

Investing in micromobility at stations.

A London study of benefits and design options



Momentum Transport Consultancy

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LSE Regional and Urban Planning

The London School of Economics and Political Science (LSE) began as an idea, sparked by three LSE professors: Peter Self (government), Alan Day (economics) and Michael Wise (geography) and was officially launched by Sir Peter Hall in 1965. Since then the MSc has trained more than 1,000 students coming from all over the world.



Its planning Master’s degrees and PhDs helped to produce leaders in the fields of urban and regional planning, architecture, transport, real estate, and academia. Its mission is to understand planning, not as a purely technical subject, but as one that interacts with populations, politics and economy.

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01. Foreword.



Roy McGowan
Managing Director



The emergence of micromobility is providing an important opportunity for London to consider a more sustainable and equitable short-distance transport choice when compared with using the car and private hire vehicles. More people can use micromobility than just car drivers, and the restricted speed and weight of micromobility vehicles better fits with the human scale of a city, and is better for pedestrian safety.

This will encourage us to plan further for improved public realm, better spaces for people and to civilise our central city areas as well as our outer London developments where micromobility can help achieve improved accessibility to stations, with less car use. The key stakeholders need to do further work on improving the operational safety for micromobility users and this needs to include reducing the speed of general traffic to at most 20mph, and even down to 15mph as proposed by the City of London. This joint report with LSE as part of supporting the RUPS course dissertation programme provides important proposals for the operation and parking of micromobility at stations and transport interchanges that should be incorporated into our future planning for London to help deliver more equitable, flexible and sustainable zero carbon transport options. As we publish this piece of research, I'd like to thank the LSE for their partnership and collaboration, and I'd especially like to thank Maxwell Meyers for his passion and energy throughout this project and this impressive research is a testament to his drive.



Alan Mace
Associate Professor



Making public transport a positive choice over the private car depends on reducing the friction of the 'last mile', that inconvenient part between alighting from public transport and arriving at your destination. The burgeoning growth in micro-transport offers an exciting range of possibilities to address the challenge, but its potential will best be fully realised only if we design an infrastructure to support it. This report contributes a range of innovative possibilities for the public and private sectors to plan for and build in that infrastructure.

The report is informed by research that draws on a range of primary and secondary sources. Its creation is a positive example of coproduction, to use the current jargon. It is the outcome of a collaboration between Momentum and the RUPS programme at the LSE. The purpose was to provide academic input to a practice report while giving a student (Maxwell Meyers) the opportunity to apply their research to practice. I warmly thank the team at Momentum for their generous support throughout, which made the collaboration such a positive experience. And Maxwell for having been a great ambassador for the RUPS programme.



Executive summary

Micromobility – the use of small, electric personal transport vehicles – is a new consideration for cities, transport authorities and people who want to travel. Its use has expanded globally in recent years, and with the UK Government allowing local authorities to trial the use of e-scooters for hire, the use of micromobility vehicles in the UK has recently become legal. The time to design and plan for the use of micromobility in London and elsewhere is now.

This paper is the culmination of a joint research project between the London School of Economics and Political Sciences' Regional and Urban Planning Studies Masters programme and Momentum Transport Consultancy to better understand the design and planning for micromobility at major London rail termini.

Appreciating the need for a diverse offering of transport options in cities, we question how micromobility can fit into this picture, how stakeholders might best coordinate and what design and policy changes would best mitigate potential issues of micromobility.

If designed for and planned appropriately, micromobility can provide a highly effective first and last mile transport option, providing alternatives to London Underground and bus usage, as well as potentially facilitating development at increased densities in outer London and contributing to improved human-scale public realm development.

What is micromobility?

As defined by the International Transport Forum's Type A Classification, micromobility transport are personal transportation vehicles weighing up to 35kg and whose power supply, if any, is cut off at speeds no higher than 25km/hour. Put simply, micromobility vehicles are human or electrically-powered personal vehicles including bicycles, e-bikes (32kg), e-scooters (17.5kg), and skateboards among others⁴.

And while e-scooters are still technically illegal to use on public roads, the DfT is currently running 12-month e-scooter for hire trials across the UK in the hopes of legalising them shortly.

Micro-mobility: what and why now?

This research piece

In recent years there has been a prolific rise in electric bikes and scooters across the world, a new phenomenon in transport systems for cities to cope with and plan for. This growth in 'micromobility' provides both challenge and opportunity to London's policymakers, transport operators, developers, commuters and residents.

