TRANSPORT FOR THE
South East

Future mobility strategy

Supporting technical report

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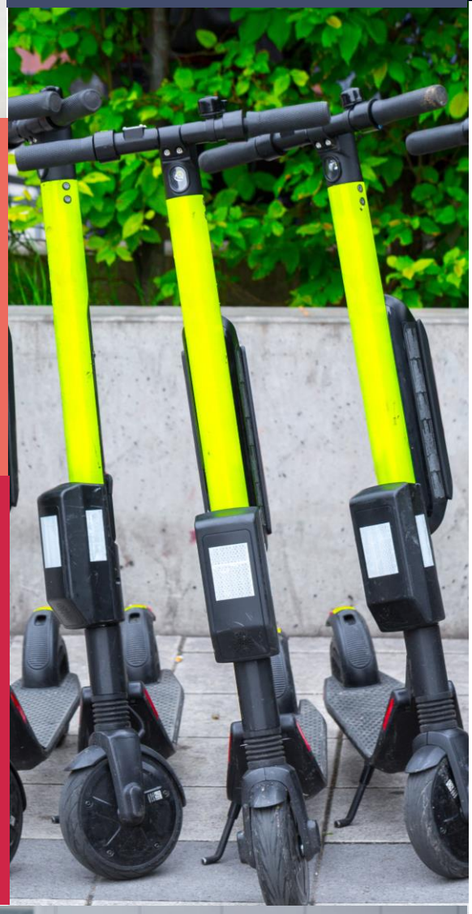

Contents

Introduction

1. Introduction

Future mobility strategy

This document presents the technical analysis undertaken in the development of the Transport for the South East future mobility strategy. This is one of three documents that together form a package of publications; these include:

- Future mobility strategy;
- Future mobility strategy: strategic plan; and
- Future mobility strategy: technical report.

The project was undertaken through a methodology encompassing four core tasks as set out below:

Core Task 1: High level strategy, policy and investment fit

The aim of this task was to refresh the work of Transport for the South East's future transport technology review (2019) to ensure that the strategy is based on the latest evidence and understanding. This core task included: a future technology review; policy, funding, legal and regulatory review; analysis of strategy interdependencies; industrial sector analysis; horizon scanning; and analysis of roles and responsibilities.

Core Task 2: The potential that future mobility interventions could have in meeting future social, economic and movement needs

This task focused on analysing the future mobility services; future outlook; development of current and future population segments; place typologies; and the development of a long list of interventions.

Core Task 3: Future mobility strategy

This task produced the future mobility strategy itself supported by: the vision and objectives; the multi-criteria assessment framework (MCAF) and its application; and the place-based bundles of interventions, using propensity and deliverability analysis.

Core Task 4: Strategic plan

This task produced the strategic plan to support the future mobility strategy and included the development of the high-level monitoring and evaluation framework; identification of roles and responsibilities and asks from partners and stakeholders; a delivery pathway for each intervention to be taken forward.

Future technology review

2. Future technology review

The first task undertaken for core task 1 was the review of the Transport for the South East future transport technology report[1] from August 2019. The review has identified a number of key issues and trends that have come to the fore since the previous report was published:

- **Climate change:** Over the last year climate change has become an increasingly prominent issue across the UK and around the world. The declaration of climate emergencies by many local authorities, including 11 in the Transport for the South East area, has put increasing energy behind work to limit carbon emissions and build resilience into the transport system. In addition, the global COVID-19 pandemic has presented an opportunity for new questions to be asked of the UK's approach to transport and its environmental impacts and there may be opportunities now to push forward more urgently and more significantly with responses to transport's impact on climate change.
- **COVID-19:** The emergence of the new coronavirus resulting in the COVID-19 global pandemic has been a human tragedy but has also resulted in unprecedented impacts on the global, national, regional and local economies. The situation around COVID-19 in the UK remains fluid and changing and the future progress of emergence from restrictions is uncertain and open to significant risk. Transport has been one of the most visibly impacted sectors of the economy with people told to remain at home, social distancing substantially reducing the capacity of public transport and freight and logistics being more visible as a fundamental infrastructure to the functioning of the economy. There have also been shifts to more active travel with temporary improvements to infrastructure put in place and debates around the future provision for such modes.

At present the medium- and long-term mobility impacts of both COVID-19 and the economic harm it has caused are unclear. However, understanding will continue to develop, and a key role of the Future mobility strategy will be to support the reopening of the economic and social recovery following the pandemic.

- **Future Transport Zones:** The Transport for the South East Future Transport Technology Review was published during the bidding process for the Future Transport Zones (FTZs; formerly known as Future Mobility Zones). In the preceding months, three of the seven final bids have been awarded FTZ funding including Nottingham & Derby, West of England and, importantly for the South East and this strategy, the Solent Transport bid.

The launch of the zones was delayed somewhat due to the ongoing disruption caused by COVID-19, however, the FTZs provide a significant opportunity, both in the South East and further afield, to learn from state-of-the-art research into future mobility modes, services and infrastructure. All three projects commenced in 2020.

- **Policy development:** Over the course of the last two years since the future transport technology report was published, policy has continued to be published that directly leads or influences future mobility. The next section of this report summarises thus this but it is worth highlighting here that a further key policy document, the DFT's Future of Mobility: Rural Strategy, may be published over the coming months and will provide key policy direction in this space alongside its sister document, the Future of Mobility: Urban Strategy.
- **New modes:** New mobility modes, models and services continue to emerge and evolve, and since the previous report was written, two particular modes have come to the fore. The FTZs were supposed to be the focus for trialling e-scooters, to research the mode that is already becoming embedded in the mobility eco-systems of many European cities and beyond. However, the need to increase choices in the alternatives to single-occupancy car travel and public transport in light of COVID-19, has resulted in the UK Government pressing ahead earlier with trials outside of the FTZ programmes.

The FTZs and COVID-19 have also pushed the development and use of delivery drones further. The Solent Transport FTZ has already trialled the limited use of drones for deliveries between the mainland and the Isle of Wight while delivery of medical products has been undertaken by drone to the Isle of Mull of the west coast of Scotland.

[1] https://transportforthesoutheast.org.uk/wp-content/uploads/2019/10/Future-transport-technology.pdf

- **Mobility hubs:** Since the Transport for the South East future transport technology report was published mobility hubs have become a major trend across the mobility sector and the development of mobility hubs, across a range of spatial typologies is ongoing. Late in 2019 CoMoUK[2] launched guidance for the development of hubs and a number of authorities are developing proposals, either area wide, or for specific sites. In late 2019, South East of Scotland Transport Partnership (SESTran) let possibly the first major study to identify a standard area wide approach for mobility hubs and Midlands Connect has awarded a commission to develop guidance for mobility hubs for rural areas as part of its future of rural mobility strategy.

  Over the course of the past year, the mobility hub concept itself has evolved with early concepts focussing on the interchange of modes and provision of supporting facilities. This has now developed into a much wider place-focussed concept that agglomerates movement with wider complementary utility functions, such as convenience retail, healthcare, childcare, co-working space and business unit. This provides the opportunity to concentrate high density activities around the most accessible locations and develop hubs of both movement and economic activity.

[2] https://como.org.uk/wp-content/uploads/2019/10/Mobility-Hub-Guide-241019-final.pdf

Policy Context

3. Policy context

Updating the background

The Transport for the South East Future transport technology report presented a local and national overview including an understanding of the sub-national government and economic structure in the South East as well as a review of the wider policy context for the future of mobility.

This section of the working paper updates the previous report with summaries of additional policy documents, most of which have been published since.

The Ten Point Plan for a Green Industrial Revolution (2020):[3]

In November 2020, the Government announced a ten-point plan for a "green industrial revolution" which includes ending the sale of new petrol and diesel cars and vans by 2030, ten years earlier than originally planned. Plug-in hybrid electric vehicles (PHEVs) will still be permitted to be sold until 2035. The ten-point plan consists of:

1. Point 1 - advancing offshore wind;
2. Point 2 - Driving the growth of low carbon hydrogen;
3. Point 3 - Delivering new and advanced nuclear Power;
4. Point 4 - Accelerating the shift to zero emission Vehicles;
5. Point 5 - Green public transport, cycling and walking;
6. Point 6 - Jet zero and green ships;
7. Point 7 - Greener buildings;
8. Point 8 - Investing in carbon capture, usage and storage;
9. Point 9 - Protecting Our Natural Environment; and
10. Point 10 - Green Finance and Innovation.

Future of Mobility Urban Strategy (2019):[4]

The Future Mobility Urban Strategy outlines key principles and policies that the government will implement to further advance future mobility in the UK. The strategy identifies the following six key changes:

- Automation;
- Cleaner transport;
- New business models;
- New modes;
- Data & connectivity; and
- Changing attitudes.

25 Year Environment Plan (2018):[5]

The environment plan details how the government will work with communities and businesses to improve the environment and what the government will be doing over the next 25 years to achieve their goals. Four early priorities in relation to mobility have been identified:

- Establishing a flexible regulatory framework to encourage new modes of mobility and new business models;
- Seizing opportunities and addressing the challenges of moving from hydrocarbon to zero emission vehicles;
- Preparing for a future of new mobility services, increased autonomy, journey sharing and a blurring of the distinctions between private and public transport; and
- Exploring ways to use data to accelerate the development of new mobility services and enable the more effective operation of our mobility system.

Clean Growth Strategy (2018):[6]

This strategy sets out government proposals for decarbonising all sectors of the UK economy through the 2020s. It explains how the UK can benefit from low carbon opportunities, while meeting national and international commitments to tackle climate change. The ambition for mobility that is set out in the strategy is for a more modern mobility system, one that is clean, affordable and easy to use. A 2032 pathway is set out with measures to upgrade the mobility system to help achieve it.

[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment data/file/936567/10_POINT_PLAN_BOOKLET.pdf
[4] Future of Mobility: Urban Strategy (2019) Department for Transport. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/846593/future-of-mobility-strategy.pdf Accessed: 12 October 2020.
[5] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment data/file/693158/25-year-environment-plan.pdf
[6] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf

Decarbonising Transport: Setting the Challenge, DFT (2020):[7]

The Government is developing an ambitious plan to accelerate the decarbonisation of transport. The transport decarbonisation plan (TDP) will set out in detail what government, business and society will need to do to deliver the significant emissions reduction needed to achieve net zero emissions by 2050. This paper sets out emissions, by mode of transport, for movement of people and goods and sets out six strategic priorities. These priorities have been identified to deliver a net zero transport system:

- Accelerating modal shift to public and active transport;
- Decarbonisation of road vehicles;
- Decarbonising how we get our goods;
- Place-based solutions;
- UK as a hub for green transport technology and innovation; and
- Reducing carbon in a global economy.

Air Quality: Clean Air Zone Framework for England, DEFRA (2020):[8]

This framework sets out the principles for the operation of clean air zones in England. It provides the expected approach to be taken by local authorities when implementing and operating a clean air zone. Local authorities can use this framework to deliver clean air zone outcomes. This framework identifies the outcomes clean air zones are expected to deliver aligned with three themes:

- Supporting local growth and ambition (decoupling growth and pollution);
- Accelerating the transition to a low emission economy; and
- Immediate action to improve air quality and health.

Options might include steps to support ULEVs in developments in Clean Air Zones; requirements to support parking and recharging of Clean Air Zone compliant vehicles; and design and support for public transport, walking and cycling accessibility.

Clean Air Strategy, Department for Environment, Food and Rural Affairs (2019):[9]

The report outlines the UK strategy to tackle sources of air pollution and reduce emissions, highlighting how the priority has shifted from large individual sources of pollution to the contribution of smaller, more diffused sources of air pollution. The report highlights the key role that transport must play in reducing emissions, with the sector (inclusive of road transport, domestic shipping, aviation and rail) currently being responsible for 50% of nitrogen oxides, 16% of fine particulate matter (PM2.5) and 5% of non-methane volatile organic compounds (NMVOCs). Actions to reduce emissions from transport include the immediate challenge to reduce roadside concentrations of nitrogen oxides of which roads transport is responsible for 80%.

Inclusive Transport Strategy, DFT (2018):[10]

This strategy sets out the Government's plans to make the transport system more inclusive, and to make travel easier for disabled people. While it is focused on the inclusion of disabled people, many of the improvements will also benefit other travellers. The strategy states that emerging technologies such as connected and autonomous vehicles (CAVs) and mobility as a service business models (MaaS) have the potential to change the way disabled people travel. With active engagement, technology can enable new ways for older people or those with visible or less visible conditions to get around. However, the strategy also highlights that without active engagement and consideration of their needs, innovations can risk accidently 'designing out' sections of society.

Road to Zero (2018):[11]

The Road to Zero outlines a strategy to cement the UK as a leader in the design and manufacturing of zero emission vehicles, for all new cars and vans to be zero emission by 2040 and to ensure that by 2050 almost every car and van will be zero emission. The document sets out the actions Government will take to achieve this aim. The measures included amount to nearly £1.5 billion of investment. Key actions include the on-street residential chargepoint scheme, the electric vehicle homecharge scheme and the workplace charging scheme amongst many others.

Since publication of the Road to Zero, in November 2020 the Government announced a ten-point plan for a "green industrial revolution" which includes ending the sale of new petrol and diesel cars and vans by 2030, ten years earlier than originally planned.

[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/878642/decarbonising-transport-setting-the-challenge.pdf

[8] https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england

[9] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment data/file/770715/clean-air-strategy-2019.pdf

[10] https://www.gov.uk/government/publications/inclusive-transport-strategy

[11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment data/file/739460/road-to-zero.pdf

New Technology and Automation in Freight Transport and Handling Systems (Government Office for Science, 2019):[12]

This report presents a state-of-the-art review of new technologies and automation in freight transport and handling. The review identifies:

- key emerging technologies, how are they being applied in the UK, and examples of (international) best practice;
- the drivers of, and constraints on, innovation in the UK freight sector; and
- implications for policies and research.

One of the key technologies identified in the report is autonomous vehicles (AVs) as an emerging solution for last mile deliveries. A driver of change that is identified in the report is superfast/gigabit broadband and high-speed mobile networks which the reports states will be fundamental to stimulating innovation in the freight sector. However, constraints identified in the report include the need for complementary infrastructure, perceived safety and reliability, resistance to change amongst institutions and labour force and perceived limited added value.

The report looks at what the future of freight could look like in the UK. With regards to AVs and CAVs, the report states that they may require more time to be commonly used for freight transport on the long haul and fully automated systems for last-mile deliveries might replace more traditional delivery settings (e.g. trucks or vans). However, due to their complexity they may not become widely used until much further into the future.

Better Delivery: the challenge for freight (NIC, 2019):[13]

The National Infrastructure Commission was asked by the government to provide advice on how to ensure an efficient, low carbon freight system, that manages its impacts on congestion and utilises technology to continue to provide a world class service that supports the UK's growth and global competitiveness. The Commission's central finding is that through the adoption of new technologies and the recognition of freight's needs in the planning system, it is possible to decarbonise road and rail freight by 2050 and manage its contribution to congestion. Connected and autonomous vehicles (CAVs) are identified as disruptive new technologies that could fundamentally alter the operation of freight in the UK.

Aviation 2050, The Future of UK Aviation (2018):[14]

The aim of the new aviation strategy is to achieve a safe, secure and sustainable aviation sector, the report outlines six objectives in detail. New and emerging technologies are identified as a means of addressing some of the challenges facing the sector such as empowering passengers through information at all stages of their journey, minimising delays at borders, developing innovative solutions for aviation security, encouraging data sharing between aviation sector organisations and advancing automation and electrification of aircraft.

Future flight challenge phase 2: strand 1, fast track development (2020):[15]

UK registered businesses can apply for a share of up to £30 million to develop integrated aviation systems and vehicle technologies that enable new classes of electric or autonomous air vehicles. This funding is from the Industrial Strategy Challenge Fund. Solutions should be able to be integrated into a mature operational environment, ensuring safe and reliable operation in flight and on the ground. Phase 2 of a 3-phase programme will fund projects up to 18 months duration, shorter duration that can deliver rapid impact. Strand 1, the 'fast track' strand encourages applications from smaller businesses and organisations who may not work within the aerospace or aviation sector.

Connected Future: Getting back on track, NIC (2020):[16]

This review examines the progress by government against recommendations made by the National Infrastructure Commission in the 2016 connected future report on 5G digital mobile connectivity. The review finds that a lack of leadership from government, frequent ministerial changes, and split departmental responsibilities have halted any initial momentum in steps to improve rail passengers' access to mobile services. In contrast, UK road users have benefitted from 'clear, continuous progress' on connectivity, with UK motorways now offering near universal coverage for voice and data calls and good progress elsewhere across the roads network.

Design Principles for National Infrastructure, NIC (2020):[17]

This paper sets out four principles to guide the planning and delivery of major infrastructure projects: climate, people, places and value. The principles should be applied to all economic infrastructure, including mobility.

[12] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781295/automation_in_freight.pdf
[13] https://www.nic.org.uk/wp-content/uploads/Better-Delivery-April-2019.pdf
[14] https://www.gov.uk/government/consultations/aviation-2050-the-future-of-uk-aviation
[15] https://apply-for-innovation-funding.service.gov.uk/competition/591/overview
[16] https://www.nic.org.uk/publications/connected-future-getting-back-on-track/
[17] https://www.nic.org.uk/publications/design-principles-for-national-infrastructure/

- Climate – Mitigate greenhouse gas emissions and adapt to climate change;
- People – Reflect what society wants and share benefits widely;
- Places – Provide a sense of identity and improve environments; and
- Value – Achieve multiple benefits and solve problems well.

Physical infrastructure for high speed electronic communications networks (2016):

This document introduced a new requirement for in-building physical infrastructure which enables connections to broadband networks for new, and existing undergoing major redevelopment, residential dwellings and other buildings in England.

Route Strategies: April 2015-March 2020, Highways England: These route strategies establish outline operational and investment priorities for England's major roads for the period April 2015-March 2020. Many routes are within, through or adjacent to the South East, including:

- Kent Corridor to M25 (M2 and M20);
- South Coast Central; and
- London Orbital and M23 to Gatwick.

Road Investment Strategy 2 (RIS2): 2020 to 2025:[18]

This paper sets out plans for strategic road investment between 2020 and 2025 but also presents a strategic, long-term vision for what the strategic road network should look like in 2050. The 2050 vision is for a greener, smarter, safer, integrated and reliable network that supports the economy. Within the 2050 vision, the paper states that there should be no gaps in digital infrastructure to allow the roads of the future. The vision also includes the majority of all vehicles using the SRN, including almost all cars and vans, to be zero emission at the tailpipe, transforming the impact of the SRN on air quality and carbon emissions.

Calls for evidence

Future of Transport Regulatory Review (2020):[19]

This is a call for evidence asking for information and views on micromobility vehicles, flexible bus services and mobility as a service. The consultation closed on 3rd July 2020 and asked:

- Whether certain micromobility vehicles (such as electric scooters) should be permitted on the road, and if so what vehicle and user requirements would be appropriate;
- How effective existing rules are around flexible bus services, and which other areas of the bus, taxi and private hire vehicle framework should be considered in this review; and
- What the opportunities and risks of MaaS platforms might be, and what role central and local governments should play in their development.

The results of this consultation were posted in November 2020. In total, 1,066 responses were received, 821 responses from individuals and 245 from organisations. As a result of this consultation, the DFT have committed to:

- Continue to engage with stakeholders on regulatory proposals relating to micromobility, alongside taking account of lessons learned from e-scooter trials;
- Engage with demand responsive transport (DRT) service operators and collate findings from Rural Mobility Fund schemes and services deployed in response to COVID-19, to inform the forthcoming National Bus Strategy;
- Take forward a code of practice for Mobility-as-a-Service (MaaS), and continue our work to improve the quality, accessibility and discoverability of transport data;
- Investigate ways to improve awareness of the Equality Act 2010, and work with the Cabinet Office Disability Unit ahead of the upcoming National Strategy for Disabled People;
- Use findings and learning from trials of new vehicles and services to explore what approaches or guidance can be developed to support trialling;
- Explore what approaches or guidance can be developed to support local leadership of new transport services and alignment with the upcoming Devolution and Local Recovery White Paper; and
- Continue to engage with stakeholders to understand what regulatory changes may be needed to support innovation.

Future of Transport: Rural Strategy (2020):[20]

Following the DfT's Future of mobility: urban strategy, which was published in March 2019, the DfT are now seeking views and evidence on what could be incorporated into a future of transport: rural strategy.

[18] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872252/road-investment-strategy-2-2020-2025.pdf

[19] https://www.gov.uk/government/consultations/future-of-transport-regulatory-review-call-for-evidence-on-micromobility-vehicles-flexible-bus-services-and-mobility-as-a-service

[20] https://www.gov.uk/government/consultations/future-of-transport-rural-strategy-call-for-evidence

Electric Vehicle Charging in Residential and Non-Residential Buildings, Consultation (2019):[21]

This consultation sets out how the government propose to deliver the commitments set out in the Road to Zero strategy. The consultation looked at three policy positions:

- Policy position: Residential buildings - The government proposes every new residential building with an associated car parking space to have a chargepoint. We propose this requirement applies to buildings undergoing a material change of use to create a dwelling. The government proposes requiring every residential building undergoing major renovation with more than 10 car parking spaces to have cable routes for electric vehicle chargepoints in every car parking space;
- Policy position: New non-residential buildings - The government proposes every new non-residential building and every non-residential building undergoing a major renovation with more than 10 car parking spaces to have one chargepoint and cable routes for an electric vehicle chargepoint for one in five spaces; and
- Policy position: Existing non-residential buildings - The government proposes a requirement of at least one chargepoint in existing non-residential buildings with more than 20 car parking spaces, applicable from 2025.

The consultation closed in October 2019 and results are yet to be published.

Call for Evidence on Carbon offsetting in transport, DFT (July 2019):[22]

In July 2019, the DFT launched an inquiry into Carbon offsetting in transport looking at the role of carbon offsetting in transport across different modes of transport. The concluding report is still awaited.

Solent Future Transport Zone

Future Transport Zone Funding, Solent (2019):[23]

Solent Transport will receive a share of the Government's £90m Future Transport Zones funding pot to trial new transport technologies. Solent has been awarded £29m for a three-year programme that includes smartphone apps for planning and paying for sustainable journeys demand, an e-bike share scheme and new approaches to freight distribution (such as consolidation, zero emission last mile and drones). The Solent Mobility Zone programme proposes to address local challenges such as high levels of car usage and the impacts of freight movement within Solent's urban areas through delivering a series of complementary projects within two key themes, Personal Mobility and Sustainable Urban Logistics.

The Transport for the South East future mobility strategy needs to be cognisant of this study as the FTZ provides an opportunity for local collaboration on Future Mobility research with the South East and to share learning.

Local policy

Local enterprise partnerships

There are five Local enterprise partnerships that cover the South East to promote economic development across the region. These are:

1. Coast to Capital;
2. Enterprise M3;
3. South East;
4. Thames Valley Berkshire; and
5. Solent.

Key themes that emerged throughout the LEP policies include low carbon and digitally connected economies. There are also a number of sectors that have been identified by several of the LEPs including science and innovation, creative industries, aerospace, medical technologies and visitor economies. Policy from each LEP have been reviewed below.

Coast to Capital

Strategic Economic Plan (SEP), Coast to Capital (2018):[24]

The SEP set out in 2014 is also entitled Gatwick 360 as it is centred around a highly successful Gatwick airport. The SEP sets out a vision for towns and cities to be known around the world as fantastic places to live, grow and succeed by 2030. Also, to become the most dynamic non-city region in England. Eight economic priorities are set out which each include short- and long-term goals, the priorities are:

1. Deliver prosperous urban centres;
2. Develop business infrastructure and support;
3. Invest in sustainable growth;
4. Create skills for the future;
5. Pioneer innovation in core strengths;
6. Promote better transport and mobility;
7. Improve digital network capability; and

[21] https://www.gov.uk/government/consultations/electric-vehicle-chargepoints-in-residential-and-non-residential-buildings
[22] https://www.gov.uk/government/consultations/carbon-offsetting-in-transport-a-call-for-evidence
[23] http://www.solent-transport.com/images/Bids/future-mobility-zones-fund-application-form-final-proposal_30_09_19_FINAL_redacted.pdf
[24] https://www.coast2capital.org.uk/storage/downloads/coast_to_capital_strategic_economic_plan_2018-2030_pdf-1535099447.pdf

8. Build a strong national and international Identity.

Sector analysis identifies the importance of the horticulture, visitor economy, advanced manufacturing, creative, digital and IT, low carbon, professional and financial services, and health and life science sectors to the local economy. The analysis also reveals that the future economic strengths lie in a range of economic sub-sectors in distinct, localised areas and include:

- Med tech;
- Pharmaceuticals;
- Computer software;
- Programming and publishing;
- Data processing & hosting;
- Insurance and financial services;
- Telecommunications;
- Visitor economy and support services;
- Air transport;
- Horticulture and food manufacturing;
- Computer & consumer electronic manufacturing;
- Communications & navigation equipment manufacturing;
- Electric power generation and transmission; and
- Automotive manufacturing.

South2East Local Energy Strategy. Coast to Capital, SELEP & Enterprise M3 (2019):[25]

The strategy sets out a shared vision across three LEP regions to become a leader for sustainable energy production within the UK, powering innovative, decarbonised and clean economic growth. Five identified priority themes are:

1. Low carbon heating;
2. Energy saving and efficiency;
3. Renewable generation;
4. Smart energy systems; and
5. Transport.

Projects identified in the strategy aim to attract investment into the region and significantly reduce carbon emissions.

Enterprise M3

Strategic Economic Plan (SEP), Enterprise M3 (2018):[26]

The SEP identifies two 'stimulants' that will generate economic expansion, digital and data technologies and the clean growth economy, which underpin the identified five priorities:

1. High value sectors for a globally facing economy;
2. Enterprise and innovation for scaling up high productivity SMEs;
3. Skills for a high value, high growth economy;
4. Connectivity for a 21st century advanced digital and low carbon economy; and
5. Dynamic communities and sustainable growth corridors.

Sector specialisations of the Enterprise M3 area include high value sectors such as digital, defence/aerospace, satellite technology, business services, and the creative industries, Enterprise M3 is identified as on the front line of the new economy.

Local Industrial Strategy, Enterprise M3 (2020):[27]

The local industrial strategy defines Enterprise M3's approach to the national Industrial Strategy. Smart Mobility is identified to support the EM3 area as a location in which to do business by providing better, cleaner and more efficient connections between businesses and their staff, supply chains and markets to enhance productivity and new approaches to mobility.

South East

Strategic Economic Plan (SEP), South East Local Enterprise Partnership (SELEP) (2014):[28]

The SEP set out in 2014 aims to generate 200,000 jobs and complete 100,000 new homes. The South East Transport Deal, included in the SEP, is composed of essential motorway and rail investment, strategic growth corridors and sustainable transport funding. Self-employment is above the national average in the SELEP area (11.0% compared to 9.8% for England). The SELEP area also has an above average proportion of registered micro-enterprises. Many parts of the SELEP economy are reliant on the public sector, wholesale, retail and accommodation, and construction jobs. Identified future priority sectors include advanced manufacturing; life sciences/medical technologies; transport and logistics; low carbon environmental goods and services, creative, cultural and media and the visitor economy.

[25] https://www.coast2capital.org.uk/storage/downloads/energy_south2east_-_energy_strategy-1554122644.pdf

[26] https://www.enterprisem3.org.uk/sites/default/files/2020-02/Strategic%20Economic%20Plan%202018.pdf

[27] https://www.enterprisem3.org.uk/sites/default/files/2020-02/EM3_LIS_Defining%20Our%20Approach_0.pdf

[28] https://www.southeastlep.com/our-strategy/local-industrial-strategy/

SmarterFasterTogether, SELEP (2019):[29]

SmarterFasterTogether sets out ambitions for the South East economy. The document outlines a five-year action plan to deliver on the Government's National Industrial Strategy and will lead to a Local Industrial Strategy for the South East. One of the top priorities is creating places which includes putting the South East's towns, cities and rural communities on the 'front foot' in responding to new technology and changing work patterns through better digital connectivity. The document also highlights how SELEP will use the location of the South East to become a leading location for 'smart places' by taking advantage of better digital communications and using public data. With regards to the future of mobility grand challenge from the National Industrial Strategy, the SELEP are mindful that the introduction of electric and autonomous vehicles will have potentially significant implications for the South East's large transport and logistics sector, which currently employs around 100,000 people.

Thames Valley Berkshire

Strategic Economic Plan (SEP), Thames Valley Berkshire (TVB) (2014):[30] The overarching priority of the SEP is to secure better access to talented people and bright ideas, and to use both more effectively. This is supported by six objectives, three relating to people and three relating to ideas. The people objectives are:

1. Use better those who are already in the workforce;
2. Inspire the next generation and build aspirations and ambition; and
3. Ensure that economic potential is not restricted by labour supply issues.

The idea objectives are:

1. Ensure that knowledge is effectively commercialised and grown within Thames Valley Berkshire;
2. Strengthen networks and invest in the 'soft wiring' to use ideas better; and
3. Make Thames Valley Berkshire's towns genuine hubs in the idea's economy.

The SEP highlights the TVB as having a vibrant population of SMEs and TVB are leading the way in terms of the strength of the tech-based (or, more precisely, IT-based) economy.

Solent

Transforming Solent: Growth Strategy, Solent (2015):[31]

The Growth strategy summarises Solent's economic plan for the period 2014-2020. The strategy aims to unlock jobs and growth through six enabling strategic priorities:

1. Supporting new businesses, enterprise and ensuring SME survival and growth;
2. Enabling infrastructure priorities including land assets, transport and housing;
3. Establishing a single inward investment model to encourage companies to open new sites;
4. Investing in skills to establish a sustainable pattern of growth, to the benefit of local residents;
5. Developing strategic sectors and clusters of marine, aerospace and defence, advanced manufacturing, engineering, transport and logistics businesses, low carbon, digital and creative and the visitor economy; and
6. Building on our substantial knowledge assets to support innovation and build innovative capacity.

The strategy sets out key investment proposals including a £7m Enterprise Zone capital grant, £124.8m package of funding through the Local Growth Deal, £16.78m Growing places Capital Fund, £28.9m EU strategic investment funding and £24m across a range of Regional Growth Fund programmes.

Transforming the Solent: Productivity and Growth Strategy Update, Solent (2017):[32]

The update of the growth strategy sets out future priorities for the Solent area which are:

- Developing our economic infrastructure;
- Skills;
- Science and Innovation;
- Inward Investment and International Trade;
- Enterprise; and
- Strategic Sectors.

Solent Growth Deal:[33]

- The Solent LEP secured £124.8m through Solent Growth Deal 1 in 2014 with an extra £27.1m secured through Solent Growth Deal 2 and a further £31.02m under Local Growth Deal 3 in 2017 to invest in high profile projects.

[29] https://www.southeastlep.com/app/uploads/2019/03/SELEP_StratEconState_singles.pdf
[30] http://www.thamesvalleyberkshire.co.uk/getfile/Public%20Documents/Strategic%20Economic%20Plan/TVB%20SEP%20-%20Strategy.pdf?inline-view=true
[31] https://solentlep.org.uk/media/1508/transforming_solent_growth_strategy_-_jan_2015.pdf
[32] https://solentlep.org.uk/media/1860/productivity-and-growth-strategy-update-february-2017.pdf
[33] https://solentlep.org.uk/what-we-do/solent-growth-deal/

Funding Review

4. Funding Review

Funding

As stated in the Draft Transport for the South East Future transport technology report, the Future of Mobility: Urban Strategy outlines the national context for the funding mechanisms available to enable the development of new mobility solutions. Through the future mobility strategy, Transport for the South East can be an enabler, helping the South East to secure a larger proportion of funding to support future mobility research, development, innovation and intervention.

The previous report identified the funding mechanisms aimed at supporting industry and local leaders; Table 4-1 reiterates and expands on those previously identified:

Table 4-1 - Summary of Funding

Total Funding Available	Title	Funding for:
£90 million Funding allocated	Future Transport Zones (formerly Future Mobility Zones)	Foster experimentation and trialling (as part of the Transforming Cities Fund).
£1 billion Funding available	Advanced Propulsion Centre	Support the automotive industry to adapt
£248 million Funding to 2025	Faraday Battery Challenge (Industrial Strategy Challenge Fund)	Supporting the automotive industry to adapt
£80 million Competition closed	'Driving the Electric Revolution' Challenge (Industrial Strategy Challenge Fund)	Supporting the automotive industry to adapt
£26 million Competition closed	Manufacturing and Future Materials Challenge (Industrial Strategy Challenge Fund)	Supporting the next generation of affordable light-weight composite materials including for aerospace and automotive
£28 million Competition closed	Self-Driving Cars Challenge (Industrial Strategy Challenge Fund)	Supporting three projects to develop next generation AI and control systems for driverless cars (DRIVEN, RoboPilot and Streetwise)

Since the Transport for the South East future technology report was published, some £29 million has been awarded to the Solent Transport bid to the FTZ fund. It is also rumoured that a further bidding round may be forthcoming for FTZ, either for previously unsuccessful shortlisted bidders or for open competition.

The FTZ Fund is part of the Transforming Cities Fund and there have been opportunities to build future mobility into those bids to the TCF including those in the South East for Southampton and Portsmouth. Southampton has been awarded £5.7m and Portsmouth and South East Hampshire awarded £4m.

With the possible publication of a rural-focussed follow up to the Future of Mobility: Urban Strategy, there has been significant pressure on the DFT to replicate the funding associated with the Urban Strategy and provide funding for rural-focussed future mobility projects.

The Advanced Propulsion Centre funding continues with its £1 billion funding over 10 years with three further competitions in 2020. The Industrial Strategy Challenge Fund projects also continue, with, for example, the Faraday Institute's four initial projects in 2018 and a further five projects launched in the autumn of 2019.

The Transport for the South East future technology report also highlighted the following funding mechanisms aimed at technology specific development programmes which continue to operate:

Table 4-2 – Technology Specific Funding Mechanisms

Total Funding Available	Title	Funding for:
£400 million Funding closed	Charging infrastructure investment fund	Zero emission vehicles
£2 million Funding closed	E-Cargo Bike Grant Programme	Zero emission vehicles
£125 million Competition closed	Future Flight Programme (Industrial Strategy Challenge Fund)	Drones and future flight
£120 million – bidding open	Zero Emission Bus Regional areas scheme (ZEBRA).	Zero emission vehicles.

Since the publication of the report there have been further funding announcements from the DFT including:

Table 4-3 – Further DFT Funding Announcements

Total Funding Available	Title	Funding for:
£50 million – winners announced (Coventry and Oxford)	All-Electric Bus Town (A Better Deal for Bus Users)	A pilot to electrify an entire town or city's bus fleet
£20 million – winners announced	Rural Mobility Fund	Funding to trial on-demand bus services in rural or suburban areas

In addition to the above, there have been further ongoing funding mechanisms via Innovate UK with regular opportunities to bid. The following is a summary of current relevant funding opportunities:

Table 4-4 – Innovate UK Funding Opportunities

Total Funding Available	Title	Funding for:
£30 million Competition closed July 2020	Future flight challenge phase 2	UK registered businesses can apply for a share of up to £30 million to develop integrated aviation systems and vehicle technologies that enable new classes of electric or autonomous air vehicles. This funding is from the Industrial Strategy Challenge Fund
£2.5m Competition closed June 2020	NATEP: helping SMEs innovate in aerospace, spring 2020	UK micro, small and medium-sized enterprises (SMEs) can apply for a share of up to £2.5 million for industry led civil aerospace research projects.
£3.9billion across whole programme Funding ongoing	Aerospace Technology Institute Programme	The ATI Programme provides funding for industrial research and capital projects to encourage innovation in UK civil aerospace.
£25m Competition closed May 2020	Innovate UK Smart Grants	Opportunity to apply for a share of up to £25 million to deliver ambitious or disruptive R&D innovations that can make a significant impact on the UK economy.

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Funding for future mobility is not restricted to innovation funding streams with the potential to link into established sources of funding in the public and private sector. The draft Transport for the South East Transport Strategy funding & financing options Report[34] highlights a range of opportunities open not just to the overall strategy itself but potentially to the Future mobility strategy. It should be noted that the majority of these opportunities are outside of the scope for Transport for the South East itself to directly utilise and are reliant on others to secure funding or finance.

National funding

- Direct DFT funding to Transport for the South East;
- Periodic DFT funding opportunities for local authorities such as the Housing Infrastructure Fund, National Productivity Investment Fund and Transforming Cities Fund;
- Network Rail enhancement, renewals and innovation funding;
- Highways England, through RIS2;
- National Roads Fund; and
- Funding in response to COVID-19.

Local revenue

- Direct contribution from stakeholders;
- Workplace parking levy;
- Intelligent or congestion charging, road user charging;
- Community Infrastructure Levy (CIL) and Section 106 (S106) contributions;
- Strategic infrastructure Tariff;
- Business Rate Increment Retention;
- Business Rate Supplement;
- Council Tax Increment Retention;
- Council Tax Precept;
- Farebox Surplus/Premium Fare; and
- Asset utilisation (e.g. property assets, road and car park assets).

Financing

- Public Works Loan Board;
- Policy Bank lending via a possible National Infrastructure Bank;
- Commercial lending;
- UK Municipal Bonds Agency;
- Corporate finance;
- Non-recourse finance (project finance); and
- Asset Backed Vehicles.

In addition to the above, there may be funding opportunities through:

- Local authority capital funding through the DFT's Integrated Transport Block which may facilitate the application of future mobility projects; and
- City regions and local enterprise partnerships from their own budgets and the government funding they secure.

[34] https://transportforthesoutheast.org.uk/wp-content/uploads/2019/10/Funding-and-Financing-Options.pdf

Legal and Regulatory Review

5. Legal and Regulatory Review

Introduction

As outlined in the Future of Mobility: Urban Strategy (2019), a thriving mobility sector needs an innovative and flexible regulatory framework. The impact of the digitisation of society on transport has increasingly blurred the lines between different modes and business models, and accelerated the emergence of new products, ideas and behaviours. Consequently, the UK's regulatory framework, that has evolved over centuries, is being challenged. Areas of UK transport regulation are therefore being reviewed to ensure they are not becoming outdated, which risks being a barrier to innovation and hinders the UK's ability to attract the best global transport technologies to invest and locate in the country. Reviews and updates are also occurring in order to ensure regulations are designed with new technologies and business models in mind.

This section will review the evolving regulatory framework in which the Transport for the South East future mobility strategy will operate, highlighting recent regulatory changes relating to the six key future mobility changes outlined in the Future of Mobility: Urban Strategy and areas where the current systems my evolve further, particularly as a result of **the Future of Transport Regulatory Review: Call For Evidence** that was announced March 2020.[35]

Automation

Improved sensing technology, computing power and software engineering are leading to increasing levels of automation in transport, across many different modes. However, before self-driving vehicles are approved for commercial service, it is necessary for industry to clearly demonstrate that they are safe.

In terms of automation relating to road vehicles, in 2015, the UK published its world-leading **Code of Practice**[36] for the safe trialling of self-driving vehicles on public roads which importantly aimed to also build public confidence in automated vehicle technologies and services (updated in 2019). Support of the safe development of automated technologies in the UK has also been facilitated by the 2018 launch of the three-year **Law Commission** review of the regulatory framework for the safe deployment of automated vehicles in the UK and the **Automated and Electric Vehicles Act**[37] in 2018. The detailed Law Commission regulatory review, which aims to examine any legal obstacles to the widespread introduction of self-driving vehicles and identify where reforms may be required, is currently in the third consultation stage. The first consultation covered safety assurance and legal liability, the second consultation covered highly automated road passenger services and the third aims to draw together all responses to formulate overarching proposals. Final policy recommendations will be provided in the final quarter of 2021.

The Automated and Electric Vehicles Act (2018) in turn amended the existing compulsory third party insurance framework by extending it to cover the use of automated vehicles. By taking a proactive approach to answering insurance questions, the UK has hoped to encourage manufacturers to develop transport technology in the UK with the confidence that they can exploit market opportunities.

The UK Government is also an active participant in international discussions regarding road autonomy, influencing new vehicles standards and potential changes to the rules of the road. Partaking in discussions such as that of the United Nations Economic Commission for Europe's Global Forum for Road Traffic Safety and World Forum for Harmonisation of Vehicle Regulations are particularly important.

In relation to maritime autonomy, the Government has established a **Maritime Innovation Lab** (MAR Lab) to pioneer innovative regulatory approaches to Maritime Autonomous Surface Ships (MASS). Led by the UK's maritime regulator, the Maritime & Coastguard Agency, MAR Lab is responsible for developing a flexible and practical domestic regulatory framework to facilitate safe and innovative testing of vessels. Again, the UK has international aspirations in relation to maritime autonomy and aims that the MAR Lab will enable the UK to gather a body of evidence and expertise that will enable it to lead international efforts to regulate maritime autonomy at the **International Maritime Organisation (IMO)**.

Cleaner transport

In order to meet the UK economy wide net zero commitment by 2050, all transport modes need to decarbonise. Consequently, regulation to reduce

[35] Department for Transport, 2020. Future Of Transport Regulatory Review: Call For Evidence. Moving Britain Ahead. [online] London: Department for Transport. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/886686/future-of-transport-regulatory-review-call-for-evidence.pdf> [Accessed 14 May 2020].

[36] Centre for Connected and Autonomous Vehicles, Department for Business, Energy & Industrial Strategy, Department for Transport, 2019. Code Of Practice: Automated Vehicle Trialling. [online] Available at: <https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling> [Accessed 1 June 2020].

[37] Butcher, L. and Edmonds, T., 2018. Automated And Electric Vehicles Act 2018. [online] House of Commons Library. Available at: <https://commonslibrary.parliament.uk/research-briefings/cbp-8118/> [Accessed 1 June 2020].

tailpipe emissions from new cars and vans is a crucial lever in helping the nation meet these targets.

The 2018 **Automated and Electric Vehicles Act** outlined enabling measures intended to help deliver the aim in the for almost every car and van to be a zero-emission vehicle by 2050. Taken together, the powers would allow Government to regulate if necessary, in the coming years, to improve the consumer experience of electric vehicle charging infrastructure, to ensure provision at key strategic locations like Motorway Service Areas (MSAs), and to require that charge points have 'smart' capability.

Since publication of the Road to Zero, in November 2020 the Government announced a ten-point plan for a "Green Industrial Revolution" which includes ending the sale of new petrol and diesel cars and vans by 2030, ten years earlier than originally planned. Plug-in Hybrid electric vehicles (PHEVs) will still be permitted to be sold until 2035.

The Road to Zero stated that now the UK has left the EU it will pursue a future approach that is at least as ambitious as the current arrangements for vehicle emissions regulation. This includes recent CO2 emission reductions for cars and Heavy Duty Vehicles (HDVs) whereby manufacturers face fines for non-compliance:

- New car CO^2 emission reductions regulations came into effect on 1 January 2020 setting targets out to 2030 which apply in the UK. The regulation sets binding CO^2 emission reduction targets for new cars[38] of 15% by 2025 and 37.5% by 2030 (based on a 2021 baseline); and
- New Heavy Duty Vehicle (HDV) CO^2 emission standards regulation came into effect in July 2019. This establishes, for the first time, CO^2 reduction targets for HDVs. The new regulation sets binding CO^2 emission reduction targets for HDV manufacturers[39] of 15% by 2025 and 30% by 2030 (based on 2019 emission levels).

In 2019 the Government consulted on requiring charge points to be built in all new homes with a parking space, smart requirements for private charge points, and the introduction of green number plates to raise awareness, and increase uptake, of cleaner vehicles. Government is also working with industry to make charge point data freely available so that software developers can develop the tools which drivers need to easily locate and access available charge points. Government has powers in the **Automated and Electric Vehicles Act 2018** to facilitate this and is prepared to intervene to ensure a good deal for consumers if the market is too slow to deliver improvements across the entire network. In 2020 the Government published a vision for a core network of rapid/high-powered charge points along the strategic road network. The Rapid Charging Fund was announced in the March 2020 Budget as part of a £500 million commitment for EV charging infrastructure. The purpose of this programme will be to ensure that there is a rapid-charging network ready to meet the long-term consumer demand for electric vehicle chargepoints ahead of need. The following ambitions will be supported by the Rapid Charging Fund to assist where the electrical connection costs of upgrading sites to meet future charging demand is not commercially viable:

- By 2023, there is an aim to have at least 6 high powered, open access chargepoints (150 - 350 kilowatt capable) at motorway service areas in England;
- By 2030, there is an aim for there to be around 2,500 high powered chargepoints across England's motorways and major A roads; and
- By 2035 there is an aim for around 6,000 high powered chargepoints across England's motorways and major A roads.

