

Report
October 2021

Leading Light: What Light Rail can do for City Regions

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Executive Summary

Light rail is now playing a bigger role in the life of British towns and cities than since the heyday of urban tram systems between the First and Second World Wars. In the year to March 2019, 282 million journeys were made on Britain's nine light rail networks.

Light rail has supported economic growth in the areas that it serves, promoted social inclusion and led to environmental gain, including a reduction in carbon emissions. It contributes to meeting the Government's "levelling up" agenda and helps meet the need to decarbonise transport. What our comprehensive review of the evidence shows is that light rail:

- Benefits the economy:
 - Light rail supports the sustainable growth of town and city centres – it allows town and city centres to grow without the adverse impacts that result from increased car traffic
 - Light rail supports site and location specific redevelopment and regeneration – it can increase the scale of new housing and new employment and allow development to come forward sooner than would otherwise be the case
- Benefits society:
 - Light rail helps 'left behind' towns and local centres bounce back
 - Light rail help promote social inclusion by providing attractive connections to job and training opportunities, as well as important public services
 - Light rail encourages more sustainable and healthier lifestyles by reducing car dependency
- Benefits the environment:
 - Light rail is zero emission at the point of use and can be powered by green electricity. It can help towns and cities meet their air quality goals
 - Light rail can help enhance the urban realm

It is light rail's intrinsic attributes that lead to these benefits: the advantageous journey times that it offers particularly over medium distance journeys, its journey time reliability, the frequency of its services and the quality and comfort of the journey, its penetration of town and city centres, and the capacity it provides. This makes light rail attractive to users, particularly those would otherwise use car. In turn, this means that there are fewer cars on the roads resulting in less congestion, lower carbon emissions and better air quality.

The benefits that light rail brings have grown as networks have been extended. There are now twice as many light rail route miles than there were twenty years ago. Systems have also benefitted from enhancements, such as new light rail vehicles (trams), improved stops and smart ticketing.

With Government's support, Britain's light rail systems have continued to operate throughout the pandemic. This has allowed key workers to get to and from their places of work, as well as those who do not have access to a car and cannot work from home to continue to access their places of employment. Light rail has provided access to vaccination centres. As the economy has re-opened, light rail has provided a safe and secure public transport mode to access town and city centres.

How public transport connectivity is provided as the nation exits the pandemic will influence the rate, scale and nature of the recovery. Town and city centres are already highly productive and, because of their higher density and better public transport accessibility, are more sustainable than suburban sprawl. Strong and vibrant town and city centres are synonymous

with a strong and vibrant economy. Maintaining public transport connectivity is integral to helping town and city centres recover and in the conurbations that they serve, light rail is integral to this connectivity. There is a clear need to maintain the connectivity provided by light rail as the economies of the towns and cities that light rail serves recover from the impacts of the pandemic.

There is, however, uncertainty about the rate of recovery from the pandemic. At present, Government's financial support for maintaining light rail operations at broadly pre-pandemic levels extends only to the end of March 2022. If the benefits that light rail has brought to the economy, to society and to the environment are to be maintained and grown in the future, strategic patience will be needed as society exits the pandemic, impacts on the economy unwind and public transport demand returns, stabilises and then grows.

Looking beyond the pandemic, the case for light rail is stronger than ever. Light rail can play a key role helping rebalance the economy by supporting and facilitating economic growth in towns and cities across the country. It can contribute to the Government's levelling-up agenda by connecting left behind communities to a greater range of job opportunities, to the opportunities to gain new skills and qualifications and to essential services, such as health care.

The Government's Transport Decarbonisation Plan is clear that relying on the take-up of electric cars will not allow the country to meet its commitments to reach carbon net zero by 2050. Powered by electricity, light rail is already a highly carbon efficient mode of transport and with investment can become even more energy efficient. Moreover, transport decarbonisation requires a shift from car to public transport. Light rail networks play a vital role in supporting this shift. They provide attractive alternatives for car users and the capacity required for the necessary shift to public transport. Directly serving city centres and providing cross-city connectivity, and through the provision of Park and Ride and interchange with rail and bus, light rail is attractive to those who would otherwise travel by car. Light rail, through its ability to attract car users and support sustainable growth can play a major role in helping Britain's cities reach net zero.

Essential to continuing light rail's benefits is investment in maintenance and renewal of existing systems. As well as allowing light rail to continue to deliver benefits, maintenance and renewal creates a cost-effective opportunity to increase the benefits that light rail brings to the economy, society and the environment.

There are also opportunities to further extend existing systems and to introduce new systems in towns and cities that currently do not benefit from light rail. Having seen the benefits that it can bring, places that developed initial phases of light rail (such as Manchester, Tyne and Wear, Sheffield, Nottingham) have extended their networks. Many are pursuing further network expansion. Other towns and cities are developing proposals for new light rail systems. However, developing and promoting light rail systems is a time consuming and resource hungry process.

One of the major obstacles to timely and cost-effective implementation of light rail has been a shifting central Government view on the merits of light rail and Government's willingness to pay the capital costs that only Government is in a position to pay. Over the last two decades successive Governments have shifted their position on the desirability of funding further light rail schemes at a faster rate than promoters have been able to develop and deliver schemes. A stable policy and funding environment will give greater confidence for promoters to come

forward with proposals for system extensions and for new systems, as well as the wherewithal to take these proposals forward to implementation.

Key Findings

1. Britain's light rail systems have supported economic growth in the areas that they serve, promoted social inclusion and led to environmental gain, including a reduction in carbon emissions.
2. There is a need to maintain the connectivity provided by light rail as the economies of the towns and cities that light rail serves recover from the impacts of the pandemic.
3. Investment in maintenance and renewal will continue and potentially enhance the benefits that light rail brings to the economy, society and the environment.
4. A stable Government policy and funding environment will help promoters come forward with light rail proposals that will bring further economic, societal and environmental benefits.

1 Introduction

- 1.1 In the twelve months to March 2019, 282 million journeys were made on Britain’s nine light rail networks.¹ Everyone who uses light rail does so because they benefit when compared to travelling by the alternatives, be that travel by bus, by car, making a different journey altogether, or simply not travelling at all. For these people light rail is quicker, more convenient, more accessible, is considered safer, or is a combination of these and other factors. And these benefits are not just felt by individuals. Light rail supports and facilitates economic growth. It helps meet the Government’s “levelling up” agenda by connecting people, often in deprived communities, to job opportunities, education and essential services such as hospitals. Electrically powered and an attractive alternative to car travel, light rail is helping meet the country’s pressing need to reduce transport’s carbon emissions.
- 1.2 With Government financial support, light rail has continued to operate throughout the Covid pandemic. It has allowed key workers to get to their jobs and it is supporting the economic recovery as workers return to their offices and people return to the high street. Light rail will help support post-pandemic economic recovery and shape the recovery from Covid so that urban economies follow a more inclusive and more sustainable path.

“Light rail is a lifeline for many communities across the UK.”

Rt Hon Grant Shapps, Secretary of State for Transport²

- 1.3 Light rail has a continuing role shaping the future of our towns and cities. However, the economic, societal and environmental benefits that light rail delivers will only continue with the on-going up-keep of the existing systems and when needed, their enhancement and renewal. The benefits that light rail brings can be increased by further network expansion and elsewhere by new systems, all making best use of new technology to maximise benefits and make light rail even more carbon efficient.
- 1.4 The purpose of this report is two-fold:
- Looking back, the report sets out the type and scale of benefits that light rail delivers to its users and to wider society, as well as how these benefits come about.

¹ Department for Transport (DfT) Transport Statistics Table LRT0101. Hereafter in this report when we quote DfT Transport Statistics we simply use the table reference. The twelve months to March 2019 are the last twelve month period for which statistics are available that was unaffected by the behavioural responses and Government restrictions due to the Covid pandemic.

² Written Statement to Parliament, 19th July 2021

- Looking forward, the report considers light rail's future role in the short term as the nation exits from the pandemic, as well as in the longer term as we move to a net zero carbon future.

1.5 What we conclude from these two perspectives is:

- Britain's light rail systems have supported economic growth in the areas that they serve, promoted social inclusion and led to environmental gain, including a reduction in carbon emissions.
- There is a need to maintain the connectivity provided by light rail as the economies of the towns and cities that light rail serves recover from the impacts of the pandemic.
- Investment in maintenance and renewal will continue and potentially enhance the benefits that light rail brings to the economy, society and the environment.
- A stable Government policy and funding environment will help promoters come forward with light rail proposals that will bring further economic, societal and environmental benefits.

This Report

1.6 As should be the case for all Government supported transport capital projects, implemented light rail schemes have been subject to formal monitoring and process and impact evaluation. Throughout this report we draw upon evidence that has been collected and collated by Urban Transport Group members and other light rail promoters in the UK. We have also drawn upon Department for Transport (DfT) statistics and other published research. We gratefully acknowledge the input to this work from the UTG and its members, in particular the provision of evaluation evidence. This said, the responsibility for any errors or omissions is ours and ours alone.

1.7 After this introductory Chapter, the structure of this report is as follows:

- **Chapter 2** introduces light rail in the UK. It defines what light rail is, gives a brief overview of the UK's nine light rail systems as well as an overview of who uses light rail.
- **Chapter 3** answers the question 'why light rail'. It sets out the benefits that light rail can bring and introduces a set of hypotheses on how light rail can lead to economic, societal and environmental benefits. These are then explored in more detail in subsequent chapters.
- **Chapter 4** considers light rail and the economy - how light rail supports and facilitates economic growth and the evidence that demonstrates light rail successes in this regard.
- **Chapter 5** is about light rail and society – how light rail can meet broader societal objectives such as greater social inclusion and supporting those people and places considered 'left behind'.
- **Chapter 6** is about light rail and the environment – how light rail can contribute to meeting environmental goals through being a low carbon and attractive alternative to car travel, as well as helping shape more sustainable patterns of urban development.
- **Chapter 7** looks at light rail through the Covid pandemic and considers light rail's role in the post pandemic recovery.
- **Chapter 8** concludes by considering the future of light rail in city regions.

1.8 This report has two Appendices. The first sets out some more detail on the history of the UK's light rail systems, while the second maps England's light rail systems and the Index of Multiple Deprivation (IMD), demonstrating the extent to which light rail supports deprived communities.

2 Light Rail in the UK

What is Light Rail

2.1 Light rail is a form of **rapid transit**. The Urban Transit Group (UTG) has defined rapid transit as:³

“A public transport system which is mainly segregated from other traffic, running within or adjacent to the highway, or on separate rights of way, with an average speed of at least 20 kilometres per hour and a capacity in the range of 1,000 to 15,000 passengers per hour per direction.”

2.2 The Office of Road and Rail (ORR) defines **light rail** as follows:⁴

“Light rail is an urban transportation system that generally uses electrically powered rail guided vehicles along exclusive rights-of-way at ground level, on raised structures, in tunnels, and in streets. To allow greater flexibility in integrating systems into urban environments, light rail systems generally use lighter equipment that operates at slower speeds when compared to mainline or heavy rail metro/urban railways.”

2.3 **Tramways** are a particular form of light rail. This is how the ORR defines tramways:⁵

“Tramways are a specific type of light rail system that have a significant element of the system operating in a highway environment or other public space. Tramways are typically built at street level, sharing roads with traffic, but most systems feature a variety of operating environments, including private rights of way, segregated, and off-street sections.”

2.4 **Light Metro** is light rail that operates entirely on segregated tracks under signal control, but using lighter weight vehicles than found on the national railway or London Underground networks. Stations can be underground, elevated or at-grade.

2.5 **Tram-train** is where light rail vehicles can operate on segregated alignments and as a tramway and additionally, on mainline “heavy” railway lines shared with conventional trains. The goal for tram-train is to combine heavy rail’s connectivity advantages of providing attractive journey times and capacity over distance with the penetration of town and cities provided by light rail and the added connectivity that this brings.

2.6 **Very Light Rail (VLR)** is an emerging concept. Lighter weight versions of light rail have been proposed for routes where the level of patronage is lower than for many urban mass transit

³ Select Committee on Environment Transport and Regional Affairs (2000) - Eighth Report: Light Rapid Transport Systems - HC 153, 8 June 2000, paragraphs 5-6, quoted in Steer Davies Gleave (2005) *What Light Rail Can Do for Cities: A Review of the Evidence*

⁴ See: <https://www.orr.gov.uk/about/who-we-work-with/railway-networks/light-rail-tramways>

⁵ *Op. cit.*

systems. Smaller vehicles can be used, which in turn will be lighter and impose lower loads on the track structure than conventional light rail. The goal is for VLR to offer many of the advantages of conventional light rail at a lower unit capital cost, albeit at lower capacity that light rail can offer.

Light Rail Capacity

2.7 A particular feature of light rail systems is the ability to efficiently move large numbers of people in comfort. The capacity of a light rail system is a function of the vehicle capacity and the frequency of service operated. For instance, a light rail vehicle with a capacity of 200 on a route with a 3 minute frequency has a capacity of 4,000 people per direction per hour, around the same as 50 fully laden double decker buses or 2,500 cars.⁶ Light rail capacity can be higher than this. In Manchester for instance, some Metrolink services are operated as 'doubles', which is two two-car trams coupled together. Fully segregated light rail systems can operate at frequencies similar to urban metros systems, such as London Underground.

2.8 In summary, light rail is characterised by:

- Steel wheels running on conventional track formations or on rails laid into the highway
- An ability to operate on alignments with steeper gradients and sharper curves than is possible on the national rail network
- Generally manually operated, but full automation is possible on fully segregated light metro systems
- Speeds of up to 80 kph and rapid, yet comfortable, acceleration and deceleration
- A vehicle length of 20 m to 50 m, width of 2 m to 3 m, with multiple doors and one or two articulated sections, often capable of being coupled into longer formations
- Typically externally electrically powered either through overhead line or by charging batteries, although diesel trams are feasible as are new emerging power sources such as hydrogen fuel cells
- Level boarding for passengers at all stops, either using high-floor vehicles and raised platforms, or low-floor vehicles and platforms almost at street level
- Fares collection not being undertaken by the driver, instead ticket vending machines, other 'off system' sales, or conductors are used
- A centralised control system for operational management and security monitoring
- Signalling ranging from line-of-sight to full automation on fully segregated routes
- A dedicated depot and stabling facility

⁶ Assuming bus capacity is 80 people and average car occupancy is 1.6

Figure 2.1: Light Rail Technologies

<p>Light Rail/Tramway</p> 	<ul style="list-style-type: none"> • Run on-street with traffic or on dedicated alignments • Steel wheels on steel rails • Low or high floor, multiple doors • Could be overhead line, battery or hydrogen powered • 50-80 seats with capacity c.200 • Established – Blackpool Trams, Edinburgh Trams, London Trams, Manchester Metrolink, Nottingham Express Transit, Sheffield Supertram, West Midlands Metro
<p>Light Metro</p> 	<ul style="list-style-type: none"> • Segregated alignments • Steel wheels on steel rails (generally) • High floor, multiple doors • Could be overhead line or third rail powered, scope for battery or hydrogen power • Some driverless automated systems • 25-50 seats per car with capacity c.100. Trains made up of multiple cars • Established – Docklands Light Railway, Tyne & Wear Metro
<p>Tram-Train</p> 	<ul style="list-style-type: none"> • Run on-street with traffic or on dedicated alignments or with heavy rail • Steel wheels on steel rails • Low or high floor, multiple doors • Could be overhead line, battery or hydrogen powered • 50-80 seats with capacity for c.200 • Limited application in the UK – Sheffield Supertram
<p>Very Light Rail</p> 	<ul style="list-style-type: none"> • Run on-street with traffic or on dedicated alignments • Steel wheels on steel rails • Low weight should mean cheaper construction than tram • Low floor, multiple doors • Could be overhead line, battery, hydrogen or flywheel powered • 20-30 seats with capacity for c.70 • No UK operational street running systems– Test centre and test track under construction in Dudley and VLR operation on the Stourbridge Town branch of the national rail network

Who implements Light Rail

- 2.9 Outside London, the UK's light rail systems are owned by their respective Local Transport Authorities. In the metropolitan areas, these are the Combined Authorities often acting through an executive agency (e.g. Greater Manchester Combined Authority and Transport for Greater Manchester). In London, Transport for London is an executive agency of the Greater London Authority. Any new light rail system would be promoted by the relevant Local Transport Authority.
- 2.10 As infrastructure owners, the Local Transport Authorities (or equivalents) are responsible for the maintenance and up-keep of their light rail systems, including the infrastructure and the light rail vehicles. Different approaches are taken to operations, with some Local Transport Authorities letting operating concessions while others operate their systems through in-house companies. Where there are concessions, the revenue risk can either rest with the public sector or with the private sector. Each concession has its own arrangements for which party (the authority or the concessionaire) undertakes different maintenance activities and how these are paid for.
- 2.11 In common with all public sector spending programmes, new light rail systems or extensions/enhancements to existing systems are subject to a business case, developed following the staged Treasury "Green Book" five case business case model. These business cases set out the strategic rationale for an investment (why it is needed), establish the value for money of the proposal, as well as set out how it will be funded and financed, implemented and how the public sector will oversee the overall process. The development of a light rail business case through the various stage-gates to implementation is an involved and time consuming process, often taking many years.
- 2.12 Light rail promoters secure the legal powers to build and operate a light rail system (or modify an existing system) by securing an Order granted by the Secretary of State for Transport using powers granted by the Transport & Works Act (1992). The Transport & Works Act Order (TWAo) process is a powerful one, with the Order giving the promoter wide ranging powers which otherwise would have to be obtained through multiple consenting routes. However, securing TWAo powers is also a costly and time consuming process for promoters and while the TWAo process does allow for effected parties to raise objections to a proposal and (usually) for these to be considered at a public inquiry, there are legitimate arguments that the TWAo approach is an obstacle to all but the most well-resourced, determined or obdurate objectors. There would appear to be opportunities to learn the lessons from nearly two decades of applications for TWAo powers to reduce the burden on the public sector promoter, while at the same time reducing the obstacles for legitimate public, business and stakeholder concerns to be considered.
- 2.13 The principal source of capital funding is Exchequer grant or Government approved borrowing. Government expects Local Transport Authorities to contribute capital costs and to use local sources to re-pay borrowings. The Government's contribution is justified by a value for money assessment, including a cost benefit analysis in which the benefits to the national economy are compared with the whole life costs of the proposal. In some areas, complex arrangements combining Government grant, local contributions and expected operating surpluses have been put in place to fund light rail expansion, with the Government's contribution part-justified by the expected boost to the local economy and what this is expected to mean for Exchequer tax revenues. As a condition for its support, successive Governments have expected light rail revenue to exceed day-to-day operating costs.

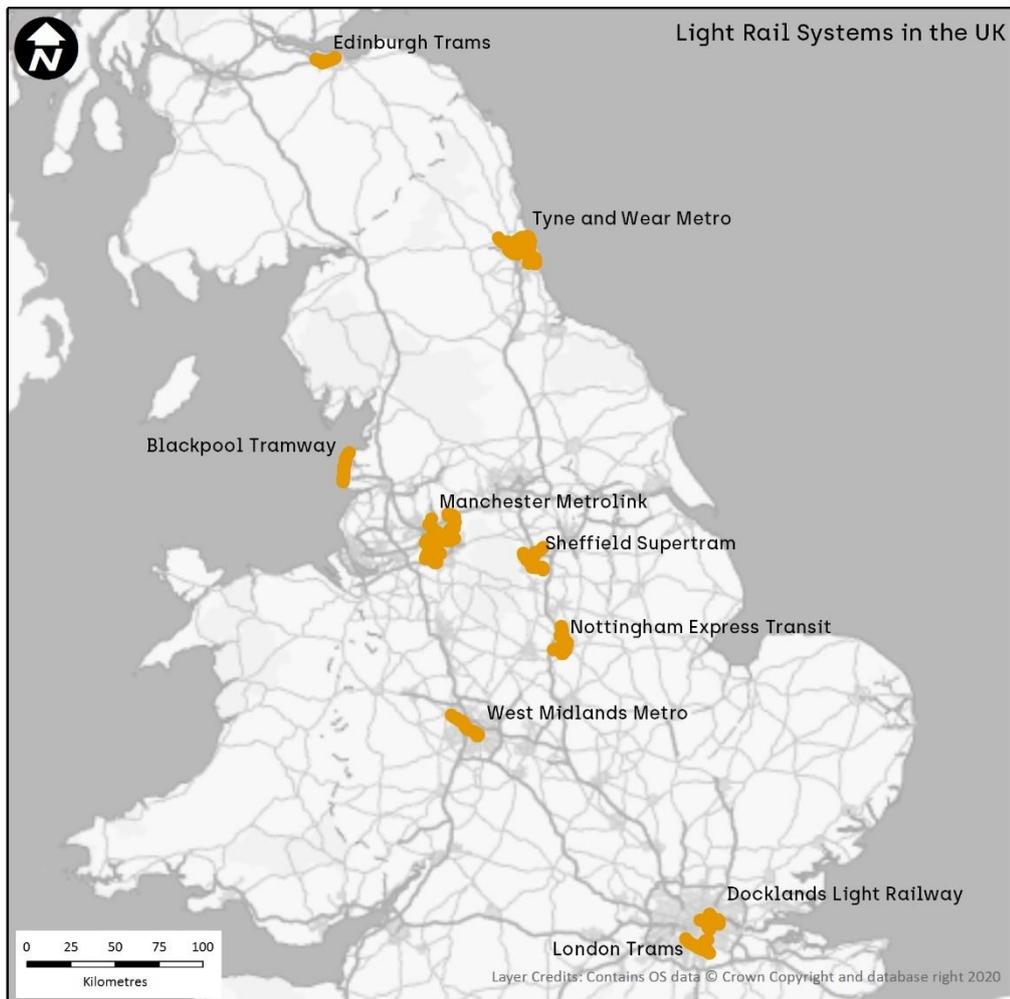
2.14 In Scotland, there are equivalent arrangements.

The UK's Nine Light Rail Systems

2.15 There are nine light rail systems currently operating in the UK. Their locations are shown in Figure 2.2, and they are:

- Blackpool Tramway
- Docklands Light Railway
- Edinburgh Trams
- London Trams
- Manchester Metrolink
- Nottingham Express Transit
- Sheffield Supertram
- Tyne and Wear Metro
- West Midlands Metro

Figure 2.2: Light Rail in the UK



- 2.16 There are six light rail systems in England outside London. The Tyne & Wear Metro, which is the light rail network that provides local rail services in the North East conurbation, opened in stages from 1980. The first phase of the Manchester Metrolink, a tram-based light rail network, commenced operation in 1992 and has been extended in phases since then. Modern tram systems have also been introduced in Sheffield, West Midlands and Nottingham, each using former rail alignments for part of their route. The Blackpool tram – the only first-generation tram system to survive the post Second World War closures – has been substantially upgraded and now has the characteristics of a modern tramway, as well as operating tourist-focussed heritage services.
- 2.17 In London, the Docklands Light Railway (DLR) is a fully-segregated automated light railway. The first part of the system opened in 1987 and there have been several extensions. The DLR network now serves south of the Thames and London City Airport, as well as a large part of east London. London Trams operates on a mixture of former railways and on street, with the network focussed on Croydon. Both DLR and London Trams are operated by concessions awarded by Transport for London (TfL).
- 2.18 Edinburgh Trams is Scotland’s sole light rail scheme. Opened in 2014, Edinburgh Trams links Edinburgh Airport with the city centre using a mixture of tramway and segregated alignment. The system is currently being extended to Newhaven via Leith.
- 2.19 Whilst the arrangements are unique for each system, reflecting the economic and wider benefits that they bring, the capital costs of each light rail system have been substantially funded through Exchequer contributions. The way each system is operated is also unique, but reflecting Government capital funding conditions, in the main, pre-Covid light rail systems covered their day-to-day operating costs from fare box revenue. Receiving direct grant from the Department for Transport, Tyne & Wear Metro is an exception to this, and the revenue and costs of London Trams were integrated within TfL’s overall budget.
- 2.20 Key characteristics of the nine light rail systems are set out in Table 2.1, which also sets out how each system is operated and where revenue risk lies. A brief overview of the characteristics of each of these systems, as well as the history of their development is provided in Appendix A.

Table 2.1: UK Light Rail Systems (2018/19 statistics)

Network	Passengers (million)	Revenue (£m)	Length (kilometres)	Fleet (trams/LRVs)	Description	Operation and revenue risk
Blackpool Trams	5.2	£7.0m	18	18 ⁷	Follows coast between Blackpool and Fleetwood. Significant seasonal traffic	Direct award to council owned bus company which takes revenue risk
Docklands Light Railway	121.8	£171.6	38	149	Six-line network linking Lewisham in the south, Stratford and Stratford International in the north, Beckton and Woolwich Arsenal in the east, and Central London to the west	TfL concession operated by Keolis Amey Docklands Ltd. Revenue risk rests with Transport for London
Edinburgh Trams	7.5	£15.7	14	15 ⁸	Single line network linking Edinburgh Airport with Edinburgh city centre (York Place)	Operated by Edinburgh Trams Limited, which in turn is owned by City of Edinburgh Council
London Tramlink	28.7	£23.5	28	35	Three-line network focussed on Croydon and serving Wimbledon, New Addington and Beckenham Junction	TfL concession operated by First Group. Revenue risk rests with Transport for London
Manchester Metrolink	43.7	£82.1m	103	120 ⁹	Seven lines radiating out from city, mixture of new alignments, on-street and heavy rail conversion	Seven-year concession to KeolisAmey until 2024. TfGM takes revenue risk
Nottingham Express Transit	18.8	£20.6m	32	37	Cross city tram spine with routes to the North, South and West of city	A DBOM concession granted to the Tramlink Nottingham consortium which takes revenue risk

⁷ Excludes historic and B series trams

⁸ Total fleet is 27 vehicles, which will support future services that will operate once the route is extended to Newhaven. The extension is under construction and due to open in 2023.