Momentum has partnered with the LSE's RUPS Masters programme to support a dissertation exploring the proliferation and future of micromobility in London, especially considering its role around existing rail terminal infrastructure. The dissertation process, led by LSE's Maxwell Meyers, involved interviews with planners and designers at Network Rail, micromobility operators and thought leaders, and consultants. This report, using the dissertation completed in August 2020 as a fundamental source, thanks all those interviewees whose views have been anonymised and incorporated into this report.

The LSE / Momentum partnership began before the Covid-19 pandemic, whilst research for the dissertation was undertaken throughout the summer of 2020. Travel patterns and regulations have both changed dramatically since the start of this research partnership, which is perhaps even more relevant now than before the Covid-19 pandemic, where high occupancy modes have become less popular.

Potential benefits

Micromobility, when designed carefully, can bring a range of benefits. A key opportunity is to make public transport more convenient by improving its first and last mile connections. Whilst often short in distance, the first and last legs of public transport-based journeys are often the most challenging¹, as well as being disproportionately highly valued by commuters relative to the rest of their journey².

To create seamless and attractive public and active transport offerings, we know that we need a rich variety of services with interchange facilities – it's no coincidence bus stations are almost always located close to Tube and rail stations.

Micromobility can reduce pressure on existing public transport services by making it a realistic option to board and alight at less crowded stations, and in the current context micromobility could provide a socially-distanced travel option. In outer London, higher-density and car-free or low-car development could be extended by increasing the catchment areas around stations and across all stations and locations.

Micromobility could also be a positive commercial benefit for station operators and for nearby businesses – nearby businesses can expect positive commercial externalities as well – as high street retail sales have been reported to increase by nearly a third with investment in walking and cycling infrastructure³.

The question at the heart of this research piece is:

How can passenger micromobility transport be better planned for and integrated at London's major rail termini to achieve stronger first and last-mile connectivity?

Fully embracing micromobility will require strong facilities at origin points (i.e. the stations), routes (i.e. segregated lanes on borough roads), and destinations (i.e. a person's office or residence).

There are certainly parallels with the major investment in cycling infrastructure in London in recent years, where we now have a mature network of segregated cycle lanes as well as very strong design standards for cycle parking facilities, enforced through planning. These interventions, controversial at the time, have seen a major increase in the uptake of cycling in London both for leisure and commuting.

As we have seen in cities readily adopting micromobility, such as Paris, Baltimore and San Francisco, micromobility needs careful planning, design and dedicated infrastructure. These include detailed parking strategies, unified station signage, creating "destinations" to catalyse nearby development, combined trip planning and payment, and methods to foster stronger integration between Network Rail, Transport for London (TfL), the local boroughs, and shared micromobility firms.

State of play

Since summer 2020, local authorities in the UK can operate or permit the operation of e-scooter rental schemes, under accelerated new regulations from the Department for Transport (DfT). This represents a major breakthrough for micromobility operators whose use was, until summer 2020, limited to private land. Many are seizing this opportunity, with e-scooter for hire trials now taking place in areas across the country including Milton Keynes, Norwich, Cambridge and Northampton. TfL has recently announced a tender for a large-scale shared e-scooter trial, which will span multiple London boroughs.

The time to design, trial, learn and act is now. This report sets out the following:

Why micromobility?



First and last mile connectivity



Reducing peak hour demand in central London



Developing at density in outer London



Station placemaking and public realm

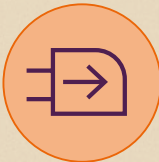


Mobility hubs as generators of station rent

Policy and design recommendations



Micromobility parking at stations



Station signage and continuity across stations



Micromobility parking at destinations



Incorporation into PTAL



Integrated trip planning and payment



Why micro-mobility and why now?

