



**THE ROLE OF TRANSPORT
IN SHAPING A NEW AND
SUSTAINABLE ERA FOR SUBURBS**





CONTENTS

The Urban Transport Group represents the transport authorities for Greater Manchester, Liverpool City Region, London, Tyne and Wear, South Yorkshire, West Midlands and West Yorkshire.

Our wider associate membership brings together the transport authorities serving Cambridgeshire and Peterborough, Nottingham, Strathclyde, Tees Valley, Wales, West of England and Translink in Northern Ireland.

We work to ensure that transport plays its full part in making our city regions greener, fairer, happier, healthier and more prosperous places.

Executive summary	4
1 Introduction	8
2 Suburban travel trends	12
3 A potted history of the suburbs	15
4 Suburbs for a new era	22
Foundation one: Help people to access more of what they need locally	24
Foundation two: Provide family-friendly sustainable transport choices	33
Foundation three: Prioritise gentle densification around sustainable transport infrastructure	41
Foundation four: Provide reliable, convenient connections to the nearest town or city and key employment sites	45
5 Joining the dots: the broader decarbonisation of suburbs	55
6 Conclusion.....	58
References.....	61

EXECUTIVE SUMMARY



Around 80% of Britons live in suburbs, and yet their unique transport challenges, shaped by their common features and unique histories, are rarely afforded special attention in transport planning. Furthermore, their potential role in tackling the climate emergency is frequently overlooked.

This represents a huge oversight. Given that suburbs are where most of us live, we must recognise that there can be no decarbonisation of transport without specific measures to decarbonise transport in the suburbs. Measures that take account of the space suburbs occupy physically – neither urban nor rural; historically – from the early railway suburbs offering respite from the grime of industrialisation to sprawling car-dependent outcrops; and in our imaginations – as places that may deliver on the dream of the ‘good life’.

The suburb is a nebulous concept. Today, life in the suburbs is just as likely to be one of poverty as one of affluence and the idea of a sleepy suburban dormitory is more of an illusion than ever. Suburbs mask a hive of activity. They are places of work – both paid and unpaid. Far from simply feeding workers in and out of the city, they are home to a myriad of local journeys which are seldom measured or accounted for but are nonetheless vital to the smooth functioning of our economy, not least those associated with the business of caring for others.

It is, however, possible to identify a number of common features of suburbs that help to distinguish them from their urban and rural neighbours, as well as help us to understand their transport challenges and how we might address them. Suburbs in the UK can be defined as sharing the following features:

- An interdependent relationship with a large town or city. It is this relationship that has typically dominated transport planning for suburbs, with a focus on getting suburban residents in and out of their nearest urban area.
- Primarily residential. Unlike the city or the countryside, the main purpose of suburbs is to house people. The extent of shops, jobs, services and amenities around that will vary greatly between suburbs and will influence local travel patterns.
- Low density, low-rise. The typical British suburban built form impacts the viability of public transport and means destinations are often spread out, increasing car dependency.
- Favoured by families with children. The hyper-local travel patterns of families and children are often unaccounted for and the freedom to move and play safely and independently are curtailed as a result.

EXECUTIVE SUMMARY

The COVID-19 pandemic led many people to see suburbs anew. Confined to our homes and local neighbourhoods, what suburbs already had to offer, what they lacked and what they could be in the future became clearer than ever.

At their best, suburbs offer the opportunity to live a more 'local' life – with more of what people need on their doorstep – from shops to green space, schools to swimming pools. The best of both worlds between city and country.

At their worst, they are dominated by traffic and parked cars. Fraught with road danger and offering little opportunity to safely walk, cycle, gather or play. Basic shops, services and amenities are out of reach on foot or by bike.

The climate emergency demands that, wherever we can, we sever car dependency, ensure more people can access what they need locally and have access to a range of sustainable transport options.

With this mission in mind, together with an understanding of the common features of suburbs, their unique histories and the extent of their existing assets, we present four foundations for suburbs for a new era and a range of ideas for how these could be supported in practice. Suburbs for a new era should:

1. HELP PEOPLE TO ACCESS MORE OF WHAT THEY NEED LOCALLY

The most effective way to cut transport emissions is to avoid making an emissions-generating journey in the first place. Improving digital connectivity and skills; ensuring suburban deliveries are sustainable; supporting remote working; making the most of existing spaces and places; and adopting 15-minute neighbourhoods (where key amenities and services are within a 15-minute walk or cycle from home) will give people access to more of what they need as locally as possible.

2. PROVIDE FAMILY-FRIENDLY SUSTAINABLE TRANSPORT CHOICES

Family-friendly transport and planet-friendly transport choices go hand-in-hand – what is good for one is good for the other. These include Low Traffic Neighbourhoods (where motor vehicle traffic in residential streets is reduced by removing through-traffic using temporary or permanent barriers); School Streets (where roads outside schools have temporary restrictions on motorised traffic at pick-up and drop-off times); the use of e-cargo bikes to support more suburban families to cut their car use; and placing convenient transport choices on people's doorsteps in the form of mobility hubs.

3. PRIORITISE GENTLE DENSIFICATION AROUND SUSTAINABLE TRANSPORT INFRASTRUCTURE

Gentle densification of suburbs along existing transport corridors can help to build up the critical mass needed to justify more comprehensive conventional public transport provision as well as new solutions such as larger shared mobility hubs. It can also support the creation of 15-minute neighbourhoods if densification efforts are focused around existing services and amenities. As well as supporting densification and expansion of existing suburbs, taking a transit orientated development approach can be used to develop new suburbs at appropriate densities.

4. PROVIDE RELIABLE, CONVENIENT CONNECTIONS TO THE NEAREST TOWN OR CITY AND KEY EMPLOYMENT SITES

Ideally, every suburb would have a network of regular bus, tram and/or train services providing connections between them and beyond to the nearest town or city, but many suburbs still lack these services. Alternative solutions through shared (and equitable) micromobility options such as bikes and e-scooters; technology driven demand responsive transport; lift-sharing, car clubs and car-pooling; and the electrification of private car use can enable people to access nearby towns and cities sustainably.

If we are to fully realise the potential of the suburbs in tackling the climate crisis, fulfilling these four foundations must form part of a wider programme to decarbonise suburbs, the places where most of us live.

Policy makers and practitioners must work across sectors to join the dots between suburban infrastructure – including transport, energy, water management and housing – and understand how these might work together to achieve more.

This could include, for example, repurposing existing buildings rather than building new; using community microgrids to power homes and transport; or incorporating green-blue assets (vegetation and water) into transport infrastructure to support decarbonisation and climate change adaptation.

Ultimately, the dream of a good life in the suburbs should be within reach of all and be fully aligned with the needs of our planet. We hope that this report provides some inspiration for what a good life in the suburbs means for a new, sustainable era. An era where suburbs are places for community and gathering; powered by people and green energy; brought to life by nature and play; and rich in sustainable transport choices for all kinds of people and all kinds of journey, reflecting the full diversity of suburban life.

INTRODUCTION

1

Occupying the middle ground between urban and rural, suburbs are often overlooked in transport policy. This report aims to shine a light on the unique transport challenges of suburbs which require tailored interventions suited to the common features and unique histories of suburban Britain.

The COVID-19 pandemic gave cause to revisit the dream of the suburban 'good life' where, once again, suburbs could offer a place of safety, respite and comfort. Confined to their neighbourhoods, many people came to recognise just what the suburb could offer on their doorstep, and how it could do more to support a more local lifestyle.

Finding ways to live more locally has never been more urgent, given the pressing climate crisis. It compels us to ensure that people can access more of what they need near home, reducing the need to travel wherever possible. When

travel is needed, suburbanites need access to a range of sustainable options, working towards breaking the chains of car dependency that prevent many neighbourhoods from thriving.

This report aims to provide inspiration as to how transport can play its part in shaping a new and sustainable era for suburbs, improving quality of life for communities whilst also tackling climate change.

WHAT IS A SUBURB?

For many people, the idea of the suburb is a powerful one. Neat ranks of semi-detached homes, each with its own garden, a car outside and arranged along tree-lined streets. The sounds of children playing, the hum of lawnmowers at the weekend, the clank of crockery in the evening. A vision of aspiration but also conformity and comfort – maybe even boredom.

The reality is harder to pin down.

Britain is, in fact, a nation of suburbanites. It is estimated that around 80% of us live in a suburb¹. For some, this ubiquity renders the term 'suburb' almost meaningless². Whilst there is no universally agreed definition, it is possible to identify common features which – taken together – distinguish suburbs from their urban and rural neighbours and demand different approaches to transport policy and provision.

However, none of these features are entirely clear cut and definitive, reflecting the nebulous nature of suburbs as a concept.

Suburbs in the UK can be defined as sharing the following features, discussed in more detail below, alongside the implications of these features for transport provision:

- An interdependent relationship with a large town or city.
- Primarily residential.
- Low density, low-rise.
- Favoured by families with children.



AN INTERDEPENDENT RELATIONSHIP WITH A LARGE TOWN OR CITY

The roots for the word 'suburb' translate as 'less than or below urban'. Suburbs are unavoidably defined by their relationship with a neighbouring urban area. Historic England suggests suburbs are best described as 'outgrowths or dependencies of larger settlements – somewhere with a clear relationship with a city or town but with its own distinct character³. That larger settlement typically relies on suburban residents to come into the city to work and they, in turn, depend on the city to access key services, shops and amenities.

This relationship helps to explain why transport networks surrounding suburbs tend to take the form of radial routes connecting suburbs to town and city centres (rather than connecting suburbs to one another).

Whilst the reality of suburban travel patterns is more complex, there will always be some form of connection with a larger settlement and often, it has been that connection that has shaped transport planning.

Some suburbs are more dependent on towns and cities than others. Some, for example, may have grown up around particular employers located on the outskirts of the city, employers that provided the majority of jobs for the surrounding community. Whilst many of these employers have since disappeared, suburbs often continue to have their own pull in terms of jobs. The suburbs of outer London, for example, are where almost 40% of the capital's jobs are located⁴.



Suburban housing, Boveney Road, London. Image: David Martin

PRIMARILY RESIDENTIAL

Whilst many suburbs will have their own shops, amenities and employers, their primary purpose is to house people. This is different from the city, where the focus is on business, commerce and culture and different from rural areas where large swathes of land are undeveloped or used for farming and forestry.

However, whilst suburbs are often thought of as 'set apart' from work, this is not – and arguably never has been – entirely the case. As noted above, some suburbs sprung up to specifically serve employers located at the heart of the community, others have their own pull in terms of jobs.

Suburbs are home to many jobs in what has been termed the foundational economy – the everyday 'services and products that keep us safe, sound and civilised'. These include, for example, social care and health services, education, construction and retail.

Still more economic activity is going on within private homes, from mobile hairdressers to craftspeople and from carers to electricians. The COVID-19 pandemic also necessitated greater levels of home working, particularly among those who usually work in an office, a trend that seems set to endure as many office workers seek to maintain at least a hybrid approach.

Furthermore, suburban neighbourhoods have always been the sites of vast amounts of unpaid domestic and family care work, just as valuable to the economy, but frequently unaccounted for in land-use and transport planning. These tasks generate their own travel patterns – bringing shopping for an older relative, the school run and escorting someone to the doctors, for example.

It is also important to note that, whilst primarily residential, suburbs will vary considerably in the extent of amenities and services available locally. Some will have shops, a library, sports facilities, an affordable supermarket, for example. Others will require people to travel further afield to access these facilities and will have differing capacity to enable these journeys to be made sustainably.

Far from being sleepy residential dormitories – suburbs mask a hive of activity, raising questions of how well existing transport networks serve them and the kinds of journeys people make, or would like to make.

LOW DENSITY, LOW-RISE

Suburbs are generally less densely packed than urban areas. In the UK, most suburbs are low-rise and development is spread out. It is unusual to see semi-detached and detached homes in the city, but these are often the norm in suburbs and have come to typify our idea of these areas. Terraced homes are also common, particularly in the urban outgrowths that sprung up during the Victorian era.

It has been suggested that residential densities of 10-40 dwellings per hectare characterise the suburbs⁶, distinguishing them from more sparsely populated rural areas as well as from denser urban developments. Lower densities impact on the viability of public transport services, meaning that networks often focus on the most used commuter routes.

Minimum density for a bus service is suggested as 25 dwellings per hectare, a threshold that many suburbs will fall well below if we use the threshold of 10-40 dwellings per hectare⁷. Furthermore, reaching this density is no guarantee of a good level of service. Services could still be infrequent, convoluted and with long journey times, for example. Without measures for bus priority, buses get caught in the same traffic as cars, but with the added disadvantage of waiting times at the beginning and end of journeys and at bus stops along the way.

Lower densities can also mean that key destinations seem further away than is considered walkable, meaning the use of cars for short journeys becomes more common. The routine use of the car for short, everyday trips, such as the school run, generates congestion and road danger and – in a vicious circle – makes walking and cycling still less attractive.

However, whilst low density, low-rise is the form suburbs tend to take in the UK, this is not necessarily a defining characteristic of suburbs

elsewhere. In Western European cities, for example, suburbs are often denser, with more mid-rise residential buildings.

Research by Centre for Cities⁸ has found that just 40% of residents surrounding Britain's largest cities are able to travel to their city centres using public transport within 30 minutes. This compares to almost 70% of residents surrounding similar-sized European cities.

The research attributes much of this disparity to population density. European cities have more people living in well-connected mid-rise suburbs close to the city centre, whereas the suburbs around Britain's cities are more spread out, with a low-rise built form, making public transport less viable and car dependency more likely. Centre for Cities estimates that this lack of connectivity costs the UK economy more than £23.1bn per year⁹.

FAVoured BY FAMILIES WITH CHILDREN

Suburbs are attractive to people with children. Many cities in the UK continue to cater poorly for families with children. A lack of schools, sense of community and green space often push young families to the suburbs. Whilst rural areas offer community and more abundant green space, they lack the convenience of the suburb in terms of access to jobs, key infrastructure (including schools and hospitals) shops and services.

Analysis of the Census by Centre for Cities¹⁰ found that suburban residents tend to be over 30 with children, bearing out the assumption that suburbs are particularly popular among families.

The same research found that – in order of preference – suburban residents had chosen to live where they did because of the relative affordability of housing (31%); proximity to friends and family and the safety and security of the neighbourhood (both 29%); and the size and type of housing (24%). Suburban residents were also more likely than city centre or 'hinterland' residents to select proximity to good schools (12%) as a reason for moving to their neighbourhood.

This is in contrast to city centre residents where the most popular factors were proximity to restaurants/leisure or cultural facilities (39%), followed by availability of public transport (28%) and proximity to shops and work (both 27%).

These differing preferences help to underline the differences in the needs and priorities of city versus suburban residents, as well as a seeming acceptance of a degree of car dependency upon moving to the suburbs, with public transport availability ranking less highly as a deciding factor in choice of neighbourhood.

Despite the prevalence of families and children in the suburbs, their particular needs and journey patterns have often been neglected. Suburbs are often set up to facilitate car use and getting commuters from A to B in the hub and spoke model, as opposed to providing a finer grid network which would facilitate safe, easy movements around and between suburbs 'with as much funding, importance and care given to those journeys made by children going to school...as adults going to work'¹¹.