⁹ 131 trams as at October 2021, to be 147 trams by late 2022

Network	Passengers (million)	Revenue (£m)	Length (kilometres)	Fleet (trams/LRVs)	Description	Operation and revenue risk
Sheffield Supertram	11.9	£14.0m	34	32 ¹⁰	On street or new build lines to north west, north east and south east of city. The link with Rotherham is the UK's only tram-train	Operated by Stagecoach who hold the concession until March 2024. Stagecoach takes revenue risk
Tyne & Wear Metro	36.4	£51.9m	78	89	Combines heavy rail conversions with tunnel section under Newcastle	In house operation with LTA taking revenue risk
West Midlands Metro	8.3	£10.7m	22	21	Largely follows former rail alignment between Wolverhampton and Birmingham. On street sections in both centres. Extensions under construction	In house operation with LTA taking revenue risk

Data Source: Department for Transport LRT Statistics Tables 0101, 0202, 0203 and 0301

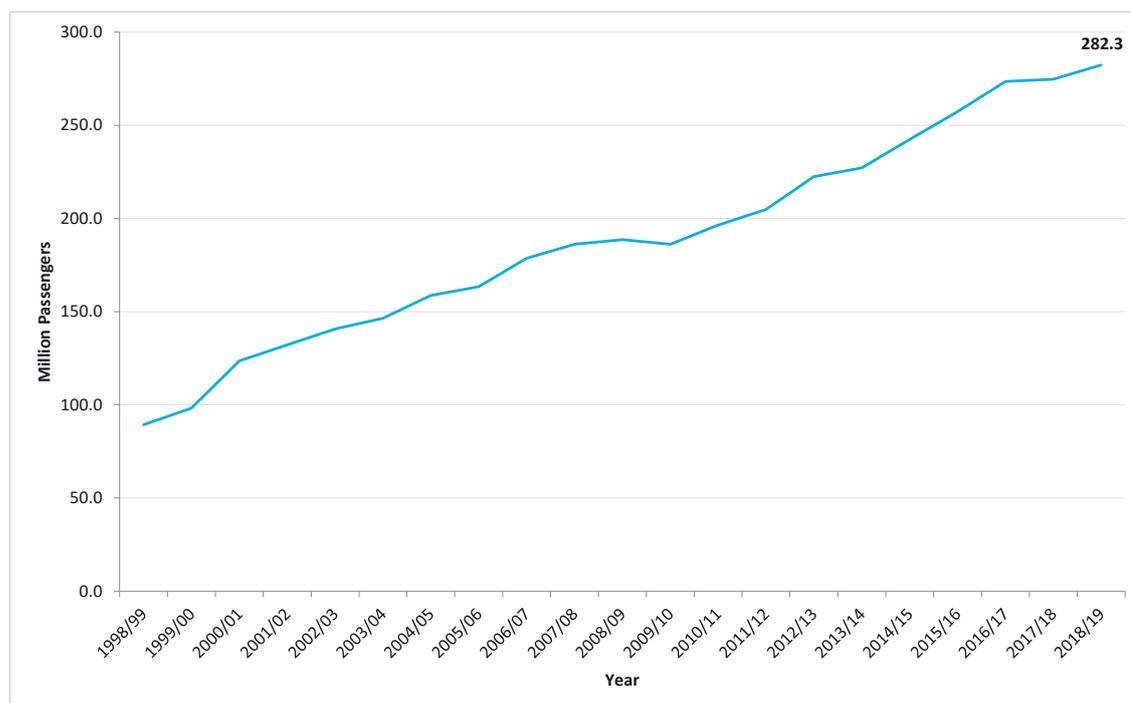
¹⁰ Includes 7 tram train vehicles

Who uses Light Rail

2.21 In the 12 months to 31st March 2019, 282 million journeys were made by light rail.¹¹ As shown in Figure 2.3, use of light rail has been increasing over the last twenty years reflecting:

- the expansion of these networks which has made them a viable travel option for a greater number of people
- the growth in employment and economic activity in the city centres that they serve
- that light rail is an attractive alternative to other forms of transport, especially for medium-distance journeys within conurbations

Figure 2.3: Passenger Journeys on the UK's Light Rail Systems

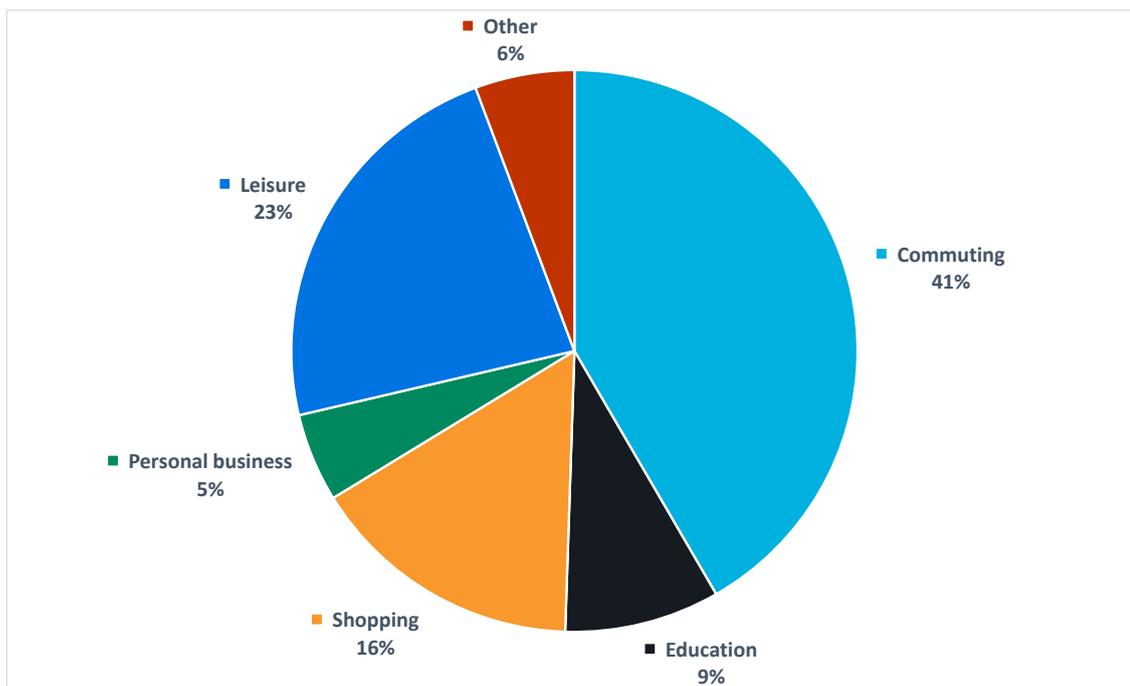


2.22 The reasons why people travel by light rail are shown in Figure 2.4. Together, commuting to work and journeys to education account for around 50% of all light rail journeys. Compared with bus, commuting trips make up a larger share of all trips whereas journeys to education make up a smaller share. This reflects that light rail networks are focussed on the centres of the conurbations that they serve, which are the largest centres of employment in their areas. In addition, they are also the largest centres for retail and the leisure industry. On the national rail network, 54% of all trips are associated with commuting to work and journeys to education, although this figure will be greater for rail journeys in London and to the largest city centres outside London.¹²

¹¹ LRT 0101

¹² Department for Transport Rail Factsheet, December 2020

Figure 2.4: Why People Travel by Light Rail

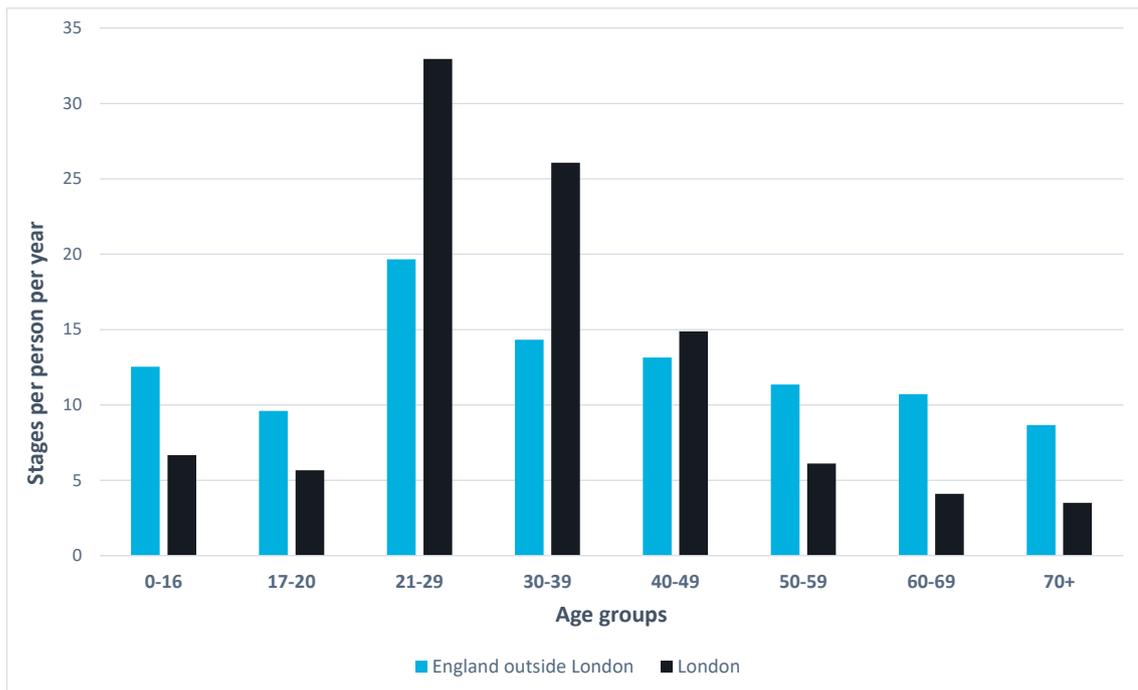


Data Source: LRT0401a

- 2.23 The younger in society have a greater propensity to use light rail than the older, with those in the 20 to 40 age bracket having the greatest propensity (Figure 2.5). This figure shows separately the propensity to use light rail by age in London and outside London. There is a higher propensity for younger people to use light rail in London than elsewhere, reflecting the Capital’s overall younger age profile, as well as the characteristics of the particular areas that light rail serves.
- 2.24 Light rail tends to be used more by the better off (Figure 2.6). Again, the chart distinguishes London from outside London, with the propensity to use light rail by higher income groups higher in the Capital than outside it. Generally, the income distribution reflects where light rail serves. It is city centre markets that light rail serves well – city centres have the highest concentration of better paid knowledge intensive jobs.
- 2.25 Overall, men make 54% of light rail journeys and women 46%.¹³

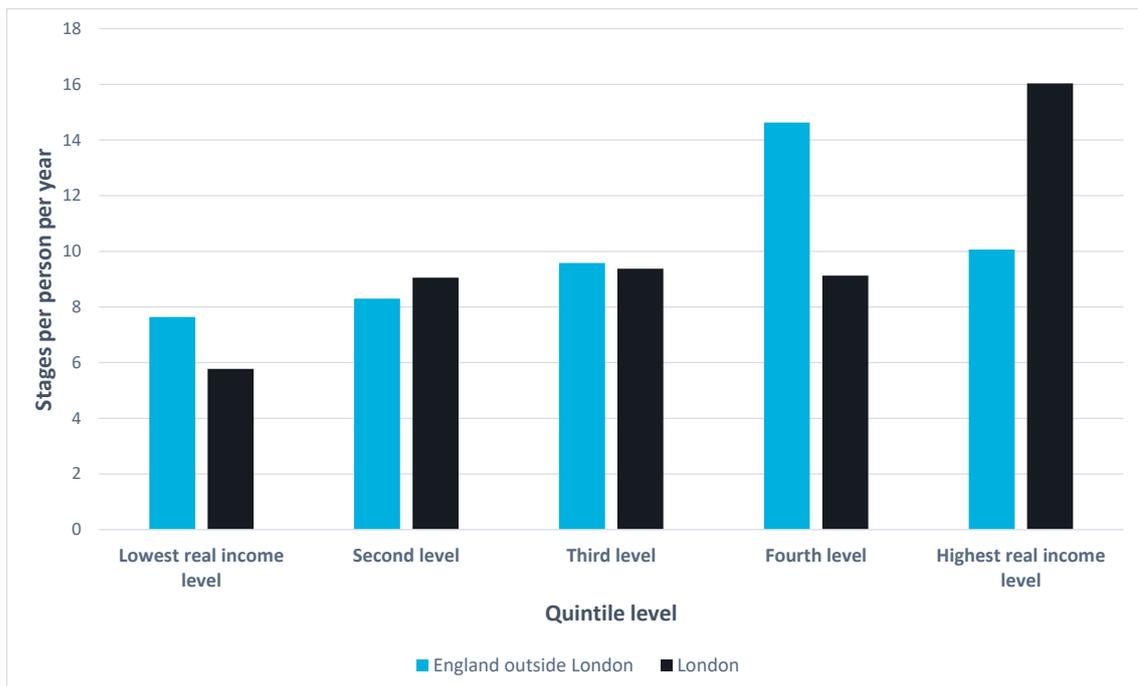
¹³ DfT Light Rail and Tram Statistics Table LRT0401c

Figure 2.5: Propensity to Use Light Rail (by Age)



Data Source: LRT 0401b

Figure 2.6: Propensity to Use Light Rail (by Household Income)



Data Source: LRT 0401f

3 Why Light Rail

Introduction

- 3.1 Light rail is a convenient, attractive and sustainable transport option used by millions of people every year. Light rail delivers substantial and widespread benefits to its users and to non-users alike. In turn, these lead to benefits to the economy, environment and social make-up of the areas which light rail serves.
- 3.2 Everyone who uses light rail does so because they benefit when compared to the alternatives, be that travel by bus, by car, walking or cycling, making a different journey altogether, or simply not travelling at all. For these people light rail is quicker, more punctual, more convenient, more accessible, is considered safer, or is a combination of these along with other more intangible factors that make light rail attractive to its users. As well as making life better for the people that use it, either directly or indirectly, these individual benefits felt by users translate to benefits to the national economy and these impacts are recognised and incorporated in the cost benefit analysis that is integral to the business cases that underpinned each of the UK's nine light rail systems.
- 3.3 The benefits of light rail, however, are not limited to benefits felt by its users. There are wider societal benefits too. Indeed, it is these wider benefits that promoters of light rail systems are looking to realise when they bring forward their proposals. These benefits include
- Benefits to the economy:
 - Supporting the sustainable growth of town and city centres – allowing town and city centres to grow without the adverse impacts that result from increased car traffic
 - Supporting site and location specific redevelopment and regeneration – increasing the scale of new housing and new employment and allowing that to come forward sooner than would otherwise be the case
 - Benefits to society:
 - Helping 'left behind' towns and local centres bounce back
 - Promoting social inclusion by providing attractive connections to job and training opportunities, as well as important public services
 - Encouraging more sustainable and healthier lifestyles by reducing car dependency
 - Benefits to the environment:
 - Light rail is zero emission at the point of use and can be powered by green electricity (which in turn can be an efficient way of supporting the transition to net zero), as well as helping towns and cities meet their air quality goals
 - Light rail can help enhance the urban realm
- 3.4 Light rail secures these benefits because:
- Light rail is highly efficient at moving large numbers of people in urban areas, especially for medium distance urban trips that are not best served by bus (shorter distances) or national rail (longer distances)

- Light rail is attractive to people who would otherwise use cars, but don't consider bus a viable alternative
- Light rail is perceived as a permanent commitment to improving an area's public transport, economy and environment and these perceptions are integral to customer and investor confidence

Hypotheses

3.5 To help use the available evidence on the impacts and benefits that light rail brings to the towns and cities that it serves, a set of hypotheses have been developed and these are listed below. Each hypothesis is given a reference and these are used in the following chapters.

Light Rail and the Economy

- can support and facilitate:
 - growth in employment and economic activity in town and city centres (H1)
 - and do this in a way that minimises the negative impacts that growth in car traffic would bring (H2)
- can support and facilitate economic redevelopment and regeneration (H3)

Light Rail and Society

- can help 'left behind' town and local centres (H4)
- can promote social inclusion by providing better access to jobs, education/training and other facilities for those living in deprived areas (H5)
- can encourage use of public transport, helping people have more active lifestyles (H6)

Light Rail and the Environment

- can support the transition to net zero carbon (H7)
- can support achieving clean air including meeting legal air quality limits (H8)
- can help enhance the urban environment and urban realm (H9)

3.6 It is further hypothesised that light rail achieves these benefits because:

- Light rail is more efficient than alternatives at moving large concentrations of people in urban areas (H10)
- Light rail provides an attractive alternative to travel by car (H11)

Logic Map

3.7 Logic mapping forms a "systematic and visual way of presenting the steps involved in turning a set of resources or 'inputs' into activities that are designed to lead to a specific set of changes or outcomes".¹⁴ It provides a means of illustrating how specific inputs, can deliver a wider set of actions, which in turn lead to immediate outputs, intermediate outcomes and impacts (also known as 'final outcomes'). The mapping helps illustrate how transport can affect society, the economy and the environment.

¹⁴ Tavistock Institute (2010) *Logic Mapping: Hints and Tips – for Better Transport Evaluations*. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3817/logicmapping.pdf

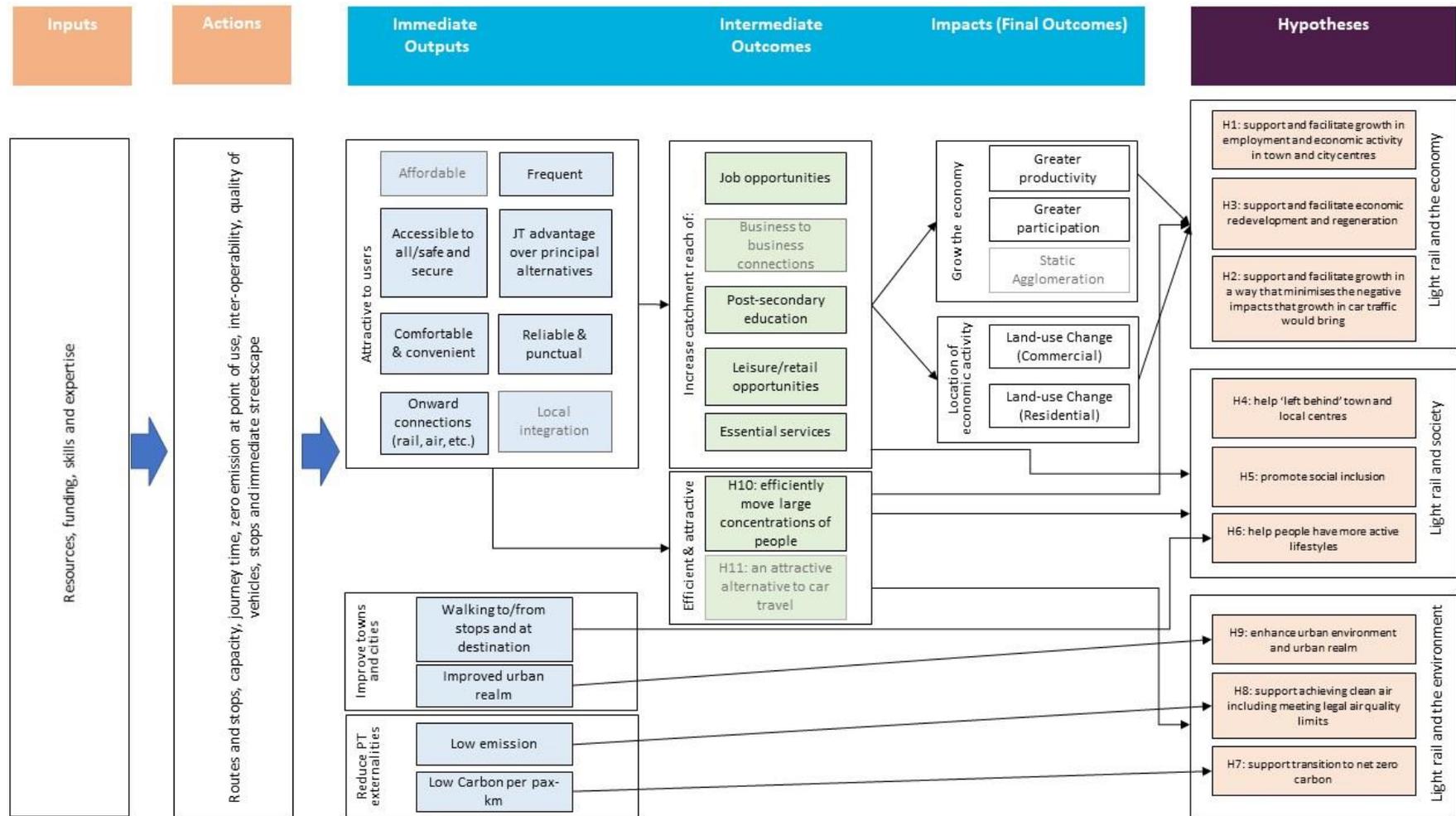
The Light Rail Offer

- **Penetration of town and city centre with permanent, visible, and acceptable infrastructure:** direct access can be provided to city centre jobs, shopping and other facilities in a way that is highly visible and perceived as reliable and dependable.
- **Predictable, regular and reliable journey times and service patterns:** service levels are generally high (5 to 20 or more trams per hour) on simple, easily understood routes, generally operating at a high level of reliability due to segregation from traffic, priority at junctions and contractual incentives to operators.
- **Accessible and visible stops:** vehicles are highly accessible to all users and can provide 100% level boarding at stops. Other features include highly visible stops, good information, easy to purchase tickets and security measures (visible staff or police on and around the system, CCTV etc).
- **A high quality of ride throughout the entire journey:** whether or not a system is fully segregated or mixes on-street and off-street running.
- **Short dwell-times:** multiple doors and off-vehicle ticketing ensure light rail has the benefit of short dwell times at stops, with consequent journey time benefits.
High passenger carrying capacity: in radial road corridors in urban areas, light rail can provide a more efficient and sustainable use of existing capacity by making best use of available road and junction priority. Indeed, it is essential to provide this priority for light rail to avoid reliability problems on street-running sections. Light rail can increase capacity on an existing rail corridor by providing more stops and higher frequency services – made possible by the provision of dedicated routes in city centres thus avoiding congested rail termini.
- **Additional capacity in a sustainable way:** light rail can provide additional passenger carrying capacity to existing city centres or major developments, whereas new road capacity would not be acceptable.
- **Attractive to car users:** evidence suggests that car users find the connectivity and the quality of service offered by light rail attractive.
- **Integration with new developments:** the development of light rail in conjunction with major changes in the urban fabric is an effective way of supporting development activity, as has been demonstrated primarily in London Docklands, but also in Manchester and elsewhere.
- **Integration with urban realm enhancement:** light rail can be integrated with wider initiatives to enhance urban realm and reallocate road space away from motorised traffic to pedestrians and cyclists, and create new public open space.
- **Linking major traffic generators/attractors:** routes that serve more than one major travel market are particularly efficient as they help to provide balanced all day flows and make better use of the infrastructure. Examples include city centres to town centres, major park and ride sites to city centres and major developments to city centres.
- **Integration:** physical integration of light rail routes is often ‘designed-in’ (e.g. to major rail or bus stations or major developments). Integration of fares and services with bus and rail operators is limited by the regulatory environment in the UK, although it is usually achieved to some extent. Replacing the deregulated bus market with bus franchising, which is being actively considered by a number of Combined Authorities, creates opportunities to increase fare and service integration.
- **Permanence:** the image offered by light rail infrastructure, vehicles and operations secured in the long term, gives individuals and business confidence to make location decisions.
- **Emblematic:** light rail can be emblematic of the places that they serve, a visible sign of a modern and dynamic city and become an object of civic pride, a symbol of the cities served.

Source: Developed from Steer Davies Gleave (2005) *What Light Rail Can Do for Cities: A Review of The Evidence*

- 3.8 Logic mapping has been used to illustrate how the outputs that light rail produces – that is the connections that it makes, the journey times it offers, the punctuality and reliability of its services, etc. – lead to the hypotheses set out above.
- 3.9 While logic maps produced in different contexts may use different terminological definitions, for this work the following terms have been adopted all of which are consistent with DfT guidance:
- Inputs are the resources that scheme promoters can deploy to develop light rail proposals. These include staff as well as financial resources.
 - Actions refer to the implementation of light rail. While unique to each light rail system, actions lead to an investment.
 - Immediate Outputs are elements of the changes to connectivity that light rail delivers: stop-to-stop journey times, service frequencies, punctual and reliable journeys, service quality, etc. They can also include things such as improvements to the urban realm in the immediate corridor served by the system.
 - Intermediate Outcomes refer to the short and medium-term results from the investment. These come about because of the immediate outputs and are typically achieved over a period of two to five years. They may also reflect second-order changes in transport behaviour as a result of light rail’s immediate outputs. An example of an intermediate outcome would be better linkages between people seeking work and job opportunities that match their skills.
 - Impacts/final outcomes refer to the longer-term effects of investment on wider society and the economy, which could typically materialise after 4 to 5 years. These are hard to link directly to any specific transport scheme as they are also influenced by wider trends, other plans and policies, as well as other transport investment. Examples include how transport can help to support growth in the number of people employed (through improving access to work opportunities for those not in employment), or reduced greenhouse gas emissions (through the longer-term effects of modal shift).
 - Strategic Outcomes are the policy goals that light rail promoters wish to achieve. Light rail will be just one of the interventions needed to realise the goals, albeit a potentially effective one, and like the impacts/final outcomes they will also be influenced by other plans and programmes and exogenous factors.
- 3.10 Shown in Figure 3.1 is a logic map that shows how the “immediate outputs” that light rail delivers such as attractive journey times, frequent and reliable services and a comfortable ride leads to the benefits to society that are captured by the hypotheses introduced in Paragraph 3.5. This is not intended to represent any particular light rail scheme, rather it is a prototypical example. Each scheme will have its own unique focus, reflecting the areas it serves and the priorities of the promoter.
- 3.11 The next three chapters explore these hypotheses in greater detail and set out evidence that demonstrates the effectiveness of light rail at securing these societal benefits.

Figure 3.1: Light Rail Logic Map



4 Light Rail & the Economy

Introduction

4.1 That a successful and dynamic modern economy needs a functioning transport network is self-evident. Conversely, it is recognised that overstretched transport networks can constrain economic success. Reflecting this, supporting and facilitating economic growth by investing in transport - both to remove constraints and to provide the enhanced connectivity that a growing and evolving economy needs - has been a central plank of the transport policies of successive governments, as well as local transport authorities across the country. However, how improving transport supply and the connectivity that this brings leads to economic growth is complex.

4.2 In this chapter we explore how light rail can support and facilitate:

- growth in employment and economic activity in town and city centres (H1)
- and do this in a way that minimises the negative impacts that growth in car traffic would bring (H2)
- and that can support and facilitate economic redevelopment and regeneration (H3)

4.3 We do this by briefly surveying contemporary thinking on how investment in transport can lead to economic growth and how in particular the connectivity that light rail provides in city regions supports their economies. Case studies are used to illustrate how the UK's light rail systems have benefitted the economy. These lead to the conclusion that the UK's existing light rail systems have helped positively shape the scale and nature of the economies that they serve and that there are further potential economic gains to be had through the further expansion of light rail provision.

Transport & the Economy

4.4 Fundamentally, transport is a derived demand. People travel because they want to undertake an activity, which could be go to their place of work, to school or college, to the shops or to meet a friend. As well as being a benefit to the traveller, directly or indirectly, each of these activities contributes to the economy. Improving transport connectivity makes it easier for people to undertake such activities. Making it easier for people to travel leads to a benefit to the economy, whatever the purpose of the journey.

4.5 Transport has further influences on the economy beyond the benefits experienced directly by users. By making some areas more attractive to live or do certain types of business than others, transport connectivity affects the scale, pattern and location of economic activity - where people live and where businesses locate.

4.6 Transport, however, also creates economic externalities, that is additional costs to the economy that impair its performance. Congestion on the roads increases journey times and makes journeys unreliable. Crowding on public transport means some people don't travel when they would like to. Accidents create a cost to society. Noise from roads and railways, air

pollution and greenhouse gas emissions, as well as the impact of transport infrastructure on townscapes and the natural environment are all externalities that lead to an economic cost.

- 4.7 The thrust of transport policy has been constant over time: maximise connectivity to minimise the “cost” felt by travellers as they go from activity to activity, while at the same time seek to minimise the negative externalities – congestion, accidents and impacts on the environment - that transport infrastructure and its use brings.
- 4.8 What has changed over time though is our understanding of the mechanisms of how transport interacts with the economy both in terms of how benefits and externalities are generated, which in turn has influenced transport strategies, plans and programmes at national, sub-national and city region level. In particular, it is now widely recognised that in town and cities, there is a need to maximise the use of active modes (walking and cycling) and public transport. This is because active modes and public transport are an efficient and effective way to support and facilitate economic growth, while minimising the negative economic externalities that transport can bring. Furthermore, it is recognised that it is not possible to provide the urban connectivity that modern economies need by simply building more and more road capacity.

“Light rail can play an important part in assisting local areas deliver their aspirations for economic growth.”

Department for Transport (2019) *Light Rail (and Other Rapid Transit Solutions): A Call for Evidence*

Welfare & GDP

- 4.9 There are two alternative ways that the economic benefits of transport investment can be considered. One is from the welfare perspective and the other is by looking at measures such as Gross Domestic Product (GDP) (or Gross Value Added (GVA), which is a similar metric to GDP) and associated measures such as the number of additional jobs that come about due to a transport investment.
- 4.10 The welfare approach is a more comprehensive way of looking at the economic impacts of a transport investment and because of this it underpins the Government’s approach to cost benefit analysis that is integral to the *ex ante* appraisal of transport investments in the United Kingdom.¹⁵ Central to the welfare approach is the consideration of user benefits, that is the savings in travel time and other elements of ‘generalised journey time’ that users experience due to a new transport investment. In the context of light rail systems, generalised journey time includes access and egress time between ultimate origins and destinations and light rail stops, waiting time at stops, journey time reliability, in-vehicle crowding and factors such as journey comfort/quality.
- 4.11 The welfare approach also captures impacts experienced by non-users. These include changes to the levels of road congestion, which can decrease due to light rail (as car users decide to travel by light rail instead) or can increase (as road space is reallocated to public transport), as well as changes to the number of accidents and environmental impacts.

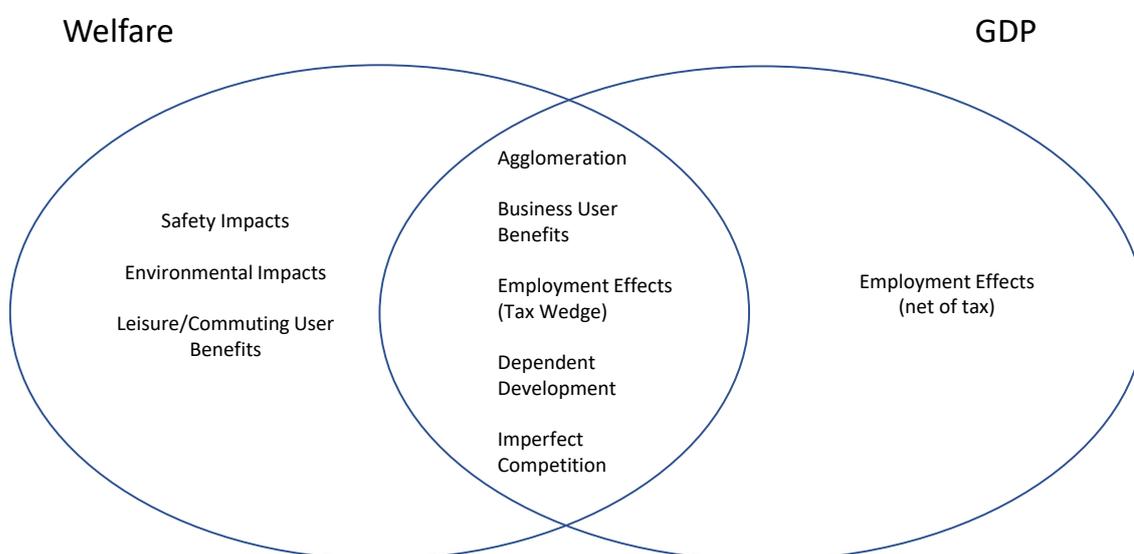
¹⁵ HM Treasury (2020) *The Green Book: Central Government Guidance on Appraisal and Evaluation*

- 4.12 Central to the welfare approach is the understanding that in a market economy the benefits that are felt by users and non-users transfer to the more general economy. Some welfare benefits have a direct impact on the economy. These include time savings for people travelling as part of their job (on employers' business), as this saved time can be used for productive work or save their employer money. Other welfare benefits have an indirect impact. For example, there is evidence that areas that are well served by light rail systems experience higher average house prices than comparable areas that are not as well served.¹⁶ This is an example of the welfare benefits felt by light rail users who commute to work or travel for leisure purposes transferring to the 'real' economy, in this instance house prices which leads to a tangible economic gain to householders when they come to sell their properties.
- 4.13 In addition to business user benefits, light rail has the potential to lead to a further set of 'productivity' benefits that while part of a welfare appraisal can also be captured in terms of GDP. Principal amongst these are agglomeration benefits. Agglomeration benefits are the additional productivity that comes about because improved transport leads to firms being in closer proximity to their customers, suppliers and collaborators, as well as with their potential labour force. In essence, agglomeration benefits are why people and businesses choose to locate in towns and cities – the benefits of proximity to customers and workers outweighs the disbenefits of (for instance) higher property prices and in the transport sphere, additional costs due to traffic congestion and crowded public transport.
- 4.14 By increasing effective economic density, light rail can directly lead to existing firms being more productive. This is referred to as 'static agglomeration'. On top of this, light rail systems can make the areas they serve more attractive places for people to live and for firms to locate their businesses. It can support denser housing developments, firms to grow and new firms to start-up, or existing firms to relocate. It can change the pattern and scale of land use development and this is referred to as 'dynamic agglomeration'.
- 4.15 A further way that new transport supply can lead to economic benefits is through facilitating land use development that would otherwise not be able to occur in the absence of investment in transport. This requires there to be a clear intention to develop a site and a tangible transport-related barrier that prevents the site being developed to its full potential. Overcoming these barriers – for example by providing additional public transport capacity – leads to a 'dependent development' benefit.
- 4.16 One of the challenges to the welfare-based approach for assessing transport benefits is that it is difficult to express the full range of impacts of a transport scheme in terms of metrics such as GDP or new jobs that may be created by the investment. In part, this is because the transmission mechanisms between welfare impacts and the real economy are indirect and take place over time. Transport is also not the only factor that may influence how the economy grows or how many jobs are created and it is difficult to disentangle the impact of transport investments from other local policies and programmes (for example, supporting skills and training) or from national policies (for example, taxation) as well as global economic trends. On top of this, welfare impacts are conventionally assessed over the appraisal life span of a project (currently 60 years), whilst GDP and job impacts are only meaningful when expressed in a particular year or over a short time span.