First and last mile connectivity

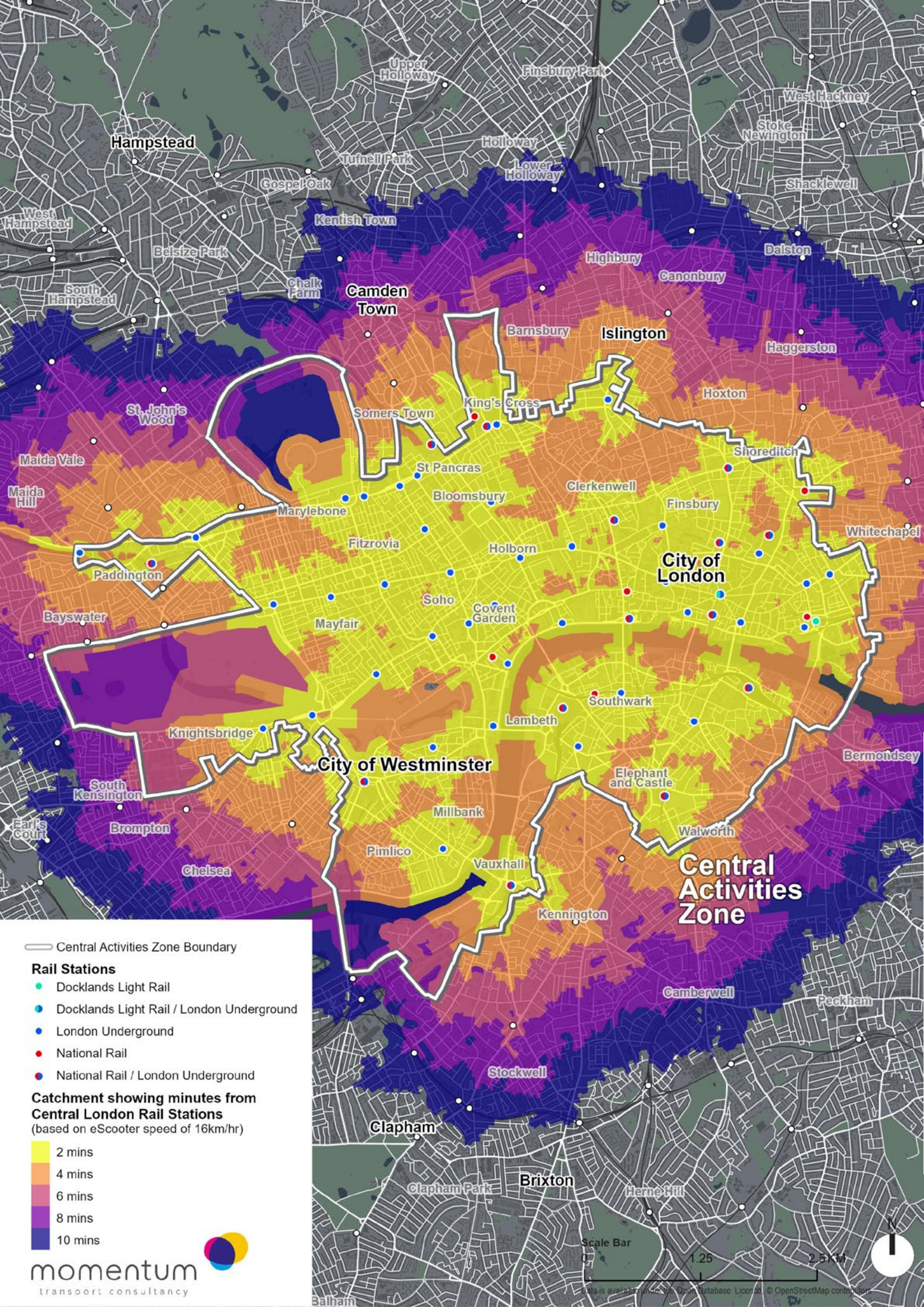
There is a growing consensus that micromobility can be an important piece in the jigsaw of the network of public and semi-public transport, improving connectivity to rail stations⁵. Although most studies completed over the past decade have assessed the benefits of rail-cycle synergies for first and last-mile station connectivity, more recent studies⁶ have found that cycling and micromobility may generate similar effects. Strong rail-cycle synergies create a “magic wand”⁷ that limits last-mile transfers and transforms diffuse passenger travel patterns into more concentrated stations with additional interchange options.

Passengers directly benefit from time savings, reduced trip complexity, and feedback effects (e.g. cycling improvements near a station can be used by cyclists who don’t regularly cycle to that station). Research has shown that passengers value their time spent using a single mode of transport (i.e. sat in a car or on a train) 2-2.5 times more highly than multi-modal travel – meaning clunky interchanges are viewed disproportionately negatively.

Providing improved first and last-mile connectivity is not only beneficial to passengers but also to transport operators. For rail, studies⁸ have found that improved first and last-mile station connectivity is more effective at increasing ridership than speeding up the railway, expanding the railway, or providing better service reliability. Put simply, rail and micromobility are naturally complementary: rail transport covers great distances at high speeds, but with limited flexibility running on fixed routes and timetables. Micromobility is limited in practical range but is highly flexible in terms of trip destination, route choice and timing.

