

February 2021

# Castlefield Corridor Congested Infrastructure

## Capacity Enhancement Plan

*February 2021*

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## Part A: Executive Summary

This is the second report required by the Congested Infrastructure Code of Practice and considers a capacity enhancement plan to alleviate the constraints identified in the Castlefield Corridor Congested Infrastructure (Capacity Analysis) Report, dated September 2019 <sup>1</sup>.

Since the completion of the Capacity Analysis Report, the Department for Transport (DfT) and Network Rail jointly established the Manchester Recovery Task Force (MRTF) in January 2020. The remit was to develop short-, medium- and long-term proposals to manage the recovery of the railway in Manchester and the North West, working collaboratively with the industry and stakeholders.

The Covid-19 pandemic has fundamentally changed the context for the performance of the rail network in Manchester and the North West. In the short term, Covid-19 timetables have reduced the quantum of train services operated and have consistently delivered good performance. Plans are being developed for a recast timetable designed to be a high performing foundation for the future and targeted for May 2022 implementation.

The Covid-19 pandemic and consequent reduction in travel has created a timetable opportunity to address the underlying issues which led to the declaration of Congested Infrastructure, which:

- reflects future capacity and capability requirements;
- develops a timetable plan to meet the needs of passengers; and
- provides sufficient capacity for post Covid-19 peak demand.

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<sup>1</sup> <https://www.networkrail.co.uk/wp-content/uploads/2020/12/Castlefield-Corridor-Congested-Infrastructure-Capacity-Analysis-060920.pdf>

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# Part B: Introduction

## B.01: Purpose and preamble

The introduction of the May 2018 timetable caused significant performance issues in the North West, particularly in the Manchester area. Whilst there were multiple root causes, this highlighted a major issue that the Castlefield Corridor (between Deansgate station and Manchester Piccadilly platforms 13 and 14, Figure 1) is a major pinch-point, due to the range and number of services which are funnelled onto a highly utilised two-track section of railway. The May 2018 timetable increased services from 12 trains per hour (tph) in each direction to 15tph bringing into focus the limits to timetabling options, and significantly magnifying delays.

The Castlefield Corridor does not operate like a high frequency metro railway. Local, regional and inter-regional services all use this key section of the network which is important to thousands of local and regional commuters accessing jobs in the south of Manchester City Centre. The importance of the Castlefield Corridor for regional and inter-regional access to Manchester Airport and for key axes such as Liverpool to South Yorkshire means there is significant risk any poor performance is transmitted over a wide area across the North of England and beyond.

Throughout this document the train plans for the Castlefield corridor include 1 freight train per hour (tph).