New business models

New digitally enabled business models of transport provision are emerging, changing the way people access, book, pay for and experience mobility. However, in order for business models such as demand responsive transport (DRT) and Mobility-as-a-Service (MaaS) to deliver their full potential they must enhance journey experience, enable greater social inclusion and access, and potentially help to deliver more sustainable transport services. The Government is aware that existing regulatory frameworks need to be updated to account for data driven technological advances. In the context of demand responsive transport, powers acquired in the **Bus Services Act 2017**[40] are a starting point in this updating process by requiring all bus operators in England to release route, timetable, fare, and location information for local bus services. In January 2020 the Bus Open Data Service went live with the aim of aiding bus passenger journey planning.

Bus, taxis and private hire vehicle legislation, needs modernisation to encompass increasingly flexible service offerings that are not defined by vehicle size or

[38] Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO2 emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011 (Text with EEA relevance.) (online). Available at: http://data.europa.eu/eli/reg/2019/631/oj

[39] Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 setting CO2 emission performance standards for new heavy-duty vehicles and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC (online). Available at: https://eur-lex.europa.eu/eli/reg/2019/1242/o

[40] Legislation.gov.uk. 2017. Bus Services Act 2017. [online] Available at: <http://www.legislation.gov.uk/ukpga/2017/21/contents/enacted> [Accessed 1 June 2020].

static routings. Previously, regulation assumed a clear distinction between buses, taxis and PHVs however new business models have blurred these boundaries. As part of the Future of Transport Regulatory Review, the Government is keen to update the 2004 amendment to the **Public Service Vehicles (Registration of Local Service) Regulations**[41] relating to flexible bus services and is considering the following matters:

- Categories of service;
- Area of operation definitions;
- Time windows e.g. should operators be required to provide real-time information.
- Pre-booking & Ad-hoc journeys;
- Fare structures;
- Bus Service Operators Grant e.g. should it be adjusted to accommodate the development of flexible bus services?
- Record keeping e.g. in the context of the Data Protection Act 2018; and
- Safeguarding.

Mobility-as-a-service platforms, which aim to provide a layer between mobility providers and consumers, by integrating and analysing data from multiple modes of transport to offer a choice of journeys to consumers, also require UK regulatory changes in order to reach their full potential. Current legislation and regulation relevant to MaaS is spread across multiple levels of government and fragmented across modes. The Future of Transport Regulatory Review is also consulting on MaaS, particularly focusing on:

- Data – e.g. A number of initiatives have already opened and digitised relevant data across modes such as The Bus Services Act 2017[42], **The Joint Rail Open Data Action Plan**[43]**, The Rail Sector Deal**[44] **and The Local Data Action Plan**, however the Government is interested in measures required for standardisation and interoperability of data;
- Competition impacts – e.g. Consideration of MaaS in relation to **Competition Act 1998**[45] and **Enterprise Act 2002**[46]; and
- Consumer protection – e.g. Does the current consumer regulatory framework need to be expanded to include liability for multi-modals journeys?

Accessibility and inclusivity – e.g. Are there inclusivity and or accessibility concerns that might be difficult to address through existing regulations such as **Consumer Rights Act 2015**[47] and Part 12 of the **Equality Act 2010** which provides legal protections for disabled transport users.

- Digital accessibility – e.g. Not all sectors of society have access to smartphone applications, what actions can be taken to ensure all can access applications and who is responsible for delivering solutions?
- Financial accessibility – e.g. those without a bank account and those relying on cash;
- Data privacy – e.g. are there any concerns regarding data privacy from MaaS that are not protected by **General Data Protection Regulation**[48] (GDPR) or the **Data Protection Act 2018**[49]; and
- Modal shift – e.g. concern that as MaaS applications make it simpler and quicker to book and pay for transport, more convenient door-to-door transport options will compete with active travel over short distances.

New modes

Technology is increasingly enabling new ways of transporting people and goods which are not necessarily encompassed in existing UK regulatory structures.

Drones

Drones or unmanned aerial vehicles (UAV), have become popular in recent years for both recreational and commercial uses, such as last-mile delivery, maintenance and inspection, as the technology has improved and costs reduced. Additionally, passenger Vertical Take-off and Landing service technologies are being invested in and developed globally.

The Civil Aviation Authority (CAA) is the chief independent statutory body responsible for the regulation of aerial drones and has implemented a number of regulations that govern drone use in the

[41] Legislation.gov.uk. 2018. The Public Service Vehicles (Registration Of Local Services) (Amendment) Regulations 2018. [online] Available at: <http://www.legislation.gov.uk/uksi/2018/439/made> [Accessed 1 June 2020].
[42] Legislation.gov.uk. 2017. Bus Services Act 2017. [online] Available at: <http://www.legislation.gov.uk/ukpga/2017/21/contents/enacted> [Accessed 1 June 2020].
[43] GOV.UK. 2018. Joint Rail Data Action Plan. [online] Available at: <https://www.gov.uk/government/publications/joint-rail-data-action-plan> [Accessed 1 June 2020].
[44] HM Government, 2018. Rail Sector Deal. Industrial Strategy. [online] London: HM Government. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/790469/beis-rail-sector-deal-accessible.pdf> [Accessed 2 June 2020].
[45] Legislation.gov.uk. 1998. Competition Act 1998. [online] Available at: <http://www.legislation.gov.uk/ukpga/1998/41/contents> [Accessed 1 June 2020].
[46] Legislation.gov.uk. 2002. Enterprise Act 2002. [online] Available at: <http://www.legislation.gov.uk/ukpga/2002/40/contents> [Accessed 1 June 2020].
[47] Citizensadvice.org.uk. 2015. The Consumer Rights Act 2015. [online] Available at: <https://www.citizensadvice.org.uk/about-us/how-citizens-advice-works/citizens-advice-consumer-work/the-consumer-rights-act-2015/> [Accessed 1 June 2020].
[48] Gdpr-info.eu. 2016. [online] Available at: <https://gdpr-info.eu/> [Accessed 1 June 2020].
[49] GOV.UK. 2018. Data Protection Act 2018. [online] Available at: <https://www.gov.uk/government/collections/data-protection-act-2018> [Accessed 1 June 2020].

UK, most of which are outlined within the **Civil Aviation Act 1982**[50] and the **Air Navigation Order 2016**[51], as amended in 2019. For example, it is an offence to endanger aircraft, drone pilots must not fly their drones near people or property, and drones have to be kept within visual line of sight. The 2019 amendment to the 2016 Air Navigation Order (ANO) extended the Flight Restriction Zone around protected airports from 1km to 5km as a result of significant disruption to UK airports in 2018. Drones are also covered under other laws, particularly if the drone has a camera mounted on it, such as data protection, privacy, liability, insurance, export, and intellectual property laws, as well as the common-law torts of nuisance and trespass.

In 2019 the Government published **Taking Flight: the future of Drones in the UK: Government response**[52], which outlined the next steps the UK needs to ensure safety, security and accountability of the drone industry, whilst harnessing the benefits that drones, used in a safe way, can bring to the UK economy. As a result, a **Draft Drones Bill** has had a first reading in parliament which aims to bring about new measures such as giving the police more powers to request evidence from drone users where there is reasonable suspicion of an offence being committed. As of November 2019, it was also announced that operators of drones weighing more than 250grams will be required to register to a national registration scheme, pass an online competency test and pay an annual fee of £9 before they can fly their drones.

Micromobility vehicles

Micromobility vehicles, which are defined by the Department for Transport as small, usually electric, mobility devices designed to carry one or two people, or for 'last mile' deliveries e.g. electric scooters, electric skateboards and self-balancing vehicles. As with emerging business models, micromobility innovations challenge previously long-established vehicle definitions and most cannot legally be used on the road due to the fact that they are classed as 'motor vehicles' in law which requires them to meet a wide range of requirements. Therefore, the **Future of Transport Regulatory Review** is considering whether and how regulation should change to legalise the use of some or all of micromobility vehicles on roads. It will consider:

- Vehicle requirements – Which minimum design standards should be applied and how vehicles should be approved;
- User requirements – What requirements users must meet to use micromobility vehicles and how we should regulate micromobility vehicles for any type of user;
- Use on the road – Whether micromobility vehicles should be permitted on roads, cycle tracks, cycle lanes or pavements; and
- Service provider requirements – What rules should apply to businesses operating micromobility vehicle hire schemes and the powers local authorities should have to manage such schemes and their impacts.

It should be noted that as a result of transport challenges arising from Covid-19, e-scooter trials have been fast tracked to June 2020 (instead of 2021) in order to encourage more people to be more active and move from single occupancy cars and onto greener alternatives. Originally the trials were due to take place in three 'Future Transport Zones' alongside the existing West Midlands zone, however the trials will now be offered to all local areas across the country.

Data & connectivity

The harnessing of data and connectivity underpins nearly every element of Future Mobility and if used properly, promises to make public transport more transparent, convenient, efficient, accessible and affordable. However, regulation and protection of transport data and associated algorithms is vital in creating a quality transport system.

In terms of the regulatory framework that is required to enable appropriate collection and use of data, the following considerations need to be taken. These are currently under review as part of the Future of Transport Regulatory Review:

- Data sharing:
  - What role there may be for regulation, or other incentive mechanisms, to support the sharing of transport data in a way that is fair to both innovators and transport authorities and protects individual privacy; and

Determine which datasets should be shared, and with whom, striking a balance between empowering local authorities and consumers and being fair to those who have invested in collecting and formatting data.

[50] Legislation.gov.uk. 1982. Civil Aviation Act 1982. [online] Available at: <http://www.legislation.gov.uk/ukpga/1982/16/pdfs/ukpga_19820016_en.pdf> [Accessed 2 June 2020].

[51] Civil Aviation Authority, 2016. The Air Navigation Order 2016 And Regulations. [online] Publicapps.caa.co.uk. Available at: <https://publicapps.caa.co.uk/docs/33/CAP393_Fifth_edition_Amendment_13_March_2019.pdf> [Accessed 2 June 2020].

[52] Department for Transport, 2019. Taking Flight: The Future Of Drones In The UK Government Response. Moving Britain Ahead. [online] London: Department for Transport. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/771673/future-of-drones-in-uk-consultation-response-web.pdf> [Accessed 2 June 2020].

Interdependencies

6. Interdependencies

A review has been undertaken of the draft Transport for the South East transport strategy, the outputs from the consultation on the document, and the Transport for the South East future transport technology report to identify the interdependencies between the two documents.

Table 6-1 – Summary of interdependencies

Interdependency theme	Challenge/opportunity	Impact
Climate change and environment	Future mobility's role in supporting more ambitious climate change targets and wider environmental protections/ improvements	The future mobility strategy will need to support the transport strategy and wider policy drivers to achieve the zero-climate change emissions target as a key priority particularly with regard to the role of e-mobility. The full implications of the Court of Appeal's decision on Heathrow Third Runway are yet to become clear but it may have significant impacts on future major infrastructure projects. The future mobility strategy will need to consider wider environmental issues including air quality and impacts on the natural, built and historic environment.
COVID-19	The global coronavirus pandemic has presented a range of challenges and opportunities.	The impact of the lockdown and move to a 'new normal' presents short, medium and potentially long-term challenges to the economy. This may impact on the delivery of both the transport strategy and future mobility strategy through changes in funding availability and the commercial viability of modes, services and infrastructure interventions. Opportunities to support the economy through new mobility modes and services may increase through demand for digital-as-a-mode (including home-working, remote education, remote healthcare, online retail, etc) and first mile/last mile modes, however the willingness of users to share assets may be impacted in the short term.
Brexit	The UK has left the EU, and this presents potential challenges to the future mobility sectors	Uncertainty over trading internationally may constrain and reduce investment and the economic impact of the final trade agreements is unknown. Both the transport strategy and future mobility strategy could be affected by this issue.
Modes	The future mobility strategy is reliant on the delivery of new modes to supplement the wider Strategy, but these can cause disruption to established networks	Future mobility blends new with established modes but the new can cause significant disruption to those existing markets. This could lead to challenges in delivering the wider transport strategy if it is based on the continued development of established modes in their current form. For example, the digitisation of DRT has the potential to substantially disrupt traditional bus services, more so than established non-digital demand responsive transport, and the rapid roll out of e-scooter legislation and trials has the potential to disrupt other first mile/last mile modes. However, future mobility also provide opportunities to support and enhance established modes through, for example, improvements in planning, ticketing, payments and propulsion. Whilst these may also be disruptive, they could provide patronage opportunities. The pace of change in new modes is variable and uncertain making strategy development for both wider networks and future mobility challenging. Future mobility development is often reliant on the private sector to deliver and with business models that do not necessarily facilitate integration with existing networks.
Energy	To achieve challenging climate change targets both the wider transport strategy and future mobility strategy will be reliant on changes to energy generation and supply.	Electrification of both established and new modes, services and infrastructure will generate significant demand for electricity generation and for it to be green. There could be local network constraints. Within local areas, the supply networks may limit the ability of developers, organisations, fleet operators and consumers to transition to zero carbon propulsion. Networks also require adaption to enable smart generation, supply and storage to make the most efficient use of energy and related networks
Digital communications	Communications are a key dependency of future mobility with many new modes reliant on digital connectivity	Strong digital networks will be necessary to support future mobility interventions, and, increasingly, the evolving established modes, networks and services. The development of digital connectivity through superfast broadband and 5G promises to help transform mobility. However, spatial variability of communications means that, at present, some rural areas lag behind core urban areas, limiting the reach of some future mobility interventions. Digital-as-a-mode is reliant on strong communication networks and variability presents inequality issues. Furthermore, digital working and commerce present both challenges and opportunities ranging from increasing delivery vehicle traffic to reducing need to commute in traditional peak periods, at least some of the time. The use of digital-as-a-mode during the COVID-19 pandemic has demonstrated, for example, that many people can effectively work from home for a significant proportion of the time.
Behaviour change	The Transport strategy and future mobility strategy are both reliant on behaviour change to secure objectives	Established transport modes and services networks have long struggled to change traveller behaviour to encourage a shift from private car to sustainable modes. Future Mobility interventions also face challenges from behaviours such as the acceptance of sharing, concerns over autonomous vehicles and inappropriate use of micro-mobility modes. To support behaviour change, it is therefore important to plan for people and places rather than simply the provision of modes and services to help behaviour change through a customer or needs-led approach.

Interdependency theme	Challenge/opportunity	Impact
Spatial planning	The interaction of land use and transport is key to the working of a modern economy and the integration of policies can support wider objectives and outcomes.	As with many changes in transport in the past, such as the rise of the private car and containerisation of freight, new modes can present significant challenges to established land use patterns. However, future mobility also presents opportunities to redress previous negative impacts of transport by reducing the need to travel, helping to meet zero carbon targets, reduce car dominance and rebalancing space towards people and communities. In addition, transit or future mobility-orientated development focusses intensive demand for travel around the most accessible locations.
Economic development and employment	Supporting the economy and employment are a primary purpose of transport, both established and new	A key driver for both the transport strategy and future mobility strategy will be to support planned economic growth within the region. This will need to focus on delivering sustainable development and limiting the negative impacts of resulting demand whilst also facilitating the necessary movement of people and goods. The Future mobility strategy as well as the transport strategy need to align with wider economic policies including the strategic economic plans and local industrial strategies.
Planning for people and places	The transport strategy has taken a people and place-focussed approach	The future mobility strategy needs to align with the transport strategy in terms of taking a people and place-focussed approach to the development of interventions rather than a purely mode of technology-focussed approach. Planning for mobility needs to consider the variation in communities including considering the young, the ageing, life stages, gender, the socially/financially excluded, the less-abled as well as wider society.
Education	Transport is reliant on key skills and education to deliver new modes, services and infrastructure	The ability of the transport sector to develop is reliant on the having the right skills within its associated professions and future mobility understanding is only now starting to develop within the industry. Digital learning and technology in education are driving changes in campuses, courses, work patterns, behaviours and achievements. Our schools, colleges and universities may look different as a result. As employment patterns change the need for lifelong learning may increase to support changes in careers throughout individuals' working lives
Health and wellbeing	Transport provides access to healthcare and presents opportunities for improved wellbeing, but it can also have detrimental impacts on health	The transport industry needs to work towards reducing health impacts through improving air quality, facilitating more active lifestyles, reducing noise and limiting the impacts of infrastructure on communities. Future mobility, alongside established network transport modes, services and infrastructure, has opportunities to facilitate improvements but there is potential for unintended consequences in the development of new modes. For example, the convenience of new modes, such as DDRT or ride-hailing, may reduce the propensity for active travel and leading to more sedentary lifestyles. Future mobility also needs to face wider health-related issues such as the ageing population, leading to more demand for travel by people with varying mobility needs, and the digitisation of healthcare resulting in changing travel patterns.
Retail and services	Retail and services are central elements of the economy but how people and businesses interact are changing	Changes to retail and service provision are presenting challenges to established transport networks (e.g. through demand for home deliveries) whilst also enabling consumers to engage remotely. The 'High Street' continues to evolve in the face of many challenges, not least COVID-19, and there is a shift to a more experience-based consumption of shopping and related services. This is changing our town and city centres and the demand for travel associated with retail and leisure. Both the transport strategy and the future mobility strategy need to reflect changes in these markets, harnessing positive changes and helping to mitigate negative impacts.
Freight and logistics	Freight and logistics are a major generator of transport movements within the South East	Transport policy often focusses on the movement of people but freight and logistics, particularly in a world of increasingly digital consumption, is vital to the functioning of the economy. The providing for and managing the movement of goods within and through the South East are important to both the transport strategy and the future mobility strategy. The freight and logistics industry continue to evolve in the face of changing demands from consumers and new technologies available to operators to increase efficiency and reduce cost whilst also mitigating impacts.
International gateways	International gateways are key to the South East economy	The South East both generates and attracts international movements but is also a gateway to the UK, Europe and the global economy, through which people and goods pass. The transport strategy faces the challenges in international transport and the future mobility strategy has a role in supporting the meeting of those challenges. The long-term impacts of COVID-19 and Brexit on international travel are unclear but they could substantially change the demand and how people and goods travel.
Devolution of decision-making and funding	There is increasing devolution of decision-making within the transport sector	Both established and future mobility interventions could be delivered under devolved decision-making and funding following the development of the sub-national transport bodies and city regions. However, a significant proportion of delivery will be undertaken by other tiers of government including central government and local authorities.

Interdependency theme	Challenge/opportunity	Impact
Funding and investment	Funding for future mobility is likely to come from the same sources as the wider transport strategy	There are a wide range of funding sources available to both the transport strategy and future mobility strategy, but the availability of funding is limited and may become more so following the economic and fiscal impact of COVID-19.
Regulation and legislation	Changes to the transport regulatory framework may be required to support the delivery of future mobility and manage its impacts	Changes have already been made to the regulatory and legal framework to support the development of future mobility including those related to autonomous vehicles, for example. In addition, rapid changes are being made to legislation and piloting to test e-scooters in response to mobility issues related to the COVID-19 pandemic. Changes also continue to be made to support the further development of established modes (bus franchising for example) and this may need to continue to support future mobility interventions.
Stakeholders	The delivery of the strategies will be reliant on engagement with stakeholders	There are a substantial range of stakeholders related to future mobility as well as the wider transport strategy. The development and delivery of the strategies needs to consider the challenges, ideas and policies of stakeholders to ensure it is focussed on local conditions and objectives within the South East. Stakeholders need to be engaged from a wide cohort of interests outside of the immediate transport professionals. Businesses, communities, the arts, funding bodies, user groups, and others, need to be engaged to ensure that a sustainable, customer-focussed and needs based approach to achieving outcomes is delivered.
Partners	Transport strategies require the involvement of a range of partners to secure successful delivery.	Transport for the South East will require partners to deliver both the transport strategy and future mobility strategy. Those partners range across the public sector, private sector, academia and the arts, focussing on transport and a wider range of dependent and supporting sectors. Transport in the UK relies in many instances on an open marketplace and future mobility may continue to require market-driven investment alongside public sector funding to deliver interventions.
Existing programmes and proposals	Embedding future mobility thinking and interventions within existing transport programmes and proposals	There are a range of existing transport programmes and proposals, across a number of partners and stakeholders, which both strategies will need to be cognisant of and align with to deliver objectives and outcomes. However, where programmes and proposals exist, there should be connection with Future Mobility to ensure future readiness and reduce the potential for obsolescence.
Other Transport for the South East Studies	The interaction of the Future mobility strategy, Area Studies and Freight Strategy will be vital to the delivery of the Draft Transport for the South East Transport Strategy	Central to the development of future mobility strategy is the connections and interdependencies with the other Transport for the South East strategies. The future mobility strategy takes its strategic lead, in terms of scenarios, vision and objectives from the transport strategy but it will also interact with and provide interventions to the area studies and freight strategy.
Future Transport Zones	The Future Transport Zones, including the Solent Transport Zone, will be central to steering national future mobility understanding and practice	The future mobility strategy will need to consider emerging findings from the Future Transport Zones, including the Solent zone, both in terms of its development and its eventual delivery. Additional Future Transport Zones could present further opportunities to progress future mobility and embed the learning across the South East.
Safety and security	All transport must be safe and secure by design	As stated in the Future of Mobility: Urban Strategy, the planning, delivery and operation of future mobility must ensure that safety is paramount alongside the established transport network
Inclusivity	Transport must support all parts of the UK and all segments of society	Both established transport networks and future mobility must support all geographies, including urban and rural, and all segments of society across ages, wealth, life stage, gender and levels of mobility impairment.
Active travel	Active travel must remain the best options for short journeys	As stated in the Future of Mobility: Urban Strategy, active travel is central to the development of the transport system and is now increasing in importance as we recover from COVID-19. Both established and future mobility interventions must support continued and increasing active travel. The Government has recently announced an initial £250 million investment for the reallocation of road space to support active travel as the economy emerges from lockdown. Major cities around the world, including London and Paris, are also looking at major road space reallocation programmes.
Mass transit	Mass transit must remain fundamental to an efficient transport system	Mass transit must be the focus of planning for longer journeys both through established transport networks and future mobility
Congestion	Future mobility must help reduce congestion	Future mobility needs to lead to reduced congestion on our transport networks through more efficient use of space
Mobility marketplace	The marketplace for mobility must be open	As stated in the Future of Mobility: Urban Strategy, the marketplace for mobility must be open to stimulate innovation and give the best deal to consumers.
Integration	Established transport networks and future mobility must work together to support wider outcomes	Future mobility should form part of the wider integrated transport network with established modes to support wider environmental, economic and social wellbeing objectives.
Data	Data from new mobility services must be shared	The movement of data is vital to future mobility but it is also important that data is equitably shared to ensure the most can be made of this vital resource.

Sector Analysis

7. Sector Analysis

A review has been undertaken of the South East's strategic economic plan and the National Industrial Strategy to identify supporting and inter-dependent sectors to enable the development and delivery of a successful Future mobility strategy. The UK Standard Industrial Classification of Economic Activities 2007 has been used as a framework for evaluating sectoral activities in term of how activities in the sector may change themselves but also how the sectors could play a role in delivering Future Mobility outcomes.

The list of organisations listed in the righthand column is indicative of those present in the South East, but this is not a complete list of all organisations.

Table 7-1 – Review of Sectoral Activities

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
A: Agriculture, forestry and fishing	0.9%	Shifting dietary patterns over past 50 years Requirements for transparency in how food is produced and supplied from farm to fork Potential for increase in environmental impacts as intensification occurs to feed growing populations Precision agriculture using new technologies (e.g. drones, automated tractors) combines technology with livestock and crop science to increase production, improve quality and cut costs. Growth of biomass and carbon sequestration markets	Demonstrating & testing autonomous capabilities in controlled environments, potentially helping to overcome challenges such as labour shortages. Promoting use of new modes for rural use cases to introduce public to new technologies and change attitudes (e.g. drones for crop spraying) Electrification of sector vehicles to set precedent in rural areas.	Gowan Crop Protection, Reading[54] Goodwood Estate, Chichester[55] Barfoots of Botley, Bognor Regis[56]
B: Mining and quarrying	0.2%	Reducing carbon emissions from the sector Reducing extraction through increased recycling of materials and use of alternatives (e.g. recycled material road surfacing	Demonstrating & testing autonomous capabilities in controlled environments, potentially helping to overcome challenges such as labour shortages	Hanson UK. Maidenhead[57] Esso Petroleum, Leatherhead[58]

[53] ONS NOMIS December 2019
[54] http://avadex.co.uk/
[55] https://www.goodwood.com/goodwood-estate/
[56] https://www.barfoots.com/
[57] https://www.hanson.co.uk/en
[58] https://www.esso.com/en

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
C:Manufacturing	7.8%	Traditional production techniques are being disrupted by additive (3D printing), on-demand and modular techniques moving production closer to consumers. Skilled worker shortages Use of Internet of Things to streamline factory processes e.g. predictive maintenance Adoption of virtual reality to test out new designs Manufacturers becoming responsible for the lifetime of products including recycling and disposal	Producing increasingly automated electric vehicles, electrified personal mobility devices and devices which support access to mobility (e.g. smartphones). Shifting to business models where they provide services rather than just goods e.g. Michelin leasing tires to truck fleets as a package with servicing and charge per mile driven.	McLaren Group, Woking (Automotive)[59] Siemens Mobility, Camberley[60] (Transport) Lilly Group, Basingstoke (Pharmaceuticals)[61] Crown Lift Trucks, Basingstoke[62] Xtrac Limited, Thatcham[63] Ford Motor Company, Essex[64] Leonardo MW Ltd, Essex[65] Thales UK, Crawley[66] Rolls Royce Motor Cars, Chichester[67] Airbus Defence & Space, Portsmouth[68] Euromotive, Dover & Hythe[69] Alexander Dennis, Guildford[70]
D: Electricity, gas, steam and air conditioning supply	0.6%	General power trends: Increasing renewable electricity generation Adoption of electric vehicles and investment in EV charging infrastructure Digitalisation and focus on cybersecurity; with more data coming out of customers' meters, utilities are focusing on data analytics for load forecasting, generation planning, managing peaks and increasing customers' awareness regarding energy efficiency. Decentralisation; microgrid projects driven by the need for resilience, energy security and electrification of remote areas.	New business models to incentivise people to switch to cleaner transport options and ownership models e.g. OVO Vehicle to grid Delivery of electric vehicle charging infrastructure and alternative fuel filling stations as well as integration into smart grids Increasing customers' awareness of energy use and demand side measures to increase efficiency. Integration of vehicles into a smart network for generation, distribution and storage	Centrica, Windsor[71] National Grid Plc, Wokingham[72] SSE Plc, Reading[73] British Gas, Windsor[74] Ceres Power, Horsham[75]

[59] https://www.mclaren.com/group/
[60] https://www.mobility.siemens.com/uk/en.html
[61] https://www.lilly.co.uk/en/index.aspx
[62] https://www.crown.com/en-uk.html
[63] https://www.xtrac.com/
[64] https://www.ford.co.uk/
[65] https://uk.leonardocompany.com/en/home
[66] https://www.thalesgroup.com/en/countries/europe/united-kingdom
[67] https://www.rolls-royce.com/
[68] https://www.airbus.com/
[69] http://www.euromotive.co.uk/home
[70] https://www.alexander-dennis.com/
[71] https://www.centrica.com/
[72] https://www.nationalgrid.com/
[73] https://sse.co.uk/home
[74] https://www.britishgas.co.uk/
[75] https://www.ceres.tech/

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
E: Water supply, sewerage, waste management and remediation activities	0.7%	Increasing impact of Internet of Things; data capture, smart networks and intelligent automated systems will enable optimisation with predictive analytics able to balance systems, reduce losses and manage water/waste services. Reducing electricity used for pumping, water treatment and waste management Renewable energy from biogas Increasing requirements for water quality protection from transport schemes	Potential for smarter monitoring of water quality, via Internet of Things, near to transport infrastructure including following incidents	Thames Water, Reading[76] Southern Water, Horsham[77]
F: Construction	7.4%	Prefabricated buildings/offsite construction and use of new technologies e.g. drones Use of new materials to extend life and reduce maintenance Labour shortages Green construction methods and materials Smart home technology installation Use of virtual reality to facilitate designers and developers Build-to-rent Vs Build-to-sell	Constructing places to support future mobility including people-centric places and places that are designed for flexibility (by time and season) so to accommodate new modes and encourage behaviours. Promotion of the decarbonisation of construction and service vehicles Use of new modes to enhance construction process	BAM Group, Camberley[78] Costain Group Plc, Maidenhead[79] Laing O-Rourke Plc, Dartford[80] Wates Group, Leatherhead[81] Balfour Beatty Living Places, Basingstoke[82]
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	12.1%	Continued growth of e-commerce Sustainability focus; circular economy growth and demand for increased transparency in supply chains Growth of experience economy whereby customers expect unique experiences in store & online. Changing skillset requirements for vehicle maintenance with dawn of low emission vehicles	New business models in retail have potential to reduce physical retail trips As sustainability becomes increasingly a focus in the retail sector, the sector has a responsibility to promote use of low emission vehicles for delivery and consolidation of trips. Upskilling vehicle maintenance employees to handle zero emission vehicles Highlighting importance of equal data and connectivity access so those who would benefit most from digital business models have access Packaging mobility into retail and experience products	Fyffes Group, Basingstoke (Wholesale)[83] Andrew Page 1917 Limited, Reading[84] McColl's Retail Group Plc, Brentwood[85] The Body Shop, Littlehampton[86]

[76] https://www.thameswater.co.uk/
[77] https://www.southernwater.co.uk/
[78] https://www.bam.com/
[79] https://www.costain.com/
[80] https://www.laingorourke.com/
[81] https://www.wates.co.uk/
[82] www.balfourbeatty.com
[83] https://www.fyffes.com/
[84] https://www.andrewpage.com/
[85] https://www.mccolls.co.uk/
[86] https://www.thebodyshop.com/en-gb

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
I: Accommodation and food service activities	5.0%	General trends in hospitality: More automation e.g. online reservation services, automated chatbots, mobile hotel check-in Predicted labour shortages and renewed efforts to retain employees Eco-friendly/sustainable practices e.g. reducing food waste More personalised experiences Food delivery growth Development of Dark Kitchens Potential impacts from COVID-19	New business models in the sector influencing food delivery Commercial deployment of low emission vehicles in hospitality e.g. hotel pick-ups, electric moped food delivery Incorporating new mobility business models into hospitality experience to nudge behaviour towards active and shared transport modes e.g. mobility credits with spend, options to include public transport tickets in cost of hotel stay Partnering with technology start-ups to test mobility technologies and gauge public opinions e.g. Co-op Starship delivery droids. Packaging mobility into accommodation products	Baxterstorey Ltd. Reading[87] Butlins, Bognor Regis[88]

[87] https://baxterstorey.com/
[88] https://www.butlins.com/

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
H: Transportation and storage	5.1%		Decarbonisation of transport; electrification, alternative fuels and more energy-efficient transport e.g. lightweight materials Changing travel patterns including for commuting and business journeys Increasing importance of real-time and shared data collection and analysis for enhancing the consumer experience, traffic management and fleet/infrastructure maintenance Increasingly automated technologies Increasing trends of sharing in mobility Importance of behavioural trends and responses to mobility Increase in light goods vehicles as a result of internet shopping/e-commerce Importance of active travel stressed Importance of mass transit at the centre of the mobility network Introduction of new modes Trends away from vehicle ownership and new business models disrupting traditional modes e.g. Uber Innovation in mobility being driven by an open marketplace with a consumer focus Demand for cost efficient, personalised services for both passenger and freight transport A focus on new modes and services being safe and secure by design A focus on mobility supporting all segments of society Driving greater integration between modes, services and infrastructure through aggregation through mobility hubs and MaaS	AA Plc, Basingstoke (Breakdown services)[89] Global Freight Solutions Ltd, West Berkshire[90] Stansted Airport Limited, Essex[91] DSV Solutions Ltd, Essex[92] P&O Ferries Holdings Limited, Kent[93] Gatwick Airport, Crawley[94] ABP Port of Southampton, Southampton[95] First Hampshire and Dorset, Southampton[96]

[89] https://www.theaa.com/
[90] https://gfsdeliver.com/contact-us/
[91] https://www.stanstedairport.com/
[92] https://www.uk.dsv.com/
[93] http://www.poferries.com/en/portal
[94] https://www.gatwickairport.com/
[95] www.abports.co.uk
[96] www.firstgroup.com/southampton

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
J: Information and comms	5.9%	The evolution of information and communication technologies such as superfast broadband, 5G, Artificial Intelligence, the Internet of Things, Big Data Analytics & Blockchain are impacting all sectors and creating new business possibilities.	Nearly all of the opportunities offered by Future Mobility changes depend upon the presence of ubiquitous, high-speed, reliable connectivity. Users and providers alike will likely expect telecom companies to build and maintain this backbone network infrastructure. Prioritising network security so to build trust with users of mobility technology and increase public confidence towards increasingly connected and intelligent infrastructure. Formation of common operating technologies and standards for the mobility ecosystem to reduce interoperability issues. Creating systems that allow for data collection and analytics to generate mobility insights which can be used to improve customer experience whilst guaranteeing data privacy Ensuring equality of access to communications and data across spatial and socio-demographic typologies	Dynniq UK, Basingstoke[97] (Transport IT Systems) Electronic Arts, Guildford (Gaming)[98] Sage Group. Reading[99] Critical Software, Southampton[100]
K: Financial and insurance activities	4.1%	FinTech Disruptors driving new business models, often focusing on a particular innovative technology Embedding of sharing economy in financial system Digital financial services becoming mainstream e.g. payments, retail banking, insurance, and wealth management Cybersecurity top risk to financial institutions Insurers having to rethink their role in the mobility ecosystem and their relationship to drivers, owners, and vehicles	Insurance sector has key role in enabling future mobility; future insurance underwriting models need to consider the advent of safer vehicles, new vehicle designs, and new sources of risk and liability Insurers my need new operational capabilities to underwrite policies and assess claims in a more technologically advanced and diverse environment Financial services sector to provide for customer needs demanding multiples transactions in a single payment to provide seamless customer experience in future mobility ecosystem Willingness to collaborate with other sectors and create innovative business models to finance future mobility and drive adoption	Prudential Plc, Reading[101] Esure, Reigate[102]

[97] https://dynniq.com/
[98] https://www.ea.com/en-gb
[99] https://www.sage.com/en-gb/
[100] https://criticalsoftware.com/en/
[101] https://www.prudentialplc.com/
[102] https://www.esure.com/

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
L: Real estate activities	1.2%	Growing pace of urbanisation but trend may be affected by post-COVID-19 trends Changing working styles reshaping traditional office spaces Online estate agent growth; offer flexibility, 24/7 customer service Wider changes in consumer patterns changing demand for different land uses (e.g. retail)	Collaboration with technology disruptors to promote the low carbon lifestyle agenda and look for opportunity to embed e.g. rental payments combined with utilities and mobility subscriptions Unlocking new land for development through the reduction in car parking space designations Investors should consider the flexibility of existing real estate portfolios and look for properties with assets that can enable mobility innovators to implement their technologies and business models. Actively market those places to the broader mobility ecosystem. Potential impacts of COVID-19 on where people live may generate changes in demand for residential property in different locations. Increasing ability to work while travelling may be changing the value of time during journeys and may shift demand in residential and business locations.	Segro, Slough[103] Barton Wilmore, Reading[104] Vail Williams, Southampton[105]
M: Professional, scientific and technical activities	8.7%	Move to more activity being undertaken remotely via Digital-as-a-Mode Potential for significant automation of mundane and standardised procedures	Developing new innovations in modes, business models, services, materials, manufacture, propulsion and digital connectivity, and bringing them to the market Working with partnerships across the sector to develop new mobility solutions Designing places, streets, neighbourhoods and buildings for flexibility (by time and season) so to accommodate new modes and encourage sustainable behaviours. Supporting the aggregation of transport interchanges and local amenities and services at mobility hubs so to offer opportunity multi-destination trips	The Pirbright Institute, Woking (Medical research)[106] TRL Limited, Wokingham[107] Ricardo UK, Shoreham by Sea[108] Atkins, Epsom[109] BDO, Southampton[110] Ordnance Survey, Southampton[111]

[103] https://www.segro.com/
[104] http://www.bartonwillmore.co.uk/
[105] https://www.vailwilliams.com/
[106] https://www.pirbright.ac.uk/
[107] https://trl.co.uk/
[108] https://ricardo.com/
[109] https://www.atkinsglobal.com/en-gb
[110] www.bdo.co.uk
[111] https://www.ordnancesurvey.co.uk/

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
N: Administrative and support service activities	4.5%	Trends away from ownership Jobs for life a thing of the past Remote or bureau administration Automation of routine task	Dispersal of function leading to changing demand for travel	Austin Fraser, Reading[112] Norse South East, Havant[113]
O: Public administration and defence; compulsory social security	6.3%	Need to respond to growing customer expectations Adjusting delivery of service to reflect aging demographic profile The need for public sector to transform the way they employ data in policymaking Devolution of decision-making Cross-sector planning	Wide-ranging and in-depth reviews of regulation and legislation from central government. Integration and implementation of new technologies and services may stagnate if these barriers are not addressed. The development of a vision at a local Government level to set out the characteristics of future mobility services (following lead of national government with the Future of Mobility: Urban Strategy). Promote behaviour change to more sustainable and active transport modes by leading by example Leading delivery of Future mobility strategy	AWE, Aldermaston[114]
P: Education	11.4%	Lifelong learning requirement Importance of digital literacy Sharp focus on student wellbeing Teacher workload and retention EdTech; Integration of new technology and systems e.g. e-learning Artificial intelligence in higher education/further education to aid student retention Academic research	Future mobility requires new skillsets (particularly those relating to digital ecosystems) and the education sector has a large role to play in helping transport address skill shortages e.g. data scientists, electrical engineers Promotion and education programs highlighting importance of sustainable travel to induce long lasting behaviour change Promotion and education programs to enhance digital literacy across all ages Academic research including transforming results into commercial propositions	QA Limited. Slough[115] Leigh Academies Trust, Rochester[116] Artswork, Southampton[117] Brockenhurst College, Brockenhurst[118]

[112] https://www.austinfraser.com/en/
[113] http://norsesoutheast.co.uk/index.php
[114] https://www.awe.co.uk/
[115] https://www.qa.com/
[116] https://leighacademiestrust.org.uk/
[117] https://artswork.org.uk/
[118] www.brock.ac.uk

	% of employment in region[53]	General trends impacting sector activities	Potential role in delivering wider future mobility changes	Transport for the South East region organisations
Q: Human health and social work activities	11.7%	Medical staffing shortages Automating the mundane, repetitive and time-consuming tasks Better connectivity driving investment in telemedicine/telecare e.g. remote consultation and home monitoring Aging population mean more people have long-term health conditions and require care Rise mental health illness	Promoting active travel and the associated health benefits Prescribing active travel Trialling of new mobility technologies to increase resource efficiency and enhance patient experiences e.g. remote consultations, autonomous vehicles in senior living facilities, drones for time-critical deliveries	Hartford Care Group, Basingstoke[119] Stryker UK Limited, Newbury[120] Care UK Clinical Services Limited, Reading[121] Cygnet Health UK Limited, Kent[122] GlaxoSmithKline, Worthing[123]
R.S.T, U, Other arts, entertainment & recreation and other	6.4%	Experiential nature of culture and entertainment offerings helping sector to appeal to discovery-oriented consumers More inclusive leisure activities Rise of global wellness economy e.g. fitness, healthy eating, wellness tourism	Incorporating new mobility business models into leisure experiences to nudge behaviour towards active and shared transport modes e.g. mobility credits with spend, options to include public transport tickets in cost of leisure activity	Hotelplan, Godalming (Tour company)[124] Merlin, Windsor[125] Park Holidays Limited, East Sussex[126] South Downs National Park Authority, Midhurst[127]

[119] https://hartfordcare.co.uk/
[120] https://www.stryker.com/ie/en/index.html
[121] https://www.careuk.com/
[122] https://www.cygnethealth.co.uk/
[123] https://www.gsk.com/en-gb/
[124] https://www.hotelplan.co.uk/
[125] https://www.merlinentertainments.biz/
[126] https://www.parkholidays.com/
[127] https://www.southdowns.gov.uk/

Horizon Scanning

8. Horizon scanning

Overview

The emerging mobility sector is extremely buoyant with many new and emerging entrants disrupting traditional public transport, ownership and access models. The landscape can currently be summarised as follows:

- New mobility models are emerging in the UK, and elsewhere, at various levels of commercial maturity;
- Most new mobility models are dependent upon underlying digital capabilities and access via smartphones / apps and other emerging digital devices (such as voice activated);
- There have already been notable market failures resulting in risk to local users.
- New mobility models are generally focusing on the customer with an intention to reduce / remove 'friction' from the mobility experience;
- Access vs. ownership is a common thread with a focus on providing access to mobility through service based models to avoid traditional models of vehicle ownership;
- Mobility models and service offerings are changing rapidly;
- Commercial viability (in the short and long term) remains to be seen, although some models and operators are now long established; and
- Innovation is rife, influenced by major international initiatives.

Turning to the potential impacts on the Transport for the South East network in the future, many of these models could disrupt the local transport particularly in the first mile / last mile market providing new alternatives to bus, taxi and short distance car trips. What constitutes 'public transport' will inevitably change, extending the definition beyond the traditional modes and linear, largely fixed networks. Disruption to the traditional model of 'car ownership' could provide for new fleet models serving communities in different ways. However, it is important that mobility innovation is underpinned by the following principles, as outlined by the Government in the Future of Mobility: Urban Strategy:

- New modes of transport and new mobility services must be safe and secure by design.
- The benefits of innovation in mobility must be available to all parts of the UK and all segments of society.
- Walking, cycling and active travel must remain the best options for short urban journeys.
- Mass transit must remain fundamental to an efficient transport system.
- New mobility services must lead the transition to zero emissions.
- Mobility innovation must help to reduce congestion through more efficient use of limited road space, for example through sharing rides, increasing occupancy or consolidating freight.
- The marketplace for mobility must be open to stimulate innovation and give the best deal to consumers.
- New mobility services must be designed to operate as part of an integrated transport system combining public, private and multiple modes for transport users.
- Data from new mobility services must be shared.

The Transport for the South East Future transport technology report undertook horizon scanning across the range of future mobility models and reviewed their potential trajectories up to 2035. The Transport for the South East Future mobility strategy will now look 15 years beyond that timescale to 2050. It has therefore been necessary to review and update the horizon scanning to review trends that have changed in the year since the previous report was published and to update the dashboards that the previous findings were presented in.

Horizon scanning review

The horizon scanning has reviewed the mobility models identified in the Transport for the South East Future transport technology report to identify any updates or changes in light of recent trends or further thinking in the future mobility space since the report was published.

Table 8-1 presents the changes made to the definition of the mobility models.

Table 8-1 – Table of definitions, future mobility models

Original (future tech report)	Future mobility strategy	Commentary
Ridesharing	Ride sharing	No change proposed to the mobility model definition
Ride-sourcing	Ride-sourcing – sole user	Ride-sourcing (also known as ride-hailing) has been split into two separate models – 'sole user' and 'shared'. The sole user approach results in single journeys by individuals or groups effectively replacing single car or taxi journeys. However, the shared approach combines journeys of multiple individuals or groups therefore having a more significant impact on reducing vehicle kilometres travelled.
	Ride-sourcing – shared	
Mobility asset sharing	Mobility asset sharing	No change proposed to the model which includes such sub-models as. car clubs, bike share and e-scooters.
MaaS platforms	MaaS platforms	No change proposed
Parking platforms	Parking and kerb space management platforms	This mobility model has been expanded to cover kerb space management to wider its scope across off-street and on-street management of parking and road-space
Digital-as-a mode	Digital-as-a Mode	No change proposed
Digital based freight models	Operator-focussed freight models	The title has been updated for this mobility model to provide greater clarity. These models provide opportunities for freight operators to share their infrastructure and fleet to make more efficient use of their investments. These models include fleet management systems, transport management systems, tender platforms, digital marketplaces and covers shipper to carrier & carrier to carrier interaction.
Service based freight model	Consumer-focussed freight models	This title has been updated to aid clarity. This model focussed on the consumer need for freight and deliveries through digitally enabled consumption and include the last mile deliveries of online purchases such as comparison goods, groceries and food

Dashboards

The results of the horizon scanning are presented in a series of 'dashboards'; one for each mobility model. The dashboard format remains based on that produced for the Transport for the South East Future Transport Technology Report; however, two significant changes have been made:

- The timelines for the future mobility model impact analysis have been updated to reflect a longer timeline to 2025, 2035 and 2050.
- The potential contribution to the Transport for the South East strategic priorities has been included to better reflect the draft Transport for the South East transport strategy.

