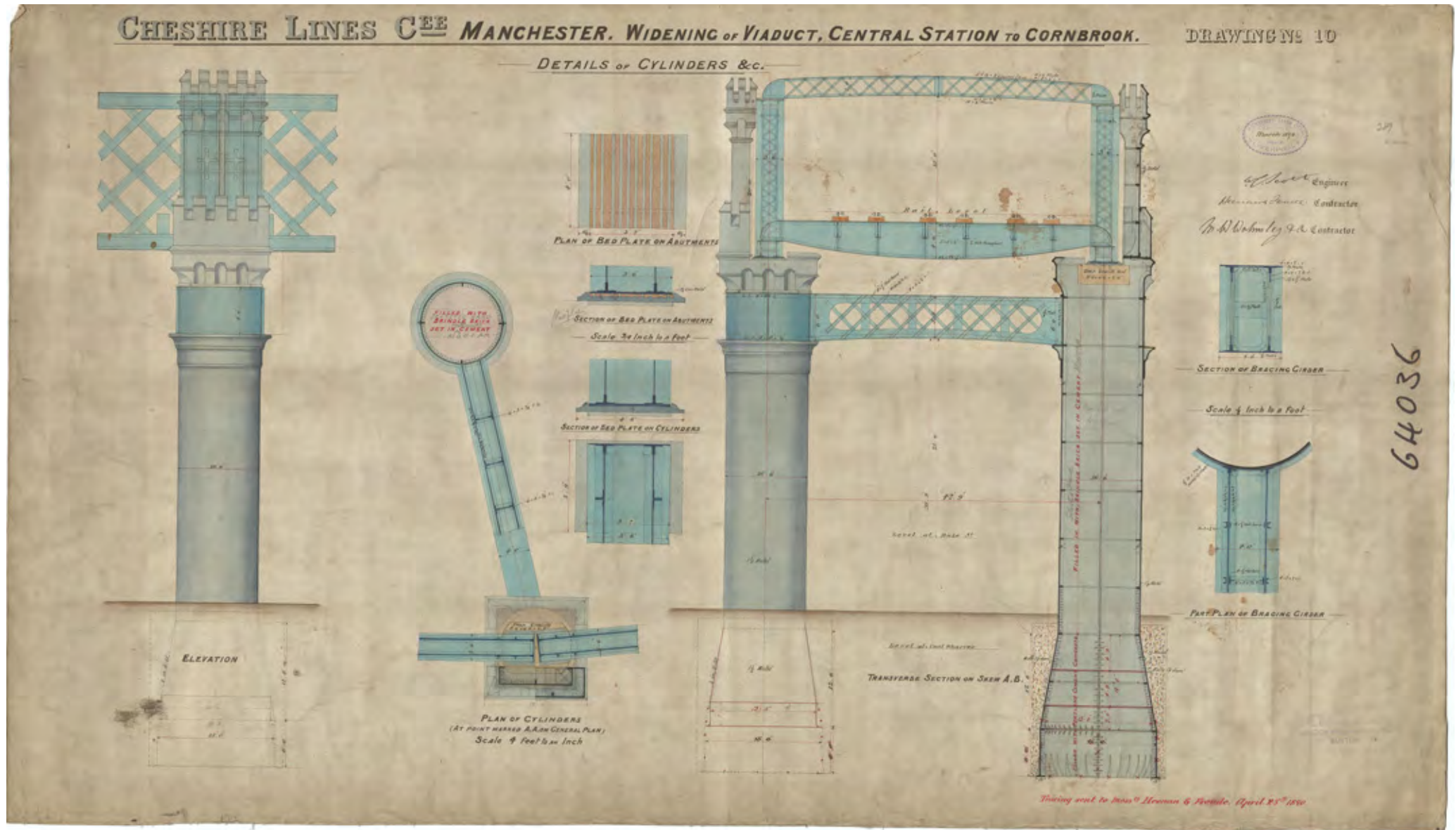
Please note the full archive contained over 80 pages of drawings and only a selection of these are reproduced here. They full set can be viewed at the [Network Rail Archives](#).