Children cycling from high school, Greater Manchester. Image: Transport for Greater Manchester

The next section explores in more detail how people travel around, between and beyond suburbs.

SUBURBAN TRAVEL TRENDS



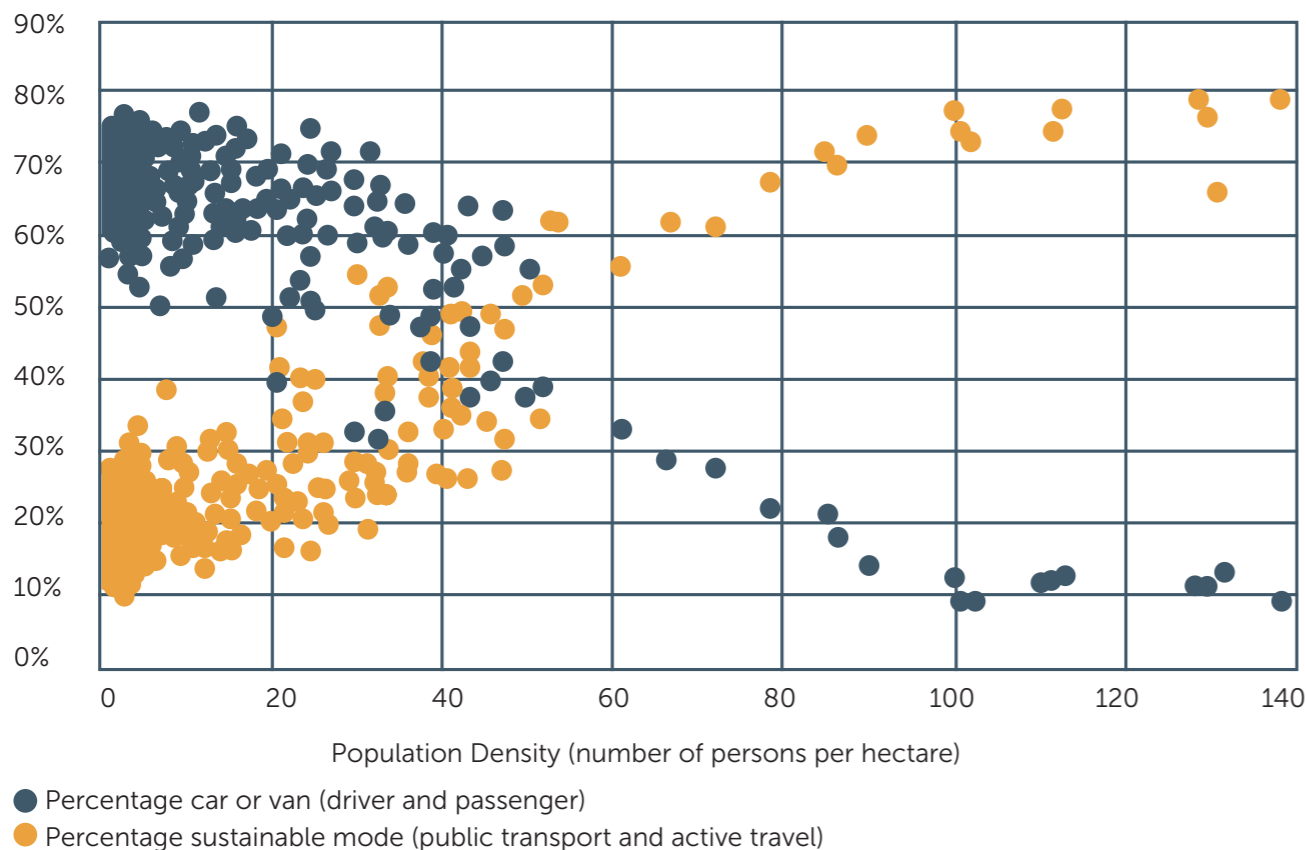
COVID-19 has turned travel trends upside down and it will take time for the pieces to settle into place. It is worth looking, however, at suburban travel trends before the pandemic hit as these can provide important evidence as to the challenges suburbia presents for transport planning and clues as to what might be needed in the future.

According to Centre for Cities analysis, conducted in 2015, just over half of suburban dwellers commute to work by car or van¹². After the car, the bus and walking are the most

common commuting methods (roughly the same proportion of trips, at around 10% each); followed by the train; underground/light rail; cycling; and finally, motorbike/scooter or taxi.

As the chart below shows¹³, the less densely populated a place is, the more likely someone is to drive to work, whereas sustainable transport use goes up as population density rises. This is a reflection of the fact that traditional forms of public transport are less viable at the lower densities often found in suburbs.

MODE CHOICE FOR TRAVEL TO WORK AGAINST POPULATION DENSITY



Despite the apparent dominance of the car in the suburban commute, some 54% of those who do not own a car live in suburbs¹⁴ raising the question of the extent to which these residents are able to access opportunities in suburbs set up to be more car dependent.

Further data on suburban travel trends beyond the commute is less easy to find, but likely to be very significant given the nature of suburbs. Suburbs are the places where most people live, as opposed to simply work and they are also favoured by families with children. As such, many journeys will be hyper local in nature – to and from school, to friends and family living nearby, to the doctors, the supermarket.

These kinds of journeys can be described as the ‘mobility of care’, defined as ‘*all travel resulting from home and caring responsibilities: escorting others; shopping for daily living...; household maintenance, organisation, and administrative errands...; visits to take care of sick or older relatives... etc.*’¹⁵

Counted together, these mobility of care journeys have been shown to closely rival or even exceed commuting as the most common journey purpose. Commuting accounted for 15% of all journeys in England in 2018/19, whilst escort journeys (including education escort) accounted for a fractionally higher share of trips. The most common journey purpose is shopping.

Women report less commuting than men and more escort journeys, a key feature of the mobility of care. If we group potential mobility of care journeys together (escort journeys plus shopping) we see that these account for 37% of women’s trips and 30% of men’s.

PERCENTAGE OF TRIPS PER PERSON, PER YEAR BY JOURNEY PURPOSE – ENGLAND 2019¹⁶

Journey purpose	% of trips (ALL)	% of trips (Males)	% of trips (Females)
Shopping	19	18	20
Escort journeys	15	12	17
Commuting	15	18	12
Visiting friends	14	13	14
Sports/entertainment/holidays/days out	12	13	12
Personal business	9	9	9
Education	7	8	6
Other (including just walk)	6	6	7
Business	3	3	3
TOTAL	100	100	100
Mobility of care (shopping + escort journeys)	34	30	37

Mobility of care trips will often be more complex (involving trip chaining), relatively local in nature and tend to be undertaken by women who, in turn, are less likely to have access to a car and will need to rely on walking, cycling or public transport. However, mobility of care trips are rarely grouped together in statistics and are

often not counted at all¹⁷. Their lack of collective visibility in transport statistics means that too often, the network is not set up to support these kinds of trips within or between suburbs or as part of longer trip chains (e.g. school run plus commute).



Meanwhile, for the children of those families, education journeys take centre stage as the most frequent journey type, followed by other escort journeys and visiting friends¹⁸. As with mobility of care journeys, these trips are likely to take place within, or between, suburbs, rather than in and out of the nearest city. Such journeys can be difficult to undertake independently and sustainably by children without the necessary safe walking, cycling and public transport infrastructure at this very local level.

More research is needed to understand how people travel (or would like to travel) around, between and beyond suburbs, as well as to explore what would enable people to access

more of what they need locally. In the meantime, more consideration needs to be given to enabling non-commuting journeys to be made sustainably in the suburbs whilst maintaining attractive and convenient connections to the nearest towns, cities and employment sites.

The common features of suburbs and their travel patterns give rise to a number of considerations and challenges for transport provision. These are also a product of how suburbs have developed over time.

The next section provides a potted history of suburbs and examines the resulting legacy for transport planning and provision.

A POTTED HISTORY OF THE SUBURBS

3

The exact form a suburb takes, and the degree of service provision and transport infrastructure it benefits from is often a reflection of when it was built and how it evolved.

In many respects, the history of suburbs is also the history of transport. Since the dawn of the Industrial Revolution, developments in transport have enabled people to decouple their paid working lives from their home and family lives. In recent decades however, advances in technology have once again blurred the boundaries between work and home.

THE AGE OF THE TRAIN

The birth of the suburbs as we know them today is inextricably linked to the developments of the Industrial Revolution, beginning in around the mid-eighteenth century – the era of steam, canals, factories and invention.

During the Industrial Revolution, cities became increasingly dirty and even dangerous places. Nonetheless, cities were where the jobs were, and most people had little choice but to live close to where they worked. However, records show that even in the very early years of this period – around 1770 - people were beginning to look for an escape, with eight horse-drawn coaches a day leaving central London to ‘suburban’ locations. At that time suburbs did not have a distinctive character other than being commonly ribbon developments located alongside rivers and roads²⁰.

Suburbs began to take on their own distinct character in the nineteenth century as the railways rapidly expanded and the possibility of living outside of the city became a reality for more people. This was a welcome escape for

many. To planners and reformers ‘suburbs seemed not only healthier and happier places to live, but morally preferable as well. The more people who could be persuaded out of the city to live a safe, orderly and restful family life in the suburbs, so much the better...That idea was common ground for about a century between 1840 and 1939²¹’

The concept of ‘Metroland’ is perhaps the epitome of the ‘good life’ associated with the railway suburbs, with the growing Metropolitan Railway acting as the catalyst for the development of suburbs around North West London. Metroland promised the dream of a new home in the countryside within easy reach of London by rail.



Metroland booklet cover, promoting housing in the area served by the railway, 1921

During this period, other suburbs also grew up around mills and factories on city outskirts across the country, whilst other employers chose to locate close to existing or planned

suburbs for a ready supply of workers²². The pictures below show some examples of suburbs that grew up around factories.



Port Sunlight, model village and suburb on Merseyside, built to accommodate soap factory workers, begun in 1888 *Image: Ian Peticrew*



Terraced housing and industrial units in Gipsyville, a suburb of Hull. Industrial and housing development began simultaneously at the turn of the twentieth century. A canister works and black lead factory were among the first employers in the suburb. L: an alleyway connecting terraced streets. R: a nearby disused fish factory smokehouse in the midst of housing. *Images: L: Paul Harrop. R: Paul Glazzard*

To this day, pre-1939 suburbs often have good public transport options within walking distance²³, reflecting their roots in the days before mass car ownership.

That said, these places face their own transport challenges reflecting their history. They may have no, or limited space, for off-road parking, meaning street space is dominated by parked cars, making walking, cycling and wheeling less attractive.

A lack of off-road parking also makes electric vehicle charging more of a challenge and limits space available on street for other uses. In city centres, it is perhaps easier to replace on-street car parking spaces with parklets or shared mobility hire points than it is in residential suburbs, where cars spend most of their time.

THE CAR IS KING

During the inter-war period, especially the 1930s, there was a boom in housebuilding with new suburban semis served by railways but also, increasingly by new arterial roads²⁴ as car ownership began to grow. After the Second World War, there was further mass housebuilding with many people taking the opportunity to move out of bombed, scarred and polluted cities²⁵.

The escape from the city continued through the 1950s, 60s, 70s and 80s with inner city living associated with poverty and deprivation. Throughout the period, new and expanding suburbs were frequently designed around booming car ownership, a legacy that continues to cause difficulties for mobility in and around suburbs today.

Research published in 2021 found that less than half (40%) of suburban dwellers living on the outskirts of Britain's biggest cities outside London can reach their nearest city centre within 30 minutes by public transport²⁶.

Meanwhile, car dependent suburbs have changed the experience of childhood and opportunities for children to move and play independently. The traffic generated and the

space taken up by cars confines children to home, private gardens or designated play areas, limiting their opportunities to 'play out' and their scope to roam and explore their local area independently as previous generations have done²⁷.

THE RISE OF CITY CENTRE LIVING AND THE SUBURBANISATION OF POVERTY

From around the 1990s and into the 2000s, suburbs – despite continuing to be where most people lived – fell out of fashion. Cities outside London were beginning to thrive once more and city centre living, previously the preserve of those with little other choice, became desirable as riverside wharfs were regenerated and new city centre apartments sprang up. Outside London between the 2001 and 2011 Census, the population of city centres grew by 37% (albeit from a low base), whilst suburban populations rose by just 8%²⁸.

Policy also reflected this shift, with the concept of 'city regions' placing 'core cities' like Leeds, Manchester and Birmingham centre stage as the economic drivers of the surrounding subregion.

The renaissance in city living saw lower income households pushed out of inner cities and into suburbs where housing was more affordable²⁹. Research by the Smith Institute³⁰ found that most people in poverty (57%) now live in suburban areas. The same research found that between 2001 and 2011, the number of suburban areas with above average levels of poverty rose by 34%.

Looking at eight English cities in particular, they found that poverty worsened most in suburban areas furthest away from the city centre. These trends have been cited as evidence for the 'suburbanisation of poverty' representing a reversal of the original impetus for the creation of suburbs as places of escape from inner city deprivation. Suburban poverty poses particular challenges for transport given that, because of their histories, many suburbs are poorly served by public transport.

SUBURBAN SPRAWL?

In recent years, UK governments have been anxious to get new homes built. Between 2011 and 2019, around 803,000 new homes were built in or around cities and large towns, the majority of which (734,000) in areas that can be defined as suburbs³¹. That said, these new homes are not evenly distributed. Analysis suggests that a handful of suburban neighbourhoods account for a large share of new builds – 4% of suburban neighbourhoods supplied 45% of new suburban homes between 2011 and 2019³². Meanwhile, over a fifth of suburbs have seen no new houses over the period, and half have built less than one home a year.

Prime Minister Boris Johnson pledged to increase housebuilding to 300,000 new homes a year in England by the mid-2020s³³. By early 2020, 247,000 more houses were being built in England and Wales every year than were demolished³⁴.

Local authorities face additional challenges to facilitate the delivery of these new homes given public transport limitations and the lack of readily available land in close proximity to employment and services³⁵. Existing suburbs are also under increasing pressure to grow, with services and transport infrastructure struggling to keep pace.

Research published by Transport for New Homes in 2018 found that new residential developments continue to be built without

adequate consideration for public transport and active travel access as well as failing to provide local services, thereby perpetuating car-based living³⁶.

Their research of over a hundred urban extensions and greenfield new housing estates of up to ten years old revealed that transport infrastructure investment was dominated by providing added road capacity. Bus infrastructure was rarely given significant funding and only one new rail station was delivered. New developments were often built in isolation from existing suburbs and urban areas, failing to capitalise on the potential to connect up with existing public transport, walking and cycling infrastructure. On the estates themselves, the public realm was dominated by road access and parking.

Designing for the car and giving priority to vehicle movement, access and parking also means *'less attention has been paid to the place function of streets and human movement through them, resulting in (for example) narrow footpaths, inadequate street lighting and fragmented cycle lanes'*³⁷. These factors disproportionately affect the mobility of women³⁸ and people on a low income who are more likely than men and people on higher incomes to walk or use public transport for their everyday journeys. Estates designed around the car also often lack permeability – they may, for example, feature multiple cul-de-sacs, making public transport provision difficult.



The car is still king in these new build suburban developments in Chapelford, Warrington and Bicester, Oxfordshire. Images: Transport for New Homes

2020: RESURGENT SUBURBS?