Appendix A presents an overview and commentary to explain each cell in the dashboard, Appendix B presents the dashboards themselves and Appendix C presents more detail on the assessment of the impact each mobility model may have on total vehicle kilometres travelled in the periods to 2025, 2035 and 2050.

Roles and responsibilities

9. Roles and responsibilities

The first Transport for the South East Future Mobility steering group meeting was held on 1st July 2020 ('digitally' via Microsoft Teams). As part of the meeting, a workshop was held to identify the roles and responsibilities of key stakeholders who could become partners in delivering the emerging Transport for the South East Future mobility strategy.

Background

To provide background information to the workshops, a presentation was given highlighting the following:

1. The key industrial sectors that could have a role in delivering the strategy:
2. The need to consider partners spatially:
   - By scale: national, sub-national, regional, local; and
   - By location: urban, peri-urban, rural.
3. The need to consider the types of intervention in the strategy:
   - Engagement and influencing;
   - Policy;
   - Services; and
   - Infrastructure;
4. The future mobility service models:
   - Ridesharing;
   - Ride-sourcing – sole user or shared;
   - Mobility asset sharing;
   - MaaS platforms;
   - Parking and kerb space management;
   - Digital-as-a-Mode;
   - Operator-focussed freight models; and
   - Consumer-focussed freight models.
5. The potential roles in supporting the strategy:
   - Development – feasibility, design, business case, piloting, testing.
   - Funding – enabling, securing or providing.
   - Commissioning – specification and procurement.
   - Delivery – from procurement to first day of operation.
   - Operation – day-to-day operation of services, modes and infrastructure. and
   - Monitoring and evaluation – assessment
   - , learning and dissemination.

Figure 9-1 - Key Industrial Sectors

Workshop

The workshop was held using the Miro virtual whiteboarding tool which was pre-populated with two tasks for attendees to undertake:

Task 1: Consider each industrial sector and who the key partner organisations are that could have a role in delivering the Future mobility strategy:

- Consider national to local levels and urban to rural; and
- Consider those specific to the South East.

Task 2: Consider the different roles each sector could play in delivering each of the four types of intervention.

Task 1: Key partner organisations

Task 1 asked workshop attendees to simply list all the relevant potential partner organisations or types of organisations in each industrial sector; the outputs were as follows: Table 9-1 Partner organisations by industrial sector

Table 9-1 – Partner organisations by industrial sector

Industrial Sector	Partner Organisations
Agriculture, forestry and fishing	• DEFRA; • Forestry Commission; • National Farmers Union; • Campaign to Protect Rural England; • Local Farmers; and • County Shows.
Mining and quarrying	• Imerys; and • Shale gas .
Manufacturing	• OEMs; • Federation of Small Businesses; • Chambers of Commerce; and • Hi-tech Manufacturing.
Utilities including electricity and hydrogen	• Premier Energy; • Ryse UK; • LC Energy; • EV infrastructure providers; • Energy Companies; and • Energy Sector Groups.
Construction	• Major housebuilders; • Civil Engineering Contractors Association; and • Strategic site developers e.g. Martin Grant Homes.
Retail	• Large retail centres and 'High Streets'; • Retail asset owners e.g. Land Securities; • Business Improvement Districts; • Amazon; and • Courier Companies.
Accommodation and food services	• Uber East/Deliveroo/Just Eat, etc; • AirB&B; • Hotels and guesthouses; • Supermarkets including delivery services; • Tourist boards; and • Farmers' markets.
Transport and storage (including people and freight)	• Highways England; • Freight Operating Companies; • Delivery companies; • Road Haulage Association; • Freight Transport Association; • Freight end users; • Royal Mail; • HS1 and HS2; • Network Rail (rail and land); • Train Operating Companies; • Rail Freight Group; • Bus operators; • UITP (International Association of Public Transport); • NATS; • Airports; • Associated British Ports; • Red Funnel; • Transport Focus; • CoMoUK; • The AA; • Rail pressure groups; • Vehicle rental companies; • British Vehicle Rental and Leasing Association; • MaaS Alliance; • Start-ups; • Micromobility companies; and • Urban Mobility Partnership.
Information and communications	• App developers; • MaaS platforms; • Mobile operators; • Journey planners; • Communications providers; • Openreach; • Internet Service Providers; and • Social Media.
Financial and insurance	• Association of British Insurers; • MBI; • Private finance; • Vehicle insurance providers; • AXA; and • Transport for the South East Private Sector Steering Group.
Real estate and land ownership	• Planning authority on S106 usage; • House builders; • Car Park Operators; and • Business Parks.
Professional, scientific and technical	• Institution of Civil Engineers; • Chartered Institution of Highways and Transportation; • Chartered Institute of Logistics and Transport; • Transport Planning Society; • Royal Town Planning Institute; • Royal Institute of British Architects; • Consultants; and • TRL Ltd.
Administration and support activities	• Confederation of British Industry
Government (national to local)	• DFT; • DCMS; • MHCLG; • BEIS; • DoH&SC; • Homes England; • National Infrastructure Commission;

Industrial Sector	Partner Organisations
	• Transport for the South East; • Neighbouring Sub-national Transport Bodies; • Solent Transport; • County Councils; • District Councils; • Town and parish councils; • National Parks; and • AONBs.
Academia, education and training	• Universities including research centres e.g. University of Southampton Transportation Research Group • Further Education Colleges and University Technical Colleges including those teaching transport/mobility-related skills; and • School travel plans.
Health and social care	• Public Health England; • NHS; • NHS Trusts; • Local authority public health; • Association of Directors of Public Health; • Private health care providers; and • Community health providers.
Arts, entertainment and recreation	• Arts Council; and • Sports and entertainment clubs and venues.

Task 2: Sector Roles

The second task asked workshop attendees to consider four tables, one for each of the intervention types (engagement & influencing, policy, services and infrastructure), with each table having the six potential roles as column headings and the industrial sectors as the row headings. The attendees were asked to insert a star in each table cell where they thought the sector could perform a role. An example of one of the tables is copied below from the Miro whiteboard. Attendees were asked to put more stars into a cell where a sector had a particularly significant role.

Figure 9-2 – Sector Roles

Sectors	Markers	Development (Feasibility, design, business case, piloting and testing)	Funding (Providing funding for interventions)	Specification (including commissioning and procurement)	Delivery (from procurement to first day of operation)	Operation (Day-to-day execution of intervention)	Monitoring and evaluation (Monitoring, evaluating, learning and disseminating)
Agriculture, forestry and fishing	★★★★★★						
Mining and quarrying	★★★★★				★		
Manufacturing	★★★★	★			★		
Utilities including electricity and hydrogen	★★★	★			★ ★		
Construction	★★★★	★ ★					
Retail	★ ★★★		★	★			
Accommodation and food services	★★★★★★						
Transport and storage (including people and freight)		★★	★★	★★	★★	★	★
Information and communications	★★★★★	★	★				★
Financial and insurance	★ ★★★						
Real estate and land ownership	★★★★★★						
Professional, scientific and technical	★★★★★		★	★			
Administration and support activities	★★★★★★						
Government (national to local)	★	★	★	★	★		★
Academia, education and training	★★★	★ ★ ★		★		★	★
Health and social care	★ ★★★★	★		★	★	★	★
Arts, entertainment and recreation	★★★★★ ★	★			★		

To summarise findings from this task, all the stars have been summed for each of the six roles for each of the industrial sectors. The following table summarises all the stars across all interventions and roles indicating that attendees considered that transport and storage will play the greatest role in delivering the Future mobility strategy. Government organisations, from national to local level, may play the second greatest role in delivering the strategy according to attendees. Beneath the top two sectors, there was a significant gap to the next sectors, with a cluster including utilities, academia, construction and, information and communications. Beneath this cluster came health and social care which, alongside others further down the table, could be seen as an end user of transport rather than it being a primary role of the sector. With a similar score to health and social care were manufacturing and professional, scientific and technical, both of which could have transport as a primary role such as the manufacturing of vehicles and the design of services and infrastructure.

Table 9-2 - Task 2 summary – total scores

Industrial Sector	Total	%
Transport and storage (including people and freight)	97	21%
Government (national to local)	77	16%
Utilities including electricity and hydrogen	34	7%
Academia, education and training	34	7%
Construction	29	6%
Information and communications	27	6%
Health and social care	24	5%
Manufacturing	22	5%
Professional, scientific and technical	22	5%
Retail	18	4%
Real estate and land ownership	15	3%
Arts, entertainment and recreation	15	3%
Agriculture, forestry and fishing	14	3%
Financial and insurance	14	3%
Mining and quarrying	12	3%
Accommodation and food services	10	2%
Administration and support activities	9	2%
Total	473	100%

The following table highlights the sector roles in developing strategy interventions (feasibility, design, business case, piloting, testing). Transport and storage, and government scored the highest amongst attendees with information and communications, and real estate and land ownership coming next.

Table 9-3 - Task 2 summary – development role

Industrial Sector	Total	%
Transport and storage (including people and freight)	11	20%
Government (national to local)	8	14%
Information and communications	5	9%
Real estate and land ownership	5	9%
Utilities including electricity and hydrogen	4	7%
Academia, education and training	4	7%
Construction	4	7%
Professional, scientific and technical	4	7%
Manufacturing	3	5%
Arts, entertainment and recreation	2	4%
Administration and support activities	2	4%
Health and social care	1	2%
Retail	1	2%
Agriculture, forestry and fishing	1	2%
Mining and quarrying	1	2%
Financial and insurance	0	0%
Accommodation and food services	0	0%

Government was seen as key to obtaining or providing funding for the strategy, with more than a quarter of the scores, with transport and storage, financial and insurance, and utilities some way behind.

Table 9-4 - Task 2 summary – funding role

Industrial Sector	Total	%
Government (national to local)	22	27%
Transport and storage (including people and freight)	11	14%
Financial and insurance	10	12%
Utilities including electricity and hydrogen	8	10%
Construction	5	6%
Manufacturing	4	5%
Retail	4	5%
Information and communications	3	4%
Real estate and land ownership	3	4%
Health and social care	2	2%
Professional, scientific and technical	2	2%
Arts, entertainment and recreation	2	2%
Administration and support activities	2	2%
Agriculture, forestry and fishing	1	1%
Mining and quarrying	1	1%
Accommodation and food services	1	1%
Academia, education and training	0	0%

In the commissioning, specification and procurement role, transport and storage, and government were identified as the most important sectors with a gap in the scoring to academia, utilities and construction.

Table 9-5 - Task 2 Summary – Commissioning role

Industrial Sector	Total	%
Transport and storage (including people and freight)	21	19%
Government (national to local)	17	15%
Academia, education and training	11	10%
Utilities including electricity and hydrogen	10	9%
Construction	9	8%
Health and social care	8	7%
Professional, scientific and technical	7	6%
Retail	6	5%
Manufacturing	5	4%
Information and communications	4	4%
Real estate and land ownership	4	4%
Mining and quarrying	4	4%
Arts, entertainment and recreation	3	3%
Agriculture, forestry and fishing	2	2%
Accommodation and food services	2	2%
Financial and insurance	0	0%
Administration and support activities	0	0%

In terms of the delivery role (from procurement to the first day of operation) transport had nearly a quarter of the scoring with government and construction at around half that level.

Table 9-6 - Task 2 Summary – Delivery role

Industrial Sector	Total	%
Transport and storage (including people and freight)	22	24%
Government (national to local)	12	13%
Construction	11	12%
Utilities including electricity and hydrogen	7	8%
Information and communications	5	5%
Manufacturing	5	5%
Agriculture, forestry and fishing	5	5%
Mining and quarrying	5	5%
Health and social care	4	4%
Academia, education and training	3	3%
Professional, scientific and technical	3	3%
Retail	3	3%
Arts, entertainment and recreation	3	3%
Accommodation and food services	3	3%
Real estate and land ownership	1	1%
Financial and insurance	1	1%
Administration and support activities	0	0%

According to attendees, the role of operating future mobility interventions will focus on the transport and storage sector with 36% of the scoring. The remainder of scores are reasonably evenly distributed across many of the other sectors.

Table 9-7 - Task 2 Summary – Operation role

Industrial Sector	Total	%
Transport and storage (including people and freight)	26	36%
Government (national to local)	5	7%
Manufacturing	5	7%
Agriculture, forestry and fishing	5	7%
Utilities including electricity and hydrogen	4	6%
Health and social care	4	6%
Arts, entertainment and recreation	4	6%
Accommodation and food services	4	6%
Retail	3	4%
Financial and insurance	3	4%
Information and communications	2	3%
Real estate and land ownership	2	3%
Administration and support activities	2	3%
Academia, education and training	1	1%
Professional, scientific and technical	1	1%
Mining and quarrying	1	1%
Construction	0	0%

Attendees considered that academia could have a major role to play in the monitoring and evaluation of the Future mobility strategy and interventions with government also playing a significant role.

Table 9-8 - Task 2 Summary – Monitoring and evaluation role

Industrial Sector	Total	%
Academia, education and training	15	26%
Government (national to local)	13	22%
Information and communications	8	14%
Transport and storage (including people and freight)	6	10%
Health and social care	5	9%
Professional, scientific and technical	5	9%
Administration and support activities	3	5%
Utilities including electricity and hydrogen	1	2%
Retail	1	2%
Arts, entertainment and recreation	1	2%
Construction	0	0%
Manufacturing	0	0%
Real estate and land ownership	0	0%
Agriculture, forestry and fishing	0	0%
Financial and insurance	0	0%
Mining and quarrying	0	0%

Next Steps

The above scores are a view of the cohort of attendees at the workshop and will feed into the development of the Future mobility strategy in Core Task 3. The outputs will be combined with further consideration by the project team in the development of the strategy and enable the identification of roles and responsibilities to deliver specific interventions. This will be discussed again at subsequent meetings of the steering group.

Transport for the South East population segmentation introduction

10. Transport for the South East population segmentation introduction

A Transport for the South East population segmentation was developed as part of previous work by Steer for the Transport strategy. The segmentation has been developed based on the Office for National Statistics Output Area Classification (OAC) with 'pen-portraits' for each of seven segments created, which aim to provide a one-page overview of the typical characteristics of each segment. The Transport for the South East segmentation is a geodemographic classification meaning that every 1km hexcell in the Transport for the South East area has been allocated to one of the seven segments[128] (Figure 10-2 and Table 10-1).

The sources of data used to create the segmentation and profile the segments include the 2011 Census, the National Travel Survey and an on-line survey of 2,000 people undertaken in 2019 by Steer as part of our research and innovation programme. The survey examined attitudes towards various social and technological trends. Therefore, the profiles reflect the current situation, which is changing quite rapidly under the influence of a number of trends explained in this note and presented in Table 10-2. To support the development of the Future mobility strategy for Transport for the South East, this work predicts how the segments are likely to evolve up to 2035.

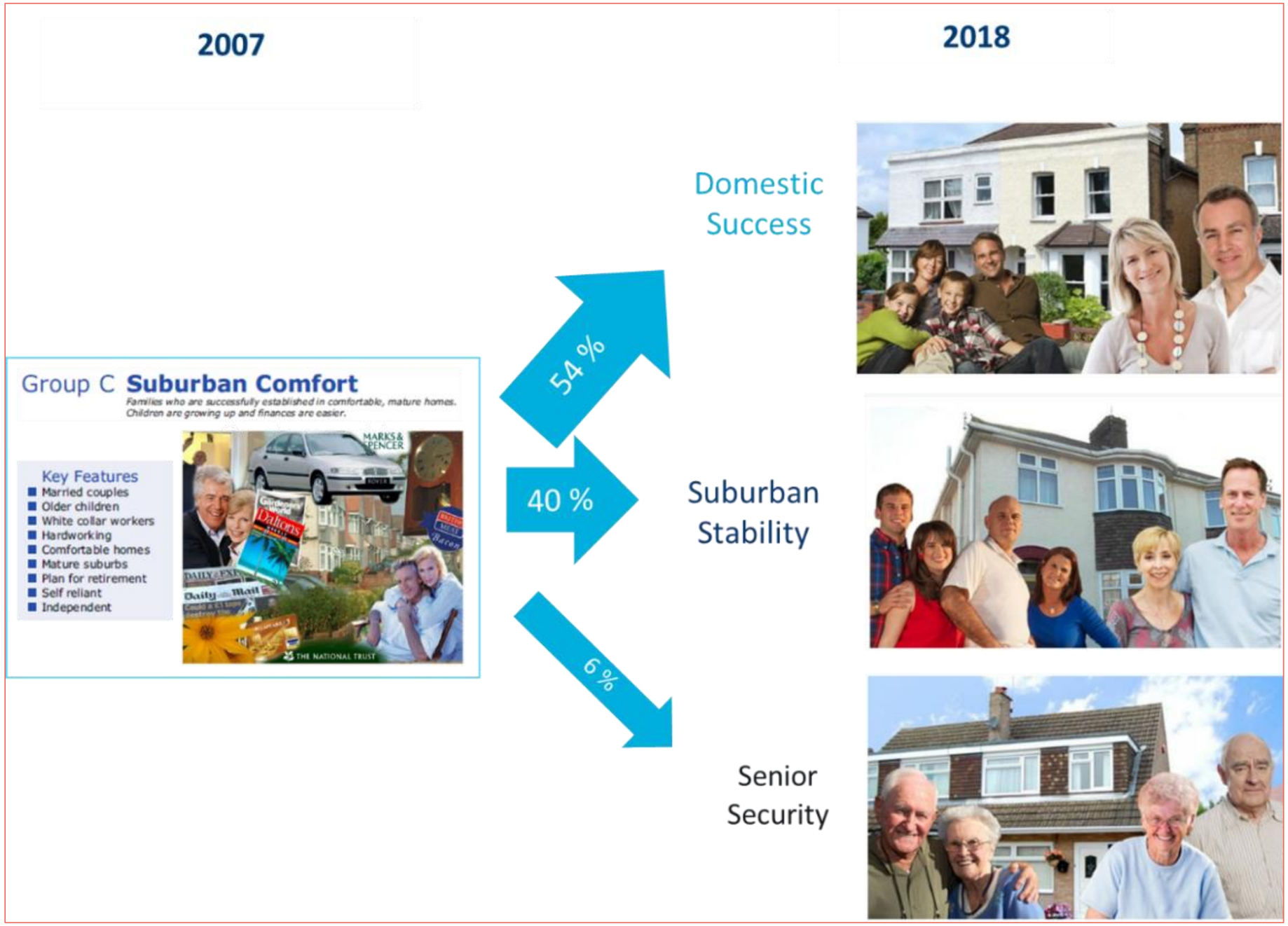
This work has been informed by studies that have been undertaken by Steer and UCL to examine how geodemographic segments have evolved in the past, for example between the 2001 and 2011 Census and several iterations of MOSAIC (see below).

In the example below it is illustrated how one geodemographic (MOSAIC) group, 'Suburban Comfort', evolved between 2007 and 2018. The closest equivalent to Suburban Comfort in 2018 is Suburban Stability, with the demographics of these segments being very similar, along with the types of properties they live in. Over this time, though, the 'Domestic Success' segment emerged, with this segment being slightly more affluent, living in somewhat larger properties and making greater use of the Internet and technology in general. The third segment to emerge, 'Senior Security' is in many aspects quite similar to the original Suburban Comfort segment but has a higher proportion of 65+ population.

Note that the percentages shown relate to a specific location and will vary depending on the location. The equivalent types of change also impacted other segments, so each of the new segments shown will also include people previously classified in other segments.

[128] With the exception of number of 'sparsely populated' hexcells which have less than 50 residents living there which have not been allocated to one of the segments.

Figure 10-1 - Example of Segment Evolution



Important general lessons about how populations change over time include:

- Some trends affect all segments, albeit to differing degrees;
- Over ten to fifteen years it can be expected that some segments will decline in size, some will increase in size and new segments appear;
- When examining the composition of new segments, whilst they are likely to draw people from a number of other segments, there will tend to be one or possibly two main source segments. For example, a visible illustration of the effect can be seen where neighbourhood is 'gentrified'. Gentrification gradually affects an increasing proportion of a locality, but remnants of the original character stay for many years; this can happen in both urban and rural areas;

As a broad theme, there is more change amongst younger people, so segments in which younger people dominate, are more likely to change than those of more settled, middle aged or elderly groups.

Figure 10-2 - Mosaic demographic segmentation

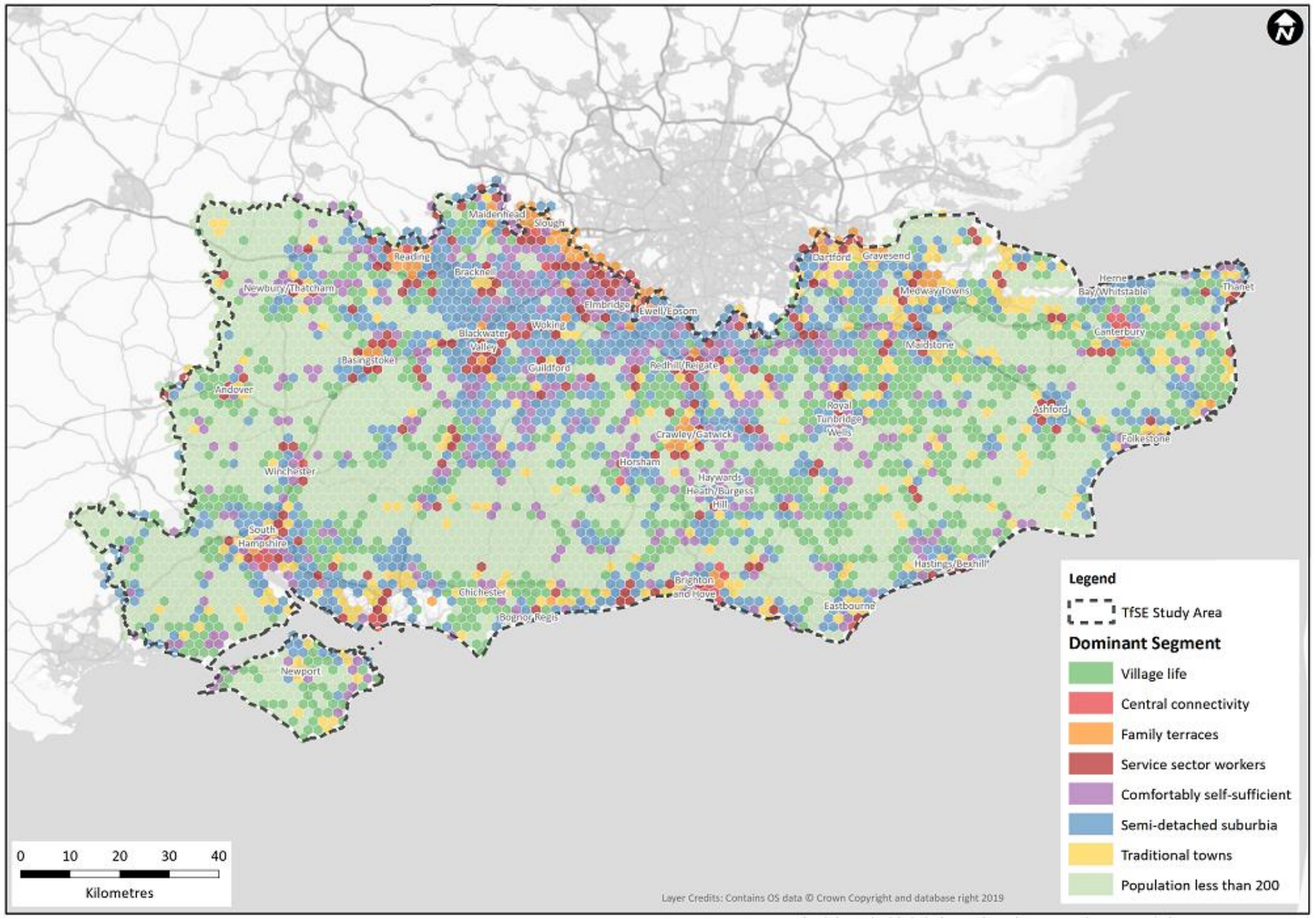


Table 10-1 - Transport for the South East segment summaries 2020

Segment	Description
Village life	The population of this segment live in areas that are less densely populated, typically in a village or small town. They tend to be older, well-educated and live in detached properties which they own, though an above average proportion live in retirement homes. Each household is likely to have multiple motor vehicles, with these being the most common method of transport to their places of work.
Central connectivity	The majority of people in the Central connectivity segment live in relatively densely populated urban areas. They include an above average proportion of young adults without children, including full time students. They tend to live in places where they can walk, cycle or use public transport to get to work.
Family terraces	People in this segment typically live on the edge of a town centre, in the transitional areas between the core and the suburbs. There is an above average proportion of families with pre-school or school age children. Typically, they will have one car between two adults, with one driving to work and the other walking or using public transport.
Service sector workers	The Service sector workers segment tend to live in urban areas and work in the information and communication, financial, public administration and education related sectors. There is an above average likelihood of having young children in the household and a below average likelihood of older age adults.
Comfortable self-sufficiency	Those in the Comfortable self-sufficiency segment are typically approaching retirement age or already retired. They tend to live in a detached property or flat and are quite likely to have paid off their mortgage and have no dependent children. Therefore, while they may have a modest income are still quite likely to have both time and money.
Semi-detached Suburbia	People living in areas of Semi-detached suburbia will typically have school age children and own at least one car. They will mostly work in information and communication, finance, public administration and education sectors. It also includes some recently retired people living in semi-detached or detached housing.
Traditional Towns	Households in this segment are more likely than average to have older non-dependent children and to live in semi-detached or terraced properties. Their level of qualifications tends to be lower than average with jobs typically in the wholesale and retail, energy and transport related industries.
Sparsely populated	Locations with very few people living there (less than 50 people per 1km Hexcell)

Approach to the development of future segments

Taking into account the lessons learnt from historic changes, we have undertaken the following steps to develop a version of the 2035 population segmentation:

- Assessment of the key demographic and social trends affecting, and likely to continue to affect future travel and mobility needs (see Table 10-2);
- Identification of the connections between these trends and the Transport for the South East segments;
- Analysis of the impact of these trends on the relative size of the segments;
- Where an existing segment is predicted to grow in size and be differentially affected by one or more of the trends, the possibility of a new segment emerging has been considered. Predicted population growth (or decline) to 2035 of each segment has been assessed;
- Potential new segments have been challenged and verified by a peer group of Steer and WSP experts;
- The combined impact of the short-listed additional segments on the segmentation as a whole has been tested to ensure that it remained consistent with the expected overall change in the population; and
- The new segments will be profiled and the interactions between segments and trends updated.

Key data sources used for developing the original Transport for the South East segments and the future segments are the National Travel Survey, Output Area Classification, future transport technology study, Transport for the South East, 2019 and Steer's dynamic geodemographics study. These are briefly introduced here, including how they were used.

National Travel Survey

The Department for Transport's National Travel Survey (NTS) is the definitive source for individual travel behaviour data in Great Britain. For Transport for the South East, Steer obtained a Special Licence to access and analyse the source data, which includes Output Area Classification (OAC) as a descriptive variable. This enabled the analysis of travel behaviour by OAC group within the South East. This was particularly valuable in creating the Transport for the South East segmentation, which is based on combining OAC Subgroups into similar sized segments with similar travel behaviours.

Output Area Classification

OAC is a geodemographic classification tool developed by the ONS with technical input from UCL. It is a three-tiered system built on the 2011 Census with:

- 8 supergroups;
- 26 groups; and
- 76 subgroups.

All output Areas in England and Wales have been allocated to one OAC subgroup, one group, and one supergroup. The average population of an output area is around 310 people.

Although it is derived largely from demographic and place type variables, there is a strong relationship between OAC groups and the propensity to use different modes of travel. It was used for the Transport for the South East segmentation as it supplements the access to detailed travel behaviour data from the National Travel Survey and, unlike alternatives such as MOSAIC and ACORN, it is open source and freely available for anyone to use. It should be noted that this approach is driven by transportation data rather than the consumer habits data in, for example, MOSAIC. For the future segments it can be considered a useful base onto which other data can be fused, including data on the use of emerging technologies and modes.

Future transport technology study, Transport for the South East, 2019

The Future Transport Technology study, Transport for the South East, 2019, has been reviewed and the key mega trends extracted. The key mega trends have been assessed and the findings have been supplemented by the Dynamic Geodemographics study (see below).

Dynamic geodemographics study, 2019

The Steer dynamic geodemographics study is an internally funded research & innovation project which involved exploring the impact of demographic, social and technological trends on travel behaviour, and how these effects differ by geodemographic groups within the population. It involved three key elements:

- An extensive literature review including extracting the latest data on relevant trends;
- Primary research in the form of an online panel survey (the sample was stratified using OAC with a total sample size of 2,000); and
- Research with a range of experts using an online Delphi style survey and a number of interactive workshops.

For the future mobility strategy this has been used to provide evidence for the relative impact of different trends on each Transport for the South East segment, and also for the relative extent to which each segment uses each mode.

Key demographic and social trends affecting and likely to continue to affect future travel are presented in Table 10-2. The trends outlined in the table below draw from the range of sources detailed above. We have also referenced where these trends were previously identified as mega trends in the Transport for the South East future transport technology study (October 2019). A full list of data sources used to identify key trends is presented in Appendix D.

Covid-19

The trends presented in Table 10-2 are likely to be affected by the Covid-19 pandemic: some of the trends may be slowed while others accelerated. For example, trends such as “online lives” and “working flexibly” have been boosted. Online shopping has grown from a nice-to-have to a must-have for certain groups of population, and due to the closure of schools and universities, many pupils have had their first experience of distance learning. Many companies have asked employees to work from home and remote working became a new normal for certain population segments, while those who are not able to work from home still need to commute to work every day. At the same time, “City attraction” trend may be reversed with people leaving the urban centres and moving to more suburban and rural areas.

The dynamic geodemographics online survey has been used as a source for travel behaviour data, which makes it possible to update the segments for any longer-term trends by repeating the survey post lockdown to assess any variations and changes in attitudes and behaviours.

At the moment, it is not possible to accurately predict the long-term impact of Covid-19 and how the trends related to Covid-19 will evolve. To answer the questions arising from the uncertainty surrounding the easing of Covid-19 lockdown, Steer has worked with Transport for the South East on scenario development considering a range of potential futures. Steer has developed four broad scenarios describing possible and plausible ways in which the future could develop and implemented new mechanisms in the South East Economy and Land Use Model (SEELUM). It can then be used to test how effective transport related remedial measures might be in reducing the negative impacts of lockdown and/or of speeding up recovery. This work is not a forecast but a simulated rehearsing of various scenarios. The results can be found in the Transport for the South East: COVID-19 lockdown scenarios report.

Table 10-2 - Key demographic, social and technological trends

Key trends	Future transport technology study – mega trends
City attraction	**Urbanisation**
It has been estimated that 68 per cent of the global population will live in an urban area by 2050. Since the beginning of the 21st Century the population of many town and city centres has doubled in size, while the population of the UK has increased by 10%[129]. There is an acknowledged trend towards an increase in the urban population and this is hypothesised to be one of the reasons that growth in rail travel has exceeded the forecasts. The growth in city centre living is mainly down to young people - older generations have not returned from the suburbs in significant numbers.	
Online lives	**Expectation of 'immediacy' and always being 'on'** **Rise of the 'gig' economy** **Digital as a mode**
The 'Online Lives' trend is the increasing use of Information Communication Technology (ICT), the Web, mobile devices and other digital technologies for work, education, healthcare, social interaction, shopping etc. This trend reflects the Digital as a mode mobility business model, which is described in the Future Transport Technology study as the use of digital connectivity to reduce or remove the need to travel. Institutions such as The Open University (which enables flexible, distance teaching in the UK and in 157 countries worldwide) and Babylon Health (the UK's leading digital health provider) are clear examples of services that remove the need to travel. In the South East region, there are a number of educational establishments that offer services that enable distance working or working from home. For example, the University of Southampton offers free online courses and MOOCs (Massive Open Online Courses). The key interest from a transport perspective is the extent to which digital communications or 'digital-as-a-mode is a replacement for travel compared with supplementing commuting and shopping journey, social life, ordering goods, routine healthcare, education of all ages, etc. This trend may be accelerated by the aftereffects of the Covid-19 pandemic.	
Working flexibly	**Rise of the 'gig' economy**
There has been a slow decline in commuting over the last twenty years or so with potential explanations for this including (aside from working from home) employees working fewer days a week, an increase in employment without a usual place of work, and an increase in part time work. Flexible working people, who work flexible hours or on a freelance basis, make nearly a quarter fewer commuting trips than those working regular office hours. This does confirm that changes in working patterns is at least one of the explanations for the observed fall in commuting travel. Flexible and remote working took on even more importance during the Covid-19 pandemic with many employees transitioning to home working. Anecdotal evidence suggests that this has led to many people experiencing working days without the time hungry commute and many have now begun to question the logic in travelling long distances every day to do work that could just as easily be done from home.	
Sharing economy	**Acceptance of 'sharing'** **'New' business models**
One key aspect of this is the growth in the sharing economy typified by Airbnb, car clubs, and cab/taxi sharing apps such as Uber, Gett, Kapten etc. These examples could reflect a more general move away from the sole use of modes, to a pay as you need model as well as wider economic pressures of the cost of 'ownership' such as purchase costs and insurance premiums for younger drivers. The rise of the sharing economy comes as attitudes towards 'ownership' of assets are changing, increasingly people are more open to sharing over obtaining assets for their sole use. There is evidence of a willingness to experiment with a number of these shared mobility services in the Transport for the South East area, despite not having any performance statistics. This is demonstrated by BTN Bikeshare in Brighton & Hove, BlaBlaCar carpooling, Enterprise car club in Southampton, Woking, Portsmouth and Maidstone. However, some other services such as UberPool are not yet available, potentially a reflection of the market readiness or geographical feasibility in the area. Behaviours are changing and the economic value societies traditionally placed on vehicle ownership are shifting. Whilst some business models are in their infancy this willingness to 'access' rather than 'own' has the potential to dramatically reduce car dependency in certain conurbations in some use cases. The transport sector is one that is heavily influenced by this notion of 'sharing', with car, bike and lift-sharing gaining impressive traction in recent years. This can be seen by the likes of Uber, who have grown to operating in over 60 countries and 400 cities worldwide in under a decade. It should be noted that in the short term the Covid-19 pandemic may potentially influence the sharing economy market while the industry is recovering and coming back to a new normal.	

[129] https://www.bbc.co.uk/news/uk-44482291

Key trends	Future transport technology study – mega trends
Elderly care needs	**Growing & ageing population**
Like many other countries, the UK's age structure is shifting towards later ages. In 50 years', time, there is projected to be an additional 8.2 million people aged 65 years and over in the UK – a population roughly the size of present-day London[130]. By 2050, it is projected that one in four people in the UK will be aged 65 years and over – an increase from approximately one in five in 2018. This is the result of the combination of declining fertility rates and people living longer. In 2019, the over-65 population resident in the Transport for the South East area is predicted to account for 19.7% of the population (based on the 2011 Census), however by 2030 this is set to increase to 23.5%[131]. Elderly care needs will include increasing demand for care homes and easy access to key facilities including healthcare.	
More active mature population	**Ageing economically active population**
The changing structure of the UK's population, with people living longer and having fewer children, means the age structure is shifting towards later ages. The maturing population is affected by a number of inter-related factors including an ageing population, a more active elderly population, delayed retirement, and older people being wealthier. Reflecting the more general trend, up until 2014 the overall trip rate for people aged 50+ was falling but since then (up to 2017) has increased by 14%. The increasing retirement age and taking on larger financial burdens later in life means that people will need to work for longer. By 2020, the retirement age for both men and women, will be 66 and this is planned to increase to 67 by 2028 and to 68 by 2039, thus delaying the age at which one can claim their state pension. Additionally, people in the UK are increasingly having to take on larger financial burdens later in their lives as housing affordability reduces for first-time house buyers. In most local authorities in the South East specifically, an average first-time buyer spent more than five times their income on buying a property with a mortgage in 2017, compared to the increasing national average of 4.3 times. An increasingly financially burdened ageing population who still need to commute to work will have different expectations and needs from all modes of transport and we will have to consider their vulnerability in design and other assumptions.	

Key trends	Future transport technology study – mega trends
Life expectancy is also improving, and the older population is generally more active and engaged after their retirement. A study by Standard Life indicated that in their first retirement year, 17% of individuals exercise daily, compared to 12% of younger people.	
Delayed adulthood	**Changing family compositions**
Another important dimension trend is delayed adulthood which is reflected in young adults staying in education longer then starting work later and starting a family at an older age. In 2018, the age at which more than 50% of young people left the parental home was 23. Two decades earlier, more than 50% of 21-year-olds had already left home. Young men aged 20 to 34-years-old living in the UK are more likely than young women to be living with their parents (31% and 20% respectively). There is an observable impact of delayed adulthood on travel behaviour with the miles driven by 17 to 34-year olds falling by 20% in the decade up to 2014. In terms of predictions for the future, our experts thought the existing trends would continue and, for example, car ownership levels to fall for both males and females from approximately 30% to 25% in ten years and then down to 20% in twenty years. It is interesting to note that when asked, those aged under 35 expected to increase their car driver trips over the next three years so there's no guarantee that car use amongst this age group will fall in the future.	
Environmental awareness	**Air quality, climate change**
The Environmental Awareness trend reflects a range of related factors, such as concerns over climate change and air quality. There is overwhelming evidence that climate change is likely to mean an increasing number of extreme weather events, and that there is a need to do something about improving air quality. The fact that concerns over the environment do not seem to translate into changes in personal travel behaviour, means that there is likely to be a role for government to intervene with policies such as clean air zones, promoting ultra-low emission vehicles, or road pricing and our experts were largely in agreement that this would be the case. Car manufacturers have already announced their EV launch plans. COVID-19 will delay some of these, but it is predicted that by 2022 there will be over 500 different EV models available globally. In 2019, combined alternatively fuelled vehicle (AFV) registrations increased in the UK to take a record 7.4% market	

130 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/august2019

131 Future Transport Technology, Transport for the South East, 2019

Key trends	Future transport technology study – mega trends
share. Battery Electric Vehicle (BEV) registrations experienced the highest percentage growth, rising +144.0% to 37,850 units and overtaking plug-in hybrids for the first time.	
Health awareness	**Health & wellbeing**
The Health Awareness trend reflects a range of related factors such as concerns over health and fitness and the 'obesity crisis'. The potential impact of this trend on transport is to favour active modes and reduce the attractiveness of the car. However, it is doubtful that this potential impact is set to materialise and in fact the volume of walking trips has been in decline and there is little evidence of a noticeable shift in attitudes to the car. Although, it should be noted that in the aftermath of Covid-19 pandemic, more people may be choosing active travel modes where and when possible.	

New segments

The result of this process has been the creation of three new segments: Pre-family, Semi-retired flexibility, and School-run suburbia.

In practical terms these reflect a sub-dividing of three existing segments:

- Pre-family primarily comes from Family terraces;
- Semi-retired flexibility primarily comes from Comfortable self-sufficiency; and
- School-run suburbia primarily comes from Semi-detached suburbia.

Table 10-3 – New Segments

Segment	Description
Pre-school	Under 30's contemplating starting a family and who would like to bring children into a better and more sustainable world. They tend to live in well-connected urban areas, where they have access to good public transport and there is therefore no need to own a car. They are happy to make maximum use of technology to minimise their carbon footprint, and when they do need to use car are likely to hire an electric vehicle.
Semi-retired Flexibility	Relatively affluent mature professionals who are looking to wind down their careers and perhaps work part time. They are looking to make use of the time they free up to participate in a range of activities and experiences, many of which will involve travelling. They typically live in a detached house on the outskirts of a pleasant town or village where they are close to the countryside. They are very likely to own a car but will travel by rail if the service is good.
School-run suburbia	Families with school age children typically living in a suburban area, ideally with a rail station to provide links to their local town centre, as well as London. Encouraged by their children, they like to use local produce and to shop locally. They are avid recyclers and try to avoid unnecessary travel. They are quite likely to own a car, though it is also likely to be a low emission vehicle and they are happy to give lifts to neighbours and fellow parents.

It is worth bearing in mind that there will be a degree of change across all the segments, and that many of the trends identified will affect all the segments, albeit to varying degrees. What distinguishes the newly emerging segments is that there is an interaction between factors, which results in the segment's travel behaviour being substantially affected. This contrasts with other segments where a trend may be present, but it has little impact on travel behaviour. For example, while attitudes to climate change and the environment are likely to strengthen, for most people this is unlikely to have a major impact on their travel behaviour, meaning an additional trigger is needed.

New segment 1 - Pre-Family

With the increasing concerns over the effects of climate change, poor air quality and the sustainability of our way of life, some people are questioning the notion of bringing new life into the world. The Pre-Family segment partly arises out of this, primarily from young couples living in moderately affluent urban areas. Their lifestyle is orientated around minimising their impact on the environment by choosing to live in an area where there are facilities within walking or cycling distance and good public transport options. They do their best to re-use and recycle, and they are happy to use technology to help reduce their carbon footprint. They will therefore work from home when possible and use home deliveries to avoid the need to travel.

This is currently a small segment which is expected to grow at a steady rate, but its growth could be accelerated if there are some major climate related events that key opinion leaders push forward.

New segment 2 - Semi-retired flexibility

Some people who are in the later stages of their careers are in a position to work more flexibly and perhaps work part-time or partly at home. This flexibility is partly enabled by the lack of dependent children, and potentially no longer having a mortgage to pay off. With ongoing improvements in technology to support flexible working combined with an increasing awareness of the importance of wellness, there is likely to be growth in the number of professionals and managers looking for a better work-life balance which they achieve through semi-retirement.

Since there is a limit on the types of occupation semi-retirement suits, this segment is expected to increase at a gradual rate, though this could be accelerated in the future by changes in working patterns created by increased automation.

New segment 3 - School-run suburbia

The School-Run Suburbia segment is characterised by having a high proportion of households containing school-age children. Since school age children and teenagers are becoming increasingly aware of the environment, and while the practicalities of family life limit the actions that can be readily taken, one thing that can be done is to look locally for places to make purchases and provide entertainment. While most people do not wish to become environmental activists, many will be happy to do some of the more easily accessible actions, such as recycling their waste, avoiding unnecessary journeys and possibly also use car / ride sharing.

This segment may already be quite sizeable and is expected to grow at a good rate and to represent a significant proportion of the population by 2035.

Summary of new segments and interaction with existing segments

A summary of the new segments descriptions is shown in Table 10-3. The interactions between the new segments and the existing segments and identified trends is shown in Table 10-4.

Summaries of emerging segments

Future pen portraits of all segments are presented in Appendix E, an example of a pen portrait for the Village life segment is shown in Figure 10-3 - Pen portrait: Village life.

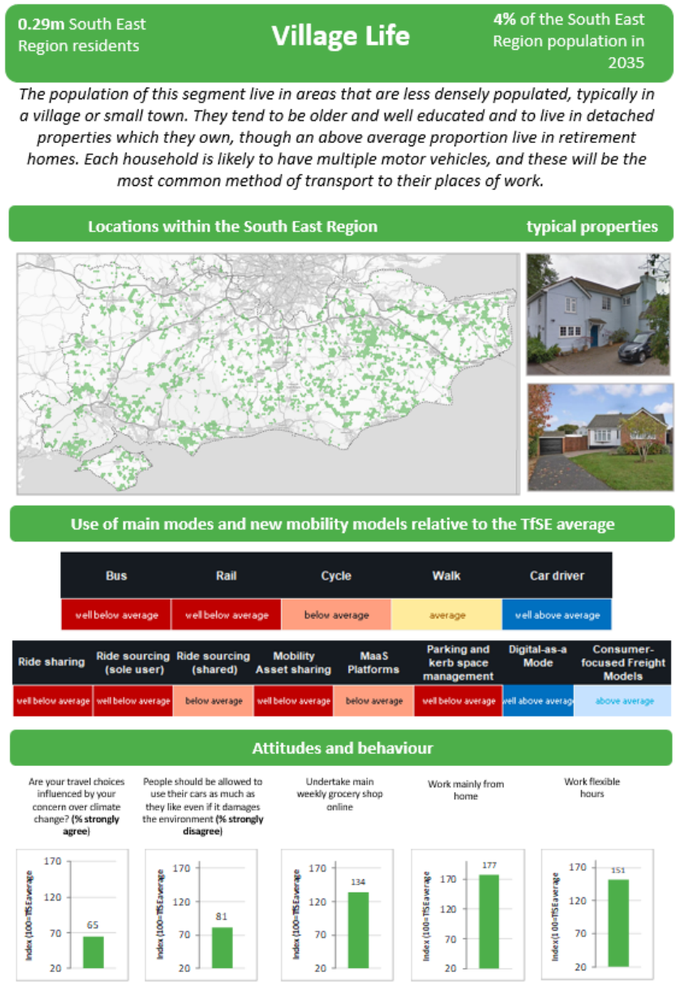
Interaction between trends and segments have been assessed and results are presented in Table 10-4 below.