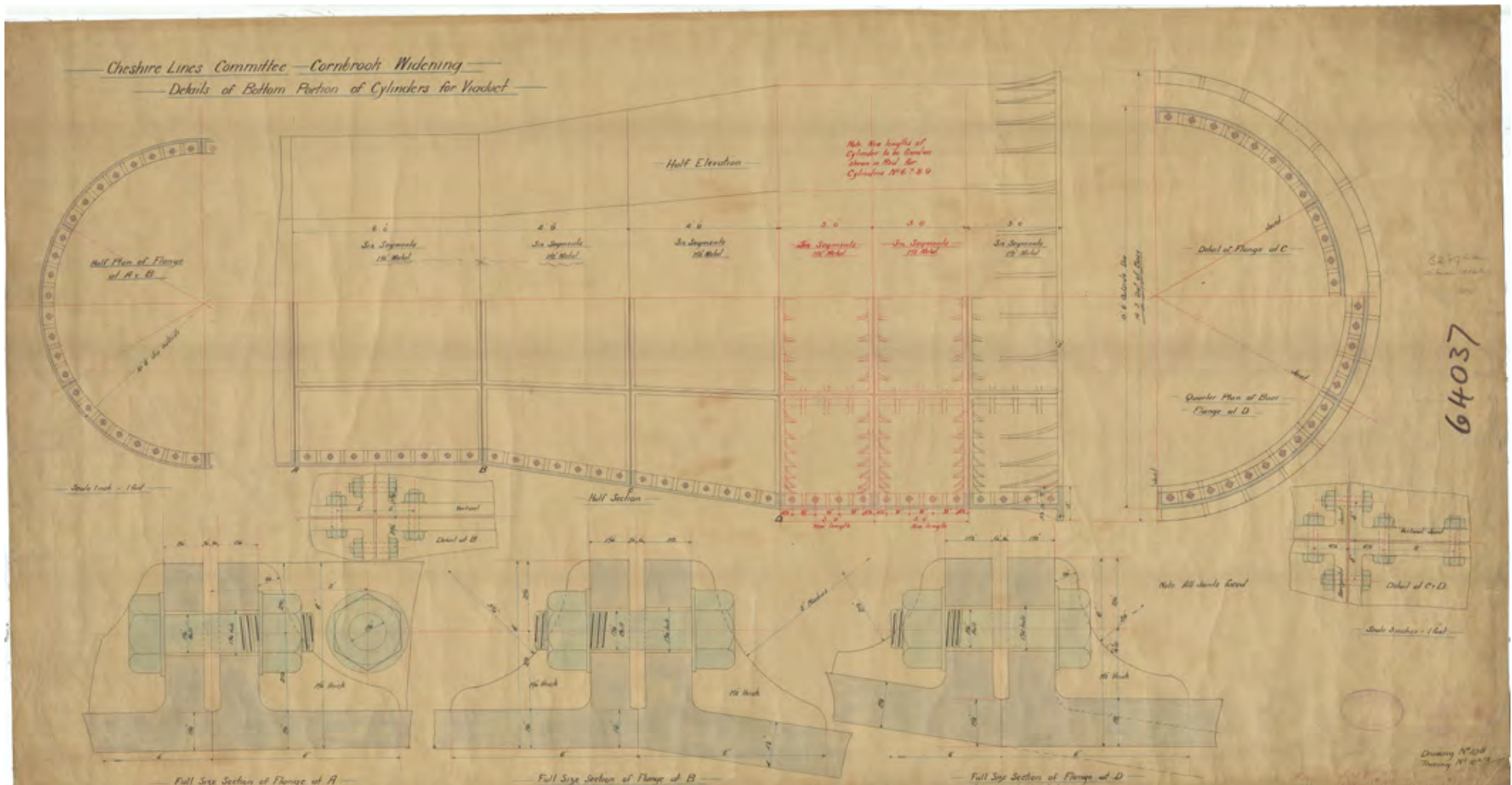


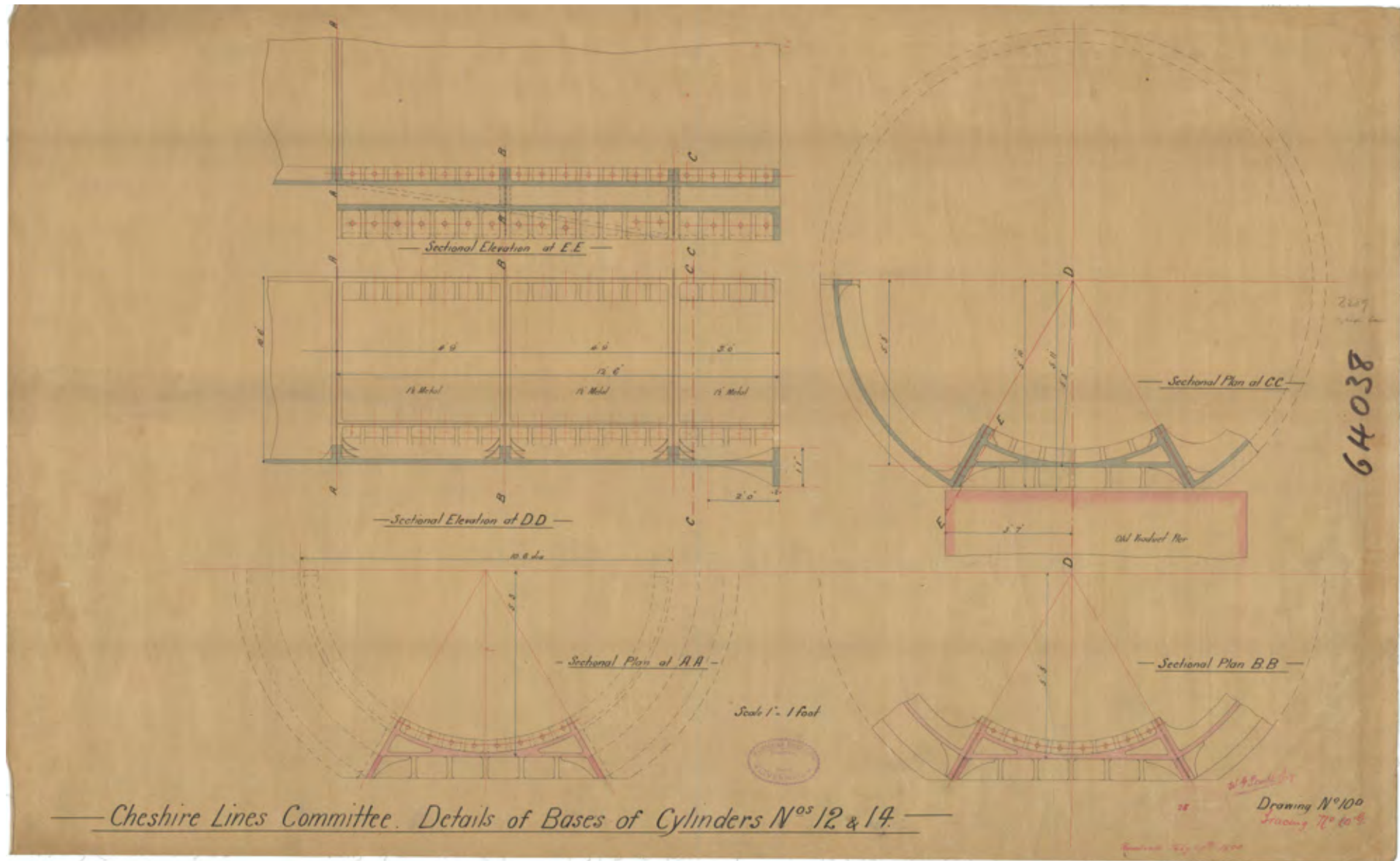


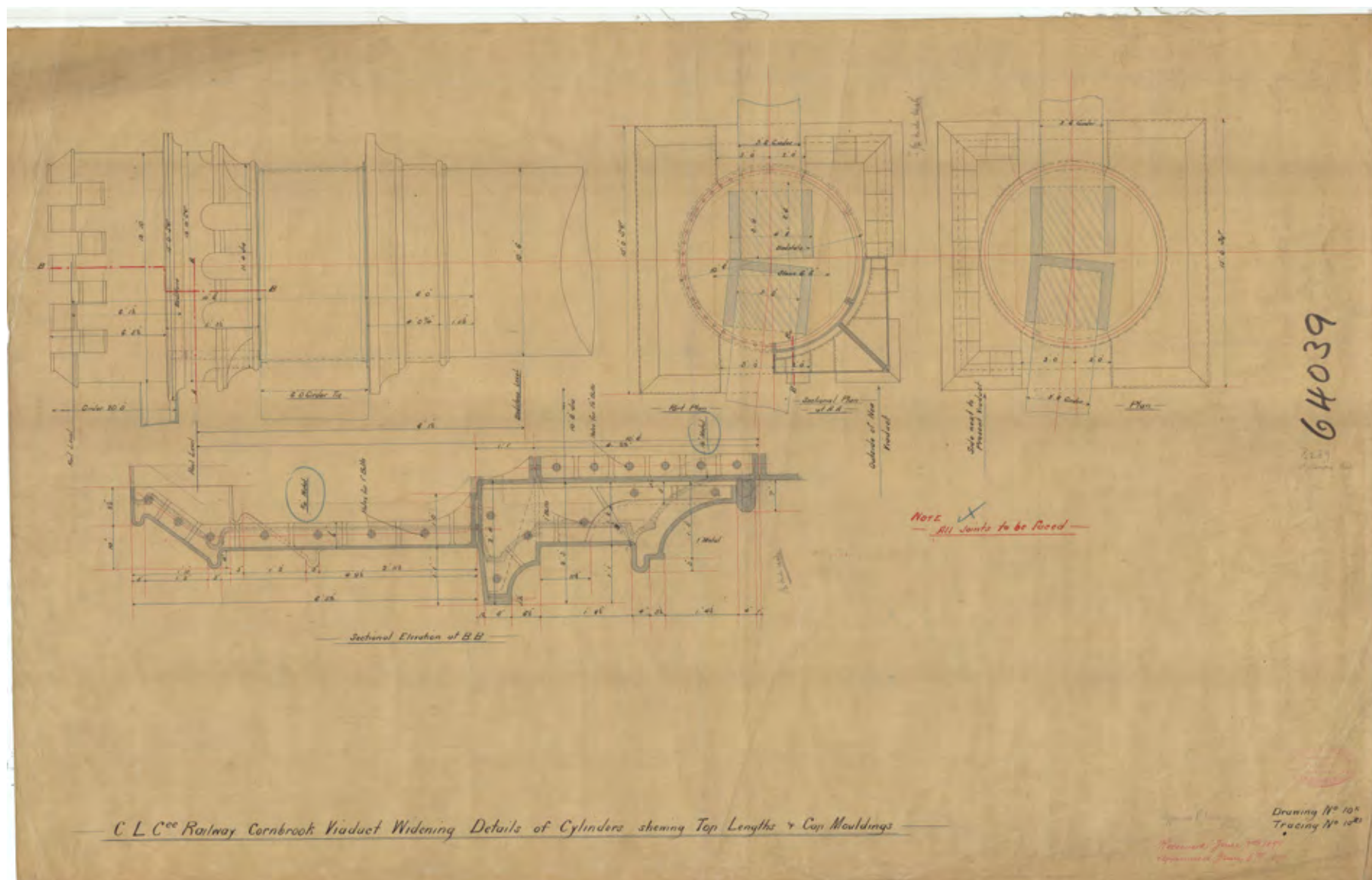


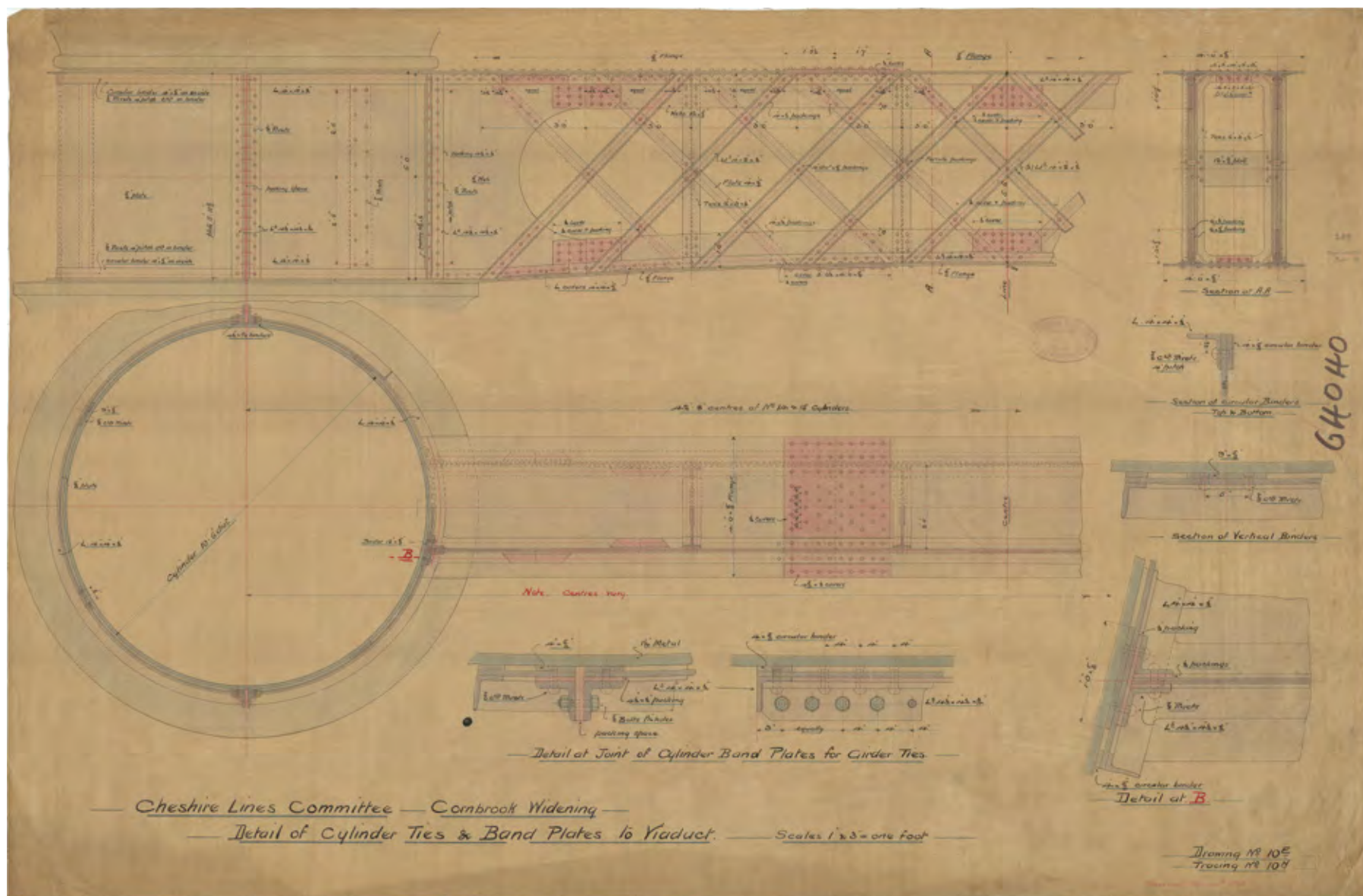


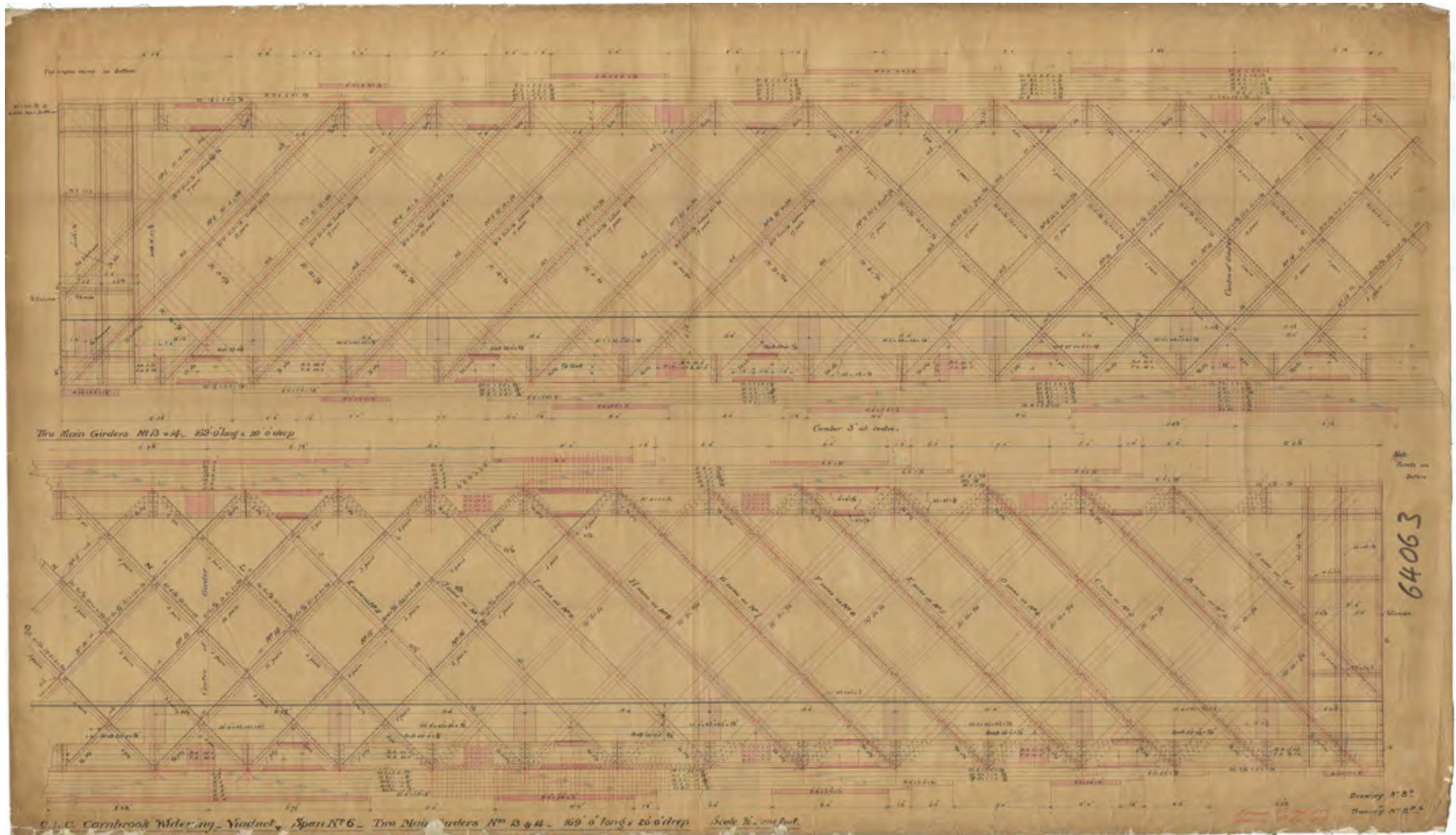


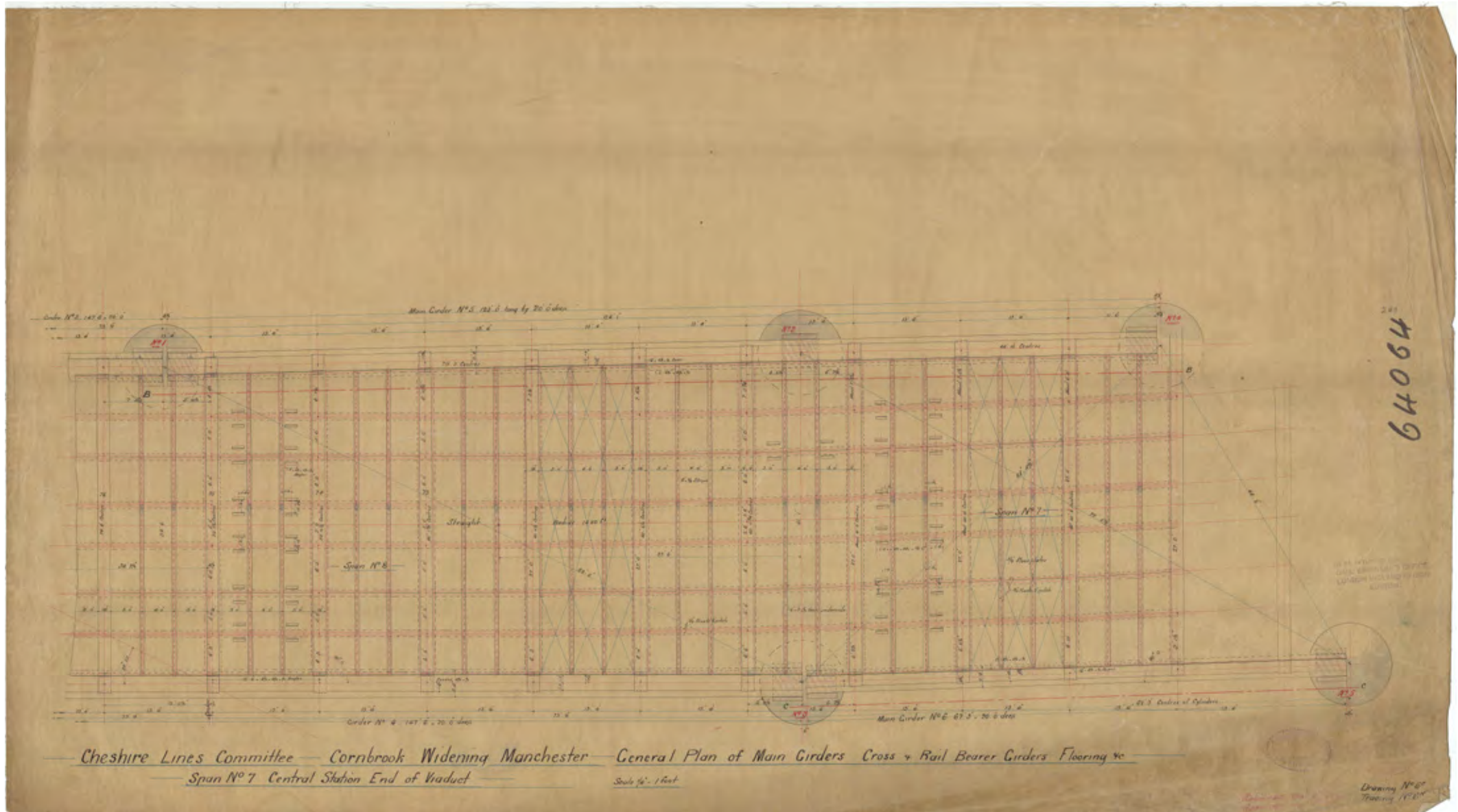


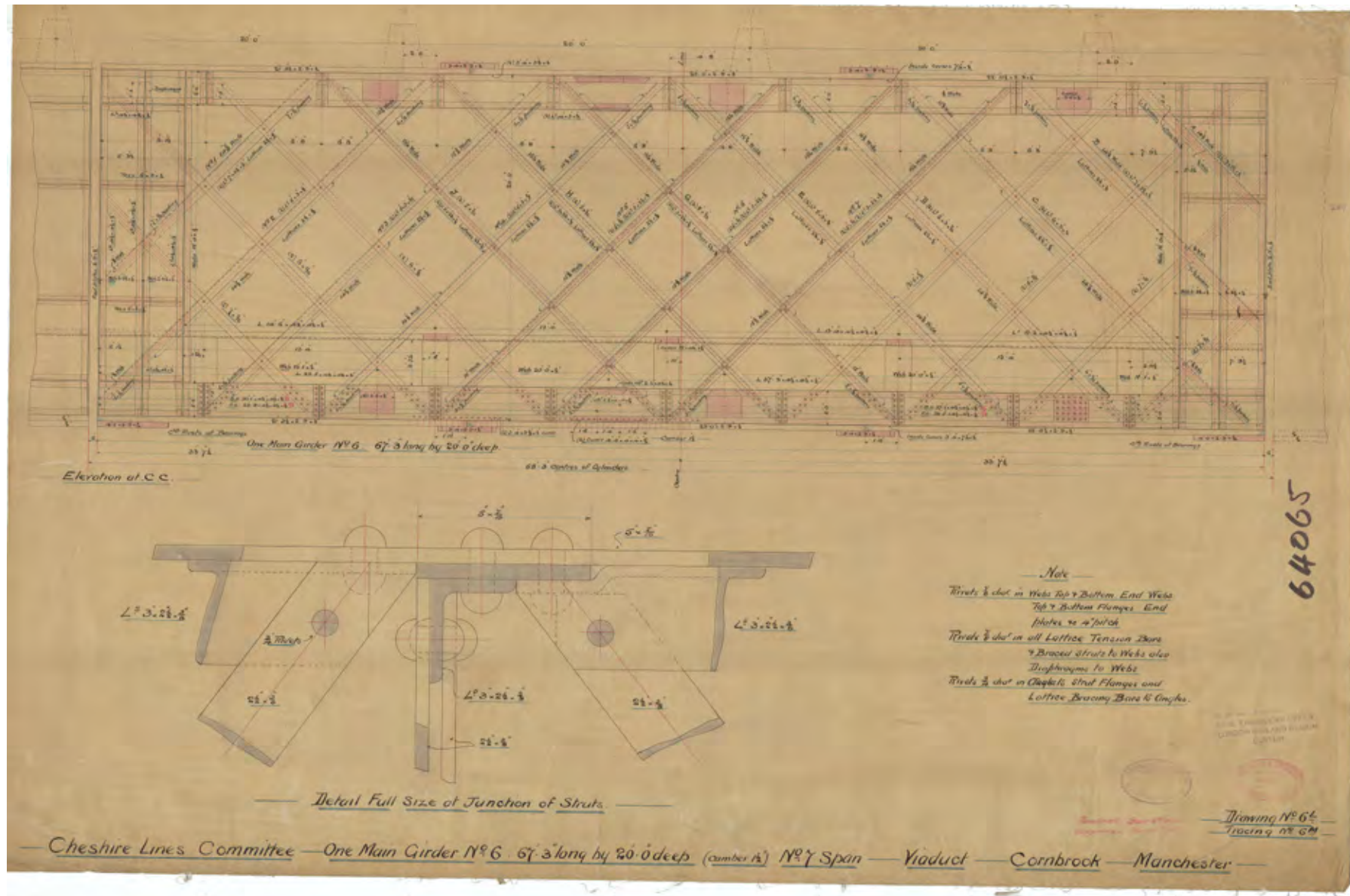


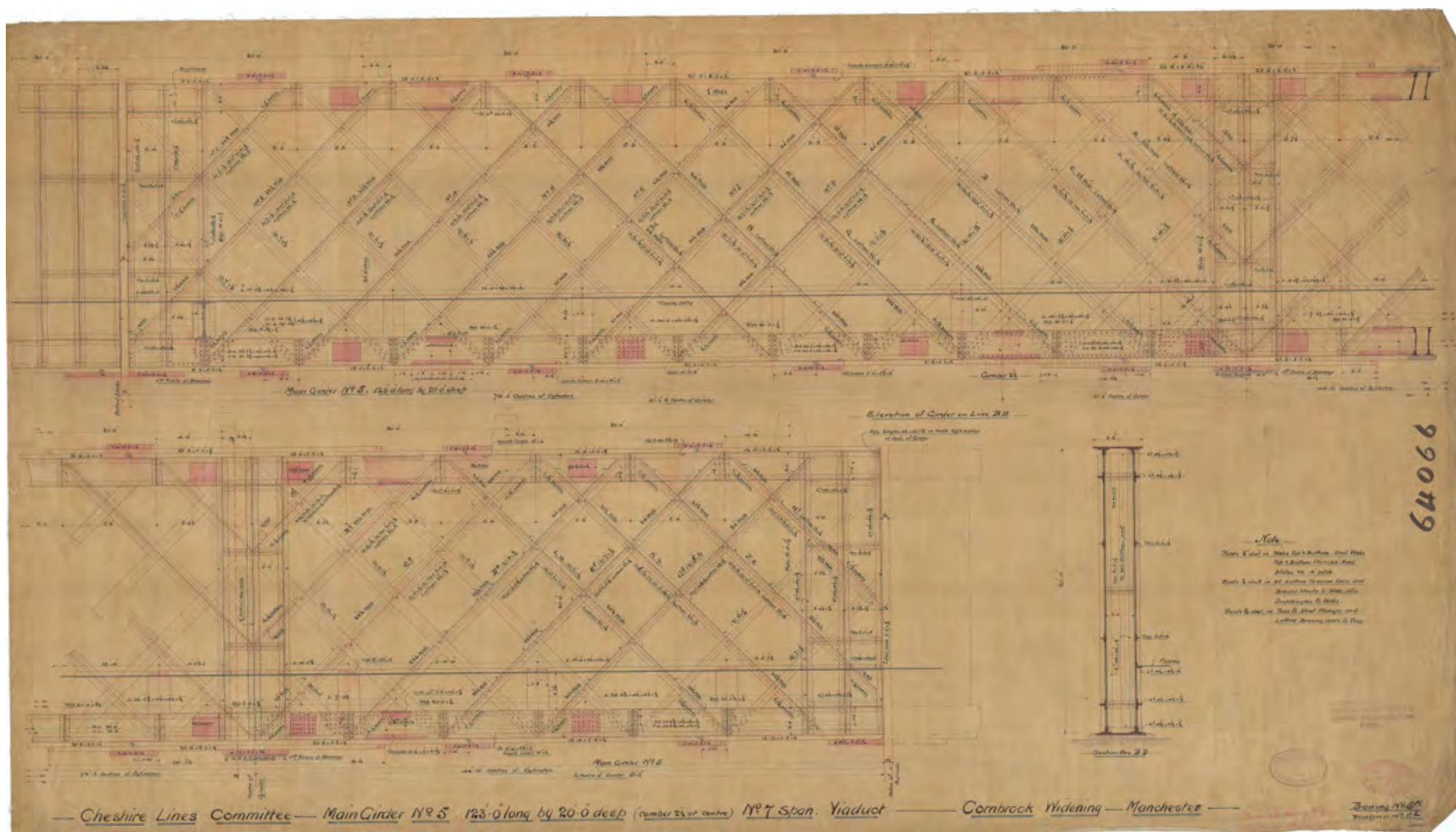


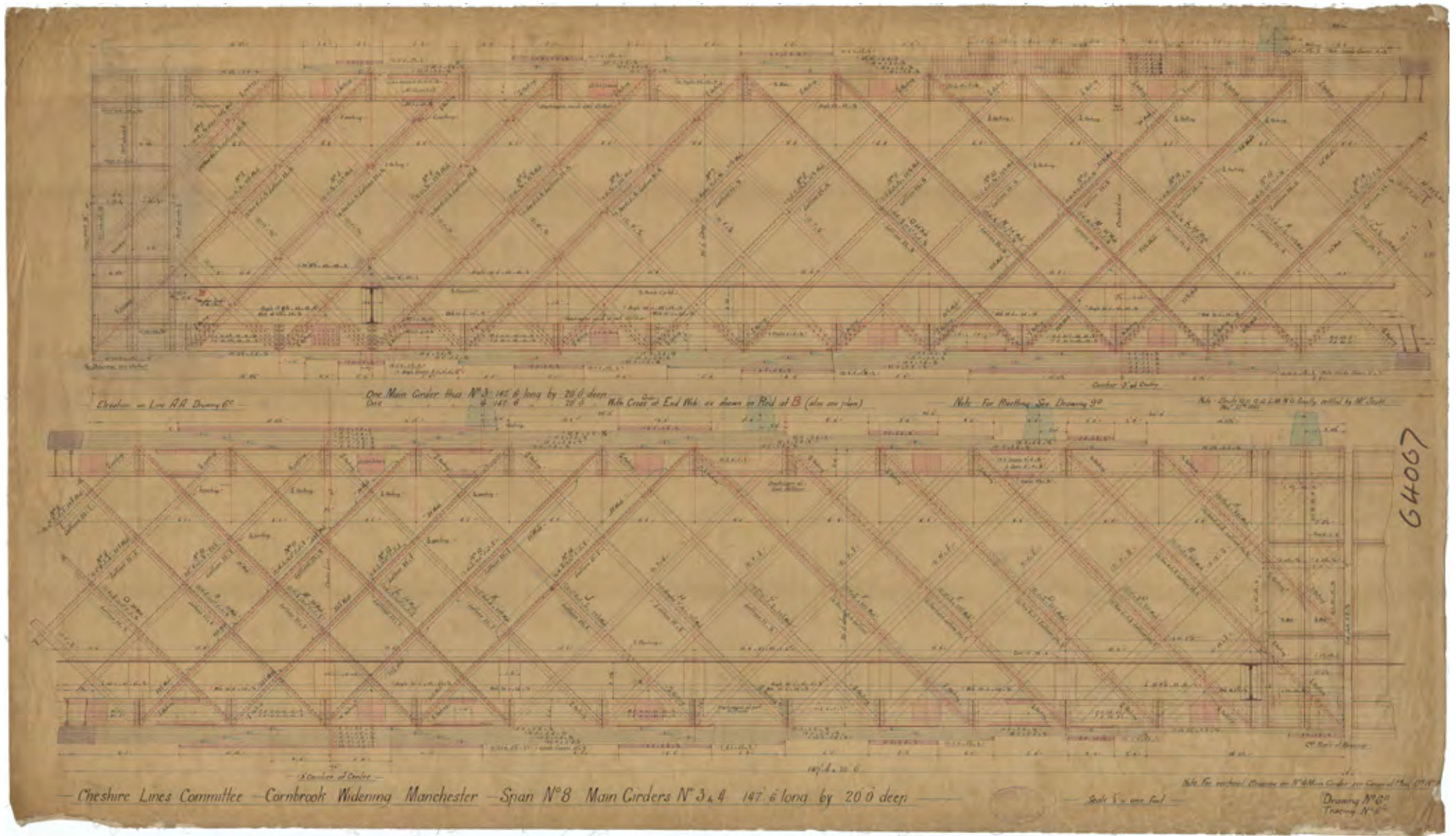


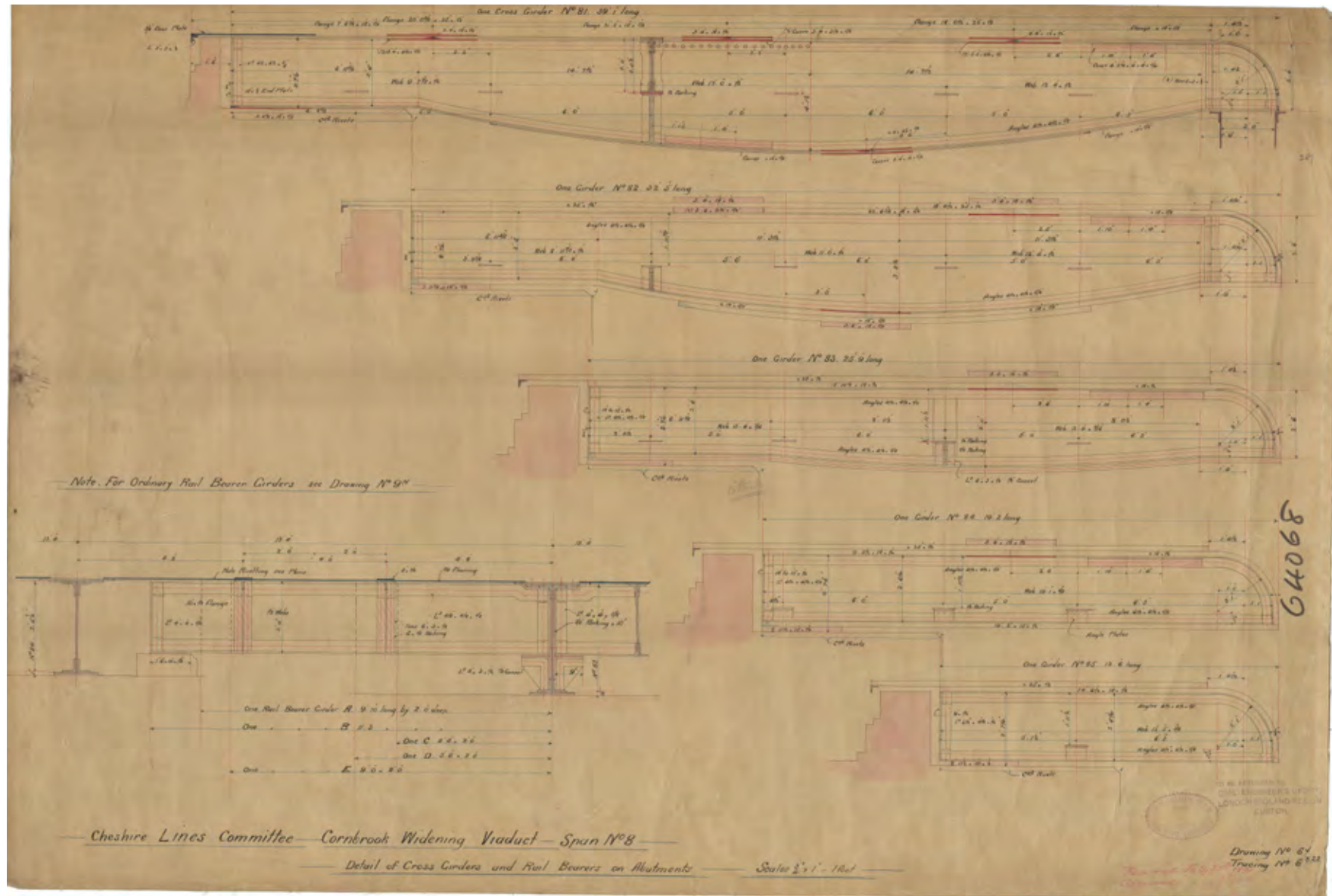


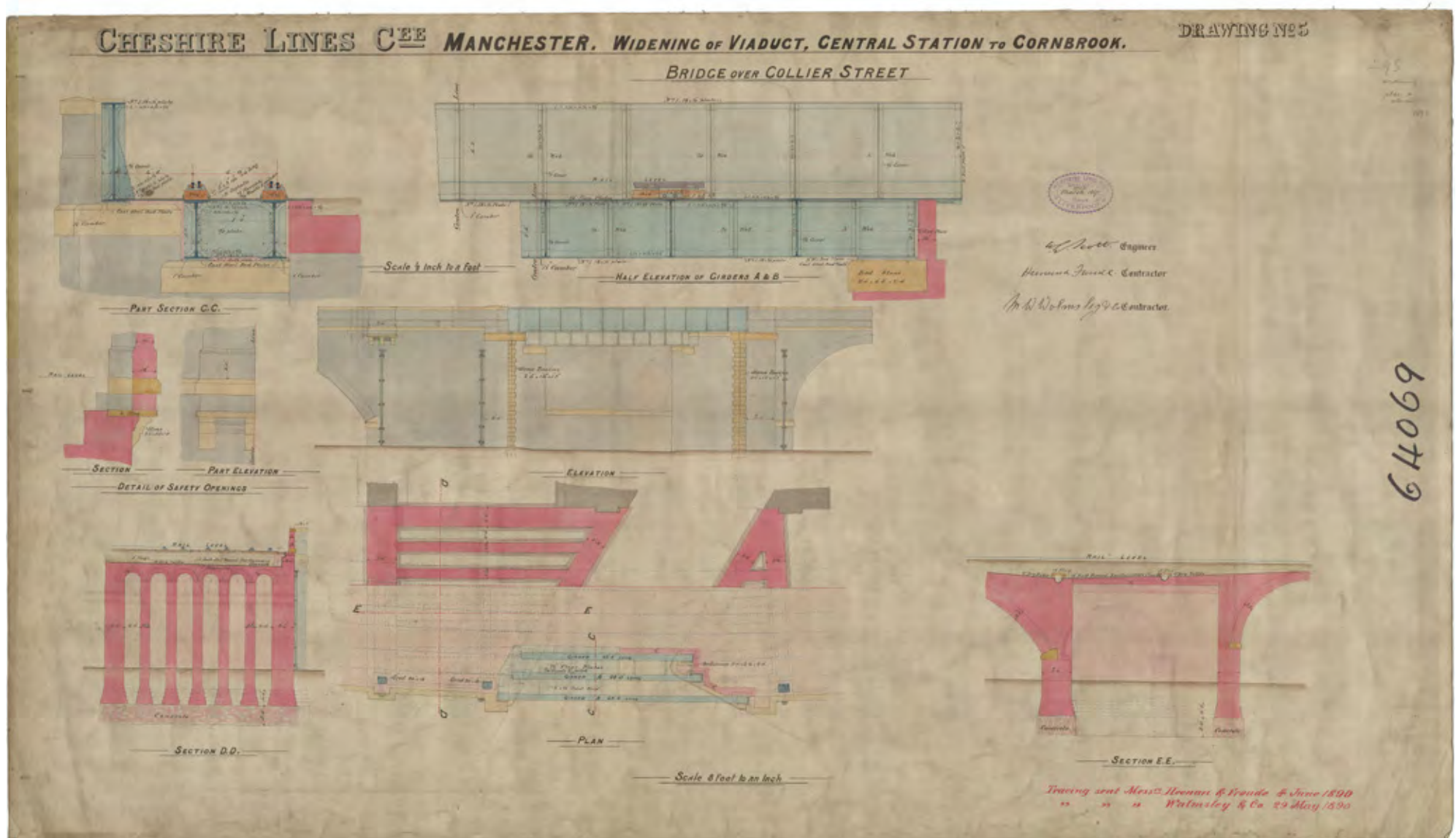


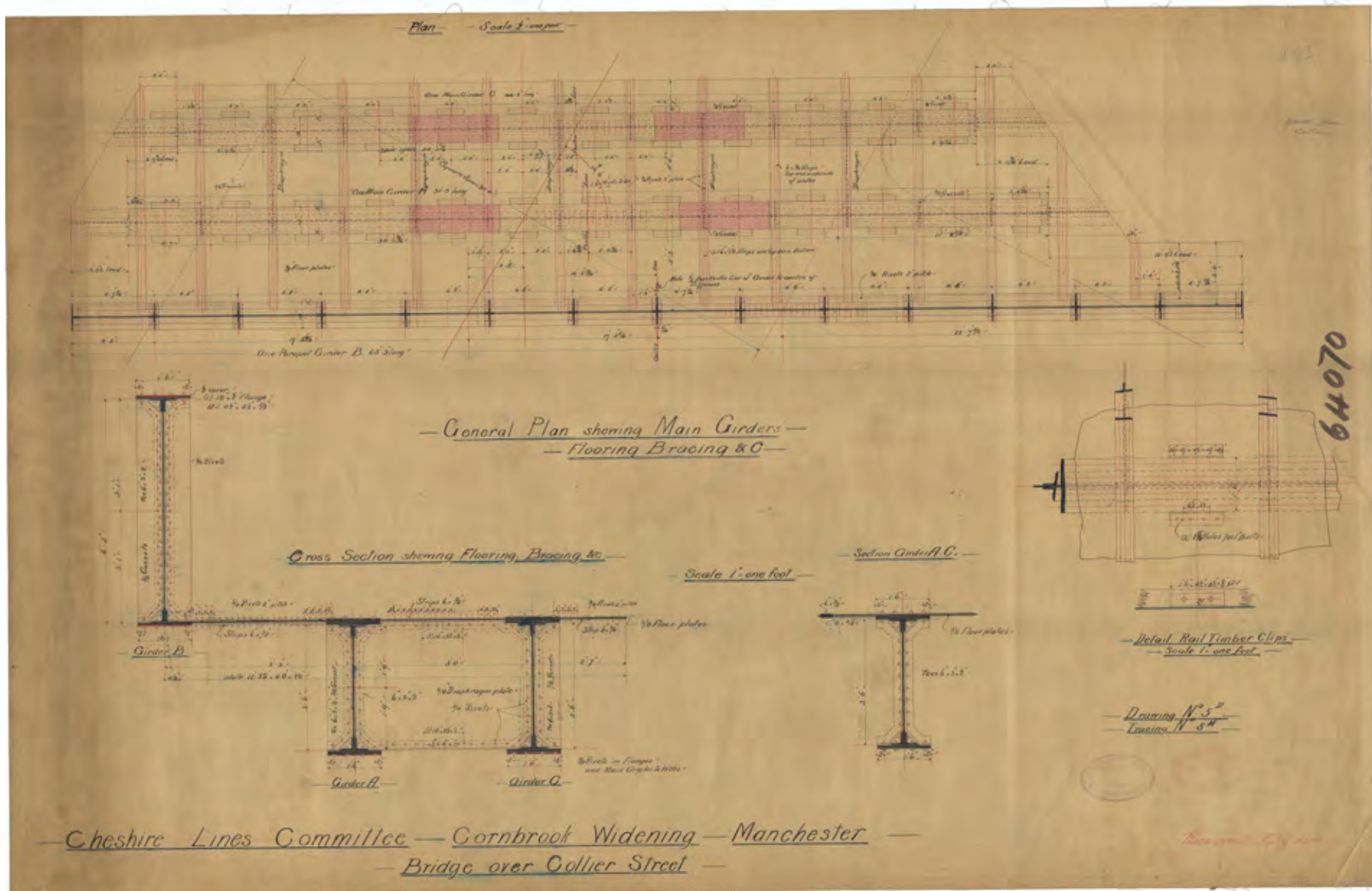












MANCHESTER COURIER AND LANCASHIRE GENERAL ADVERTISER - SATURDAY 6 MAY 1893

'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.

'In 1875, it will be remembered that the Central Station in this city, which is jointly used by the Cheshire Lines Committee and the Midland Railway Company, was opened. Previously the Midland Company's terminus was London-road Station. The establishment of the new Cheshire Lines route to Liverpool led to an arrangement between that Committee and the Midland Railway Company, which resulted in the construction of the new Midland line from Stockport to Manchester and the erection of the spacious Central Station, which has since been used by the two companies as just stated. Two lines of rails were originally made, and to carry them from Cornbrook to the Central Station a huge viaduct was constructed. 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 progress of the work has been watched by those with the habit of travelling over the line to and from the Central Station with great interest, and it is matter for general congratulation that the contracts have been successfully carried out. 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. As a matter of fact no fewer than 300 trains have passed over the two lines of rails every 18 hours for some time past as compared with 120 at the opening of the line. Three new lines have now been added, and it expected that ere long 400 or 500 trains will run every 24 hours from and to the Central Station without the least delay, even in the busiest seasons.