¹⁶ For example, see Nationwide (2019) *House Price Index Special report – June 2019*

- 4.17 A further challenge to the way that the welfare-based approach is applied in cost benefit analysis in the UK is that there is a limiting assumption that transport investments do not change the patterns of economic activity – where people live or work, or the overall make-up and scale of the economy other than at the margin. This means that the ‘static agglomeration’ effects, where existing businesses become more productive, are included in the cost benefit analysis of transport schemes while changes to the patterns of housing and employment that come about because of the transport scheme (‘dynamic agglomeration’) are not (although to an extent such impacts can be quantified and monetised). However, one of the objectives of many promoters of light rail schemes is for their light rail schemes to directly support such growth in employment and/or housing. Robustly bringing such considerations into the assessment of value for money is an analytical challenge where further work is needed.
- 4.18 Shown in Figure 4.1 is the Department for Transport’s view on the link between economic benefits expressed in welfare terms and those that can be expressed in terms of GDP.

Figure 4.1: The Links Between Welfare and Gross Domestic Product



Source: DfT (2019) TAG Unit A2.1 Wider Economic Impacts Appraisal

Light rail supports growth in employment and economic activity in town and city centres

Benefits to Users

- 4.19 The intrinsic features of light rail – the advantageous journey times that it offers particularly over medium distance journeys, its journey time reliability, the frequency of its services and the quality and comfort of the journey and its penetration of town and city centres and the capacity it provides – all offer benefits to its users. This is why light rail attracts users who would otherwise use car. These benefits to users translate to benefits to the local and national economy.
- 4.20 We provide examples of light rail’s attractiveness to car users below. Light rail can also be an attractive alternative to under-invested rail services. Linked by a tramway across Manchester city centre, Phase One of Manchester Metrolink was the conversion of two suburban railway

lines and this led to an immediate patronage boost compared with the rail services they replaced, explained by a more frequent service and the fact that services ran across Manchester city centre rather than terminating at railway stations at its periphery. The conversion of the Oldham Rochdale railway line to Metrolink as part of the Phase Three expansion led to a similar effect. TfGM has estimated that 1.15 million trips were carried on the Oldham Loop line in 2008/09, its last year of conventional rail operation, compared to the 6.125 million Metrolink trips in 2019/20, a five-fold increase.¹⁷

- 4.21 When proposed light rail systems are subjected to *ex ante* appraisal, the benefits that forecast users experience are monetised and along with other non-user and wider benefits these are compared with costs as part of a cost benefit analysis. However, these user benefits are experienced by users not just as time savings to their journeys but in other ways too. They can mean the ability to get a job that otherwise would have been too difficult to get to if it had not been for light rail, or it could mean being able to get to a college and take the course that leads to better qualifications.
- 4.22 A behavioural survey undertaken as part of the first year evaluation of Phase Two of Nottingham Express Transit (NET) showed that around 10% of commuters using NET who changed their workplace in the last 5-6 years would not have found it practical to move jobs without NET. This suggests that NET is delivering real economic benefits with improved labour market supply initiated by improved accessibility, which is in turn increasing GVA via an increase in productivity and a rise in general wage levels as the workforce accesses better paid jobs.
- 4.23 These benefits are felt by businesses too. As part of the Metrolink Phase Three monitoring and evaluation work, benefits have been identified by businesses in terms of improved customer and labour force catchments. Some businesses also have the perception that the Phase Three lines have opened up their businesses to greater competition to the benefit of other Greater Manchester businesses. While this may be a disbenefit to particular businesses, it is a benefit to consumers, whether they use Metrolink or not, as well as to other businesses that gain new trade.¹⁸

Fares

- 4.24 In part the benefits that light rail users experience is captured through the fare that they pay. Those who use light rail experience a benefit equivalent to the fare they pay (as a minimum) and for most light rail passengers it will be more than this (that is, they are willing to pay more than the fare). However, some people who would like to use light rail don't do so because they consider the fare to be too expensive.
- 4.25 TfGM has benchmarked Metrolink fares against other light rail networks in the UK (see Table 4.1). This shows that Metrolink fares are circa 60% higher than the average of the other UK light rail networks.¹⁹ One reason why there is such a variation in fares across systems is the way that the implementation costs of light rail are financed. In the Metrolink example, the deal struck between the Greater Manchester authorities and Government is that some of

¹⁷ Section 3.6 TfGM (2021) *Metrolink Phase 3 Monitoring and Evaluation Second Report*

¹⁸ Section 4.2 *ibid.*

¹⁹ Season/multi-use tickets reduce the cost per journey for regular travellers, but the point stands – some systems are markedly more expensive per journey than others.

Metrolink's implementation costs are partly financed by Metrolink's operating profit. Not only is there a need to cover operating costs from revenue to avoid the need for an on-going subsidy, but there is a need to make a certain level of surplus to support the financing of the capital expenditure. This results in high fare levels both *per se* and compared with other systems, which diminishes the overall societal benefits that Metrolink brings. Of course, the societal benefits are greater than would be the case if Metrolink did not exist so this could be seen as a necessary price to pay. However, it is an unavoidable conclusion that the Government's requirement for a fare-box funded contribution means that Metrolink's societal benefits are not as great as they could be.

Table 4.1: UK Light Rail – Fare Comparison

Network	Most Comparable Single Fare
Manchester Metrolink	£4.60
West Midlands Metro	£4.00
Docklands Light Rail	£3.90
Tyne & Wear Metro	£3.15
Sheffield Supertram	£2.60
Nottingham Express Transit	£2.30
Edinburgh Tram	£1.80
London Trams	£1.50

Source: TfGM Analysis (2020 data)

Light Rail minimises the negative impacts that growth in car traffic would bring

- 4.26 Light rail is attractive to people who would otherwise use car for their journey. Because of this, there are fewer cars on the road which leads to less congestion, fewer road traffic accidents and lower carbon emissions. It can also help areas that experience traffic-related poor air quality by providing a less polluting alternative to car travel.
- 4.27 The extent to which a light rail scheme attracts people from cars is affected by a number of factors. These include but are not limited to:
- the relative journey times of each alternative mode of transport. Light rail that is direct, segregated and/or has priority over traffic can offer attractive journey times compared to car
 - the availability and cost of parking at the destination end of the journey
 - the accessibility of the stops. Light rail can penetrate the heart of town and city centres, as well as provide cross-city connectivity
 - park & ride provision, which can extend the catchment of light rail systems especially in places where town and city centre parking is limited
 - the quality of the journey. Running on steel wheels powered by electric motors, light rail can offer a more comfortable ride than bus and as such be a more attractive alternative to people who have a choice of travelling by car. Light rail vehicles and their stops tend to be well lit and covered by CCTV, increasing the sense of safety and security. There is real time information provision at stops and on vehicles. A number of UK light rail systems have conductors and this too adds to passengers' perceptions of safety and security
- 4.28 Recent evidence on the attractiveness of light rail to car users includes:

- Surveys undertaken as part of the 2017 evaluation of Nottingham Express Transit which found:
 - 30% of passengers using the Phase Two network extensions had previously used the car for their main mode of travel prior to the introduction of new services or had transferred from other park and ride sites to those on the Phase Two network (Clifton South and Toton Lane).²⁰
 - Over 50% of passengers who had changed travel mode to Line One of NET previously used car as their main mode of travel.²¹
 - A key feature of the NET system is its park and ride. The five park and ride sites on Line One have an occupancy rate of over 85%, which effectively means they are considered ‘full’. The evaluation report suggests demand of around 800-900 cars using Toton Lane each weekday and 300-400 at Clifton South. As these sites are not yet operating at capacity, there is potential for further growth.²²
 - This has contributed to growth in public transport use in the city of nearly 25% between 2004 and 2019 which in turn has led to Nottingham being one of the few cities outside London to see a reduction in car usage.
- Surveys undertaken in October and November 2018 on Manchester Metrolink found that:²³
 - Network-wide, 48% of all passengers reported that they had a car or van available for the journey they were making when surveyed. On the East Didsbury line this figure increases to 58%, while on the Eccles line it is 39%, which reflects both the characteristics of the journeys made on these two lines and the socio-demographic characteristics of the areas served.
 - When asked “if Metrolink was not available for the journey you are describing, what would you have done instead”, network-wide 29% said that they would travel by car, either as a driver or as a passenger.
- Work by Nexus that explored the hypothetical question of what would happen if the Tyne and Wear Metro was closed identified that there would be significant shift to private cars – for example as much as 42% of Metro passengers in North Tyneside would switch to car or taxi.²⁴

²⁰ See Section 8.2, Nottingham Express Transit (2017) *NET Phase Two Monitoring and Evaluation –Year One Report*

²¹ *Ibid.*

²² Para 8.4.8, *ibid.*

²³ Tables 3.1 and 3.2 TfGM (2021) *Metrolink Phase 3 Monitoring and Evaluation Second Report*

²⁴ Data provided by Nexus

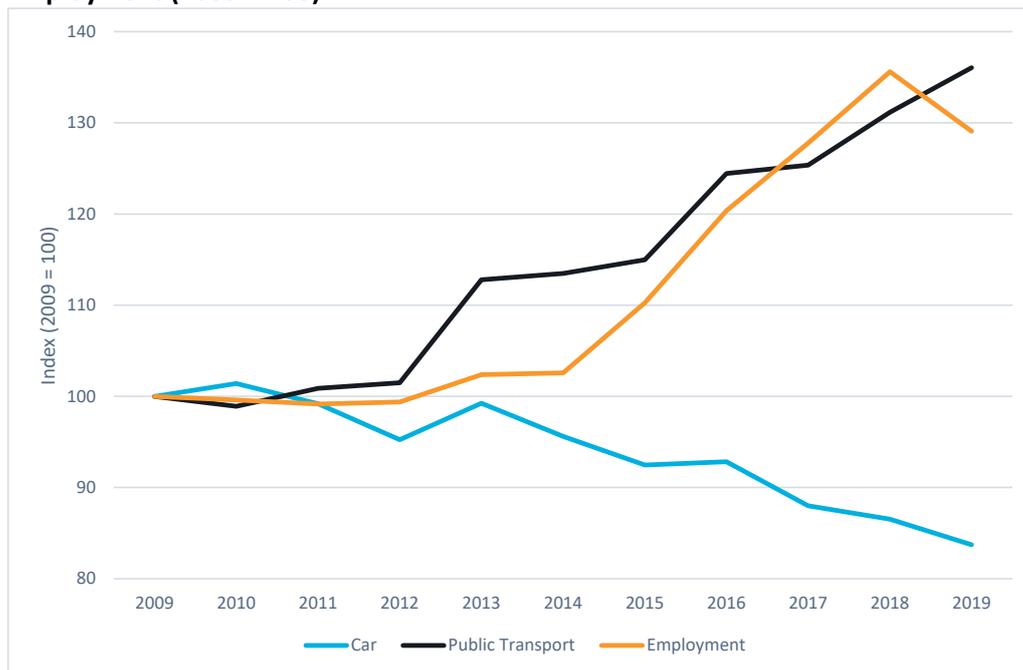
Metrolink and Job Growth in City Centre Manchester

Manchester city centre is one of the largest centres of employment outside London, much of it in highly productive office-based knowledge-intensive sectors.

Between 2009 and 2019 employment in city centre Manchester has grown from 135,000 to 175,000, a 30% increase. Over the same period, the number of car trips crossing the Manchester city centre cordon in the morning peak period has decreased from 27,000 to 22,500.²⁵ The use of bus to cross the cordon in the morning peak has also declined. Rail and Metrolink patronage has grown to such an extent that by 2019 public transport accounted for around two-thirds of all inbound morning peak trips crossing the cordon.

As shown in Figure 4.2, there is a strong correlation between the rate of city centre Manchester jobs growth and the rate of growth in the use of public transport. As can be seen from Figure 4.3, Metrolink has been integral to this growth. Rail trips have grown in number, but rail's mode share has not increased. In contrast, Metrolink demand has grown nearly threefold. The only conclusion is that the expansion of the Metrolink network and the attractive public transport connectivity to the city centre that it offers has supported and facilitated the level of job growth that has been seen in city centre Manchester and without Metrolink this could have only happened with increased traffic and the congestion and pollution this brings.

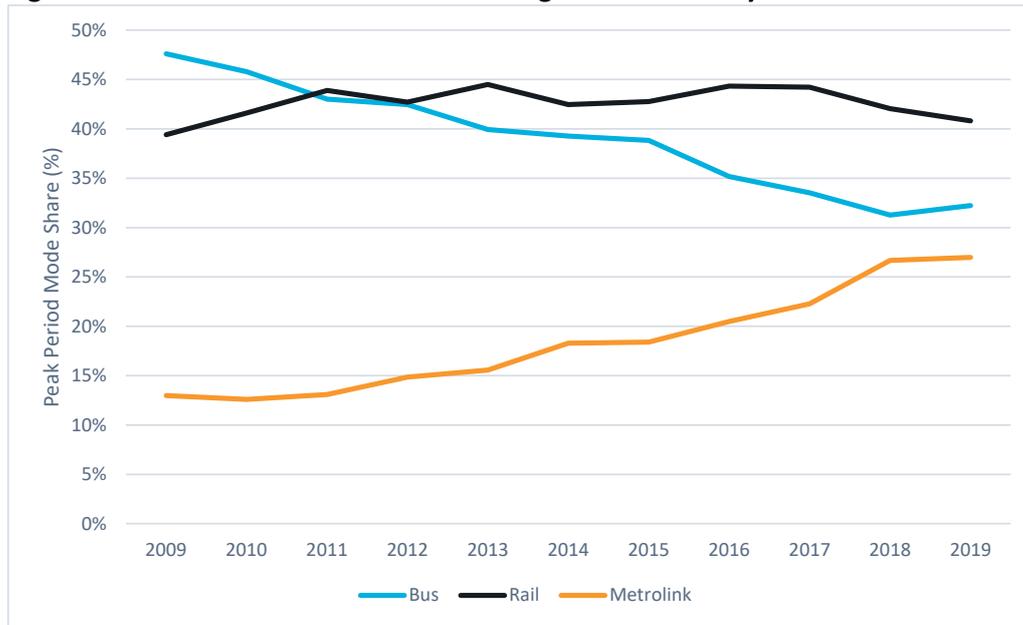
Figure 4.2: Peak Period Trips Crossing Manchester City Centre Cordon and City Centre Employment (2009 = 100)



Data Source: SRAD Report 2040 *Transport Statistics Manchester 2019-2020* Key Centre Section (Feb & March 2020) and TfGM analysis of Business Register and Employment Survey

²⁵ The match between the cordon used for the transport data and the boundary of the city centre used for the employment analysis is not exact, but this does not affect the conclusions drawn from the analysis.

Figure 4.3: Peak Period Mode Share Crossing Manchester City Centre Cordon



Data Source: SRAD Report 2040 *Transport Statistics Manchester 2019-2020* Key Centre Section (Feb & March 2020)

Light rail supports and facilitates economic redevelopment and regeneration

Supporting Redevelopment and Regeneration

4.29 There is evidence from across the UK’s light rail systems that when light rail is implemented alongside coordinated and integrated land use planning, there can be new development and regeneration which would otherwise not have happened. These can range from large area wide impacts where the provision of light rail is integral to the transformational development that has occurred to smaller scale more local impacts. Examples include:

- Salford Quays is a former dockyard area, lying 5 km west of Manchester City Centre. The dockyard closed in 1982 and the redevelopment was built around the extension of **Manchester Metrolink**, which opened in 2000 and provides direct connections to Manchester city centre and Manchester Piccadilly, which is Manchester’s principal railway station, as well as connections to the rest of the Metrolink network. Before Metrolink, the area was poorly served by public transport. Part of Salford Quays is the flagship ‘MediaCityUK’ site, which is home to around 250 businesses employing around 7,000 people including one in seven BBC employees. Integral to the MediaCity development is a 360 m spur from the Metrolink line through the Quays and this opened in 2010. A further 1,000 business are in the wider Salford Quays area, employing 27,500 people.²⁶
- A new £21 million interchange at South Shields on the **Tyne and Wear Metro** forms part of a wider £100 million regeneration of the town centre (“South Shields 365”) which

²⁶ Case study provided by TfGM

includes renewing town centre retail and the market square, new commercial and housing developments as well as the new National Centre for the Written Word.²⁷

- Recent extensions to **NET** are helping unlock a number of significant development sites in the area, including the Southern Gateway, NG2 business park, Queens Medical Centre and Beeston town centre.²⁸
- Interview evidence from key developers has shown that **Edinburgh Tram** played a role in their decision to invest and in their marketing of developments to potential buyers and occupiers.²⁹ Regarding the impact on businesses, the same research suggests that as a result of the light rail line, a number of businesses have been able to open new market sectors or increase their resilience and ability to deal with increased growth. Evidence from stakeholder interviews shows that offices located along the light rail line were generally more profitable and attractive for staff and new recruits.
- Light rail can also support residential developments. Opened in 2007, Langdon Park station is on the Stratford-Lewisham line of the **Docklands Light Railway**. The opening of the station generated a step change in local development activity, resulting in around twice as many residential units coming forward than an equivalent nearby area without a new station. By 2013, around 700 to 1,700 net additional homes had been delivered compared to the control areas.³⁰

²⁷ Case study provided by Nexus

²⁸ Nottingham Express Transit (2017) *NET Phase Two Monitoring and Evaluation –Year One Report*

²⁹ Steer (2018) *Edinburgh Tram Evaluation Report*, City of Edinburgh Council (unpublished)

³⁰ Arquati D (2013), *No Train, No Gain: The Local Economic Impact of Langdon Park DLR Station*, Report provided by TfL

South Yorkshire Supertram and Regeneration of the Lower Don Valley

Supertram connects the Lower Don Valley with Sheffield city centre and the city's main railway station, as well as residential communities south and west of the city centre. Following the introduction of Tram Train services connectivity is now extended to the centre of Rotherham and the Parkgate shopping complex. This and future enhancements to park and ride facilities at Parkgate and Tinsley will further improve connectivity.

The Lower Don Valley was a key industrial area of Sheffield that has experienced de-industrialisation and by the late 1980s there was approximately 1000 acres of redundant land and industrial buildings.³¹ Throughout the 1990s the Lower Don Valley was re-developed with one of the first major developments being Meadowhall, alongside venues such as the DSA Sheffield Arena. These were all connected via the Supertram system. There was also the development of the Valley Centertainment Leisure complex which saw the development of a new Supertram stop. This site includes a 20 screen multiplex cinema and other food and beverage outlets. It also provides Park and Ride facilities for journeys into Sheffield City centre.



³¹ Sheffield City Story, LSE Housing and Communities, Centre for Analysis of Social Exclusion, May 2016.

Meadowhall Shopping centre is one of Britain’s six super regional shopping centres, employing up to 8,500 people in both full and part-time jobs. In 2018, British Land secured planning approval for a new Leisure Hall, to diversify the centre away from pure retail. In 2020, the plan was revised and an outline planning application submitted for a revised Leisure Hall and wider Masterplan.³² Supertram is key to the Leisure Hall development and so the shopping centre’s future. A Section 106 Agreement was entered into to improve one of the key Supertram stops serving the new Leisure Hall. Collectively these plans have the potential to deliver over 6,000 new jobs and help sustain thousands more.

The Olympic Legacy Park³³ is a £100m development across 30 hectares expected to create 3,500 jobs. It is set to become an internationally recognised Innovation District for health and wellbeing research and learning, plus the location for offices, laboratories, leisure retail and residential spaces. The site is home to the Sheffield Hallam University Advanced Wellbeing Research Centre, University Technical College, Community Stadium and Community Arena alongside established venues such as Ice Sheffield, Sheffield Arena and the English Institute of Sport. The Arena/Olympic Legacy Park Supertram stop serves the site directly, providing access for those who don’t have a car as well as an attractive alternative way of travelling for those who do.

Highway constraints in the Lower Don Valley and around Junction 34 of the M1 mean that further developments in the area need the connectivity that Supertram provides, and this is integrated into development planning and planning applications for the area.

Source: Narrative by SYPTE

Supporting Local Employment

- 4.30 Building and then operating light rail systems directly supports local employment. Conventionally, the Treasury considers such impacts as neutral at a national scale saying that both the construction activity and the operation of the light rail is simply displacement from other sectors of the local economy or from other parts of the country. This ignores local impacts and these are important, especially (as is seen in Chapter 5) many light rail systems operate in areas that experience high levels of deprivation.
- 4.31 Light rail construction involves a range of skills and trades, offering employment opportunities to people who are highly trained and experienced, as well as those who are entering or re-entering the labour market or who have low skills. An evaluation of the Nottingham Express Transit Phase Two found that:³⁴
- Over 40% of construction staff were from the Greater Nottingham area
 - Around 2,900 years of employment in the local economy and a further 1,600 years of employment in the regional economy were created and this generated around £108m and £61m of Gross Value Added respectively
 - Supply chain expenditures generated £140m of activity in the local economy and a further £77m in the regional economy

³² <https://www.meadowhall-masterplan.co.uk/>

³³ <https://sheffieldolympiclegacypark.co.uk/>

³⁴ Nottingham Express Transit (2017) *NET Phase Two Monitoring and Evaluation –Year One Report*

- 4.32 In operation, light rail systems also provide good local jobs directly and support many more in their supply chains. They also invest in skills through supporting apprenticeships. For instance, the Tyne and Wear Metro, employs more than 800 people, Manchester Metrolink around 900 and South Yorkshire Supertram in the region of 350. ³⁵

Nottingham Express Transit Phase Two – Local Recruitment, training & Skills Impacts

NET Phase Two provided significant training for people before and during employment, and work experience for young people. Examples include:

- Delivering pre-employment training and targeted recruitment for local candidates claiming Jobseekers' Allowance, via:
 - Five Sector Based Work Academies for the NET Phase Two Works – these resulted in 80 candidates completing their course and attaining NVQ Level 1 and a CSCS Card (Construction Skills Certification Scheme), with around 50 candidates being employed on the project.
 - New College Nottingham's 'work like' training experience configured to help to improve the 'work readiness' of potential recruits, helped to establish the profile of NCN's Civil Engineering Academy which has since hosted a number of construction courses for other projects and employers.
- Various apprenticeship courses, including:
 - Stephenson College and Taylor Woodrow Alstom (TWA -the design and construction Joint Venture) - two-year Level 2 Apprenticeship courses in Construction Operations (5 apprentices).
 - New College Nottingham - Level 3 Apprenticeships (3 apprentices).
 - West Notts College and Nottingham Tram Ltd (6 apprentices).
- New College Nottingham also led a consortium of colleges in delivering a training programme to over 100 Alstom staff, including a mix of NVQ Level 1, 2 and 3 qualifications.
- National Citizenship Scheme initiative held at the University of Nottingham during the summer holidays providing work experience courses involving over 700 young people. The Princes Trust also ran three 'get into construction' courses with TWA.

Source: Paragraph 3.3.25 Nottingham Express Transit (2017) *NET Phase Two Monitoring and Evaluation –Year One Report*

Light Rail and Value for Money

- 4.33 Light rail systems provide high quality rapid transit at a lower capital cost than the larger-scale metros or undergrounds seen elsewhere. Taking Manchester Metrolink as an example, it offers fast and frequent links that connect outlying towns with the economic prosperity of the city centre. Some lines operate on sections which were previously served by conventional heavy rail with a significant government operating subsidy.
- 4.34 As with all other major public sector funded infrastructure schemes, as part of the development of the investment business case each light rail investment is subject to an *ex ante* value for money assessment. An integral part of this is a cost benefit analysis, although Department for Transport guidance is at pains to point out that the results of the cost benefit

³⁵ Data provided by Nexus, TfGM and SYPTE respectively

analysis are just one part of the consideration when coming to a view on value for money, albeit an important one.³⁶ Evidenced by them being built, the *ex ante* view was that each light rail system in the UK offered value for money.³⁷

- 4.35 There is a view that *ex ante* cost benefit analysis has an inherent tendency to overstate the monetised benefits that an investment brings, as well as understate the implementation costs, especially for complex schemes such as light rail.³⁸ What is helpful therefore is to consider *ex post* evaluations of light rail schemes – this is where work is done to assess the actual benefits that a light rail scheme delivers and compare these to a counterfactual view of what would have happened if the light rail scheme hadn't been implemented.
- 4.36 The case study in the box below summarises the results of a comprehensive *ex post* cost benefit evaluation of the Tyne & Wear Metro. From this, it is clear that Tyne & Wear Metro delivers on-going and substantial economic benefits to the North East and at a national scale.

³⁶ Department for Transport (2017) *Value for Money Framework*

³⁷ The Sheffield Supertram tram-train extension from Meadowhall to Rotherham Parkgate had a benefit cost ratio less than 1, which normally would be considered poor value for money and as such would not attract funding. However, it was recognised by the Secretary of State that the introduction of a new technology that could have wider applicability offered the opportunity to learn and apply valuable lessons, which in itself offered value. This is a particular example of wider considerations forming part of a value for money assessment.

³⁸ For example, see the work of Professor Bent Flyvberg

The Economic Impact of Tyne & Wear Metro

A report commissioned by Nexus in 2018 concluded that in 2015, Metro (and local rail) contributed around £290.6m to the Gross Value Added (GVA) to the North East economy when expressed in today's prices. This value captures the benefits accruing to individuals, businesses, and wider society from more efficient travel, greater productivity through better business connectivity. Using a welfare assessment of the type that would underpin a cost benefit analysis of a new light rail investment, each passenger journey would contribute benefits of £8.15.³⁹

The report identified that Metro delivers economic benefits in the following ways:

- **Providing labour market access and mobility:** Metro plays a major role in supporting access to economic centres, thereby ensuring a supply of labour. This has enabled concentration of economic activities, based upon excellent access to the local workforce.
- **Supporting businesses, inward investment and economic growth:** Metro supports the North East economy by providing supply-side capacity to support growth, particularly the urban centres and other key economic nodes. It enables the rapid and unimpeded access to urban centres that is critical for business-to-business connectivity and linking people to jobs.
- **Improving long term productivity growth:** public transport discourages 'sprawl' and the associated congestion from land-use patterns which encourage access by car (and conversely encourages densification). By changing the "effective density" of the area it serves this results in productivity gains, through the process of agglomeration
- **Supports economic inclusion across socio-economic groups:** despite some areas of strength there are fundamental challenges within the North East labour market relating to persistently high levels of economic inactivity, worklessness, and/or income-linked deprivation. Metro services play a very important role in providing good levels of accessibility from these areas to jobs, education, training, retail and health facilities, as part of a more inclusive economic model that drives productivity
- **Supports land utilisation** in and around stations, as well as supporting the regeneration and renaissance of town centres
- **Enhances the North East's quality of life attributes:** Metro provides efficient access to urban centres and encourages people to live and work in our region. Use of Metro also contributes towards town centre regeneration by acting as a gateway and providing access to services. It also helps to reduce road traffic and negative externalities such as emissions, road traffic accidents and community severance.

Source: Mott Macdonald (June 2018) *NEX 17/36: Economic Value of Metro and Rail to the NECA Area Stage 2 Report - The Current Value*, a report for Nexus

³⁹ The Mott Macdonald study expressed 2015 values in 2010 prices and also discounted these to 2010 values. For this report, the calculated benefits have been expressed in 2020 prices. This was done using factors derived from the Department for Transport's TAG Data Book v1.15.

5 Light Rail & Society

Introduction

- 5.1 That there are societal benefits from improving transport connectivity is clear. Transport provides the means to access opportunities, whether these be for employment, education, health, social or recreational. Being able to access these opportunities at all, more easily, at lower cost or more frequently has benefit. Areas with improved transport connectivity can become more attractive residential locations, potentially with increased house prices or rental income, and a faster-moving property market.
- 5.2 Investment in high quality transport can also catalyse regeneration, for example from provision of high-quality and permanent stop and route infrastructure and associated investment in urban realm. Bringing these benefits together can stimulate a virtuous circle, improving an area's sense of place and attractiveness, and through increased opportunities and aspirations, creating a market for greater options to spend locally.
- 5.3 Light rail systems offer the potential to provide high-quality transport infrastructure and to transform transport connectivity, directly and through coordinated improvement in active modes infrastructure. Additionally, public transport use is associated with increased levels of physical activity in comparison to car/taxi use, bringing health benefits to users as well as reducing the number of trips on the highway network and their associated impacts. Finally, light rail systems can directly provide employment opportunities.
- 5.4 However, we note that the societal benefits are strongly influenced by system specification. In absolute terms, light rail is a relatively costly technology. In general, the greatest benefits come from systems that serve multiple markets. Light rail systems which have resulted in material societal benefits have done so as part of a wider set of benefits, for instance supporting the growth of town and city centres by providing needed additional and attractive public transport connectivity. Furthermore, the scale of societal benefits is influenced by light rail's affordability to its passengers. Many who experience social exclusion are those with the lowest disposable incomes. The cost of transport is one thing that adds to social exclusion.
- 5.5 In this chapter we explore how light rail can:
- help 'left behind' town and local centres (H4)
 - promote social inclusion by providing better access to jobs, education/training and other facilities for those living in deprived areas (H5)
 - encourage use of public transport, helping people have more active lifestyles (H6)

Light Rail can help 'left behind' town and local centres

- 5.6 The specific issue of 'left behind' town and local centres is a particular focus of the Government's 'levelling up' agenda and it is worth giving consideration to definitions of 'levelling up' and of the objectives behind the agenda.