In 2020, with the COVID-19 pandemic, the world stood still. Many industries were shut down or mothballed, their staff furloughed or working from home. In the early days, only key workers were allowed to travel to work.

Amongst the impacts of COVID-19 restrictions was what has been described as 'zoomshock' – the change in the location of economic activity that took place as large numbers of people suddenly switched to working from home, leading to a redistribution of activities from urban city centres to residential suburbs³⁹.

Zoomshock effects were unevenly distributed. Research found substantial variation even between adjacent neighbourhoods due to clustering of job types by neighbourhood and which of these could be done at home. Potential remote workers were more likely to live in wealthier neighbourhoods.

However, it is possible to overstate the impact of

'zoomshock'. No evidence has been found, for example, of a so-called 'zoomshock dividend' for suburban businesses⁴⁰. In terms of demand for local shops and services, suburbs of cities with high levels of remote working actually performed less well than those with low levels of remote working.

The reasons for this are thought to be that suburban high streets have always catered to a local audience and sold more essential goods (and therefore less affected by restrictions on opening).

Furthermore, as explored earlier in this report, the image of the suburban dormitory has never been entirely accurate – the suburbs have always been a site of work (whether paid or unpaid) and many suburban residents will have continued to travel for work throughout the pandemic. Indeed, Centre for Cities estimates that people able to work from home are in the minority in every UK town and city⁴¹. Research by CIPD found that 44% of employees did not work from home at all during the pandemic⁴².



Suburban home in Roundhay, Leeds during the first COVID lockdown Image: Dan Burton, Unsplash

Whilst the evidence for zoomshock effects is uncertain, remote and hybrid working is undoubtedly more widespread and accepted than ever before, a trend that could prove very useful in supporting more local, less carbon intensive lifestyles. As at March 2022, some two years on from the first lockdown, 12% of people reported exclusively working from home in the last seven days, whilst 14% took a hybrid approach, combining working from home and travelling to work. This is a striking shift, given that pre-pandemic, just 5% of Britons regularly worked from home⁴⁴.

More time spent at home also caused people to look at suburbs with fresh eyes. With many confined to quarters or severely constrained in their mobility, suburbs took on a new meaning and significance in people's lives. Even city

dwellers began to see the appeal of more generous homes (including space to work and home-school), private gardens, public green space and community.

During the first lockdown, there were numerous reports of people enjoying the quieter roads, better air quality and hidden gems on their own doorsteps. Proximity to a park or significant green space (within a five-minute walk) was found to be the strongest predictor of satisfaction with neighbourhoods during lockdown, closely followed by shops and services within easy (preferably five-minute) reach⁴⁵. The same research found that people also valued less trafficked streets, good walking and cycling routes from home and wider pavements.



Less traffic during the lockdowns saw children begin to reclaim the streets for play.

Image: Peter Burdon, Unsplash

WHAT'S NEXT FOR SUBURBS?

Reflecting their varied histories and evolution, suburbs vary greatly in their degree of access to public transport; the extent and quality of walking and cycling infrastructure; the availability of local jobs, shops, services and facilities; and the quality and quantity of public realm and open space. Accordingly, the exact nature of their transport challenges will differ.

However, the common features of suburbs identified earlier in this paper, together with an understanding of their history can help in exploring what suburbs could look like in the future and how some of the challenges they face might be tackled.

The next section looks what role transport could play in shaping suburbs for a new and sustainable era.



Image: Transport for Greater Manchester

SUBURBS FOR A NEW ERA

4

The fallout from the COVID-19 pandemic gives cause to reflect on how we think about, and plan transport for, the suburbs. Frequently drowned out on either side by the powerful voices of the city and of the countryside, the pandemic has shown us how much suburbs matter to people. How suburbs still have the potential to improve quality of life, to offer the best of both worlds between town and country.

Suburbs must also urgently play their part in tackling the climate emergency and that means finding ways to dramatically cut car dependence and ensure that all suburban residents have the opportunity to access more of what they need locally as well as have a range of sustainable transport options to choose from.

Transport solutions that work for suburbs must reflect and account for their common features as

identified earlier in this report – interdependence with a large town or city; primarily residential; lower density; favoured by families with children.

At the same time, we know that individual suburbs will find themselves in very different starting positions based on their unique histories and evolution and the extent of their existing assets.

For example, they may differ in respect of:

- The quality and extent of non-car based connections to the nearest town or city
- Extent of built-in car dependency
- Levels of affluence or deprivation
- Location of jobs and extent of remote working
- Extent and quality of local shops, services and amenities
- Quality and extent of walking and cycling provision
- Availability of green space
- Quality of public realm
- Types of housing

These factors may even vary within a suburb, from neighbourhood to neighbourhood. Given these factors, a one-size fits all approach to suburban mobility solutions is not appropriate, however, it is possible to set out some common foundations that suburbs – old and new – should aspire to.

Suburbs for a new era should:

1. Help people to access more of what they need locally
2. Provide family-friendly sustainable transport choices
3. Prioritise gentle densification around sustainable transport infrastructure
4. Provide reliable, convenient connections to the nearest town or city and key employment sites

The following sections explore each of these foundations and provide examples (as opposed to a comprehensive list) of ways in which these could be supported, focusing in particular on new and emerging approaches.



Image: Sustrans

FOUNDATION ONE: HELP PEOPLE TO ACCESS MORE OF WHAT THEY NEED LOCALLY

Transport is responsible for the largest share of domestic greenhouse gas emissions, at 27% in 2019, with 91% of this from road transport⁴⁶. By law, the UK's emissions must reach net zero by 2050⁴⁷.

The most effective way to cut transport emissions is to avoid making an emissions-generating journey in the first place. To do this, people need to be able to access more of what they need as locally as possible. The way we plan and evolve our suburbs and their transport options will have a pivotal role in determining whether people will be able to live more sustainably.

Below are some ideas for how suburban communities can be enabled to get more of what they need within walking and cycling distance.

AFFORDABLE DIGITAL CONNECTIVITY AND SKILLS

Improving digital connectivity is a key component in reducing the need to travel. As the pandemic has highlighted, it enables people to work, learn, shop and access services (such as doctor's appointments) from home.

However, some suburban neighbourhoods, particularly those with higher levels of deprivation, struggle to access affordable internet

connectivity. The Big Local funding programme, set up with a National Lottery endowment to support deprived, 'left behind' communities found that many of its target areas suffered from poor access to local job markets and other services, such as health and education. This was often due, not only to poor public transport connections, but also to poor digital connectivity⁴⁸.

According to the Local Government Association (LGA), digital exclusion is more likely to be faced by those on low incomes as well as people over 65 and disabled people⁴⁹. This is an important issue for suburbs, given that the majority of people in poverty now live in suburban areas and that the cost of living crisis could see many more people struggling to make ends meet.

The LGA found that when the pandemic hit in March 2020, only 51% of households earning between £6,000 to £10,000 had home internet access, compared with 99% of those households with an income of over £40,000. Even with access, they found that poorer households were less likely to have the digital skills necessary to fully utilise it. This makes it more likely that poorer households will have to travel to access essential goods and services rather than access these online.

Case study: Digital Inclusion Programme⁵¹

The LGA Digital Inclusion Programme has supported ten councils to work with specific cohorts of residents who lack the skills, confidence or infrastructure to go online.

The programme has worked in neighbourhoods offering, for example: digital training; recycled laptops; tablets to borrow;

home visits from IT buddies; and installation of fixed access iPads in sheltered housing.

The aim of the scheme is to help people to benefit from the potential for using digital tools and solutions to contribute to improving life outcomes.

The growing importance of digital connectivity has led some to argue for free or affordable internet access to be provided to all as a basic human right, including Sir Tim Berners-Lee (inventor of the world wide web) on the grounds that *'It is knowledge, it is opportunity, it is empowerment. It is critical to life in today's world.'*⁵⁰

SUSTAINABLE SUBURBAN DELIVERIES

Whilst fulfilling more tasks digitally does remove the need for many personal journeys, it may generate those made by others. More online shopping – whether it's the supermarket 'big shop' or an Amazon delivery – still requires journeys to be made to collect or deliver the goods.

In the suburbs, delivery is most likely to involve a van. Encouragingly for the decarbonisation agenda, more of the big delivery companies are using electric, zero emission vehicles to complete their rounds. Whilst this helps to reduce air and noise pollution in our suburbs, those vans still contribute to traffic and more traffic reduces the liveability of neighbourhoods and increases road danger.

It may be that these van deliveries are more efficient than each suburban resident making their own individual car journey to the shops, but we cannot assume that this is always the case. Whilst supermarkets offer 'green' delivery slots, timed to coincide with other deliveries in the area, people might not always take these up, and the on-demand, ad-hoc booking of deliveries may generate an inefficient delivery pattern for the vehicle.

Furthermore, an online shop is almost certainly less efficient than visiting local shops on foot, by bike or by public transport. Ultimately, over reliance on home deliveries may harm the viability of suburban centres, hollowing out local shops and services, leaving places that *'are filled, not with people, but with speeding delivery vehicles'*⁵².

There are, however, options that can improve the sustainability of suburban deliveries. Greater use of parcel lockers, for example, enables delivery drivers to make multiple drops to one location. However, these must be located in places that are easily accessible on foot, by bike or as part of a public transport journey, to avoid people making a dedicated trip by car to reach them.

Another option is to encourage local organisations and businesses to use cargo bikes to deliver to their customers, supporting the environment and the local economy.

Case study: Chorlton Bike Deliveries⁵³

Started to support people and local businesses during the lockdown of 2020, delivering food, medicines and other essential supplies to people's doors, Chorlton Bike Deliveries has continued to provide a cargo bike delivery service to the local community.

The co-op has a commercial and community arm. The commercial arm partners with local retailers to enable them to deliver their products to their customers by bike.

The community arm picks up unsold food from supermarkets and delivers it to local projects and food banks, as well as delivering prepared food from community food schemes to residents who need it.

The service also has a contract with the NHS to pick up samples from surgeries that need to go to the lab, avoiding the use of vans⁵⁴.

In 2021, the delivery bike riders pedalled 10,000 km, saving an estimated 1.9 tonnes of CO₂ compared to car and van deliveries.

For people who are able to do so, greater levels of working from home reduce pollution and congestion as well as the cost and time spent travelling. Whilst the lasting effects of the COVID pandemic on working patterns are yet to fully play out, it has been estimated that up to a quarter of the time office workers were based in urban centres will now be spent in suburbs⁵⁵.

There is the potential now to lock in the benefits of remote working. The Welsh Government has set an ambition for around 30% of the workforce to work from or near home in recognition of the following benefits⁵⁶:

- Less or no commuting and a better work-life balance
- Less congestion, air and noise pollution
- Less traffic meaning more room for cyclists and walkers
- More job opportunities in suburbs and other out of town communities and access to an increased workforce
- Economic and social benefits for local high streets
- Allows disabled people to work in a place that supports their needs
- More job opportunities for people who cannot travel easily

As part of this vision, it is developing a network of 'community-based working hubs'.

Case study: Community-based working hubs – Wales

Recognising that working from home can be lonely for some and impractical for others due to their home environment, the Welsh Government is piloting a network of 'community-based working hubs'. These are office-like environments that are within walking or cycling distance of homes that will allow people to work together in their local community.

The Government used the Commonplace platform to ask the public where they would like to see local work hubs using interactive maps and surveys⁵⁷. Respondents were able to drop pins on the map to show where they would like hubs to be located.

When asked about the most important requirements for choosing a location for a

remote working hub, the top five answers were:

- near home
- near nature and green space
- near shops
- near transport links
- near cycle paths

Many of those responding to the survey had pre-COVID commutes of over fifteen miles, suggesting that a positive impact could be made if these people were enabled to work closer to home.

At the time of writing, around 30 hubs have been established, with a further two open to public sector workers only. Locations range from local libraries to nature reserves.

In a suburban context, hubs could not only reduce the need to travel but also – if located in a suburb's centre (assuming there is one) – give a boost to local businesses, like cafes and shops and contribute to an increased sense of place, community and vibrancy.

Their presence could in turn generate more jobs for the local community and allow still more people to work near home. This could transform

suburban centres that previously only came alive at weekends into places that are busy and populated throughout the week, justifying more amenities and local services.

Streets that are full of life are also more attractive for walking and cycling, which in turn supports the concept of the 15-minute neighbourhood, another useful method of enabling people to access more of what they need locally.

THE 15-MINUTE NEIGHBOURHOOD AS INVESTMENT PLAN

Research has shown that when journeys are short enough, most people will choose to walk. 800m (approximately ten minutes walk) is generally considered walkable, with 20 minutes the longest distance that most people are willing to walk for their everyday needs⁵⁸ (although propensity to walk drops off considerably for journeys of more than ten minutes).

15-minute neighbourhoods are those where work, key amenities, shops and services are within a 15-minute walk or cycle from home, helping to cut motorised journeys.

15-minute neighbourhoods are a good fit for suburbs, which we know are favoured by families with young children. Before they reach the age of being able to use public transport alone, children and young people are constrained in their independent mobility to the places they can safely reach on foot or by bike. They naturally inhabit approximately a 15-20 minute neighbourhood

and it is important that they are able to access a range of amenities and activities within that zone. Indeed, child friendly planning is thought of as having two dimensions – the first is mobility – the ability of children and young people 'to get to spaces and facilities, especially under their own steam'⁵⁹. The second dimension is things to do – 'the number and type of spaces and facilities on offer in a neighbourhood'⁶⁰.

Using the 15-minute neighbourhood concept as an investment plan for suburbs can help address both of these dimensions. For children and adults alike, it illuminates what assets a suburb has and how easy these are to access on foot or by bike. It also highlights what amenities are missing, or what assets need to be better connected, helping to provide a focus for future planning decisions and connecting infrastructure.

Some suburbs will already be well set up to provide more of what people need locally, with a range of shops and services and good walking and cycling links between these.



A busy neighbourhood centre, Greater Manchester. Image: Transport for Greater Manchester

Others may lack any facilities within walking or cycling distance and be almost entirely residential. Some may have a supermarket, for example, but one that is unaffordable to many local residents. Others may have an affordable supermarket that is technically within walking or cycling distance, but

engrained travel habits, or something about its design and setting may deter access using anything other than a car. You may have to walk across a busy road or car park to reach it or there may be nowhere to safely store your bike or cargo-bike while you shop.

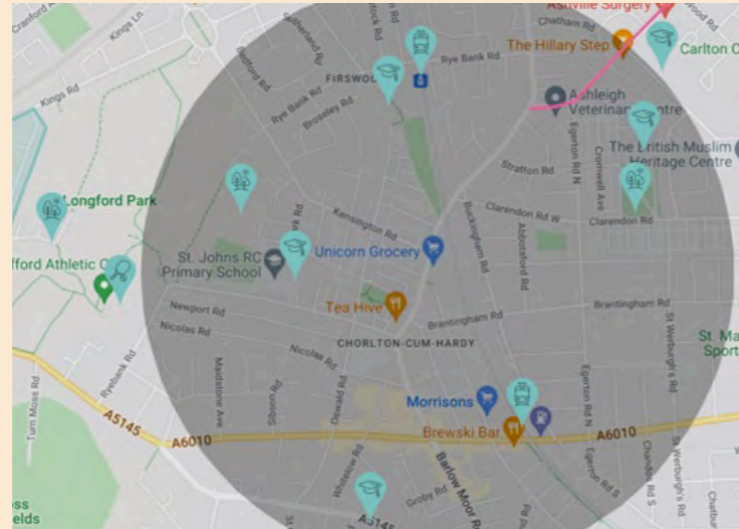
Case study – a tale of two suburbs

Transport for Greater Manchester has created a tool enabling mapping of what, in theory, can be reached within a 15-minute walk of any given postcode⁶¹. The results help to illustrate the stark differences between suburbs in terms of how well set up they are to offer a 15-minute neighbourhood.