- "low" means while there may be some interaction between the trend and the segment, it is very weak and unlikely to be noticeable;
- "med'" means there is a relationship between the trend and the segment, with the scale of the impact being around the national average;
- "high" means that the segment is particularly affected by the trend with there likely to be an observable effect from this.

Table 10-4 – Interaction of trends and segments

	City attraction	Going online	More active mature population	Sharing economy	Delayed adulthood	Environmental awareness	Working flexibly
Village life	Low	High	High	Low	Low	Low	High
Central connectivity	High	High	Low	High	High	High	Low
Family terraces	Medium	Low	Low	High	Medium	Low	Low
Pre-school	Medium	High	Low	High	High	High	Medium
Service sector workers	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Comfortable self-sufficiency	Low	Low	High	Low	Low	Medium	Medium
Semi-retired flexibility	Low	High	High	High	Low	High	High
Semi-detached suburbia	Low	Medium	Medium	Low	Medium	Medium	Medium
School-run suburbia	Low	High	Low	Medium	Low	Medium	Low
Traditional towns	Low	Low	Medium	Low	Medium	Low	Low

Figure 10-3 - Pen Portrait: Village life[132]



Predicted population segmentation composition in 2020 and 2035

The overall predicted mix of the population in 2035 is shown in Table 10-4, compared with the existing population composition in 2020.

Table 10-4 - Population composition in 2020 and predicted for 2035

	Current	Population in 2020 (m)	Future	Population in 2035 (m)
Village Life	5%	0.35	4%	0.29
Central connectivity	6%	0.45	9%	0.77
Family terraces	10%	0.73	6%	0.50
Service sector workers	18%	1.30	12%	0.96
Comfortable self-sufficiency	17%	1.23	14%	1.17
Semi-detached suburbia	26%	1.92	21%	1.71
Traditional towns	15%	1.08	8%	0.69
Pre-school	0%	0.00	6%	0.50
Semi-retired flexibility	0%	0.00	5%	0.39
School-run suburbia	0%	0.00	11%	0.92
Sparsely populated	3%	0.22	3%	0.23
Total	100%	7.29	100%	8.15

[132] In the attitudinal and behavioural graphs presented in Figure 3 an index value of 100 represents the average response for all segments. An index value of 200 represents twice the average propensity for all segments, with an index value of 50 representing half the propensity for all segments

Geographic location of new segments

The geographic location of each of the three new segments is illustrated in the following three maps. In each case the 'master segment' from which the new segment is sub-divided is also shown. Each master segment was split based upon values from the following appropriate datasets.

- **Family Terraces / Pre-School** – Proximity to services (Index of Multiple Deprivation (2019)) – The Pre-School group are more likely to want to live closer to local services.
- **Comfortable Self-sufficiency / Semi-retired Flexibility** – Occupation Category, UK Census 2011 – The Semi-retired Flexibility group are more likely to work in Managerial or Professional roles.
- **Semi-detached suburbia / School-run suburbia** – Households with dependent children, UK Census 2011 – The School-run suburbia group are more likely to have school age children living within their households.

The segments were then spit and assigned their new groups based upon the predicted population composition in Table 10-5. For example, as Semi-detached suburbia represents 22% of the future predicted population and School-run suburbia represents 12% of the future predicted population it can be assumed that roughly one third of the 'master segment' will transfer to the future segment. The proportion of households with dependent children was calculated for all Semi-detached suburbia hexcells. The top third of hexcells (based upon the proportion of households with dependent children) were assigned to the new group, School-run suburbia. A set of maps for each segment is presented in Appendix F.

Figure 10-4 - New segment 1 - pre-school

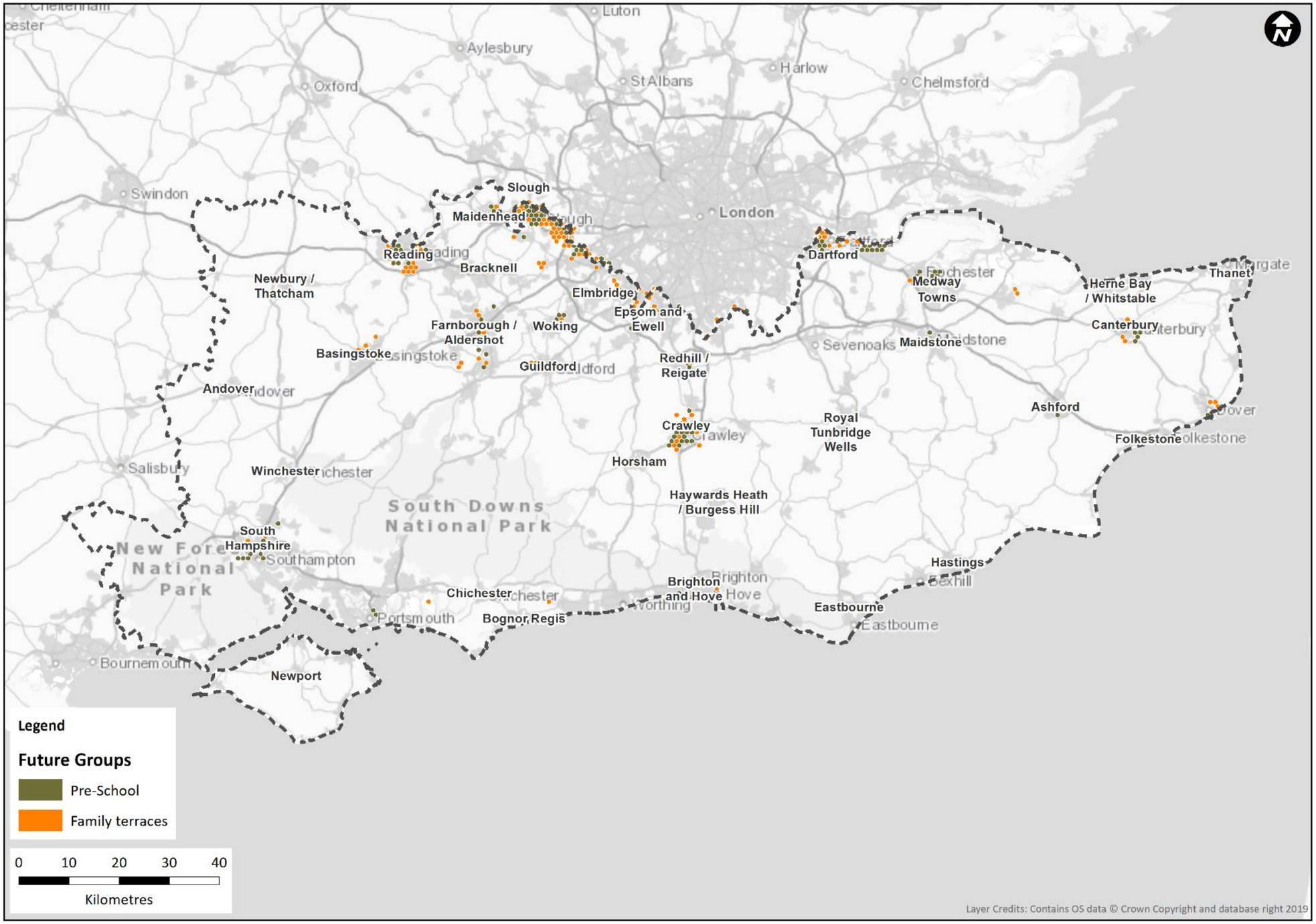


Figure 10-5 - Semi-retired flexibility

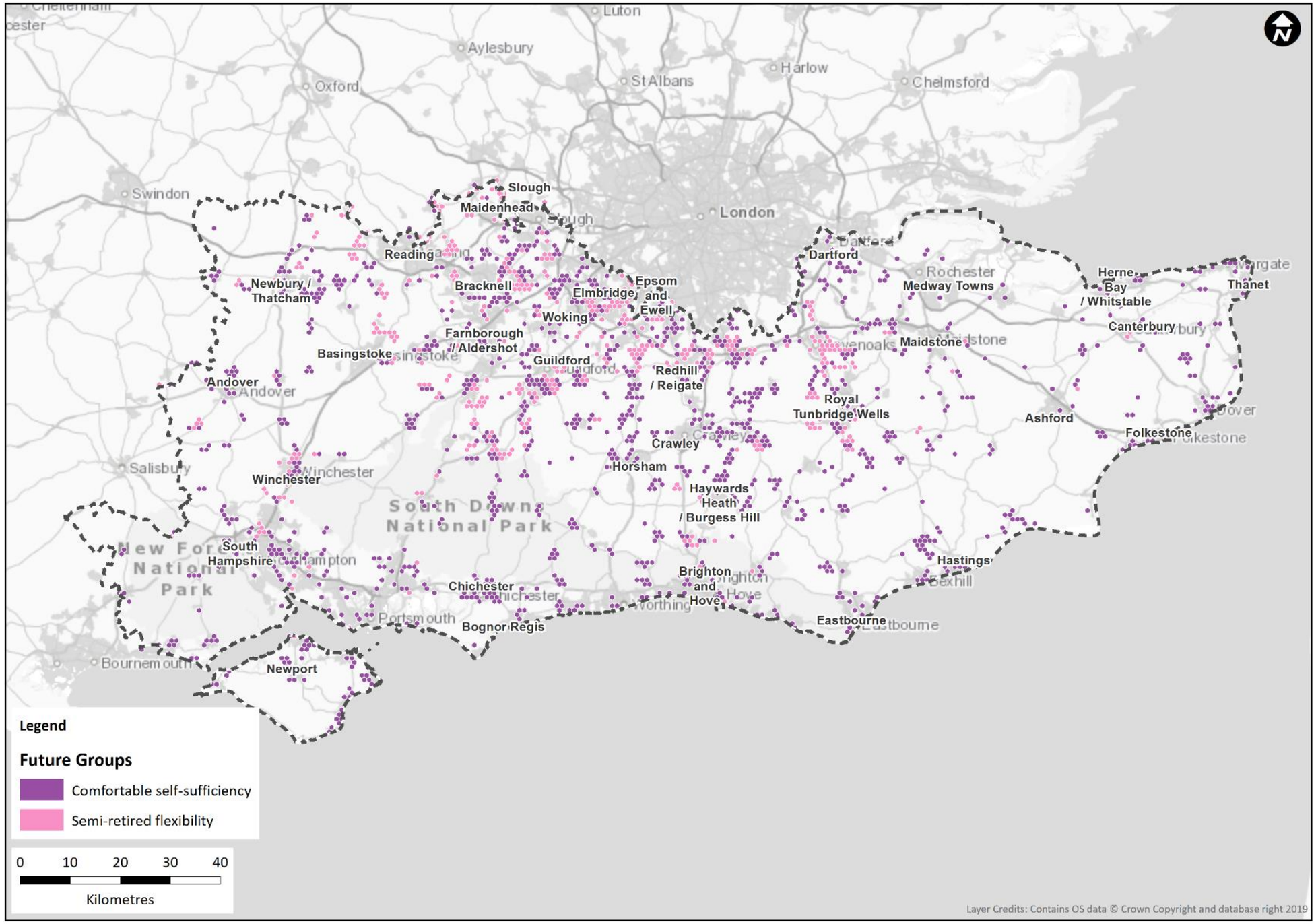


Figure 10-6 - New segment 3 school-run suburbia

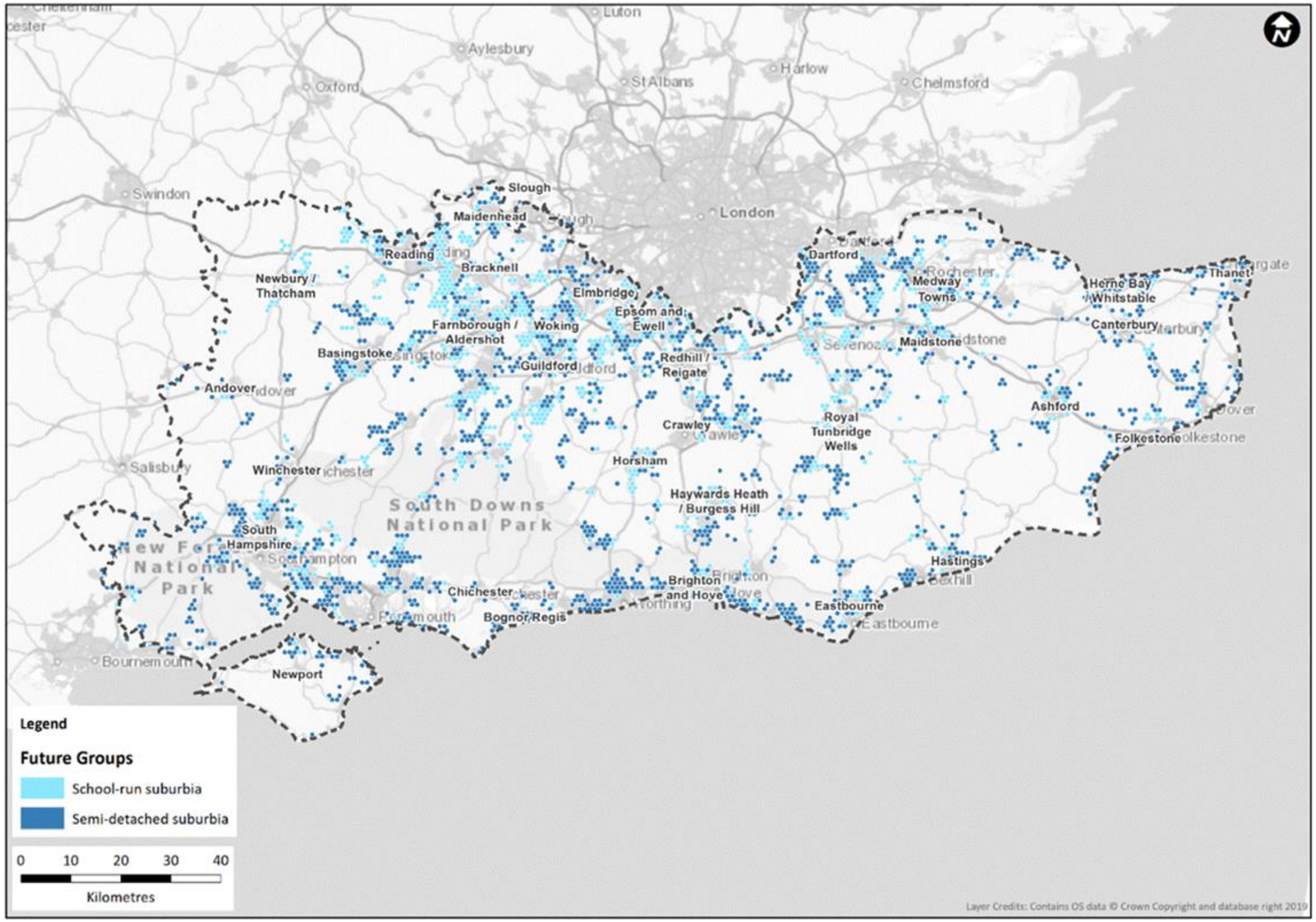
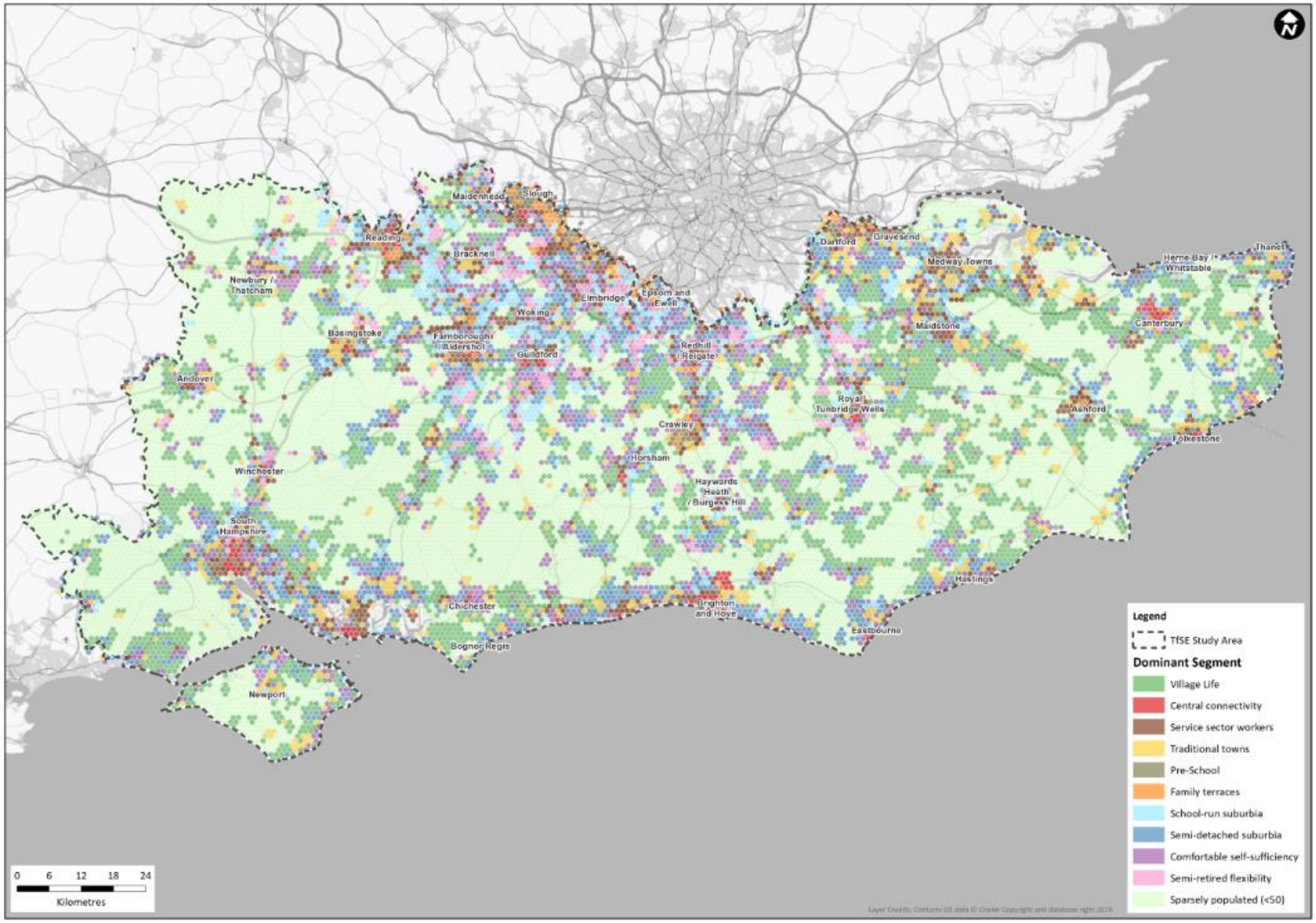


Figure 10-7 - All new transport for the south east population segments



Propensity of each segment to use primary transport modes

For existing transport modes, the relative propensity of each segment to use different modes has been analysed and presented in Table 10-6 using the National Travel Survey data (2017) and the Steer dynamic geodemographics study

It is important to bear in mind that over this period the existing segments will also change, with the Central connectivity segment perhaps likely to see the most change as it has a relatively high proportion of 'early adopters'.

Table 10-5 - Predicted relative use of primary modes by segment

	Bus	Rail	Cycle	Walk	Car Driver
Village life	Well below average	Well below average	Below average	Average	Well above average
Central connectivity	Well above average	Well above average	Well above average	Above average	Well below average
Family terraces	Well above average	Well above average	Well above average	Average	Below average
Pre-school	Above average	Above average	Average	Above average	Above average
Service sector workers	Well below average	Below average	Below average	Above average	Well above average
Comfortable self-sufficiency	Well below average	Below average	Below average	Average	Well above average
Semi-retired flexibility	Below average	Well below average	Below average	Below average	Average
Semi-detached suburbia	Well above average	Well above average	Well above average	Average	Well below average
School-run suburbia	Well below average	Well above average	Well below average	Well above average	Well above average
Traditional towns	Well below average	Well above average	Below average	Average	Well above average

Note: this table highlights the differences between segments and does not take into account any underlying trends which affect the overall use of the mode.

Propensity of each segment to use future mobility models

Based on the analysis of the National Travel Survey data (2017), the Steer Dynamic Geodemographics study and other available sources, an assessment of the propensity of each segment to use future mobility models has been undertaken and is summarised in Table 10-7. The analysis is based on the following key factors and data sets:

- Attitudes and behaviour patterns of each segment (see Table 10-8); and User profiles of future mobility models (see Table 10-9).

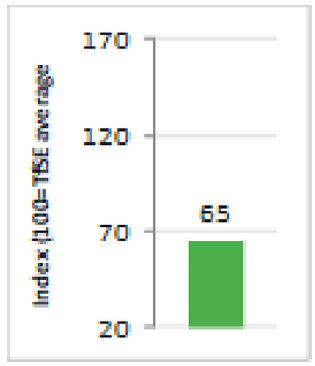
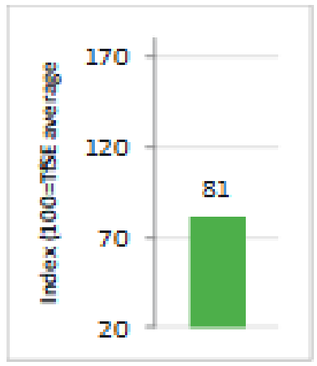
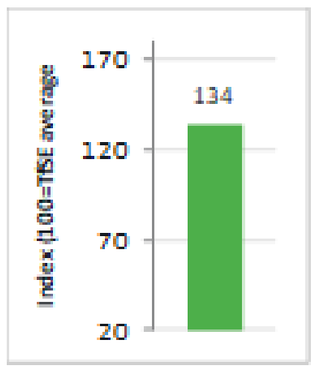
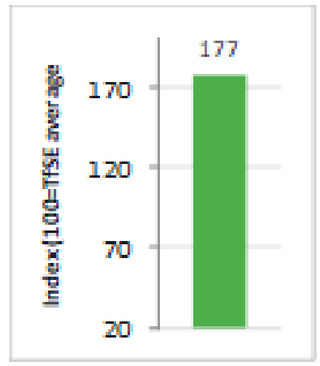
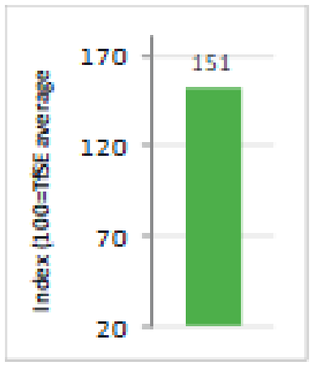
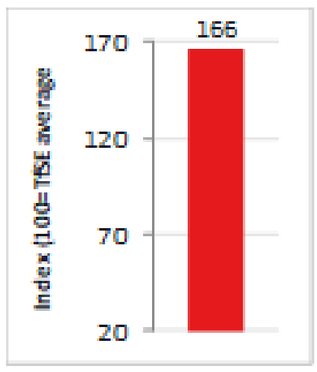
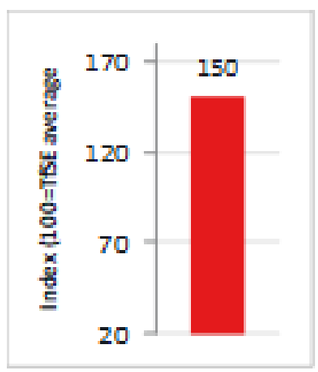
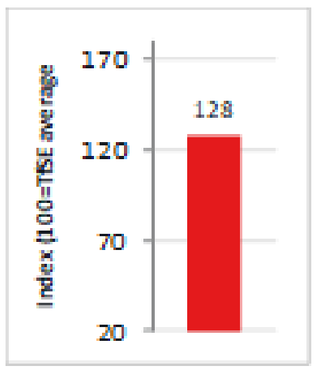
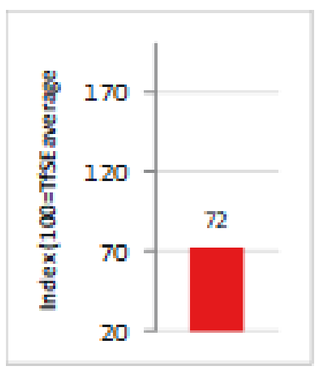
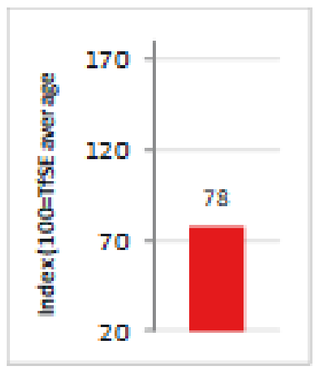
An operator-focused freight model is not included in the table, as it is a business to business (B2B) model and not a business to customer (B2C) model, and our analysis is focused on an end user and a specific population segment.

Table 10-6 - Predicted relative use of future modes by segment

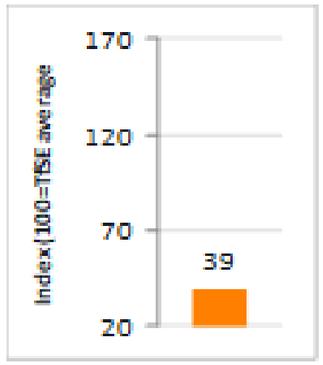
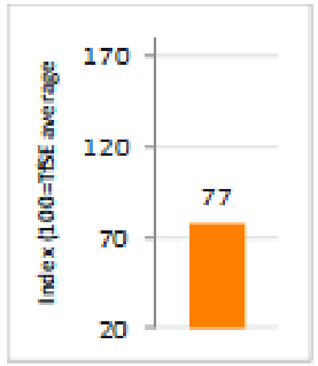
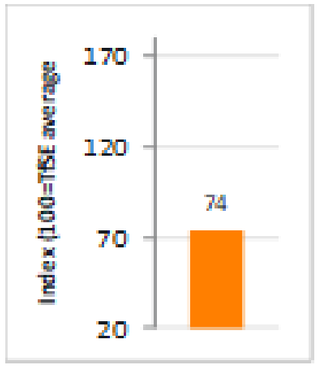
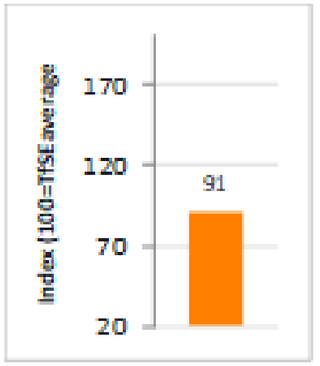
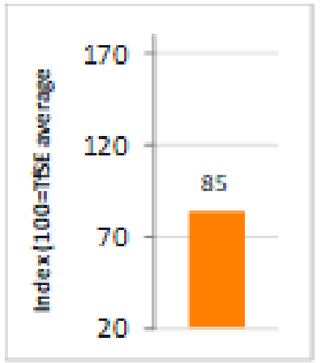
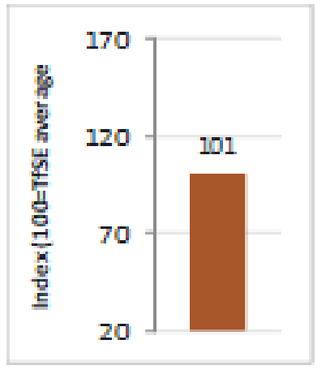
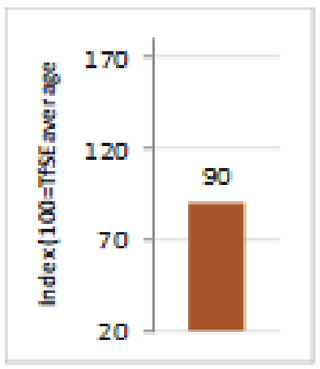
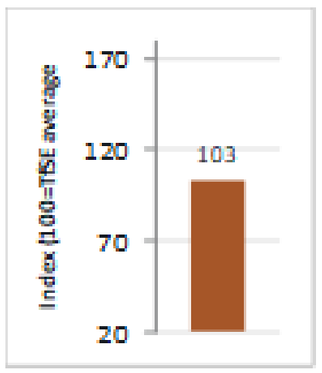
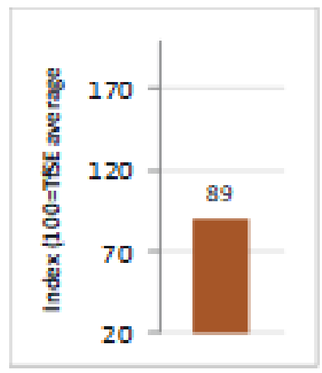
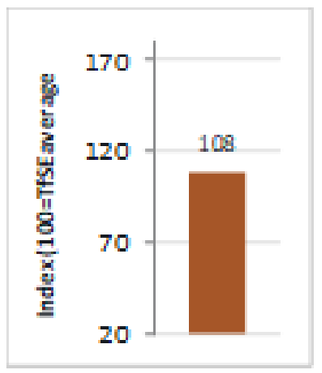
	Ride-sharing	Ride-sourcing (sole user)	Ride-sourcing (shared)	Mobility asset sharing	MaaS platforms	Parking and kerb space management	Digital-as-a-mode	Consumer-focused freight models
Village life	Well below average	Well below average	Below average	Well below average	Below average	Well below average	Well above average	Above average
Central connectivity	Average	Well above average	Well above average	Well above average	Well above average	Below average	Above average	Well above average
Family terraces	Average	Average	Below average	Average	Above average	Average	Average	Above average
Service sector workers	Average	Average	Average	Well above average	Well above average	Below average	Above average	Above average
Comfortable self-sufficiency	Well below average	Below average	Below average	Below average	Average	Average	Below average	Below average
Semi-detached suburbia	Below average	Below average	Below average	Average	Above average	Above average	Above average	Average
Traditional towns	Above average	Below average	Average	Below average	Below average	Average	Well below average	Average
Pre-school	Above average	Well above average	Well above average	Well above average	Well above average	Below average	Above average	Well above average
Semi-retired flexibility	Below average	Average	Below average	Below average	Average	Average	Above average	Well above average
School-run suburbia	Above average	Average	Above average	Average	Average	Above average	Above average	Above average

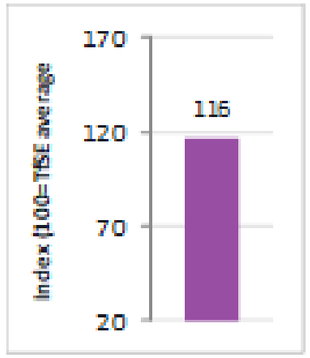
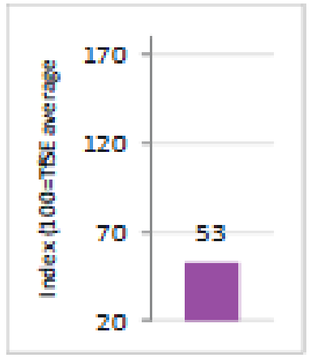
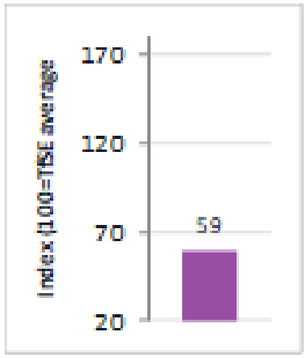
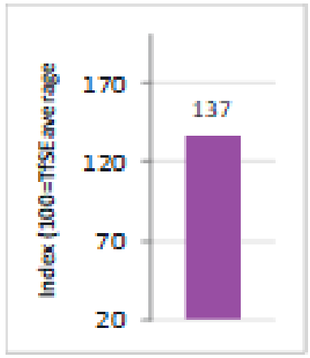
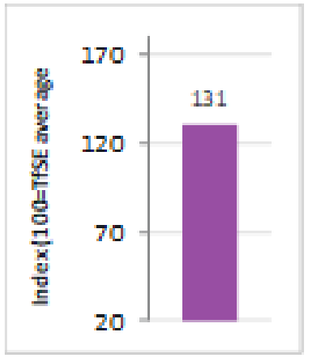
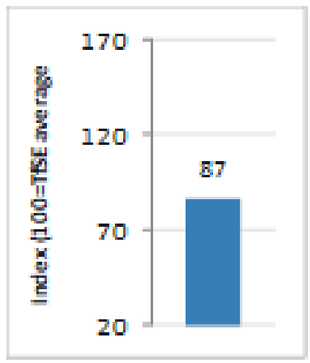
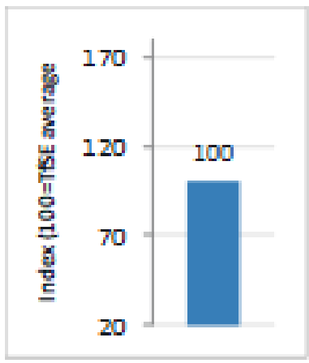
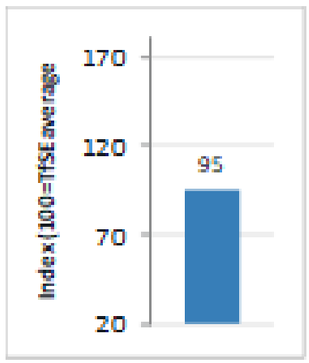
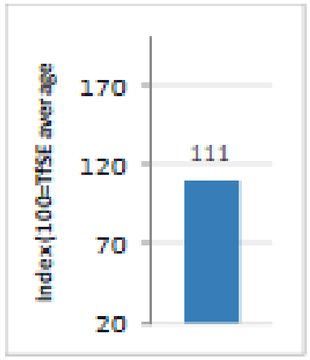
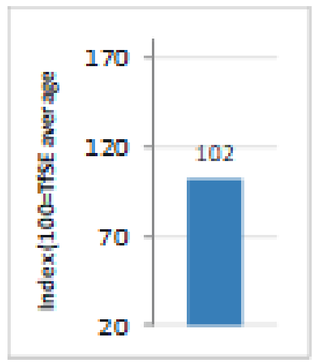
Note: this table highlights the differences between segments and their relation to each other. If the underlying trends are further affected by the Covid-19 pandemic, while the base level of use may change, we expect the relative difference between segments to stay similar.

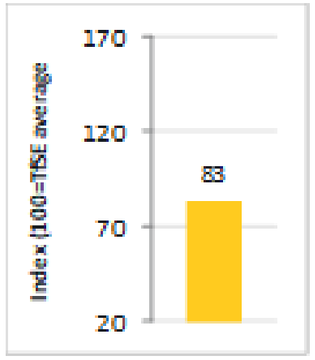
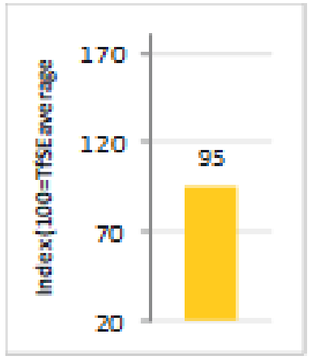
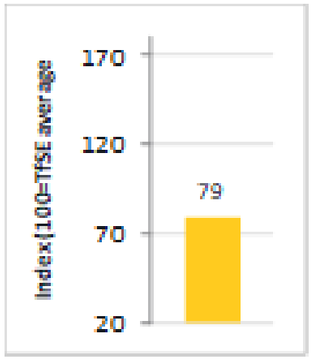
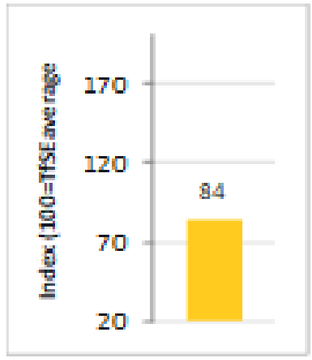
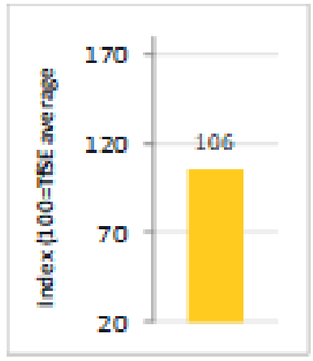
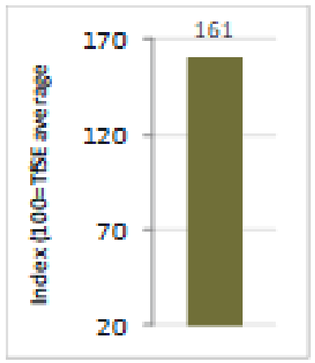
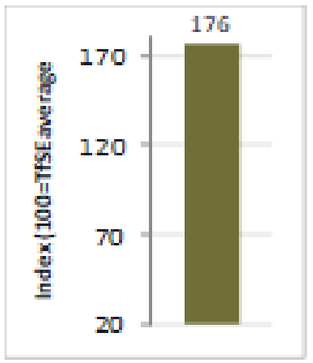
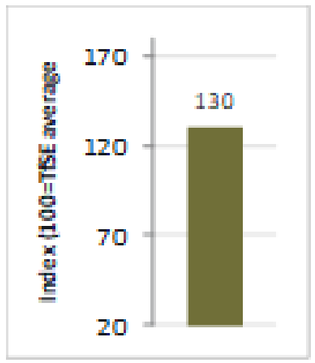
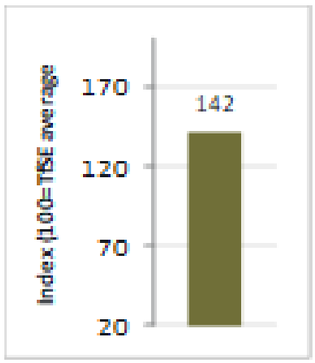
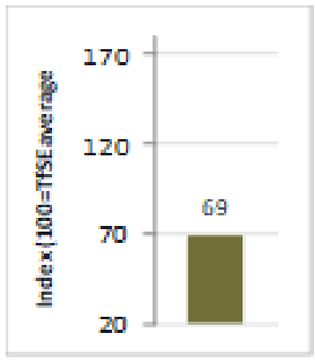
Table 10-7 – Attitudes and behaviour

Segment	Attitudes and behaviour[133]				
Village Life	Are your travel choices influenced by your concern over climate change? **(% strongly agree)**	People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					
Central Connectivity	Are your travel choices influenced by your concern over climate change? **(% strongly agree)**	People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					

[133] Data received from the Steer Dynamic Geodemographics study. In the attitudinal and behavioural graphs an index value of 100 represents the average response for all segments. An index value of 200 represents twice the average propensity for all segments, with an index value of 50 representing half the propensity for all segments

Segment	Attitudes and behaviour[133]				
Family Terraces	Are your travel choices influenced by your concern over climate change? (% strongly agree)	People should be allowed to use their cars as much as they like even if it damages the environment (% strongly disagree)	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					
Service Sector Workers	Are your travel choices influenced by your concern over climate change? (% strongly agree)	People should be allowed to use their cars as much as they like even if it damages the environment (% strongly disagree)	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					

Segment	Attitudes and behaviour[133]				
Comfortable Self-Sufficiency	Are your travel choices influenced by your concern over climate change? **(% strongly agree)**	People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					
Semi-Detached Suburbia	Are your travel choices influenced by your concern over climate change? **(% strongly agree)**	People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					

Segment	Attitudes and behaviour[133]				
Traditional Towns	Are your travel choices influenced by your concern over climate change? (% strongly agree)	People should be allowed to use their cars as much as they like even if it damages the environment (% strongly disagree)	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					
Pre-School	Are your travel choices influenced by your concern over climate change? (% strongly agree)	People should be allowed to use their cars as much as they like even if it damages the environment (% strongly disagree)	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					

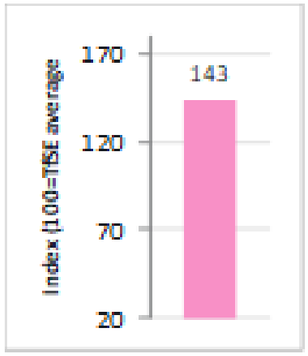
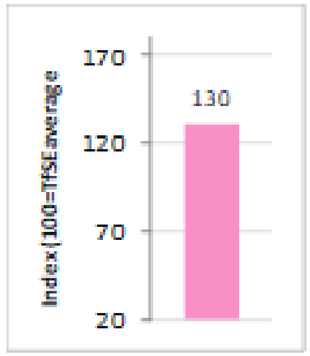
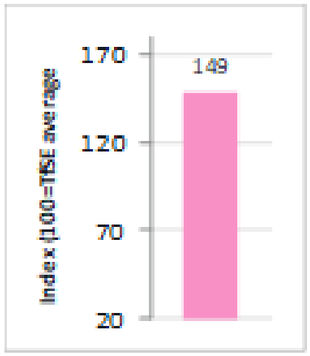
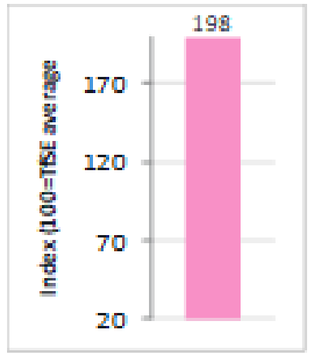
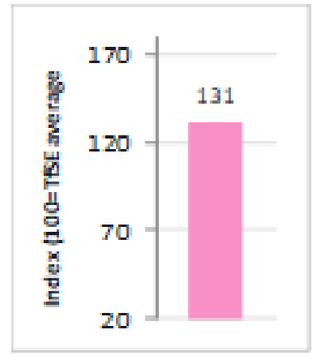
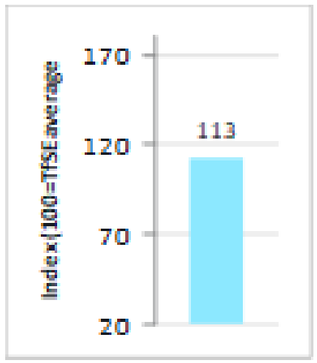
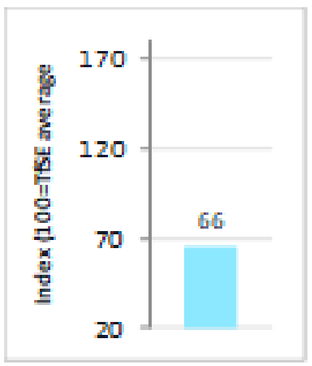
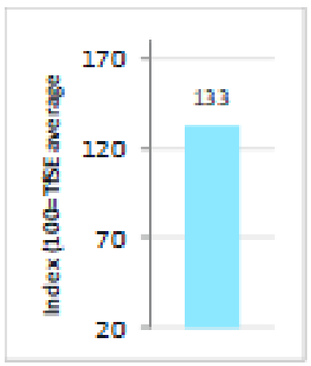
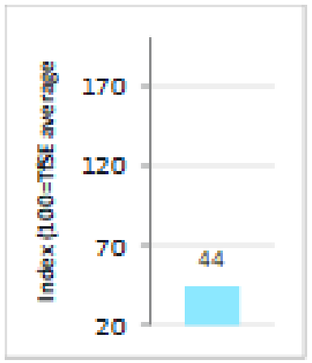
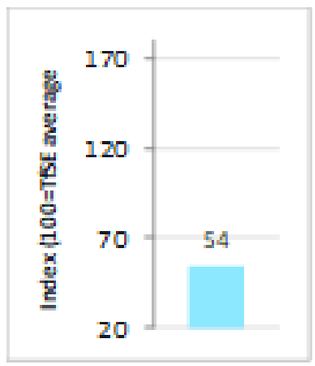
Segment	Attitudes and behaviour[133]				
Semi-Retired Flexibility	Are your travel choices influenced by your concern over climate change? **(% strongly agree)**	People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					
School-Run Suburbia	Are your travel choices influenced by your concern over climate change? **(% strongly agree)**	People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**	Undertake main weekly grocery shop online	Work mainly from home	Work flexible hours
					