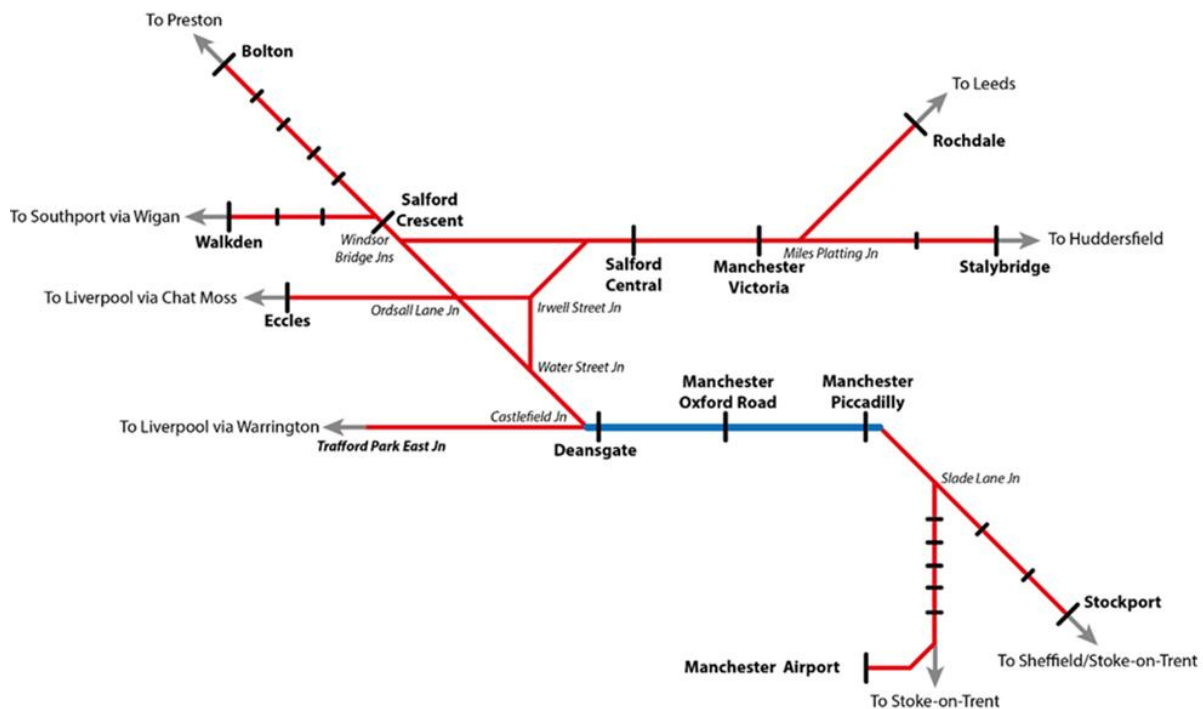


Figure 1. Routes (red) feeding the Castlefield Corridor (blue).

(This is a simplified diagram for clarity.)

The Capacity Analysis Report published in September 2019 identified that a combination of infrastructure, timetable and/or train service interventions are required to enable a robust service to operate in and around central Manchester. Furthermore, the report set out that without infrastructure intervention, 13 trains per hour (tph) (of which two terminate at Manchester Oxford Road from the west) is the maximum number of services which can be dependably operated through the Castlefield Corridor.

Since the completion of the Capacity Analysis Report, the Department for Transport (DfT) and Network Rail have jointly established the MRTF in January 2020 to develop short-, medium- and long-term proposals to manage the recovery of the railway in Manchester and the North West, working collaboratively with the industry and stakeholders. MRTF has led a wide-ranging evidence-gathering exercise including performance, markets, planning and infrastructure leading to a strategy built on four pillars:

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- Immediate performance improvement, through short-term timetable interventions and a medium-term timetable recast expected by May 2022
- Longer trains for passenger capacity, to support growth to 2030 and including platform extensions, depot and stabling capacity
- An integrated train service and infrastructure strategy to enable the North West's railway to grow reliably
- Investment at city centre stations to improve the quality of passenger facilities and increase capacity to handle increased passenger journeys

The MRTF strategy is now being progressed through pan-industry development of opportunities for a major timetable recast, targeted for May 2022 and integrated with Covid-19 recovery.

## B.02: Consultation with interested parties

The collaborative approach developed for MRTF means interested parties have been engaged in the ongoing workstreams throughout 2020. The following organisations are represented on the MRTF Board:

- DfT
- Network Rail
- Northern
- Transpennine Express
- Rail North Partnership
- Transport for the North
- Transport for Greater Manchester

Additionally, the following parties have also been directly engaged with through the MRTF workstreams:

- South Yorkshire stakeholders
- West Yorkshire stakeholders
- North East stakeholders
- Transport for Wales
- East Midlands Railway
- Freight operators

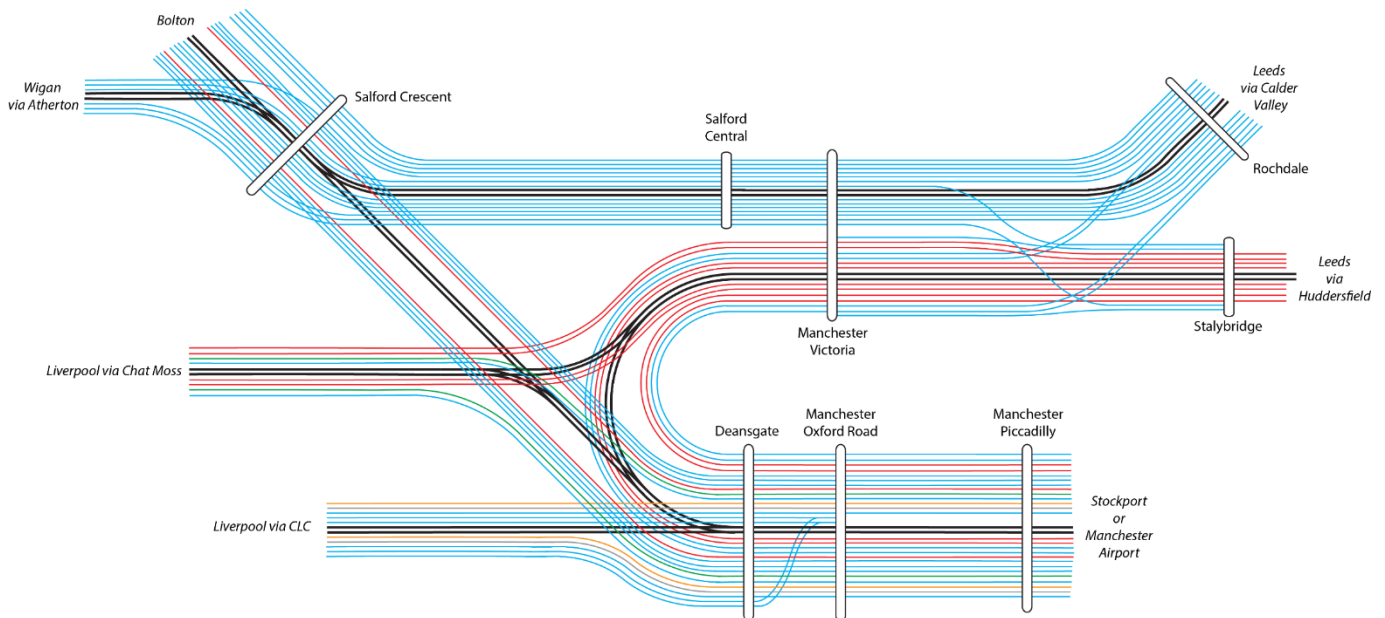
During the first half of 2021, a two-stage public consultation to support the development of the May 2022 timetable will take place. The first stage consultation, for eight weeks in early 2021, provides a wide range of detail setting out the issues identified across the Manchester rail network and offers three strategic options. The second stage consultation, planned for early summer 2021, will invite responses to the detailed timetables developed for the chosen strategic option.