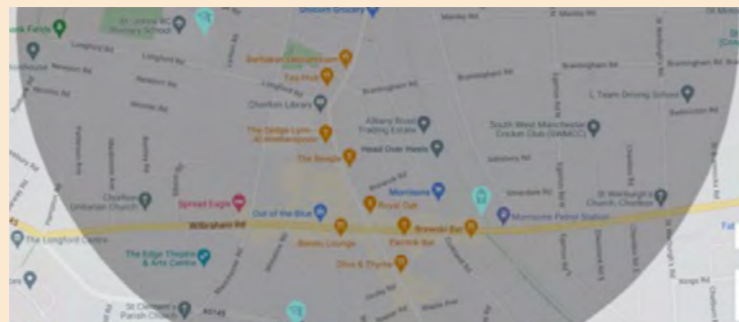
Here, we compare Chorlton-cum-Hardy, a relatively well-off suburb of Manchester and Gipsyville, a suburb of Hull with high levels of deprivation.

Chorlton-cum-Hardy

The overview map of accessibility from the centre of the suburb shows that Chorlton-cum-Hardy is well served in terms of amenities with schools, tram stops, parks and an affordable supermarket within walking distance.

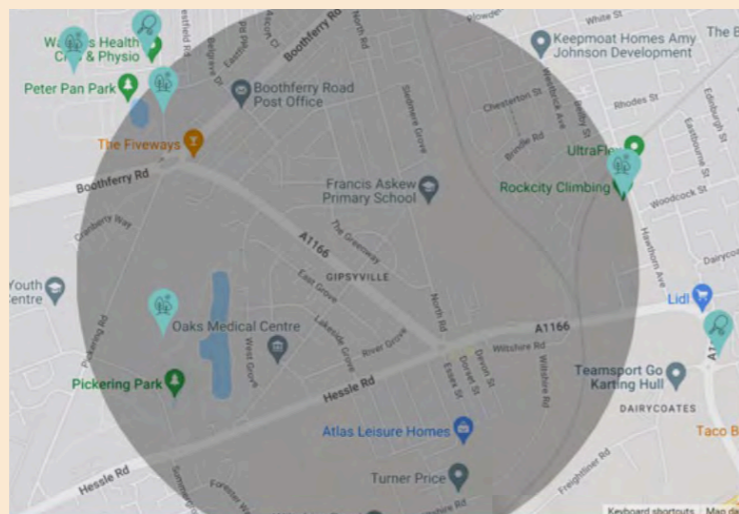


Zooming into the map further reveals cafes, bars, a theatre and arts centre, library and allotments.



Gipsyville, Hull

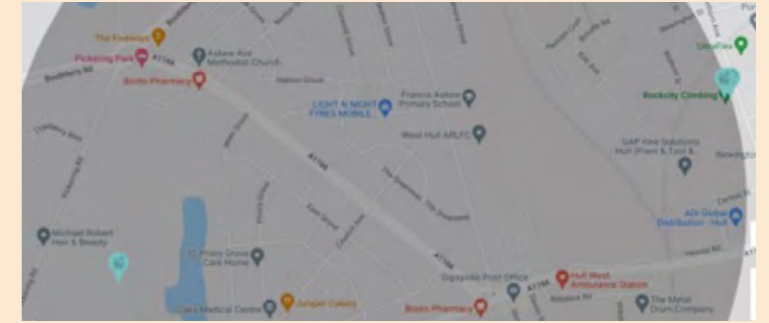
The picture in Gipsyville is sparser, with large areas devoted purely to housing.



However, zooming in, there are parks, a medical centre, community run library, pharmacy, a school and two post offices within the 15-minute walk zone.

On this map the nearest affordable supermarket is just outside the walkable envelope, but in theory, not beyond reach on foot.

However, the supermarket is located along the A1166, a dual carriageway, which does not provide a pleasant walking environment for pedestrians



Snapshot of the walk along the A1166 to reach the supermarket from the direction of the centre of Gipsyville (a pedestrian and a cyclist can be seen on the right).



Approaching the supermarket (on the right).

This is in contrast to the nearest supermarket in Chorlton-cum-Hardy, which is located alongside a more human-scale, residential street (pictured below) and likely to provide a more pleasant, safer and accessible walking experience.



Approach to affordable supermarket – Chorlton-cum-Hardy

The 15-minute neighbourhood will not be instantly applicable or even achievable for every suburb. However, it can be used as an investment strategy⁶², focusing first on the neighbourhoods that need it most⁶³.

Such a strategy would map the existing assets – and potential assets – of neighbourhoods (e.g. parks, under-used buildings, wasteland, healthcare, schools, affordable housing, shops) and their accessibility on foot or by bike (using maps, walking audits and community consultation, for example) and seeking to fill any gaps that emerge in available services or improve walking and cycling connections between communities and local assets.

In doing so, it is important to ensure that the ‘walking envelope’ is measured using the available pavement network, rather than measured as the crow flies – as the case study above illuminates, whilst amenities may be 15 minutes away in theory, in practice, finding a safe and acceptable route could involve a longer journey.

Furthermore, it is worth remembering that distances of 800m or less (10 minutes walk) are most likely to be walked⁶⁴ and that the likelihood of this is in turn affected by the health, topography and demographics of the suburb in question. The likelihood of completing a trip by car begins to climb when walking distances exceed 10 minutes.

Creating neighbourhoods where more amenities can easily be reached on foot will require partnership working with planning departments to support gentle densification around existing assets (explored later in this report); prioritising planning permissions for the most needed assets; supporting unused or under-used buildings to be bought back into use; as well as enable buildings and spaces to fulfil a range of different purposes.

MAKE THE MOST OF EXISTING SPACES AND PLACES

Making the most of a suburb’s existing assets is an important step towards creating more 15-minute neighbourhoods. Many suburbs, for example, lack ‘spaces to gather’ – which could be places to work remotely; to play; to hold meetings; provide health drop-in sessions; exercise; deliver groups, clubs or classes; run a community shop; or offer space for a coffee and chat.

Identifying existing, or providing new, flexible buildings and outdoor spaces in suburbs that could fulfil any number of these purposes and more could play a big part in helping people to live more locally.

Case study: Flexible office space in a suburban supermarket⁶⁵

Flexible office space operator IWG is testing a 3,800 square foot flexible working area within a suburban Tesco supermarket, with room for 12 private desks, 30 co-working spaces and a meeting room.

Offering communities the chance to work flexibly from their local supermarket, the plan makes use of unused space in-store which was previously used to sell electrical goods, films and music, and are now largely bought online. If successful, the venture could be rolled out to more stores.

Explaining the move, the Chief Executive of IWG is quoted as saying *“People don’t want to spend hours commuting every day and instead want to live and work in their local communities. A Tesco Extra in a suburban location, in the middle of a vibrant local community, is the perfect location for flexible office space.”*

Case study: Use of school facilities out of hours

According to ukactive, school playing fields, halls and courts make up 39% of community sport facilities in England⁶⁶. They see potential for these to be used outside of school hours (particularly in the school holidays) to give children and young people more opportunities to engage in physical activity in a safe space that is close to where they live. On average children live within 2.4 miles of their local school⁶⁷ and many of these will be in suburban areas which may have limited sports facilities.

Together with Nike, they have developed ‘Open Doors’ a model for ‘unlocking the sports facilities on the doorstep of every community’. Making use of these facilities is particularly relevant given the continued decline in the number of youth centres and youth workers present in communities. It offers the opportunity for children and young people to access more of what they need locally, and is particularly beneficial for those on the lowest incomes who do not have the resources to travel further afield.

The ability of assets to shift purposes throughout the day and evening and on different days of the week enables the community to make the best use of limited space and adds to the busyness and vibrancy of a place.

Outdoor spaces to gather which fulfil multiple purposes are also valuable – a patch of wasteland could transform into a play area, wildlife meadow, space for an exercise class, a community food growing patch or host a pop-up market or fete, providing more to do locally, without needing to travel. These uses also help to build a sense of community and identity for the area.

Outdoor spaces to gather which fulfil multiple



Case study: Garden streets

Architects Foster and Partners⁶⁸ have called for more public green spaces in residential areas, opening up access to the outside to more people, rather than privatising space in the form of gardens attached to homes or handing it over to parked cars.

They describe ‘garden streets’ where

residential neighbourhoods become miniature green belts so that everyone can access green, social space on their doorsteps. They propose centralised bin collection (as in some European cities) to free up further space, as well as restricting car parking and through traffic to encourage walking, cycling and play.

The picture below shows an example of a residential neighbourhood in Copenhagen that provides many of the qualities of a garden street. The street is tree-lined and free from moving or parked cars (although a child’s red and yellow toy car can be seen traversing the street in the

distance), centralised bins set apart from the street free up additional space. It is also notable that the street has a higher density of homes with more of a mid-rise built form compared to the lower densities found in a typical UK suburb.



A residential neighbourhood in Copenhagen. Image: Jonathan Bray

When we reclaim space from cars we gain the opportunity to use the space on residential streets differently, providing more of what people need closer to home. We can create places to gather and play. Walking and cycling become easier and

safer. Low traffic neighbourhoods help to create these kinds of streets.

The next chapter looks at these and other family-friendly sustainable transport options that are suited to suburban neighbourhoods.

FOUNDATION TWO: PROVIDE FAMILY-FRIENDLY SUSTAINABLE TRANSPORT CHOICES

We know that suburbs are most likely to house families with children. The measures outlined above to facilitate more local living will go a long way to support those households, particularly their youngest members.

Family-friendly transport choices and sustainable transport choices go hand-in hand – what is good for one is also good for the other. Children’s mobility and outdoor play expert Tim Gill argues that ‘Child-friendliness brings a human face to urban sustainability. It reveals the close links between making places better for children and making them better for the planet.’⁶⁹

He continues: ‘child-friendly neighbourhoods look and feel a lot like sustainable neighbourhoods. They are light in traffic. They have plenty of trees for shade, and easily accessible, green, public open spaces...They are free from harmful pollutants in the air, on land and in water. The services, shops and facilities that families need every day are close at hand, and easy to get to on foot and by bicycle, with good public transport connections to those destinations that are further away and less essential.’⁷⁰



An example of a child-friendly residential neighbourhood in Copenhagen – car-free streets allow for walking, play and cycle storage. Image: Jonathan Bray

To make a suburb child-friendly is to make it better for everyone, better for health and wellbeing and better for the planet. In the longer-term, if children grow up in places where walking, cycling and public transport are the obvious and easy ways to get around, they are likely to keep up those sustainable travel habits in the future. As the places where most children live in the UK, suburbs provide an ideal opportunity to embed those habits.

That said, we must also recognise that the car will continue to have a role to play in suburban transport for the foreseeable future. The challenge is to provide all suburban households with the opportunity to let go of their car or at least go 'car-lite' and reduce their dependence on it through greater use of other options, including car-share. Or, if they decide to own a car, find ways to reduce the impacts of that both on the planet and on the liveability of the neighbourhood (see foundation 4).

Below are a range of ideas for how suburbs can provide a range of sustainable transport choices for all whilst also ensuring that those choices are family-friendly.

LOW TRAFFIC NEIGHBOURHOODS

Low Traffic Neighbourhoods (LTNs) also known as liveable neighbourhoods, active neighbourhoods or high activity streets⁷¹ make it easier for people to safely make journeys around their suburb on foot or by bike rather than choosing the car.

LTNs reduce motor vehicle traffic in residential streets by removing through-traffic (or rat-runs) using temporary or permanent barriers called 'modal filters' (e.g. bollards, planters, cameras, bus gates, one-way streets)⁷². Residents and businesses can still use motor vehicles to access the street, but through-traffic is greatly reduced.



Image: Matt Seymour, Unsplash

LTNs facilitate the kinds of short, local trips and trip chaining that we know are a key feature of suburban travel patterns, and particularly the travel patterns of families and women within those families. According to research⁷³, women and children are far less willing to cycle when mixing with traffic is required – 'In other words, women and children need low traffic residential streets, to enable them to cycle from their homes to the places they need to get to.'⁷⁴

A network of LTNs in a suburb (or even between suburbs) would support mobility of care journeys as well as greater independent mobility for children and young people. In reducing traffic, they also free up more places to play, gather, grow and exercise.

A LTN makes it more likely that local journeys – by people of all ages – will be made on foot or by bike, rather than by car.

The modal filters needed for a LTN are relatively cheap to implement (measures could be as simple as placing some large planters to block off one end of the street), making them a good option for suburbs that may not necessarily have the critical mass needed to justify more major changes to road layout and infrastructure – such as dedicated bike lanes. GIS mapping software can be used to identify which residential roads could be filtered and which cannot⁷⁵.



A simple modal filter in Greater Manchester. Image: Transport for Greater Manchester

Case study: 'Mini-Holland' LTN – Waltham Forest

The aim of Waltham Forest's Mini-Holland project was to get more people in the London suburb walking and cycling and reduce car-dependency. The scheme included traffic calming, blocking rat-runs and improving walking and cycling provision.

The council initially faced opposition, particularly from drivers and lobby groups culminating in protests at the town hall and a 6,000 signature petition against the scheme⁷⁶.

To manage this, they conducted research⁷⁷ to understand what businesses and visitors thought would improve the area. This allowed them to spot and challenge assumptions – for example, businesses thought that visitors would value better car parking the most, whereas the top priorities for visitors were actually better pedestrian crossings, less traffic, protected cycle lanes and better pedestrian signage. They also engaged with over 15,000 residents as they planned the scheme, taking an open and responsive approach to build trust and buy-in.

The scheme is now well established and achieving results. After one year, people in the area were on average walking and cycling for 41 minutes a week more than those in comparable areas. Motor traffic levels fell by over half inside the residential area and by 16%

After (2022)



Francis Road, Leyton, Waltham Forest. Images by Dan Kelly @deekinstow via Twitter

when including the main roads surrounding it⁷⁹.

Below are before and after pictures of one of the streets given the 'Mini-Holland' treatment. The local shopping parade had previously suffered from high levels of rat-running and was dominated by car parking⁸⁰. The after pictures show the same portion of street transformed into a place where young and old are free to cycle and scoot and where parked cars make way for trees and pavement cafes.

Before (2016)



Francis Road, Leyton, Waltham Forest. Image: Google Street View

The challenge for implementing more LTNs is a political one, as the above project demonstrates. They can often face strong opposition from a vocal minority or from residents of neighbouring streets who fear the traffic will be redirected to theirs. However, with continuing engagement and perseverance, evidence suggests that, once in place, LTNs do work and are popular with residents⁸¹.