Left.

This illustration shows a possible environment for internal micromobility parking within a station. By Momentum.



Why micro-mobility and why now?

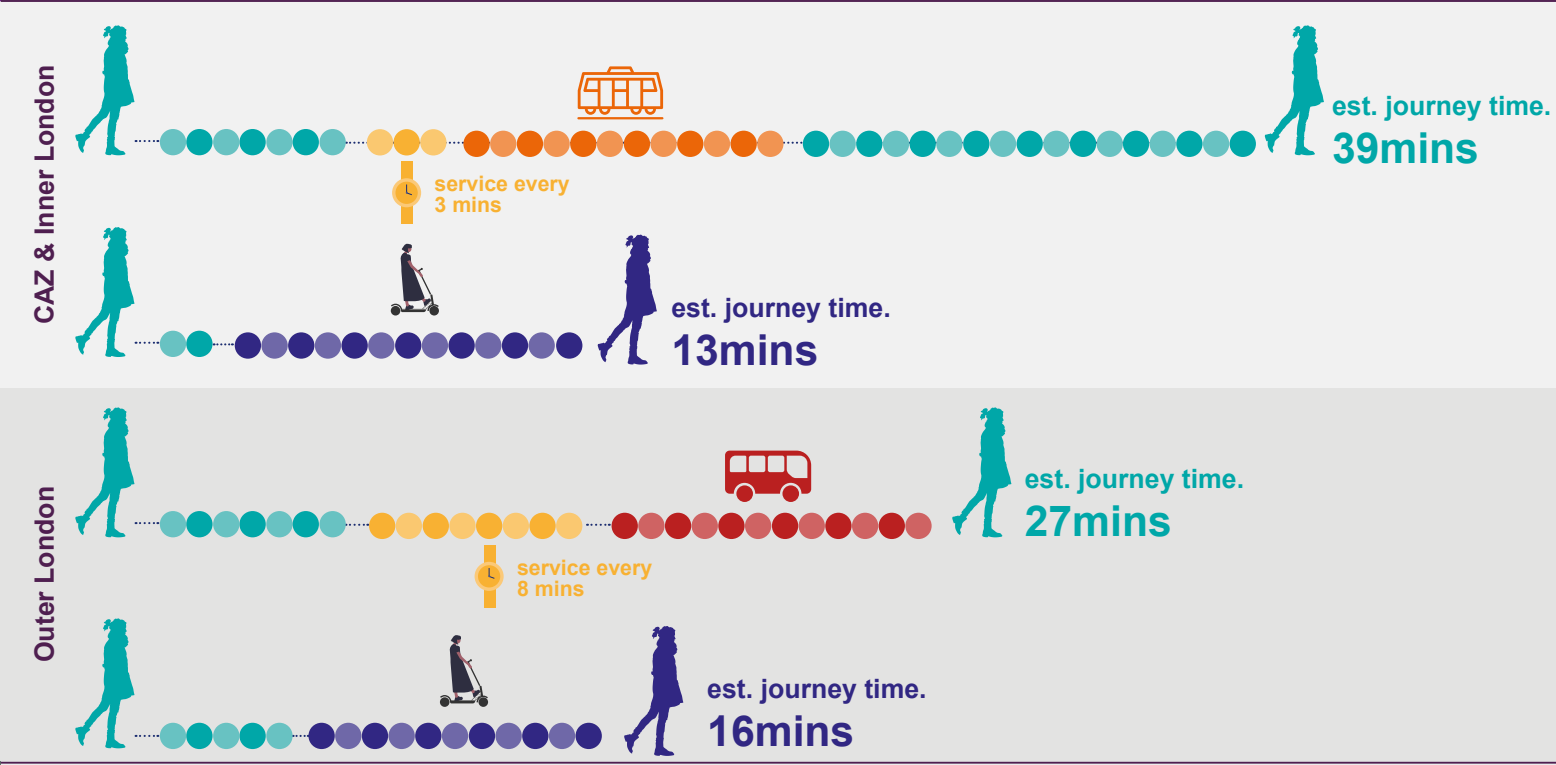
Reducing peak hour tube demand in central London

One key potential benefit of making micromobility available around London's major stations is the potential to shift trips from the Underground to micromobility services. This stands to be particularly valuable in the peak commuting periods, when – pre-Covid – many central Underground services were running highly-congested services.