Table 10-8 - User profiles of future mobility models

Future mobility model[134]	Description	User profile
Rideshare: **Rideshare schemes match private vehicle drivers with potential passengers making similar regular or one-off long-distance trips.**	Employer-led rideshare examples – Liftshare and Faxi	Employer-led rideshare: • Use social media platforms; • Have a smartphone; • Keen on shared economy; • Awareness of environmental concerns; • Keen to save money on journeys; • Used by employees (working in councils, universities, airports, other large employers like Toyota, Ocado etc.); • Almost three quarters of Liftshare users are aged between 26-55.[135]; and • 70% of Liftshare members work full time.
	P2P (Peer to Peer) rideshare (e.g. BlaBlaCar, Waze Carpool and informal rideshare, e.g. arranged through Facebook)	Peer to Peer rideshare:[136] • Age profile: 18-40 years old; • 71% working/ 21% students; • High usage of internet; • 82% shop online; • Use social media platforms; • Have a smartphone; • Keen to save money on journeys; • Keen on shared economy; and • Awareness of environmental challenges.
Ride-sourcing - sole user	Ride sourcing typically connects a commercial driver with an individual passenger as an alternative to a single car or taxi journeys. Examples – Uber, Ola	• Use social media platforms; • Have a smartphone; • Age profile: Figures from Ofcom released this year show that Uber users are disproportionately young: 28 per cent of 18-24-year-olds in the UK use Uber, with those numbers decreasing by age.[137]; • People living mainly in urban areas; and • Key purpose of travel by PHV: leisure (47%), personal business (14%), commuting (13%), shopping (12%), education (8%), other and business (6%). [138]

[134] Future mobility models include new and upcoming mobility technologies and services as well as established services in the market, which have not been implemented on a wide scale in the Transport for the South East area.
[135] https://blog.liftshare.com/liftshare/aside-from-james-corden-and-peter-kay-who-liftshares
[136] http://www.fondazionesviluppososostenibile.org/f/Documenti/2015/sharing%20mobilty/Presentazione_Cecchetti_BlaBlaCar_Gdl_Dati_Indagini.pdf
[137] https://www.telegraph.co.uk/technology/2017/09/26/really-ubers-40000-drivers-35m-users-london/#:~:text=Figures%20from%20Ofcom%20released%20this,across%2019%20cities%20and%20regions.
[138] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833569/taxi-and-phv-england-2019.pdf

Future mobility model[134]	Description	User profile
Ride-sourcing - shared	The shared approach combines journeys of two and more people therefore potentially having a more significant impact on reducing vehicle kilometres travelled App based shared taxi/private hire. Examples - e.g. UberPOOL, Digital Demand Responsive Transport (DDRT) - Arriva Click, ViaVan	App based shared taxi/private hire: As above (ride-sourcing – sole user) Digital demand responsive transport: • Have a smartphone; • People living in urban areas but also can include villages (if the service is subsidised); and • Age profile: 18-50 (similar to ride-sourcing).
Mobility asset sharing	Mobility asset sharing allows customers to access and share the use of different mobility modes without having to own them (e.g. car/ bicycle). Assets are generally available at permanent or semi-permanent locations and booked, paid for and located via an app Includes such sub-models as. car clubs[139], bike share and e-scooters	**Bike share** • Awareness of environmental concerns; • Have a smartphone; • Use social media platforms; • People living in urban areas; • 37% female and 61% male[140] ; • 48% reported on exercise as reason why they choose to use bike share; • The age spread of bike share users was from 15 to 75 with the majority in the 25-54 category (78%), including 30% in the 25-34 group, 29% in the 35-44 group and 19% in the 45-54 group; and • 82% of respondents stated they were employed; 11% were students; and 2% were retired. **E-scooters** • Younger adults; • Tech savvy; • Have a smartphone; • Use social media platforms; • People living in urban areas; • Younger men tend to use e-scooters more (Men are twice as likely as women to say that they'd used a vehicle for a trip)[141]; • Micro mobility is most popular among youths under the age of 17 and adults in the (rather wide) 18-50 age demographic[142]; and • Portland study: 16-24yrs (14%), 25-34yrs (42%), 35-44yrs (27%)[143]. **Car clubs** • Awareness of environmental concerns; • Have a smartphone; • Both urban and rural areas (if subsidised): cities/towns/villages; • Half of car club's member in England/Wales are under 40[144] ; • Mosaic profiles from CoMoUK annual survey:

[139] Car clubs vary from the national providers to regional sized schemes to community schemes, some of which can be very small
[140] https://como.org.uk/wp-content/uploads/2019/11/CoMoUK-Bike-Share-Survey-2019-final-1.pdf
[141] https://www.bloomberg.com/news/articles/2019-12-05/most-electric-scooter-riders-are-men-here-s-why
[142] https://transportfindings.org/article/10777-shedding-nhts-light-on-the-use-of-little-vehicles-in-urban-areas
[143] https://www.slideshare.net/otrec/escooter-users
[144] https://como.org.uk/wp-content/uploads/2019/06/EW-report-v4.0.pdf

Future mobility model[134]	Description	User profile
		- Motivated young renters in locations close to jobs and amenities (31%); - Ambitious 20- and 30-year olds in prestige central locations (13%); - Professional families with growing children in good quality housing (10%); - Other key Mosaic types include older households owning small properties in diverse urban neighbourhoods (Urban Cohesion - 9%) and younger families in value homes in the suburbs or developments (Aspiring homemakers - 7.5%); and - Age profile: 71% of England & Wales car club members are under 50 years old; the key age range for car club membership is predominantly amongst the 30-44 age group.
MaaS platforms	MaaS is the integration of multi-modal public and private sector mobility services delivered through one or more digital platforms. It incorporates travel information, payments, reservation of demand responsive modes and authentication. MaaS is designed to enable customers to seamlessly access and consume mobility services to undertake end-to-end journeys that meet individual's quality, cost and time preferences. Examples MaaS apps and platforms – Whim, Citymapper, Jelby (Berlin)	MaaS is often associated with the use of digital communication channels and touch points with the users, such as digital apps. At the same time, the communication channels and user touch points can be paper-based tickets or phone call services. The user profiles for the use of MaaS apps is commonly based on the following characteristics: • Awareness of environmental concerns; • Have a smartphone; • Positive attitude to tech and innovation; • Willingness to try new technologies; • Biggest commercial market is the 'flexi traveller', rather than those who are dependent on their car for daily travel or those well suited by the current public transport offering (shown in numerous trials e.g. Whim, Smile, Gothenburg); • Age profile: Whim users are groups[145]: 18-25yrs (17%), 26-30yrs (16%), 31-40yrs (24%), 41-50yrs (16%), 51-65yrs (19%), 66+yrs (8%); and • MaaS is concentrated in urban areas with further development of rural MaaS expected between 2025-2035.
Parking and kerb space management platforms	Parking and kerb space management platforms provide consumers with information and app-based payment functions to reduce the traditional problems associated with finding and paying for parking. Examples – AppyWay, JustPark, RingGO	• Willingness to try new technologies and ability to use smartphone; • Owning and driving a car: Personal car ownership increases with age to a peak of 58 per cent amongst 55-59-year olds, after which it declines again[146]; • In households with incomes of up to £75k, car access rises as income increases, after which it levels off; and • Can be used by drivers of ride-hailing and delivery services in urban areas.
Digital-as-a-mode	The use of digital connectivity to reduce and/or remove the need to travel can be referred to as "Digital-as-a-mode". Digital access to work, education and healthcare access provides for similar opportunities without the need for physical travel. Examples – Open University, EBT, Babylon Health, Fiit.	• Access to good broadband; • Use of Internet: while almost all adults aged 16 to 44 years used the Internet daily or almost every day (99%), older age groups used it less frequently. For adults over the age of 65, 61% used the internet daily while 24% had not used the internet in the last three months[147]; • Professional occupation: easier for office workers; • Have a computer/smartphone/tablet[148]; • Take up of communication devices by age group; At present, just 12% of all adults say they never go online, increasing to 29% of those aged 55+.

[145] https://ramboll.com/-/media/files/rfi/publications/Ramboll_whimpact-2019.pdf
[146] http://content.tfl.gov.uk/technical-note-12-how-many-cars-are-there-in-london.pdf
[147] https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2019
[148] https://www.ofcom.org.uk/__data/assets/pdf_file/0022/117256/CMR-2018-narrative-report.pdf

Future mobility model[134]	Description	User profile
		Connected device take up has increased in the past decade, especially for portable devices such as smartphones and tablets, which brings the convenience of being able to go online anytime, anywhere[149].
Consumer-focused freight models	This model is focused upon the consumer need for freight and deliveries through digitally enabled consumption and includes the last mile deliveries of online purchases such as goods, groceries and food. • Robot deliveries • Automated parcel lockers • Online shopping	• Have a smartphone; • Use social media platforms; • Use internet; • Good broadband connection; • Keen on shared economy; • Like shopping for goods online; • Younger people tend to be more active when shopping on the internet than older people, but older people are catching up in their shopping activity.[150] The largest rise in adults buying online was in those aged 55 to 64 years, where there has been a rise of 30% since 2008, to 75% in 2017; • In 2019, for the first time, more than half of adults aged 65 years and over shopped online, at 54%.151; • In terms of shopping frequency, younger adults bought online more often than older adults. While 26 percent of adults aged 25 to 34 years bought online 11 or more times in the last 3 months, only 7 percent of those aged 65 and over did so.[152].

[149] https://www.ofcom.org.uk/__data/assets/pdf_file/0022/117256/CMR-2018-narrative-report.pdf
[150] https://fashionunited.uk/news/retail/uk-online-shopping-behaviour-revealed/2017080825414
[151] https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2019
[152] https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2019

Transport for the South East place led typology

11. Place led typology

Introduction

A set of geographically anchored place led typologies has been developed, bringing together the Transport for the South East socio-demographic typologies and relevant place-based data, such as population densities, mode share and income levels.

The combination of people-based geodemographic segments and place led typologies has been used to inform a long list of interventions.

Definition of major economic hubs (MEH)

The Transport for the South East Economic Connectivity Review, through analysis of the economic characteristics of the Transport for the South East area, identified and defined major economic hubs (MEH).

An MEH is defined as a contiguous area of relatively high population and employment density. It has a self-contained travel to work area and acts as a centre of employment for other surrounding settlements. It has high levels of retail square footage which means that it also acts as an attractor to surrounding areas for its shopping and leisure offer. Moreover, an MEH will typically have one or more further education, higher education or research facilities.

MEHs have been identified by selecting built up areas with either a resident population of more than 50,000 or employment of more than 20,000. This is used as a proxy for the level economic activity in a contiguous urban area which would constitute an MEH.

Through this process, locations have been identified where two areas that are almost contiguous also have the characteristics of an economic hub. In this situation the two areas are considered together as one economic hub. Following feedback from stakeholders, there are selected MEHs, such as South Hampshire, which will be considered for sub-division into their named locations, e.g. Portsmouth and Southampton.

MEH types

The differing levels of 'self-containment' in the major economic hubs were identified by analysis of the relationship between the 'net import / export' of labour and the percentage of people living and working within the same major economic hub (i.e. 'self-containment'). MEHs have been split into different types, presented in the table below.

Table 11-1 - MEH types

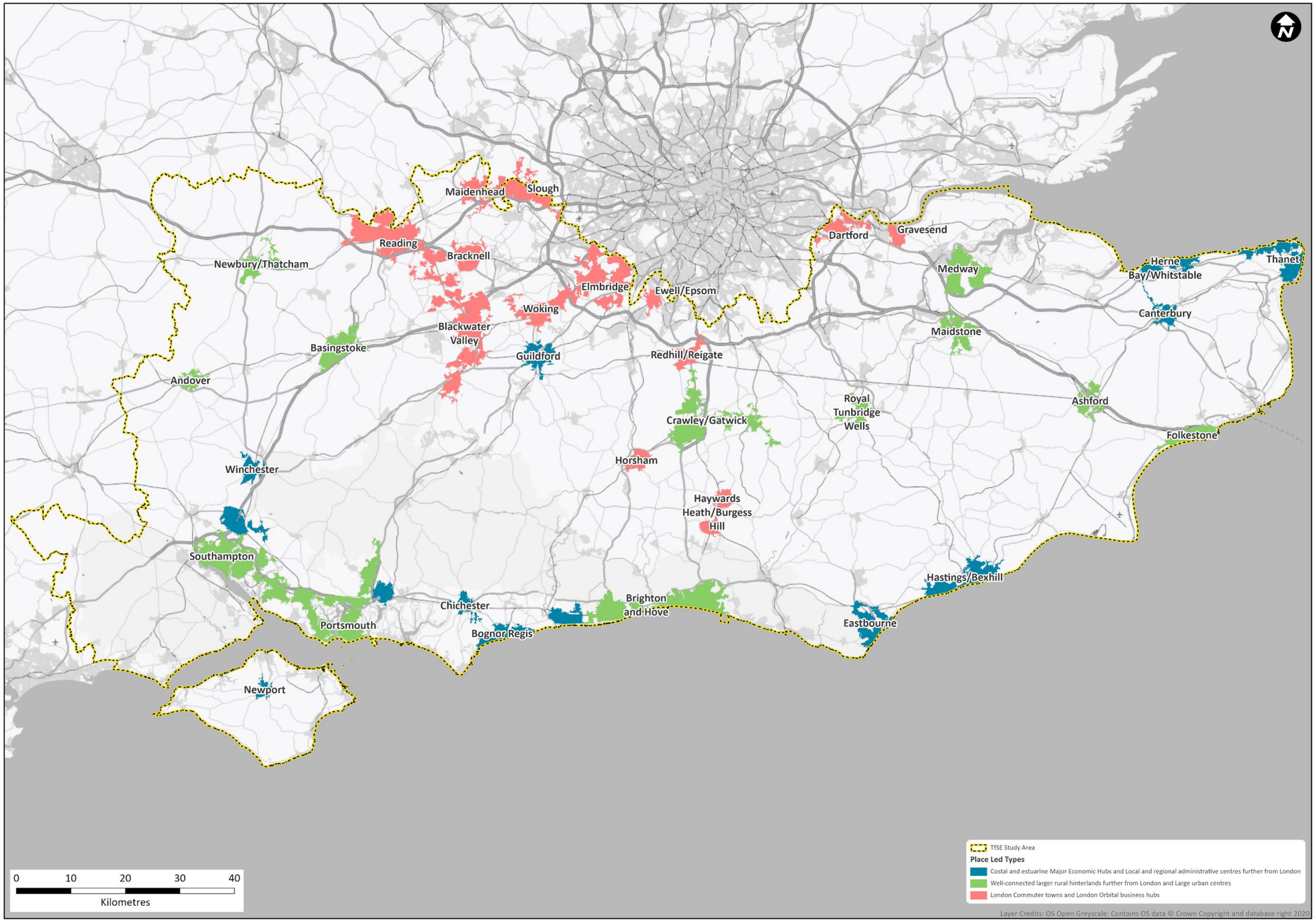
Group	Description
The hubs with higher levels of "self-containment'	
Coastal and estuarine major economic hubs (e.g. Bognor Regis, Eastbourne, Hastings/Bexhill, Herne Bay/Whitstable and Thanet)	These major economic hubs, which are highlighted in light blue in Figure 8, have relatively low skill and wage/salary levels of jobs. They are also less well connected to London, meaning they are less attractive to London commuters, which contributes to higher levels of self-containment
Well-connected larger rural hinterlands further from London (e.g. Andover, Ashford, Crawley/Gatwick, Basingstoke, Newbury/Thatcham)	Although many people commute to London from these major economic hubs, thanks to their excellent rail connections to the capital, they also have relatively high levels of self-containment themselves. These major economic hubs, which are highlighted in green in Figure 8, are important regional centres in their own right and are 'net importers' of labour from large, rural catchments
Large urban centres (e.g. Brighton and Hove, Medway, Portsmouth and Southampton).	These major economic hubs, which are highlighted in black in Figure 8, are the largest urban centres in the South East area. They are home to industries and public institutions, including hospitals and universities. They therefore have high levels of self-containment. However, they are also well connected to London, which means they are attractive to London commuters and are therefore net exporters of labour. It should be noted that while there is a lot of self-containment in these large urban centres, there are also significant commuting flows within them. The mode share for public transport within these large urban centres is influenced by their shape. For example, public transport and active travel mode share is relatively high in Brighton and Hove, which is orientated along the South Coast, whereas car mode share is higher in Portsmouth and Southampton.
The hubs with lower levels of 'self-containment'	
Local and regional administrative centres further from London (Canterbury, Chichester, Guildford, Newport and Winchester):	These major economic hubs, which are highlighted in orange in Figure 8, have lower levels of self-containment with many more jobs than workers. As historic, administrative centres (e.g. county towns, cathedral and university cities) they are often desirable places to live but are constrained from expanding to accommodate more housing due to 'greenbelt' and environmental constraints (e.g. National Parks and Areas of Outstanding Natural Beauty). As such, they have high levels of 'net-importing' of labour
London commuter towns (e.g. Blackwater Valley, Epsom/Ewell, Gravesend and Woking	These major economic hubs, which are highlighted in red in Figure 8, have higher levels of commuting to London and other nearby major economic hubs. They are generally well served by the railway network

	and are within easy reach of London. As such, they are typically high 'net exporters' of labour.
London orbital business hubs (e.g. Bracknell, Dartford, Redhill/Reigate, Maidenhead, Slough):	These major economic hubs, which are highlighted in grey in Figure 8, are net importers of labour but also have high levels of out-commuting and low levels of self-containment. These are typically areas located close to the M25, which have been successful in attracting investment into employment areas, but also have good rail links to London. These centres are attractive to both London commuters and local workers.

Table 11-2 - Transport for the South East MEHs

BUA	Employment	Population
South Hampshire BUA	404,056	855,569
Brighton and Hove BUA	215,625	474,485
Reading BUA	163,080	318,014
Farnborough/Aldershot BUA	117,554	252,397
Medway Towns BUA	91,882	243,931
Crawley BUA	112,951	180,508
Slough BUA	83,406	163,777
Hastings BUA	51,052	133,422
Elmbridge (Borough of)	56,375	130,875
Thanet BUA	43,564	125,370
Eastbourne BUA	47,977	118,219
Basingstoke BUA	64,504	107,642
Maidstone BUA	56,731	107,627
Woking BUASD	43,922	105,367
Dartford (Borough of)	54,972	97,365
Bracknell BUASD	42,678	77,256
Guildford BUASD	54,927	77,057
Epsom and Ewell (Borough of)	30,223	75,102
Ashford (Ashford) BUA	38,595	74,733
Herne Bay/Whitstable BUA	21,711	70,485
Royal Tunbridge Wells BUA	34,848	68,910
Newbury/Thatcham BUA	40,657	68,258
Folkestone BUA	30,395	66,429
Maidenhead BUA	33,225	64,831
Haywards Heath/Burgess Hill BUAs	29,322	64,480
Bognor Regis BUA	19,164	63,885
Redhill (Reigate and Banstead) BUA	31,224	56,621
Gravesend BUASD	17,704	55,467
Canterbury BUA	36,496	55,240
Horsham BUA	23,364	51,472
Winchester BUA	32,056	46,074
Andover	23,877	42,276
Chichester BUA	27,947	31,654

Figure 11-1 - Transport for the South East region profile



Approach to the development of place led typology

When developing a place led typology for the Transport for the South East area, there is a balance between creating too many place types, which is difficult to manage and interpret, and too few place types, resulting in an insufficient representation of the diversity of places across the Transport for the South East area.

The MEH classification already undertaken has been used as a basis for this approach and this methodology describes our further approach to classifying smaller urban and rural areas based on the following concept: "Each MEH type has the potential to have an associated urban type and rural type".

The new urban types and rural types are defined based on population size, proximity to an MEH, and a series of other localised data, which has been collated to sense check the allocation of urban and rural areas to a particular Type.

It is important to note that this place led typology is designed to characterise settlements and rural areas across the Transport for the South East area into a manageable number of types, to enable further analysis at a sub-regional level, rather than at a settlement by settlement level. As such, there always will be particular locations which have unique characteristics and differ in character to other locations in the same type. These limitations to the methodology are recognised.

The following approach has been used to allocate urban and rural areas to the types.

- The Built Up Area (BAU)[153] data from the Office for National Statistics (ONS) has been used to determine whether locations are urban or rural, based on a defined population size. It has been assumed that populations of 5,000 people or over are urban and those with less than 5,000 people are rural.
- In instances where finer granularity is required (such as distinguishing the individual settlements within South Hampshire BUA), the Built Up Area Sub Division dataset from the ONS is utilised. The sub division dataset is based upon the BUA dataset and neatly divides the larger BUAs.
- For all urban areas (as defined in 1 above), the nearest and second nearest MEH have been identified.
- The following descriptive data has been collated for each urban BUA including:
    - Population size;
    - Population segmentation (%)[154];
    - Access to services;
    - Employment size;
    - Income;
    - Skill levels;
    - Proximity to rail station; and
    - Mode share.
- For rural areas (as defined above), the nearest and second nearest MEH have been identified. Rural areas were additionally assigned the Office for National Statistics Rural Urban Classification[155].

The following data has been collated for each rural area including:

- Population segmentation;
- Income;
- Access to services;
- Proximity to the rail station; and
- Mode share.

Urban areas

New categories

Settlements were assigned a category based on the MEH closest to the respective urban settlement. Initially this was done based on the closest MEH but some settlements have been moved to other categories – see 'manual changes'. Table 11-3 shows the initial allocation of urban areas and how they relate to the MEHs.

Table 11-3 - Initial allocation of urban areas

MEH type	Urban type
Coastal and estuarine major economic hubs	Coastal and hinterland urban
Well-connected larger rural hinterlands further from London	Well-connected urban[156]
Large urban centres	
Local and regional administrative centres further from London	Local centres urban
London commuter towns	London commuter urban
London Orbital business hubs	London orbital urban

[153] BAU areas are defined as built-up land with a minimum area of 20 hectares (200,000 m²), while settlements within 200 meters of each other are linked.
[154] Previously identified and developed by Steer for TRANSPORT FOR THE SOUTH EAST.

[155] The use of Office for National Statistics Rural/Urban Classification has been explored, but have employed a more disaggregate segmentation, more closely linked to MEHs. By comparison the ONS classification only identifies three rural settlement types (Rural town and fringe, Rural village and Rural hamlets and isolated dwellings).

[156] One Urban Category has been assigned for the places closest to the 'Well-connected larger rural hinterlands, further from London' and 'Large urban centres' as the characteristics of these urban areas have similarities.

Manual changes

The top down approach above does not necessarily reflect the MEH that individual urban settlements best align with. As such, some manual changes have been made so the urban settlement categories better reflect their MEH counterpart changes. These have primarily been based on a review of the geographical location and other data collated, such as income and qualification statistics.

Geographical location

18 urban settlements were reallocated on the basis of their location. This method was limited to changing settlements to the Coastal and Hinterland Urban category and was done by manually checking the settlement locations. For example, if a settlement had a shorefront it was changed. In addition, several settlements located on estuaries were also changed as it was felt this better reflected their income and qualification statistics (e.g. Northfleet).

Income and qualification statistics

Several urban settlements have been changed because their summary statistics were outliers and did not fit their respective category. This review has mainly been undertaken on the basis of their demographics, relative income and qualification levels and for the most part the category has been changed to reflect the second closest MEH instead of the closest. Appendix D includes a table, which details the settlements that have been changed, the justifications are relative to the other settlements in the category it has been removed from.

Summary

The table below shows the categories that were assigned to each MEH and the number of urban settlements that make up each category.

Table 11-4 - Transport for the South East urban categories

MEH type	Urban type	No. Settlements
Coastal and estuarine major economic hubs	Coastal and hinterland urban	27
Well-connected larger rural hinterlands further from London	Well-connected urban[157]	24
Large urban centres		
Local and regional administrative centres further from London	Local centres urban	18
London commuter towns	London commuter urban	24
London orbital business hubs	London orbital urban	16

Table 11-5 presents a high-level description of each urban place category.

[157] One Urban Category has been assigned for the places closest to the 'Well-connected larger rural hinterlands, further from London' and 'Large urban centres' as the characteristics of these urban areas have similarities.

Table 11-5 – Urban place categories

Urban Category	No. of settlements	Description	Most prevalent segments and their key 'pain points' associated with travel / mobility	Highest propensity to use future mobility models [158]
Coastal urban (e.g. Dover, Northfleet & New Haven)	27	The settlements have relatively low skill and wage/salary levels of jobs. They are also less well connected to London, meaning they are less attractive to London commuters. Volume of employment is on average lower than in other urban types Population segments: On average, the most dominant population segments are Semi-detached suburbia, Comfortable self-sufficiency, Traditional towns and Village life. Income: The areas generally have lower levels of income compared to other types with 21.8 % of people having income between £20K and £29K and 21.4% with income less than £15K. Qualifications: Coastal urban areas have the highest average number of people without qualifications (24.6%) and the lowest number of Level 4 qualifications and above (22.8%) compared to other urban types. Mode share: The mode share will be different in various places due to their location and nature of services. On average, people living in coastal rural areas tend to cycle more compared to other urban types (2.7%) and are using a bus/minibus or coach more than those living in other urban types (4.6%). Most people are driving. Only 3.9% on average are using train, which is the lowest number amongst all urban types.	Semi-Detached suburbia - lack of car parking Comfortable self-sufficiency - poor quality and availability of public transport in outer suburban areas. Traditional towns - availability and cost of public transport Village life - Lack of access to public transport	Semi-detached suburbia - parking and kerb-space management Comfortable self-sufficiency – parking and kerb-space management Traditional towns – all models are average or below average Village Life – Digital-as-a-Mode, consumer-focused freight models
Well-connected urban (e.g. Hawkinge, Tonbridge & Rochester)	24	Although many people commute to London from these settlements, thanks to the available rail connections to the capital, they also have relatively high levels of 'self-containment', themselves being located close to important regional Major Economic Hubs. People tend to work in closest MEH, however, as the areas are also well connected to London, which means they can be attractive to London commuters and be net exporters of labour. Population segments: On average, the most dominant population segments are Semi-Detached suburbia, Comfortable self-sufficiency, Traditional Towns and Village life Income: On average, 46% of people living in these urban areas have income between £20K and £49K. Qualifications: Well-connected urban areas have a good spread between different qualification levels with 26.4 % people having Level 4 qualifications and above.	Semi-detached suburbia - lack of car parking Comfortable self-sufficiency - poor quality and availability of public transport in outer suburban areas. Traditional towns - availability and cost of public transport Village life - lack of access to public transport	Semi-detached suburbia - parking and kerb-space management Comfortable self-sufficiency – parking and kerb-space management Traditional towns – all models are average or below average Village Life – Digital-as-a-Mode, consumer-focused freight models

[158] Above average and well above average

Urban Category	No. of settlements	Description	Most prevalent segments and their key 'pain points' associated with travel / mobility	Highest propensity to use future mobility models [158]
		Mode share: The mode share will be different in various places due to their location and nature of services. On average, more people (67.5%) are driving in well-connected urban areas compared to others. More people (6.8%) are using train compared to coastal urban type. Only 2.1 % use bus, minibus or coach.		
Local centres urban (e.g. Liss, Petersfield & Cranleigh)	18	These are historic, administrative centres (e.g. county towns, cathedral cities) which are often desirable places to live but are constrained from expanding to accommodate proportionately more housing due to 'greenbelt' and environmental constraints (e.g. National Parks and Areas of Outstanding Natural Beauty). Volume of employment is on average the lowest compared to other urban types Income: There is a good spread of income, with 16% having income between £20-£29K, 15% less than £15K and 11% having income between £70K to £99K Population segments: On average, the most dominant population segments are Semi-Detached Suburbia, Comfortable Self-Sufficiency, Traditional Towns and Service Sector Workers Qualifications: Local Centres' urban areas have a good spread between qualification levels with 33.5% people having Level 4 qualifications and above. Mode share: The mode share will be different in various places due to their location and nature of services. In terms of mode share, on average Local Centres' urban areas are very similar to well-connected urban areas. Most people drive (66.1%) and more people (6.8%) are using train compared to coastal urban type. Only 2.1 % use bus, minibus or coach.	Semi-detached suburbia - lack of car parking Comfortable self-Sufficiency - poor quality and availability of public transport in outer suburban areas. Traditional towns - availability and cost of public transport Service sector workers - poor quality of public realm in urban areas discouraging walking and cycling.	Semi-detached suburbia - parking and kerb-space management Comfortable self-sufficiency – parking and kerb-space management Traditional towns – all models are average or below average Service sector workers – Mobility asset sharing, MaaS platforms, parking and kerb-space management, consumer-focused freight models
London commuter urban (e.g. Fleet, Southwater & Ashstead)	24	These areas have higher levels of commuting to London and nearby major economic hubs. They are generally well served by the railway network and are within easy reach of London. As such, they are typically high 'net exporters' of labour. Income: Income brackets tend to be higher in these urban types with 14% having income between £70K and £99K, which can be explained by close proximity to London and people working in London with higher salaries. Population segments: On average, the most dominant population segments are Semi-detached suburbia, Comfortable self-sufficiency, and Service sector workers Qualifications: London commuter urban areas have the highest number of people with Level 4 qualifications compared to other urban types, which can be explained by the close proximity to London.	Semi-detached suburbia - lack of car parking Comfortable self-sufficiency - poor quality and availability of public transport in outer suburban areas. Service sector workers - poor quality of public realm in urban areas discouraging walking and cycling.	Semi-detached suburbia - parking and kerb-space management Comfortable self-sufficiency – parking and kerb-space management Service sector workers – mobility asset sharing, MaaS platforms, parking and kerb-space management, consumer-focused freight models

Urban Category	No. of settlements	Description	Most prevalent segments and their key 'pain points' associated with travel / mobility	Highest propensity to use future mobility models [158]
		Mode share: More people (10.5%) use train compared to well-connected, local centres and coastal urban areas. Only 1.6 % use bus/minibus/coach, which is the lowest amongst all urban types.		
London orbital urban (e.g. High Wycombe, Sevenoaks & Windsor)	16	These areas are typically located close to the M25, which have been successful in attracting investment into employment areas, but also have good rail links to London. These centres are attractive to both London commuters and local workers. They have the highest volume of employment in their area compared to other urban types. Income: Income brackets tend to be higher in this urban type and are similar to London commuter type with 13% having income between £70K and £99K, this is also likely to be due to people working in London with higher salaries. Population segments: On average, the most dominant population segments are Semi-Detached suburbia, Comfortable self-sufficiency, Traditional Towns and Service sector workers Qualifications: London commuter urban areas have the second highest number of people with Level 4 qualifications compared to other urban types, which can be explained by the proximity to London. Mode share: London orbital areas have the highest number of people using train compared to other types of urban areas. 61% of people drive, which is the lowest percentage across all urban types. 2.6% of people use bus/minibus/coach, which is higher than London commuter, local centres and well-connected urban types.	Semi-detached suburbia - lack of car parking Comfortable self-sufficiency - poor quality and availability of public transport in outer suburban areas. Service sector workers - poor quality of public realm in urban areas discouraging walking and cycling.	Semi-detached suburbia - parking and kerb-space management Comfortable self-sufficiency – parking and kerb-space management Service sector workers – Mobility asset sharing, MaaS platforms, parking and kerb-space management, consumer-focused freight models

Rural Areas

For our initial analysis, rural settlements (those with a population less than 5,000) have been categorised by their closest MEH. This has resulted in the following categories and settlement numbers:

Table 11-6 - Initial rural types

MEH category	Rural type	No. of settlements
Coastal and estuarine major economic hubs	Coastal rural	65
Well-connected larger rural hinterlands further from London	Well-connected rural	249
Large urban centres		
Local and regional administrative centres further from London	Local centres rural	141
London commuter towns	London commuter rural	94
London orbital business hubs	London orbital rural	44

To better reflect the difference in accessibility to local services, the Rural Types have been further subdivided based on accessibility, so that for each type there is a 'good' and a 'poor' accessibility sub-type. Good or poor accessibility were assigned on the basis of the mean accessibility score[159] for a given type. If the value for a given settlement was less than the respective mean score for its type, then that settlement would be deemed 'good accessibility', likewise if the value was more than the mean that settlement would be deemed 'poor accessibility'. The sub-types mean score and the number of settlements within each are presented in Table 11-7

Table 11-7 - Final rural types

Type	Mean accessibility score	Sub-types	No. of settlements
Coastal rural	0.954	Coastal rural (good accessibility)	29
		Coastal rural (poor accessibility)	36
Well-connected rural	1.117	Well-connected rural (good accessibility)	111
		Well-connected rural (poor accessibility)[160]	138
Local centres rural	1.192	Local centres rural (good accessibility)	69
		Local centres rural (poor accessibility)	74
London commuter rural	1.109	London commuter rural (good accessibility)	49
		London commuter rural (poor accessibility)	54
London orbital rural	1.175	London orbital rural (good accessibility)	23
		London orbital rural (poor accessibility)	27

[159] Accessibility scores have been derived from the DCLG Index of Multiple Deprivation database (2019).

[160] A well-connected location with poor accessibility is likely to have reasonable transport connectivity for a rural area (e.g. road or rail services) and limited local services (e.g. post office, doctor's surgery, village shop).

Table 11-8 - Description of transport for the south east rural categories

Type	Sub-Types	No. of settlements	Mean accessibility score	Description
Coastal rural (e.g. Fairlight, Crowhurst & Pevensey Bay)	Coastal rural (good accessibility)	29	0.42	The settlements have relatively low skill levels (notably low levels of level four and above qualifications) and low wage/salary levels (this category and its poor accessibility counterpart has the lowest % earning over £70K). These areas are less well connected to London, meaning they are less attractive to London commuters. Access to services is better than in other rural (good accessibility) types.
	Coastal rural (poor accessibility)	36	1.38	Same as above but with a worse accessibility score.
Well-connected rural (Greywell, Knowle, Ram Lane)	Well-connected rural (good accessibility)	111	0.50	People in these types of rural area tend to work in larger urban settlements, including the closest MEH, however, they also have relatively high levels of 'self-containment'. These areas have relatively low-income levels and low numbers of people with level 4 qualifications.
	Well-connected rural (poor accessibility)	138	1.61	Similar to above, but with higher levels of individuals with level 4 or above qualifications and higher income levels.
Local centres rural (e.g. Frogham, Rookley & Shorwell)	Local centres rural (good accessibility)	69	0.68	These are historic, minor rural centres (e.g. prominent market towns with a good supply, relative to their urban areas, of amenities), which are constrained from expanding to accommodate proportionately more housing due to 'greenbelt' and environmental constraints (e.g. National Parks and Areas of Outstanding Natural Beauty). Access to services is relatively poor compared to other 'good accessibility' subcategories. Level 4 qualification levels are relatively high.
	Local centres rural (poor accessibility)	74	1.67	Similar to the above, with the poorest accessibility score of all the rural sub-categories but, perhaps surprisingly, the highest % of Level 4 or above qualifications.
London commuter rural (e.g. Buxted, Ewhurst & Plumpton)	London commuter rural (good accessibility)	49	0.61	These areas have higher levels of commuting to London and nearby Major Economic Hubs. They are generally well served by the railway network and are within easy reach of London. As such, they are typically high 'net exporters' of labour. They have high levels of income and level 4 qualifications.
	London commuter rural (poor accessibility)	54	1.58	Same as above but poorer accessibility (though a relatively average level of accessibility for the 'poor accessibility' sub-categories).
London orbital rural (e.g. Chaldon, Bletchingley & Hawley)	London orbital rural (good accessibility)	23	0.70	These areas are typically located close to the M25. They are attractive to both London commuters and local workers. They are also the closest to a rail station of the sub-categories and have the second highest percentage of people earning over £70K.
	London orbital rural (poor accessibility)	27	1.54	Similar to the above but they are the second closest to a rail station of the sub-categories and have the highest percentage of people earning over £70K.

Placed led typology: propensity

An assessment of propensity of each settlement type to use future mobility models has been undertaken and is summarised in Figure 11-2. The analysis is based on the following:

- understanding of the type of place (based on the analysis presented above);
- analysis of the most prevalent population segments in each place led type;
- propensity of each population segment to use future mobility models (see Section 10); and
- user profiles of future mobility models (see Section 10).

An operator-focused freight model is not included in the table, as it is a business to business (B2B) model and not a business to customer (B2C) one, and our analysis is focused on an end user and a specific population segment

Table 11-9 – Propensity

MEHs	Ride-sharing	Ride-sourcing (sole user)	Ride-sourcing (shared)	Mobility asset sharing	MaaS platforms	Parking and kerb space management	Digital-as-a-mode	Consumer-focused freight models
Coastal and estuarine	Above average	Above average	Above average	Above average	Above average	Well above average	Average	Above average
Well-connected larger rural hinterlands further form London	Above average	Above average	Above average	Above average	Above average	Well above average	Average	Above average
Large urban areas	Above average	Well above average	Well above average	Well above average	Well above average	Well above average	Below average	Well above average
Local and regional administrative centres further from London	Above average	Well above average	Well above average	Well above average	Well above average	Well above average	Below average	Well above average
London commuter towns	Above average	Above average	Above average	Above average	Well above average	Well above average	Average	Above average
London orbital business hubs	Above average	Above average	Above average	Above average	Well above average	Well above average	Average	Above average
Urban settlements								
Coastal and hinterland urban	Average	Average	Average	Average	Average	Average	Average	Average
Well-connected urban	Above average	Above average	Above average	Above average	Above average	Above average	Average	Above average
Local centres urban	Above average	Above average	Above average	Above average	Average	Above average	Average	Above average
London commuter urban	Above average	Above average	Above average	Above average	Above average	Above average	Above average	Average
London orbital urban	Above average	Above average	Above average	Above average	Above average	Well above average	Above average	Above average
Rural								
Coastal and hinterland rural (good accessibility)	Well below average	Below average	Below average	Below average	Below average	Well below average	Average	Above average
Coastal and hinterland rural (poor accessibility)	Well below average	Well below average	Well below average	Well below average	Well below average	Well below average	Above average	Above average
Well-connected rural (good accessibility)	Well below average	Average	Below average	Below average	Below average	Well below average	Average	Above average
Well-connected rural (poor accessibility)	Well below average	Below average	Well below average	Well below average	Well below average	Well below average	Above average	Above average
Local centres rural (good accessibility)	Well below average	Below average	Below average	Below average	Below average	Well below average	Average	Above average
Local centres rural (poor accessibility)	Well below average	Well below average	Well below average	Well below average	Well below average	Well below average	Above average	Above average
London commuter rural (good accessibility)	Well below average	Average	Below average	Below average	Below average	Below average	Average	Above average
London commuter rural (poor accessibility)	Well below average	Below average	Well below average	Well below average	Well below average	Below average	Above average	Above average
London orbital rural (good accessibility)	Well below average	Average	Below average	Below average	Below average	Below average	Average	Above average
London orbital rural (poor accessibility)	Well below average	Below average	Well below average	Well below average	Well below average	Below average	Above average	Above average

Future mobility trends and changes

12. Future mobility trends and changes

The adoption of key technologies is disrupting mobility at a faster pace than ever before. New technologies and business models are changing the way that people and goods move around our cities and towns. Navigating these changes effectively is important to maximise the potential benefits of more efficient, safer and personalised services and to minimise the risks, such as increased congestion and inequalities.

The mobility sector, like many aspects of life, has changed dramatically in recent years and will continue to transform in the future. The drivers of these transformations are mega trends which are broadly categorised into the following groups: demographic challenges, social change, economic shift, environmental focus and political landscape. These drivers of change are not mutually exclusive, they are working both independently and together to transform the transport sector and life more generally

Many mega trends are having a direct bearing on changes within the mobility sector capitalising upon technological trends that are rapidly emerging from within the sector itself. In turn, some of the anticipated changes and benefits of these technology trends will have wider impacts on society and the economy.

The DFT's Future of Mobility: Urban Strategy, identifies the following six key changes within future mobility driven by the trends:

- Automation;
- Cleaner transport;
- New business models;
- New modes;
- Data & connectivity; and
- Changing attitudes.

An additional change, "aggregation", has been added to the list above to better reflect the recent changes and development in the mobility sector where combinations of the six key changes and existing transport provision are brought together either physically or digitally to provide agglomerated benefits. Typical examples of this additional aggregation change include Mobility Hubs and Mobility as a Service. An overview of the changes and how they may evolve beyond 2035 is presented in Table 12-1.