# Part C: Factors Driving Congestion

## C.01: Reasons for the congestion

The findings of the Capacity Analysis Report identified four areas which contributed to poor performance in central Manchester, driven by the very high levels of capacity utilisation already identified:

- Train Planning Rules (TPRs) – the delivery of platform re-occupation times<sup>2</sup> at Manchester Oxford Road, exacerbated when trains are longer than 4 cars, and achieving station dwell times with a variety of rolling stock and passengers with varying needs both impact throughput of train services on the Castlefield Corridor.
- Train service limitations – and in particular the range of complex service groups and the way they interact on the approaches to Manchester through multiple conflict points at junctions (Figure 2).
- Defensive driving techniques – exacerbated by the pathing time required to support T train Planning Rules (TPR) compliance through the central area, but which can lead to additional capacity consumption compounded by different policies adopted by each operator.
- Infrastructure constraints – with high junction utilisation and therefore high impact on performance identified at Castlefield Junction, conflicts from terminating trains at Manchester Oxford Road and more generally insufficient capacity along the Castlefield Corridor.



**Figure 2. Illustrative ITSS developed for the Congested Infrastructure Report showing the levels of service required to deliver franchise output commitments.** Black lines represent simplified infrastructure. Each coloured line represents one train movement per hour. Crossing lines show a potential timetabling conflict.

<sup>2</sup> The time allowed for one train to arrive at a platform after another has left the platform.

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Subsequent work through the MRTF programme has broadened the understanding of the issues created by the complexity of the network and train service specification. This work has reinforced the understanding that the Castlefield Corridor is not the only driver of poor performance in and through Manchester, and that:

- Delay imported to Manchester from outside the North West affects performance across the region, exacerbated by the inability of the central Manchester network to mitigate such poor performance
- Prior to Covid-19, there was a 25 % rise in reactionary delay from pre-May 2018 levels further emphasising the transmission of poor performance across the congested network
- Infrastructure constraints driven by high junction utilisation go beyond the geographic scope set out in the Capacity Analysis Report – and in particular the high utilisation of Slade Lane Junction is an important factor driving timetable structure and performance

However, Covid-19 has fundamentally changed the context; in the short to medium term demand is unlikely to return to pre Covid-19 levels and so the factors which led to the congested infrastructure declaration have changed. This shifts the focus in the short to medium term towards train service solutions which mitigate poor performance and are adequate for forecast demand.

### C.02: Likely future development of traffic

The MRTF programme drew together previous analysis and forecasting to project a growth horizon to 2030, to support understanding of demand and capacity constraints, and building requirements around a projection of 3 % per annum passenger growth validated with stakeholders.

Network Rail's long term planning analysis shows that 4 x 6-car trains per hour will not be sufficient to carry peak loadings from Bolton to Manchester Piccadilly beyond 2030 and that an extra service or lengthening of services is required. However, as this work was completed pre Covid-19 it is now assessed that this requirement may not be required until 2040. The Bolton corridor represents the greatest challenge in terms of passenger volumes to the west of the Castlefield Corridor. Infrastructure decisions during the next decade to accommodate post-2040 growth are driven most by considerations on the Bolton corridor.