As the Mayor's Transport Strategy⁹ already notes, 75% of tube stations below National Rail London termini depart with excessive crowding – and this was (pre-Covid) a trend expected to continue to worsen with population and employment growth in London.

The provision of shared micromobility services at stations would provide another travel option for onward journeys, potentially reducing demand on overcrowded services.

Whilst beneficial in the longer run as a means of potentially delaying or eliminating the need for very capital-intensive capacity enhancements on London's Underground network, in the short-term micromobility would also provide another means for social distancing.



Above. Above illustration presents indicative e-scooter journey times in comparison to existing public transport modes. Source: Dott 2020. By Momentum

Left. E-scooter catchments from Central London rail stations. By Momentum



Why micro-mobility and why now?

Developing at density in outer London

Micromobility offers the opportunity for adding another layer to an already rich network of public and semi-public transport options in central London. But perhaps the real value of micromobility lies in outer London, in the suburbs (and in cities with a less well-established network of public transport). Because the suburbs are more spread out, walking and cycling is less attractive but public transport options are also less available and less accessible.

Currently the car caters for suburban trips that are too far to easily walk or cycle yet require flexibility that public transport can't offer in these suburban locations. Micromobility can rival the flexibility of the car, but for more people, while allowing passengers to travel more quickly than walking, and with less effort than cycling. The use of micromobility would allow suburban residents to travel to leisure, commercial and employment spaces without the use of the car. For longer journeys micromobility brings more of the suburbs within range of a rail station – it extends the catchment area of suburban stations.

The Publication London Plan, London's spatial development plan, makes a connection between access to public transport and density levels. Places that are well-connected are permitted to deliver higher densities than poorly connected places. By expanding a station's catchment area, micromobility could enable increases in development density over more of the suburbs. The London Plan identifies Opportunity Areas in outer London where new stations are being planned or actively delivered. The amount of residential development being delivered, and its overall density might be increased in the Opportunity Areas through the incorporation of micromobility use.

Furthermore, the incorporation of micromobility infrastructure might allow for more new housing to come to market sooner, since large developments are currently reliant on new stations becoming operational first. With increased micromobility and fewer cars at suburban stations, newly dormant car parking space could be developable. This may benefit Network Rail and TfL, given they own significant car parking land around stations, meaning they could accelerate the already-advanced land development wings of their operations to further diversify their revenue streams.

Station placemaking & public realm

An increase in micromobility provision at London's stations can help boost station-area regeneration. Rather than viewing stations as mere transport interchanges, micromobility can support station area placemaking because, instead of immediately boarding subterranean tubes away from stations, passengers using micromobility will be more likely to interact with nearby shops and attractions.

This is supported by the London Cycling Campaign¹⁰ which argues that micromobility users can easily stop at points of interest and have more interactions with the nearby city.

A growing body of research¹¹ demonstrates that cycle lanes can substantially improve the economic vibrancy of a high street, through increased local spending – walking and cycling improvements can enhance retail spend by up to 30%. In turn, this can lead to higher land values near stations and increase the liveliness and attractiveness of the nearby public realm¹².

With more people wanting to live, work, and play near London's major termini than ever before (King's Cross, Paddington Basin, Nova at Victoria, Liverpool Street's Broadgate Circle), micromobility can contribute to the placemaking benefits of these resurgent station development schemes.

As new schemes continue to come forward above and around stations – such as the new Crossrail stations, Elizabeth House at Waterloo Station, a possible DLR extension to Thamesmead Waterfront – the incorporation of micromobility designs could provide further reason not to drive, meaning stations won't need to be surrounded by busy roads and car parking, but can be developed with improved retail and public realm.

Why micro-mobility and why now?

Mobility hubs as generating station rent

The growth of micromobility across London has occurred in tandem with Network Rail's *Tomorrow's Living Station* initiative which seeks to make Network Rail stations more than just entrances to the railway, but instead welcoming multi-modal interchanges¹³.

Tomorrow's Living Stations builds on CoMoUK's *Mobility Hubs* framework¹⁴, which pushes for public transport, shared transport, active travel and the public realm to all come together in one hub. If Network Rail can start to think of its London termini as a "network of hubs" connected by micromobility, then there is the possibility that all of central London will be within a micromobility ride of a termini station – effectively making these terminus stations genuine multi-modal hubs.

Becoming true multi-modal hubs can generate great economic potential for Network Rail; if people are attracted to Network Rail termini for their micromobility provision, regardless of if they were taking a train, then station retailers would benefit as more people would be visiting the stations and then using more of the station shops – which for now are mainly dependent on rail passengers. And these higher rents collected from station retailers could then be re-invested back into the rail network.