Table 12-1 - Future mobility changes

Key change	Description/short-term outlook	Long-term outlook: 2035-2050
Automation	The automation agenda is gathering pace, with advances in computing power and sensor capabilities having led to well publicised advancements in road, rail, water and aerial technology. Automation in the transport sector will significantly impact how modes function and perform as well as having potential impacts on placemaking and utilisation of space. It has several applications in transport ranging from autonomous vehicles to drones and robotics. The Government has communicated an expectation that autonomous vehicles will be on UK roads by 2021, a date further confirmed by some vehicle manufacturers. However, it is likely that scale fleet penetration will occur in the period of 2025 to 2035 and in the case of HGVs and trunk haul freight probably beyond 2035. The investment and implementation of automation in its widest sense is observed across the South East: from Govia Thameslink Railway implementing more automated train services (e.g. the Automatic Train Operation (ATO) system[161] which removes control of acceleration and braking from the driver) to an increasing level of automation within Gatwick airport (e.g. Stanley Robotics valet parking service). The companies, organisations and academic institutions in the Transport for the South East area have been granted over £15 million of Innovate UK funding in Connected and Autonomous Vehicle competitions since 2015, which are attributable to a wide range of projects[162].	Automation could transform the mobility sector and influence all existing transport modes including both public and private sectors. It could open up exciting opportunities such as improved road safety, cheaper public transport and accessibility for people whose mobility is impaired but will also bring significant challenges and disruption, especially during the transition. period to a fully automated transport system[163].. It is expected that by 2040 the technological, legal, and legislative challenges to full autonomy in vehicles will be resolved. Autotrader in its “Cars of the future” report, 2020, predicts that by 2050 a car will be a driverless vehicle in the shape of a smooth pod, which caters to recreational activities including sleeping on the go, board games and even yoga[164] One of the key concerns is that automation could reduce human resource requirements in transport and wider industrial sectors. This may result in the need to retrain significant proportions of the workforce to either face changes to their current roles or in new sectors establishing over this time period. For example, PwC estimates that the share of jobs that could be impacted by automation is estimated to rise to 30% by the mid-2030s, as autonomous robots and driverless vehicles roll out more widely across the economy[165].
Cleaner transport	The use of alternative fuels (including electricity, hydrogen, natural gas) is one of the key trends that is reshaping the future of mobility. In transport, electrification is typically represented in the form of battery electric and plug-in hybrid electric vehicles. A key impact of all kinds of alternative fuels is emission reductions. Implementation of less environmentally damaging fuels in transport would contribute to efforts to reduce carbon emissions and enhance air quality in urban areas. Alternative fuels require considerable infrastructure investments to ensure successful development and take up. In the case of electric vehicles, it ranges from ensuring that there are enough charging points installed, to making sure that the grid has sufficient local capacity to serve the increased demand for electricity. The hydrogen refuelling network is in the early stages of development with central Europe leading the way. The Road to Zero stated that now the UK has left the EU it will pursue a future approach that is at least as ambitious as the current arrangements for vehicle emissions regulation. This includes CO2 emission reductions for cars and Heavy-Duty Vehicles (HDVs) whereby manufacturers face fines for non-compliance. The electrification agenda is gathering pace across the UK, but few places have seen as dramatic an uptake as the South East. Unlike many other areas in the UK, the South East has seen sustained investment in its electric charging infrastructure, providing the ideal conditions for influencing the local fleet. Investment, however, has not been uniform across the area and	Across all transport modes, applications are likely to be developed further and increase in numbers. For example, electric vehicles technology is expected to be improved, in particular the energy density of electric vehicle batteries (which have increased since 2010 and will continue to improve into the future). This is key to the development of applications of vehicle electrification in transport for vehicles that require a greater mileage range or have ancillary energy requirements. The forecasts on how big a part hydrogen will play in the overall future energy landscape varies considerably. Hydrogen is considered to be the most promising decarbonisation option for larger vehicles (trucks, buses, commercial vehicles). Hydrogen as a fuel for rail (hydrail) is still in its infancy, with several small-scale demonstration projects around the world including in the UK, representing the limit of its development. It is forecasted that all new cars will be electric by 2035 in line with the UK government’s deadline and new brands from the US, China, India and Latin America will enter the UK market[166]. It is expected that by 2040 electrification and other alternative fuels will have a positive impact on reduction of carbon emissions across all transport sectors[167]. In order to meet the UK economy wide net zero commitment by 2050, all transport modes need to make radical changes to decarbonise; to date it

[161] https://www.thameslinkprogramme.co.uk/learning-legacy/new-trains-technology/ato/
[162] Transport for the South East Future Transport technology report, 2019
[163] https://www.wmu.se/news/transport-in-2040-how-automation-and-technology-will-impact-the-future-of-work
[164] https://m.atcdn.co.uk/static/cars-of-the-future.pdf
[165] https://www.pwc.co.uk/who-we-are/regional-sites/northern-ireland/press-releases/automation-impact.html
[166] https://m.atcdn.co.uk/static/cars-of-the-future.pdf
[167] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/780868/future_of_mobility_final.pdf

Key change	Description/short-term outlook	Long-term outlook: 2035-2050
	nor have areas been consistently reactive to such investment, which arguably has resulted in differentiated electric vehicle uptake.	has made limited headway in reducing overall emissions in comparison to other sectors which have already made considerable reductions. The Government is currently consulting on bringing forward the end to the sale of new petrol and diesel cars and vans from 2040 to 2035 (previously outlined in The Road to Zero), as well as including hybrids for the first time in the same timescales.
New business models	New business models are largely driven by underlying data aggregation; such solutions not only simplify ticketing but also provide tailored and personalised travel information. In addition, bundled energy generation and storage solutions are being offered with new electric vehicles to offer a different mobility business model. New digitally enabled business models of transport provision are also emerging, changing the way people access, book, pay for and experience mobility. These include ride-hailing and Mobility as a Service. At present, the market is fragmented and disintegrated. For example, there are more than a dozen of e-scooter operators and a few MaaS providers all competing to establish a foothold. With time, some of the operators and business models will not be able to reach commercial feasibility and will leave the market. The current commercial market is driven by funding from numerous investors, and it is also witnessing a huge number of collaborations and partnerships among the key players. In addition to further new market entrants, mergers and acquisitions are expected to continue in the future leading to some consolidation of the market.	It is expected that new business models will appear under the influence of improved connectivity, automation and shared technologies. Digital platforms will enhance transport network efficiency by rapidly connecting excess system capacity with demand or reducing the search and transaction costs associated with sharing. Automation may have significant impact on mobility operators' business models. For example, when automation is widely adopted by fleet operators, ride-sourcing may merge with car share (mobility asset sharing) into a single business model after the establishment of CAVs and capitalising upon the functionality of the new technology.
New modes	New mobility modes are emerging under the influence of the technology, which is increasingly enabling new ways of transporting people and goods which are not necessarily encompassed in existing UK regulatory structures. The following examples of new modes are emerging: Drones or unmanned aerial vehicles (UAV), have become popular in recent years for both recreational and commercial uses, such as last-mile delivery, maintenance and inspection, as the technology has improved, and costs reduced. In addition, passenger Vertical Take-off and Landing service technologies are being invested in and developed globally. Micromobility vehicles, which are defined by the Department for Transport as small, usually electric, mobility devices designed to carry one or two people, or for 'last mile' deliveries e.g. electric scooters, electric skateboards and self-balancing vehicles.	Innovative ways to move people and goods will continue to appear in the market. It should be noted that some of the new modes will be developed through evolution and improvement of existing modes. Some of the future mobility modes may include: Powered exo-skeletons; Personal Rapid Transit; Personal Air Vehicles; Autonomous pods and shuttles; and, Hyperloop.
Data & connectivity	Digital connectivity is already underpinning many of our daily activities where access to communications networks (fixed or mobile) is possible. Digital connectivity continues to progress with faster broadband speeds over copper and fibre connections, the progression from 3G to 4G (although incomplete in many corridors) and emerging 5G technology. When considering the infrastructure associated with mobile services, the deployment of 5G is one of the key developments that the country will be faced with tackling. It is expected that by 2030, two-thirds of the global workforce will use 5G. Research conducted by the World Economic Forum and Imperial College London has found a strong positive correlation between mobile broadband adoption and quality and GDP growth. 5G capacity and the speed of transmission has potential to greatly expand the scope of functions of the platform economy and mobile services as we know it today. There is a concern that the intensity of connectivity, data transmission and infrastructure needed to safely deploy automated transport vehicles may have implications that lead to more isolated areas being excluded. Connectivity is also anticipated to have impacts such as increasing the capacity of roads, as distances between vehicles can be reduced and smaller, lighter vehicles can be developed. Development of digital connectivity will facilitate adoption of the Digital as a mode mobility business model reducing or removing the need to travel. Like many places in the UK, the Transport for the South East area has seen significant investment in its digital communications over recent years. Future combinations of 4G, broadband and emerging 5G connectivity will provide the foundations for many technologies and associated services which will gather pace over the coming years. The A2/M2 Connected	The UK has committed to developing large scale testing sites of connected and automated driving on motorways and key transport corridors. These trials should help the UK to reach its ambition of being a leader in the large-scale testing and deployment of 5G infrastructure. It is expected that information and combination technologies will significantly influence the mobility sector and development of future mobility modes supporting a more integrated transport system. By 2050 the volume of data produced and collected will increase significantly and will underpin new technologies and digital infrastructure. Mobility infrastructure planning will be better executed allowing infrastructure and operators to make informed decisions based on the data collected. To optimally utilise big data technology, it is important that local, regional and central governments have access to this data. This allows them to have an overview of the service sectors and hence, improve planning, operation and integration of services to maximise provision. 5G could be a key enabler for connected and autonomous vehicles, as they will be able to almost instantaneously communicate with each other, buildings, and infrastructure (V2V, V2I, V2X).By 2035, it is expected that the majority of vehicles will contain vehicle-to-vehicle (V2V) communications to transmit information about speed, heading and brake status, amongst other data. Vehicle to Everything (V2X) Connectivity will be widely adopted in

Key change	Description/short-term outlook	Long-term outlook: 2035-2050
	Corridor project, which is a collaboration between the Department for Transport, Transport for London and Kent County Council between London and Dover, aims to enable vehicles and road infrastructure to communicate through cellular networks and ITS-G5 networks on road corridors. The goal is to enhance journey safety and reliability.	cities by 2050 driven by automotive IoT sensors and it will be used to establish interconnectivity between vehicles, infrastructure, networks, and pedestrians
Changing attitudes	The DFT strategy highlights how customer attitudes and expectations are changing, which are driving transport and delivery innovations to become increasingly affordable, convenient and personalised. Public perceptions and willingness to engage with new technologies, modes and business models are a fundamental aspect of successful deployment and should not be taken as a given. For example, sharing of assets between users has been a developing and disruptive trend in transportation over the last few years facilitated by the development of the platform economy. By the 2030s, fewer and fewer young people are likely to own a car which is supported by the evidence on the average age of the driving test already rising in the UK.	As technology develops and behaviours become more accustomed to accessing transport options with little forward planning, mobility across a variety of modes can act as an integrated service that can be accessed instantaneously. Attitudes to health and active travel may change and the environmental awareness trend may have a wider impact on users' travel choices. Mobility may no longer be something viewed as a commodity in the form of a car or a personal bike, mobility may instead be viewed as a personalised on-demand service, whether that service is the provision of a shared bike that you ride yourself, or ride-hailing a car journey or a combination of multiple modes.
Aggregation	When considering transport specifically, there are several phenomena that have started to appear in urban areas in recent years; these include developments such as Mobility Hubs and MaaS. All of these are facilitated by the platform economy and changing attitudes leading to increased physical and digital integration. For example, Mobility Hubs present an opportunity to integrate public transport and shared transport to enhance connectivity and user experience, encouraging more sustainable travel. Through more effective implementation of joined up transport services, there is potential to maximise the benefits of more sustainable transport and minimise the negative effects of private car travel such as congestion, poor air quality and inequalities.	It is expected that a more holistic approach to the mobility eco-system management will be implemented across the Transport for the South East area with future mobility modes being a part of land-use planning. Integrated planning, integrated infrastructure, and integrated operations should create mobility systems that work together well and successfully serve their users. By 2050 the cities may have an established network of Mobility Hubs encouraging use of public transport and shared mobility. In rural areas, Mobility Hubs could be more focused on community and creating a co-working space for locals, which will be accelerated by adoption of the Digital-as-a-Mode business model.

Future mobility models in 2025, 2030 and 2035

13. Future mobility models in 2025, 2030 and 2035

Table 13-1 presents a review of future mobility models looking at the evolution of the model by 2025, 2030 and 2035. For each model, the potential impact of modal shift, potential to service different trip lengths and the expected ability for demand to be served commercially have been assessed. This assessment is qualitative and collated using desk-based research, industry insight, experience and informed judgement applied to the Transport for the South East area. Each model has been allocated a rank for the expected ability for demand to be served commercially:

- High – good commercial ability, no need for public investment;
- Low – there is a need for public sector to fund and contribute to development of the future mobility model.

Table 13-1 - Review of future mobility models

Future mobility model	Description	Evolution			Potential impact of modal shift	Transport for the South East segments with the highest[168] propensity to use future mobility models	Potential to service different trip lengths and trip densities	Expected commercial ability to serve the identified segments vs need for public investment	Rank
		Up to 2025	Up to 2030	Up to 2035					
Ride sharing	Ride-sharing schemes match private vehicle drivers with potential passengers (often co-workers) making similar regular or one-off long-distance trips. Examples – Liftshare, Faxi, Blablacar Modes: car	Limited willingness to share limits sector growth but countered by the high cost of technology (price sensitive consumers potentially need to ride-share to overcome high cost of private ULEV vehicles) and trend of environment awareness Ride sharing demand is expected to be lower due to Covid-19 pandemic[169]	CAVs enter fleets and automation starts to be adopted quicker and private CAVs appears on the road Growth in ridesharing associated with high costs of CAV purchase	Automation is widely adopted by fleet operators and provides attractive mobility options. Growth in ride sharing associated with opportunities provided by CAVs	Reduction in single occupancy car trips. Direct substitute for single-car occupancy journeys (e.g. 56% of Liftshare users previously would drive alone). Supports shared private car use over public transport Likely insignificant mode shift expected from long-distance bus/rail	• Traditional towns • Pre-school • School-run suburbia	Trip lengths vary for employee-led ride sharing For long distance ride-sharing the average journeys in Europe are between 130 - 200 miles[170]	For large employers the commercial sector is generally able to serve the market For smaller organisations or less dense areas, local government funding may be required. Councils could fund initial set up costs and contribute to operational costs and promote the service.[171] Long distance ride sharing is typically run by the private sector without investment from the public sector but has had limited success in the UK to date.	Low - Medium

[168] Above average and well above average
[169] https://blog.liftshare.com/industry/48-of-people-to-change-commuting-habits-after-lockdown-with-many-choosing-to-continue-working-from-home
[170] https://tech.eu/features/481/ride-sharing-europe-carpooling-blablacar/
[171] https://takeclimateaction.uk/solutions/car-sharing-how-warwickshire-curbing-vehicle-emissions

Future mobility model	Description	Evolution			Potential impact of modal shift	Transport for the South East segments with the highest[168] propensity to use future mobility models	Potential to service different trip lengths and trip densities	Expected commercial ability to serve the identified segments vs need for public investment	Rank
		Up to 2025	**Up to 2030**	**Up to 2035**					
Ride-sourcing - sole user	Ride sourcing typically connects a commercial driver with an individual passenger or a group of passengers as an alternative to a single car or taxi journeys. Examples – Uber, Ola Modes: taxi, car	Continued private sector disruption, with new entrants to the market encouraging competition. Geographical extent of service offering increased, offering point-to-point transport to more people, increasing trip volumes Electrification is started to be adopted by fleet operators. Ride sourcing may temporarily decrease due to Covid-19 pandemic.	CAVs enter fleets and automation starts to be adopted quicker by fleet operators leading to increased utilisation CAV ride sourcing services may incur empty miles searching for/attending reservations MaaS roll out provides easier access to ride sourcing. Little regulation prevents nudging trips towards public transport/active modes	Automation is widely adopted by fleet operators. Ride-sourcing merges with car share (mobility asset sharing) into a single business model after the establishment of CAVs capitalising upon the functionality of the new technology. This is expected as a result of limited differentiation in service provision, MaaS providing an integrated and seamless mechanism of accessing services and reduction in brand perception associated with travelling in a particular type of vehicle	Some use as direct substitute for private car/hire services Some mode shift from public transport services As price for the CAV services decreases, some mode shift from longer trips made by PT (e.g. rail) can be expected	Central Connectivity Pre-school	Shorter trips up to 15 miles mainly in urban areas In 2018, the majority (40%) of taxi or PHV trips were between 2 and 5 miles[172]	Ride-sourcing companies (sole user) are private sector led with no need for public investment Although, currently ride-sourcing companies like Uber and Lyft are operating with losses, which can be partially explained by a high investment required for development of the service.	High
Ride-sourcing - shared	The shared approach combines journeys of individuals or groups therefore having a more significant impact on reducing vehicle kilometres travelled Examples – Uber POOL; Digital Demand Responsive	Electrification has started to be adopted by fleet operators. Pooling will grow in dense urban areas, but single occupancy prevails. Digital Demand Responsive Transport models are tested and either thrive or fail	Electrification is adopted by fleet operators. CAVs enter fleets and automation has started to be adopted quicker by fleet operators MaaS roll out provides easier access to ride sourcing	Automation is widely adopted by fleet operators. Ride-sourcing merges with car share (mobility asset sharing) into a single business model after the establishment of CAVs, capitalising upon the functionality of the new technology. This is expected as a result of limited differentiation in service provision, MaaS	Mode shift from private car/hire services Limited mode shift from public transport services	• Central connectivity • Pre-school • School-run suburbia	Shorter trips within 5-15 miles UberPool: mainly journeys between 2 to 5 miles	Ride-sourcing companies (sole user) are private sector led with no need for public investment In recent years Digital Demand Responsive Transport (DDRT) has expanded and become more frequently used in many towns and cities as a result of new developments in operational and vehicle technology. The long-	Low – Medium

[172] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/751202/taxi-and-phv-england-2018.pdf

Future mobility model	Description	Evolution			Potential impact of modal shift	Transport for the South East segments with the highest[168] propensity to use future mobility models	Potential to service different trip lengths and trip densities	Expected commercial ability to serve the identified segments vs need for public investment	Rank
		Up to 2025	**Up to 2030**	**Up to 2035**					
	Transport (DDRT) - Arriva Click, ViaVan Modes: taxi, car, DDRT			providing an integrated and seamless mechanism of accessing services and reduction in brand perception associated with travelling in a particular type of vehicle				term financial sustainability of such schemes continues to be questioned with a limited number of schemes recognised as commercially sustainable. As such, DDRT can be considered as an evolving transport mode The are several trials and pilots of the DDRT around the world, introducing the services as an alternative to fixed routes during off-peak hours, in remote neighbourhoods or as a replacement for underperforming fixed routes. Some of them have been successfully implemented, while others have ceased operations for various reasons (e.g. Citymapper Ride in London, Ford Chariot worldwide and Slide in Bristol) Public sector will likely be required to subsidise DDRT services in less dense areas (e.g. rural areas)	
Mobility asset sharing	Mobility asset sharing allows customers to access and share the use of different	Establishment of shared e-scooter schemes after the trials in the UK and	CAVs enter fleets and automation has started to be adopted by fleet operators	Automation is widely adopted by fleet operators and provides attractive mobility options.	Mode shift from private car Car club users tend to walk and cycle more too	• Central connectivity • Service sector workers • Pre-school	Bike share – average journey distance 6 miles, longer journeys by e-bikes	Mobility asset sharing companies are private sector led but require public investment in some cases.	Medium - High

Future mobility model	Description	Evolution			Potential impact of modal shift	Transport for the South East segments with the highest[168] propensity to use future mobility models	Potential to service different trip lengths and trip densities	Expected commercial ability to serve the identified segments vs need for public investment	Rank
		Up to 2025	**Up to 2030**	**Up to 2035**					
	mobility modes without having to own them (e.g. car/ bicycle). Assets are generally available at permanent or semi-permanent locations and booked, paid for and located via an app Includes such sub-models as. car clubs, bike share and e-scooters Modes: bicycle, car club, moped/motorbike, scooter/personal mobility device	supporting legalisation New bike share schemes appear in Major Economic Hubs (MEH) also driven by Covid-19 aftermath. Electrification starts to be adopted by fleet operators offering electric car club vehicles, e-bikes and e-scooters First wave implementation of Mobility Hubs bringing various mobility asset sharing models together (e.g. car club, shared bikes and shared e-scooters) Shift to e-bikes due to convenience and ability to cover longer distances and challenging road topology. Increase in the use of micro mobility triggered by Covid-19.	Mobility Hubs are becoming more widespread, facilitating the uptake of mobility asset sharing models New types of shared micro mobility vehicles are introduced Ownership of vehicles reduces in major urban areas	Ride-sourcing is merging with car share (mobility asset sharing) into a single business model after the establishment of CAVs, capitalising upon the functionality of the new technology. This is expected as a result of limited differentiation in service provision, MaaS providing an integrated and seamless mechanism of accessing services and reduction in brand perception associated with travelling in a particular type of vehicle Mobility Hubs are widely implemented Continued decline in vehicle ownership in urban areas	Car sharing only significant impact in urban/suburban areas where parking is at a premium and there is a critical mass of users E-scooters replace private car trips and ride-hailing trips[173] Post-COVID move from public transport to bike share/e-scooter share Bike share can enable use of public transport by offering last mile solution[174]		For trips made using bike share, a third (32%) of respondents of CoMoUK Bike Share Survey reported their most recent ride duration was between 5-15mins and just under half (43%) reported 15-30mins.[175] E-scooters – up to 5 miles, average distance around 1.5 miles[176] Car clubs – 62% of journeys are less than 20 miles with an average trip distance being 33 miles for round trips [177]	Bike share schemes can be subsidised by local authorities. Bike share is increasingly being considered and funded as public transport Car clubs can be subsidised for services in rural areas. The e-scooter market is expected to grow, and companies are backed by investment funds.	

[173] https://www.portlandoregon.gov/transportation/article/709719
[174] https://como.org.uk/wp-content/uploads/2019/11/CoMoUK-Bike-Share-Survey-2019-final-1.pdf
[175] https://como.org.uk/wp-content/uploads/2019/11/CoMoUK-Bike-Share-Survey-2019-final-1.pdf
[176] https://www.portlandoregon.gov/transportation/article/709719
[177] https://como.org.uk/wp-content/uploads/2019/06/EW-report-v4.0.pdf

Future mobility model	Description	Evolution			Potential impact of modal shift	Transport for the South East segments with the highest[168] propensity to use future mobility models	Potential to service different trip lengths and trip densities	Expected commercial ability to serve the identified segments vs need for public investment	Rank
		Up to 2025	**Up to 2030**	**Up to 2035**					
MaaS platforms	MaaS is the integration of multi-modal public and private sector mobility services delivered through one or more digital platforms. It incorporates travel information, payments, reservation of shared and demand responsive modes and authentication. MaaS is designed to enable customers to seamlessly access and consume mobility services to undertake end-to-end journeys that meet individual's quality, cost and time preferences. Examples – Whim, Citymapper, Jelby (Berlin) Modes: all	MaaS schemes are being trialled and implementation is driven by the outcomes from the Future Transport Zones (FTZs). MaaS can unlock public transport services in certain areas, with some customers using ride-sourcing services to reach public transport access points	MaaS platforms are established in parts of the region MaaS enables easier access to ride-sourcing and asset sharing options CAV ride sourcing services may incur empty miles searching for/attending reservations. MaaS unlocks public transport services in certain areas, some customers assumed to use ride-sourcing services to reach public transport access points Origin-destination data allows for enhanced planning and deployment of transport services in line with demand to combat rises in single occupancy ride-sourcing	MaaS platforms are established across the region MaaS enables easier access to ride-sourcing and asset sharing options in locations it is operational MaaS unlocks public transport services in certain areas, some customers assumed to use ride-sourcing services to reach public transport (VKT increases) Rural MaaS is being tested and accelerated by development of CAVs and CAV services Infrastructure decisions are driven by data collected from MaaS platforms (e.g. investment in Strategic Road Network and property developments)	Move to mass transit, shared mobility and micromobility from travelling by car	• Central connectivity • Family terraces • Service sector workers • Pre-school	N/A	There are a few business models for MaaS available in the market. Some models are led by the public sector (e.g. in Berlin and Paris where white label platforms are being used by transport and local authorities as the basis for their MaaS offer); but others are standalone and are primarily commercially driven (e.g. Whim, Citymapper). All are still struggling for commercial viability (i.e. they are loss-making / still raising money, require public funding or are developing their business models). There is a general opinion that understanding the regulatory context and public involvement will make or break the success of the business model.	Low-Medium
Parking and kerb space management platforms	Parking and kerb space management platforms provide consumers with information and app-based payment functions to reduce the traditional	Platforms are gradually integrated into journey planning, Platforms enable parking and kerb spaces to be used more efficiently for	Platforms widely integrated into MaaS platforms, preventing excess vehicle miles, congestion, and emissions from searching for a parking space rather than just	Platforms widely integrated into MaaS platforms, preventing excess vehicle miles, congestion, and emissions from searching for a parking space rather than just being used as a payment platform.	N/A	• Semi-detached suburbia • School-run suburbia	N/A	Market is led by private sector No need for public funding	High

Future mobility model	Description	Evolution			Potential impact of modal shift	Transport for the South East segments with the highest[168] propensity to use future mobility models	Potential to service different trip lengths and trip densities	Expected commercial ability to serve the identified segments vs need for public investment	Rank
		Up to 2025	**Up to 2030**	**Up to 2035**					
	problems associated with finding and paying for parking. Examples – AppyWay, JustPark, RingGO Modes: car, taxi, DDRT	people and goods (freight)	being used as a payment platform. Platforms are used in freight to mitigate challenges with parking for loading/deliveries Platforms enable parking and kerb spaces to be used more efficiently and are linked with CAV services	Platforms enable parking and kerb spaces to be used more efficiently and are linked with CAV services for both movement of people and goods					
Digital-as-a Mode	The use of digital connectivity to reduce and/or remove the need to travel can be referred to as "Digital as a mode". Digital access to work, education and healthcare access provides for similar opportunities without the need for physical travel. Examples – Open University, EBT, Babylon Health, Fiit. Modes: N/A	Workplace, education and healthcare culture changes only adopted by certain proportions of the population and geographies. Greater adoption of teleworking triggered by Covid-19 Further roll-out of broadband in rural areas Cost of digital communications tech falls	Increasing proportion of population digitally literate Increase in teleworking Cost of digital communications tech falls Rural areas have good broadband and connectivity	Increasing proportion of population digitally literate Increase in teleworking Cost of digital communications tech falls All rural areas have good broadband and connectivity	Reduction in use of public and private transport Time spent not having to travel to commute to work locations replaced by leisure trips to gym, shops that may not have been previously possible – journeys are more localised	• Village life • Central connectivity • Family terraces • Pre-school • Semi-retired flexibility	N/A	Market is led by both private and public sector service providers with public sector funding needed to support the digitisation of some services including health & social care, education and those provided by local authorities. Public sector may need to fund the rollout of broadband in rural areas	High
Operator-focused freight models	These models provide opportunities for freight operators to share their infrastructure and fleet to make more efficient use of	Business models are being tested and developed Accelerated by low emission initiatives in	Business models are established CAVs enter the operators fleet leading to operational efficiency gains and an increased	Business models increasingly established Established links with MaaS platforms	N/A	N/A	N/A	Market is driven by private sector Public sector may need to support and fund some of the fleet and transport management systems	High

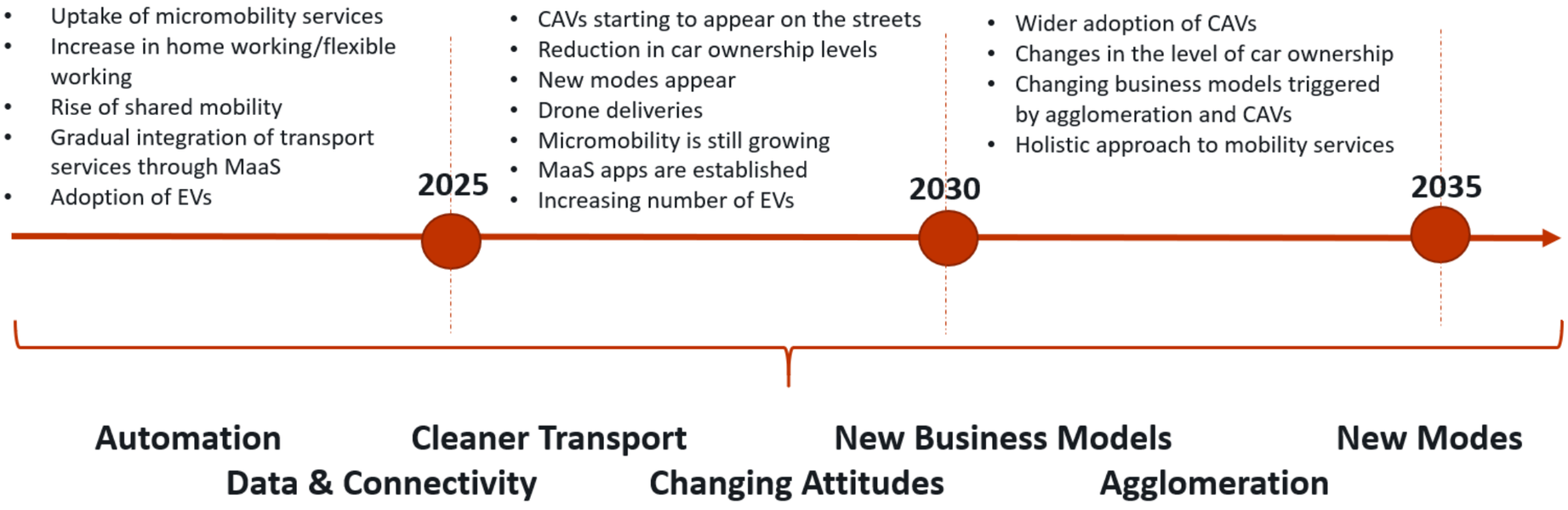
Future mobility model	Description	Evolution			Potential impact of modal shift	Transport for the South East segments with the highest[168] propensity to use future mobility models	Potential to service different trip lengths and trip densities	Expected commercial ability to serve the identified segments vs need for public investment	Rank
		Up to 2025	**Up to 2030**	**Up to 2035**					
	their assets. These models include fleet management systems, transport management systems, tender platforms, digital marketplaces and covers shipper to carrier & carrier to carrier interaction. Modes: Light good vehicle, Heavy good vehicles, High level air, Maritime	urban areas (scheme specific) Unwillingness to share data prevents widescale adoption	uptake of the model Accelerated by low emission initiatives in urban areas (scheme specific) Some may collaborate with MaaS platforms to share and get the data						
Consumer-focused freight models	This model is focused upon the consumer need for freight and deliveries through digitally enabled consumption and includes the last mile deliveries of online purchases such as goods, groceries and food Robot deliveries Automated parcel lockers Online shopping Modes: aerial and ground drones, car, light good vehicle, bicycle, moped/motorbike	Business models are being established Micro consolidation centres are being built Adoption of lockers, in-boot and in-house deliveries Technology costs are high and not widely implemented First implementation of Mobility Hubs Testing of aerial and ground deliveries using drones and robots Covid-19 can facilitate the uptake of the model with lockdowns and restriction of people's movement	Business models are mature The rise of micro consolidation centres Delivery lockers are widespread and are a prominent component of mobility hubs Aerial and ground drones are integrated into the model MaaS platforms facilitate an uptake of the models though provision of information Lockers and in-house deliveries prevent multiple delivery attempts and consolidate deliveries into one	Business models are mature Micro consolidation centres are widespread Mobility hubs are widely adopted including in rural areas Integration with MaaS platforms	Shift from use of private car and active travel	• Village life • Central connectivity • Service sector workers • Pre-school • School-run suburbia •	Serving first/last mile - less than 8 miles	Market is primary driven by private sector with funding from investors Public sector may need to support and fund development of consolidation centres and first/last mile deliveries (e.g. by drones).	High

Future outlook

For a selection of urban and rural settlement types developed in the place led typology (see Section 11) we have illustrated potential future changes in terms of future mobility services and modes from present day to 2035.

Major economic hubs: large urban centres

Figure 13-1 - Future outlook of mobility services



Major economic hubs are urban centres with the highest population and employment densities in the South East. With the highest population densities in the Transport for the South East area, there is the greatest potential for private investment in the form of new business models such as shared cars and micromobility. Firstly, we may see an increasing number of people using shared cars in 2025 and use of car clubs may be encouraged as part of the Government's policy and incentives. Micromobility is able to offer a cleaner mode and more space efficient form of transport which makes travel more convenient for the user. The popularity of micromobility including e-bikes, e-scooters, e-mopeds and other evolving vehicle types, is likely to increase in Major Economic Hubs as urban users become more familiar with the micromobility offer.

By 2030, a higher number of urban travellers may be using e-bikes and e-scooters as a more favourable mode of travel than the car, when considering shorter car journeys. Benefits such as improved air quality and lower noise levels will continue to attract users. The number of car share/car club members may plateau during the 2025-2030 period, as the majority of users who require access to a vehicle occasionally are already using such services. An increase in home working and flexible working, rather than commuting five days per week is likely to reduce the need for long car commutes, which may influence some residents to reconsider the need to own a car in general or have a second car.

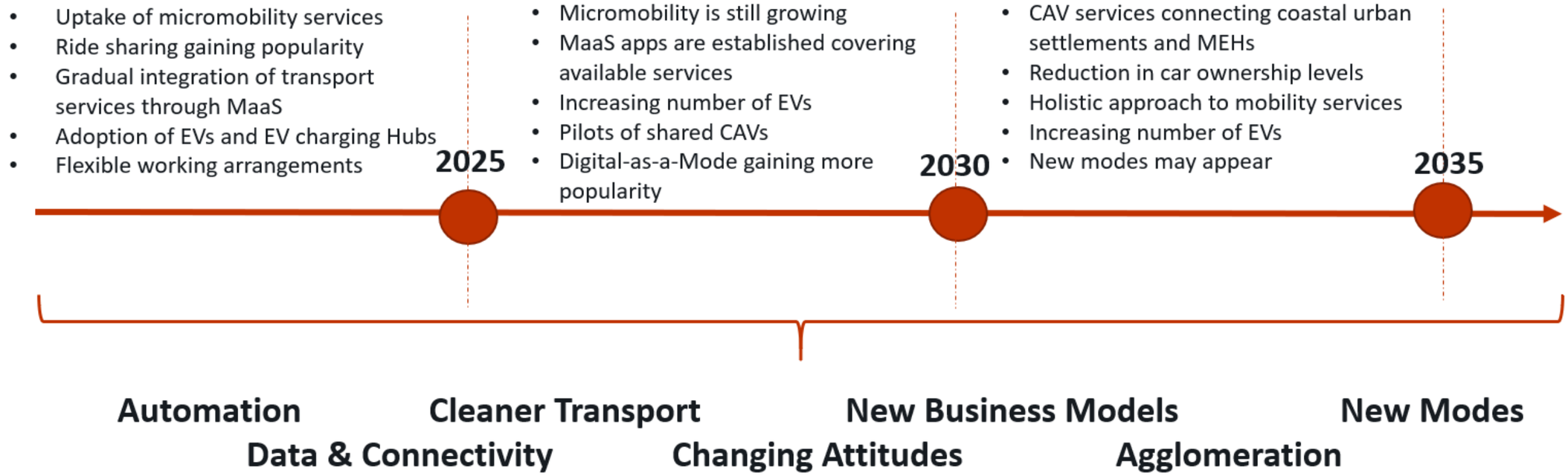
As innovations in vehicle automation evolve, it is likely that the first places to see autonomous vehicles in transport services are MEHs, due to higher potential levels of demand. By 2035 some of the MEHs may have a point-to-point (e.g. city to airport) autonomous services and CAVs may be in use on public roads. Adoption of CAV services could lead to a lower need to own a car by 2035, but could also increase vehicle trips, depending on the pricing of these services.

It is likely that micromobility will still be growing in 2030, with users increasingly enjoying the freedom and convenience of electric bikes and e-scooters. We may see this movement in the market as well as acquisitions and changes in ownership continue into the 2025 to 2030 period. E-scooters or an evolution of small electric personal mobility vehicles are expected to become hugely popular in the same time period.

Aggregation of all mobility services into a multi-modal travel planning app would be in the interest of the end user and MaaS platforms will become available integrating a variety of the services in the urban centres.

Urban Type: coastal and hinterland urban

Figure 13-2 - Future outlook of mobility services, coastal and hinterland urban



Residents in coastal urban settlements would likely increasingly use e-bikes and e-scooters if they are available, although it is likely that shared services would require public investment. Residents in coastal areas tend to cycle more compared to other urban types, they also use the bus more. In the next five years, up to 2025, we may see more e-bikes and e-scooters on the roads as more people in the area try new modes for getting around and as attitudes towards e-bikes and e-scooters become more accepting and/or adventurous; coastal locations also attract more leisure/tourist visitors which provides for greater demand for shared micromobility services. For 2025-2035, we may see higher integration of all apps and services, increasing the speed and efficiency of travel for the users.

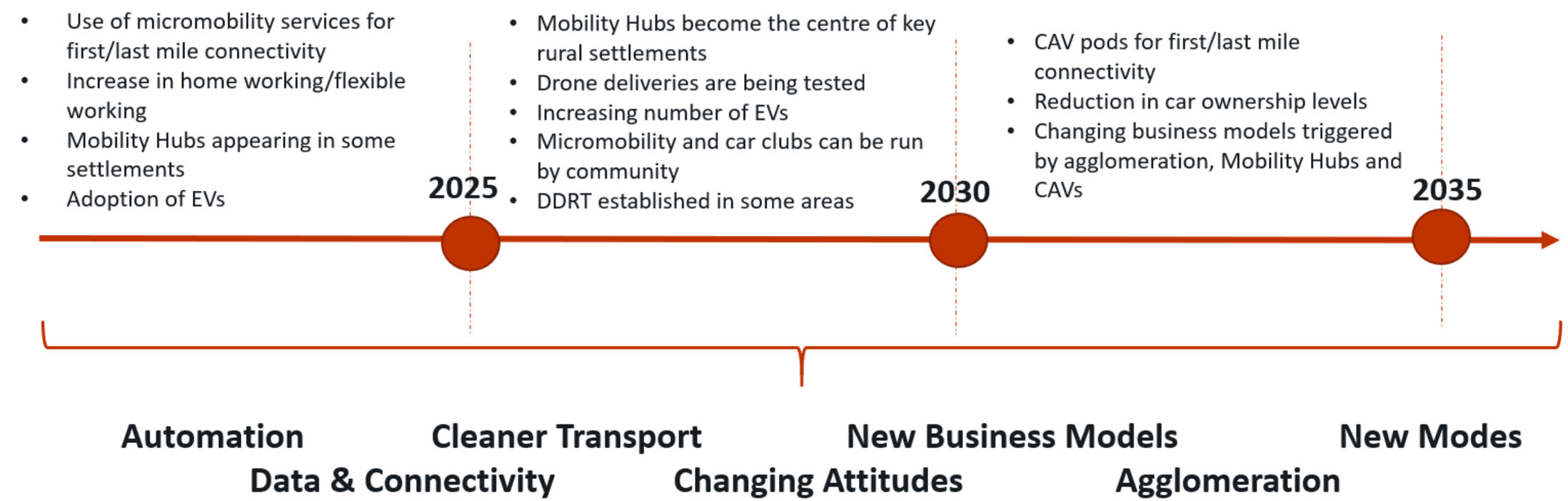
As more micromobility services come online, there will need to be good coordination in urban centres to help local authorities manage the streets. Co-ordination could be a focus of the period 2025-2030. Ride sharing may become popular with the users commuting to work as it may be seen as a cheaper and more environmentally friendly way of travelling. An increase in ridesharing may be accelerated by development of MaaS and establishment of digital platforms. Visitors driving to coastal urban settlements may need to pre-book their trip through an app-based platform to help manage demand for parking.

Electric vehicles infrastructure will be gradually deployed encouraging people to use EVs. EVs rapid charging hubs will appear in urban settlements encouraging an uptake of EVs. Dynamic demand responsive transport may become popular in coastal settlements encouraging connectivity with nearby MEHs and other urban coastal settlements.

There is potential for CAV services to be launched in coastal urban settlements, but due to lower potential demand it is more likely that this will happen through innovative pilots involving integration or replacement of existing public transport services rather than through privately funded initiatives.

Rural Type: Well-connected rural (good accessibility to services)

Figure 13-3 - Future outlook of mobility services, well connected rural



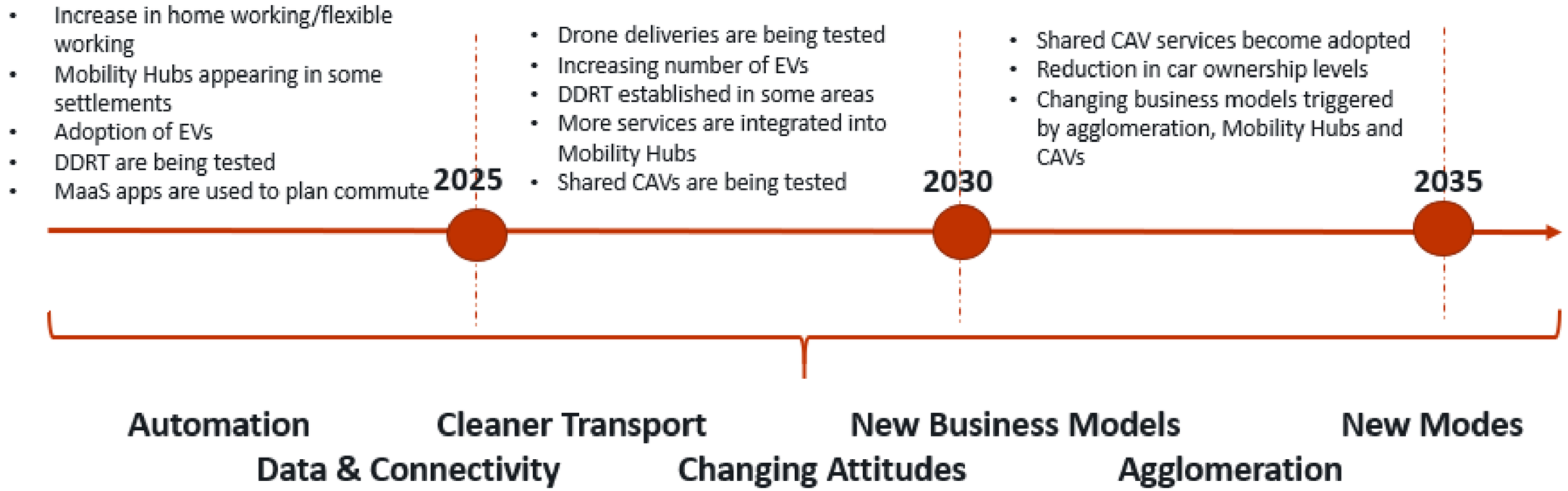
The well connected rural settlement may evolve to become an economic force in its own right – through development of connected, smart and green technologies. Settlements with access to services such as a train station, schools, post office and shops are likely to be attractive locations for home working, with increased provision of localised flexible workspaces and a solid infrastructure for digital communications. These would provide an alternative to city centre working and may attract a new younger demographic to rural locations. On the other hand, better data and connectivity with new transport modes in the settlement means that short trips as well as first-mile/last-mile trips can be done on e-scooter and e-bike to get to work or other destinations. Mobility hubs can facilitate this process and enable a range of other mobility innovations.

By 2035 a mobility hub in a well-connected rural location could have a co-working space and a cafe, delivery lockers, drone delivery area, digital demand responsive transport stop, pick up/drop off area for autonomous pods, EV charging infrastructure, a shared mobility service like e-bike share/e-cargo bike share and a car club. Integration between services would allow one payment method to access all components that are part of the hub. Components of the mobility hub, as laid out above, will help to establish equal access to mobility services for residents, encourage cleaner and more sustainable travel, create a sense of place for the village and improve accessibility to those with limited transport choice or no access to a car. Some innovative locations may secure funding to enable application of CAV services within a rural settlement in the form of a direct connection to a neighbouring urban area or as a loop between residential areas, inter-city transport links and the heart of the village.

Shared transport can make villages more accessible with less dependency on private and single occupancy vehicles. In future in rural settlements some of the shared mobility schemes may be established and run by the local community or accessed through a subscription package, providing access to a car, rather than ownership or leasing.

Rural Type: London orbital rural (poor accessibility to services)

Figure 13-4 - Future outlook of mobility services, London orbital rural



London orbital rural settlements are typically located close to the M25 and attract both London commuters and local workers.

DDRT services are expected to be trialled by 2025 to test their feasibility, connecting London orbital rural settlements with local urban areas. It is likely that by 2030, residents will be using MaaS apps to plan their commute to London and nearby MEHs, as digitalisation and shared economy spreads further from London and other urban settlements.

Electric vehicles are expected to be widely adopted by 2030 driven by deployment of electric vehicles infrastructure and changes in residents' behaviour.

It is expected a focus to be on first/last mile connectivity, e.g. to the rail station. Some of the villages may implement community run shared micromobility schemes with the focus on electric bikes or small electric vehicles for longer journeys.

When CAVs are introduced, the areas may see adoption of shared CAV services for commute to nearby urban settlements and first/last mile connectivity. DDRT vehicles can become autonomous and shared pods may be seen on the roads. As London orbital rural settlements attract wealthy population, private CAVs are likely to be adopted by certain population segments.

Some of the villages may secure funding to develop mobility hubs, which will be focused on the needs of the residents and provide first/last mile connectivity, a shop and a café, co-working spaces and rapid electric vehicle charging. Delivery lockers will be a prominent part of the hub, which can be served by autonomous pods or drones when those become widely adopted. Additionally, a mobile health centre may visit the hub regularly to serve the residents.

Options long-list

14.Options long-list

A long list of potential interventions was drawn up based upon inputs including the previous future transport technology report, Transport for the South East and partners via stakeholder engagement and wider views from the supporting consultancy team.

The long list brought together a wide variety of interventions from the physical delivery of modes, services and infrastructure to the development of policy to support their delivery and from the strengthening of engagement and collaboration to the monitoring and evaluation of progress in delivery. The long list is set out below with options separated into themes presented in alphabetical order.

Air transport	
Future of air transport strategy	Develop South East future of air transport strategy (including low level)
Low level air	Enable with partners the delivery of low level air targeted at specific use cases and appropriate geographies.
Automation	
Automated shuttles	Enable with partners the delivery of automated shuttle projects appropriate to the needs of communities in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
FMLM delivery robots	Enable with partners the delivery of first mile/last mile delivery robot projects appropriate to the needs of communities in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
Automated road mass transit	Enable with partners the delivery of automated road mass transit projects appropriate to the needs of communities in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
Decarbonisation	
Mobility decarbonisation campaign	Coordinate a public fleet decarbonisation awareness campaign across partner authorities in the South East to raise public awareness and support public adoption of low emission vehicle technologies.
Future propulsion strategy	Develop a future propulsion strategy for the Transport for the South East area across all vehicle types and use cases, including people, freight and plant.
Harmonised EV charging in new developments	Develop harmonised regional EV charging standards in new developments
Harmonised on-street EV charging standards	Develop harmonised regional standards for on-street EV charging
Local authority electrified mobility policies	Work with local transport authorities to develop their own electrified mobility policy
Interoperability of EV systems and services	Use learnings from the future mobility strategy to accelerate interoperability of EV systems and services in order to drive the people & outcome focused agenda in the South East.
Local electricity grid upgrades	Engage with central Government to provide funding to support local grid upgrades and implementation of EV infrastructure in the area.
Heavy duty use case electrification infrastructure	Engagement to secure funding to support infrastructure for electrified propulsion in heavy duty uses cases
EV policy integration	Encourage partner local authorities to incorporate support for EVs into a range of policies e.g. Traffic regulation orders, parking tariffs, residential parking zones and charges, EV only infrastructure, green number plates etc. Ensure effective policy monitoring and evaluation is undertaken.
Publicly available EV charging	Enable with partners the delivery of public electric vehicle charging infrastructure across all geographies (fast, rapid & ultra-rapid) including in hubs
Hydrogen refuelling stations	Enable with partners the delivery of hydrogen refuelling stations across the area for fleet and private use.
Vehicle-to-grid charging infrastructure	Enable with partners the delivery of vehicle-to-grid charging capabilities across the area that bring benefits to individuals and businesses.
Mass transit net zero fleet conversion	Accelerate the conversion of existing bus, rail and tram services where they are not yet net zero.