'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. The main girders are supported on 15 cast iron cylinders, each 10ft. 6in. in diameter in the shaft and 13ft. 6in. at the base. The cylinders are embedded in Portland cement, and rest upon the solid rock some 20ft. below the surface of the ground. The longest column is 60ft. high from the ground level to the railway level, and the 20ft. below the surface makes the total length 80ft. The steel latticed girder work extends from Egerton-street to Deansgate, the width being 38ft. There are eight spans in this portion of the work, the widest being 175 ft., undoubtedly one of the largest and finest in England. The lattice girders are 20ft. deep, the cross girders having span of 38ft. with bearers under each rail. In its course the viaduct runs over the Ship Canal wharves, formerly the

property of the Bridgewater Canal Navigation Company—and crosses the Manchester South Junction main line near Deansgate. The lattice girder work—which constitutes, perhaps, the leading feature, extends from Duke-street to Dawson-street. At the latter place, the outside plate girder is 178 ft. long. The bridge over the canal has a square span of 61ft., and a skew span of 80ft. Ten lattice girders are employed here, being 8ft. 6in. deep, and 7ft. 7in. wide. All the bridges are fitted with ½ in. steel floor plates.

'At Cornbrook there is a bridge with a skew span of 64ft. This is a trough-bridge, having four large girders, the troughs being 7in. deep, and filled with cement. Four of the arches, it may be stated, have each span of 70ft., 22 a span each of 40ft., and 14 a span each of 34ft. ; and one of the bridges has a skew span of 50ft. To illustrate the magnitude of the work it may mentioned that the cast-iron columns which support the latticed viaduct weigh altogether 2,000 tons ; some 12,500 cubic yards of concrete were used in connection with the foundations, and 1,500 cubic yards of concrete were employed in the arches. About 42,000 cubic feet of stone were used in forming the beds for the cylinders supporting the lattice viaduct. Then it will be interesting know that 24,000,000 of common bricks were used in the arches and foundations, and 6,000,000 Staffordshire blue bricks were employed for facing and buttress purposes. The total weight of iron and steel in the viaduct is about 7,000 tons. Upwards of 6,000,000 rivets were used the construction of the viaduct, and some 600,000 of them were clinched by hydraulic power.

'Not the least interesting and important fact is that the cost of the work amounted to about £250,000. Great credit is due to the engineering staff of the company, and the contractors for the eminently satisfactory way in which the work has been carried out. Various difficulties of no light character were encountered, and were successfully overcome. In two places the old viaduct had very sharp curves, one being near Dawson-street, and the other

near the Bridgewater Canal. They were really what are known as S curves. These have been got rid of very skilfully, and the lines are now much straighter than formerly. The improvement has been effected without any interference with the traffic.

'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. In addition to those gentlemen, amongst those present were Mr. Podmore, Mr. J. Johnson, Mr. A. J. Caufield, Mr. W. Lavarack, Mr. G. Walker, and Mr. J. Ward (of the engineering staff of the Cheshire Lines Committee), Mr. W. Walmsley, Mr. J. Roberts, Mr. H. Lockwood, Mr. W. Kirk (stationmaster, Central Station, Manchester), Mr. Langridge (goods agent), Mr. Collier and Mr. Fowden (permanent way inspectors); Mr. J. Oubridge, Mr. J. Hilton, Mr. J. Bell, Mr. Gilbert, and Mr. Reed. 