Engaging with, and amplifying the voices of children can help to build support for these kinds of measures, adding a sense of moral imperative:

*'Highlighting children's perspectives and views can open up crucial debate about vision and values, and focus attention on more long-term, collective goals and outcomes...It may help build up support, overcome resistance and counterbalance vested interests, which could be particularly valuable with controversial proposals, such as schemes to manage traffic or car parking.'*⁸²

SCHOOL STREETS

Implementing School Streets is a way to make safe walking, cycling and scooting to school an option for more families, helping to cut congestion and road danger. A School Street is defined as 'a road outside a school with a temporary restriction on motorised traffic at school drop-off and pick-up times. The restriction applies to school traffic and through traffic.'⁸³

School run related traffic accounts for a quarter of cars on the road⁸⁴. In London alone, it adds 254,000 vehicles to the roads a day⁸⁵. A significant proportion of this traffic will be in suburban locations, contributing to a vicious cycle where parents do not feel safe to allow their children to travel to school independently.

At the time of writing, there are at least 285 School Streets known to be in action in England and around 18 in Scotland⁸⁶. Research led by Edinburgh Napier University⁸⁷ found that School Streets help lower congestion, improve air quality and boost the number of children walking, cycling and scooting to school each day.



A School Street on Windermere Road, Leigh, Greater Manchester. Image: Transport for Greater Manchester.

Case study: Leeds School Streets map⁸⁸

Leeds City Council has created a map of its School Streets using GIS. For each school implementing a School Street, the map shows which roads are restricted;

an alternative parking spot and 'park and stride' route; and a 400 and 500 metre buffer to help visualise journey distances from surrounding homes to school.

MOBILITY HUBS

CoMoUK define mobility hubs as ‘highly visible, safe and accessible spaces where public, shared and active travel modes are co-located alongside improvements to the public realm and, where relevant, enhanced community facilities.’⁸⁹

When brought to the suburbs, mobility hubs

essentially place a range of convenient transport choices together on people’s doorsteps, supporting low car lifestyles. Convenience is enhanced still further where these modes are accessible via an integrated payment system or a single mobility as a service (MaaS) app, allowing instant access and seamless transition between modes.

Case study: mobility hubs and MaaS in Berlin’s suburbs

Berlin’s municipal public transport authority, BVG, has been installing mobility hubs across the city and its suburbs, complemented by the city’s mobility app ‘Jelbi’.

Jelbi allows users to book public transport tickets as well as over 40,000 shared vehicles including bikes, cars and e-scooters. It is the biggest MaaS platform globally⁹⁰.



Jelbi app. Image: Andreas Süß

Large Jelbi stations are located at S-Bahn (railway) and subway stations and offer hire, return and charging of cars, bikes and scooters, as well as offering stops for taxis and on-demand shuttles. There are also smaller Jelbi points, just for vehicles with two wheels.



A Jelbi station including e-car share and charging. Image: BVG Elke Stamm



A Jelbi point incorporating a parcel locker. Image: BVG Julia Roitsch

Jelbi hubs are expanding across suburbs in Berlin, providing residents with a range of transport choices on their doorsteps and enabling them to make first and last mile connections to the main bus and subway network.

The scheme demonstrates the city authority’s desire to connect suburban areas, including those with fewer public transport stops, to the wider sustainable mobility network.

Becoming increasingly commonplace in many European and North American cities, mobility hubs are now beginning to appear in the UK. Mobility hubs are scalable – they can be shrunk down into mini hubs or scaled up to serve particularly significant points on the wider transport network.

Significantly for suburbs, they can provide sustainable first and last mile connections to feed into the core public transport corridors which may not otherwise serve a suburb directly. They can

also facilitate more journeys within and between suburbs, outside of main commuter routes.

They could offer electric vehicle charging bays which could assist those who do not have the capacity to charge off-road at home (e.g. residents of terraces or flats). Secure cycle parking could also be offered, as well as pick-up and drop-off points for demand responsive transport and parcel lockers. Accompanying urban realm improvements could include traffic calming, parklets and community exercise equipment⁹¹.

Case study: Mobility hubs – a kit of parts⁹²

Research by Transport for West Midlands (TfWM) has found that only 15% of journeys made across its patch are into city centres, and yet it is these journeys that are best served by the public transport network.

They see mobility hubs as a way to serve some of the other 85% of journeys, ‘putting choice on people’s doorstep’ and, in doing so, rivalling the convenience of the car in the drive.

They specified eight core attributes for hubs – that hubs must be: accessible; modular; moveable; secure; temporary; COVID-conscious; weather proof and durable.

The modular, moveable and temporary elements are particularly interesting in a suburban context given they offer the potential to scale hubs up or down depending on demand, as well as to experiment with optimum locations and mixes of provision.

TfWM designed a kit of modular units that can be used in a range of combinations to allow for maximum flexibility.

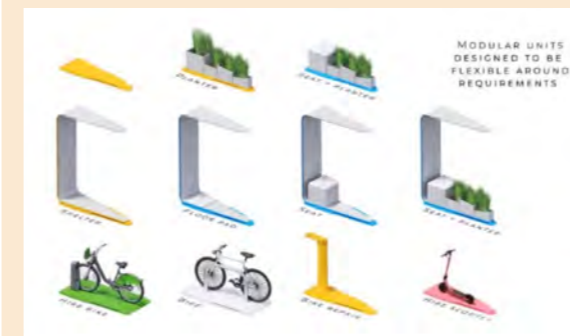


Image: Transport for West Midlands

The picture below illustrates how the parts can be used at different scales to provide different levels of service depending on the local context.



Image: Transport for West Midlands

The pictures below show what the parts look like when assembled as a prototype. The hubs are now in the process of being trialled across the city region’s neighbourhoods and local centres⁹³.



Image: West Midlands Combined Authority

E-CARGO BIKES

As well as their potential to support more sustainable suburban deliveries (see previous chapter), greater access to e-cargo bikes could also support more suburban families to cut their car use. With electric assist, these vehicles can carry up to 300kg – anything from a supermarket shop to children on the school run – without the

need for high levels of physical fitness. Indeed, analysis suggests that e-cargo bikes could replace the car for 77% of 'private logistics trips' (shopping, leisure, child transport)⁹⁴.

Roll-out of e-cargo bike sharing schemes in suburbs could give more families the confidence to try out the technology before – or instead of – buying their own vehicle.

Case study: Greater Manchester eHUBS project

In a UK first, e-cargo bike hire is offered as part of Manchester's eHUBS project⁹⁵. The eHUBS project recognises that around a third of households in Greater Manchester do not have a car and still more share access to a car with another member of their household or wish to cut down their private car use.

The eHUBS trial aims to provide an alternative to private car use, offering innovative electric alternatives to help people make more sustainable travel choices. The hubs offer a range of ways to hire e-cargo bikes and electric car club vehicles.

As part of the trial, 25 e-cargo bikes are available to hire in the suburbs of Chorlton, Whalley Range and Ancoats at a cost of £3.50 per hour. Their range on a full battery is around 62 miles. The booking app shows where nearby available bikes are, how much battery they have remaining and how many miles of travel that will allow.

The bikes are designed to encourage use by families. The bikes come equipped with seat belts for children and some have a Maxi-Cosi car seat holder for babies (identified via the app)⁹⁶. Free one-to-one training sessions are also offered to help people ride confidently⁹⁷.

The bike stands do not require charging infrastructure, and instead use battery swap⁹⁸.



Image: Transport for Greater Manchester

FOUNDATION THREE: PRIORITISE GENTLE DENSIFICATION AROUND SUSTAINABLE TRANSPORT INFRASTRUCTURE

Gentle densification of suburbs along existing transport corridors can help to build up the critical mass needed to justify more comprehensive conventional public transport provision as well as new solutions such as larger shared mobility hubs.

It can also support the creation of 15-minute neighbourhoods if densification efforts are focused around existing services and amenities – people need places to walk to: *'developments can have tree-lined pavements, dropped kerbs and safe crossings, but if they're not near shops, schools, and services for everyday trips, people don't have much of a reason – or option – to walk.'*⁹⁹

Densification should be gentle, to retain the character and appeal of suburbs. This may involve changes to the built form of new and existing developments as well as a focus on development around new or existing transport infrastructure.

CHANGES TO THE BUILT FORM

As explored earlier in this report, UK suburbs are typically low-rise, low-density in their built form compared to their European counterparts. As Centre for Cities note, *'reliance on terraced and semi-detached housing means there are fewer people living close to city centres'*¹⁰⁰ with the result that the provision of high-quality public transport networks connecting suburbs cannot always be justified. Furthermore, low densities make the local provision of shops, services and amenities less viable, undermining efforts to support 15-minute neighbourhoods.

Among the measures to address this, Centre for Cities suggest reform is needed to the planning system to make it easier to build mid-rise new neighbourhoods in well-connected suburbs as well as to support transit orientated development (see next section of this chapter for more details).

The Centre for London has also highlighted the case for gentle or 'Goldilocks' suburban development – not too high and not too low, not too dense but dense enough in order to meet growing demand for housing as well as make it *'easier to support public transport and sustain lively high streets, town centres and community infrastructure, and the jobs and social networks they can bring.'*¹⁰¹

Higher densities need not detract from liveable, human scale neighbourhoods, as this picture from a residential area of Eindhoven in the Netherlands illustrates. There are a mix of building heights, built close together complemented by sociable, car-free space to gather and play.



Residential neighbourhood in Eindhoven, Netherlands. Image: Jonathan Bray

Whilst it is perhaps easier to add in higher densities in suburban new-build extensions, suburbs could also gently densify through infill development on small brownfield sites, adding layers to existing buildings or through re-purposing existing empty or under-used buildings. Where possible, densification should be planned around new or existing sustainable transport infrastructure.

TRANSIT ORIENTATED DEVELOPMENT

Transit orientated development (TOD) seeks to place access to walking, cycling and public transport front and centre in new residential and commercial developments, whether by focusing development around existing transport infrastructure; planning new development and accompanying transport infrastructure in tandem or; using new transport infrastructure to unlock development sites in the surrounding area.

In doing so, TOD seeks to¹⁰² :

- minimise the need to own and use private cars
- improve physical and mental health through the promotion of active travel and the creation of attractive and sociable spaces
- create the critical mass needed to sustain public transport services
- reduce congestion, improve air quality and cut carbon emissions
- help to meet housing demand without the kind of sprawl or loss of greenbelt that car dependent developments facilitate

TOD is well suited to help suburbs grow sustainably, indeed, the establishment of some of the earliest suburbs was facilitated by the growing reach of the rail network, as discussed earlier in this report.

Focusing expansion around existing or new sustainable transport infrastructure can support suburbs to gently densify, build critical mass for transport services and reduce the need for suburban residents to use private cars regularly.

Case study: Kirkstall Forge, West Yorkshire¹⁰³

Kirkstall Forge is an expansion to the popular Leeds suburb of Kirkstall. Situated on a brownfield site adjacent to an existing railway line, it features a brand-new station, connecting residents to Leeds in six minutes and Bradford in 15 minutes.

On completion it will also offer 1,050 new homes, 300,000 square feet of office space and 100,000 square feet of retail, leisure and community facilities, including a school. The public realm around the site also supports walking and cycling, including woodland walks and links onto the nearby canal path, leading into the city centre.

The station exceeded projected demand of 20,200 passengers in the first year, achieving those numbers in the first five months of operation, prompting service frequencies to be increased.



Image: West Yorkshire Combined Authority

Case study: Maghull North, Merseyside

Maghull North, a new station on the Merseyrail network, opened in 2018 to serve a new adjacent housing development of 370 homes. Further housing is planned for the future and the station will help to ensure that new residents are able to establish sustainable transport habits

from the moment they move in¹⁰⁴ .

Key transition points in people’s lives, like moving to a new house, are pivotal moments in establishing the travel habits that will stick in the long term.



Image: Merseytravel

Existing transport infrastructure can also become a focus for densification efforts. For example, in Lille, France, there are special planning measures setting minimum densities around existing tram stations.¹⁰⁵

The London Plan¹⁰⁶ also focuses on permitting new homes around public transport corridors, using public transport accessibility levels (PTAL) to determine permitted housing density. PTAL is seen as one of the key factors shaping the densification of London’s suburbs, making it easier for developers to understand where there is capacity for growth and ensure that these places are well connected to transport infrastructure¹⁰⁷.

Centre for Cities suggest that local authorities in England should release parts of the green belt

next to stations for what it calls ‘button development’¹⁰⁸. They calculate that between 795,000 and 994,000 homes could be built at suburban densities in walkable ‘buttons’ around stations, along lines that lead into England’s four largest cities outside London. They also suggest that local government should make greater use of Local Development Orders to allow redevelopment of land near existing public transport, as well as setting conditions around density to shift to a mid-rise built form¹⁰⁹.

As well as supporting densification and expansion of existing suburbs, a TOD approach can also be used to develop new suburbs at appropriate densities, a common practice in Europe.

Case study: Copenhagen's 'finger plan'

The strategic 'finger plan' for Copenhagen, Denmark was first developed in 1947 and visualises the core of the city as the palm of a hand with the city developing along the five fingers.

Each of the fingers follow rail lines connecting them to the city. Between each finger are green 'wedges' for recreation and agriculture. Later, a sixth finger was added to connect the city to Malmo, Sweden, over the Oresund bridge.

Planned suburbs were (and continue to be) built along these corridors to allow for controlled urban growth whilst retaining green space in between¹¹⁰.

As part of the finger plan, new employment opportunities must be located within 500m of a tram or metro stop along the fingers¹¹¹. The Danish Ministry of the Environment state that 'Location near stations has positive effects with

*regard to countering road congestion. Locating workplaces near a station promotes the use of public transport. When given an actual choice between types of transport, many people choose to leave their car at home and take the train instead.*¹¹²

Residential areas near stations in the core urban region are built at densities of at least 40 residences per hectare. For the remaining stations, densities of at least 25 residences per hectare are required¹¹³.

As noted earlier in this report, UK suburban densities are typically within the range of 10-40 residences per hectare. Copenhagen's minimum of 25 residences per hectare for suburbs outside the core urban region helps to ensure that public transport services are viable, given that minimum density for a bus service, for example, is 25 homes per hectare.

Barking Riverside, in London, offers a UK example of a new suburban development unlocked by the provision of expanded transport infrastructure.

Case study: Barking Riverside, London

Barking Riverside is a new brownfield development located on land formerly occupied by Barking Power Station with planning permission for 10,800 homes as well as schools, shops, health clinics and churches around three neighbourhood centres¹¹⁴. Described as a new 'garden suburb' the development will be the size of Windsor on completion¹¹⁵.

To serve the development, the London Overground Gospel Oak to Barking Line has been extended to reach the development, including a new terminus station within Barking Riverside's town square¹¹⁶. Work is also ongoing to create a street network that supports walking and cycling¹¹⁷ whilst bus and river bus services are already in operation¹¹⁸.

Under London planning rules, without approval for the Overground extension, the development could not have expanded beyond 1,200 homes, due to the lack of public transport provision¹¹⁹. The Overground extension was therefore essential to unlock the full potential of the development site.



Image: Transport for London

FOUNDATION FOUR: PROVIDE RELIABLE, CONVENIENT CONNECTIONS TO THE NEAREST TOWN OR CITY AND KEY EMPLOYMENT SITES

Ideally, every suburb would have a network of regular bus, tram and/or train services providing connections between them and beyond to the nearest town or city as well as to key employment sites and other services.