Policy and design recommendations

Micro-mobility parking at stations

Since too many bikes and scooters being brought onto trains may lead to unsustainable capacity issues, as well as slowing down the boarding process¹⁵, this report offers solutions to how cities can embrace shared micromobility integration at stations rather than facilitating the use of private micromobility.

The most critical question of physically integrating shared micromobility at London's rail termini is how and where they should be parked. As early as 2015, a joint TfL-Network Rail audit showed that most of Network Rail's London terminus stations lacked sufficient cycle parking to meet current demand, and certainly not enough to meet expected future demand¹⁶. Although the *Mayor's Transport Strategy*¹⁷ and *Cycle Parking Implementation Plan*¹⁸ call for more cycle parking at London's rail stations, these documents are relatively high level and do not address micromobility.

The first consideration is whether these vehicles are to be parked in static "docked" stations or if they should self-lock and be "dockless." While the *Cycle Parking Implementation Plan*¹⁹ calls for TfL and Network Rail to increase the provision of Santander Cycles at London's stations, they consume more space than "dockless" vehicles and are relatively expensive to install. Therefore, we see opportunity for a form of dockless micromobility to be prioritized over docked micromobility at London's termini. However, appreciating the well-publicised street clutter issues experienced elsewhere, our preferred parking solution is parking micromobility vehicles only within certain designated areas²⁰.

These areas would be enforced through geo-fencing and physical measures such as painted areas. Moreover, these parking bays should have recharging capabilities to avoid "juicing" vans having to come and pick up depleted vehicles at night. Where outside public realm space is available, such as at stations like King's Cross, micromobility hubs can be placed there.

However, given that most London termini have both minimal available interior and exterior public realm space, (e.g. Waterloo Station) and rather than Network Rail take away existing cycle parking for micromobility, this report recommends the strategy that micromobility firms rent out retail units within stations to act as parking "stations within stations". Concerns on safety (i.e. passengers riding e-scooters into dense station concourses) can be mitigated through operators renting retail units that open directly onto a street.

Left.

This illustration shows a possible environment for external micromobility parking on the King's Cross Station forecourt. By Momentum.

Policy and design recommendations

Station signage and continuity across stations

If there are to be clearly identified micromobility parking bays, they must be developed in tandem with simple, clear and user-friendly station signage. While the DfT and *Mayor's Transport Strategy*²¹ call for increased collaboration between Network Rail, the DfT, and TfL to improve station cycling signage, these efforts should also extend to micromobility.

A frequent complaint among dissertation interviewees, and supported by the *Mayor's Transport Strategy*, is that London's rail stations have poor cycle signage. As TfL's cycle terminology and wayfinding have improved, TfL, Network Rail and others can also incorporate micromobility wayfinding at stations. Network Rail can improve its signage for micromobility.

Micromobility parking bays should be consistently signed across all London stations. And whether micromobility parking is located within a station (i.e. in a retail unit) or outside in the public realm, all micromobility parking bays must be branded as part of that station.

As ample research²² and anecdotal evidence across London has made clear, London developers in recent years have realised that high quality public realm and good cycle provision is highly valued by tenants and makes their buildings easier to let.

Driven partly by tenants' demands, and partly by stringent cycling requirements in the *Publication London Plan* and *Mayor's Transport Strategy*, it's unclear if these cycling requirements will be extended to micromobility moving forward. The Greater London Authority (GLA) and Mayor should rectify this ambiguity immediately.