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. The work of putting down the rails and fixing the signals will be finished in the course of a few days. The viaduct will then be surveyed by Government inspector, and it is expected that it will be opened for traffic about the close of the present month. Above we give views representing a portion of the latticed viaduct at Cornbrook, and the bridge which crosses Dawson-street.'

RAILWAY EXTENSION IN MANCHESTER.

Patrick Harrigan, a driller of Habbema-on-Tra, was charged on Tuesday before the South Sheldahl County magistrate, with the murder of his wife, Catherine. According to her dying deposition, her husband returned home worse for liquor, and, while she was in bed, struck her several blows in the face, afterwards striking her on the head and shoulders with an iron coal pole. The medical evidence showed that she died from injuries to the head. The magistrate committed the prisoner for trial on the capital charge.

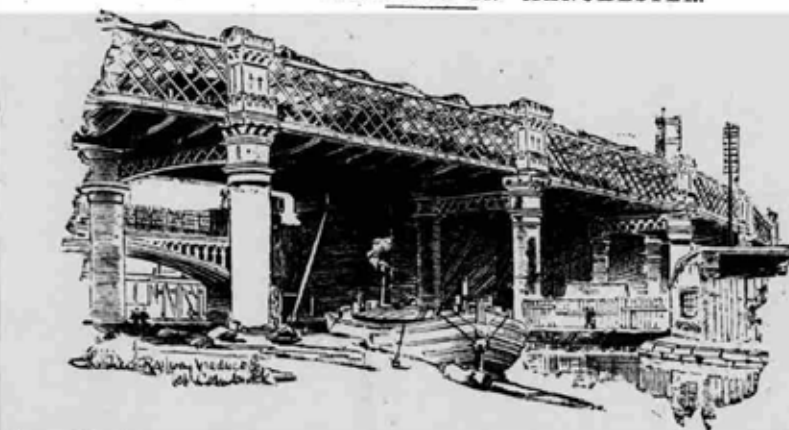
Mr. Rudersick, coroner for Llanelli district, resumed the inquiry on Monday, at Burryport, relative to the deaths last week of Daniel Williams and David Evans from the effects of eating brown, alleged to have been consumed from a decomposed meat by a local butcher, Mr. Morgan. Evans, reported that the sample of brown forwarded to him contained poisonous meat. The jury, after an eleven hours' hearing, retired at half past nine on Monday night to consider their verdict, and at half-past 10 returned a verdict of manslaughter against Daniels, from whom the brown had been received.