Whilst gentle densification and transit-orientated development can help build the case for such services, many suburbs will still lack the critical mass to make that vision a reality. In these communities, complementary and alternative solutions are needed to supplement conventional public transport and enable people to access nearby towns and cities sustainably. At the same time, it is important to protect and expand conventional public transport options that already exist in the suburbs.

This section provides ideas for keeping suburbs connected to their nearest urban areas and employment sites.

EQUITABLE MICROMOBILITY

Micromobility refers to personal, small, human or electric powered vehicles, such as bikes and e-scooters. Shared forms of micromobility can extend the reach of public transport networks by providing first and last mile connections as well as alternatives to mass transit.

Shared micromobility is a good fit for suburban locations, which may be underserved by public transport and where there are opportunities for people to connect onto the core network for their onward journey, either between suburbs or into surrounding towns and cities.

However, often the first places to get shared micromobility hubs tend to be city centres, where transport options are already plentiful, rather than suburban locations. When suburban locations are selected for hubs, wealthier neighbourhoods are often the first to benefit.

Case study: Equitable e-scooter access – St Louis, Missouri¹²⁰.

In St Louis, the city authority prioritises spatial equity for e-scooter access. They require rental companies to keep 20% of their fleet in targeted underserved neighbourhoods.

The data shows that large amounts of ridership are coming from those targeted

areas, and trips taken are comparatively longer.

St Louis also require non-smart phone access options and the ability for users to pay in cash to further support access for low income groups.

Within micromobility, e-bikes (whether shared or privately owned) represent a huge opportunity for improving transport between and beyond suburban areas where distances to key destinations are too long for many to consider walking or cycling using a conventional bike and where public transport options are limited.

Greater use of shared e-bikes in the suburbs (together with infrastructure improvements) would help to extend this option to more people and help to address security concerns around ownership of such an expensive piece of kit and where to store it.

In extending people's range, e-bikes offer a real

alternative to the car for longer journeys to and from suburban areas.

An evaluation of e-bike schemes across Europe found that typically around half of e-bike trips replaced car trips and that, in some cases, as much as 70% of e-bike trips were previously made by car¹²¹.

Research by the University of Leeds found that the greatest carbon saving potential for e-bikes are in rural and suburban settings, given that city dwellers already have many low carbon travel options and key services within walking distance¹²². Indeed, e-bikes can bring more amenities within 15 minutes reach for more people in suburban areas.

Case study: e-bikes in Norwich

Shared mobility service Beryl operates shared bikes, e-bikes and e-scooters in Norwich. Data collected from September 2020 to April 2021 shows that the scheme's e-bikes are used for longer journeys than its standard cycles. The median distance for journeys using standard bikes is 2.2km and for e-bikes it is 3km. The data also shows that e-bikes are used 2-3 times more often per day than standard pedal bikes, which means more people are exposed to cycling¹²³.

In general, across all Beryl shared

micromobility schemes, the biggest factor that influences the distance people will travel by e-bike is the size of the scheme itself: the wider the area covered by the scheme, the further people will travel using e-bikes. This highlights the role e-bike share schemes could play connecting suburbs and city and town centres.

Indeed, Beryl have been placing their hubs further and further out from the centre of Norwich and found that they are just as well used as more central locations¹²⁴.



Image: Beryl

In considering the installation of equitable micromobility in the suburbs, it is also important to account for the full spectrum of people who may wish to use the vehicles, particularly given the need to support trip chaining and the mobility of care.

Often micromobility fails to account for encumbered travel, for example. Shared bikes may lack baskets, luggage racks or the option to choose a bike with a child seat making it less likely that they will be practical for uses other than a straightforward commute, for example.

Research into women's perceptions of e-scooters¹²⁵ revealed concerns about their practicality for the journeys they would wish to make – for example, taking young children to school with bags and PE kits – as well as the weight of the vehicles themselves. Physical improvements suggested included tow bars for children's push scooters or bike trailers as well as baskets and hooks to accommodate bags.

DEMAND RESPONSIVE TRANSPORT

Demand responsive transport (DRT) is another form of shared mobility that could be a good fit with the needs of suburbs. DRT services can be seen as a cross between a traditional bus and a taxi. Using a variety of vehicle types, DRT does not

travel along a fixed route, instead it adjusts to fulfil passenger trip requests, usually within a defined geographical area. It allows multiple people travelling in the same direction to share one vehicle.

DRT has been around for a long time but has tended to focus on 'dial-a-ride' type services, supporting specific groups, such as older or disabled people, often to reach specific opportunities or services. Often services needed to be booked hours or even days in advance and required a lot of manual oversight from operators. Rural areas were frequently the focus of DRT services.

Developments in technology mean that services no longer need to rely on resource-intensive phone-based bookings and can now make use of apps and improved technology to automate bookings, route optimisation and schedules, allowing more flexibility and spontaneity for passengers and reducing costs to operators.

DRT can be used help to serve suburbs that have fewer public transport options, filling gaps in the network and enabling journeys to be made that would not be commercially viable to provide on a fixed basis (although DRT can serve to build demand and make a case for a more conventional public transport service).

Case study: nationwide DRT in Wales¹²⁷

Administered by Transport for Wales, 'fflecsi' is a country-wide demand-responsive bus service providing flexible transport for rural, suburban and urban communities. It uses software to support 11 discrete service zones across Wales, each implemented in partnership with local authorities and operators in those zones. Each zone is locally bespoke with its own goals and design.

Users book the service via an app or by phone, with a bus then picking them up, adjusting its route so that all passengers can

get to where they need to go. The booking system means that passenger numbers can be monitored, enabling guaranteed seats and avoiding overcrowding, helping to enhance the appeal of the service.

fflecsi delivers around 5,000 rides per week and 73% of users report being able to reduce their private car use.

Opportunities to evolve and expand are built in – the digital infrastructure allows new zones to launch within weeks.

Case study: Technology driven DRT in the West Midlands

In April 2021, Transport for West Midlands (TfWM) and transport technology provider Via launched Bus On Demand, aimed at reducing dependence on private cars. The West Midlands is one of four UK Future Transport Zones, granted £22m of funding to experiment with new transport technologies to provide alternatives to private vehicles and cut emissions¹²⁸.

Operating Monday to Friday, 7am to 8pm, the service covers a wide area, connecting suburbs as well as key destinations such as Coventry, the University of Warwick and the local hospital¹²⁹.

Users book their trip using the WM On Demand app. It enables users to select their preferred pick-up point by inserting an address or dropping a pin on the map. The app then assigns the user to a 'virtual bus stop', choosing the most convenient and efficient location. Users then select their

destination and the day and time of their trip. The app enables users to book a trip for immediate travel or up to two days in advance, allowing for greater convenience and spontaneity. Telephone booking is also available to ensure those without smartphones are not disadvantaged.

Upon booking a ride, 'advanced algorithms create quick and efficient shared trips by pooling multiple passengers headed in the same direction into a single bus in real time'¹³⁰. The platform for the service tracks fluctuating demand to determine the need for vehicles and drivers¹³¹.

More than 7,500 rides had been taken by February 2022, with the service proving particularly popular for users whose journeys do not follow main routes¹³², making it a good solution for suburbs. The success of the service means it has now been expanded to cover a wider area.



Image: Transport for West Midlands

Case study: Making best use of existing taxi and minibus fleets

Mobility service Tandem makes use of existing taxi and minibus fleets to provide shared mobility in poorly served areas. It allows people to make and pay for a vehicle booking via an app choosing from 20-minute slots to make it more likely that people will end up travelling at the same time as others.

Passengers are then matched to the right sized vehicle (depending on how many people have booked the same slot and want to make similar journeys).

The vehicle itself is dispatched from existing

local taxi and minibus fleets which would already be on standby but can now be used to serve people more efficiently. If no passengers book onto a slot, no vehicle is dispatched (incurring zero costs).

This approach could be used in suburbs to build a case for a more fixed transport service or to extend service hours and create new routes at a low cost. The service could also enable people who work shifts at the same employer to easily book and share transport to work where no direct transport links exist.

Whilst there are many promising new developments and innovations around DRT, particularly around driving down the costs of provision, it is worth noting that research suggests DRT is prone to failure even in its most innovative forms.

In the UK, 67% of DRT schemes were found to have failed to survive, with half lasting less than seven years. The research showed a strong link between failure and higher costs. In general, the simpler the service, the lower the failure rate. Complex services serving many people and many destinations were the most likely to fail.

With this in mind, securing sufficient revenue funding and demand for more conventional bus services must also play a role in keeping suburbs connected to their surrounding urban areas, whether via feeder services or direct routes.

SUPPORT FOR CONVENTIONAL BUS SERVICES

The nature of suburbs, a deregulated bus market outside London and declining levels of revenue funding, means that often bus services will be limited to the most profitable (usually commuter)

routes. However, the importance of maintaining, expanding and investing in conventional bus services, cannot be underestimated.

The bus is intrinsically targeted at the people and places most in need of support to access opportunity – the people and places most in need are the same as those most reliant on the bus to get around. As mentioned earlier in this report, the suburbs can no longer be associated primarily with affluence. Some 57% of people in poverty live in suburban areas and 54% of suburban residents do not own a car¹³⁴.

Furthermore, the climate emergency demands that more car drivers switch to sustainable modes and, for many in our suburbs, the bus will be the most practical substitute for journeys where walking and cycling are not viable options.

In the words of the Department for Transport's Bus Strategy, the bus offers the 'quickest, easiest and cheapest way'¹³⁵ to avoid a car-led recovery from the shock of the pandemic, which saw public transport use plummet overnight.

The bus must form a core part of any integrated sustainable transport network for the suburbs.

Case study: The role of the bus in the 'Bee Network', Greater Manchester

The 'Bee Network' is Greater Manchester's plan for a fully integrated sustainable transport network covering the whole of the city region. Seen as a vital tool for levelling-up, it brings together plans for bus, tram, train, cycling and walking under the Bee Network brand. It is envisaged that buses will play a key part in the network, accounting for around 75% of all public transport journeys in Greater Manchester¹³⁶.

Greater Manchester is the first city-region to take forward the powers in the Bus Services Act 2017, enabling the Greater Manchester Combined Authority to take direct control of bus services, similar to the model operated in London. Through Transport for Greater Manchester, it will set routes, timetables, fares

and standards as well as ensure bus services are integrated into the wider public transport, walking and cycling network.

The franchising model enables services that would not be viable to run on a commercial basis to be packaged up and delivered as part of the broader contracts that bus operators bid for. The approach would support less well-served suburbs to be better connected to the public transport network.

Planned improvements to buses include 10-minute frequencies on major routes; improved orbital connections; safe and seamless travel, integrated with other modes; bus priority measures; simple, affordable fares; clear passenger information and a zero emission, high quality fleet.



Image: Transport for Greater Manchester

As well as allowing London-style bus franchising, the Bus Services Act also introduces ways in which bus services could be improved within the existing deregulated market through formalising partnership arrangements between transport authorities and operators.

These include Enhanced Partnership (EP)

schemes, where a local transport authority and operators agree a Bus Plan, setting out certain requirements on operators – such as quality standards or compliance with a joint ticketing scheme. All local transport authorities in England outside London are now required to bring forward an EP if they decide not to progress with a franchising approach.

GREATER USE OF LIFT-SHARING, CAR CLUBS, CAR-POOLING AND PEER-TO-PEER SHARING

Greater shared car use in the suburbs could help to increase vehicle occupancy, make better use of existing assets, reduce the overall volume of car traffic on our roads and give more households the option to go car-free or car-lite.

It is a solution that recognises that whilst sometimes the car is the best (or only option) for longer journeys between or out of suburbs, there

are choices for making those journeys more efficient, helping to cut congestion and carbon.

According to research by CREDS, there are 36 million empty seats travelling during the morning commute every day, an average of just 1.2 occupied seats per car¹³⁷. There is huge potential to make better use of these assets.

To overcome concerns people may have around sharing with strangers, schemes can be arranged directly with local employers, as in the case study below.

Case study: Enabling lift-sharing for Ocado staff¹³⁸

Ocado's Customer Fulfilment Centre in Warwickshire employs around 2,000 people. Access to the site is via a dual carriageway, meaning walking and cycling options are limited and the main mode of travel to work is by car. The company recognised that, in order to grow, it needed to expand its ability to reach into different local labour markets and enable people in those areas to reach the site sustainably.

They introduced a lift-sharing scheme to attract new employees as well as retain existing ones by offering cost savings. So far, the scheme has saved its members £496,000 and 4.3 million miles of unnecessary journeys. In doing so, it has also saved 852 tonnes of CO₂. Some 36% of the workforce are registered to share their journey.

Another option could be peer-to-peer sharing which 'enables people with underused vehicles to offer them for rent to their neighbours or other members of the local area.'¹³⁹ According to the RAC Foundation, the average car or van in England is only driven 4% of the time, a figure that has barely changed in 25 years. For the rest of the time it is either parked at home (73%) or parked elsewhere (23%).

Peer-to-peer sharing could make better use of these unused assets, potentially meaning fewer people feel the need to own their own vehicle. However, there may be reluctance on the part of owners to trust others with their vehicle.

The RAC Foundation figures also call into question the value of owning a car at all when it is used so little, adding weight to the case for replacing car

ownership with car club membership (which is likely to be more attractive to most people than peer-to-peer sharing).

Car clubs reduce traffic and parking congestion (as multiple users share one car or parking space) contributing to more liveable suburban streets and freeing up space for other uses – such as wider pavements, mobility hubs, seating or play.

Car clubs also tend to use newer, cleaner models on average emitting 33% fewer CO₂ emissions per kilometre than the typical British car¹⁴⁰. Research has also found that car club members tend to drive less, and use public transport, walking and cycling more¹⁴¹.

Case study: Car sharing in suburban Bremen, Germany

Bremen is a city in Northern Germany with over half a million residents. Historically it suffered from congestion and parking problems. In 2003, a strategic approach to managing these challenges was developed and included the deployment of a network of mobility hubs. By 2020 there were 10 large mobility hubs and 33 smaller ones in residential areas¹⁴².

There are currently 344 shared cars located at mobility hubs across Bremen, and they are increasing at about 8-10 cars a year¹⁴³. Findings from car share users in Bremen have shown that users own fewer private cars, make fewer car trips and use public transport,

walking and cycling more, demonstrating more sustainable journey patterns¹⁴⁴. Car sharing vehicles in Bremen have accounted for approximately 5,000 fewer vehicles on the streets of Bremen¹⁴⁵.

One of the key reasons for success has been the proximity of mobility hubs to homes. Ultimately, the aim is to have a mobility hub every 300m, to ensure they are only ever a short walk away¹⁴⁶. Another key success factor has been building public awareness of mobility hubs, with big and conspicuous signage, community outreach and marketing¹⁴⁷. As a result, awareness of car clubs and mobility hubs is approximately 85% in Bremen¹⁴⁸.



Mobility hub in Bremen showing car sharing vehicles, bicycle parking and prominent signage.

Image: North Sea Region Programme

Car clubs can also offer a more affordable option than car ownership or the use of taxis.