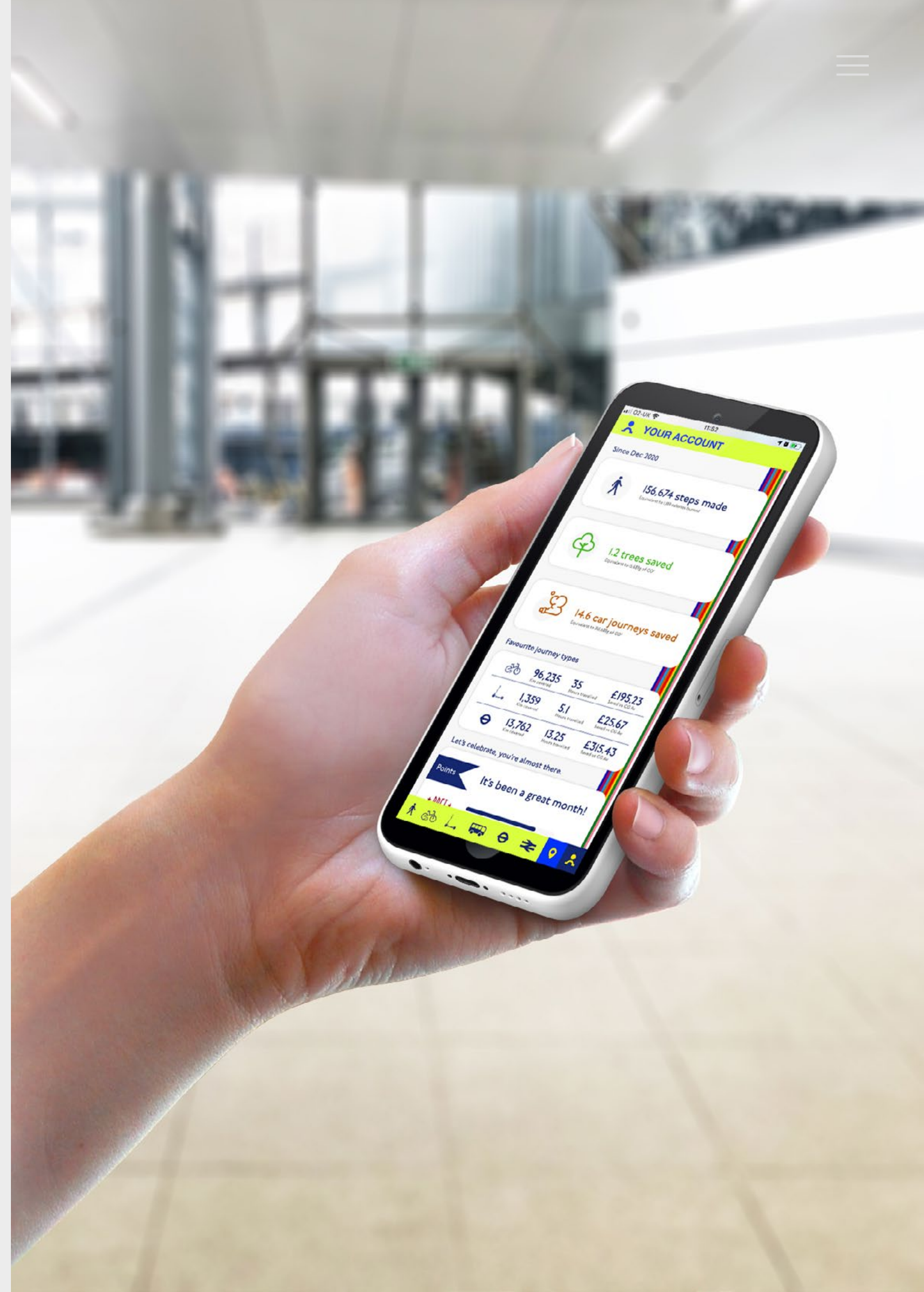
Micromobility parking at destinations

Even with ample micromobility provision and infrastructure at station origins, similar infrastructure is required at destinations – such as shopping areas, offices and residential areas.

To achieve these “destination” parking and charging zones, developers might look to contribute ground-level, publicly-accessible space with either incentives from the GLA and boroughs or to let the space as retail units to micromobility operators.

They may also look to create dedicated micromobility parking within their developments to complement, rather than cannibalise, their cycle-parking facilities. Although developers are now comfortable with the provision of racks and associated facilities for cyclists, micromobility provision needs to remain sensitive to the public nature of shared vehicles, meaning more prominent locations will thrive for shared micromobility parking.

Momentum has recently released more specific guidance to developers on micromobility parking design and quantities at offices, to support with the simultaneous growth in private micromobility.



Policy and design recommendations

Incorporation into PTAL

TfL might consider incorporating micromobility as a component of Public Transport Accessibility Levels (PTAL), and/or within the Cycling Transport Accessibility Level (CTAL) moving forward. PTAL, an index calculated by TfL to determine a location's accessibility to the public transport network, is used to determine development-density standards.

The commonly used PTAL does not account for cycle trips on cycle routes, nor does it account for micromobility. The incorporation of micromobility into PTAL calculations, or using an alternative complementary PTAL, may incentivise developers to provide infrastructure to facilitate denser development.

Not everyone can, or will want to, use micromobility and so the use of a new tool incorporating cycling and micromobility should not be the only tool available. Micromobility's use alongside PTAL could provide a more granular understanding of a site's accessibility.