At Birmingham, Police court on Monday morning the husband of Mary Ann Colburn, 121, Tausen-street, was charged with causing the death of his wife. Early on Monday morning a woman returned home and found it strange that he should be asleep. It is alleged that he struck his wife who ran to the stairs. The demand followed with a lighted lamp in her hand. She was ordered to get up. She did so. Mrs. Colburn jumped from the stairs and fell through the window and, falling into the yard, a distance of 15 feet. Her skull was seriously fractured, and a policeman found her unconscious. Her husband was charged with having thrown her body from the window and with having caused her death. Her husband was standing beside her, and told the jury that his wife had fallen through the bedroom window. He said that he did not know how it happened, and that he had no recollection of anything. The woman was taken to the hospital, and died on Tuesday morning. After admission, the husband was arrested, and was charged with causing the death of his wife. He was remanded until after the trial.

[illegible]

It has transpired that Stoddard was well known in Haddameth and district, he having some few years ago held a position as coachman in the neighborhood. Besides the death of Mrs. Whittle's mother, two victims of the tragedy have been frequent visitors in the village. Five weeks ago they drove to the church yard, where Mrs. Whittle deposited fresh flowers on

Another stage of the tragedy at Oswestry, North Wales, was reached on Saturday, with the adjourned inquest upon the body of the murderer, George Skelton, which was held at the Ffrench Inn, Greffrall, before Mr. W. Wynne Evans, the district coroner. The crowd assembled outside the old inn where the inquest was held, testified to the interest felt in the details of the story of the relationship between Mrs. Whittaker



The 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.

[illegible]

A disturbance occurred in Angel Meadow, Manchester, on Saturday night which resulted in

Indicated, to the great increase which has taken place in the traffic. As a matter of fact so few trains are now being run that the 300 trains have passed over the two lines of rails every 15 hours for some time past as compared with 120 at the opening of the line. Three new lines have now been added, and it is expected that ere long 400 or 500 trains will run every 24 hours from and to the Central Station without the least delay, even at the busiest seasons. The violent



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. Numerous blocks of buildings had to be demolished to make room for the widest and

If I had wanted to hit him I could have done so, as his brother has told you I was only two yards off. I have nothing else to say except that I was stupid drunk.

foundations of great depth and solidity had never
before to be put in to bear the great weight of
the bridge and to maintain the weight of
the bridge that will pass over it. The new viaduct
carries three new beds of rails from a point near the
engine shed at Cuthbert to the Central Station, the
distance covered being three-quarters of a mile.
There are 55 arches, several girded bridges
and a steel lattice viaduct 300 yards long.

The main grinders are supported on 18 cast iron cylinders each 150 ft. in diameter in the shaft at 20 ft. intervals. The cylinders are embedded in Portland cement concrete, the concrete being 20 ft. below the surface of the ground. The longest cylinder is 620 ft. high from the ground level to the main shaft level, and the 250 ft. below the surface makes the total height 870 ft. The shaft is 15 ft. in diameter, extending from Parkers-street to Deane-street, 70 ft. below level. There are eight spans of this portion of the shaft, the widest being 15 ft. and the narrowest 10 ft. The shaft is 15 ft. in diameter. The latter cylinders are 120 ft. each, the ones above having a span of 30 ft. with bearings under each rail. The total weight of iron and steel in the shaft is about 7,500 tons. Upward of 100,000 ft. of the cylinders and 100,000 ft. of the shaft are made of cast iron and some 500,000 ft. of them were displaced by hydraulic power.

The contractors for the machinery are the Brown, Walker and Co., of New York, and the machinery was made at their works in New York.

newark, Essex, Heman and Friends, of New
Heath. The contracts may be said to have been
fully completed on Wednesday last week, and in the
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Manchester, South Junction and Altrincham Railway.
This was the laying and clinching of the last rivet by
Mr. W. C. Wood, C.E., and Mr. H. H. H.

obtained goods to the value of about £400 from M. Charter, bookbinder and stationer, in Bridgewater place, High-street, in this city, without informing his

At the Salford Police Court on Friday, Mr. Makinson, the stipendiary magistrate, committed George Henry Wykes to the Liverpool Assizes on the charge of having embezzled money belonging to the Valley City Milling Company, Madison, U.S.A.

In giving evidence before the House of Commons Committee on Death Certificates on Friday, Dr. Latham, medical officer of health for Manchester, advised the registration of stillborn children. In Manchester the proportion of stillborn children increased in 1911 to 1.2 per cent of the total number of infants born. It was a significant one, to his mind, because of the fact that it was almost impossible for him to find out the cause of the stillborn children. In the case of the five-born infants dying in their first year, were inquired in Manchester without competent testimony as to the cause of death.

TERRIBLE ACCIDENT AT BROUGHTON.—Mr. F. Price, the Ballfield Through Carriage, held an inquest on Monday relative to the death of Thomas Mooney, aged 24, a contractor's labourer, who lived in lodgings at 2, King's-street, Ballfield. Wooden planks were being laid on the bed of the Great Northern Canal at Broughton, to form a road for a refuse-truck, when it was to be erected. The planks are being driven in the bed by a large piece of iron called a "monkey," which is drawn upwards by a winch worked by four or five men. Deceased was employed on Friday, the 10th inst., to assist in the work, and was standing at the head by the "monkey" and died about afternoon. The jury returned a verdict of "Accident."

CARBOLIC ACID POISONING.—An inquiry was held by Mr. P. Price, the Salter House Coroner, on the Friday evening last, at the residence of Gertrude Green, aged a year and six months, the daughter of a copper roller engraver, a labourer, living at 10, St. George's street, Brompton. The child was placed in a state of comatose insensibility on Thursday last, and put there in different parts of the house for disinfecting purposes. On Saturday morning the child revived and was playing and talking to the nurse, who was sitting on the sofa upstairs close to the room where the child was playing. When the mother entered the room, and saw that all had been peace, the mother heard a scream. On running upstairs she found that the child, instead of playing, was lying on the floor, and was in a state of complete insensibility of the prison. The child was immediately attended by a doctor, but died the same night from carbolic acid poisoning.—The jury returned a verdict.

CHESTERHAM COUNTRY GUILD.—The second annual autumn festival in aid of the "widows and orphans" and "distressed members" fund of the Chesterham Hill branch of the National Independent Order of Odd Fellows, was held on Saturday afternoon on the Chesterham Cricket Ground. Weather was fine. There was a very large attendance and the proceedings were highly successful. The prizes were distributed by the visiting brethren of the various lodges. The ladies themselves very pleasantly with the exception of the men's band, which was not present. The Chesterham Cricket Club is a vigorous organization, and the Committee have striven hard to give their ground into first class condition. The ground is well kept and the pavilion has been expanded in the work, and expanded and the most constructive results. The ground premises is the only failure to be one of the best in the immediate neighborhood. The ground is well kept and the pavilion managed on another level, has turned out to be a credit. For the last four years it has only lost one

SHOCKING CARE OF CHILD NEGLECTED.—An inquest was held by Mr. H. Smith, Deputy Coroner, on Wednesday, on the body of Gertrude Annie Winslow, aged 18 months, the daughter of William Ashley Winslow, a hawker, who lived at 20, Roseau-street, Newrick. It appeared that the father and mother are in badger at the above address, and that on the day the child died, symptoms of illness were observed. The mother said she did all she could for the child, both in the way of personal attention and in the matter of obtaining medical assistance. The child grew worse and died on Monday. In connection to

At Liverpool, on Wednesday, William Milliken Crawford and Patrick Fitzgerald, the captain and mate respectively of a vessel named *Frankman*, were charged with the manslaughter of a seaman, named Orr, on the voyage from New York to Rio Grande do Sul. The seamen were released.

A branch post office at Liverpool was entered on Tuesday during the temporary absence of an assistant and the thieves carried off £39 in money and £40 in postal orders. It is believed the robbery was committed by some London mailmen, who are known to be in Liverpool on their way to Chester town.

BROUGHT TO HEIN BY BETTING.—On Saturday morning, at Rankins, Alexander Isaacson, 34, heard cloth-maker at the New Lee Mills, was charged with stealing a large quantity of cotton yarn, belonging to his employers, Messrs. Shugart and Sons, and was taken to the mill. The prisoner had been seized attending camp for two weeks and that had raised him. The bench sent the prisoner to jail for two months.

FATAL CARRIAGE ACCIDENT NEAR ROCKDALE
Charles Darneston, aged 43, wheelwright, of Bank
Well, near Bury, and John Taylor, ironworker
Bury, were driving out in a waggone along
Hawthorn-road, near Rockdale, on Saturday
evening, when the bridge of one of the horse's hind
so the horse bolted. One of the wheels came against the
kitchen, and the waggone was upset. Dr.
Stenham found that Darneston's skull was fractured.
He died a few hours afterwards.

ALLIGATOR SINGULAR TRAGEDY—The Kalamazoo register, on Friday, commented for trial a man named Oskaloosh, who has several alligators among which is that of the "Jubilee Flinger," for obtaining money and money from several people in Lehigh. "Flinger" represented himself to be the oldest alligator flinger, and told his tale that he had won the war with the black and still said. He had a journal with him which he said contained explosive electric wire, but on it being opened it was found to contain old trummers.

TERRIBLE ACCIDENT AT ST. HELENA.—A terrible fatal accident occurred at Hawthorn Colliery, St. Helena, owned by Messrs. Richard Krane and Company on Tuesday night. Three men named Peripal, Swift and Jones were ascending the shaft in one of the cages when the latter somehow collided with what is known as the beam. Peripal fell from the cage, and his body, tumbling a distance of over 200 yards, was left oblique mass at the bottom. His two companions luckily escaped the cage, and escaped with slight injuries and a severe shaking.

HEAVY DAMAGES FOR ASSAULT AT WEDMAN.—On Tuesday, at the Windsor County Court, Judge J. Jones, Sarah Whitte, of the Newmarket Inn, Windsor Green, brought an action against John Morris, called watercloser, of Swin-Lane, Windsor Green, for the recovery of £50 damages, for injuries sustained by her on the 10th January last, when she was assaulted upon her by the defendant on the 10th January last. The evidence showed that Morris was sent to the public-house, and, some disagreement arising, kicked the plaintiff off severely in the back, and dragged her into the street, where he again kicked her. She fell at intervals. The defence was that no kicking took place. His Honour awarded the plaintiff the £50 damages.

Old horses.—At Warrington, on Saturday, Edmund Collins, an agent for a Boston dealer in old horses, was sent to prison for three months for cruelty to two horses that had been walked from Chester, though excessively lame. The cruelty inspector said there was an agency all over the island, that resulted in such horse mutilation.

A driver named Alburton was sent for 14 days for aiding. A police officer said that altogether there were four horses, three being tied to a leader's tail. The three were so lame that the leader was pulling the along. It took witness 25 minutes to take them to stable 300 yards away. The magistrate seemed confused the system, and said that such a method

THE BONA-FIDE TRAVELLER QUESTION.—At the Cigarette Control Session, on Tuesday, a bona-fide traveller case of interest was tried. The subject concerned Elizabeth Howard, De Laet Anna Henri, Gustav, with seller dated during prohibited hours on Sunday the 23rd April, and also charged to other persons with being unlawfully on licensed premises. All the persons were from Barkley, Arrington, Mackenzie and later being *defence*, and all the were bona-fide travellers. The case was dismissed, all the magistrate except one holding that the defendants were bona-fide travellers.