- 5.7 The Government’s March 2021 Levelling Up Fund prospectus states that:⁴⁰
- “Investment in local transport networks can revitalise local economies by boosting growth, improving connectivity and making places healthier, greener and more attractive places to live and work”*
- 5.8 The development of an index of priority places for the Levelling Up Fund, combined data sources which showed the need for:⁴¹
- Economic Recovery and Growth
 - Based on productivity; unemployment; and skill levels
 - Improved Transport Connectivity
 - Based on average journey times to employment centres by car, public transport and bike
 - Regeneration
 - Based on commercial and dwelling vacancy rates
- 5.9 The City Region Sustainable Transport Scheme guidance for Mayoral Combined Authorities sets out the assessment criteria for the scheme, which include levelling up – considered in terms of *“where improvements to intra-city transport will deliver the best returns in improving growth, productivity and quality of life”*⁴²
- 5.10 Investment in Light Rail can and has delivered against these criteria in terms of their beneficial impacts in levels of employment, for example see the case study for Manchester Metrolink and Wythenshawe below and Sheffield/Nottingham case studies in Chapter 4.. However, the challenge remains that light rail investment must be shown to represent value for money, including in terms of being the most cost-effective (or only) way to deliver these benefits.

⁴⁰ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/966138/Levelling_Up_prospectus.pdf

⁴¹ <https://www.gov.uk/government/publications/levelling-up-fund-additional-documents/levelling-up-fund-prioritisation-of-places-methodology-note>

⁴² <https://www.gov.uk/government/publications/city-region-sustainable-transport-settlements-developing-proposals/city-region-sustainable-transport-settlements-guidance-for-mayoral-combined-authorities#allocation-process>

Case Study Part 1: Manchester Metrolink and Wythenshawe

Wythenshawe

Wythenshawe is located around eight miles to the south of Manchester city centre and just to the north of Manchester Airport. It has a population of around 45,000 and is characterised by:

- A higher than average proportion of people aged 0-16-years
- A lower than average proportion of people 65 and over

The three wards that make up Wythenshawe (Woodhouse Park, Sharston and Baguely) are ranked the fifth, eighth and tenth most deprived in the Manchester City Council area.

Manchester Metrolink Airport Line

Wythenshawe is served by Manchester Metrolink's Airport line. This opened in November 2014 and there are 15 stops between Manchester Airport and where the line joins the East Didsbury Metrolink line. Services link Manchester Airport with Manchester Victoria railway station. Usual service is one tram every 12 minutes and the journey from the Airport to Victoria takes just under an hour.



Impact of Metrolink on Wythenshawe Communities

As part of the evaluation of the Manchester Metrolink Phase Three programme, Transport for Greater Manchester (TfGM) commissioned Ipsos MORI to undertake a study of Metrolink's impacts on Wythenshawe communities. A total of 1,023 interviews of residents in Wythenshawe were undertaken which explored positive and negative impacts on transport opportunities and community wellbeing. The interviews were supplemented by drop-in focus groups in Wythenshawe town centre and business interviews.

Findings from the survey provide strong evidence that Metrolink has enhanced the social experiences of residents and led to enhanced employment opportunities:

- Of those who say that changes to public transport have increased the range of places they travel to when socialising, over four in five (83%) say this is because of the tram.
- Of those who say that changes to public transport have increased the range of places they travel to when taking part in leisure activities, 85% say the tram has most contributed to this.
- For those who have sought new employment over the last few years, the survey found that the vast majority (84%) said that the tram has contributed most to giving them access to a wider range of places where there are job opportunities.

The survey found that there is a perception that the tram has been the catalyst for additional investment and regeneration of Wythenshawe town centre and its hinterlands. Half of residents (52%) said Wythenshawe has become a better place to live since the Airport Line opened, with only 15% saying it has got worse. Around two in five residents (42%) said the tram is the best thing about living in Wythenshawe. However, two-thirds (65%) said that affordability of the tram is an issue: only two-thirds of residents (65%) see the tram as affordable, while employers think that cost is a key reason why employees don't use it more often. The perception of cost is also an issue for non-users.

Source: TfGM (2021) *Metrolink Phase 3 Monitoring and Evaluation Second Report*

Light Rail can promote social inclusion

- 5.11 The World Bank defines social inclusion as “*the process of improving the terms on which individuals and groups take part in society*”.⁴³ In the UK context, the primary designation of populations in need of support are the national indices of multiple deprivation. Taking England as an example, the seven underlying deprivation domains are:⁴⁴
- Income
 - Employment
 - Education
 - Skills and Training
 - Health and Disability
 - Crime
 - Barriers to Housing Services
 - Living Environment
- 5.12 Improving transport connectivity to employment opportunities, education and training, and other facilities can bring substantial benefits, where such opportunities are sufficiently viable to allow participation – that is: within reasonable commute/journey time; at affordable travel cost; dependable; and available at suitable times (for example arriving in time for shift-start/returning not too long after shift-end).
- 5.13 Public transport plays a particularly important role in promoting social inclusion; research for the Government’s Foresight Future of Mobility project reported that lowest income households have higher-levels of non-car ownership and that there are considerable affordability issues with car ownership for many low-income households.⁴⁵ Where car ownership levels are low, public transport can provide the only connection between areas of social need and opportunities to participate.

West Midlands – Societal Benefits

West Midlands Metro has played a critical role in the Covid crisis in the West Midlands. It has kept Key Workers working, allowing the West Midlands to continue as a functioning society. This exemplifies the role the light rail line has had over the last twenty years: getting workers to work and students to skills in one of the UK’s most deprived urban corridors. It has done this in a way which is pollution-free and without adding traffic pressures on the West Midlands’ congested highway network. It has done this in an almost totally carbon-free way.

It has helped the economic vitality of Wolverhampton, West Bromwich and Birmingham strategic centres and helped them attract investment in jobs, shops and services. Metro Line One has increased land values in its corridor, showing its powerful regeneration effect.

⁴³ <https://www.worldbank.org/en/topic/social-inclusion>

⁴⁴ English, Northern Irish, Scottish, and Welsh indices of multiple deprivation are based on similar domains, albeit with some differences in approach and geographic representation.

⁴⁵ Inequalities in Mobility and Access in the UK Transport System, Foresight. March 2019

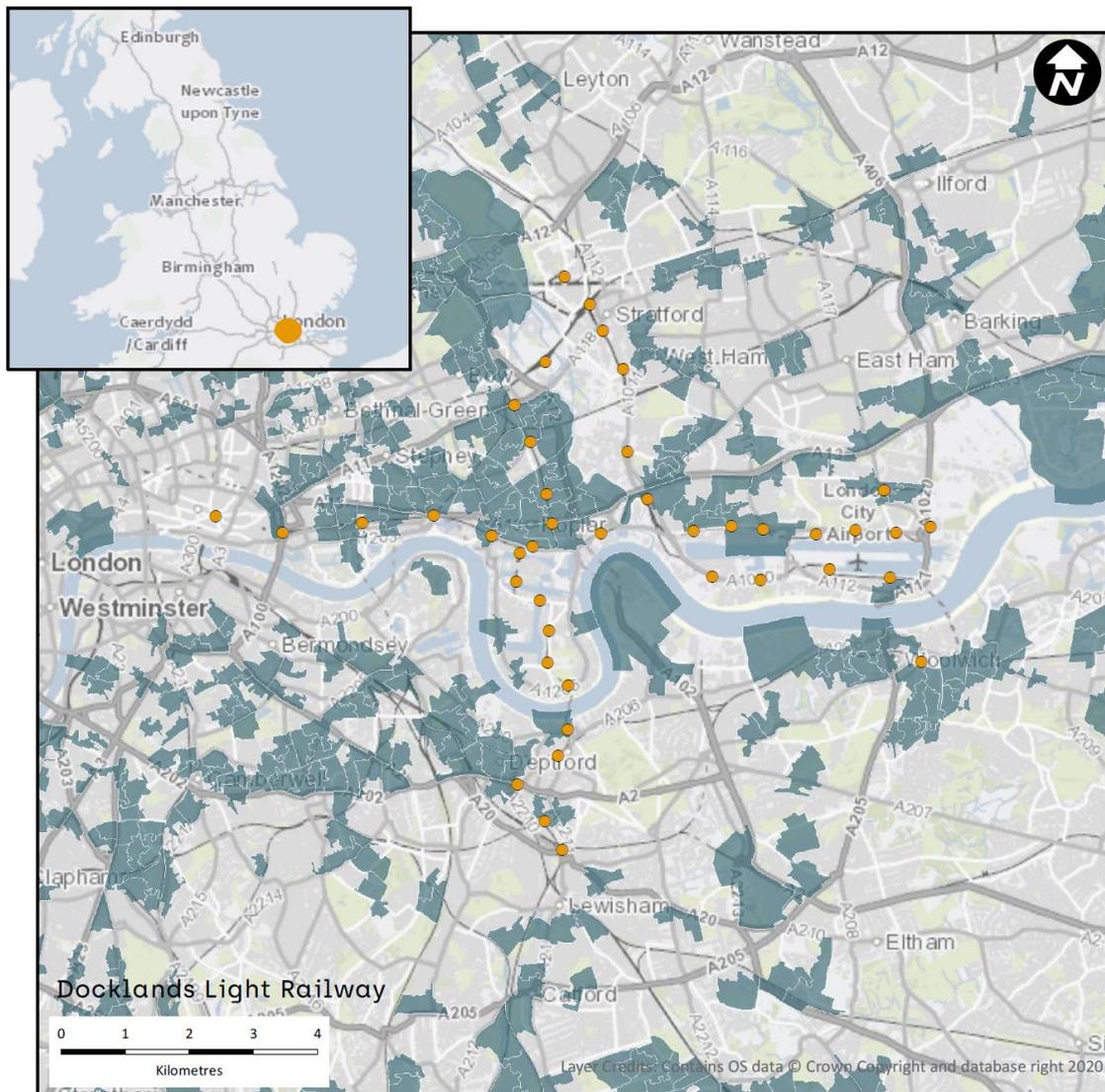
Eight million passengers a year used Metro Line One in 2019/20, a significant increase from the five million in 2015/16, before the extension to Birmingham Grand Central/New Street station opened. This shows the importance of tramways which are highly visible in city centres, and which provide key connections for customers such as between edge of centre areas and the heart of the city centre and links between central rail stations like Snow Hill and New Street.

Metro Line One serves one of the most deprived urban corridors in the UK. It provides a fast, high capacity, high frequency light rail link serving three strategic centres (Wolverhampton, West Bromwich and Birmingham) and the towns and communities of Bilston, Wednesbury, Winson Green and Handsworth. Before the Covid pandemic, commuting to work or education accounted for 62% of Metro use (Metro User Profile, TfWM, 2017) and 26% of Metro users in 2017 were from DE socio-economic group and 20% from the C2 group. Metro users were more ethnically diverse than the West Midlands population as a whole with 23% of Metro users Asian, and 11% Black. Metro has helped promote inclusive economic growth, which is fundamental to the whole development strategy of West Midlands Combined Authority.

Source: TfWM

- 5.14 To illustrate the importance of light rail to those who do not have access to a car pre-Covid, 67% of Tyne and Wear Metro journeys were made by people who did not have a car available and 23 out of the 60 stations on the Metro serve areas which are in the most-deprived 30% of nationally defined areas of deprivation.
- 5.15 Each of the UK's nine light rail systems have stops which serve areas that rank highly against indices of multiple deprivation. Figure 5.1 shows DLR, which serves areas of higher deprivation as well as connecting the financial services districts of the City of London and Canary Wharf. Equivalent figures for the other systems can be found in Appendix B.

Figure 5.1: Docklands Light Railway: High Ranking Areas of Multiple Deprivation (Upper Quintile Shaded)



Case Study Part 2: Manchester Metrolink and Wythenshawe

Survey work and in-depth interviews in the Wythenshawe area revealed positive impacts on the communities in the area, with a particular expansion of travel horizons to other parts of south Manchester and beyond, to the regional centre.

- A calculation of changes in access was made for those living in the more deprived communities in Greater Manchester. In summary, the analysis showed that public transport door-to-door access improved by 10% or more for the following proportions of the Greater Manchester population:
 - 18.2% for employment;
 - 18.8% for further education; and
 - 19.8% for healthcare.

As the Phase Three Metrolink corridors are generally located in corridors with concentrations of deprivation, the figures for the proportion of the 10% of the most deprived Greater Manchester population are more pronounced. For this part of the population, the improvements of 10% or more in public transport door-to-door access were recorded for substantial proportions of the 10% most deprived:

- 30.5% for employment;
- 27.8% for further education; and,
- 29.5% for healthcare.

Source: TfGM (2021) *Metrolink Phase 3 Monitoring and Evaluation Second Report*

- 5.16 Light Rail systems provide an additional advantage over most other public transport services, in terms of providing equal access for disabled people, and for those travelling with shopping, luggage, children and so on. Light rail allows dependable independent level access to services, often from near-ground level, and vehicle layouts which readily accommodate mobility scooters, wheelchairs and pushchairs. Light Rail provides a dependable and understandable service, allowing for clear at-stop and on-board visual, audio and tactile information provision. Across the UK, Light Rail services enable trips by passengers – and therefore fuller participation in society – that cannot otherwise be made by public transport.

Case Study: Nottingham Express Transit & the Mobility Impaired

Surveys identified that for mobility-impaired users there is a clear benefit of NET in providing individuals with enhanced access to a choice in employment opportunities, with around 50% of all mobility impaired users who have changed employment location in the past 5-6 years citing NET as essential in moving to a new job. The survey also considered an overall indicator of the impact of NET on individual travellers' quality of life, with some firm views that NET had improved quality of life for these travellers.

Source: Nottingham Express Transit (2017) *NET Phase Two Monitoring and Evaluation –Year One Report*

Light Rail can support more active lifestyles

- 5.17 Becoming more active, for example walking and cycling more, has benefits for both physical and mental health. In addition to benefitting individuals, increased physical activity can benefit the economy, wider society and the environment. Increased physical activity leads to gains in productivity, including through reduced absenteeism and presenteeism. Where active travel (with or without public transport use) substitutes a trip which would otherwise have been made by car, there are wider benefits including reductions in congestion and emissions (Chapter 6 contains more on this last point).
- 5.18 The NHS's advice is that adults undertake 150 minutes of moderate intensity (for example a brisk walk) activity or 75 minutes of vigorous activity each week, spread evenly over at least

four days of the week.⁴⁶ Survey data from SportEngland shows that just over 6 out of 10 adults achieve this level of exercise each week, with nearly 3 out of 10 undertaking less than 30 minutes per week.⁴⁷ Activity levels decreased during 2020, being particularly affected by the first full Covid lockdown. Research has shown that additional physical activity has benefits even where the weekly total does not reach this target and even when would be classified as light rather than moderate activity.

5.19 Using public transport will, in nearly every case, necessitate walking – from origin to boarding stop and/or from alighting stop to destination – and of longer distances in comparison to car use. Figure 5.2 shows a comparison of average walk times for different transport modes within London. At an average walking speed of 5 km/h, these walk times equate to distances of around 220 m total walk per trip for car users and 600 m for bus/light rail users.

Figure 5.2: Duration of walk time to/from public transport compared to the car



Source: Transport for London (2018) *Walking Action Plan (Figure 9, page 80)* based on data from London Travel Demand Survey 2016/17

⁴⁶ <https://www.nhs.uk/live-well/exercise/>

⁴⁷ Active Lives Adult Survey November 2019/20 Report, Sport England. April 2021

- 5.20 Light Rail systems typically have stops or stations which are further apart than bus stops and naturally result in longer distances walked to and from stops than bus - the simple average stop spacing for the UK light rail systems considered in this report is 900 m.⁴⁸ Data from Manchester Metrolink passenger surveys in 2014 showed average walk distances of around 550 m from origin to stop and 580 m from stop to destination, approximately twice the lengths seen in London. The additional distances in comparison to car use, are sufficient in scale to have material health benefits – for a return journey each day this can contribute towards the UK’s 150 minutes a week target and could easily equate to 10%-20% of an individual’s progress to meeting the 10,000 steps a day target pre-set on many wearable activity trackers.
- 5.21 More recent data from Manchester suggests that the presence of light rail could have a broader influence on active travel behaviour. Residents within 1 km of a Metrolink stop appear to be more likely to be walking frequently: with Metrolink the percentage of non car-owning household respondents walking on five or more days a week or more increased from 51% to 56%; for car-owning households the increase was from 38% to 41%.⁴⁹ The percentage of non car-owning households within 1 km of a Metrolink stop is also higher, at 39% in comparison to 29% elsewhere, suggesting that Metrolink can help support a car-free lifestyle. In combination, fewer car owning households and higher likelihoods of walking suggest more activity in areas served by Metrolink.
- 5.22 The introduction or presence of light rail infrastructure can provide a stimulus and focus for active modes provision. Walking and cycling connections to light rail stops can form useful components of local active modes networks – not just for trips to access services. As light rail networks are introduced, they can offer opportunities to enhance active modes networks; for example through wider urban realm enhancements or by providing active modes connections alongside segregated light rail alignments. These can be particularly beneficial where light rail crosses existing barriers to pedestrian and cycle movement, such as railways, highways or waterways. Providing additional active modes connections where it is most needed or its absence is most felt, will further stimulate active lifestyles and the benefits which these bring.

⁴⁸ This figure excludes the ‘first generation’ Blackpool Tramway system which has average stop spacings of below 500 m. Including Blackpool the total of 361 route km and 418 stops (Table A.2) yields a UK average stop spacing of close to 860 m.

⁴⁹ TfGM analysis of GMTRADS household travel diary survey

6 Light Rail & the Environment

Introduction

- 6.1 The imperative to reduce carbon and the Government's commitment to achieve net zero by 2050 is the singular greatest policy challenge facing the UK. Transport is the largest contributor to UK domestic greenhouse gas (GHG) emissions, accounting for 27% in 2019.⁵⁰ Reducing transport emissions will be fundamental to addressing the climate crisis and to meeting the Government's legally binding commitments.
- 6.2 In addition, there is increased recognition of the importance of air quality and physical activity in supporting health outcomes, and the importance of 'place' and enhancing the physical environment in supporting communities, society and economic regeneration.
- 6.3 The *potential* role of light rail will therefore be increasingly important if it can help address these policy challenges. This potential role underpins the development of our environment-related hypotheses, that light rail can:
- support the transition to net zero carbon (H7)
 - support achieving clean air including meeting legal air quality limits (H8)
 - help enhance the urban environment and urban realm (H9)

Light rail can support the transition to net zero carbon

Context

- 6.4 City region combined authorities and local authorities have responded to the climate crisis through declaring a 'climate emergency' and making commitments to climate reduction targets and, in many cases, setting out targets for the share of sustainable modes (public transport, walk and cycle) that is necessary to help achieve this target. These targets are more stretching than the Government's national target and if the national target is to be met, reflecting that some parts of the economy are harder to decarbonise than others, it will be necessary for other sectors to decarbonise faster. The commitments made by UTG member authorities are summarised in Table 6.1.

⁵⁰ page 14 Department for Transport (2021) *Transport Decarbonisation Plan*

Table 6.1: Climate Commitments from UTG Member Authorities⁵¹

Authority	Climate Emergency declared? [Y/N]	Carbon Target / Commitment	Sustainable mode target
Greater London Authority	Y	Net zero by 2030 ⁵²	By 2041, 80% of all trips in London should be made by active, efficient and sustainable modes of transport
Greater Manchester	Y	Carbon neutral city region by 2038	'Right Mix' vision is to increase non-car mode share from 39% of trips in 2017 to 50% of trips in 2040
Nottingham	Y	UK's first carbon neutral city by 2028	Railway decarbonisation by 2040
Liverpool City Region	Y	Zero Carbon by 2040	Developing comprehensive walking and cycling network which encourages active travel by 2025, and a carbon neutral bus fleet by 2040 ⁵³
Sheffield City Region	Y	Reach zero or near zero no later than 2038	Increase levels of walking and cycling by 21% and 350% respectively, by 2040 ⁵⁴
North East Combined Authority	Y	Targets to cut carbon emissions by 2030.	Key Performance Indicator in Transport Plan is 33% of journeys are made by public transport, walking and cycling ⁵⁵
West Midlands Combined Authority	Y	Net zero by 2041	Increase of bike to 10% of all trips and public transport up to 27% by 2041 ⁵⁶
West Yorkshire Combined Authority	Y	Net zero by 2038	Reducing private car travel by 21% through shifting demand to public, shared, and active travel ⁵⁷

6.5 We suggest that there are three broad mechanisms by which light rail can support the transition to zero carbon. These are:

⁵¹ [Combined Authorities | Declare a Climate Emergency, UK Local Authorities Summary Report 2020.pdf \(rackcdn.com\)](#)

⁵² <https://www.london.gov.uk/what-we-do/environment/climate-change/zero-carbon-london>

⁵³ [LCRCA TRANSPORT EXEC SUMM.pdf \(liverpoolcityregion-ca.gov.uk\)](#)

⁵⁴ [Appendix 1 - Sheffield City Region Active Travel Implementation Plan.pdf](#)

⁵⁵ [Full-Transport-Plan.pdf \(transportnortheast.gov.uk\)](#)

⁵⁶ [wm-net-zero-fyp-summary-tech-report.pdf \(wmca.org.uk\)](#)

⁵⁷ [emission-reduction-pathways-report.pdf \(westyorks-ca.gov.uk\)](#)

- Firstly, providing more carbon energy efficient means of transport in urban areas. This is a direct effect of the carbon efficiency of light rail as a mode, versus private and public alternatives. These benefits can be increased by utilising clean energy.
- Second, through attracting modal shift. Carbon is a negative transport ‘externality’ and where light rail can attract passengers from private car this can reduce car kilometres and associated carbon emissions.
- Third, by supporting sustainable patterns of land use and longer-term sustainable travel patterns.

6.6 Outlined below historical case studies and other evidence that helps assess the hypothesis that light rail can support the transition to net zero. Given there are fundamental shifts underway in transport technologies – including the future widespread adoption of EVs and move to zero emission buses –also outlined are the implications of evidence in the context of light rail’s potential future role in supporting a transition to net zero.

Light Rail as an energy/carbon efficient mode

“As we look to build back greener, Light Rail has the potential to be an environmentally sound local transport solution in its own right.”

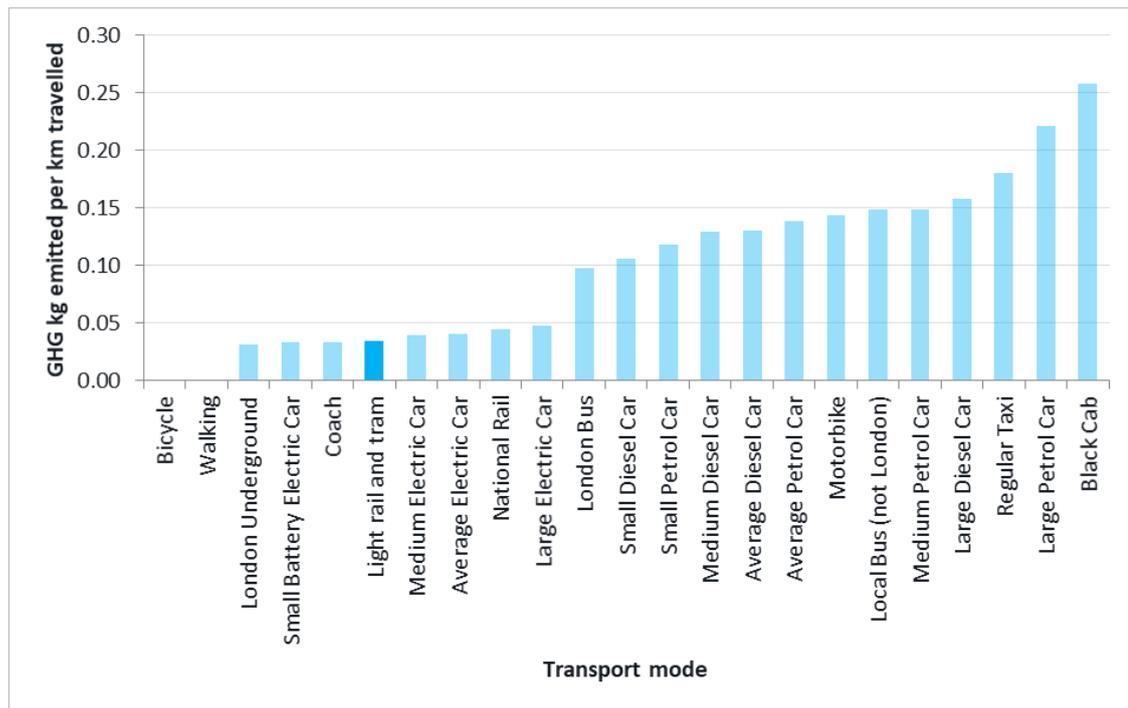
Department for Transport (2021) *Transport Decarbonisation Plan* p.162

Emissions per Passenger Kilometre

- 6.7 We look at two pieces of data sourced from the Department for Transport on journey emission comparisons.
- 6.8 A comparison of the emissions from transport modes in 2020 is presented in Figure 6.1, which shows the amount of GHG kilograms emitted per passenger kilometre travelled by each mode. The chart suggests that light rail is one of the least polluting transport modes, lower than rail and significantly lower than bus (less than half that of London buses, and less than a third of non-London buses).⁵⁸

⁵⁸ With pre-pandemic load factors

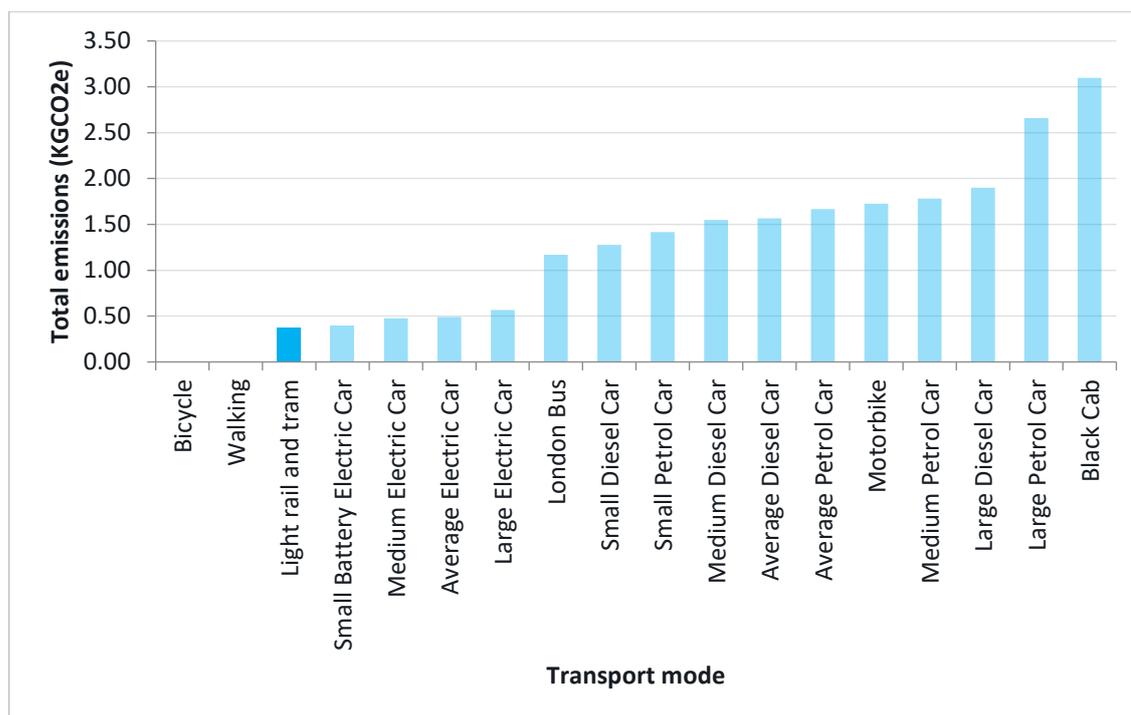
Figure 6.1: Emissions per Passenger Kilometre, by mode, 2020



Data Source: DfT ENV0701

6.9 While Figure 6.1 is based on emissions per passenger km at a national level (an average of all trip movements and distances), the DfT also publishes a subset of the data which compares emissions from transport modes for a number of journey pairs. These include journeys from Croydon to Wimbledon, which allows for a more direct comparison of emissions by mode for a journey for which light rail is an option and therefore enables a more ‘like for like’ comparison of light rail and other modes, over a representative urban geography and distance than the national dataset allows. The total emissions, measured in kgCO₂e, for a journey from Croydon to Wimbledon, are presented in Figure 6.2.

Figure 6.2: CO₂ Emissions per journey from Croydon to Wimbledon by mode, 2020



Data Source: DfT ENV0701

- 6.10 The chart shows that a journey on light rail between Croydon and Wimbledon emits the least amount of GHGs of all vehicular modes, including electric cars of all size.⁵⁹ This suggests that, for typical light rail journeys, light rail is likely to be more carbon efficient than available alternatives.
- 6.11 Over time advances in light rail technology will result in vehicles and systems become more energy efficient. For instance, the new fleet that is currently being introduced on Tyne & Wear Metro will be 30% more energy efficient, increasing Metro’s advantage over other modes further.⁶⁰ Across all systems, as light rail vehicles are renewed and replaced over time, it is anticipated that further improvement in energy efficiency will reduce carbon emissions per passenger.
- 6.12 Over time the proportion of electric vehicles in the private car fleet will increase and they too will become more efficient (although these gains may be reduced by consumers purchasing more powerful vehicles). The carbon footprint of the UK generation sector will also reduce as the renewables share grows. Similarly, electric buses will become more commonplace and hydrogen fuel cell powered buses may become mainstream. However, and as the Department for Transport’s Transport Decarbonisation Strategy sets out, the rate that these changes are expected to happen is insufficient to allow the trajectory to net zero to be met by 2050 without a reduction in the number of private vehicle kilometres. More has to be done. People will need to change their travel behaviours.⁶¹

⁵⁹ Electric cars have a car footprint because fossil fuels are used for power generation.