However, until the impact of Covid-19 on long term passenger demand is understood, the priority is to implement the May 2022 timetable solution that supports capacity and performance.

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## Part D: Options and costs for enhancing capacity

### D.01: Timetable changes to drive improved performance

The poor track record of performance since May 2018 creates an urgent need to address identified causes and implement actions prior to delivery of investment in additional infrastructure capability. Timetable interventions addressing the number of services, their complexity and ability to spread poor performance support ongoing improvements post Covid-19. A revised plan will form a new baseline for future interventions.

Covid-19 has fundamentally changed the context. In the short term, Covid-19 recovery timetables have reduced quantum and are delivering good performance. Plans under development for May 2022 build on this to create a new timetable designed as a high performing foundation for the future. Experience since May 2018, supported by analysis carried out by MRTF, has emphasised the critical trade-off between timetable complexity and the scale of infrastructure interventions required to reliably deliver the service specification, that is the more complex the timetable the more likely it is that more infrastructure is required to deliver it robustly. Reduced demand caused by Covid-19 has enabled a reappraisal of this trade-off and provided the context of a reduced demand profile through the expected recovery period.

Actions to implement the required improvement to timetables were planned in two stages:

- Small scale timetable changes to support performance recovery by December 2020, which are being implemented but in changed circumstances given the impact of Covid-19;
- A timetable recast to address structural timetable issues and support a step change in performance improvement, targeted for May 2022.

MRTF has looked at the timetable from first principles with the aim of developing a structure that will support better performance by design. Work progressed during 2020 to develop timetable options for consideration, and to assess carefully how these options would improve the overall reliability of the network as well as the impact they would have on passengers.

Three proposed timetable options for May 2022 have been developed through MRTF. All three have common features:

- A reduction in frequency on the Castlefield Corridor – to a maximum of 12 trains per hour each way off-peak and a maximum of 13 trains per hour each way in peak hours, to deliver a robust timetable with spare capacity, which has been modelled using microsimulation and shown to support the reliable delivery of train service
- Better spacing of trains on the Castlefield Corridor to avoid delays knocking-on to following trains
- Fewer conflicts at key junctions to reduce the number of trains crossing the path of other trains
- Better linkage of services at Manchester Victoria to reduce the number of trains terminating and turning round in platforms
- A move towards repeating 30 minute and 60 minute service patterns, to standardise operations and make train service patterns simpler for passenger, including when they need to interchange to complete their journey
- Broadly comparable levels of passenger capacity for commuters across all routes into Manchester compared with that provided in December 2019
- Capacity to accommodate current levels of freight traffic



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Each of the options has been assessed using two established quantitative methods:

- A rail microsimulation model that calculates the expected minutes of train delay accumulated by all trains for any given timetable. This measures the impact of the options on performance, including the impact on reactionary delay
- A rail passenger demand model, which calculates the effects on passenger number of changes in proposed timetables. This measures the impact of the options on the numbers of people travelling – both from the timetable changes themselves and from having a more reliable railway

Results from the microsimulation modelling have confirmed that No Change (pre Covid-19 December 2019) does not perform well in terms of train performance and reliability, supporting the need for change. All three options developed by MRTF would reduce the modelled average delay to train services in the Manchester area. Many train services start their journey from well beyond the Manchester area, so it is difficult to eliminate all delays from revising services in Manchester alone. The proposed options significantly reduce delay per train in the Manchester area:

	No change	Option A	Option B	Option C
Average delay per train (minutes)	3.0	2.5	2.3	2.1

Assessment of financial and economic costs and benefits have also been completed to deliver a balanced scorecard analysis of the options. To support decisions on the preferred option, required in Q1 2021 to comply with industry timescales, a public consultation setting out the options and their benefits is taking place in January and February 2021.

The impact of Covid-19 has led to wider reductions to services on a temporary basis, which has also been accompanied by recovery of operating performance. Post Covid-19, it will still be vital to realise the benefits of a comprehensive major timetable recast, designed to meet market needs whilst underpinning strong operating performance. The industry continues to work towards this, through a comprehensive programme in line with industry timescales.

Following conclusion of the timetable consultation, agreement to the preferred timetable option is expected to follow by summer 2021. Implementation of the preferred timetable, targeted for May 2022, should deliver better performance and provide capacity for recovery and growth post Covid-19. Given achievement of these outcomes, the Castlefield Corridor may no longer meet the congested infrastructure criteria.