James Minett, aged 50, a carman, was on Tuesday gored to death by a bull at Wyckbold, near Dretwich.

Henry Dennis Leicester, manager of a book office, was sentenced to seven years' penal servitude at the Old Bailey on Monday for forgery. His defalcation was £1,000.

The funeral of Emma Dowdett, the infant victim of the Portsmouth tragedy, was attended Saturday by about 200 persons. Over 1,000 kindergartners and school children took part in the funeral procession.

A shocking accident occurred at the wear bakery of the Leaside Co-operative Society on Wednesday. A man was caught in the machinery while he was cleaning it, and was immediately crushed to death.

The wife of a policeman named Horne was on Friday committed for trial at the Mission Hospital for the charge of murdering her husband by poisoning him. The woman was very seriously injured.

A porter named Charles Brown, whilst engaged in the goods yards of the London and North Western Railway Company at Preston, on Wednesday was caught between the hook of a wagon and its buffer block. The hook penetrated his chest and he died shortly afterwards.

Four boys were charged at Welverhampton on Tuesday with robbing letter boxes. One confessed that they had for a long time past abstracted letters from boxes, and had committed burglary. Two of the lads, who had been previously charged with burglary, were sent to a reformatory, another ordered to be whipped, and the fourth discharged.

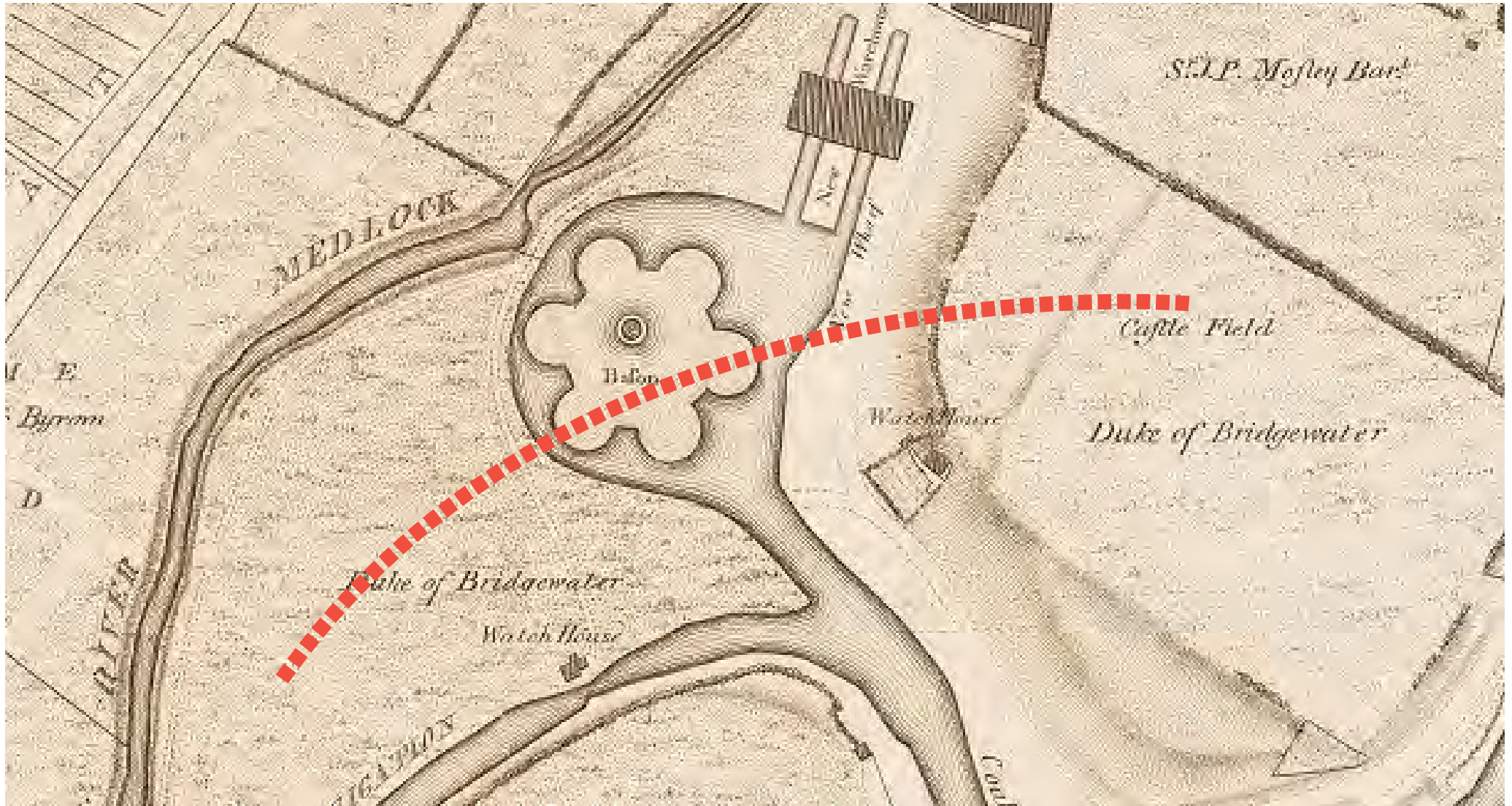
The jury at an inquest at Bethnal Green, on Wednesday, on the body of a child named Mary Ellen Harrison, two and a half years of age, returned a verdict of "Willful murder against some person unknown." It appears that the child had been dropped from Victoria Park and robbed of her earrings, shoes, and caps. She was afterwards found in a plantation in an unconscious state, and died a few days afterwards.

SHOCKING DEATH OF A BICYCLIST—William Goldy met with a shocking death on Sunday afternoon at Ripley. He was riding a bicycle, and in turning corner collided with a milk cart. One of the wheels of the cart struck his breast, and he died immediately.

A DISHONEST CLERK.—At Bow-street, on Tuesday, Arthur W. Long, formerly clerk in the office of the Metropolitan Police, pleaded guilty to embezzling £236, and was sentenced to six months' hard labour. The prisoner expressed deep contrition for his offence.

DEATH FROM MISADVENTURE.—An inquest was held in London on Saturday on the body of Emma Godfrey, of Park-square, Brompton, widow of a dentist, who died on Tuesday. Evidence showed that, being in pain, she asked her son, who refused, to pour some liniment on sugar, and to put her too much, causing death. Verdict, death from misadventure.

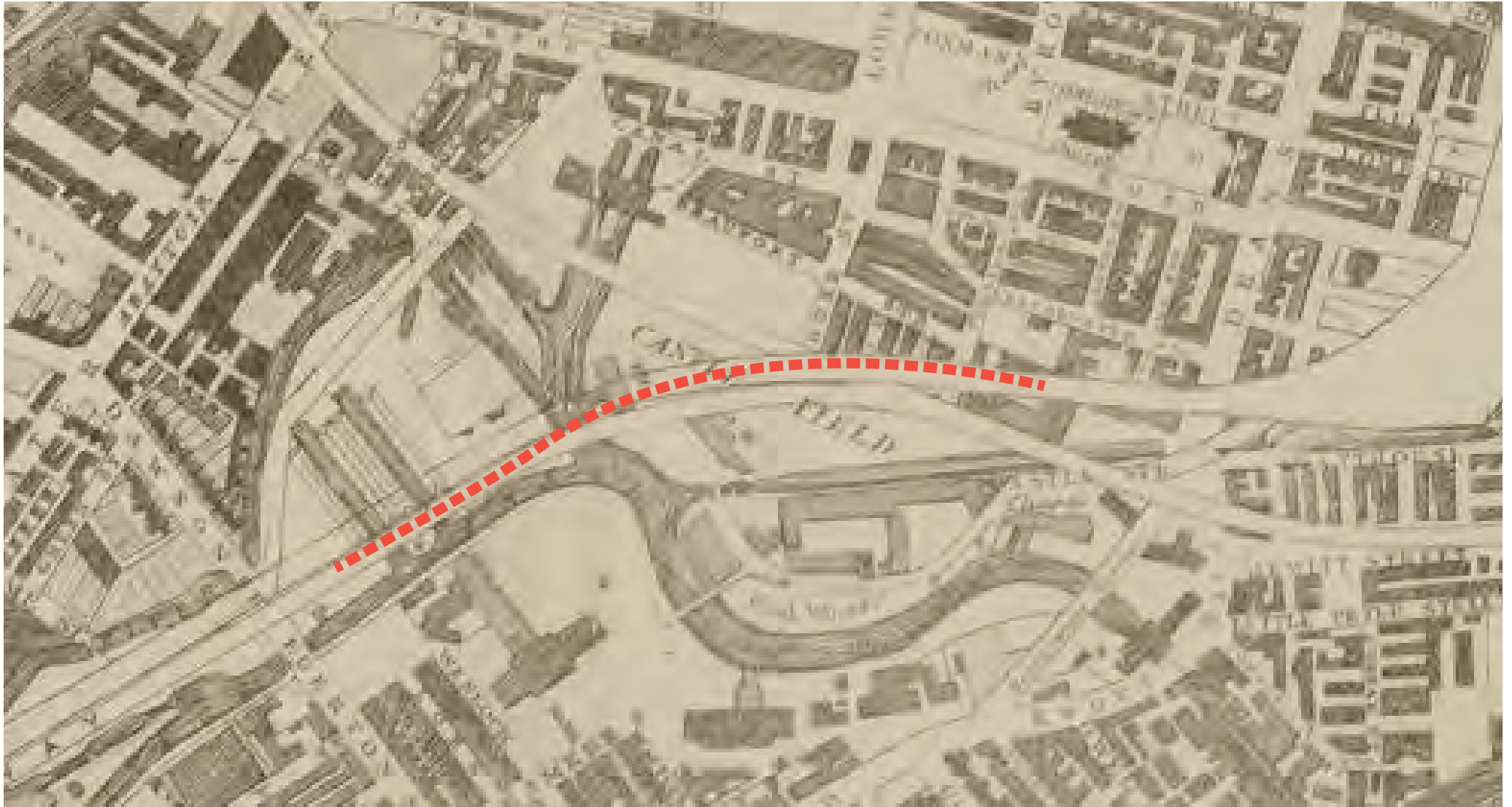
RELEASE OF A MURDERER.—The Exchange Telegraph Company states that Elizabeth Ireland has been released from Woking Gaol after seven years' imprisonment. She was concerned with two men in the murder of a man named Holt, at Spalding, November, 1899, for which she and the men were severally sentenced to death at the Lincoln Assize, but which sentence was subsequently commuted.