⁶⁰ Data provided by Nexus.

⁶¹ See page 29, DfT (2021) *Transport Decarbonisation Plan*

- 6.13 Already, light rail is a carbon efficient mode. The more people who use the UK's existing light rail systems the more carbon efficient it becomes. Growing patronage on existing systems is a carbon benefit that can be had quickly. As shown in Chapter 4, light rail is an attractive alternative to car travel. Together Manchester Metrolink's Phase Three extensions (lines to Rochdale via Oldham, Ashton-under-Lyne, East Didsbury and Manchester Airport) remove around 39 million car kilometres from Greater Manchester's roads per year. In 2019/20 this helped to save 6,700 tonnes of CO₂.⁶² SYPTE estimate that Sheffield Supertram helps save over 2,000 tonnes of CO₂ per annum.⁶³ Expanding light rail provision creates the opportunity to induce the types of behavioural change that are needed if the UK is to reach net zero by 2050.
- 6.14 On top of this, light rail promoters are increasingly seeking to ensure that the source power supply is based on renewable energy, for instance the power supply to Manchester Metrolink trams and stops is 100% from renewable sources.⁶⁴ Similarly, in the West Midlands, Metro uses renewable source-generated electricity in a green energy supply contract.⁶⁵ Commitment such as this from public sector large-scale consumers of electricity help support the further growth of renewable generation, which in turn has a wider benefit as the nation looks to decarbonise electricity generation as part of its net zero commitment.

Supporting Sustainable Development and Patterns of Movement

Light Rail and Sustainable Development

- 6.15 There is an extensive body of evidence that demonstrates that areas with high public transport accessibility are associated with higher density development and lower carbon use per person.^{66 67}
- 6.16 Locations and areas with higher development densities have significantly lower carbon intensity (emissions per person) compared to areas of comparatively low density.⁶⁸ This reflects the increased efficiency in providing a range of services (power, water, communications), the ability to consolidate functions (schools, hospitals) and that users can access employment, leisure and other opportunities travelling shorter distances and with a higher propensity to use more sustainable modes.
- 6.17 Urban areas are significantly more sustainable than non-urban areas (and larger cities more so than towns) in terms of their carbon intensity and, it follows, that the twin challenges of accommodated planned growth (people, housing, jobs) and supporting a transition to net zero would be met by focusing development in urban areas.

⁶² TfGM (2021) *Metrolink Phase 3 Monitoring and Evaluation Second Report*

⁶³ Source: SYPTE

⁶⁴ TfGM (2021) *Metrolink Phase 3 Monitoring and Evaluation Second Report*

⁶⁵ Source: TfWM

⁶⁶ <https://www.rics.org/uk/wbef/megatrends/urbanisation/urban-density-promoting-sustainable-development--part-1/>

⁶⁷ OECD (2020) *Improving Transport Planning for Accessible Cities*

⁶⁸ For example, see: <https://www.centreforcities.org/blog/cities-are-greener-than-you-might-think-density-helps-businesses-and-transport-emit-less-co2/>

Light Rail and Sustainable Patterns of Movement

6.18 In the short-term modal shift is an observable response to the introduction of a light rail system. This reflects an individual’s choice of mode - and change of mode where modal shift occurs - assuming a given origin and destination. However, further gains are to be had when people change their home and or job location and re-evaluate their transport options.⁶⁹ Shown in Table 6.2 are reasons why people re-evaluate their travel choices and changing job and moving house top the list of ‘life trigger events’. According to the Office for National Statistics, between 2000 and 2018, 9% of people changed job each year.⁷⁰ People move house less often. Owner occupiers have on average lived in their current home for 17.4 years, although those in the rented sector move more often – 4.3 years is the average time living in their current home.⁷¹ These are average rates. In urban areas, characterised by a younger population entering the job market and setting up their own households people move more often than elsewhere.

Table 6.2: Reasons for Reducing Car Use and Increasing Use of Other Modes

Life Event Triggers	Personal Motivations	Transport Triggers
Changing job	Financial	Changes in car availability
Moving house	Health/fitness	Rapid changes in costs
Having a child	Environment	New transport service
Retiring		
Child changes schools		
Illness		

Source: Steer Davies Gleave (2009) *Car Ownership and Use Exploratory Study, Second Phase*, Transport for London

6.19 Peoples’ choice of where to live and/or work will be influenced by the quality and connectivity of transport. The enhanced public transport connectivity offered by light rail will increase people’s propensity to live in a location from which they can easily and efficiently access employment and other opportunities. Light rail can often expand travel horizons and promote this effect, through its ability to:

- Serve longer distance urban movement better than bus, as light rail journey speeds are typically much faster than bus (so more opportunities are reachable within a given time threshold), more reliable and offer a higher quality travel experience. This effect is enhanced where there is a well-developed light rail network, allowing a range of cross-city movements to be viable.
- Expand public transport opportunities to a wider hinterland through Park & Ride.
- Through interchange to other transport modes, for example the national rail network and in the case of the two London light rail systems, London Underground. Integrated multi-modal ticketing, as is the case in London, can extend light rail’s reach further.

⁶⁹ For example, see: Transport for London (2013) *Roads Task Force – Technical Note 16 Understanding why People Change Behaviour*

⁷⁰ ONS (2019) *Analysis of Job Changers and Stayers*

⁷¹ Table AT1.22 *English Housing Survey 2019-22 Headline Report*

- 6.20 This effect is inherently hard to measure, but is manifest in the general observable relationship in urban areas between transport accessibility, development density, land prices and high public transport mode shares. Research published by Nationwide shows that houses that are within 500 m of a Manchester Metrolink station attract an 8% price premium over houses located 1500 m away.⁷²

Increase in Urban Density

“In recent years, many areas in London have experienced an increase in density levels well above 20 and even 50 per cent. Some places in Stratford, in the London Borough of Newham, are often used as examples of mid- to high-density living. Census data for 2001 and 2011, at the lower super output area level, shows the neighbourhood by Stratford station saw density increase significantly when the area was chosen to host the London 2012 Olympics. Over that decade, its population nearly doubled. Public transport use rose significantly, from 58 per cent in 2001 to 79 per cent in 2011. This was driven by an increase in density, and investments in public transport links (such as Stratford International station and the **expansion of the Docklands Light Railway**), with the latter underpinned, in part, by the former. The location of jobs matter too: between these two dates, the proportion of people commuting from Newham to central London has increased by four percentage points.

Croydon is another example. In the neighbourhood that surrounds Wandle Park [a stop on the **London Trams** network], the population nearly doubled between 2001 and 2011 too. And, given the area just a few hundred metres south did not experience any significant increase, the gap in public transport use is striking. In 2001 both areas had similar modal shares, with around 36 per cent of residents using public transport. However, it rose by 20 percentage points in the former, but barely changed in the latter.”

Source: Centre for Cities (2021) *Net Zero: Decarbonising the City*⁷³ [emphasis added]

Light rail can help attain clean air

Context

- 6.21 According to Public Health England, up to 36,000 deaths a year are attributable to human-made air pollution.⁷⁴ Traffic-related pollution is one of the most significant sources of poor air quality in urban areas.
- 6.22 Reducing traffic flows through encouraging greater use of public transport and active modes, as well as land use policies that minimise vehicular traffic is one way that local authorities can combat poor air quality.⁷⁵ The direction of policy across major UK cities is to enhance and

⁷² Nationwide (2019) *House Price Index Special report – June 2019*

⁷³ <https://www.centreforcities.org/reader/net-zero-decarbonising-the-city/how-a-changing-approach-to-development-can-help-achieve-net-zero/>

⁷⁴ Public Health England (2019) *Review of Interventions to Improve Outdoor Air Quality and Public Health*

⁷⁵ *Ibid.*

promote the ‘place’ function of urban areas – encouraging activity, while mitigating or ameliorating the adverse air quality and health impacts associated with vehicular traffic.

- 6.23 This is manifest is the development of policies at different scales within urban areas, including:
- City-wide policies such as Low Emission Zones (LEZs) and the Ultra Low Emission Zones (ULEZ) in London
 - City centre focused policies, such as Clean Air Zones (CAZs)
 - Area specific policies focused on Air Quality Management Areas (AQMAs)

Role of Light Rail

- 6.24 Light rail is zero-emission at the point of use and therefore provides a significant benefit compared to petrol/diesel vehicles. This advantage of light rail would persist through a transition stage towards the electrification of cars and buses over time.⁷⁶ While the sale of new electric vehicles will be banned by 2030, the Government projects that by 2040 only a third of car vehicle-kilometres and just over 10% of van vehicle-kilometres will be made by electric vehicles.⁷⁷ This reflects the anticipated rate of ‘churn’ of the UK’s car and van fleet.
- 6.25 More importantly, the capacity and connectivity that light rail offers can be a fundamental enabler of major traffic reduction in central areas, and therefore an integral component to the viability, acceptability, and success of policies such as the development of Clean Air Zones and Low Emission Zones, which can include physical or regulatory restrictions on city centre traffic movements as part of town/city centre movement strategies, as well as fiscal (charging) measures to discourage polluting traffic. Public transport provides an alternative to car travel and for many journeys, light rail is the best way of providing this.

Birmingham Clean Air Zone

A Clean Air Zone was introduced on 1st June 2021. It covers all of central Birmingham and operates 365 days a year. Cars that do not meet the exemption criteria (Diesel Euro 6 (VI) standard or better, Petrol - Euro 4 standard or better (roughly 2006 onwards), Gas – Euro 6 (VI) standard or better, fully electric or hydrogen fuel cell, hybrid electric) must pay £8 per day or face a Penalty Charge Notice.

Operating up to eight trams per hour per direction over the Clean Air Zone boundary West Midlands Metro is an integral part of the public transport alternatives to paying the CAZ charge.

Source: www.brumbreathes.co.uk

Light rail can help enhance urban realm

Context

- 6.26 The enhancement of place is central to the economic development and regeneration objectives of public authorities. Transport can either be a barrier to achieving ‘place’ related objectives (e.g. a source of major severance) or an enabler of enhanced place. The integrated

⁷⁶ Or other forms of non-fossil fuel propulsion such as hydrogen buses or cars.

⁷⁷ TAG Data Book Table A1.3.9

planning of transport and the surrounding physical environment can deliver enhanced public realm and improved transport connectivity.

- 6.27 This integration can be at the level of a city centre masterplan – such as Birmingham’s transformation enabled through the downgrade of the ring road and enhancement of rail, light rail and bus connectivity, down to more localised interventions such as the integration of tram stops within the surrounding urban fabric.

Role of Light Rail

- 6.28 There are many examples of where light rail is an integral part of the urban realm and forms part of a high-quality urban environment.
- 6.29 In terms of how light rail schemes support positive public realm, there are several potential mechanisms.

Where enhanced public realm is delivered directly as part of the development and implementation of a tram scheme

- 6.30 An example is St Peter’s Square in Manchester. While the first phase of Manchester Metrolink had served St Peter’s Square since 1992, the implementation of Metrolink’s Second City Crossing in 2017 created the opportunity to remove all traffic from the Square and enhance the urban realm. This included relocating Manchester’s Lutyens designed cenotaph from what was in effect a traffic island to a new memorial garden on the Town Hall side of the Square, a more fitting location for formal and informal commemoration of the nation’s war dead, new paving throughout the Square and a new statue of Manchester-born suffragette Emmeline Pankhurst, all while providing new tram platforms and the track layout needed for the Second City Crossing.

Where light rail is planned and implemented alongside, and as part of, a wider package of improvements focused on enhancing the overall physical environment

- 6.31 In this case, light rail is the catalyst for this wider investment. This wider enhancement can often be delivered through a combination of public and private sector investment. The Westside extension of West Midlands Metro from Birmingham New Street to Edgbaston has been integrated with the Paradise Circus redevelopment. This has included the demolition of the School of Music building and the Fletcher’s Walk shopping arcade, on the west side of Victoria Square allowing new commercial office development and improving the setting of Birmingham’s Grade 1 listed Town Hall. The Metro extension has been integrated within wider urban realm enhancements and through this area operates using batteries for power, meaning there is no overhead line

Where light rail can help facilitate public realm enhancement through the ability to remove traffic from central or local areas, and therefore ‘free-up’ capacity to enable enhanced streetscape

- 6.32 Urban realm enhancements are integral to the extension of Edinburgh Tram from Edinburgh city centre to Newhaven via Leith. Taking advantage of the reduced traffic flows along the light rail route, footways are being extended, new surfacing introduced and there is new planting, all in a way sympathetic to the vernacular architecture along the length of the route.

Figure 6.3: West Midlands Metro and Birmingham Town Hall– Catenary Free Operation in Victoria Square, Birmingham



Image courtesy of TfWM

7 Light Rail & the Covid Pandemic

- 7.1 The Covid pandemic has led to unprecedented impacts on the way we travel. The Government's decision in March 2020 to 'lockdown' society and advise people not to travel by public transport led to a precipitous decline in the use of buses, light rail and the national rail network. On all modes of public transport patronage dropped to a fraction of their pre-Covid levels. To maintain services, Government has provided financial support to the bus industry, light rail and the national rail network.
- 7.2 Other than Blackpool Tram, which temporarily closed between the end of March and mid July 2020, Britain's light rail networks continued to operate throughout the pandemic. Light rail has played a key role in keeping cities moving. It has allowed key workers and others unable to work from home to commute to their jobs. It has provided connections to healthcare facilities and vaccination hubs, and as the economy has reopened, light rail has allowed people to go shopping and return to their offices.

Access to Health Facilities

- 7.3 Light rail serves major hospitals in the towns and cities that it serves. Throughout the pandemic, light rail systems have been used by health workers to travel to and from work. For instance, the Queens Medical Centre (QMC) in Nottingham, which is the largest hospital in the region, has its own tram stop (including walkways directly into the hospital). Some 30% of the Nottingham conurbation live within 800 metres of a tram stop allowing them to easily access the hospital.
- 7.4 Light rail has helped people get to their vaccinations including mass vaccination centres at:
- the Etihad stadium served by Manchester Metrolink
 - Nottingham Forest's stadium served by NET
 - the Centre for Life in Newcastle served by the Tyne and Wear Metro
 - Sheffield Arena served by Supertram

Supporting Commuting

- 7.5 Throughout the pandemic light rail systems have been a lifeline for low-income communities where car ownership is low and where many who are in employment have jobs which cannot be done from home.

Tyne & Wear Metro: One Key Worker's Story

Key worker William Gray ... is travelling to his place of work, the Royal Mail sorting office at the Team Valley in Gateshead.

He said: "I have been travelling to work like this for best part of a year now, I have had no problems using the Metro, despite being high risk because I'm both asthmatic and a diabetic, people have adapted their daily routine to live as safely as they can with the threat of the virus hanging over us every day.

"I don't drive so the masks, hand sanitiser and social distancing are the only things that can be done on public transport to control the spread of the virus."

Source: Newcastle Chronicle *Life on The Tyne & Wear Metro in Lockdown 3: A Photo Essay*

<https://www.chroniclive.co.uk/news/north-east-news/gallery/life-tyne--wear-metro-19608954>

7.6 For instance, West Midlands Metro serves areas with a high concentration of industrial and blue-collar jobs and has been very well used during the pandemic. As shown in Appendix B, West Midlands Metro serves areas of high deprivation. During the summer of 2020, patronage recovered to as high as 80% of normal - much higher than for other forms of public transport. Similar trends could be found on other light rail systems: in Manchester, Metrolink experienced relatively higher patronage on lines serving lower income areas, for example.

7.7 Recognising that the pandemic has changed how people commute, South Yorkshire Supertram introduced a new "Flexi5" ticket in August 2020. This ticket was introduced specifically to cater for the flexible and part time worker and offers five days of unlimited travel for the price of four. These tickets can be used on any days within one month of purchase.

Post Pandemic Recovery

7.8 The pandemic has led to a step-change in the number of people working from home, either some of the time or all of the time. This led to a drop in commuting, which as shown earlier in Figure 2.4, accounted for around 4 in 10 pre-pandemic light rail trips. A further feature of the pandemic has been the increase in e-commerce – people buying goods on-line and having these delivered. Pre-pandemic, around 1 in 6 light rail trips were for shopping. The pandemic has also affected how and where people socialise, and therefore how they travel.

7.9 Looking at working from home and what this may mean for commuting in the future:

- Not everyone can work from home. People in office-based jobs in the so-called 'knowledge economy' have the greatest ability to work from home. Data from the Office for National Statistics shows that during the first lockdown in April 2020 no more than 60% of those in professional occupations were working from home and these people accounted for around 60% of the workforce. This means that around a third of the workforce was working from home during the first lockdown.⁷⁸ Of course, the professional jobs that have the highest propensity for home working are concentrated in the town and

⁷⁸ Steer (2021) *Infrastructure Demand Quantitative Analysis for Scenarios of Behaviour Change*, a report for the National Infrastructure Commission.

city centres served by light rail and as a consequence, light rail patronage has been disproportionately affected by this consequence of the pandemic.

- Before the pandemic the number of people who worked from home either all or some of the time was growing. One way that this is evidenced is by a fall in the number of national rail season tickets, which is widely considered to be a consequence of more people working from home.⁷⁹ Nonetheless, pre-pandemic national rail demand continued to grow. In a no pandemic counterfactual world, it would have been expected that the number of people working from home would have continued to grow, but this would not necessarily mean that public transport patronage would fall.

7.10 There is a similar story for the take up of e-commerce. Before the pandemic, e-commerce's share of total retail sales was steadily growing with a consequent negative impact on bricks and mortar retail. The pandemic has led to a step change in this growth, but in a counterfactual no pandemic world it would have been reasonable to expect further strong growth in e-commerce as experienced in the pre-pandemic decade leading to further pressure on bricks and mortar retail.⁸⁰

7.11 What the pandemic has led to is a rapid change in the number of people who have experienced working from home, or used internet shopping either for the first time or for goods that they previously would not have considered buying on-line. In the case of working from home, for many this change was literally overnight. In a no pandemic counterfactual world, commuting patterns will have evolved as more people worked from home some or all of the time and as the High Street changed in response to new patterns of consumer behaviour. In response, public transport operators (not just light rail) would have changed too, with different service patterns, operating hours, fares and ticketing products all to best serve changing markets. These changes would have been gradual.

7.12 While post-pandemic public transport patronage will be a function of the size and nature of the post-pandemic economy, the post pandemic economy will also be influenced by the transport connectivity that is provided. Because of agglomeration, town and city centres are already highly productive and because of scale, they are more sustainable than suburban sprawl. Strong and vibrant town and city centres are synonymous with a strong and vibrant economy. Transport decarbonisation needs a shift from car to public transport and strong and vibrant city centres are a key driver of public transport patronage. Maintaining public transport connectivity is integral to helping town and city centres recover and in the conurbations that they serve, light rail is integral to this connectivity.

7.13 What is needed now is support first while the economy settles into a post-pandemic world and then for public transport to adapt.

Summary

7.14 Throughout the pandemic, light rail has provided a means for key workers to commute to and from their places of work, as well as those who do not have access to a car and cannot work from home to continue to access their places of employment. Light rail has provided access to vaccination centres. As the economy has re-opened, light rail has provided a safe and secure public transport mode to access town and city centres.

⁷⁹ Steer & WSP (2019) *Journeys per Season Ticket Study*, a report for the Department for Transport

⁸⁰ Steer (2021) *op. cit.*

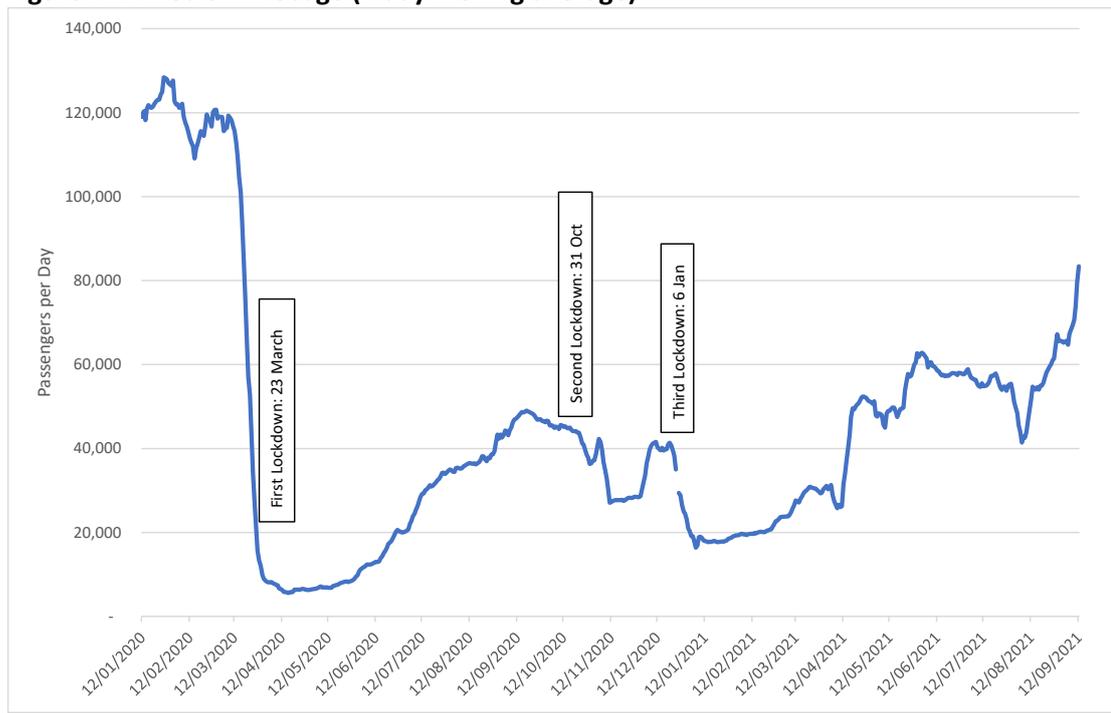
7.15 In a comparable way to bus services and the national rail network, light rail connectivity throughout the pandemic has only been achieved with financial support from the Government. This support is due to come to an end at the end of March 2022. At the time of writing (September 2021), the future course of the pandemic and what this means for the economy as a whole, the towns and cities served by light rail and their associated transport demand is unclear. Work by Professor Iain Docherty of the University of Stirling and Professor Greg Marsden of the University of Leeds has suggested that it could take “12 to 24 months or even longer” for post Covid travel patterns to become clear, a timescale that extends beyond the current Government financial support. They call for the Treasury to have “strategic patience” to make “the right rather than the rapid decisions on adjusting support for public transport.”⁸¹

Manchester Metrolink – A Covid Case Study

Pre-Covid, Manchester Metrolink operated without subsidy and generated substantial operating surpluses, with a net breakeven position after repaying and servicing borrowings associated with the Phase 3 expansion and the renewal of the existing network assets.

Since March 2020, passenger demand has followed a similar pattern to that observed nationally on local bus services. At the end of March 2020 patronage levels fell to circa 5% of pre-Covid levels

Figure 7.1: Metrolink Usage (7 day moving average)



⁸¹ See: <https://blogs.lse.ac.uk/politicsandpolicy/covid-19-impact-transport/>

and

Marsden, G. and Docherty, I (2021) *Mega-disruptions and Policy Change: Lessons from the Mobility Sector in Response to the Covid-19 Pandemic in the UK*, Transport Policy 110 pp 86–97

Source: TfGM

Pre-Covid, Metrolink service levels were at 6 or 12 minute intervals, 6 minute service levels were in place on many lines at and between the commuter peaks Mondays to Saturdays.

To allow it to maintain services throughout the pandemic TfGM has been allocated funding of up to £107.1 million as a contribution towards Metrolink's forecast losses for the period of 17 March 2020 to 5 April 2022, funded by Department for Transport grant.⁸²

Metrolink trams can be run as coupled pairs (known locally as "doubles"). The fleet of 120 trams has been utilised to allow many services to be provided with coupled pairs. This maximises the carrying capacity within social distancing guidelines.

Eight interim service patterns have been in operation since 23 March 2020, each intended to maintain network connectivity and maximise the opportunity for passengers to social distance while travelling, but within the financial constraints brought about by Covid as well as the operational constraints imposed by some staff being unwell or self-isolating.

A free travel offer was introduced from Saturday 11 April 2020 until Monday 1 June 2020, in recognition that a large number of the trips being made by Metrolink at that point were by key NHS and social care staff to enable them to continue to provide critical services.⁸³

Metrolink has observed a number of interesting facets to passenger demand in the recovery period:

- The morning peak is much quieter than pre-Covid, whereas the afternoon peak is still noticeably busy
- Individual daily usage is noticeably affected by the weather suggesting many users are leisure/shoppers rather than workers
- Lines serving lower-income areas have seen much stronger patronage recovery than the others

The last point is consistent with the national public transport recovery rates where bus has generally outstripped heavy rail – it is well understood that less affluent groups use more bus than rail whereas for the better off it is the opposite. Better-off white collar workers are much more likely to be able to work from home.

Overall, it seems clear that Metrolink is playing a major part in allowing business and retail life in Greater Manchester to recover. It is proving particularly beneficial to more deprived communities that are some distance from Manchester city centre, in particular Wythenshawe, Oldham and Rochdale.

Narrative by TfGM

⁸² <https://tfgm.com/lrrrg>

⁸³ <https://tfgm.com/coronavirus/nhs>

8 The Future of Light Rail in the City Regions

- 8.1 In this report we set out to explore a set of hypotheses about how light rail can support national and local policy goals with respect to three themes:
- supporting economic growth, as well as influencing the nature and distribution of that growth
 - helping meet societal goals such as promoting social inclusion
 - contributing to improving the environment, including the pressing need to decarbonise transport as part of the national effort to tackle climate change.
- 8.2 As summarised in Table 8.1, what the available evidence tells us is that light rail is making substantial and worthwhile contributions to each of these policy themes. This is not to say that each of the country's light rail systems contributes to each theme equally. Rather, each system makes a unique contribution that is a function of the connectivity it provides (routes, journey time, service frequency, etc.) and the characteristics of the areas that it serves. Nonetheless, the evidence is clear: collectively Britain's light rail systems make a positive contribution to each theme.
- 8.3 This leads to our first finding: **Britain's light rail systems have supported economic growth in the areas that they serve, promoted social inclusion and led to environmental gain, including a reduction in carbon emissions.**
- 8.4 Light rail's contribution to each of the policy themes we have considered is maximised by light rail carrying in comfort and with safety the greatest number of passengers possible. Like local bus services and the national rail network, light rail patronage has been seriously affected by pandemic restrictions. In March 2020 during the first national lockdown, light rail patronage fell to as low as 5% of pre-pandemic levels. Like local bus services and the national rail network, patronage has recovered as restrictions have been relaxed and the economy has reopened. However, at the time of writing (September 2021) demand remains below pre-pandemic levels. While operations have been maintained throughout the pandemic, this has only been possible with Government financial support, a reversal of the pre-pandemic situation where each system (other than Tyne & Wear Metro and London Trams) had revenues greater than day-to-day operating costs.
- 8.5 Light rail is integral to the public transport connectivity provided in the towns and cities that it serves. In these towns and cities, light rail connectivity will help shape post-pandemic recovery. However, it may take some time for travel patterns to settle to a new post pandemic normal. Some have suggested a further 12 to 24 months. For light rail to continue to deliver against the three policy themes summarised in Table 8.1 at the end of this Chapter and to positively shape the post pandemic recovery in a way that helps town and city centres bounce back will require strategic patience, potentially underpinned by further Government support.

If services are not maintained or fares are increased disproportionately, economic, societal and environmental benefits will be lost.

- 8.6 Our second finding is: **there is a need to maintain the connectivity provided by light rail as the economies of the towns and cities that light rail serves recover from the impacts of the pandemic.**
- 8.7 Looking to the longer term, there is agreement within national and local government that light rail has an important role to play to secure economic, societal and environmental benefits. As a minimum, this will require the maintenance and renewal of existing systems as assets become life expired. Expansion of existing systems and the introduction of new systems offers the potential to extend the benefits that light rail brings.

“Light rail schemes can be transformational for highly populated areas bringing societal, economic, and environmental benefits to our cities by connecting communities to jobs, hospitals, and leisure activities.”

Department for Transport (2021) *Transport Decarbonisation Plan* p 162

- 8.8 Government has previously funded some major maintenance and renewal projects. In Blackpool, system renewal and a new tram fleet introduced in 2011 led to patronage growth. There has been infrastructure renewal of the Tyne & Wear Metro and a new fleet is being introduced. However, as Sheffield has experienced where there has been a programme of replacing life-expired track on street running tramway sections of the network, renewals can be disruptive with negative consequences on light rail patronage and revenue.
- 8.9 As the country’s light rail systems get older, there will be further need for renewal of infrastructure and new light rail fleets. Renewals also create the opportunity for enhancements to add new benefits. New fleets offer a better customer experience and can be more energy (and so carbon) efficient. Enhancement creates opportunities for refurbished and new stops, new service patterns and potentially, network extension. Enhancement means that society continues to gain benefits from the sunk costs of previous investment and the carbon that is embedded within existing systems.
- 8.10 Our third finding is: **investment in maintenance and renewal will continue and potentially enhance the benefits that light rail brings to the economy, society and the environment.**
- 8.11 While not the immediate subject of this report, city regions across the country continue to come forward with proposals for expanding their existing light rail systems, or introducing new systems altogether. This is because they see the benefits of the existing systems and can see how introducing light rail can extend these types and scale of benefits to other places.
- 8.12 Light rail has much more to offer. Recent changes to the Treasury’s business case guidance stress that weight should be given to the strategic case for investment, including how light rail affects different places and supports meeting societal objectives alongside environmental ones. For proposals to extend existing light rail systems or to introduce new ones, this means that weight should be given not just to the size of the benefits that arise, but also who in society experiences these benefits as well as which places benefit.