Digital connectivity	
Local authority digital communications policies	Work with local authorities to develop digital communications policies
Public sector service digitisation	Develop standards for digitisation of public sector services across LAs in the South East.
Digital-as-a-mode services	Enable with partners the delivery of digital-as-a-mode services (across employment, education, wellbeing & healthcare) that are appropriate to the needs of communities (in terms of use cases and geographies) in the Transport for the South East area. Ensure all services are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.
Urban digital communications	Work with partners to deliver fit for purpose digital connectivity and broadband in urban areas to meet wider Transport for the South East objectives
Rural digital communications	Work with partners to deliver fit for purpose digital connectivity and broadband in rural areas to meet wider Transport for the South East objectives
Digital demand responsive transport	
Urban DDRT services	Enable with partners the delivery of urban and peri-urban DDRT services appropriate to the needs of communities (in terms of use case and geography) in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
Rural DDRT services	Enable with partners the delivery of rural-focussed DDRT services appropriate to the needs of rural communities (in terms of use case and geography) in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
Education and skills	
Future mobility university course modules	In partnership with Universities in the area, develop modules on future mobility for the relevant courses.
Future mobility apprentices	Support apprentices in private sector companies contributing to future mobility modes
Financial support	
Future mobility tax incentives	Engage with national Government to introduce tax incentives for future mobility to deliver improved people and place outcomes -
First mile / last mile	
First mile/last mile strategy	Develop a first mile/last mile strategy for the Transport for the South East area (inclusive of micro-mobility and active travel modes).
Freight and logistics	
Future mobility in freight management strategy	Build future mobility into Transport for the South East freight strategy
Business to business freight capacity exchanges	Enable with partners the setup of freight capacity exchanges for business to business interactions appropriate to the needs of businesses in the Transport for the South East area.
Customer to customer freight capacity exchanges	Enable with partners the setup of freight capacity exchanges for customer to customer interactions appropriate to the needs of individuals & businesses in the Transport for the South East area.
Regional consolidation centres	Enable with partners the delivery of regional consolidation centres the needs of individuals & businesses in the Transport for the South East area. Ensure centres are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.
Urban consolidation centres	Enable with partners the delivery of urban consolidation centres the needs of individuals & businesses in the Transport for the South East area. Ensure all centres are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.
Micro consolidation centres	Enable with partners the delivery of micro consolidation centres the needs of individuals & businesses in the Transport for the South East area. Ensure centres are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.

Leading engagement	
South East future mobility forum	Develop an overarching South East future mobility forum.
Future of maritime forum	Develop a South East future of maritime forum
Future of freight forum	Develop a South East future of freight forum
Future of energy forum	Develop a South East future of energy forum
Future of digital communications forum	Develop a South East future of digital communications forum
Future mobility integration into major sites and assets	Engagement with influential property portfolio and major asset owners to promote the trialling and incorporation of new modes and models across their estates.
Future of rail transport forum	Develop a South East future of rail transport forum
Future of air transport forum	Develop a South East future of air (including low level) transport forum
Major employer future mobility engagement	Transport for the South East and LEPs engagement with key employers in the South East to promote and facilitate the use of future mobility models to commute to work (e.g. ride sharing platforms, remote working).
MaaS, smart ticketing and fare forum	Develop a MaaS, smart ticketing and fare forum
Shared road mass transit forum	South East shared road mass transit forum
Future of rural mobility forum	Develop a South East future of rural mobility forum
MaaS and ticketing	
MaaS strategy	Develop South East MaaS strategy
Standards for interoperability of ticketing systems	Engage with central Government for standards to facilitate the interoperability of Smart Ticketing systems and services. Also promote the interoperability of Smart ticketing systems amongst partner local authorities in the South East so it is considered in their procurement.
South East MaaS platform	Enable with partners the delivery of a MaaS platform for the South East area appropriate to the needs of communities (in terms of use case and geography) in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
Mobility credit/voucher schemes	Enable with partners the implementation of mobility vouchers/credit schemes appropriate to the needs of communities (in terms of use case and geography) in the Transport for the South East area. Ensure all schemes are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.
Gamification of mobility	Enable with partners the implementation of reward schemes that make use of gameification to promote sustainable travel and use of future mobility modes. Ensure all schemes are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.
Maritime	
Future of maritime strategy	South East future of maritime strategy
Mobility hubs	
Hubs strategy	Develop a Hubs Strategy for the Transport for the South East area with associated guidance and toolkit.
Deliver hubs	Implement the outcomes of the Hubs Strategy across all typologies and networks in the South East.
Piloting, evaluating and learning	
Future mobility shared learning hub	Support the implementation of future mobility by building a future mobility shared learning hub. Used as a common location for information, learning and best practice relating to future mobility
SE future mobility behaviour study	Undertake a study in the South East to understand public and stakeholder, behaviour perceptions and acceptability of the six key changes of future mobility (plus agglomeration).

Local future mobility trials	Support and encourage partner authorities to participate in trials/projects across different geographies to test various future mobility models in order to collate evidence as to their efficacy.
Future mobility monitoring and evaluation framework	Develop monitoring and evaluation framework for future mobility models in the South East
Ties with national research bodies	Develop research & development ties with national research bodies.
Piloting co-ordination group	Form a piloting co-ordination group to co-ordinate piloting and trialling activity across the South East
Piloting best practice guidance	Development of best practice for future mobility piloting
Live eco-system piloting environments	Identification of live eco-system piloting environments across the South East
Piloting sandbox locations	Identification of sandbox locations for piloting across the South East
Piloting monitoring and evaluation framework	Development of monitoring and evaluation framework for piloting in the South East
Identification of piloting use cases	Identification of use cases for future mobility and areas that specialise in them to provide a focus for piloting in the South East
Policy integration	
Integration of transport, energy and digital communications	Setting a vision and strategy for interaction and integration of transport, energy and digital across the South East
Future mobility integration into economic, spatial and transport policy	Undertake engagement with local authorities and their planning teams in order to integrate future mobility into economic, spatial and transport policy.
Rail	
Future of rail strategy	Develop South East future of rail transport strategy
Road, kerb and parking space	
Future mobility parking and kerb use standards	Promote consistent South East approach for parking standards and kerb use by future mobility modes
Flexible highway and kerbside design and regulation	Engage with national Government to develop a more flexible approach to highway design standards, TROs and kerbside usage
Flexible streetscape	Develop use cases and applications for flexible streetscape infrastructure with Local Authority partners that deliver benefits across the Transport for the South East area.
Digital kerbside management applications	Enable with partners the delivery of digital kerbside management applications that are appropriate to the needs of communities (in terms of use cases and geographies) in the Transport for the South East area and that align with the Freight Strategy. Ensure all services are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.
Future of parking study	Undertake a study to review the impacts of future mobility on the supply, demand and use of space for vehicle parking, storage, maintenance and refuelling, and driver rest facilities.
Future of road and kerb space study	Undertake a study to review the need and priorities for infrastructure space and its allocation and flexibility in the face of emerging changes to the mobility eco-system
Sharing	
Shared micro-mobility	Enable with partners the implementation of shared micromobility schemes (both public use and freight) appropriate to the needs of communities (in terms of use case and geography) in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
Ride-sharing platforms	Enable with partners the delivery of ride sharing platforms (both peer-to-peer and employment-led) appropriate to the needs of communities (in terms of use case and geography) in the Transport for the South East area and undertake essential monitoring and evaluation with the aim of filling in the business cases of future projects.
Vehicle-based asset sharing	Enable with partners the implementation of vehicle-based asset sharing schemes (car & LGV) appropriate to the needs of communities (in terms of use case and geography) in the Transport for the South East area. Ensure all schemes are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.

Two-wheeler asset sharing	Enable with partners the implementation of two-wheeler asset sharing schemes (motorbikes & mopeds) appropriate to the needs of communities (in terms of use case and geography) in the Transport for the South East area. Ensure all schemes are monitored & evaluated and that lessons learned are continuously shared with Transport for the South East partners through forums.
Data sharing	
Data sharing exemplar	Become an exemplar in data sharing through providing support and guidance to the public and private sectors in the establishment of data sharing agreements and policy
Solent FTZ	
FTZ engagement	Work with the Portsmouth and Southampton FTZ to develop stakeholder engagement and communications plan for continuous knowledge sharing with all local authorities in the Transport for the South East area.
Supporting local delivery	
Local authority future mobility skills	Promote the upskilling of officers across Transport for the South East partner authorities to raise organisational knowledge and capabilities in the field of Future Mobility.
Local authority future mobility sponsors	Assign "sponsors" in the Councils responsible for activities connected to future mobility agenda
Future mobility planning guidance	Develop South East guidance for embedding future mobility into planning decisions
Local authority future mobility behavioural change	Develop tools for local authorities to embed future mobility into their behavioural change programmes
Public sector future mobility staff and business travel	Transport for the South East and LEPs engagement with key public sector organisations in the South East to promote and facilitate the use of future mobility models to commute to work (e.g. ride sharing platforms, remote working).
Business case future-proof test	Promote the application of a future-proof test to new service and infrastructure business cases.
Future mobility experience centres	Enable with partners the delivery of electric vehicle/mobility experience centre/s across the Transport for the South East area to myth-bust and accelerate EV and new mobility uptake.
Local authority future mobility business case guidance	Develop guidance for South East local authorities to aid the writing of future mobility intervention business cases which justify a vision-and-validate methodology.

MCAF development

15.MCAF development

Introduction

The process to develop transport strategies often involves the identification of long lists of options. These options are frequently identified through a range of sources including existing plans and proposals, the project and client teams, stakeholders and the public. With such an array of sources, the resulting long lists often include options which will strongly support objectives, are deliverable and feasible while other options may do little to support objectives or are unfeasible or undeliverable.

To support the initial assessment of those options and which are most suitable for inclusion in a transport strategy, or at least require further investigation, multi-criteria assessment frameworks (MCAFs) are often used to sift the long lists. MCAFs are generally used to identify the higher performing options and those which may deliver few benefits or have significant challenges, often resulting in the latter being removed from the long list and not taken forward for further analysis and assessment.

Following the development of a long list of options for the Transport for the South East Future mobility strategy, an MCAF has been used to support the formulation of the strategy and prioritise the options.

MCAF criteria

An MCAF was developed as part of the transport strategy development process and this has been used as the basis for the MCAF for the future mobility strategy.

In conversation with the leadership of the Area Studies commission, the MCAF has been amended to reflect further thinking on the approach suitable for both the area studies and the future mobility study. The amendments include a number of non-scoring 'intervention information' classifications, additional objective-focussed 'suitability' and 'acceptability' scoring criteria and changes to the scoring of the feasibility assessment.

Table 15-1 – MCAF non-scoring criteria

MCAF non-scoring criteria
Intervention reference
Intervention short name
Intervention name
Intervention description
Package
Intervention Type
Area study applicability
Intervention delivery lead
Journey type: radial journeys
Journey type: orbital journeys
Journey type: coastal journeys
Journey type: inter-urban journeys
Journey type: local journeys
Journey type: international journeys
Journey type: maritime
Journey type: air
Journey type: freight

MCAF non-scoring criteria
Place typology: urban
Place typology: rural
Transport theme
Stage of technological development
Stage of commercial development
Implementation time period
Interdependencies with other interventions
Estimated total capital expenditure
Estimated annual operating cost
Source
Local Enterprise Partnership area
Local Transport Authority area
Local Planning Authority area
Corridor
Major Economic Hub
Other Major Economic Hubs

Table 15-2 – Objective assessment (suitability)

MCAF scoring criteria
Transport for the South East transport strategy vision statement
Transport for the South East transport strategy strategic goals (x3)
Transport for the South East transport strategy key principles (x5)
Study-specific objectives

Table 15-3 – Objective assessment (acceptability)

MCAF scoring criteria
Transport for the South East transport strategy strategic priorities – economic (x5)
Transport for the South East transport strategy strategic priorities – social (x5)
Transport for the South East transport strategy strategic priorities – environmental (x5)
Study-specific objectives

Table 15-4 – Objective assessment (future of mobility: urban strategy)

MCAF scoring criteria
DFT Future of Mobility: Urban Strategy key principles (x9)

Table 15-5 – Feasibility assessment criteria

MCAF Scoring criteria
The availability of funding (quantum and complexity)?
The ability and willingness of commercial partners?
Likelihood of no delay from surveys/assessments/planning?
Potential for environmental mitigation?
The availability of the necessary legislation?
The ease of engineering feasibility?
The maturity of the necessary technology?
Public/political support?
Stakeholder support?

Summarising the outputs from the MCAF

Both the original and updated MCAFs summarise the scoring through averaging the individual scoring criteria across each of the assessments:

- Objective assessment (suitability) – average of seven point scale;
- Objective assessment (acceptability) – average of seven point scale;
- Objective assessment (DFT Future of Mobility: Urban Strategy) – average of seven point scale (updated MCAF only);
- Feasibility Assessment;
  - Original MCAF – average of seven point scale;
  - Updated MCAF – average of five point risk scale;
- Overall result:
  - Original MCAF – average of scores across all scoring criteria (objective and feasibility (risk))
  - Updated MCAF – average of scores across all objective assessment scoring criteria but excluding risk due to the different scoring scales.

Initial MCAF outcome

On completing the first full pass of the updated MCAF with future mobility strategy interventions inserted, the results showed only a limited spread of scores with the majority of interventions being slight or moderate beneficial. This provided limited feedback into the strategy development process in terms of which interventions were likely to perform better and contribute more to the overall strategy vision and objectives.

In response to this issue, the project team investigated the structure and scoring of the MCAF and initial conclusions were that:

- In undertaking the scoring, an overly cautious approach may have been taken resulting in both the scoring underplaying the potential benefits and too narrow a spread of scores.
- The text-based approach to the outputs, which did not provide a prioritisation of interventions, made it more difficult to form views on the outputs from the MCAF.

In discussions with the area studies project team, the future mobility strategy project team has developed an approach to provide further, more detailed summary information from the MCAF. Alongside this activity, the individual scores assigned to interventions in the first pass of the Future Mobility Study long list have been reviewed and updated, in a second pass, using a more optimistic approach, applying higher scores where there were marginal decisions between applying higher or lower scores.

The development of the approach to providing more detailed summary information from the MCAF has

been iterative as the neither updated scores in the second pass or some initial changes to the summary information resulted in significantly greater clarity of the MCAF outcome. However, the following describes the approach to summarising the MCAF:

- Each of the 42 objective assessment scoring criteria (suitability, acceptability and DFT Future of Mobility: Urban Strategy criteria) have the following numerical scores applied to their qualitative scores:
  - Large beneficial: +3;
  - Moderate beneficial: +2;
  - Slight beneficial: +1;
  - Neutral: 0;
  - Slight adverse: -1;
  - Moderate adverse: -2; and
  - Large adverse: -3.
- The scores across the objective assessment scoring criteria were totalled for each of the three sub-sets of criteria (i.e. suitability, acceptability and DFT Future of Mobility: Urban Strategy)
- The summary result of the five point scale feasibility (risk) assessment for each intervention was given a numerical score as follows:
  - Positive: 5;
  - Neutral: 4;
  - Slight risk: 3;
  - Moderate risk: 2; and
  - Large risk: 1.
- The average objective assessment scores across all sub-sets of criteria and the feasibility (risk) Assessment scores were multiplied to provide an overall score for each intervention.
- The above approach provides for each intervention scores for each of the following:
  - Objective assessment (suitability);
  - Objective assessment (acceptability);
  - Objective assessment (DFT Future of Mobility: Urban Strategy);
  - Feasibility assessment; and
  - Overall score (combination of objective and feasibility assessments).

This approach provides a more noticeable spread in scores from the MCAF and a clearer indication of the potentially higher and lower performing interventions.

However, simply using the overall score alone as a 'final result' gives equal weight to the contribution interventions may make to meeting objectives and the level of feasibility risk they may have. Whilst it is important that risk is acknowledged when considering whether interventions should be pursued, there may be potentially strong performing interventions, when assessed against objectives, that should be prioritised despite their higher levels of risk. Due to the very nature of future mobility interventions, particularly the degrees of technological and commercial maturity, the level of risk tends to be higher than for more established or mainstream transport interventions. Being higher risk should not necessarily preclude interventions from being included in a strategy, if the risk is highlighted.

Consequently, a further step in summarising the outcome of the MCAF has been applied. For each of the five sets of scores, the 89 interventions were prioritised from first to 83rd in order of their overall scores, with the highest scoring intervention being prioritised first. Finally, the average priority was calculated across all five sets of score priorities to provide a final priority. This approach enables the priority of interventions to be understood for each of the objective assessments in turn and then the feasibility assessment, and then for an overall summary result.

The following table presents the prioritisation of interventions in the long list.

The third column in the table identifies those interventions which were taken forward into the place-based bundles (see following section) which focus on mode, service model and infrastructure delivery and operation. Alongside the identification of bundle interventions is a further qualitative prioritisation of the remaining interventions for inclusion in the final strategy. The original long list has a significant number of interventions and resourcing is unlikely to be available to support the delivery of every intervention. Therefore, the remaining interventions were prioritised for inclusion in the strategy on the basis of the following:

- Level of support provided to the place-based bundles
- Level of support to the development and piloting of new mode, service model and infrastructure interventions within the South East

A high, medium and low rating was applied to the interventions with the 'high' rated interventions prioritised for inclusion in the strategy. If resources allow, 'medium' rated interventions could be considered for delivery next.

Table 15-6 – MCAF output – intervention priority

Intervention name	Overall Priority	Strategy inclusion to support bundles
Digital-as-a-mode services	1	Bundle intervention
South East MaaS platform	2	Bundle intervention
Rural DDRT services	2	Bundle intervention
Urban DDRT services	4	Bundle intervention
Gamification of mobility	5	Bundle intervention
Mobility credit/voucher schemes	6	Bundle intervention
Future mobility integration into economic, spatial and transport policy	7	High
Deliver hubs	7	Bundle intervention
Publicly available EV charging	9	Bundle intervention
Local authority future mobility behavioural change	10	High
Customer to customer freight capacity exchanges	11	Bundle intervention
Business to business freight capacity exchanges	12	Bundle intervention
Two-wheeler asset sharing	14	Bundle intervention
Public sector future mobility staff and business travel	15	Low
Shared micro-mobility	13	Bundle intervention
Public sector service digitisation	17	High
First mile/last mile strategy	16	High
Urban digital communications	18	High
Rural digital communications	18	High
EV policy integration	20	High
Integration of transport, energy and digital communications	20	High
Hubs strategy	22	High
Vehicle-to-grid charging infrastructure	23	Medium
Future of digital communications forum	25	Medium
Ride-sharing platforms	24	Bundle intervention
Future of rail strategy	26	Low
Digital kerbside management applications	27	Bundle intervention
Local future mobility trials	28	High
Vehicle-based asset sharing	29	Bundle intervention
Mass transit net zero fleet conversion	32	Medium
Urban consolidation centres	29	Bundle intervention
Hydrogen refuelling stations	31	Bundle intervention
South East future mobility forum	33	High

Intervention name	Overall Priority	Strategy inclusion to support bundles
Future mobility monitoring and evaluation framework	33	High
Ties with national research bodies	33	High
Piloting co-ordination group	33	High
Piloting best practice guidance	33	High
Piloting monitoring and evaluation framework	33	High
Identification of piloting use cases	33	High
Future mobility university course modules	33	Medium
Local authority future mobility business case guidance	33	Medium
Future mobility planning guidance	42	Medium
Future mobility integration into major sites and assets	43	High
Flexible streetscape	44	Bundle intervention
Micro-consolidation centres	45	Bundle intervention
Automated shuttles	46	Bundle intervention
Regional consolidation centres	47	Bundle intervention
FTZ engagement	48	High
MaaS, smart ticketing and fare forum	48	Medium
Business case future-proof test	48	Medium
Future propulsion strategy	51	High
MaaS strategy	53	Medium
SE future mobility behaviour study	54	Low
Automated road mass transit	52	Bundle intervention
Local authority digital communications policies	55	Medium
Future of road and kerb space study	56	Medium
Data sharing exemplar	57	Medium
Future of energy forum	58	Medium
Live eco-system piloting environments	59	High
Piloting sandbox locations	59	High
Heavy duty use case electrification infrastructure	59	High
Local authority electrified mobility policies	62	Low
FMLM delivery robots	63	Bundle intervention
Local electricity grid upgrades	64	High
Future mobility experience centres	65	Medium
Future of rural mobility forum	66	High
Future of maritime forum	67	Low

Intervention name	Overall Priority	Strategy inclusion to support bundles
Shared road mass transit forum	68	Medium
Future of rail transport forum	68	Low
Future mobility tax incentives	70	Low
Low level air	70	Bundle intervention
Future of maritime strategy	72	Low
Future of freight forum	73	Medium
Future mobility in freight management strategy	74	Medium
Local authority future mobility skills	75	Medium
Local authority future mobility sponsors	75	Medium
Future of air transport strategy	78	Low
Future mobility shared learning hub	77	High
Standards for interoperability of ticketing systems	79	Medium
Interoperability of EV systems and services	80	Medium
Future of air transport forum	81	Low
Mobility decarbonisation campaign	82	Low
Future of parking study	83	Low
Flexible highway and kerbside design and regulation	84	Low
Major employer future mobility engagement	85	Low
Future mobility parking and kerb use standards	86	Medium
Harmonised EV charging in new developments	87	Medium
Harmonised on-street EV charging standards	87	Medium
Future mobility apprentices	89	Low

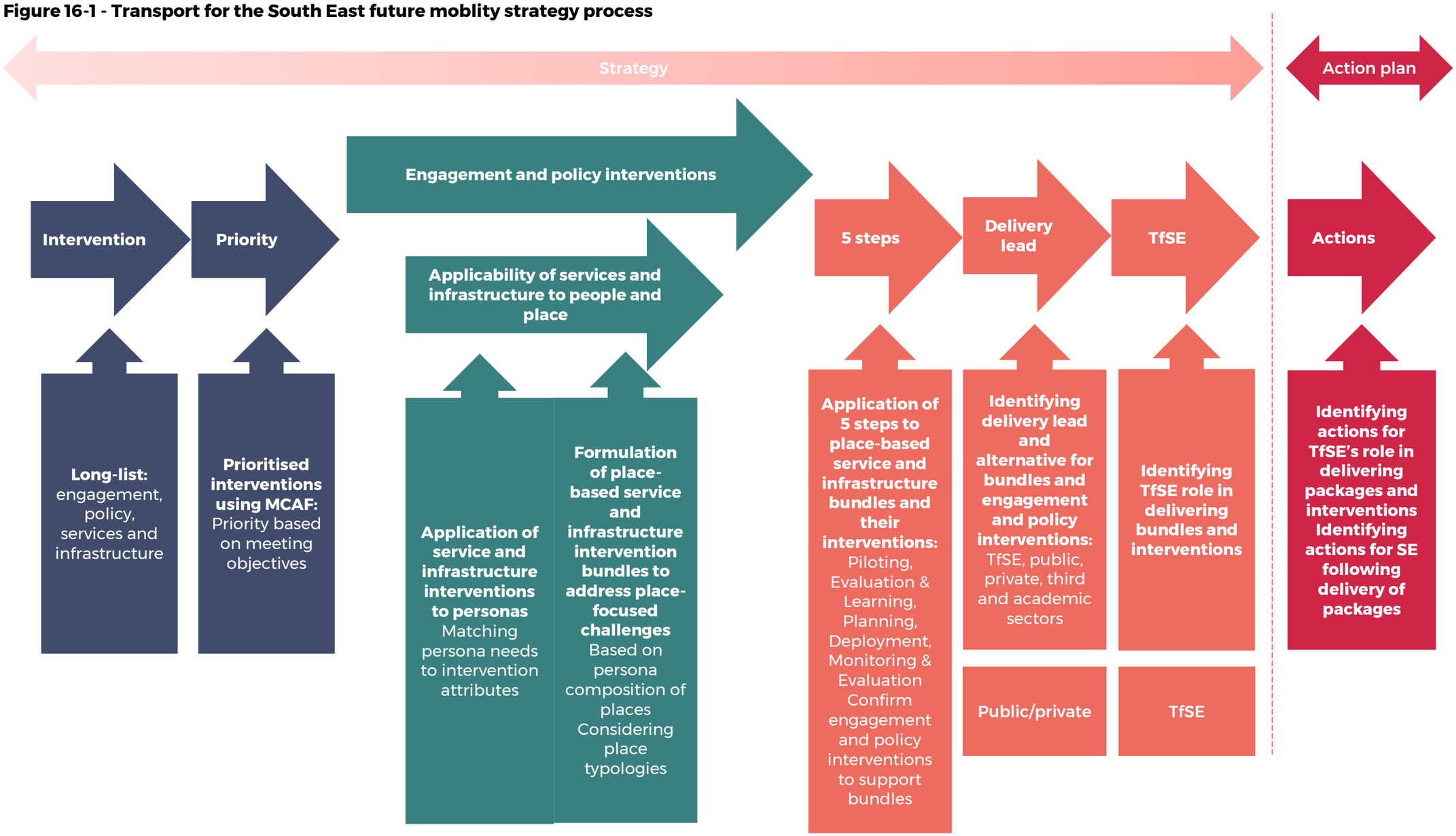
Place-based intervention bundles

16. Place-based intervention bundles

Introduction

This section presents the formulation of place-based intervention bundles defining the interventions appropriate for delivery in specific types of place within the South East of England.

Figure 16-1 - Transport for the South East future moblity strategy process



Analysis

Interventions

The first task reviewed the original long list of interventions and disaggregated them as follows:

- Mode, service model and infrastructure interventions
- Engagement and policy interventions
- Delivery interventions

The following mode, service model and infrastructure interventions have been taken forward into the analysis up to the formulation of the bundles, noting that some long list interventions have been further disaggregated into specific modes:

- Shared mobility - e-bike;
- Shared mobility - e-scooter;
- Shared mobility - P2W (powered two wheeler);
- Shared mobility - peer to peer vehicle sharing;
- Shared mobility - ride-sharing platforms;
- Shared mobility - business to customer vehicle sharing (e.g. car club);
- Shared mobility - ride-sourcing - 'on-demand private hire/taxi';
- Shared mobility - digital demand responsive transport (DDRT);
- Automated (and ultimately autonomous) road mass transit;
- Automated (and ultimately autonomous) FMLM shuttles;
- FMLM delivery robots / shuttles (land-based);
- Low level air (drones) – passenger;
- Low level air (drones) – freight;
- Shared mobility - e-cargo bike;
- Digital-as-a-mode communications / services;
- Hubs (mobility / community asset / service);
- MaaS platform (including mobility credits and 'gameification');
- Digital kerbside management applications;
- Consolidation centres (regional, urban, micro);
- Business to business freight capacity exchanges;
- Business to customer freight capacity exchanges;
- Flexible streetscape;
- Road space reallocation to future mobility modes e.g. lanes, kerb space;
- Hydrogen refuelling infrastructure (all modes); and
- EV charging infrastructure (all modes).

The operational freight, flexible streetscape and 'refuelling' interventions highlighted in italics above have been excluded from the 'people' element of the following analysis but are included later in the process due to their use being freight or mobility operations rather than passenger transport.

The engagement, policy and delivery interventions will be picked up again at the '5 steps to delivery' stage later in the process as described below.

People assessment

To assess the application of interventions to people segments (or personas) in any place in the South East, a number of steps were taken. Firstly, the range of mobility and connectivity needs and challenges applicable to any population segment were identified as follows:

Table 16-1 - People-focussed mobility and connectivity needs and challenges

Need/challenge	Description
Journey time	Need for fast mobility and connectivity services
Frequency	Need for frequent mobility services to be available
Affordability	Affordable price of mobility and connectivity services
Group travel	Capacity for multiple passengers; travelling as a group (e.g. families or elderly with carer)
Capacity for carrying luggage/goods	Capacity for carrying luggage/goods
Physical accessibility and comfort	Need to sit/rest
Cleanliness	Cleanliness/hygiene of mobility services
Reliability	Need for reliable mobility and connectivity services
Safety and security	Need for safe/secure mobility and connectivity services

Need/challenge	Description
High quality customer experience	Need for high quality of mobility and connectivity services
Environmentally friendly	Need for environmentally friendly mobility solutions
Value for money	Value for money of mobility and connectivity services
Travel information	Need for availability of travel information (including journey planning/booking in advance/price info)
Integration between different services	Need not to multiple different apps for various services
Multimodal travel	Need for seamless multi modal journeys, which include two or more modes of transport
Digital connectivity at home or business	Need for high speed digital connectivity at home/business
Digital connectivity to access services away from home or business	Need for high speed digital connectivity away from home/business
Digital connectivity while travelling	Need for high speed digital connectivity while on-board services
Accessibility of mobility services without a smartphone	Ability to access mobility services without a smartphone
Accessibility of mobility services without a bank account	Ability to pay for mobility services without a bank account
Work	Need to use mobility services and connectivity services for work
Social interaction and leisure activities	Need to use mobility services and connectivity services for social interaction and leisure activities
Shopping	Need to use mobility and connectivity services for shopping
Education	Need for mobility and connectivity services for education
Healthcare	Need for mobility and connectivity services for healthcare

People factors

Earlier in this project a number of population segments were identified to support this and other analysis.

Table 16-2 – Population Segments

Segment	Description
Village life	The population of this segment live in areas that are less densely populated, typically in a village or small town. They tend to be older, well-educated and live in detached properties which they own, though an above average proportion live in retirement homes. Each household is likely to have multiple motor vehicles, with these being the most common method of transport to their places of work.
Central Connectivity	The majority of people in the Central connectivity segment live in relatively densely populated urban areas. They include an above average proportion of young adults without children, including full time students. They tend to live in places where they can walk, cycle or use public transport to get to work.
Family terraces	This segment typically lives on the edge of a town centre, in the transitional areas between the core and the suburbs. There is an above average proportion of families with pre-school or school age children. Typically, they will have one car between two adults, with one driving to work and the other walking or using public transport.
Service sector workers	The service sector workers segment tend to live in urban areas and work in the information and communication, financial, public administration and education related sectors. There is an above average likelihood of having young children in the household and a below average likelihood of older age adults.
Comfortable self-sufficiency	Those in the Comfortable self-sufficiency segment are typically approaching retirement age or already retired. They tend to live in a detached property or flat and are quite likely to have paid off their mortgage and have no dependent children. Therefore, while they may have a modest income are still quite likely to have both time and money.

Segment	Description
Semi-detached suburbia	People living in areas of Semi-detached suburbia will typically have school age children and own at least one car. They will mostly work in information and communication, finance, public administration and education sectors. It also includes some recently retired people living in semi-detached or detached housing.
Traditional towns	Households in this segment are more likely than average to have older non-dependent children and to live in semi-detached or terraced properties. Their level of qualifications tends to be lower than average with jobs typically in the wholesale and retail, energy and transport related industries.
Pre-school	Under 30's contemplating starting a family and who would like to bring children into a better and more sustainable world. They tend to live in well-connected urban areas, where they have access to good public transport and there is therefore no need to own a car. They are happy to make maximum use of technology to minimise their carbon footprint, and when they do need to use car are likely to hire an electric vehicle.
Semi-retired flexibility	Relatively affluent mature professionals who are looking to wind down their careers and perhaps work part time. They are looking to make use of the time they free up to participate in a range of activities and experiences, many of which will involve travelling. They typically live in a detached house on the outskirts of a pleasant town or village where they are close to the countryside. They are very likely to own a car but will travel by rail if the service is good.
School-run suburbia	Families with school age children typically living in a suburban area, ideally with a rail station to provide links to their local town centre, as well as London. Encouraged by their children, they like to use local produce and to shop locally. They are avid recyclers and try to avoid unnecessary travel. They are quite likely to own a car, though it is also likely to be a low emission vehicle and they are happy to give lifts to neighbours and fellow parents.
Sparsely populated	Locations with very few people living there (less than 50 people per 1km hexcell)

The extent to which the identified needs and challenges relate to each population segment based on their characteristics was assessed resulting in a 'segment factor' rating of 1 to 5 based on the following:

- 5 (high or highest priority need)
- 4 (strong relationship to need)
- 3 (moderate relationship to need)
- 2 (limited relationship to need)
- 1 (no relationship to need)

Intervention factors

How well the mode, service model and infrastructure interventions support the needs and challenges applicable to the segments was assessed resulting in a 'intervention factor' with allocated rating of 1 to 5 based on the following:

- 5 (meets needs)
- 4 (meets most needs)
- 3 (meets some needs)
- 2 (meets limited needs)

For example, e-bikes had the following scores:

Table 16-3 – Shared e-bike intervention scores

Basic Needs														Digital Needs					Journey Purpose				
Journey time	Frequency	Affordability	Group travel	Capacity for carrying luggage/ goods	Physical accessibility and comfort	Cleanliness	Reliability	Safety & security	High quality customer experience	Environmentally friendly	Value for money	Travel information	Integration between different services	Multimodal travel	Digital connectivity at home or business	Digital connectivity to access services away from home or business	Digital connectivity while travelling	Accessibility without a smartphone	Accessibility without a bank account	Need to use mobility services to travel to work	Need to use mobility services for social interaction and leisure activities	Need to use mobility services to go shopping	Need for mobility and connectivity services for education	Need for mobility and connectivity services for healthcare
4	4	4	2	2	3	3	3	3	3	5	4	4	4	4	1	1	1	1	1	3	4	3	3	3

Combined segment/intervention analysis

How well the interventions support the needs and challenges of each population segment (1-5 rating) was assessed. This was calculated in a separate table for each population segment through a combination (multiplication) of the segment factors and intervention factors to provide a combined factor for each segment factor/intervention factor pair, with a possible minimum score of 1 and maximum of 25 score.

The average of combined factors for each intervention for each population segment was calculated (providing a ‘people factor’) to show the overall level of support each intervention gives to the specific needs of each population segment.

Table 16-4 – People factors

Intervention	Village life	Central connectivity	Family terraces	Service sector workers	Comfortable self-sufficiency	Semi-detached suburbia	Traditional towns	Pre-school	Semi-retired flexibility	School-run suburbia
Shared mobility - e-bike	10.64	13.20	13.20	12.92	11.12	11.88	12.44	13.44	11.20	12.88
Shared mobility - e-scooter	10.08	12.48	12.44	12.24	10.48	11.16	11.64	12.76	10.04	12.16
Shared mobility - P2W (powered two wheeler)	9.16	11.16	11.20	11.04	9.48	10.12	10.56	11.40	9.16	10.92
Shared mobility - peer to peer vehicle sharing	11.24	12.60	13.32	12.88	11.20	11.68	12.04	13.20	10.60	12.92
Shared mobility - Ride-sharing platforms	11.44	13.00	13.56	13.00	11.48	12.28	12.60	13.32	11.08	13.32
Shared mobility - business to customer vehicle sharing (e.g. car club)	12.12	13.72	14.52	14.04	12.12	12.80	13.16	14.32	11.52	14.12
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	11.80	13.76	14.24	13.84	12.00	12.56	12.92	14.32	11.08	13.92
Shared mobility - digital demand responsive transport (DDRT)	13.40	15.44	15.92	15.48	13.48	14.20	14.64	15.88	12.68	15.60
Automated (and ultimately autonomous) road mass transit	13.88	16.00	16.56	16.04	14.04	14.84	15.28	16.44	13.24	16.16
Automated (and ultimately autonomous) FMLM shuttles	13.88	16.00	16.56	16.04	14.04	14.84	15.28	16.44	13.24	16.16
FMLM delivery robots / shuttles (land-based)	8.76	10.12	10.36	9.88	8.96	9.56	9.80	10.36	8.56	10.12
Low level air (drones) - freight	8.24	9.60	9.92	9.48	8.44	9.12	9.28	9.88	8.04	9.68
Low level air (drones) - passenger	8.96	10.20	10.52	10.44	9.00	9.72	9.84	10.56	8.88	10.28
Shared mobility - e-cargo bike	10.60	12.60	12.64	12.32	10.84	11.52	11.88	12.88	10.60	12.36
Digital-as-a-mode communications / services	14.96	16.76	17.04	16.88	15.04	16.00	16.36	17.16	14.52	16.92
Hubs (mobility / community asset / service)	15.04	17.84	18.08	17.60	15.48	16.08	16.76	18.20	14.40	17.52
MaaS platform (including mobility credits and gameification)	12.88	16.04	16.08	15.64	13.40	14.12	14.88	16.28	12.40	15.64
Digital kerbside management applications	8.64	9.76	9.76	9.52	8.92	9.08	9.44	9.88	8.52	9.52

Place assessment

The assessment takes the people factors and applies them to the resident populations of the different place types identified for the future mobility strategy.

The place analysis undertaken earlier in this commission resulted in the identification of 20 different types of place in the South East of England, as shown in the following table.

Table 16-5 - Original place typology

.Place type	Sub-type 1	Sub-type 2
Major economic hub (MEH)	Coastal and estuarine	N/A
	Well-connected larger rural hinterlands further from London	N/A
	Large urban centres	N/A
	Local and regional administrative centres further from London	N/A
	London commuter towns	N/A
	London orbital business hubs	N/A
Urban	Coastal and hinterland urban	N/A
	Well-connected urban	N/A
	Local centres urban	N/A
	London commuter urban	N/A
	London orbital urban	N/A
Rural	Coastal rural (good accessibility)	
	Coastal rural (poor accessibility)	
	Well-connected rural	Well-connected rural (good accessibility)
		Well-connected rural (poor accessibility)
	Local centres rural	Local centres rural (good accessibility)
		Local centres rural (poor accessibility)
	London commuter rural	London commuter rural (good accessibility)
		London commuter rural (poor accessibility)
	London orbital rural	London orbital rural (good accessibility)
		London orbital rural (poor accessibility)

For the purposes of this analysis, the above place types have been aggregated to reduce the number of potential bundles identified. At the beginning of this process, it was considered that the analysis would not be able to provide significant differentiation between 20 place types and a smaller number, based on aggregation of some of the place types, would be more appropriate.

The following nine aggregated place types were identified for the purposes of this analysis:

Table 16-6 – Place types

Type number	Major economic hubs
1	• Coastal and estuarine • Local and regional administrative centres further from London
2	• Well-connected larger rural hinterlands further from London • Large urban centres
3	• London commuter towns • London orbital business hubs
	Urban settlements
4	• Coastal and hinterland urban • Local centres urban
5	• Well-connected urban
6	• London commuter urban • London orbital urban
	Rural settlements
7	• Rural (good accessibility)
8	• Rural (poor accessibility)
9	• Remote rural

The remote rural place type is new and in addition to the previously identified place types. The place analysis used earlier in this commission was based on settlements of approximately 150 residents and above. This analysis therefore missed out what has been termed 'remote' rural settlements where there are fewer residents, including hamlets and stand-alone dwellings.

The distribution of population segments within each of the nine aggregated place types was analysed and an overall place factor calculated for each place type through combining the people factors for each population segment but weighted by the proportion of each segment in each aggregated place type. The resulting place factors for each place type are presented in the following table. As with the people factor analysis, a lower score indicates that the intervention meets the needs of the population in each place type less well, while a higher score indicated that the intervention better meets the needs of the population in each place type.

It should be noted that a place factor has not been calculated for the remote rural place type as the previous analysis did not provide data to support this calculation.

Table 16-7 - Place factors by place type

Intervention	MEH			Urban			Rural	
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Shared mobility - e-bike	12.0	12.1	12.2	11.8	11.9	11.9	11.4	11.1
Shared mobility - e-scooter	11.2	11.4	11.5	11.0	11.2	11.2	10.8	10.5
Shared mobility - P2W (powered two wheeler)	10.2	10.3	10.4	10.0	10.1	10.1	9.8	9.5
Shared mobility - peer to peer vehicle sharing	11.8	12.0	12.1	11.7	11.8	11.8	11.6	11.4
Shared mobility - Ride-sharing platforms	12.2	12.4	12.5	12.1	12.2	12.2	11.9	11.7
Shared mobility - business to customer vehicle sharing (e.g. car club)	12.9	13.1	13.2	12.8	12.9	12.9	12.6	12.4
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	12.7	12.9	13.0	12.5	12.7	12.7	12.3	12.1
Shared mobility – digital demand responsive transport (DDRT)	14.3	14.5	14.6	14.2	14.3	14.3	13.9	13.7
Automated (and ultimately autonomous) road mass transit	14.9	15.1	15.2	14.7	14.8	14.9	14.5	14.2
Automated (and ultimately autonomous) FMLM shuttles	14.9	15.1	15.2	14.7	14.8	14.9	14.5	14.2
FMLM delivery robots / shuttles (land-based)	9.5	9.6	9.6	9.4	9.4	9.5	9.2	9.0
Low level air (drones) - freight	9.0	9.1	9.2	8.9	9.0	9.0	8.7	8.5
Low level air (drones) - passenger	9.6	9.8	9.8	9.5	9.6	9.6	9.4	9.2
Shared mobility - e-cargo bike	11.5	11.7	11.8	11.4	11.5	11.5	11.2	10.9
Digital-as-a-mode communications / services	15.9	16.1	16.1	15.8	15.9	15.9	15.5	15.3
Hubs (mobility / community asset / service)	16.3	16.5	16.6	16.1	16.2	16.2	15.8	15.5
MaaS platform (including mobility credits and gameification)	14.3	14.6	14.7	14.1	14.2	14.3	13.7	13.4
Digital kerbside management applications	9.2	9.2	9.3	9.1	9.1	9.1	8.9	8.8

Deliverability assessment

Whilst the overall place factors provide an understanding of the level of support each intervention may provide to each place type, this analysis does not take account of the potential deliverability of those interventions in each place. An assessment has therefore been made of the impact that place has on deliverability using a number of criteria.

This assessment has been undertaken in a similar way to the development of the segment and intervention factors. A number of criteria have been identified which may affect the deliverability of the interventions with each criterion applied to the delivery of interventions within each place type:

- Maturity;
- Ease of delivery;
- Existing infrastructure;
- Density of demand;
- Ability/willingness of commercial partners;
- Impact of statutory procedures;
- Public/political support; and
- Stakeholder support.

Each criterion was scored according to the risk to delivery it poses in each place type based on the following scoring approach:

- 5 – no risk to delivery;
- 4 – low risk to delivery;
- 3 – moderate risk to delivery;
- 2 – high risk to delivery; and
- 1 – very high risk to delivery.

The average score across all criteria were calculated for each intervention for the three highest level place typologies (MEH, urban settlements, rural settlements),

providing deliverability factors as shown in the following table.

Table 16-8 - Deliverability factors

Intervention	MEH	Urban settlements	Rural settlements
Shared mobility - e-bike	4.8	3.9	1.9
Shared mobility - e-scooter	4.4	3.5	1.9
Shared mobility - P2W (powered two wheeler)	4.5	3.8	3.0
Shared mobility - peer to peer vehicle sharing	4.8	4.5	4.1
Shared mobility - ride-sharing platforms	5.0	4.6	4.1
Shared mobility - business to customer vehicle sharing (e.g. car club)	5.0	4.5	4.0
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	4.8	4.4	3.5
Shared mobility - digital demand responsive transport (DDRT)	4.6	4.3	3.8
Automated (and ultimately autonomous) road mass transit	2.3	2.0	1.4
Automated (and ultimately autonomous) FMLM shuttles	2.3	2.0	1.4
FMLM delivery robots / shuttles (land-based)	4.3	3.8	1.8
Low level air (drones) - freight	3.0	2.9	2.5
Low level air (drones) - passenger	2.5	2.4	2.0
Shared mobility - e-cargo bike	4.9	4.5	3.5
Digital-as-a-mode communications / services	4.6	4.4	3.8
Hubs (mobility / community asset / service)	4.6	4.1	3.1
MaaS platform (including mobility credits and gameification)	4.3	3.8	2.8
Digital kerbside management applications	4.0	3.5	1.9
Consolidation centres (regional, urban, micro)	4.0	3.5	2.4
Business to business freight capacity exchanges	4.5	4.1	3.4
Business to customer freight capacity exchanges	4.5	4.1	3.4
Flexible streetscape	4.0	3.5	2.4
Road space reallocation to future mobility modes e.g. lanes, kerb space	4.0	3.5	2.3
Hydrogen refuelling infrastructure (all modes)	3.8	3.5	2.3
EV charging infrastructure (all modes)	4.4	3.9	2.8

Combined place and deliverability assessment

The drawing together of the place factors and the deliverability assessment provides an overall view of the appropriateness of each intervention in each place type. To facilitate this understanding, the place factors have been multiplied by the deliverability factors for each place type resulting in Table 16-9.

It should be noted that the remote rural figures have been extrapolated from those for the other two rural groups (Table 16-8 and Table 16-9) as the original analysis earlier in this commission did not include this place type.

Table 16-10 shows further analysis, proportionately scoring from 1 to 100 each intervention, solely looking at either MEHs, urban, rural or remote rural place types. This analysis clarifies within each place type how applicable each intervention may be compared to other interventions for that place type, rather than the comparison across all place types.