Case study: Affordable car club membership, Paisley, Scotland

Linstone Housing Association in Paisley, Scotland offers subsidised EV car club membership for their tenants. Many do not have access to their own car, and a taxi to the nearest budget supermarket costs around £15. Car club

membership is free for tenants and reduced rates mean that a two-hour trip to the supermarket would cost just £3 plus 16p per mile, a significant saving compared to taxi¹⁴⁹.

ELECTRIFY PRIVATE CAR USE

Whilst it is important to take every opportunity to encourage people living in suburban areas to choose alternatives to the private car, this may not be achievable in all areas and many households – particularly in those suburbs very much designed around the car – will feel they want (or need) to retain their own private vehicle.

As part of efforts to decarbonise the transport network, suburban residents need to be able to make the shift towards electric vehicles. Affordability – given the high purchase price of

vehicles and the as yet under-developed second-hand market – is an important factor influencing the practicality of such a shift, but one which is outside the scope of this report.

Another practical barrier of particular relevance to suburbs, is the availability of charging infrastructure. As described earlier in this report, whilst the stereotypical image of a suburb is a leafy wide road, lined with semi-detached houses, each with their own generous driveway and garage, this is far from the norm. Many suburbs, for example, feature terraces with no off-street parking.



Example of a suburban terraced street with no off-street parking, posing challenges for EV charging (as well as challenges for walking and cycling). Image: Benjamin Elliott, Unsplash

A lack of charging infrastructure is therefore not just an issue for city-dwellers, indeed, it is perhaps more of a pressing issue for suburbia which is often more car dependent and lacking in alternative transport options than its urban counterparts.

Trailing cables from homes, across pavements and into vehicles are certainly not the answer, given the impact on accessibility and liveability of streets. And whilst Mobility Hubs with EV charging built in could offer a solution for some areas, it is unlikely that these will be enough on their own, given the rapidly approaching ban on the sale of new petrol

and diesel vehicles, set for 2030.

One promising solution for suburbs would be to install chargers within existing streetlamps. Barnet Borough Council, for example, uses requests from residents to decide where to locate lamppost charge points¹⁵⁰. They have so far installed 72 lamppost charge points with plans for more.

Meanwhile, Westminster City Council, Siemens and ubitricity have converted a whole street to lamppost charging, offering a glimpse of how residential streets could change in the future.

Case study: 'Electric Avenue'¹⁵¹

The UK's first fully converted lamppost charging street is located on Sutherland Avenue, London. Whilst not a suburban location, it shows what could be put in place using existing infrastructure on a residential street with no off-street parking provision.

Some 24 lampposts along the street have had EV charging points installed as part of the 'Electric Avenue, W9' showcase. As of 2020,

there were a further 272 lamppost chargers across the local authority area. Installation of the sockets usually takes less than an hour.

With research by Siemens finding that 40% of the British public say a lack of charging points was the biggest factor stopping them from buying an EV or hybrid, highly visible schemes such as these will be important in boosting uptake.

Charging points that offer the opportunity to 'top-up' a vehicle as well as rapid charging points, that allow a vehicle to be 80% charged within 30 minutes, could also be rolled out in strategic locations within suburbs, such as supermarket car parks, to ensure that charging infrastructure is not tied up for long-periods of time. The number of supermarkets offering charging facilities has almost doubled from 607 in early 2020 to 1,300 in 2021 .

It may also be that suburban car owners will need to relinquish the expectation of being able to park directly outside their homes and that space will need to be found elsewhere to store and charge electric vehicles. This may be more immediately practical for new-build suburbs and suburban extensions.



Image: Nottingham City Council

JOINING THE DOTS: THE BROADER DECARBONISATION OF SUBURBS

5

The decarbonisation of suburban vehicle fleets and the other measures outlined in this report should form part of a wider programme to decarbonise suburbs, the places where most of us live.

The urgency of the climate crisis demands that we move beyond a siloed approach to reducing carbon emissions from different sectors and instead seek to make connections between them and deliver a more coordinated strategy.

Suburban infrastructure, including energy, water, transport and housing interact with one another, putting *'different pressures on the environment and human wellbeing, from resources extraction to pollution and waste. Systems thinking provides a structured approach to link the components of a system together. This can help decision makers take a shared view of the system and make decisions that achieve the objectives of the whole.'*¹⁵³

Working collaboratively, transport authorities are well placed to join the dots between transport and the decarbonisation and adaptation of the suburban built environment and infrastructure more widely.

Suburban bus shelters, tram stops and mobility hubs could be fitted with solar panels or wind turbines to power lighting, WiFi hotspots, charging points and signage, for example.

In future, suburbs could generate more of their own energy to power homes and sustainable transport.

Community microgrids¹⁵⁴, for example, are a way for neighbourhoods, towns and cities to

meet their energy needs locally.

The conventional model for electricity grids is for large power plants to generate electricity which is then carried hundreds or thousands of kilometres via lines to people's homes.

More recently, small-scale distributed generation has emerged (for example, the use of roof-top solar panels, wind turbines), allowing homeowners, businesses and public buildings to generate at least a portion of their energy themselves and potentially store it too as battery storage prices fall.

Community microgrids allow this energy to be shared and distributed via a local grid at a range of scales, from a small neighbourhood to a whole city. The integration of smart technology can be used to balance demand and load, with software monitoring all the different elements on the network (from heat pumps to EV charging) to smooth out peaks and troughs¹⁵⁵. Their use helps to reduce dependency on the national grid, especially at peak times or can even be entirely independent from the main grid. The energy could be used, not only to power homes, but transport – from electric vehicle charging to tram networks.

For example, community-owned solar farms could be used to supply electricity to trains and trams, an idea being explored by the DfT-funded 'Riding Sunbeams' project¹⁵⁶. With climate change and soaring fuel costs, there has never been a better time to become more self-sufficient and find ways to generate energy locally.

Case study: Locally generated electricity to power transport in Nottingham¹⁵⁷

Nottingham’s gas-powered double deck buses are fuelled by bio-methane from sewage and household waste. The ultimate aim is to establish an electrified local transport system operating on electricity sustainably generated from local waste incineration and solar energy, becoming a fully self-sufficient ‘energy city’.



Image: Nottingham City Council

Upgrades to transport infrastructure could also incorporate new green-blue assets to support decarbonisation and adaptation to climate

change. Green-blue infrastructure uses vegetation and water to mitigate the effects of climate change and offer benefits to people and wildlife.



Green infrastructure as part of Sheffield’s ‘Grey to Green’ project¹⁵⁸. Image: Sheffield City Council

It could include measures like green roofs and walls, grassed areas, gardens, parks, trees, drainage, rain gardens and channels. These measures can help to manage and absorb rainfall;

provide cooling effects; improve air quality; absorb pollution, noise and carbon; as well as enhance biodiversity, provide habitats for wildlife and offer everyday access to green space¹⁵⁹.



An example of a bus shelter with green roof in Manchester City Centre. Image: Transport for Greater Manchester

Ways of applying these measures as part of transport upgrades and reallocation of space in suburbs could include, for example, incorporating parklets or green roofs as part of mobility hubs or repurposing parking spaces for community food growing. Modal filters for low traffic neighbourhoods could take the form of planters. More broadly, reduced private car ownership in

the suburbs could facilitate the transformation of paved driveways into gardens and growing spaces. As noted earlier in this report, removing cars and bins from outside homes frees up space for walking, cycling, growing and playing.

Disused transport infrastructure can also be repurposed as green space for walking, cycling and recreation in the suburbs.

Case study: Roe Green Loophine

Eccles is one of the most popular suburbs in Greater Manchester. A major asset for the area is the Roe Green Loophine, a repurposed former railway track seen as a vital ‘green lung’ as well as supporting sustainable mobility.

The 7.2km traffic-free route begins in Eccles and runs to the border with Bolton with

frequent access points connecting to schools, residential and employment areas along the way¹⁶⁰. In turn, it connects to a wider 28km traffic-free network of other loophines, greenways and cycle routes, connecting it to neighbouring districts including Manchester, Trafford, Bolton and Wigan¹⁶¹

As noted earlier in this paper, the suburban built environment can also repurposed to provide more of what people need closer to home. By repurposing, instead of building new, it is possible to reduce reliance on the planet’s resources¹⁶² and cut the carbon embodied in construction and the transportation of building materials.

Some 80% of the buildings that will be in use in 2050 have already been built¹⁶³, meaning retrofit, refurbishment and repurposing of the built environment has an important role to play in decarbonising the suburbs as part of a coordinated approach that joins the dots between transport, energy and the built environment.

CONCLUSION

6

We are a nation of suburbanites. However, the ubiquity of suburban living is often not reflected in transport policy. We frequently fail to fully engage with, or even mention, suburban transport patterns and needs or explore the vital role that suburbs must play in tackling the climate emergency.

Instead, cities, and to a lesser extent, rural communities tend to monopolise the policy landscape. How can we facilitate movement in and out of our cities, and how can we encourage people to spend time and money in them? How can we prevent isolation in rural areas where public transport is virtually non-existent?

Whilst these are important challenges, this report has sought to show that suburbs have their own unique transport challenges which require tailored interventions. Furthermore, as the places where most of us live, suburbs must be at the centre of coordinated efforts to decarbonise not only transport but also housing and energy supply, as well as to seek to manage the effects of climate change.

This report has defined suburbs by their common features, each of which has implications for transport provision. Suburbs have an interdependent relationship with a large town or city; they are primarily residential; they tend to be characterised by low density, low-rise development; and they are favoured by families with children. These characteristics mark them apart from cities and from rural areas and require different kinds of transport solutions.

Far from being primarily dormitories for commuters, suburbs have always been hives of activity, buzzing with small everyday journeys and the site of a great deal of paid and unpaid work.

Trips to and from school, nipping to local shops, running errands, visiting family and friends - these small trips, often added on to commutes to form complex chains of journeys, are often not counted or planned for directly in transport policy but are vital to the functioning of lives and economies - perhaps even more so since the COVID-19 pandemic - and should be valued as such.

Indeed, much has been made of the shift for many people towards more working from home as a product of the pandemic. However, the truth is that suburbs have always been a site of work for many people - this work is just not always highly visible or sufficiently valued, or indeed, paid. Many more suburban residents continued to commute to work throughout the pandemic, highlighting the importance of good transport links between suburbs as well as into cities and surrounding towns.

The pandemic did, however, open people's eyes to what suburbs can offer. At their best, they provide the opportunity to live a more local life, something we should all aspire to in the face of climate crisis. They can offer local shops and services; open space; gardens and green space; and a sense of community. In the early months of the pandemic, they also offered a glimpse of quiet roads and clean air, allowing people to breathe easier and for children to safely explore

and play, epitomised by the many chalk pictures that appeared on roads and pavements in 2020.

Now, with the immediate danger of COVID-19 receding for most of us, but the climate emergency continuing to loom large, it is important to remember, and hold onto some of the lessons of the pandemic. That suburbs have the potential to provide more of what we need locally; that perhaps commuting in and out of the city every day is not as essential as many of us thought; that car free or car-lite places are more liveable, playable and sustainable; and that suburbs can become more of a haven for the many families that call them home.

We set out four foundations of suburbs for a new era, informed by the experiences of the pandemic and designed to take account of their common features and the unique transport challenges these present.

Suburbs for a new era should:

1. Help people to access more of what they need locally
2. Provide family-friendly sustainable transport choices
3. Prioritise gentle densification around sustainable transport infrastructure
4. Provide reliable, convenient connections to the nearest town or city and key employment sites

We present a variety of ideas for realising this vision on the ground, recognising that the differing histories, assets and demographics of our suburbs will require different solutions within those four core foundations that all should aspire to meet.

Achieving this vision will require a better understanding of how people travel and would like to travel in, between and beyond suburbs. We need to get better at reflecting short journeys and complex trip chains in the data we collect so that we can better facilitate and plan for those journeys.

Better data on travel patterns in suburbs needs to be accompanied by close collaboration with communities to understand their unique needs and challenges. We should look at how people travel now and how they would ideally like to travel (or avoid travelling, as the case may be).

We know, for example, that most children would ideally like to walk, cycle or scoot to school but that not all are able to do this. Is it, for example, that safe routes are not available, or is it that the resulting trip chain would not allow the accompanying parent to arrive at work on time? What could be done to make it possible? One potential solution could be to conduct a walking audit with local school children to look at making key routes into school safer and more attractive. Another could be to install a shared e-bike scheme near the school to enable accompanying parents to complete their onward journey to work in a way that is quick and offers predictable journey times. It may be that a combination of measures is required.

As well as working with the community, transport planners will also need to collaborate with colleagues in land-use planning, housing and development to ensure measures are aligned and complementary. This report has underlined the importance of joining the dots between transport, energy, water and housing in our suburbs, recognising that transport interventions alone cannot enable their wider decarbonisation.

Many enabling features for living more locally and being able to access more on foot and by bike are dependent on planning and development decisions. These might include, for example, adapting and allowing buildings with multiple uses; prioritising development around existing transport infrastructure; and working together to create beautiful places that people enjoy spending time in.

We also need to work collaboratively to explore how suburbs can generate more of the energy they need locally to power homes and

sustainable transport, as well as how we can incorporate more green and blue infrastructure to further boost climate resilience.

These partnerships could deliver tailored packages of measures for suburbs that go beyond transport interventions to encompass other features of the built environment, energy networks, changes of use, green infrastructure, and so on – together addressing each of the four foundations of suburbs for a new era.

Ultimately, the aim should be for all suburbanites to experience the promise of the

‘good life’ that the earliest suburbs offered to jaded city dwellers, transformed for a new era. A new era where the suburb has a rhythm, spirit and buzz all of its own; powered by people and green energy; enlivened with trees, gardens, water and play; and rich in sustainable transport choices for all kinds of journeys – big or small, straightforward or complex – and all kinds of people, reflecting the increasing diversity of suburban life. We hope that this report can provide some inspiration for making a good life in the suburbs a reality for more people.