8.13 Developing and promoting light rail systems is a time consuming and resource hungry process. We would argue that one of the major obstacles to timely and cost-effective implementation of light rail in this country has been a shifting central Government view on the merits of light rail and Government’s willingness to pay the capital costs that only Government is in a position to pay. Put simply, over the last two decades successive Governments have shifted their position on the desirability of funding further light rail schemes at a faster rate than promoters have been able to develop and deliver schemes. A stable policy and funding environment will give greater confidence for promoters to come forward with proposals for system extensions and for new systems, as well as the wherewithal to take these proposals forward to implementation.

8.14 This is our fourth finding: **a stable Government policy and funding environment will help promoters come forward with light rail proposals that will bring further economic, societal and environmental benefits.**

Key Findings	
1.	Britain’s light rail systems have supported economic growth in the areas that they serve, promoted social inclusion and led to environmental gain, including a reduction in carbon emissions.
2.	There is a need to maintain the connectivity provided by light rail as the economies of the towns and cities that light rail serves recover from the impacts of the pandemic.
3.	Investment in maintenance and renewal will continue and potentially enhance the benefits that light rail brings to the economy, society and the environment.
4.	A stable Government policy and funding environment will help promoters come forward with light rail proposals that will bring further economic, societal and environmental benefits.

Table 8.1: Hypotheses & Summary of Evidence

Hypotheses	Summary of Evidence
Light Rail and the Economy	
<ul style="list-style-type: none"> • can support and facilitate: <ul style="list-style-type: none"> – growth in employment and economic activity in town and city centres (H1) – in a way that minimises the negative impacts that growth in car traffic would bring (H2) • can support and facilitate economic redevelopment and regeneration (H3) 	<ul style="list-style-type: none"> • Employment in towns and cities served by light rail has grown, while the number of peak hour car commuting trips has remained static or fallen. Net public transport trips and mode share have increased. • Housing and commercial (employment) developments have happened at a faster rate in locations served by light rail than comparators. Complementary land use and economic policies amplify the gain.
Light Rail and Society	
<ul style="list-style-type: none"> • can help 'left behind' town and local centres (H4) • can promote social inclusion by providing better access to jobs, education/training and other facilities for those living in deprived areas (H5) • can encourage use of public transport, helping people have more active lifestyles (H6) 	<ul style="list-style-type: none"> • Light rail serves many deprived communities and as well as providing transport connectivity, contributes to a sense of place and community pride • Light rail can create new connections to job opportunities, training and other essential services for deprived areas otherwise poorly connected by public transport • The evidence is that people who regularly use public transport have more active lifestyles.
Light Rail and the Environment	
<ul style="list-style-type: none"> • can support the transition to net zero carbon (H7) • can support achieving clean air including meeting legal air quality limits (H8) • can help enhance the urban environment and urban realm (H9) 	<ul style="list-style-type: none"> • Light rail provides a high capacity low emission alternative for travel to town and city centres that experience poor air quality • Both directly and as part of wider initiatives, the introduction of light rail can lead to urban realm improvements • Light rail is a highly carbon efficient model of transport, as well as being as attractive alternative to more polluting modes
Light rail achieves these benefits because:	
<ul style="list-style-type: none"> • Light Rail is more efficient than alternatives at moving large concentrations of people in urban areas (H10) • Light rail provides an attractive alternative to travel by car (H11) 	<ul style="list-style-type: none"> • A light rail with a capacity of 4000 passengers per direction, is equivalent to the capacity of 50 fully loaded double deck buses or 2,500 cars with average occupancy • Light rail has been proven to be attractive to people who would otherwise use car, especially over medium distance journeys in urban area. Park & ride can increase its attractiveness to car users.

Appendices

A The UK's Light Rail Systems

Table A.1: Summary History of UK Light Rail

Year	Month	Event
1980	August	Tyne and Wear Metro opened to the public.
1984		Contract for construction of Docklands Light Railway was awarded to GEC Mowlem.
1987	August	Docklands Light Railway opened to passenger traffic.
1991	July	Docklands Light Railway extension to Bank underground station opened.
1992	July	Phase 1 of Manchester Metrolink opened in full with services between Bury and Altrincham.
1994	March	Docklands Light Railway extension from Poplar to Beckton opened. First section of Sheffield Supertram opened.
1995	January	Croydon Tramlink was approved by the Secretary of State for Transport. Government was to contribute about half of the £154 million cost. Sheffield Supertram was fully opened.
1998	June	The Secretary of State approved construction of an extension to the Docklands Light Railway to London City Airport, estimated to cost £35 million.
1999	May	West Midland Metro opened from Wolverhampton to Birmingham Snow Hill.
	November	Docklands Light Railway extension to Lewisham was opened.
	December	Phase II of Manchester Metrolink opened in part with services to Salford Quays.
2000	May	Croydon Tramlink, a light rail network in south London, opened.
	July	Phase II of Metrolink was extended to Eccles.
2004	March	Nottingham Express Transit opened to the public. Operated by Nottingham City Transport, it was integrated with bus routes at points along its 14km length.
2005	September	TfL introduced free bus and tram travel for those aged under 16.
	December	DLR extension to London City Airport opened, with a temporary terminus at King George V.
	July	On Sheffield Supertram a five year £32 million rail replacement project began in 2013 and is due to be completed in 2018. Between July and November 2013 rail replacement works meant that trams were replaced by buses in certain areas
	August	Tyne and Wear Metro had line closures lasting all of August 2013 due to major track renewals.
2014	May	Edinburgh Trams Limited commences commercial operations on the 31 May 2014.
	November	Manchester Metrolink extension to Manchester Airport opened on 3 November 2014 adding 15 stops and many more route miles.
2015	February	Manchester Metrolink re-opened Victoria station which had been closed due to rebuilding the railway station and Metrolink stop for over a year.

Year	Month	Event
	March	March Sheffield Supertram engineering works meant trams were replaced by buses at different times in all areas of the tram system.
	April	Town centre pedestrian ambience works being carried out by Croydon council required the close of town centre loop as well as improvement works on London Trams occurred throughout 2015/16 and is still ongoing.
	August	Nottingham Express Transit Phase 2 became operational on 23 August 2015 which added 10.9 miles and 27 new stops to the network.
	October	Between 25 October and 6 December 2015, Snow Hill stop on Midland Metro was closed for tie-in works for Birmingham City Centre expansion so a temporary service terminating at St Pauls stop was operated.
	December	The first phase of Manchester Metrolink's Second City Crossing was opened on 6 December 2015.
2016	March	Two new stops, one in each direction, were added to Blackpool Trams at Norbreck North.
	April	A new Elmers End - Wimbledon service commenced operation in April 2016 utilising new additional platform at Wimbledon and 4 additional trams. Two further new trams entered service late 2016.
	May	An extension to Midland Metro through Birmingham city centre to New Street Station became fully operational from 30th May 2016.
	November	On 9 November 2016, a tram operated by London Trams and running from New Addington to Wimbledon derailed on the approach to Sandilands tram stop.
2017	January	Work started on the Manchester Metrolink Trafford Park Extension.
	February	Manchester Metrolink's Second City Crossing was opened in February 2017. This incorporates some additional track and a new stop "Exchange Square".
	May	Work started on Centenary Square and Edgbaston extension to Midland Metro.
	November	Work started on Blackpool Tram North Station extension.
2018	February	New timetable on London Trams giving direct service from Beckenham Junction and Elmers End to Wimbledon and the New Addington service reduced to West Croydon.
	Summer	Rail replacement works throughout summer on Sheffield Supertram.
		Tyne and Wear Metro had a new Railway Traffic Management System installed.
	October	Sheffield Supertram Tram Train Operations started on 25th October linking Rotherham and Sheffield, the first time that tram trains have operated within UK.
2019	January	Manchester Metrolink extended Media City - Velopark service on to Ashton town centre to provide six minute frequency between Anchorage and Ashton.
	Summer	Rail replacement works throughout summer on Sheffield Supertram.
	December	Midland Metro opened a new extension at Centenary Square in Birmingham in December 2019, with 2 new stops and an additional 0.7km of route.
2020	March	The Manchester Metrolink Trafford Park line opened on 22nd March 2020, adding 6 new stops with a route length of 5.4km.
		Blackpool tramway service suspended from 29th March.
	June	Essential work to replace tram tracks in Nottingham city centre start from Saturday June 20. Track between the Royal Centre and Old Market Square stops will be replaced

Year	Month	Event
	July	Work to replace tram track between the Royal Centre and Old Market Square in Nottingham finish
		Blackpool Trams run again from Sunday, July 19.
		Nottingham's tram network resumes a full service as government restrictions around public transport continue to ease.
	September	The new Tyne & Wear Metro fleet, which is being built by the Swiss train manufacturer, Stadler, is set to enter service in 2023, transforming the experience for passengers and boosting reliability.
	Summer	Rail replacement works throughout summer on Sheffield Supertram.
	November	The first of 27 new Metrolink trams has arrived in Manchester, boosting capacity on the network by 15% once in full service.
	December	A £1m joint funding package has been agreed for the next stage of technical work on proposed extension of the Docklands Light Railway to Beckton Riverside and Thamesmead.
		A new temporary depot, built for Tyne and Wear Metro's new £362m fleet, becomes operational.
2021		
	January	Work to extend the West Midlands Metro from Wednesbury to Brierley Hill.
	February	A major line closure affecting the main route of the Tyne and Wear network started on Monday 15 February.

Source: DfT (2021) *Light Rail and Tram Quality Report: 2021* <https://www.gov.uk/government/publications/light-rail-and-tram-statistics-guidance/light-rail-and-tram-quality-report-2021>

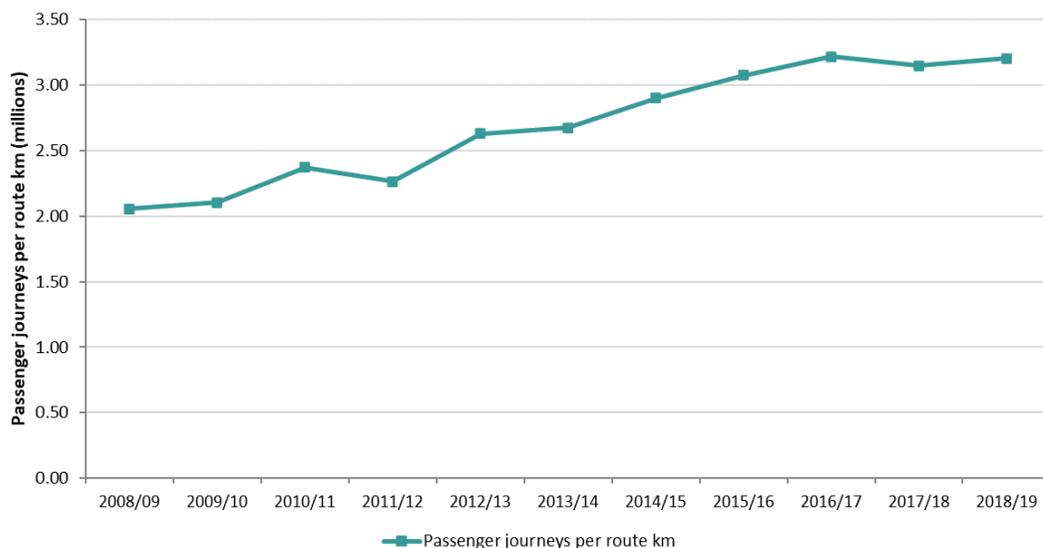
Table A.2: The UK's Light Rail Systems

System	Annual Passenger Journeys (million) Source: LRT0101	Annual Passenger Kilometres (million) Source: LRT0103	Annual Vehicle Kilometres (million) Source: LRT0105	Number of Stations/Stops Source: LRT0201	Route Kilometres Source: LRT0203	Passenger Revenue (£ million actual prices) Source: LRT0301a
Docklands Light Railway (DLR)	121.8	653.6	6.1	45	38	171.6
London Trams	28.7	149.2	3.2	39	28	23.5
Nottingham Express Transit	18.8	123.9	3.1	50	32	20.6
West Midlands Metro	8.3	86.9	1.8	26	22	10.7
Sheffield Supertram	11.9	77.4	2.6	50	34	14.0
Tyne & Wear Metro	36.4	318.6	5.5	60	78	51.9
Manchester Metrolink	43.7	457.3	12.9	93	97	82.1
Blackpool Tramway	5.2	22.7	1.0	39	18	7.0
Edinburgh Trams	7.5	60.1	1.4	16	14	15.7
Total	279.8	1949.7	37.6	418	361	397.1

Note: All data is for 2018/19, the last twelve month period for which data is available that is not affected by the impacts of the Covid pandemic.

Docklands Light Railway

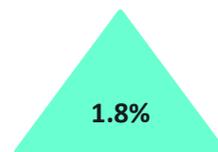
Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
1987	To the City: 1991 To Royal Docks: 1994 To Lewisham: 1999 To London City Airport: 2005 To Woolwich: 2009 To Stratford International: 2011	45	149 (2/3 vehicles per trainset)



DLR is owned by Transport for London and is operated as a concession held by Keolis and Amey plc.

Feasibility work for an extension of the Royal Docks route to Thameshead is underway, with funding for prospective completion in 2026-30. A new station at Thames Wharf between Canning Town and West Silvertown is planned. TfL plans to introduce 43 new vehicles with upgraded features including air conditioning, a walk-through design and audio-visual information. The new vehicles will replace the oldest vehicles on the network as well as to increase capacity.

Key characteristics



Patronage change, 2017/18 to 2018/19



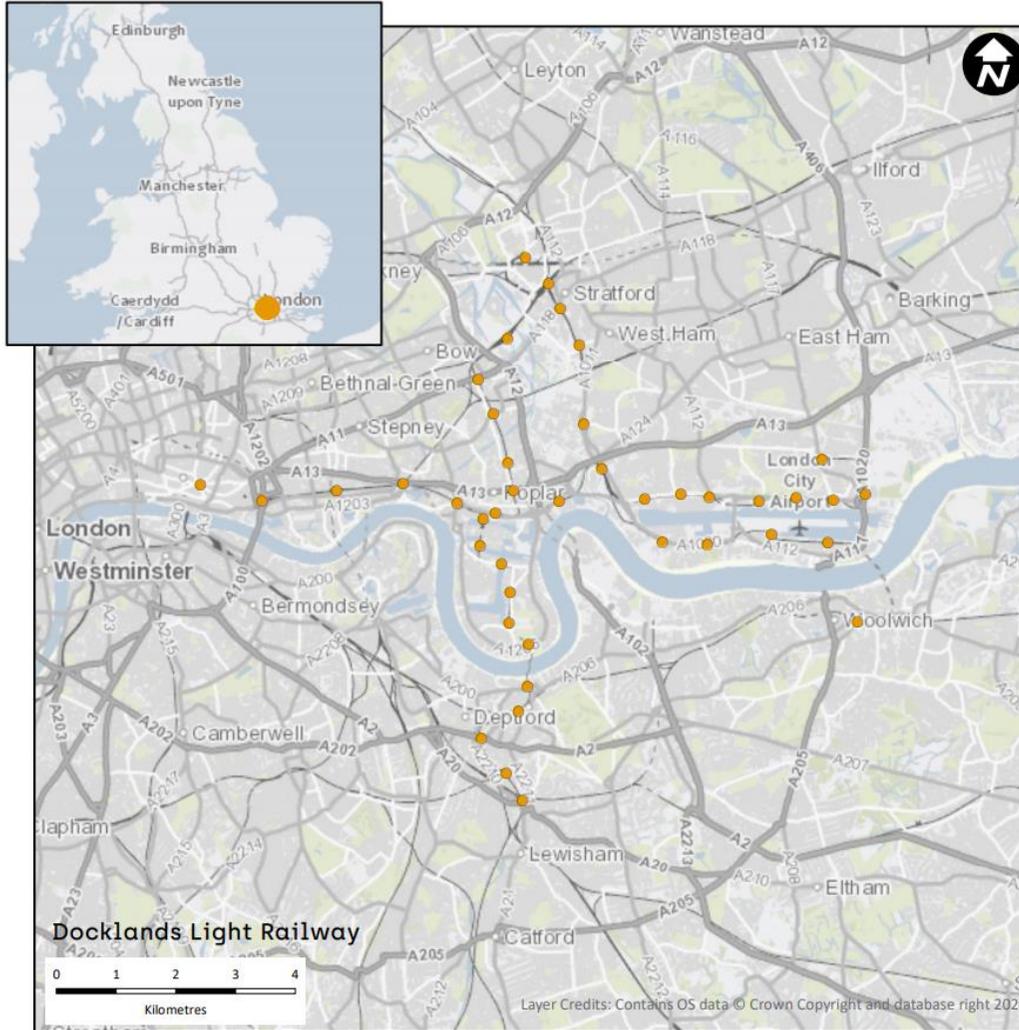
10.60 adult day ticket price (multizonal)
171.6m 2018/19 passenger revenue



121.8m passenger journeys in 2018/19



38km total route length



All DLR stations have step-free access from street to train

Improvement works to track and stations may affect your journey.
Check publicity in stations, visit tfl.gov.uk or follow @LondonDLR

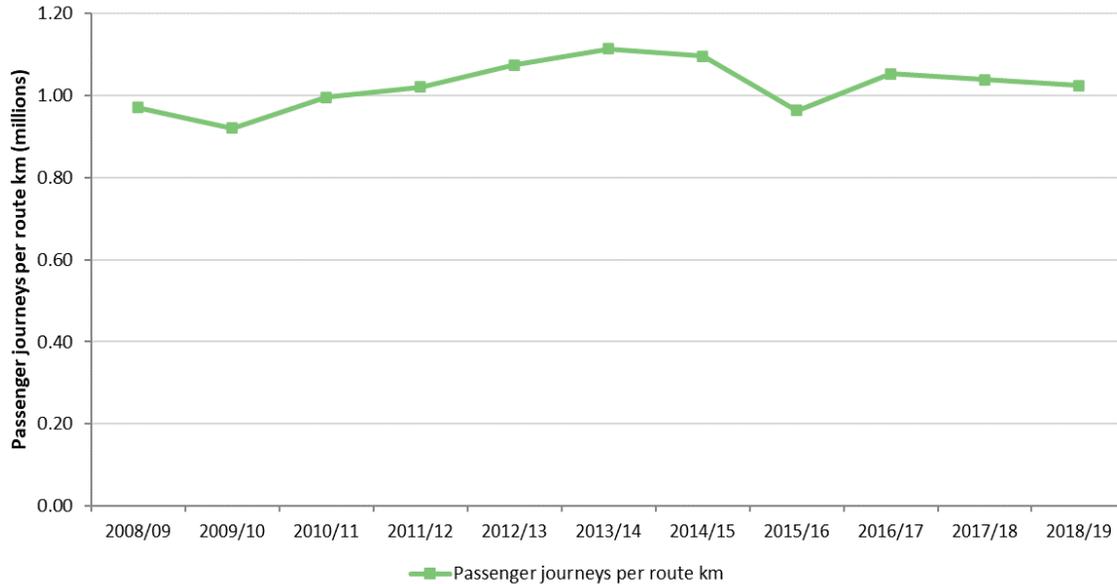
↑ The first and last two sets of doors on three-car trains will not open at these stations. Please use the centre of the train.

Bicycles are permitted on DLR trains Mondays to Fridays during off-peak hours (until 07:30, from 09:30 until 16:30 and after 19:00) and all day at weekends and public holidays. Non-folded bicycles are not allowed at Bank station at any time. There are no restrictions on folded bicycles. Riding in stations or on trains is not permitted.

In Fare Zones 2/3 tickets for either zone are valid

Tramlink

Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
2000	To Centrale (additional stop): 2005	39 (initially 38)	35



London Tramlink is owned by Transport for London and operated as a concession by FirstGroup.

TfL has consulted on an expansion of the network to Sutton town centre (the ‘Sutton Link’) with preference for a route starting from Colliers Wood station. Bus rapid transit was considered as an alternative transport option for the Sutton Link; tram was chosen for its higher public support and greater transport benefits.

As of August 2021 the proposal is on pause until suitable funding can be identified to take it forward.

Key characteristics



Patronage change, 2017/18 to 2018/19



4.65 adult day ticket price (multizonal)

23.5m 2018/19 passenger revenue



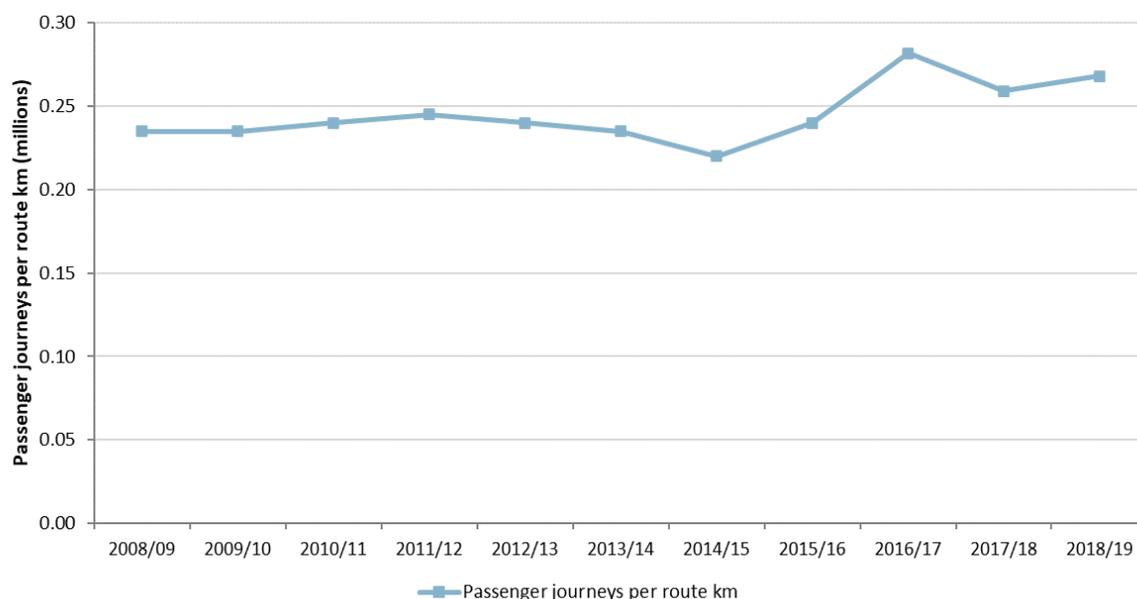
28.7m passenger journeys in 2018/19



28km total route length

West Midlands Metro

Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
1999	To Birmingham New Street: 2016	28	21

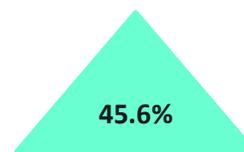


The network is owned by Transport for the West Midlands, the regional transport body, and is operated by a corporate subsidiary.

The Midland Metro is currently undergoing a major extension programme. An extension beyond Birmingham New Street to Edgbaston (University of Birmingham) is partially complete with the full line due to be opened in 2021. A further extension to Wolverhampton railway station is under construction. A new line from Wednesbury to Brierley Hill via Dudley is also under construction.

Further extensions are planned to serve the new Curzon Street HS2 station in Birmingham city centre and then onto Solihull, Birmingham International airport and the HS2 Birmingham Interchange station.

Key characteristics



Patronage change, 2017/18 to 2018/19

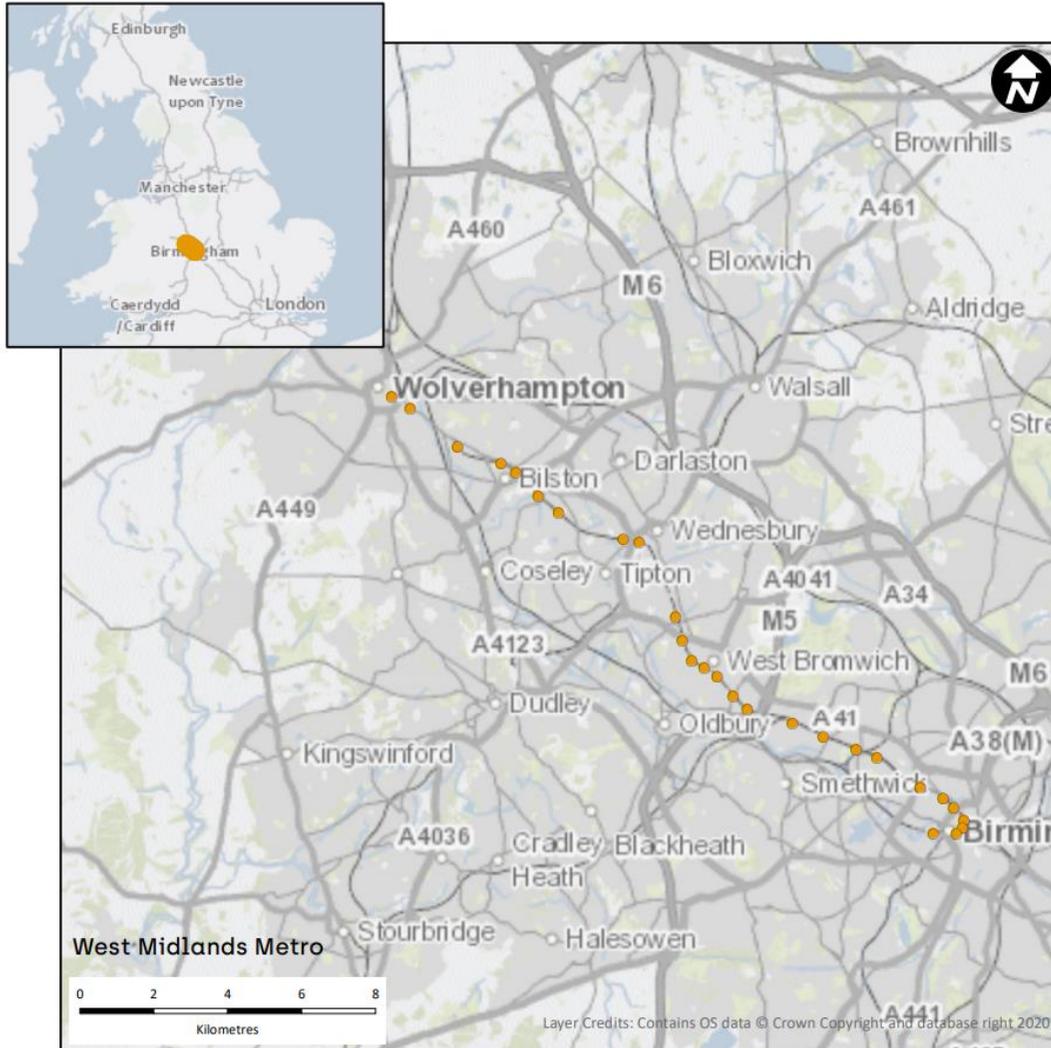
£ 6.30 adult day ticket price (multizonal)
£ 10.7m 2018/19 passenger revenue



8.3m passenger journeys in 2018/19

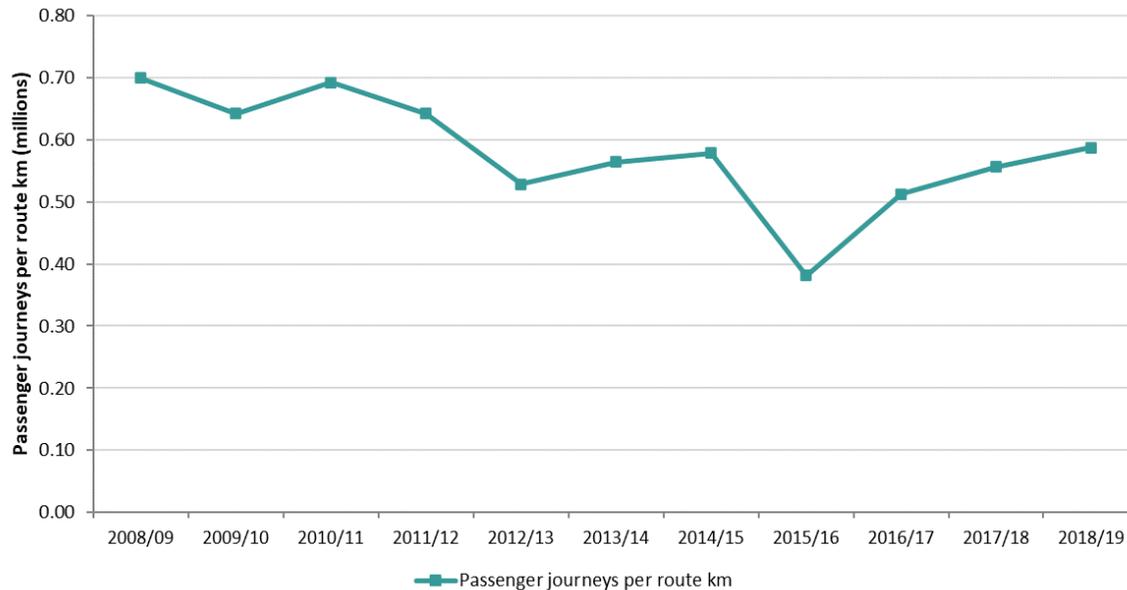


22km total route length



Nottingham Express Transit

Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
2004	To Toton (West Nottingham): 2015 To Clifton (South Nottingham): 2015	50	37



The Nottingham Express Transit network is owned by Nottingham City Council and has been operated by the Keolis-led 'Tramlink Nottingham' consortium since 2011.

Nottingham City Council is considering three possible further extensions to the NET network.

These are the proposed extensions at Clifton South to the Clifton Pastures housing and business development, at Toton Lane to the proposed HS2 East Midlands Hub, and a new line serving Gedling Borough to the northeast.