Integrated trip planning and payment

If micromobility is to improve first and last-mile station connectivity at London's stations, then the first and last-mile should be considered as part of one's total journey, not an additional "trip building block" added to the bulk part (i.e. rail) of one's journey. As new DfT²³ ambitions acknowledge, single-priced journeys on multi-modal trips need to become more prevalent across the UK.

The integration of ticketing between various rail operators is no mean feat, particularly with London running an alternative ticketing technology to the rest of the country's rail system. In the long run, though, it seems to be the only option. Seamless ticketing between public transport services is familiar in London with Oyster and Contactless card payment, but this seamless payment should now be taken a step further to incorporate rail ticketing, as well as expanding to incorporate forms of transport within London not currently covered, such as the Santander Cycles and private micromobility providers.

As journey planners such as CityMapper incorporate a multitude of providers, the next step of payment integration would create a step change in a seamless passenger journey experience.

Conclusion

Micromobility is here and, in order to avoid issues around street clutter and lack of usage, a series of physical and policy measures should be introduced at London's major rail termini and elsewhere. The way that operators, local authorities, TfL, Network Rail and others design for micromobility will significantly change the experience of users – and this will determine whether micromobility is here to stay or a technological 'blip' in London's transport history.

Micromobility can enrich London's transport network, potentially encouraging users to switch from congested rail and Underground services to enable efficient last-mile transport options for people travelling for work and leisure. With London's transport network traditionally designed to support suburb to central trips for commuting, micromobility also provides a significantly more flexible means of completing radial trips in London (i.e. those trips which are not from suburb to central London, but between areas across London).

Micromobility infrastructure is significantly cheaper to introduce than any rail service, and likely bus services too, allowing for relatively cheap changes to the infrastructure – once introduced – which enables an infrastructure provision that is flexible to meet demand changes, particularly important in our post-COVID recovery.

At the stations where micro-hubs could be introduced, the attraction of users to these hubs could well improve the vitality of the public realm surrounding stations, which are central to all modern station developments. Further afield, suburbs and new developments on the fringes of London and other cities may well be able to support increased residential densities by virtue of having expanded access to nearby stations, supporting much-needed housing development.

In order to realise the many potential benefits of the integration of micromobility and rail services, we recommend a series of measures to make parking at stations attractive, convenient, and legible. We believe all of these measures will improve the uptake and safety of micromobility, locking in long-term benefits for London.

Of course, the recommendations presented in this report are merely the starting point and, as with all innovation, unforeseen challenges will be experienced in the roll-out and usage of micromobility. We encourage operators, policy makers and users to remain open minded and flexible to understand how best to plan and design for micromobility in cities.

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Footnotes & additional resources

Footnotes

¹Arvidsson, N.; Givoni, M.; and Woxenius, J. 2016. 'Exploring Last Mile Synergies in Passenger and Freight Transport' Built Environment 42 (4): 523-538.

²Kim, J. and Lee, B. 2019. 'More than Travel Time: New Accessibility Index Capturing the Connectivity of Transit Services' Journal of Transport Geography 78: 8-18.

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¹⁶Transport for London. 2019. 'Cycle Parking Implementation Plan' Available online

¹⁷ibid, Proposals 1c and 50

¹⁸ibid, Action 2 and Action 5

¹⁹TfL, ibid, Proposal 55

²⁰Dott. 2020. 'A sound launch for micromobility services in the UK: the challenge of parking'

²¹TfL, ibid, Proposal 55

²²British Council of Offices. 2017. 'The Market Cycles'

²³Department for Transport. 2019. 'Future of Transport Regulatory Review: Call for Evidence'

Additional resources

A sound launch for micromobility services in the UK: The challenge of parking.

By Grace Packard.

URL. <https://momentum-transport.com/micromobility-the-challenge-of-parking/>

Designing for Micromobility, parking in offices.

By Grace Packard, Florencia Cinalli and David Hart

URL. https://momentum-transport.com/wp-content/uploads/2020/12/201218_Micromobility-Parking-by-Momentum.pdf.

E-bikes: The leader of the micromobility pack?

By James Draper.

URL. <https://momentum-transport.com/electric-bicycles-the-leader-of-the-micromobility-pack/>

E-Scooters: Love them or Hate them, they're coming

By Grace Packard.

URL. <https://momentum-transport.com/e-scooters-love-them-or-hate-them-theyre-coming/>