Image: Alex Jackman, Unsplash

REFERENCES

- Hall, P. 'Introduction' in Hackett, P. (ed) (2009) Housing and growth in suburbia
- Vaughan, L. et al 'The Suburb and the City' in Vaughan, L. (2015) Suburban Urbanites; Hall, P. 'Introduction' in Hackett, P. (ed) (2009) Housing and growth in suburbia
- English Heritage (2007) The Heritage of Historic Suburbs
- Mayor of London (2016) The London Plan
- <https://businesswales.gov.wales/foundational-economy> visited 16/06/22
- Bennett, J. 'Towards a suburban renaissance' in Hackett, P. (ed) (2009) Housing and growth in suburbia
- CABE (2005) Better Neighbourhoods: Making higher densities work
- Centre for Cities (2021) Measuring up: Comparing public transport in the UK and Europe's biggest cities
- Ibid.
- Thomas, E., Serwicka, I. and Swinney, P. (2015) Urban demographics: Why people live where they do
- Lucy Marstand-Taussig (2021) 'Do inclusive transport strategies really consider the needs of all?' in Local Transport Today, 29/06/21
- Thomas E, Serwicka I & Swinney P (2015) Urban Demographics, Where People Live and Work
- Urban Transport Group (2019) The place to be: How transit oriented development can support good growth in the city regions
- The Smith Institute (2014) Poverty in suburbia
- <https://unhabitat.org/mobility-of-care-ines-sanchez-de-madariaga> visited 16/06/22
- DfT National Travel Survey table NTS0611 2019
- <https://unhabitat.org/mobility-of-care-ines-sanchez-de-madariaga> visited 16/06/22
- DfT National Travel Survey Table NTS0611 2019
- Vaughan, L. (ed) (2015) Suburban Urbanites (p.4)
- English Heritage (2007) The Heritage of Historic Suburbs
- Ibid
- Ibid
- Hall, P. 'Introduction' in Hackett, P. (ed.) (2009) Housing and growth in suburbia
- Falk, N. 'Sustainable suburbs – learning from Europe' in Hackett, P. (ed) (2009) 'Housing and growth in suburbia'
- The Smith Institute (2014) Poverty in suburbia
- Centre for Cities (2021) Measuring up: Comparing public transport in the UK and Europe's biggest cities
- Gill, T (2021) Urban playground: How child-friendly planning and design can save cities
- Thomas E, Serwicka I & Swinney P (2015) Urban Demographics, Where People Live and Work
- The Smith Institute (2016) 'Towards a suburban renaissance: an agenda for our city suburbs'
- The Smith Institute (2014) Poverty in suburbia
- Swinney, P. and Breach, A. (2020) Housing crisis: Where are the most new homes being built? BBC website 25/02/20
- Breach, A. and Magrini, E. (2020) Sleepy suburbs: The role of the suburbs in solving the housing crisis
- 'Government set to miss housebuilding target by almost a decade', The Independent 09/01/21
- Swinney, P. and Breach, A. (2020) Housing crisis: Where are the most new homes being built? BBC website 25/02/20
- Transport for New Homes (2018) Transport for New Homes: Project summary and recommendations
- Ibid
- RTPI (2021) Women and planning Part II: Creating Gender-Sensitive Urban Environments Post Covid-19: Challenges and Opportunities' (p.5).
- RTPI (2021) Women and planning Part II: Creating Gender-Sensitive Urban Environments Post Covid-19: Challenges and Opportunities'
- De Fraja, G., Matheson, J. and Rockey, J. (2021) 'Zoomshock: the geography and local labour market consequences of working from home
- Quinio, V. (2022) Have suburban high streets really received a 'work from home' boost?, blog on Centre for Cities website, 03/03/22

41. Magrini, E. (2020) 'How will coronavirus affect jobs in different parts of the country?' blog post on Centre for Cities website, 17/03/20
42. 'Government taskforce urges permanent job flexibility for all workers', The Observer 02/05/21
43. ONS (2022) Coronavirus and the social impacts on Great Britain: 1 April 2022
44. 'Daily commute must evolve to lure back the 'Covid aristocracy'', The Telegraph 27/01/21
45. Carmona, M, Giordano, V., Nayyar, G., Kurland, J and Buddle, C. (2020) Home Comforts: How the design of our homes and neighbourhoods effected our experience of the Covid-19 lockdown and what we can learn for the future
46. DfT (2021) Decarbonising transport: A Better, Greener Britain
47. Ibid
48. Local Trust (2019) Left behind? Understanding communities on the edge
49. Local Government Association (2021) Tackling the digital divide – House of Commons, 4 November 2021
50. Web Foundation (2020) 'It's time to recognise internet access as a human right' 28/10/20
51. <https://www.local.gov.uk/our-support/financial-resilience-and-economic-recovery/digital/digital-inclusion-programme> visited on 16/06/22
52. Madden, P. (2021) 'The instant city: how the desire for speedy gratification is reshaping our urban lives' Medium 04/05/21
53. <https://www.chorltonbikedeliveries.coop/> visited 16/06/22
54. Camera, G. (2021) 'The future is bright and green', Now Then Magazine (online), 28/09/21
55. Heath, A. (2020) 'The home-working revolution will derail the middle-class gravy train', The Telegraph, 22/07/20
56. <https://gov.wales/remote-working-policy> visited 16/06/22
57. Welsh Government (2022) Remote working public engagement exercise: local work hubs
58. Sustrans (2022) Walkable neighbourhoods: Building in the right places to reduce car dependency
59. Gill, T (2021) Urban playground: How child-friendly planning and design can save cities (p.20)
60. Ibid
61. <https://beeactive.tfgm.com/where-you-live/> visited 16/06/2022
62. Crowe, C. (2020) 'Rethinking the 20-minute city in light of police shootings, COVID-19', Smart Cities Dive website 25/08/20
63. Yeung, P. (2021) 'How '15-minute cities' will change the way we socialise' BBC website 04/01/21
64. Sustrans (2022) Walkable neighbourhoods: Building in the right places to reduce car dependency
65. Butler, S. (2022) 'Meeting now in aisle 14: Tesco pilots in-store flexible office space', The Guardian 12/05/22
66. 'ukactive and Nike launch blueprint for unlocking nation's school sport facilities outside of school hours', ukactive news release 06/06/22
67. ukactive (2022) Open Doors: A blueprint for success – opening school facilities outside of hours
68. Michael, C., McMullan, L. and Hulley-Jones, F. (2020) 'From garden streets to bike highways: four ideas for post-Covid cities – visualised', The Guardian 25/09/20
69. Gill, T (2021) Urban playground: How child-friendly planning and design can save cities (p.30)
70. Ibid
71. Marstrand-Taussig, L. (2022) 'Global warming won't wait – Government net zero targets demand rapid change', TransportXtra (online) 26/04/22
72. Sustrans (2020) 'What is a low traffic neighbourhood?', blog post Sustrans website, 02/11/20
73. Aldred, R., Elliott, B., Woodcock, J. and Goodman, A. (2017) Cycling provision separated from motor traffic: a systematic review exploring whether stated preferences vary by gender and age. Transport reviews, 37(1), pp.29-55
74. Marstrand-Taussig, L. (2022) 'Global warming won't wait – Government net zero targets demand rapid change', TransportXtra (online) 26/04/22
75. Ibid
76. Gulliford, F. (2020) 'Creating 'Mini Holland' in Waltham Forest' Commonplace (online) 01/10/20 <https://www.commonplace.is/customer-stories/creating-mini-holland-in-waltham-forest>
77. Ibid
78. Ibid
79. Living Streets, London Cycling Campaign, Rosehill Highways (undated) Low Traffic Neighbourhoods: An introduction for policy makers
80. Priestley, A. (2019) 'Francis Road, Healthy Street of the Year 2018', Urban Movement (online) 03/05/19
81. Living Streets, London Cycling Campaign, Rosehill Highways (undated) Low Traffic Neighbourhoods: An introduction for policy makers
82. Gill, T. (2021) Urban playground: How child friendly planning and design can save cities' (p. 123).
83. <http://schoolstreets.org.uk/> visited 16/06/22
84. <http://schoolstreets.org.uk/why-school-streets/> visited 16/06/22
85. Ibid
86. As at 23/05/22 see https://www.google.com/maps/d/u/0/viewer?mid=1HSHZTD2Z5h4_ihMD8K4GGIQQFd-zsoVG&ll=12.145869227137503%2C53.54643828480279&z=1
87. Davis, A. (2020) School Street Closures and Traffic Displacement: A Literature Review and semi-structured interviews
88. <https://leedscs.maps.arcgis.com/apps/webappviewer/index.html?id=72c90521734543048b54575d9888bb73> visited 16/06/22
89. <https://como.org.uk/shared-mobility/mobility-hubs/what/> visited 16/06/22
90. Voi (2021) 'Spotlight Berlin: how Voi scooters combine with public transport' Blog post on Voi website 26/11/21
91. comouk (2019) Mobility Hubs Guidance
92. Presentation by Mark Collins, Transport for West Midlands at the comouk Shared Transport Conference 2021
93. 'New mobility hub set for trial on the streets of the West Midlands', West Midlands Combined Authority news release 08/09/21
94. <https://trimis.ec.europa.eu/project/citychangercargobike> visited 16/06/22
95. <https://electrictravel.tfgm.com/ehubs/> visited 16/06/22
96. <https://electrictravel.tfgm.com/cargoroo-faqs/> visited 16/06/22
97. Ibid
98. Sarah Kumeta, Transport for Greater Manchester, presentation to comouk Shared Transport Conference 2021
99. Streb, M(2022) 'We need to create neighbourhoods which reduce car dependency', blog post on Sustrans website 16/05/22
100. <https://www.centreforcities.org/story/mapping-the-30-minute-city/> visited on 16/06/22
101. Rogers, B. (2021) 'Gentle densification of suburbs could help meet London's housing needs', blog post on Centre for London website 27/01/21
102. Urban Transport Group (2019) The place to be: How transit orientated development can support good growth in the city regions
103. Ibid.
104. Urban Transport Group (2020) Action stations: How devolution is transforming rail stations for the better
105. Rodrigues, G. and Breach, A. 'Measuring up: Comparing public transport in the UK and Europe's biggest cities', Centre for Cities website, 03/11/21
106. Mayor of London (2021) The London Plan
107. Centre for Cities (2020) Sleepy Suburbs
108. Rodrigues, G. and Breach, A. 'Measuring up: Comparing public transport in the UK and Europe's biggest cities', Centre for Cities website, 03/11/21
109. Ibid.
110. <https://eros.usgs.gov/image-gallery/earthshot/five-finger-plan#:~:text=Five%20Finger%20Plan%20A%20Copenhagen%2C%20Denmark%20story&text=The%20development%20plan%20resembles%20a,the%20land%20between%20the%20fingers> visited on 21/06/22.
111. 2 URBACT city cases – The Copenhagen Finger Plan, available from: https://urbact.eu/sites/default/files/example_copenhagen.pdf
112. Danish Ministry of the Environment (2015) The Finger Plan (p. 14).
113. Danish Ministry of the Environment (2015) The Finger Plan
114. https://en.wikipedia.org/wiki/Barking_Riverside#cite_note-1-2 visited 21/06/22
115. 'Boris Johnson calls for creation of new 'garden suburb' in Barking and Dagenham', Evening Standard 21/02/14
116. <https://tfl.gov.uk/travel-information/improvements-and-projects/barking-riverside-extension> visited 27/06/22
117. <https://tfl.gov.uk/travel-information/improvements-and-projects/barking-riverside-extension> visited 21/06/22
118. https://en.wikipedia.org/wiki/Barking_Riverside#cite_note-1-2 visited 21/06/22
119. 'Boris Johnson calls for creation of new 'garden suburb' in Barking and Dagenham', Evening Standard 21/02/14
120. Cox, S. (2019) 'E-scooters, equity and accessibility', Better Bike Share Partnership (online) 21//03/19
121. Newson, C. and Sloman, L. (2019) The case for a UK incentive for e-bikes
122. Philips, I., Anable, J. and Chatterton, T. (2020) e-bike carbon savings – how much and where?
123. UTG/Steer (2021) Fully charged: Powering up the potential of e-bikes in the city regions
124. Jeremy Wiggin, Norfolk County Council, presentation and discussion at comouk conference 2020, 18 November 2020
125. Haddad, H., Sanderson, N. and Goodman, J. (2022) Shared e-scooters and gender equity: Learning from women's perceptions and experiences
126. Collins, M. (2021) 'Delivering demand-responsive transport in the West Midlands' Intelligent Transport, 06/10/21
127. Stone, T. (2022) 'How digital demand-responsive transportation (DDRT) is thriving in the UK', Traffic Technology Today, 03/03/22
128. Collins, M. (2021) 'Delivering demand-responsive transport in the West Midlands' Intelligent Transport, 06/10/21

129. <https://www.tfwm.org.uk/plan-your-journey/ways-to-travel/buses-in-the-west-midlands/on-demand-buses-in-the-west-midlands/> visited 16/06/22
130. 'Coventry's pioneering on demand bus service now covering city centre and hospital', West Midlands Combined Authority press release 01/02/22
131. Collins, M. (2021) 'Delivering demand-responsive transport in the West Midlands' Intelligent Transport, 06/10/21
132. 'Coventry's pioneering on demand bus service now covering city centre and hospital', West Midlands Combined Authority press release 01/02/22
133. Currie, G. and Fournier, N. (2020) 'Why most DRT/ Micro-Transits fail – What the survivors tell us about progress' in Research in Transportation Economics, Volume 83, November 2020.
134. The Smith Institute (2014) Poverty in suburbia
135. DfT (2021) Bus Back Better: National Bus Strategy for England
136. <https://tfgm.com/corporate/bus-service-improvement-plan> visited on 21/06/22
137. <https://www.creds.ac.uk/wp-content/uploads/CREDS-shared-mobility-graphic.pdf> visited 16/06/2022
138. <https://business.liftshare.com/case-studies/ocado/> visited 16/06/2022
139. <https://como.org.uk/shared-mobility/shared-cars/What/> visited 16/06/22
140. <https://como.org.uk/shared-mobility/shared-cars/why/> visited 16/06/22
141. Ibid.
142. comouk (2021) Mobility Hubs: The Problem- Solving Approach to Congestion and Parking, City of Bremen Case Study
143. Ibid.
144. Team Red (2018) Analysis of the impacts of car-sharing in Bremen, Germany
145. Ibid.
146. comouk(2021) Mobility Hubs: The Problem- Solving Approach to Congestion and Parking, City of Bremen Case Study
147. Gray (2017) Build Your Own Mobility Hub: 7 Lessons for Cities from Bremen, Germany - Shared-Use Mobility Center
148. CoMoUK (2021) Mobility Hubs: The Problem- Solving Approach to Congestion and Parking, City of Bremen Case Study
149. Presentation by Debs Allan, Scottish Federation of Housing Associations at the comouk 2022 conference
150. <https://www.barnet.gov.uk/roads-and-pavements/electric-vehicles-barnet> visited 16/06/22
151. <https://new.siemens.com/uk/en/company/topic-areas/sustainable-energy/smart-ev-charging-infrastructure-for-cities.html> visited 16/06/22
152. <https://www.zap-map.com/supermarkets-add-1000-ev-charge-points-since-2020/> visited 16/06/22
153. Brown, K. and Mijic, A. (2019) Integrating green and blue spaces into our cities: Making it happen (p. 5).
154. <https://carbontrack.com.au/blog/community-microgrid/> visited 27/06/22
155. <https://bristolenergy.coop/powering-new-homes-with-smart-microgrids/> visited 27/06/22
156. <https://www.ridingsunbeams.org/first-light> visited 22/06/22
157. Urban Transport Group (2019) Making the connections in climate – how city regions can join the dots between transport, energy and the built environment.
158. See <https://www.greytogreen.org.uk/> for more details. Visited 27/06/22.
159. Brown, K. and Mijic, A. (2019) Integrating green and blue spaces into our cities: Making it happen
160. <https://www.salford.gov.uk/parking-roads-and-travel/cycling-and-walking/traffic-free-cycling-and-walking-routes/roe-green-loopline/> visited on 22/06/22
161. Salford City Council and Transport for Greater Manchester (undated) Off the beaten track: walking and cycling in Salford available from <https://www.salford.gov.uk/media/393982/off-the-beaten-track.pdf>
162. <https://www.eventbrite.co.uk/e/retrofit-refurbishment-and-repurposing-the-action-gap-tickets-367396301227?aff=ebdsoporgprofile> – visited 21/06/22
163. <https://www.ukgbc.org/climate-change-2/> - visited 22/06/22

Wellington House,
40-50 Wellington Street,
Leeds LS1 2DE

T 0113 251 7204
E info@urbantransportgroup.org
www.urbantransportgroup.org