Key characteristics



Patronage change, 2017/18 to 2018/19



4.20 adult day ticket price (multizonal)

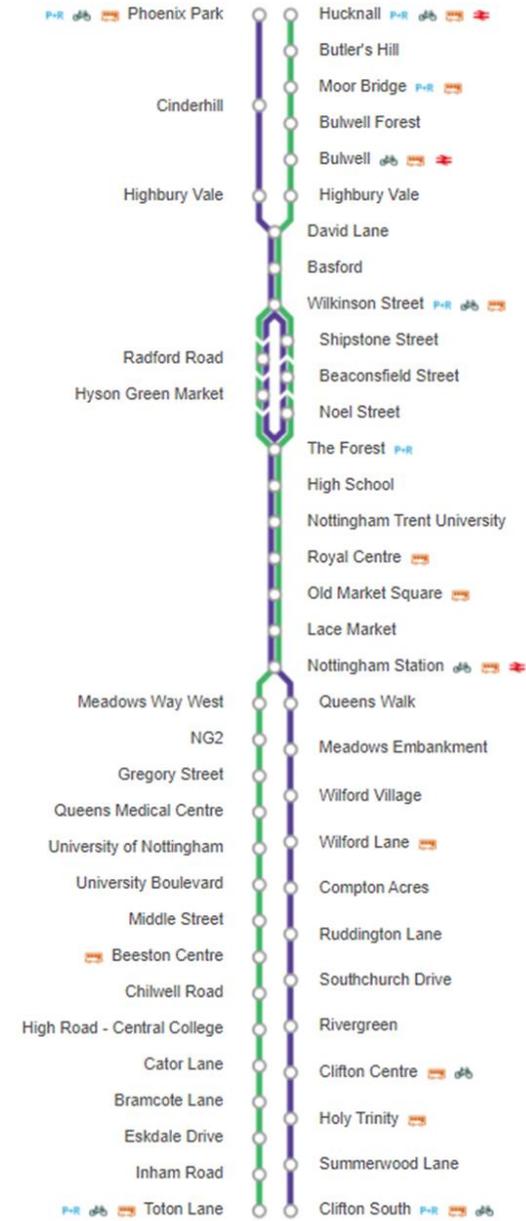
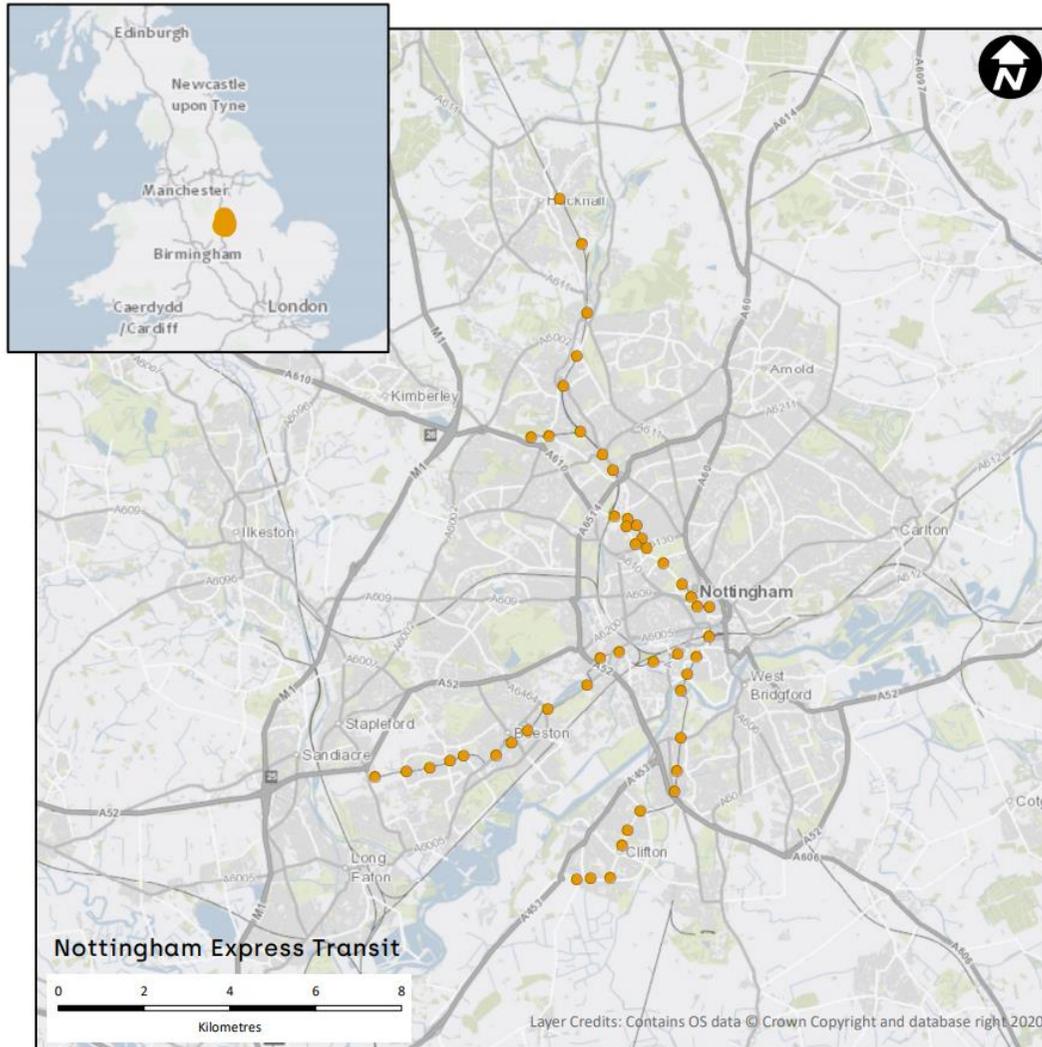
20.6m 2018/19 passenger revenue



18.8m passenger journeys in 2018/19



32km total route length

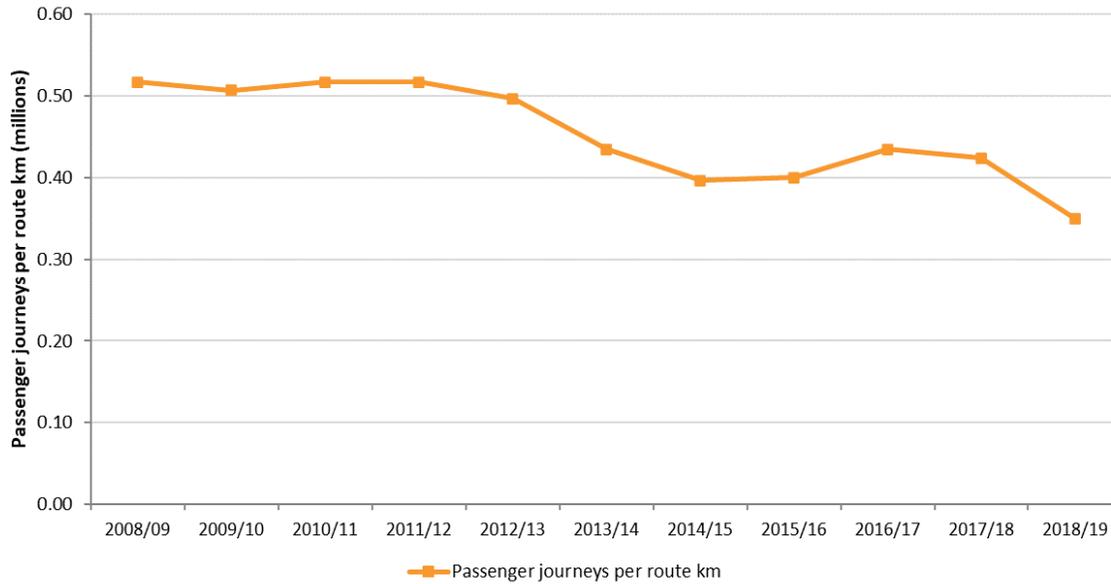


Network Map Key

- Park & Ride
- Citycard Cycle Hub
- Bus Connection
- Railway Station

Sheffield Supertram

Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
1994	To Rotherham: 2018	50	32



The Sheffield Supertram network is owned by the South Yorkshire Passenger Transport Executive, the regional transport body, and operated by South Yorkshire Supertram Ltd, a Stagecoach company.

The Rotherham extension to Sheffield Supertram (opened in 2018) operates between Rotherham Parkgate shopping centre and Sheffield Cathedral via Rotherham Central rail station. This extension makes use of tram-train technology, making it the first light rail system in the UK to do so. Tram-train allows vehicles to travel both on-street and on Network Rail track.

Key characteristics



Patronage change, 2017/18 to 2018/19

£ 4.40 adult day ticket price (multizonal)

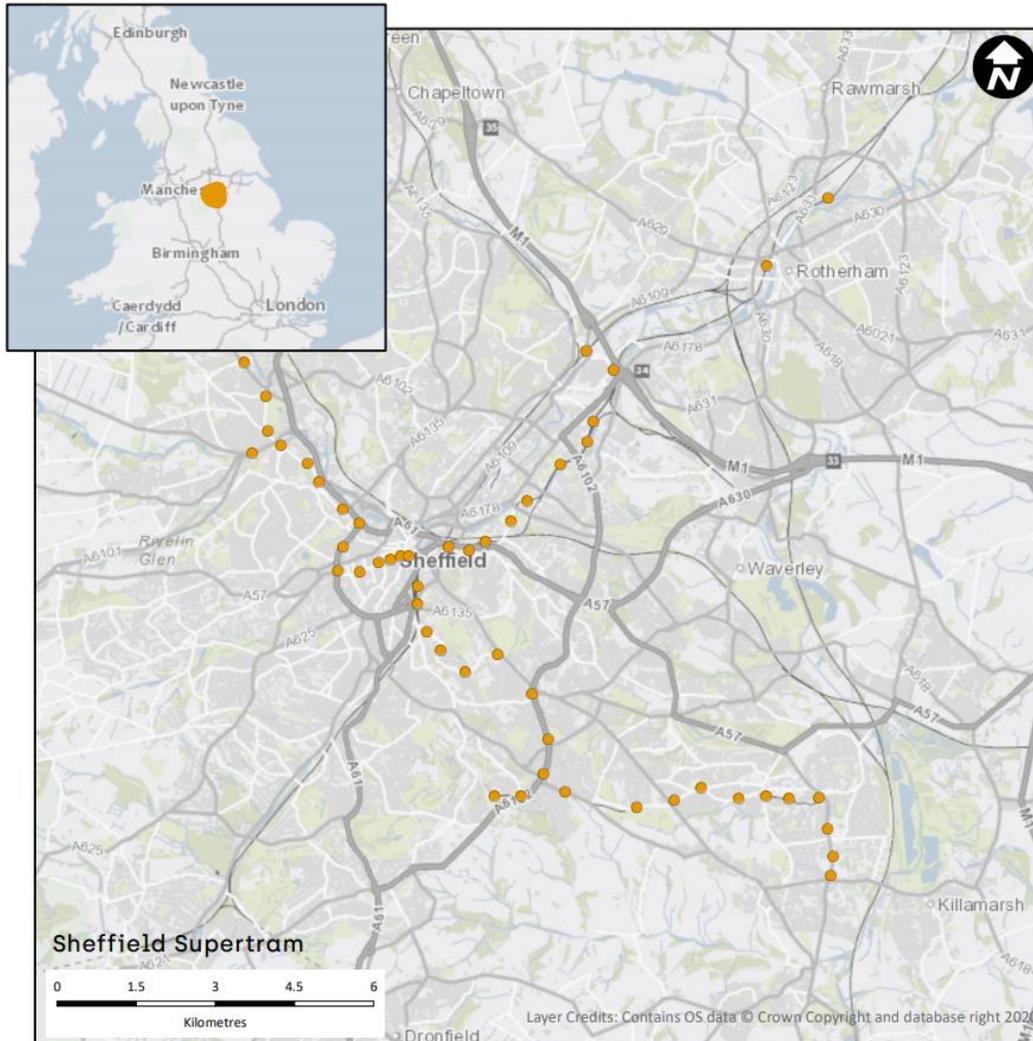
14.0m 2018/19 passenger revenue



11.9m passenger journeys in 2018/19

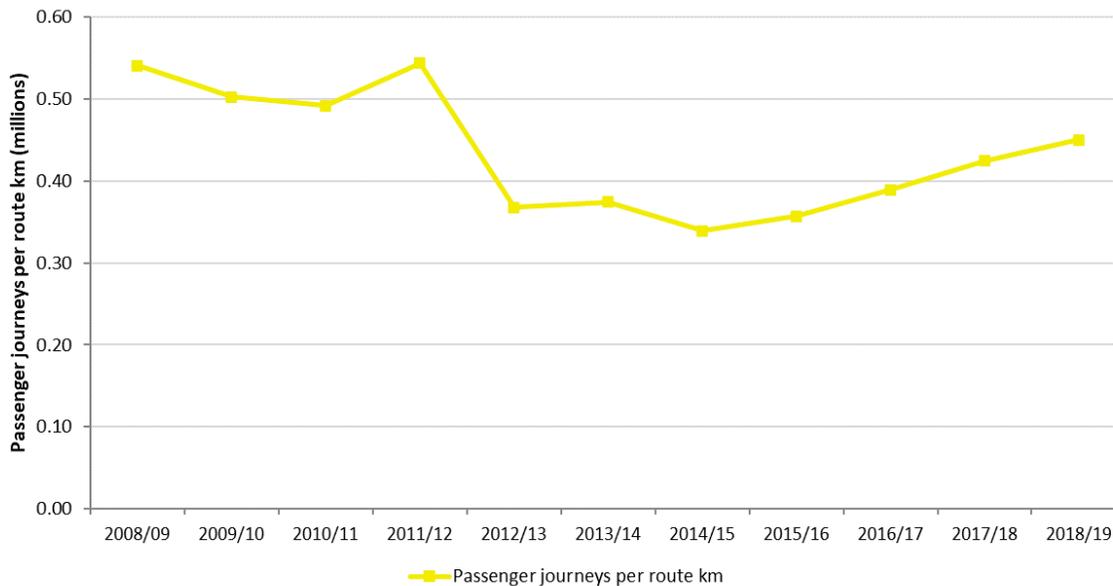


34.6km total route length



Manchester Metrolink

Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
1992	To Eccles: 2000 To East Didsbury: 2013 To Ashton-under-Lyne: 2013 To Oldham/Rochdale: 2014 To Manchester Airport: 2014 To Trafford Centre: 2020	99	131 (October 2021), 147 by late 2022

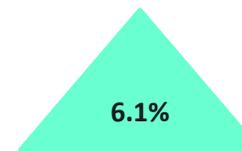


The network is owned by the regional public transport body, TfGM, and operated by a Keolis/Amey concession.

Greater Manchester Combined Authority's *2040 Transport Strategy* outlines expansion and development plans for the Metrolink network. Focus will be placed on improving customer experience and capacity on the network after a period of network expansion. Extension of the Manchester Airport line to Terminal 2 and the proposed Manchester Interchange HS2 station is being considered. New tram-train options, including: from Manchester Airport to the town of Wilmslow; from Altrincham to Hale; and from Rochdale to Heywood, are also being explored.



Key characteristics



Patronage change, 2017/18 to 2018/19

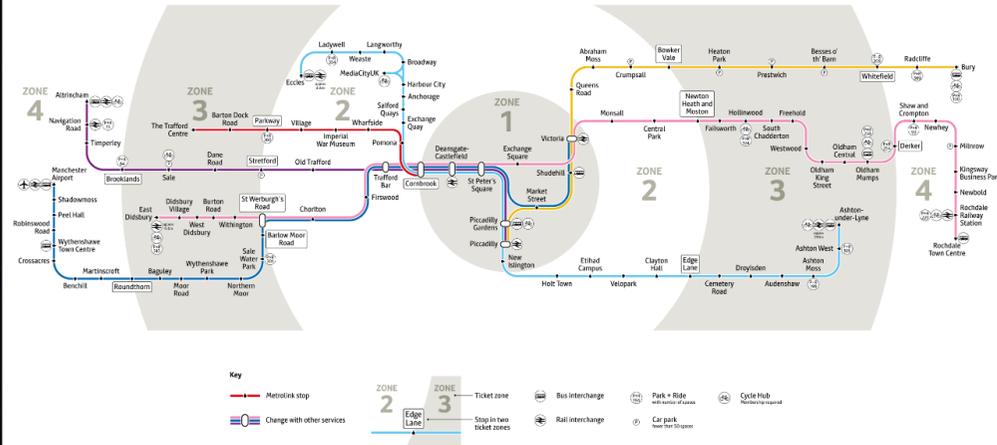
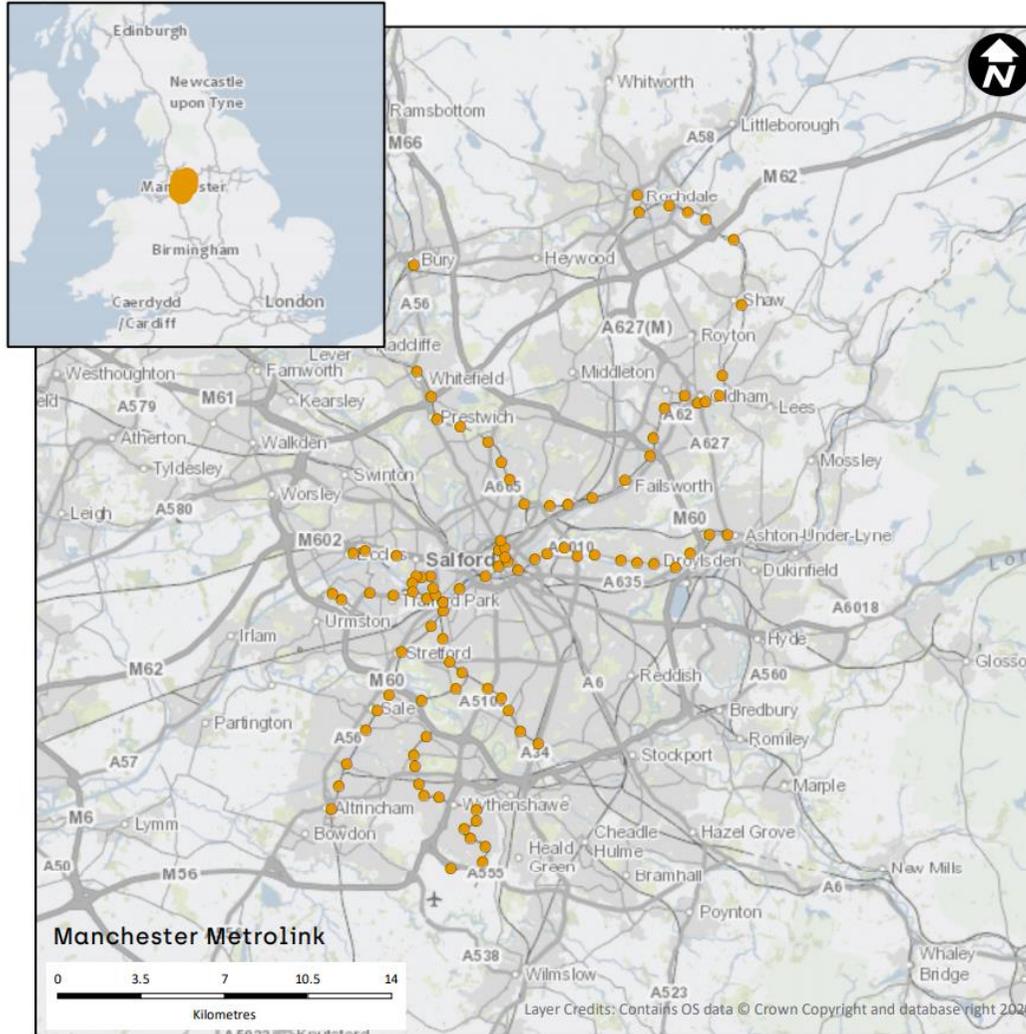
£ 7.10 adult day ticket price (multizonal)
82.1m 2018/19 passenger revenue



43.7m passenger journeys in 2018/19

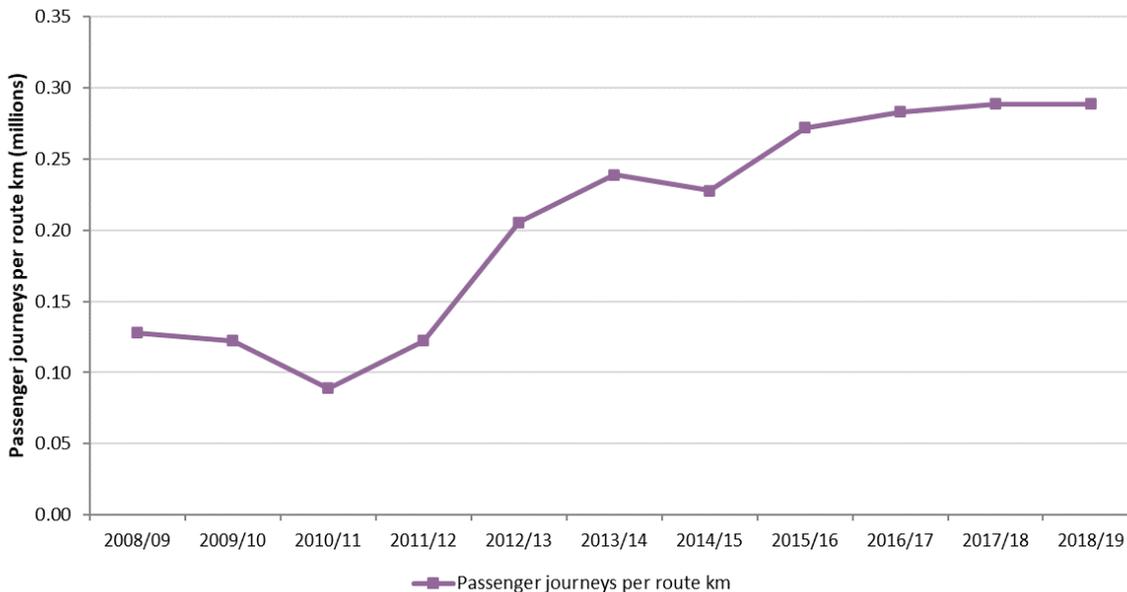


103km total route length



Blackpool Tramway

Year network opened	Year upgraded (new rolling stock)	Number of stations/stops	Fleet size (number of vehicles)
1885	2012	39	24

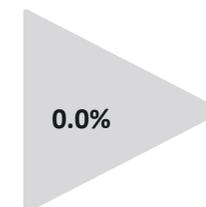


Blackpool Tramway is owned by Blackpool Council, the local authority, and operated by its corporate subsidiary Blackpool Transport.

An extension of the Blackpool Tramway network eastbound from Talbot Square to Blackpool North railway station is underway. The extension will enable improved interchange between Blackpool Tramway and local and national rail networks. It is expected to open in 2022.

Further extension proposals include for a 'Fylde Coast Tramway Loop', extending the current network to Kirkham & Wesham station and Poulton-Le-Fylde – with additional stops, including Blackpool Airport Enterprise Zone.

Key characteristics



Patronage change, 2017/18 to 2018/19

£ **5.20** adult day ticket price (multizonal)
7.0m 2018/19 passenger revenue



5.2m passenger journeys in 2018/19



18km total route length



Fleetwood Ferry

- Victoria Street
- London Street
- Fisherman's Walk**
- Stanley Road
- Lindel Road
- Heathfield Road
- Broadwater
- Rossall Square
- Rossall School
- Rossall Beach
- Thornton Gate
- West Drive
- Cleveleys**
- Anchorsholme Lane

- Little Bispham**
- Norbreck North
- Norbreck
- Sandhurst Avenue
- Bispham**
- Cavendish Road
- Lowther Avenue
- Cabin
- Cliffs Hotel
- Gynn Square
- Wilton Parade
- Pleasant Street

- North Pier (northbound)**
- Talbot Square (eastbound only)**
- North Pier (southbound)**
- Tower
- Central Pier
- Manchester Square

- St Chad's Road
- Waterloo Road (Blackpool South)
- South Pier
- Pleasure Beach**

- Burlington Road West (Pleasure Beach)
- Harrow Place

Starr Gate depot



North Station (due 2022)

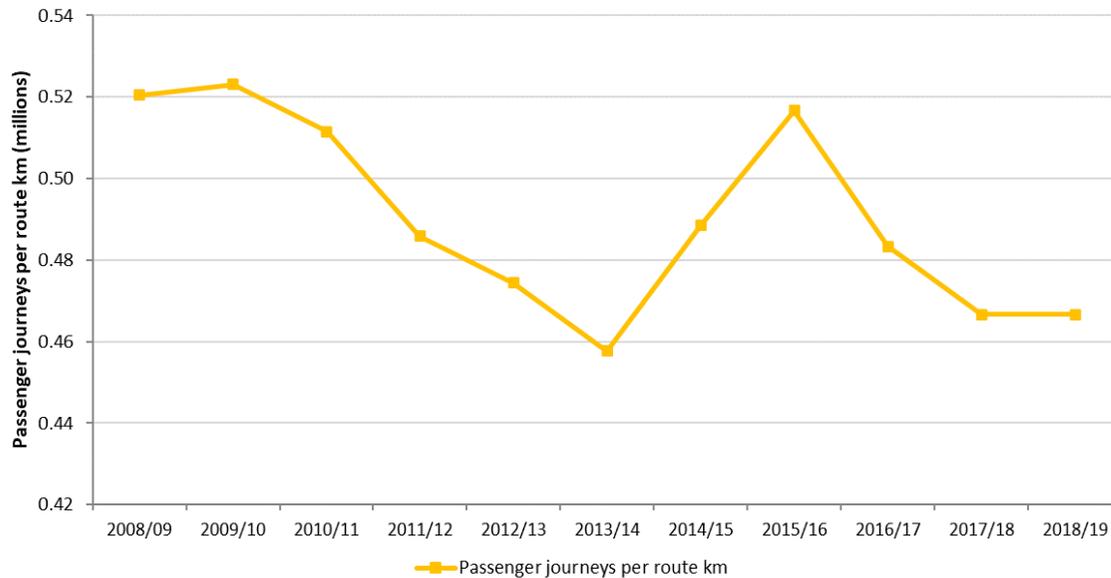
Rigby Road depot

Starr Gate (Squires Gate)

Tyne and Wear Metro



Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
1980	To Newcastle Airport: 1991 To Sunderland: 2002	60	89

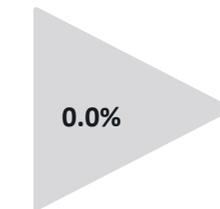


Tyne and Wear Metro is owned and operated by the Tyne and Wear Passenger Transport Executive under the 'Nexus' brand name, on behalf of the North East Combined Authority and North of Tyne Combined Authority.

The Tyne and Wear Metro has been undergoing significant modernisation since 2019 as phase 3 of the 'All change' programme progresses. This entails the introduction of a new fleet of 46 vehicles (to enter service by 2024) and a new depot. The new fleet is expected to offer reliability and energy efficiency improvements, and will include WiFi access, mobile device charging points, air conditioning and automatic sliding steps for wheelchair and pram access.

Funding has been awarded for the "Metro Flow" project which will double track the only single line part of the network, increasing capacity and improving reliability.

Key characteristics



Patronage change, 2017/18 to 2018/19



4.85 adult day ticket price (multizonal)

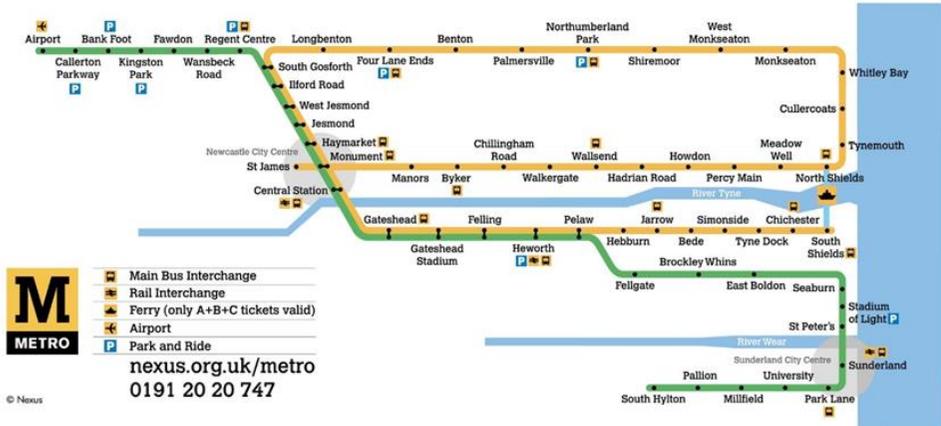
51.9m 2018/19 passenger revenue



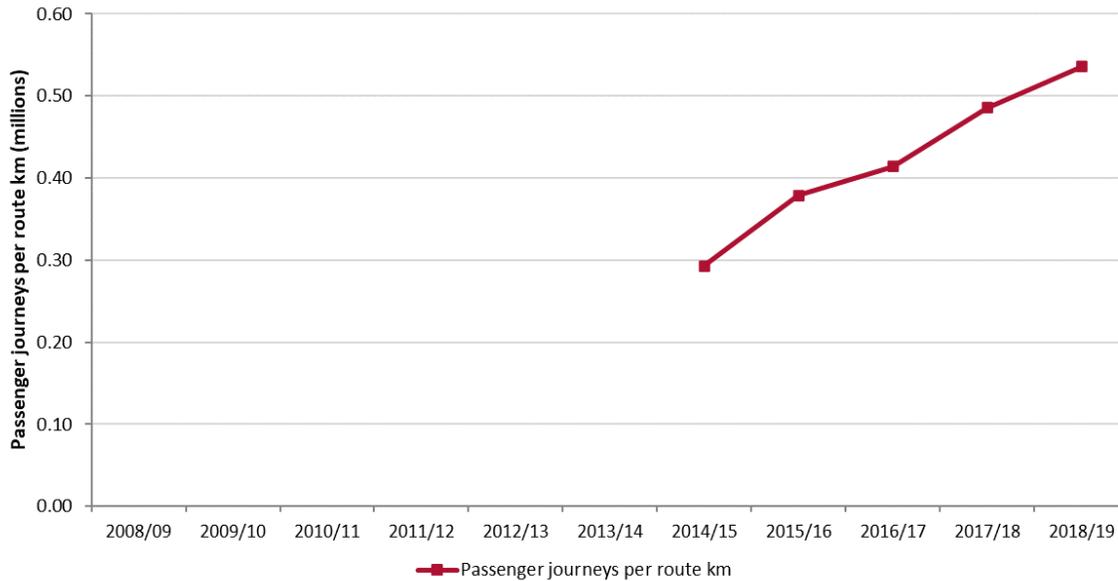
36.4m passenger journeys in 2018/19



77.5km total route length



Year network opened	Year extensions opened	Number of stations/stops	Fleet size (number of vehicles)
2014	To Newhaven: 2023 (under construction)	16	27



The Edinburgh Trams network is owned and operated by Transport for Edinburgh, the City of Edinburgh Council’s public transport body. It also owns bus company Lothian Buses.