William Green's plan of Manchester and Salford (1787-1794)



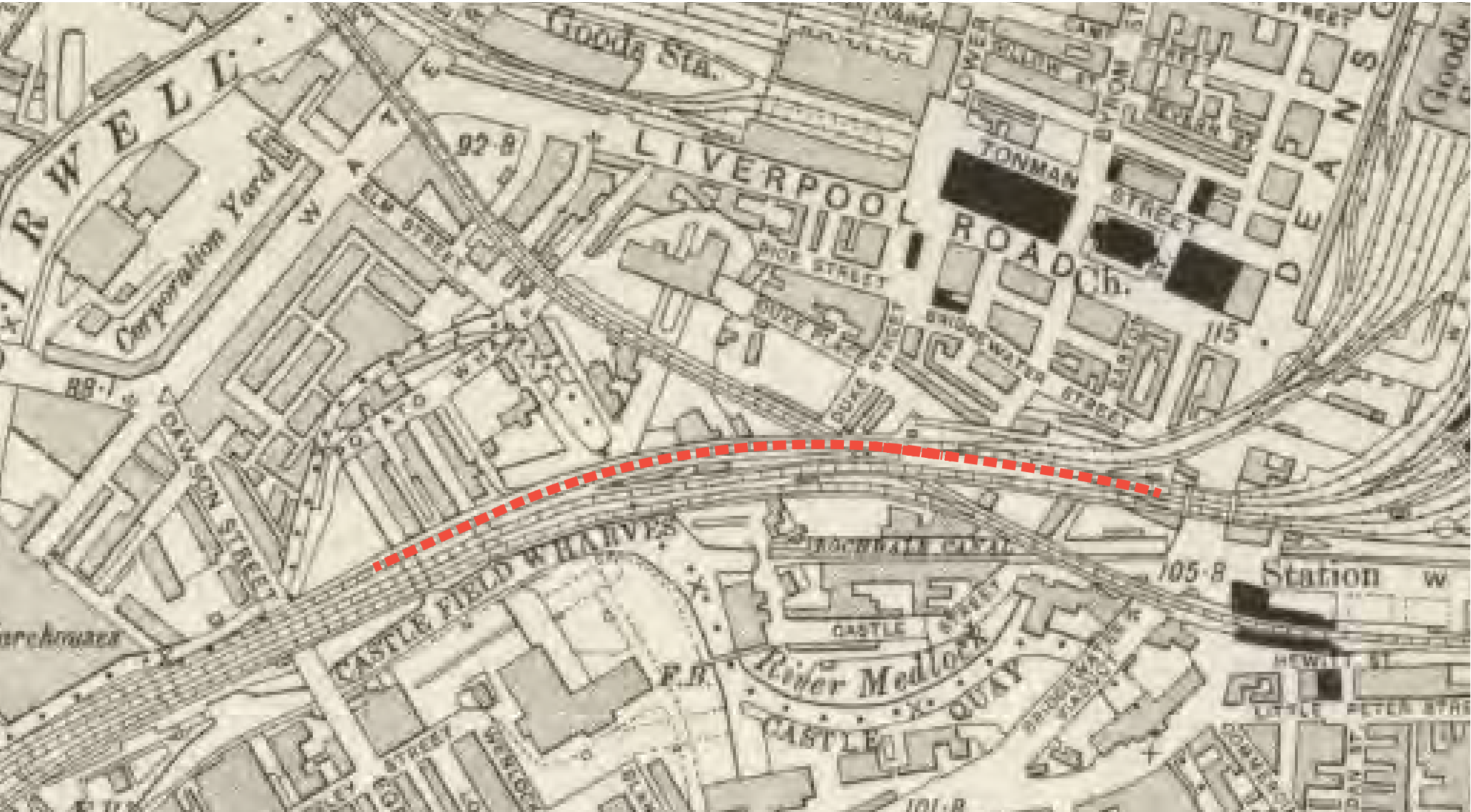
1848 OS plan of Manchester (surveyed in 1845)



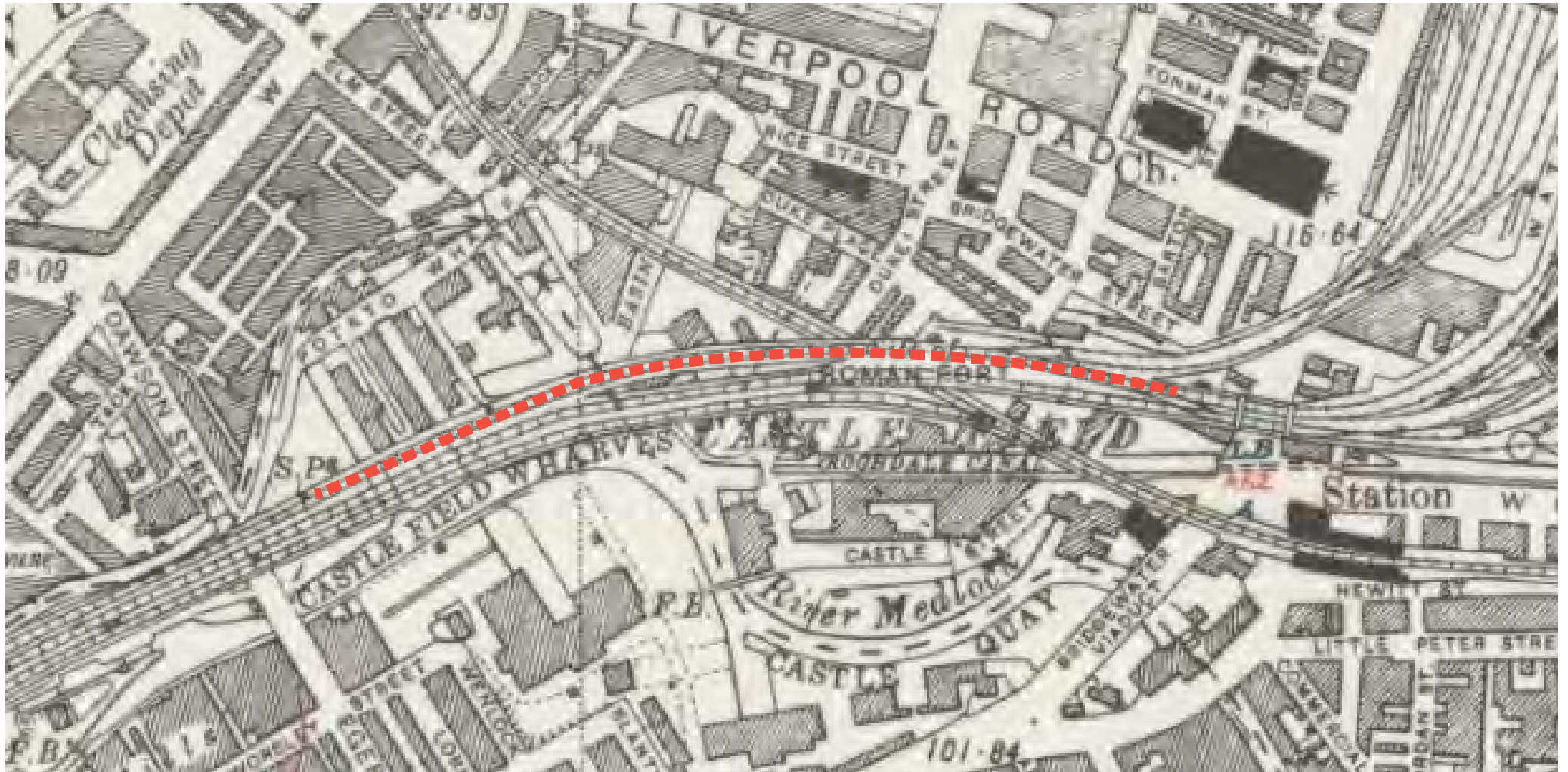
Slater's New Plan of Manchester from 1883



1896 OS plan of Manchester (surveyed in 1894)

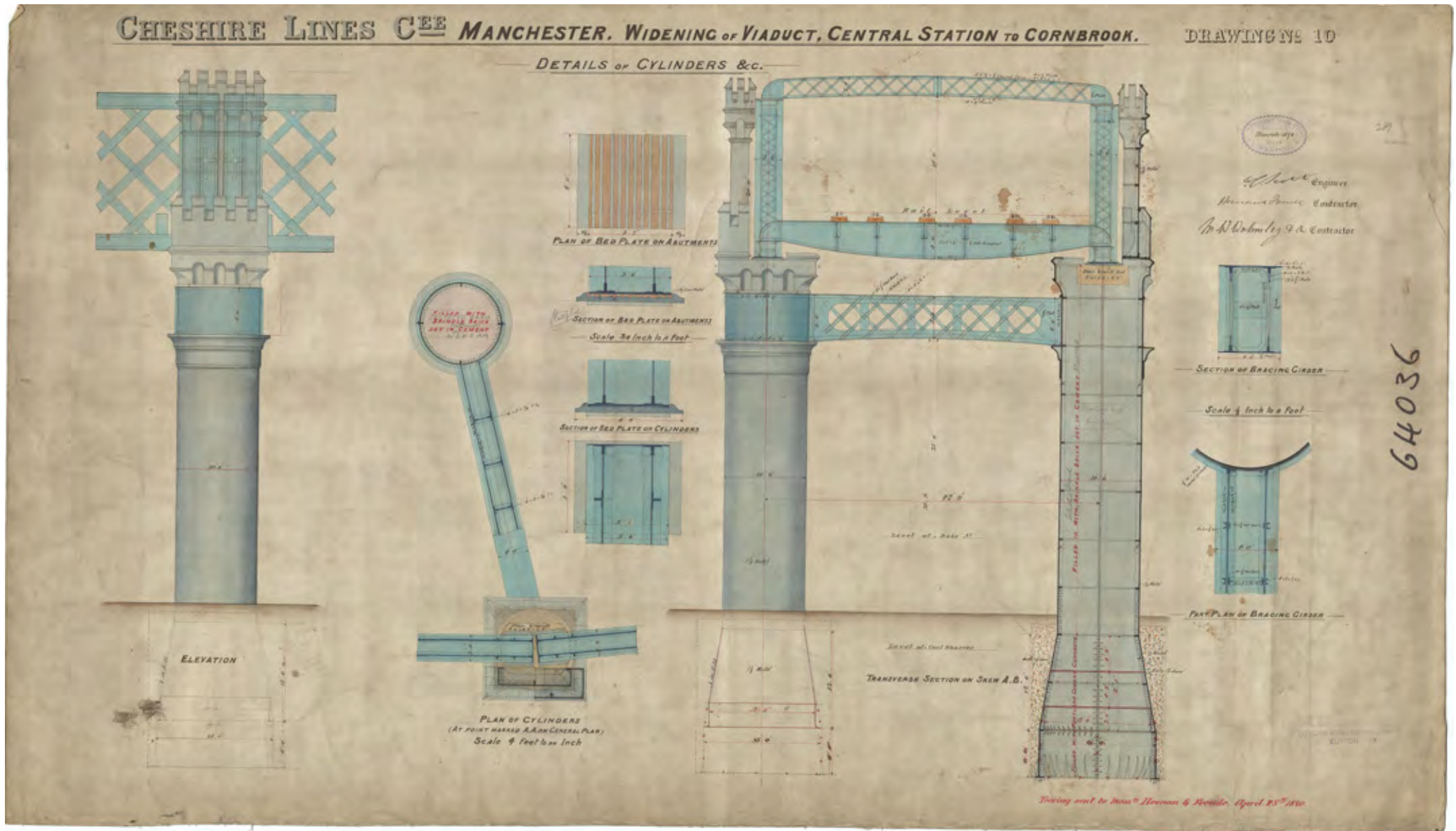


1908 OS County Series of Manchester



1946 OS plan of Manchester (surveyed in 1938)





Engineering sketch from 1890 showing the proposed viaduct, part of the archive records of engineering drawings held by Network Rail



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