Edinburgh Trams is the UK’s newest light rail network, running from Edinburgh Airport to York Place in the city centre. An extension from York Place to Newhaven (via the port area of Leith) received approval in 2019 and is currently under construction with completion in 2023. The extension will run for 4.6km, representing a 30% increase in route length for the network.

Further extensions are actively being considered.

Key characteristics



Patronage change, 2017/18 to 2018/19



10 adult day ticket price (multizonal)

15.7m 2018/19 passenger revenue



7.5m passenger journeys in 2018/19



14km total route length



B Light Rail and Deprived Areas

Figure B.1: Blackpool Tramway & Index of Multiple Deprivation Upper Quintile (Shaded)

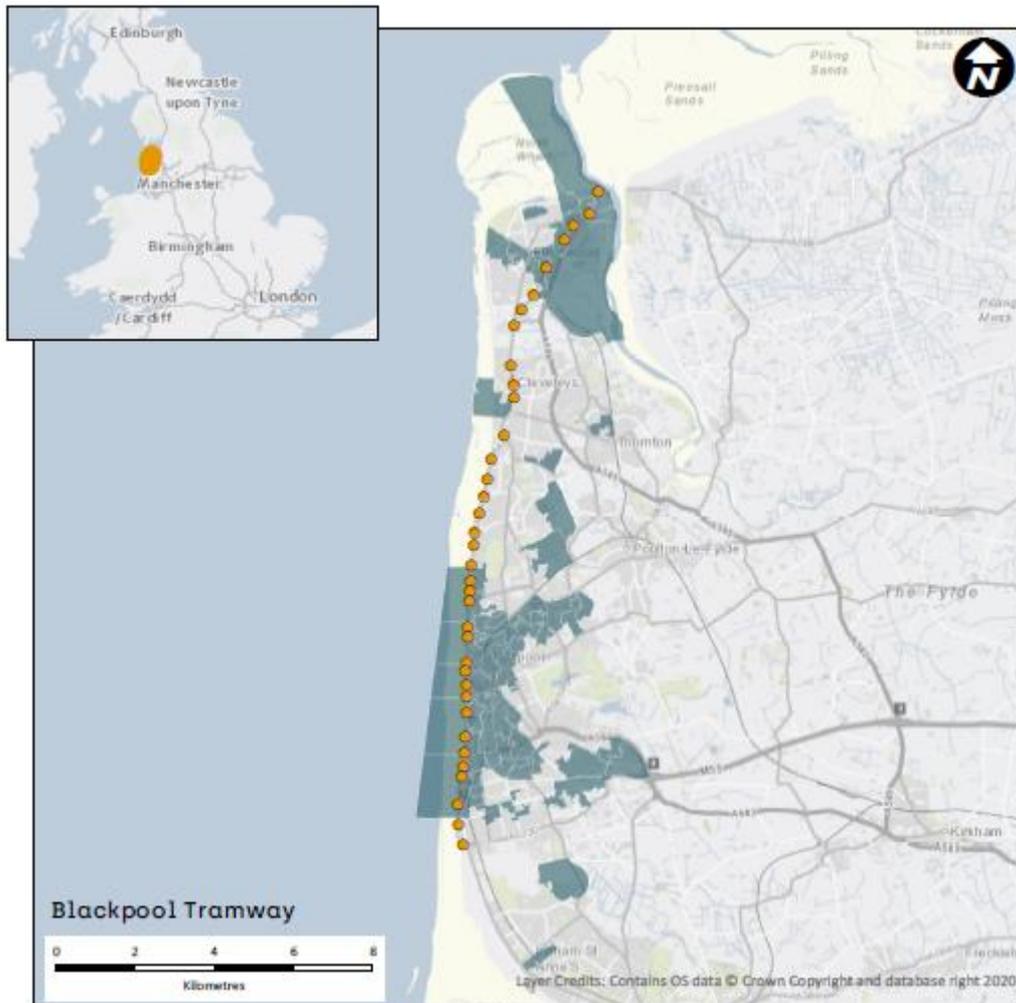


Figure B.2: Docklands Light Railway & Index of Multiple Deprivation Upper Quintile (Shaded)

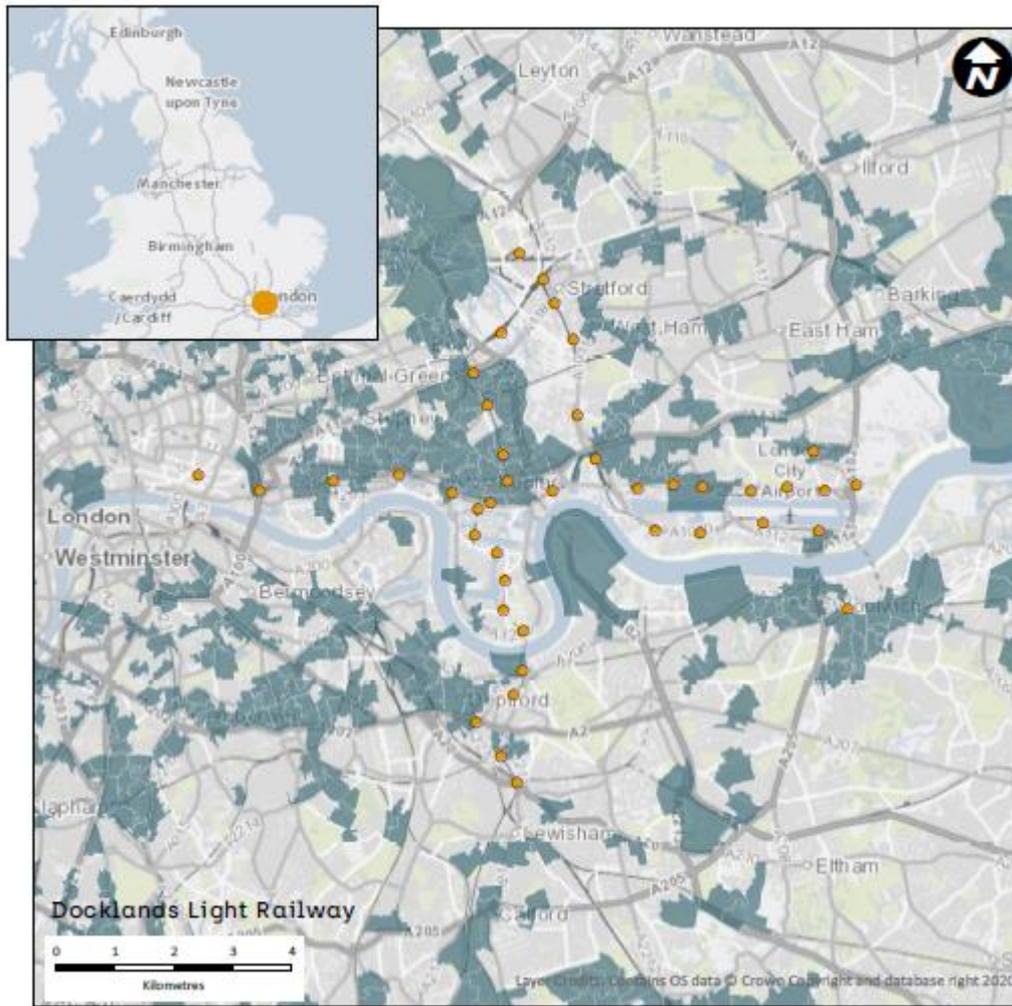


Figure B.3: Manchester Metrolink & Index of Multiple Deprivation Upper Quintile (Shaded)

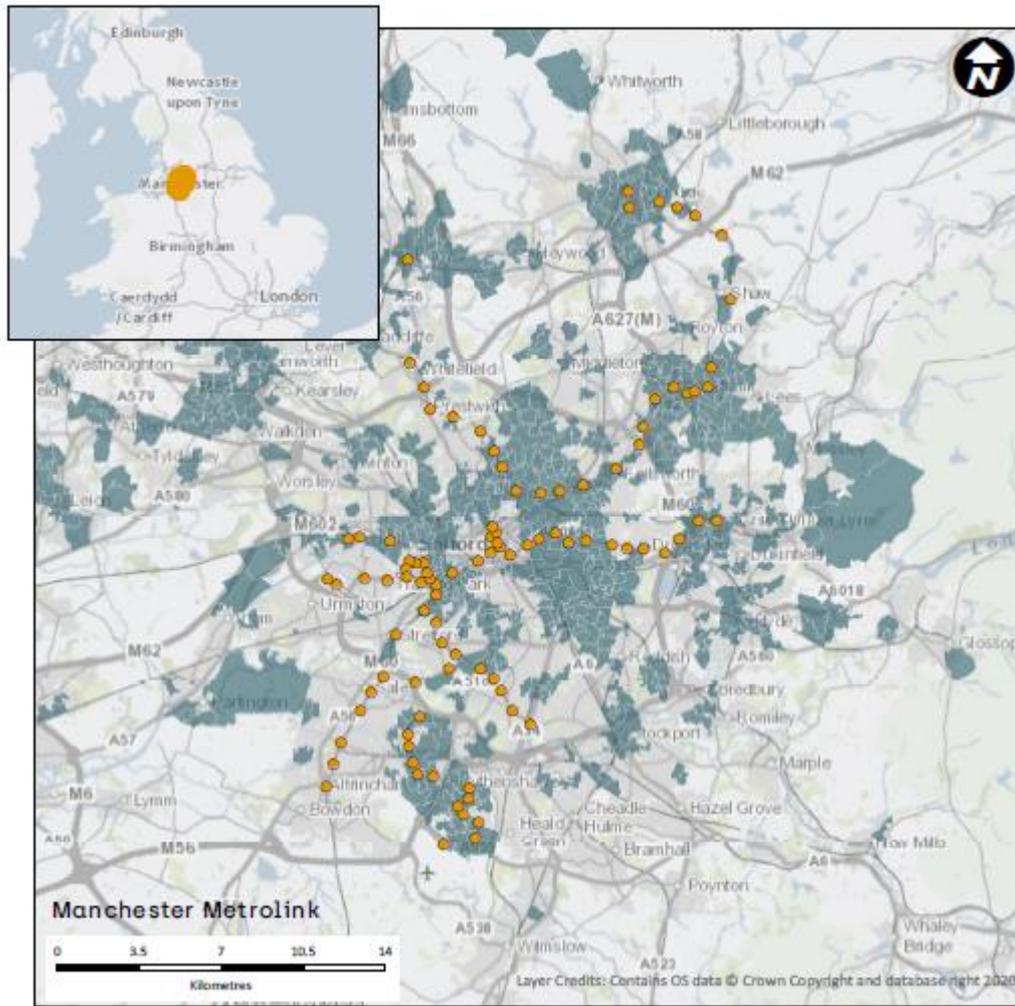


Figure B.4: Notting Express Transit & Index of Multiple Deprivation Upper Quintile (Shaded)

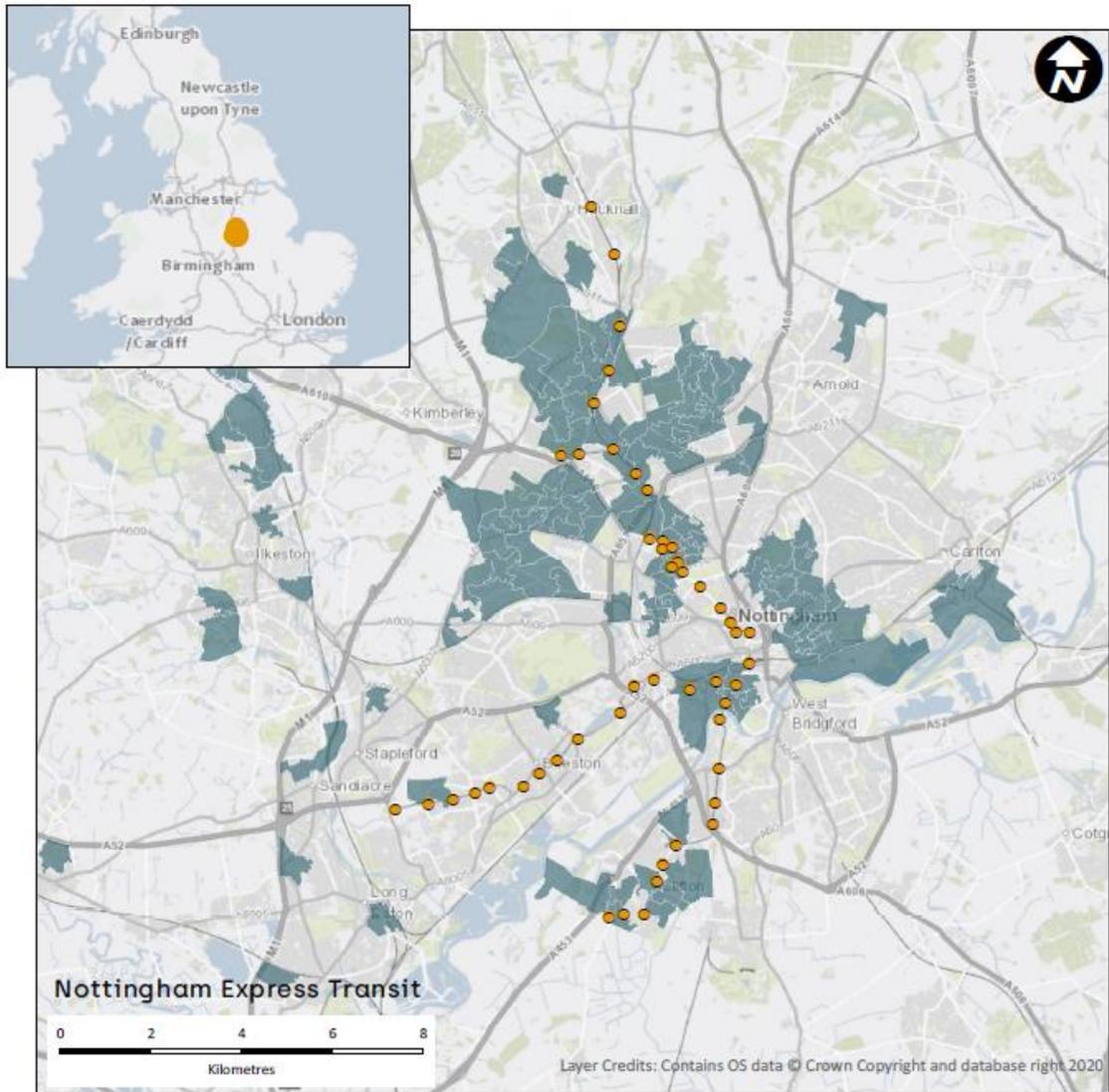


Figure B.5: Sheffield Supertram & Index of Multiple Deprivation Upper Quintile (Shaded)

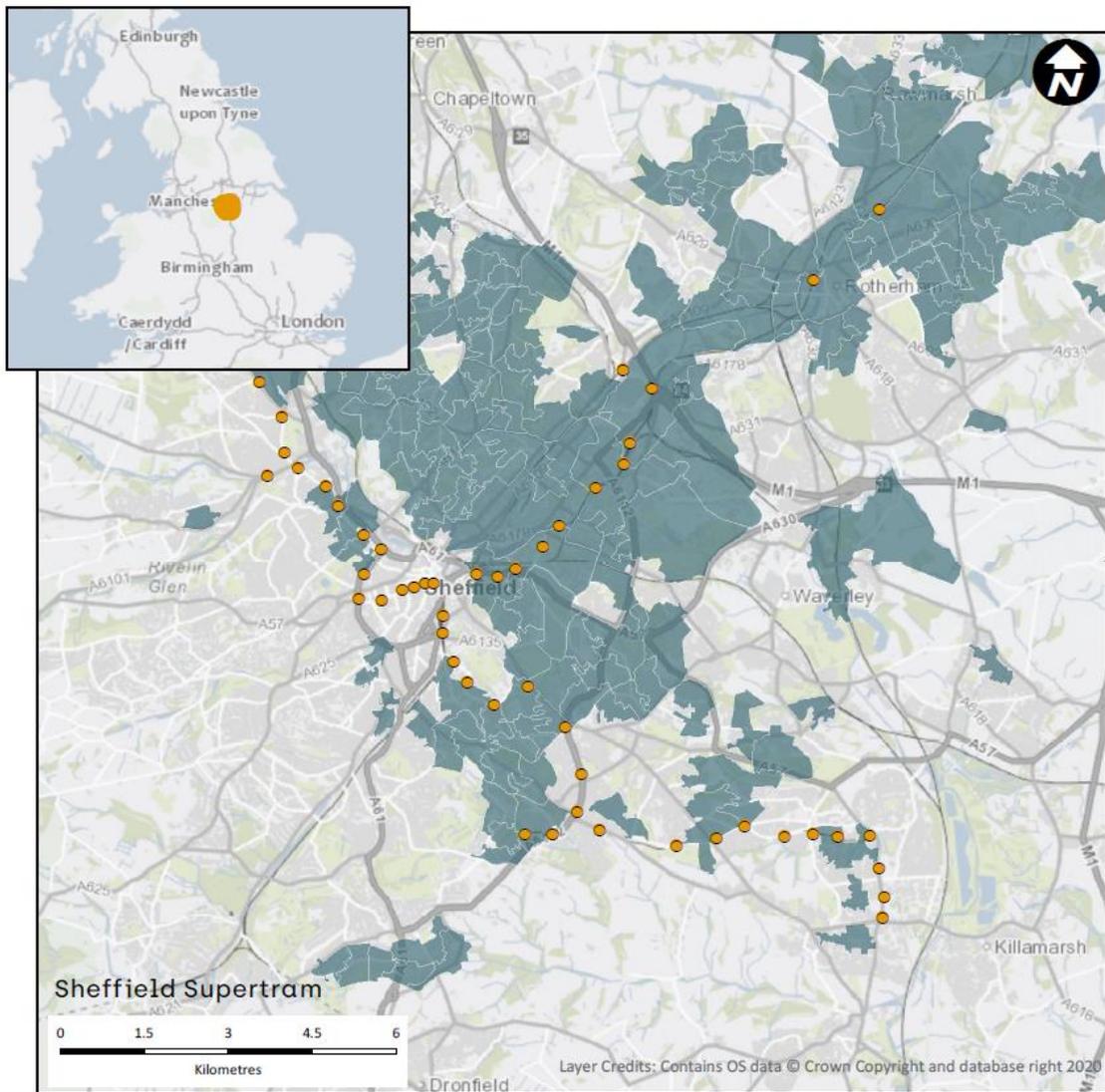


Figure B.6: London Trams & Index of Multiple Deprivation Upper Quintile (Shaded)

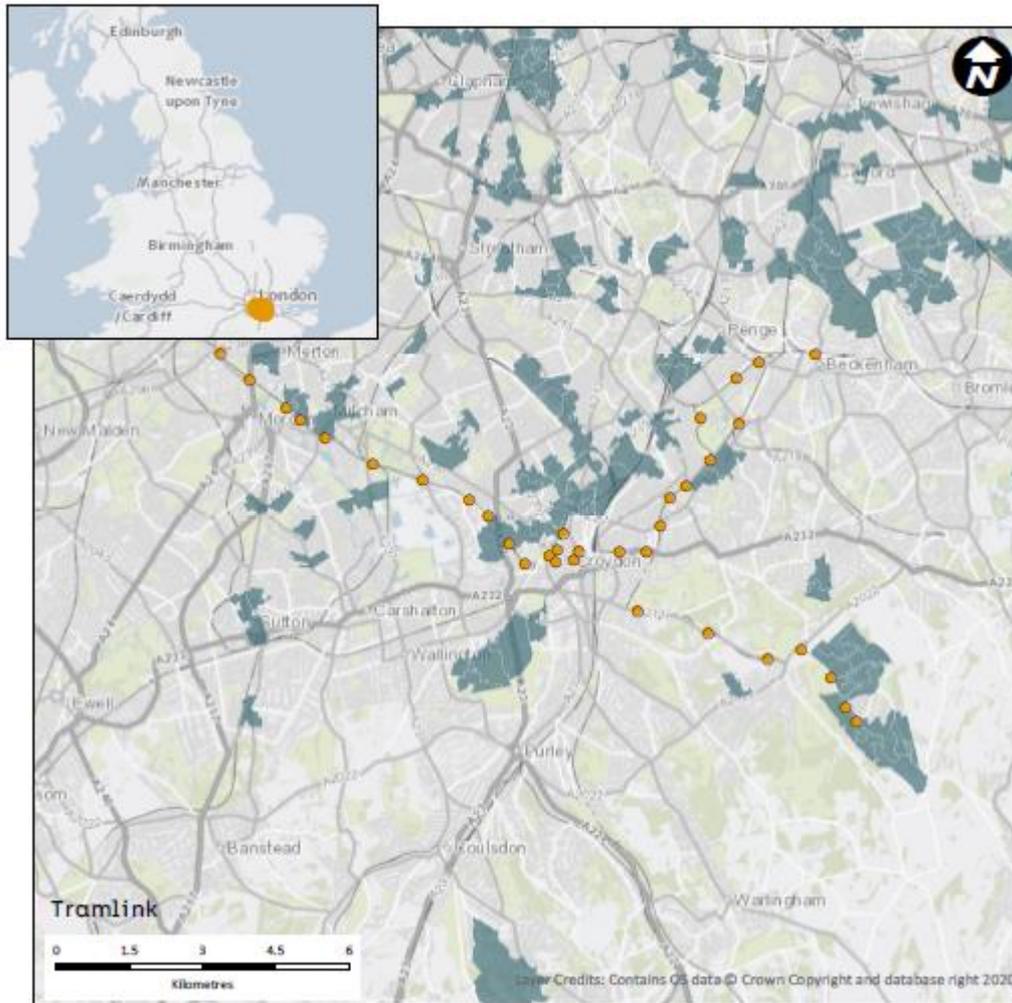


Figure B.7: Tyne & Wear Metro & Index of Multiple Deprivation Upper Quintile (Shaded)

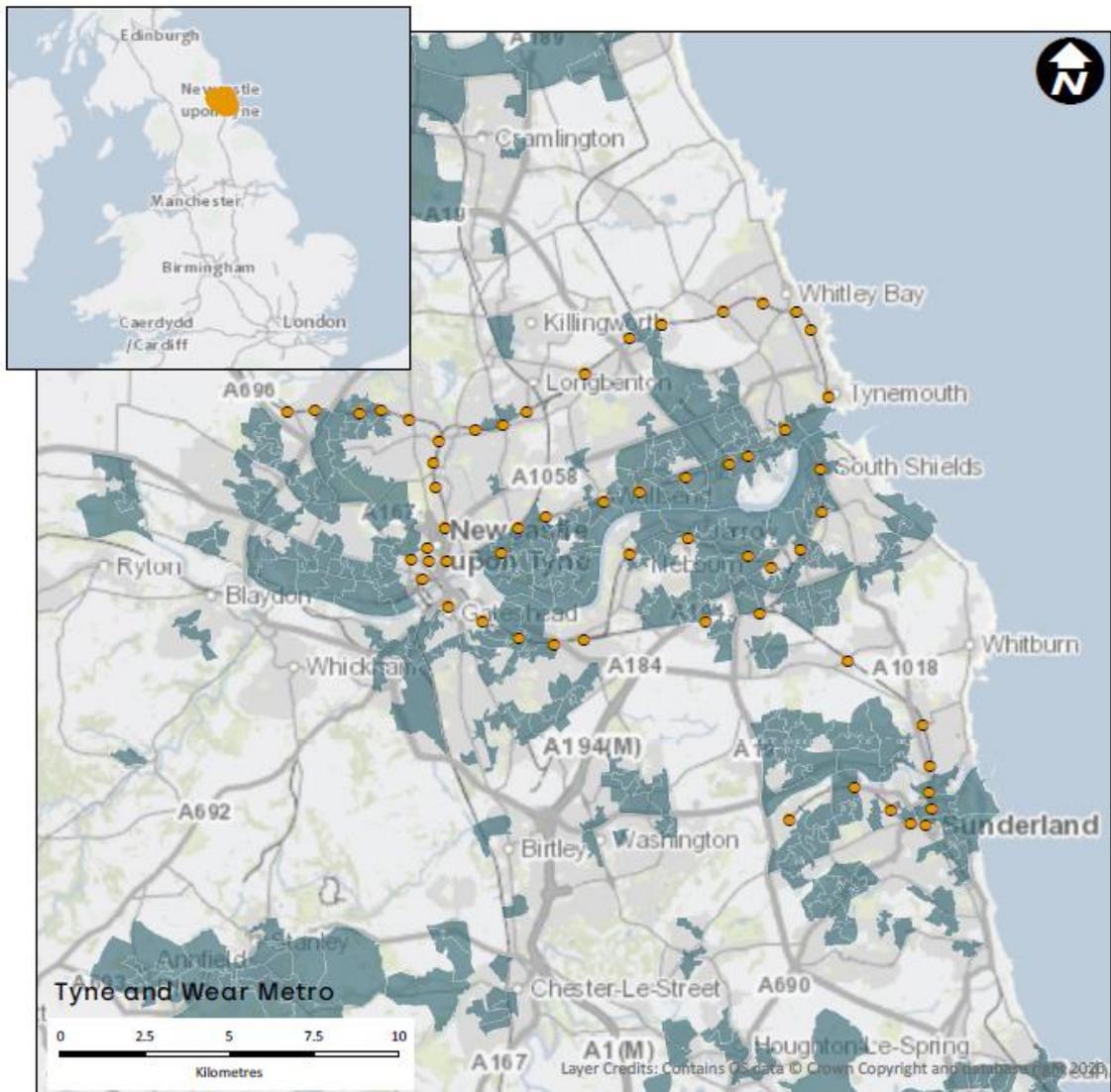
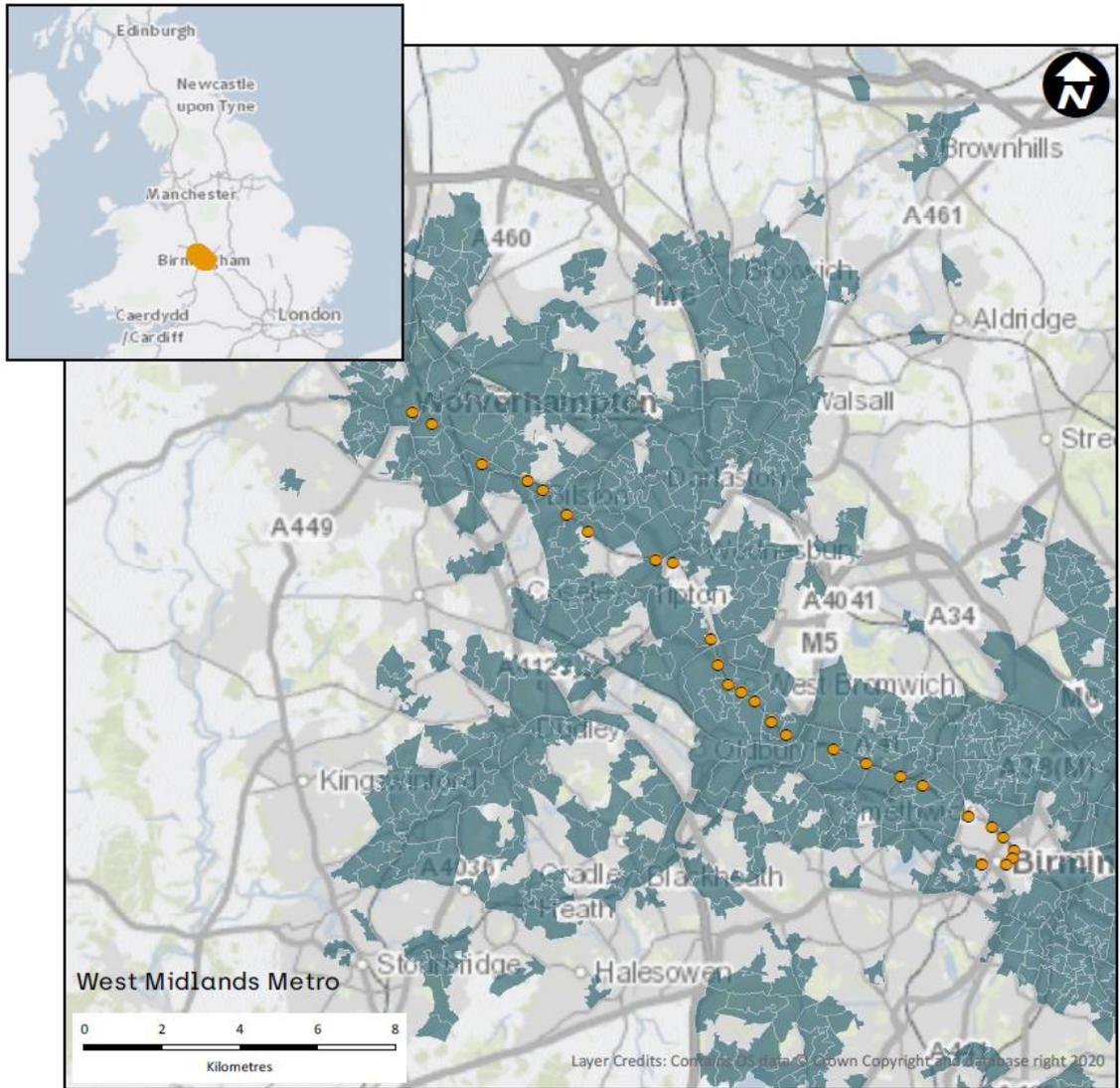


Figure B.8: West Midlands Metro & Index of Multiple Deprivation Upper Quintile (Shaded)



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Steer project/proposal number

24098501

Client contract/project number

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Distribution

Client:

Steer:

Version control/issue number

Final

Date

14th October 2021