Table 16-9 - Combined place factor/deliverability assessment

Intervention	MEH	Urban				Rural		Remote Rural	
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9
Shared mobility - e-bike	56.8	57.7	58.1	45.5	46.0	46.2	21.4	20.8	20.2
Shared mobility - e-scooter	49.2	50.0	50.3	38.6	39.0	39.2	20.2	19.6	19.1
Shared mobility - P2W (powered two wheeler)	45.7	46.4	46.7	37.5	37.8	38.0	29.3	28.5	27.8
Shared mobility - peer to peer vehicle sharing	56.2	57.1	57.5	52.8	53.2	53.3	47.8	47.2	46.5
Shared mobility - Ride-sharing platforms	61.2	62.0	62.4	56.1	56.5	56.6	49.3	48.4	47.5
Shared mobility - business to customer vehicle sharing (e.g. car club)	64.5	65.5	66.0	57.5	58.0	58.1	50.4	49.5	48.7
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	60.3	61.3	61.8	54.9	55.3	55.5	43.2	42.4	41.5
Shared mobility - digital demand responsive transport (DDRT)	66.2	67.1	67.6	60.1	60.6	60.8	52.3	51.4	50.5
Automated (and ultimately autonomous) road mass transit	33.5	34.0	34.2	29.5	29.7	29.8	19.9	19.6	19.2
Automated (and ultimately autonomous) FMLM shuttles	33.5	34.0	34.2	29.5	29.7	29.8	19.9	19.6	19.2
FMLM delivery robots / shuttles (land-based)	40.3	40.7	40.9	35.1	35.4	35.5	16.1	15.8	15.5
Low level air (drones) - freight	27.0	27.3	27.5	25.5	25.8	25.9	21.8	21.3	20.8
Low level air (drones) - passenger	24.1	24.4	24.6	22.6	22.8	22.9	18.8	18.4	18.0
Shared mobility - e-cargo bike	56.3	57.0	57.4	51.2	51.7	51.8	39.1	38.2	37.4
Digital-as-a-mode communications / services	73.5	74.3	74.6	68.9	69.5	69.5	58.3	57.3	56.4
Hubs (mobility / community asset / service)	75.3	76.4	76.9	66.3	66.8	67.0	49.3	48.3	47.3
MaaS platform (including mobility credits and gameification)	60.8	61.9	62.3	52.7	53.3	53.5	37.8	36.8	35.8
Digital kerbside management applications	36.7	37.0	37.1	31.8	31.9	32.0	16.8	16.5	16.3

Table 16-10 – Scoring

Intervention	MEH			Urban			Rural		Remote Rural
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9
Shared mobility - e-bike	48	57	59	44	46	48	41	37	33
Shared mobility - e-scooter	39	41	43	39	41	43	31	26	17
Shared mobility - P2W (powered two wheeler)	33	35	37	33	35	37	48	46	44
Shared mobility - peer to peer vehicle sharing	44	52	56	57	59	63	74	69	67
Shared mobility - Ride-sharing platforms	65	72	76	72	74	76	81	78	72
Shared mobility - business to customer vehicle sharing (e.g. car club)	78	80	81	78	80	81	87	85	80
Shared mobility - Ride-sourcing - 'on-demand private hire/taxi'	61	67	69	67	69	70	65	63	61
Shared mobility - digital demand responsive transport (DDRT)	83	85	87	83	85	87	93	91	89
Automated (and ultimately autonomous) road mass transit	13	17	20	13	17	20	30	24	20
Automated (and ultimately autonomous) FMLM shuttles	13	17	20	13	17	20	30	24	20
FMLM delivery robots / shuttles (land-based)	28	30	31	28	30	31	4	2	0
Low level air (drones) - freight	6	7	9	6	7	9	43	39	35
Low level air (drones) - passenger	0	2	4	0	2	4	15	13	11
Shared mobility - e-cargo bike	46	50	54	50	52	54	59	57	54
Digital-as-a-mode communications / services	89	91	93	94	96	98	98	96	94
Hubs (mobility / community asset / service)	94	96	98	89	91	93	83	76	70
MaaS platform (including mobility credits and gameification)	63	70	74	56	61	65	56	52	50
Digital kerbside management applications	22	24	26	22	24	26	9	7	6

Bundles

The following table presents the draft bundles for the four highest level place types; MEH, urban, rural and remote rural. The table suggests the priority interventions to be delivered in each place type on a five point scale from very high to very low. the assessment of priorities is based on the combined place factors/deliverability assessment table (Table 16-9) and the ranking table (Table 16-10) set out above as well as the professional judgement of the project team (which has been checked and challenged by others within the project team).

The interventions shaded grey at the bottom of the table have been prioritised on the spatial deliverability analysis presented in Table 16-11 below.

Table 16-11 - Intervention bundles

Intervention	MEH bundle	Urban bundle	Rural bundle	Remote rural bundle
Shared mobility - e-bike	H	M	L	L
Shared mobility - e-scooter	H	M	L	L
Shared mobility - P2W (powered two-wheeler)	H	M	M	L
Shared mobility - peer to peer vehicle sharing	H	H	H	M
Shared mobility - ride-sharing platforms	H	H	H	M
Shared mobility - business to customer vehicle sharing (e.g. car club)	H	H	H	H
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	H	H	M	M
Shared mobility - digital demand responsive transport (DDRT)	H	H	VH	VH
Automated (and ultimately autonomous) road mass transit	L	L	L	VL
Automated (and ultimately autonomous) FMLM shuttles	L	L	L	VL
FMLM delivery robots / shuttles (land-based)	M	M	L	VL
Low level air (drones) - freight	L	L	M	M
Low level air (drones) - passenger	L	L	L	L
Shared mobility - e-cargo bike	H	H	L	L
Digital-as-a-mode communications / services	H	VH	VH	VH
Hubs (mobility / community asset / service)	VH	VH	VH	VH
MaaS platform (including mobility credits and gameification)	H	H	M	L
Digital kerbside management applications	L	L	L	VL
Consolidation centres (regional, urban, micro)	H	M	L	VL
Business to business freight capacity exchanges	H	H	M	M
Business to customer freight capacity exchanges	H	H	M	M
Flexible streetscape	H	M	L	VL
Road space reallocation to future mobility modes e.g. lanes, kerb space	H	M	L	VL
Hydrogen refuelling infrastructure (all modes)	M	M	L	L
EV charging infrastructure (all modes)	H	M	M	L

The above table has resulted from a significant programme of analysis which included revising and updating the process to reflect findings at each stage. Whilst the initial intension was to provide bundles for the nine aggregated place types, the analysis indicated that the differences between nine bundles would be limited, particularly across bundles within the same highest level place type e.g. the originally proposed three bundles under the MEH place type would have demonstrated very limited variation in bundle content. The project team has concluded, both as a combined team and as independent consultant teams, that it was therefore more appropriate to aggregate the place types further under four headings of MEH, urban, rural and remote rural.

The result of this analysis therefore identifies the priorities for implementing future mobility mode, service model and infrastructure interventions across the South East of England according to four place types. However, the analysis presented in here also enables the relative appropriateness of interventions across the originally proposed nine place types to be compared and considered by practitioners when developing locally specific proposals for bundles of future mobility interventions.

Furthermore, in developing locally specific proposals, there is a range of variables, including the deliverability criteria identified previously, that need to be considered as they will have an influence on which interventions may be appropriate for a particular area (the following list is not exhaustive):

- The strength of the existing established mobility eco-system;
- Maturity of future mobility modes, services models and infrastructure currently in operation in the area;
- Ease of delivery within local conditions;
- Availability of existing infrastructure to support delivery;
- Density of demand for new interventions;
- Ability/willingness of commercial partners;
- Local issues that may affect statutory procedures e.g. environmental designations, local plans, etc
- Local policy priorities including those focusing on economic, environmental and social outcomes;
- Local funding policies and constraints;
- Public/political support and priorities; and
- Stakeholder support and priorities.

To provide some detail we have outlined below a couple of examples to provide a little more detail on potential bundles.

MEH place type bundle

Major economic hubs are urban centres with the highest population and employment densities in the South East. Based on the assessment, the following interventions scored high and very high in relation to a MEH place type:

- Hubs (mobility / community asset / service)
- MaaS platform (including mobility credits and ‘gameification’)
- Shared mobility - e-bike;
- Shared mobility - e-scooter;
- Shared mobility - P2W (powered two wheeler);
- Shared mobility - peer to peer vehicle sharing;
- Shared mobility - ride-sharing platforms;
- Shared mobility - business to customer vehicle sharing (e.g. car club);
- Shared mobility - digital demand responsive transport (DDRT);
- Consolidation centres (regional, urban, micro);
- Business to business freight capacity exchanges;
- Business to customer freight capacity exchanges;
- Flexible streetscape;
- Road space reallocation to future mobility modes e.g. lanes, kerb space;
- Hydrogen refuelling infrastructure (all modes); and
- EV charging infrastructure (all modes).

A typical bundle could include: Hubs (mobility / community asset / service) scored the highest and provide an excellent opportunity to bring various services together improving connections, collaboration, and public realm in MEHs. The hubs require integration of several services, which should exist in the area including public transport and shared mobility services like micromobility, DDRT, car clubs and ride-sourcing. With the highest population densities in the Transport for the South East area, there is the greatest potential for private investment in the form of new business models such as shared cars and micromobility and it is expected those services will be available in MEHs and at the hubs. We may see an increasing number of people using shared cars and use of car clubs may be encouraged as part of the Government’s policy and incentives. The popularity of micromobility including e-bikes, e-scooters, e-mopeds and other evolving vehicle types, is likely to increase in major economic hubs as urban users become more familiar with the micromobility offer.

Given the competing needs within the streetscape for both people and freight-based services a more flexible approach to street scape use would allow for road space reallocation in favour of existing and emerging modes as well as providing facilities for new freight solutions enabled by local consolidation centres.

Aggregation of all mobility services into a multi-modal travel planning app would be in the interest of the end

user and MaaS platforms provide an opportunity to integrate a variety of the services in MEHs.

Electric vehicles infrastructure will be gradually deployed encouraging people to use EVs. EVs rapid charging hubs will appear in MEHs encouraging an uptake of EVs.

Automated (and ultimately autonomous) road mass transit and automated (and ultimately autonomous) FMLM shuttles scored low in relation to other services as the CAV technologies are still in early development phase. As innovations in vehicle automation evolve, it is likely that the first places to see autonomous vehicles in transport services are MEHs, due to higher potential levels of demand. In the future some of the MEHs may have a point-to-point (e.g. city to airport) autonomous services and CAVs may be in use on public roads

Rural place type bundle

The Transport for the South East area has a variety of rural place types with different levels of accessibility to the services. Based on the assessment, the following interventions scored high and very high in relation to a rural place type:

- Hubs (mobility / community asset / service);
- Shared mobility - digital demand responsive transport (DDRT);
- Digital-as-a-mode communications / services;
- Shared mobility - peer to peer vehicle sharing;
- Shared mobility - ride-sharing platforms; and
- Shared mobility - business to customer vehicle sharing (e.g. car club).

A typical bundle could include: rural hubs (mobility / community asset / service), could focus on the needs of the residents and provide first/last mile connectivity, a shop and a café, co-working & pop-up spaces and rapid electric vehicle charging. Additionally, provision for (say) a mobile health centre may visit the hub regularly to serve the residents.

DDRT services are expected to be trialled to test their feasibility in rural place types connecting rural settlements with local urban areas. It is expected a focus to be on first/last mile connectivity, e.g. to the rail station. Some of the villages may implement community run shared car clubs.

Automated (and ultimately autonomous) road mass transit and automated (and ultimately autonomous) FMLM shuttles scored low in relation to other services as the CAV technologies are still in early development phase. When CAVs are introduced, the areas may see adoption of shared CAV services for commute to nearby urban settlements and first/last mile connectivity. DDRT vehicles can become autonomous and shared pods may be seen on the roads.

Movement framework applicability

Given that a key objective of the future mobility strategy work is to inform the parallel area studies commission, it is important to ensure that the interventions (as part of bundles) can be considered against the broad types of movements likely to be observed in the area studies, namely;

- Radial (longer) journeys;
- Orbital (longer) journeys;
- Inter-urban(longer) journeys;
- Local journeys: First Mile/Last Mile (FMLM);
- Local journeys: Intra-urban;
- Local journeys;
- Rural; and
- International journeys.

Table 16-12 below indicates whether each intervention can play a role in meeting the movement types described.

Table 16-12 - Movement framework applicability

Intervention	Movement Framework Applicability						
	Radial journeys	Orbital journeys	Inter-urban journeys	Local journeys: FMLM	Local journeys: Intra-urban	Local journeys: Rural	International journeys
Shared mobility - e-bike	N	N	N	Y	Y	Y	N
Shared mobility - e-scooter	N	N	N	Y	Y	N	N
Shared mobility - P2W (powered two wheeler)	N	N	N	Y	Y	Y	N
Shared mobility - peer to peer vehicle sharing	Y	Y	Y	N	Y	Y	N
Shared mobility - ride-sharing platforms	Y	Y	Y	Y	Y	Y	N
Shared mobility - business to customer vehicle sharing (e.g. car club)	Y	Y	Y	Y	Y	Y	Y
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	N	N	N	Y	Y	Y	N
Shared mobility – digital demand responsive transport (DDRT)	N	N	N	Y	Y	Y	N
Automated (and ultimately autonomous) road mass transit	Y	Y	Y	Y	Y	Y	Y
Automated (and ultimately autonomous) FMLM shuttles	N	N	N	Y	Y	Y	N
FMLM delivery robots / shuttles (land-based)	N	N	N	Y	N	Y	N
Low level air (drones) - freight	Y	Y	Y	Y	Y	Y	N
Low level air (drones) - passenger	Y	Y	Y	Y	Y	Y	N
Shared mobility - e-cargo bike	N	N	N	Y	Y	Y	N
Digital-as-a-mode communications / services	Y	Y	Y	Y	Y	Y	Y
Hubs (mobility / community asset / service)	Y	Y	Y	Y	Y	Y	Y
MaaS platform (including mobility credits and gameification)	Y	Y	Y	Y	Y	Y	Y
Digital kerbside management applications	Y	Y	Y	Y	Y	Y	N
Consolidation centres (regional, urban, micro)	Y	Y	Y	Y	Y	Y	Y
Business to business freight capacity exchanges	Y	Y	Y	Y	Y	Y	Y
Business to customer freight capacity exchanges	Y	Y	Y	Y	Y	Y	N
Flexible streetscape	N	N	N	Y	Y	Y	N
Road space reallocation to future mobility modes e.g. lanes, kerb space	Y	Y	Y	Y	Y	Y	N
Hydrogen refuelling infrastructure (all modes)	Y	Y	Y	Y	Y	Y	Y
EV charging infrastructure (all modes)	Y	Y	Y	Y	Y	Y	Y

Subsidy requirements

A key consideration for any of the interventions illustrated above is their potential subsidy requirements over the short-, medium- and long-term periods. This is particularly important as many future mobility interventions aren't yet mature from a commercial point of view and may require a degree of "pump priming" to achieve stability within the transport / mobility landscape.

As assessment has been undertaken to consider these needs on a very low to very high scale across the spatial typologies recognising that achieving commercial stability may be more difficult in less dense areas.

It should be noted that each row should be considered separately, and columns can't be compared. E.g. VH for shared mobility e-scooters in rural areas can't be compared with H for automated road mass transit in Rural areas. It should also be noted that the subsidy for new technologies and business models will evolve over time, as they scale and become more established.

Table 16-13 - Subsidy Requirements

Intervention	Short/Medium Term Subsidy Requirements				Long Term Subsidy Requirements			
	MEH	Urban	Rural	Remote rural	MEH	Urban	Rural	Remote rural
	Priority	Priority	Priority	Priority	Priority	Priority	Priority	Priority
Shared mobility - e-bike	VL	L	H	H	VL	VL	L	L
Shared mobility - e-scooter	VL	VL	VH	VH	VL	VL	H	H
Shared mobility - P2W (powered two wheeler)	VL	L	H	H	VL	VL	L	L
Shared mobility - peer to peer vehicle sharing	VL	VL	VL	VL	VL	VL	VL	VL
Shared mobility - ride-sharing platforms	VL	M	M	M	VL	VL	VL	VL
Shared mobility - business to customer vehicle sharing (e.g. car club)	VL	VL	L	L	VL	VL	VL	VL
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	VL	VL	VL	VL	VL	VL	VL	VL
Shared mobility – digital demand responsive transport (DDRT)	M	H	H	H	L	M	M	M
Automated (and ultimately autonomous) road mass transit	H	H	H	H	L	L	M	H
Automated (and ultimately autonomous) FMLM shuttles	H	H	H	H	VL	VL	L	M
FMLM delivery robots / shuttles (land-based)	L	L	M	M	VL	VL	L	L
Low level air (drones) - freight	H	H	H	H	M	M	M	M
Low level air (drones) - passenger	H	H	H	H	M	M	M	M
Shared mobility - e-cargo bike	VL	L	M	M	VL	VL	L	L
Digital-as-a-mode communications / services	VL	VL	VL	VL	VL	VL	VL	VL
Hubs (mobility / community asset / service)	L	M	M	M	VL	L	L	L
MaaS platform (including mobility credits and gameification)	H	H	H	H	L	L	L	L
Digital kerbside management applications	H	H	H	H	L	L	L	L
Consolidation centres (regional, urban, micro)	M	M	M	M	VL	VL	VL	VL
Business to business freight capacity exchanges	L	L	L	L	VL	VL	VL	VL
Business to customer freight capacity exchanges	VL	VL	L	L	VL	VL	VL	VL
Flexible streetscape	H	H	H	H	L	L	L	L
Road space reallocation to future mobility modes e.g. lanes, kerb space	H	H	H	H	VL	VL	VL	VL
Hydrogen refuelling infrastructure (all modes)	M	M	H	H	VL	VL	VL	VL
EV charging infrastructure (all modes)	VL	L	H	H	VL	VL	L	L

Delivery Stage

As has been discussed in work to date, the Future Mobility agenda is at very different stages of maturity across the UK and the South East. Considering the '5 steps to delivery' approach defined – Pilot, Evaluate & Learn, Plan, Deploy, Monitor & Evaluate – we have undertaken an assessment of the various interventions and identify a stage at which they are generally in the UK and specifically within the South East. The table below illustrates the pace of roll-out, which will change with local interventions such as the Solent Future Transport Zone, so the current position is very fluid.

Table 16-14 - Delivery Stage

Intervention	Delivery stage TfSE (2021)				Delivery stage - national position (2021)				
	MEH	Urban	Rural	Remote Rural	Pilot	Evaluate & learn	Plan	Deploy	Monitor & evaluate
	Stage	Stage	Stage	Stage					
Shared mobility - e-bike	Deploy	Deploy	N/a	N/a					
Shared mobility - e-scooter	M&E	M&E	N/a	N/a					
Shared mobility - P2W (powered two wheeler)	Pilot	N/a	N/a	N/a					
Shared mobility - peer to peer vehicle sharing	Deploy	Deploy	N/a	N/a					
Shared mobility - ride-sharing platforms	Deploy	Deploy	N/a	N/a					
Shared mobility - business to customer vehicle sharing (e.g. car club)	M&E	M&E	N/a	N/a					
Shared mobility - ride-sourcing - 'on-demand private hire/taxi'	M&E	M&E	Deploy	Deploy					
Shared mobility - digital demand responsive transport (DDRT)	Deploy	Deploy	Plan	Plan					
Automated (and ultimately autonomous) road mass transit	Plan	N/a	N/a	N/a					
Automated (and ultimately autonomous) FMLM shuttles	N/a	N/a	N/a	N/a					
FMLM delivery robots / shuttles (land-based)	N/a	N/a	N/a	N/a					
Low level air (drones) - freight	Plan	Plan	Plan	N/a					
Low level air (drones) - passenger	N/a	N/a	N/a	N/a					
Shared mobility - e-cargo bike	Plan	N/a	N/a	N/a					
Digital-as-a-mode communications / services	M&E	M&E	M&E	M&E					
Hubs (mobility / community asset / service)	Plan	Plan	N/a	N/a					
MaaS platform (including mobility credits and gameification)	Plan	Plan	N/a	N/a					
Digital kerbside management applications	Plan	Plan	N/a	N/a					
Consolidation centres (regional, urban, micro)	Plan	Plan	N/a	N/a					
Business to business freight capacity exchanges	N/a	N/a	N/a	N/a					
Business to customer freight capacity exchanges	N/a	N/a	N/a	N/a					
Flexible streetscape	Deploy	Deploy	N/a	N/a					
Road space reallocation to future mobility modes e.g. lanes, kerb space	N/a	N/a	N/a	N/a					
Hydrogen refuelling infrastructure (all modes)	Deploy	Deploy	N/a	N/a					
EV charging infrastructure (all modes)	M&E	M&E	M&E	N/a					

Appraisal of future mobility interventions

17. Appraisal Of Future Mobility Interventions

What changes should be considered for the appraisal process to effectively capture the impacts of the identified mode, service model and infrastructure interventions?

Background

The appraisal of interventions considers the impacts of a proposed change in terms of the nature of the impact, the scale of the impact and the quantum of people or resources affected. The Department for Transport's appraisal guidance (Transport Analysis Guidance – TAG), aligned with HM Treasury's Green Book, sets out the approach for assessing the quantified and non-quantified impacts of proposals, and as stated in its introduction[178]:

"Projects or studies that require government approval are expected to make use of this guidance in a manner appropriate for that project or study. For projects or studies that do not require government approval, TAG should serve as a best practice guide."

TAG is well-established and provides a comprehensive framework for appraising interventions through consideration of economic, environmental and social effects. However, given the evolution of the mobility needs and challenges of people and the development of future mobility interventions, the focus of some of the guidance is dated. Alongside the 2020 Green Book revisions, which emphasise the importance of place based analysis, there is the opportunity to revisit TAG to re-emphasise a user centric approach and reflect the diverse needs of different individuals and to effectively capture the impacts of the proposed mode, service model and infrastructure interventions.

This note provides an introduction to some of the notable areas within the current appraisal process that should be considered for development in order to better capture the impacts of future mobility interventions. It is recognised that there is limited empirical evidence of the impacts of such interventions and conventional transport modelling approaches are not well suited to estimate levels of resulting behaviour change, however this is not the focus for this note.

Appraisal process considerations

Overview

Mobility interventions seek to meet derived demand, namely, by and large, people travel in order to get somewhere for a purpose rather than for the sake of the journey itself. The impacts of the proposed mode, service model and infrastructure interventions therefore determine the convenience and resulting attractiveness of the mobility offer, e.g. journey time, cost, comfort, reliability, personal security etc. The importance placed on each of these elements will differ by individual depending on their circumstances and the purpose of their journey.

Most of these elements relate to socio-economic impacts, as discussed below. Consideration of environmental impacts of future mobility interventions is broadly consistent with the environmental appraisal for other forms of mobility and reflect the physical impacts of the construction of infrastructure and the externalities resulting from operation.

Socio-economic impacts

Economic

The direct economic user benefits of changes to the mobility offer are based on generalised journey cost derived from TAG weightings for journey components and values of time, plus financial costs.

The conventional access, wait, interchange and in-vehicle time components can take on a different perspective when considered in relation to future mobility services, e.g.:

- Waiting for a shared mobility service if booked from home and only access the local stop when know it is due
- Waiting/interchange when users have greater certainty of connection due to reliability of services, confidence the FMLM services will be available etc.
- Access/interchange 'penalty' if interventions provide opportunity to complete other activities at the mobility hub, e.g. Parcel pick-up, coffee take-out
- Access/interchange if mobility impaired and 'door-to-door' mobility is particularly important
- In-vehicle time when user have WiFi connectivity to work when using a shared mode
- In-vehicle time when using an autonomous vehicle that removes the need to drive
- In-vehicle time when certainty of a seat and non-crowded experience enabling productive use of time
- In-vehicle time when confident in the reliability of the journey time, e.g. Due to autonomous vehicles, dedicated facilities for e-bicycles and e-scooters

[178] https://www.gov.uk/guidance/transport-analysis-guidance-tag

Additionally, the financial cost is likely to be perceived differently, e.g.:

- When paying a MaaS contract fee rather than paying on a per trip basis
- When transparent pay-as-you-go cost rather than perception of low cost travel, e.g. Not considering sunk costs of vehicle purchase, insurance, servicing etc.
- When variable charging / surge pricing employed to reflect balance of supply and demand

The appraisal approach should recognise the different welfare values and the financial value (e.g. proportionate to hourly income) that different individuals will ascribe to the different elements based on the challenges and needs they have. Interventions or programmes of interventions which are proposed to address a range of these issues, or a narrow focus of issues but for which there will be a material number of beneficiaries, should perform well with an appropriate appraisal approach. And through allowing quantified and monetised analysis to be undertaken the recognised metrics such as Net Present Value and Benefit to Cost Ratio can be produced to enable a comparison of competing proposals for the use of limited resources.

Social

The social impacts of mobility interventions can be quantified and monetised alongside the economic impacts, where proportionate to do so. Whether or not they are monetised, the impacts should be given significant consideration in the assessment in the round of the value for money for proposed interventions. Given the opportunity for future mobility interventions to effectively address many of the challenges and issues identified that relate to social impacts (for example access to public services and the quality of the whole journey experience) there is significant scope to re-examine the current guidance and focus for social elements of the appraisal.

Consideration of the impact on commuter and non-work journey times and reliability should encompass the same aspects as for business travel (as described above), reflecting the range of needs, value and benefits arising from changes in mobility and the experience of the journey. Likewise, the other social impacts can take on a different perspective when considered in relation to future mobility services, e.g.:

- Journey certainty effects of autonomous vehicles (positive) and electric vehicle range anxiety (negative)
- Actual and perceived safety when dedicated facilities provided, e.g. Segregation for e-bicycles and e-scooters, and impact of autonomous services on accident rates
- Actual and perceived security when journey tracking provided through apps and door-to-door services provided
- Accessibility resulting from flexibility of app bookings and real-time information on services, e.g. Availability at hub of e-bicycles, wait time for demand responsive service
- Journey experience of interchange at a mobility hub
- Journey experience of greater personalisation of service
- Personal affordability resulting from different operating models for different future mobility services

Conclusion

The appraisal process should, in a proportionate way, capture the nature of the impact, the scale of the impact and the quantum of people or resources affected by the change in mobility offering. The recently revised HMT's Green Book and DFT's Transport Analysis Guidance provide a sound foundation for assessing the impacts of the identified mode, service model and infrastructure interventions, but should be developed to better accommodate a user centric approach, which is at the heart of future mobility's opportunity to address the ever more diverse range of mobility needs and challenges of individuals.

Appendix A - dashboards overview

Appendix A – dashboards overview

Model overview

Definition

A description of the nature of the overarching Mobility Model

Sub models

New mobility service offerings have not developed homogenously, with innovations targeting different market segments, 'modes' and geographies, attempting to distinguish their offering from competitors in the field. Thus, there are numerous sub-models that can be carved out within the overarching mobility model categorisation. In the future some of these sub-models may have evolved into separate entities but for now they have been grouped together. This is by no means a complete list but covers the foremost sub-models.

Modes impacted in the UK

Some mobility models are established around a single, traditional, mode of transport (e.g. bus), others are applicable to a variety of modes and further models utilise 'non-traditional' modes that blur the lines between 'traditional' transport modes (e.g. on-demand micro-transit obscuring the lines between taxi and bus).

Only 'traditional' modes that are affected by mobility models that are known to be commercially operational at time of writing. Therefore, although a mobility model could potentially impact additional modes in the future as the model is more widely implemented, these are not referenced.

The icon used to illustrate the traditional modes that are affected by each mobility business model in question are indicated by the following representations in the table below.

Table A1 – Mode icon reference

Icon	Mode Reference
	Car/Van
	Taxi
	Bus/Coach
	Bicycle
	Moped
	Motorbike
	Light Goods Vehicle
	Heavy Goods Vehicle
	Rail
	Tram/Tube/Tram-Train
	Maritime
	Air

N.B. modes such as electric scooter (presently illegal on British pavements or roads), droid, drone etc. are not for purposes of this report classed as a 'traditional' mode.

Journey range

An assessment of the typical range (in kilometres) which a mobility model serves.

It should be noted that the range of each sub-model differs and therefore the journey range given to the overarching mobility model is an average of reviewed operations. Also, as many of the businesses operating in the emerging mobility markets are relatively new, the information publicly available to use to make an informed decision about their operational range is limited in some cases due to commercial sensitivities. Thus, the most accurate assessment has been made using the information available.

Mobility model maturity

Most of the market entrants attempting to commercialise these technology-enabled mobility business models are relatively new in terms of their maturity. That is most companies have only recently begun business operations and launched their services, initially focusing their attention on advertising their comparative advantages and value propositions to their target consumer segments. Whether the models operate sustainably, or their predicted outcomes come to fruition is unknown in many cases.

As organisations become more experienced in their market and service offering, developing effective systems to support their activities, they become more mature in their approach. Thus, the maturity of each model at the time of writing has been assessed. Using

aspects of Auvik's 'Five levels of Operational Maturity'[179] and StartUpCommons 'Startup Development Phases'[180], mobility model development has been simplified and described with a limited number of maturity levels as outlined in Table A2.

It should be noted that the maturity of each sub-model case study differs and therefore the maturity level given to the overarching mobility model is an average of all the reviewed operations. Also, as many of the businesses operating in the emerging mobility markets are relatively new, the information publicly available to use to make an informed decision about their maturity is limited in some cases due to commercial sensitivities. Thus, the most accurate assessment of the mobility model maturity has been made using the information that was available.

Table A2 – Model maturity level criteria

Model Maturity	Name	Description
1	Beginning	Mission and vision with initial strategy and key milestones Do not know what they don't know Small scale operations are largely trial and error Inconsistent service quality
2	Emerging	Discovery of a viable business model Initial key performance indicators identified Initial product/service version developed Attract additional resources (money or workforce) via investments or loans for equity, interest or revenue share from future revenues Inconsistent service quality Project level thinking
3	Scaling	Repeatable sales and operations Begin to track key performance indicators in users, customers and revenues and/or market share Median key performance indicator based measurable growth Hiring, improving quality of service and implementing processes Median service quality Organisational level thinking
4	Optimising	High key performance indicator based measurable growth Focus on operational efficiency; forward budgeting and attainment tracking High service quality Organisational level thinking
5	Stable	Established market position Continuous innovation and optimisation to extend capabilities and offerings Achieved great growth of key performance indicator metrics and this can be expected to continue High service quality Organisational level thinking

[179] Networks, Auvik. 2019. "The 5 Levels of Operational Maturity". Auvik Networks. https://www.auvik.com/franklymsp/blog/msp-operational-maturity/.

[180] "Startup Development Phases". 2019. Startup Commons. https://www.startupcommons.org/startup-development-phases.html.

Geographical applicability

The geographical typology that the mobility model is currently operational within in the UK.

Mobility models have commercial and operational dependencies which they rely upon to establish themselves. In some cases, these dependencies, such as the requirement of a critical mass of users, impact the geographical application of the model.

Table A3 shows the icon used to illustrate the four geographical applicability typologies and the corresponding explanatory reference. These have broadly followed the Office for National Statistic's Rural/Urban Classifications for the 2011 census).[181]

It should be noted that the geographical applicability of each sub-model differs and therefore not all the contexts illustrated will be relevant to all sub-models. Instead the icons indicate the potential geographical applicability of all the sub-models within the overarching mobility model.

It should also be noted that as many of the businesses operating in the emerging mobility markets are relatively new, the information publicly available to use to make an informed decision about geographical applicability is limited in some cases. Thus, the most accurate assessment has been made using the information available.

Table A3 – Geographical applicability icon reference

Icon	Geographical context reference	2011 Census rural-urban classification
	Urban	• Major conurbation (A1) • Minor conurbation (B1) • City and town (C1) • City and town in a sparse setting (C2)
	Peri-urban	• Town and Fringe (D1) • Town and Fringe in a Sparse Setting (D2)
	Corridor / inter-urban	• N/A (SRN or MRN routes that link major centres of economic activity)
	Rural	• Village (E1) • Village in a sparse setting (E2) • Hamlets and isolated dwellings (F1) • Hamlets and isolated dwellings in a sparse setting (F2)

Existent mobility model analysis

UK best practice examples

Examples of commercial operations in the UK, with a focus on the South East where possible, at the time of writing.

Case studies provide an overview of the specific service offering, geographical availability and key performance information if available (such as uptake).

Examples have been selected objectively as there is significant media hype around many of the commercial applications of the new mobility models yet limited publicly available operational outcome figures. This is particularly the case for operations in their infancy due to commercial sensitivities.

Major market failures

Several of the mobility business models are in their infancy and although appear to be offering a sustainable transport solution through utilisation of evolving technologies, in many cases robust business models are not yet established. The robustness of

[181] Office for National Statistics. 2013. "The 2011 Rural-Urban Classification for Small Area Geographies". London: Government Statistical Service. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239478/RUC11user_guide_28_Aug.pdf

models can vary from place to place with models succeeding in major cities, for example, but not being viable in smaller centres or rural areas.

A string of recent mobility market failures, initiated as a result of anticipated benefits not materialising and investment ceasing, emphasises the need to be wary of hype and overpromise of commercial innovators. Proper due diligence is essential before new models enter into the market to reduce the threat of substantial gaps being left in the transport network if operations cease. Consumer opinions, public acceptance, market reaction and technology uptake are key – a seemingly good idea cannot succeed alone.

Examples of significant business model failures have been selected from around the world (priority for UK examples). Any information obtained detailing reasons for the ceasing of operations is documented, however, frequently this is limited due to commercial sensitivities. This information is fundamental for lesson learning and preventing market failures in the future.

Opportunities

The main opportunities for success and influence that each mobility model could bring about are outlined, informed by findings from published research from academia and industry, general industry news, business reports, thinktanks and business to business meetings.

Barriers

The main barriers to mobility model operation and adoption, informed by findings from published research from academia and industry, general industry news, business reports, thinktanks and business to business meetings are outlined.

Wider implications

Any wider implications for other programmes and interventions including digital, energy and land use are outlined.

Potential future mobility model impacts analysis

Impact on baseline total VKT (vehicle kilometres travelled)

Potential impact of each mobility model on a baseline forecast total vehicle kilometres travelled for the years 2025, 2035 and 2050. The dashboards indicate the potential variation in VKT caused by the mobility models compared to a baseline figure, based on a number of assumptions.

There is a large amount of uncertainty surrounding the impacts of new technology-enabled mobility business models on travel demand. Demand related mobility issues specifically, such as congestion, are high on Government agendas and therefore publicly available information from and about mobility market entrants is limited due to commercial sensitivities. It should also be noted that even available information requires a thorough review. This is because many market entrants are still in their infancy and only operating in limited locations, and therefore information regarding their impacts on travel demand and mode shift could potentially stem from small-scale, location specific operations that may not be scalable.

Despite the uncertainty surrounding the potential impacts of new mobility models on travel demand, findings from academic published research and industry, general industry news, business reports, thinktanks and business to business meetings have been reviewed and critiqued to make an informed qualitative assessment for the years 2025, 2035 and 2050.

The qualitative assessment assumed:

- Vehicle kilometres travelled (VKT) is an appropriate proxy for road-based vehicle demand (inclusive of car, taxi, bus, LGVs and HGVs)
- A baseline total VKT to 2050 that extrapolates extant VKT trends through to 2030, broadly considering the impact of externalities such as demographic changes (e.g. population growth, ageing population, urbanisation etc.) and socioeconomic changes.
- The 2020 mobility landscape and market position within the UK remains constant through 2025, 2035 and 2050 as outlined below in the table below. This refers to three key influencing factors which heavily influence the growth of/demand for mobility business models:
  - The regulatory environment in which the mobility business models operate
  - The likelihood of users sharing mobility services (both personal use of a shared asset and shared occupancy of an asset itself)
  - The comparative affordability of mobility technologies to existing vehicles (e.g. ultra-low emission vehicles (ULEVs) and increasingly connected and automated vehicles (CAVs)).

Table A4 – The mobility landscape and market position within the UK 2025, 2035 & 2050

Year	Regulatory environment (The **regulatory environment** in which the Mobility Business Models operate)	Likelihood of users sharing: (The **likelihood of users sharing** mobility services (both personal use of a shared asset and shared occupancy of an asset itself))	Technology affordability: (The comparative **affordability of mobility technologies** to existing vehicles (e.g. Increasingly connected and automated vehicles (CAVs))
2025	**Open market** (limited regulatory intervention and competitive market)	**Low sharing** (public willingness to share low)	**High cost** (comparatively new forms of mobility are expensive to traditional modes)
2035	**Quasi-open market** (some regulatory intervention to stimulate sharing and competitive market)	**Medium sharing** (public willingness to share medium)	**High cost** (comparatively new forms of mobility are expensive to traditional modes)
2050	**Quasi-open market** (some regulatory intervention to stimulate sharing and competitive market)	**Medium sharing** (public willingness to share medium)	**Medium cost** (forms of mobility are a comparable cost to higher end traditional modes)

In the context of the assumptions surrounding the mobility ecosystem in 2025, 2035 and 2050 (relating to regulation, willingness to share and technology affordability), the assumptions regarding the development and deployment of Level 4+ connected and automated vehicle (CAV) technology are outlined in the table below. These assumptions are in line with the 2019 SMMT Connected & Autonomous Vehicle Technology Roadmap.[182] The assumptions regarding CAV technology development and deployment are explained using Technology Readiness Levels; a nine-point scale used as a means of assessing whether an emerging technology is ready for use.[183]

Table A5 – Assumed CAV technology readiness level 2020, 2025 & 2030

Year	Assumed Technology Readiness Level	Technology Readiness Level Description	Assumed wider consequences of CAV development and deployment
2025	Level 7 - Inactive commissioning (Development)	Inactive commissioning – the technology is undergoing inactive commissioning. This can include works testing and factory trials, but it will be on the final designed equipment. Testing at or near full throughput will be expected.	Preliminary introduction of L4/5 connected autonomous vehicles into fleets by operators in specific controlled environments (such as campus style developments, dense urban centres and specific lane-controlled environments) but not reached critical mass and very limited uptake by private individuals due to high cost (if available at all).
2035	Level 8 – Active commissioning (Deployment)	Active commissioning – The technology is undergoing active commissioning	L4/5 connected autonomous vehicles for shared use in fleets form a growing proportion of overall new vehicle sales to operators (this includes public/shared transport and some logistics functions). Increasing but still limited uptake by private individuals due to relatively high costs compared to non-autonomous vehicles.
2050	Level 9 - Operations (operations)	Operations – The technology is being operationally used in an active facility	Large scale fleet penetration of L4/5 connected autonomous vehicles (both passenger and freight). Reducing costs of technology make application in private vehicles more affordable.

[182] SMMT (2019). Connected and Autonomous Vehicles. Winning the Global Race to Market. [online] London: The Society of Motor Manufacturers and Traders. Available at: https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-CONNECTED-REPORT-2019.pdf [Accessed 4 Jun. 2019].

[183] UK Government. 2014. "Guidance on Technology Readiness Levels". GOV.UK. https://www.gov.uk/government/news/guidance-on-technology-readiness-levels.

The impact of each mobility model on the baseline VKT was assessed in isolation and therefore impacts of the different models cannot be layered. This is because there are interrelationships between some of the models once increasingly connected and automated vehicles (CAVs) enter fleets (assumed to be 2025+). For example, car-sharing and ride-sourcing are ultimately assumed to merge into a single business model after the establishment of CAVs capitalising upon the functionality of the new technology. This is expected as a result of limited differentiation in service provision, MaaS providing an integrated and seamless mechanism of accessing services and reduction in brand perception associated with travelling in a particular type of vehicle.

Consequently, when considering the potential impact of each mobility model on the baseline VKT for the years 2025, 2035 and 2050, the icons in the dashboard indicate the variation caused by each mobility model on the assumed baseline VKT. The table below shows the dashboard icons and their corresponding assessment explanation.

Table A6 – Impact on baseline total VKT icon reference

Icon	Potential mobility model impact on baseline total VKT
	Major increase
	Minor increase
	N/A or no change
	Minor decrease
	Major decrease

Wider impacts across all modes

A summary of the wider impacts for all mobility models across 2020, 2025 and 2030 is available in Appendix C.

Potential contribution of mobility model to achieving transport for the south east principles

The Transport for the South East strategic goals, aligned to the pillars of sustainability are:

- Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace
- Society: Improve health, safety, wellbeing, quality of life and access to opportunities for everyone.
- Environment: Protect and enhance the South East's unique nature and historic environment

Beneath each of the strategic goals there are strategic priorities. This section of the dashboards looks at the varying extent to which the mobility models contribute to the Transport for the South East strategic goals.

The following elements were analysed for each goal:

- Economy
  - Strategic connectivity
  - Reliable journeys
  - Resilient network
  - Integrated land use
  - 'Smart' transport planning
- Society
  - Active lifestyle promotion
  - Improved air quality
  - Social inclusion promotion
  - Seamless & integrated network
- Safe network
  - Environment
  - Net zero by 2050
  - Reduce need to travel
  - Natural, built and historic environments protected
  - Biodiversity net gain
  - Reduce resource & energy consumption

The table below outlines the varying extent to which the mobility models contribute to each element of the Transport for the South East strategic goals as stated in the dashboards.

Table A7 – Extent of mobility model contribution to achieving transport for the south east strategic goals reference

Extent	Potential contribution of mobility model to achieving transport for the south east strategic principles
Maj.	Major contribution
Med.	Medium contribution
Min.	Minor contribution
N/A	Negligible contribution

FULL Mobility Model Dashboards

A full copy of each dashboard can be found in Appendix B.

Appendix B - Future mobility model dashboards

Appendix B – Future mobility model dashboards

Ride-sharing

Modes Impacted In UK:		Journey Range:	***Unlimited***	UK Model Maturity:	4

Definition	*Ride-sharing schemes match private vehicle drivers with potential passengers (often co-workers) making similar regular or one-off long-distance trips.*
Sub-models	*Employee-led ride-sharing, P2P (Peer to Peer) ride-sharing*

Geographical Applicability: 

Existent Mobility Model Analysis

UK Best Practice	**Liftshare** offers a ride-sharing platform to facilitate P2P and employee led ride-sharing across the UK. The platform has over 700,000 members and works with 900 employer clients to provide them with individual car share platforms. Thames Valley Park (TVP), located in Reading, Berkshire, is one such client, who chose to partner with Liftshare to provide a fully integrated platform and marketing support in order to manage demand for car parking spaces. Other clients such as Jaguar Land Rover (who have been partnered since 2015), have seen 10,000 staff members registered on the platform and 5,000 are confirmed to share daily. Designated car sharing parking bays have incentivised ride sharing and promoting monetary savings.
	Faxi gives employers the opportunity to create their own commuter ride-sharing community. The Faxi platform is capable of verifying employee ride sharing in real times which allows companies to offer incentives, such as priority parking to ride sharers. In 2018, Faxi partnered with Gatwick Airport to launch the first airport staff ride-sharing service in the world, offering preferential parking (up to 1 mile closer to the airport than other staff car parks) to incentivise drivers. Other Faxi partnerships, such as with Northampton County Council, have resulted in the proportion of staff ride-sharing increasing from 2% to 20% in the first 6 months after launch.
	BlaBlaCar connects people who need to travel with drivers who have empty seats heading in the same direction or to the same end destination. Users can use the digital platform to offer an empty seat or to look for a journey that suits them. BlaBlaCar is now the world's leading long-distance carpooling platform with 90 million drivers and passengers in 22 countries, more than 200,000 users are on the platform in the UK. BlaBlaCar plans to triple the size of it's UK business in 2020, however this may now have been impacted by COVID-19.
Major Market Failures	**Didi Chuxing** suspended their ride-sharing (P2P) service in China, DiDi Hitch, following a number of sexual misconduct, and murder cases in which drivers were not appropriately vetted and drivers subsequently committed crimes. The service matched private car owners with people who were headed in the same direction so they could split the cost. Regular ride-hailing services offered by Didi were not affected by changes.
Opportunities	Large private car trip generators, such as large employment sites, business parks, industrial parks and retail parks could benefit from similar solutions by reducing the number of commuter vehicles // Employers with local catchments have the opportunity to condense/consolidate employee trips // Users have the opportunity to reduce travel expenses by sharing cost // improved air quality and reduced noise pollution and congestion due to less vehicles on the network
Barriers	User attitudes to sharing vehicles such as perceived safety risks **//** employer backed incentives // flexibility issues // critical mass requirements
Wider Implications	Supports private car use over public transport // requires digital platform with functionality to track users usage and behaviour // potential of high-occupancy vehicle lanes to support dense uptake of initiatives along a certain corridor could be considered // combining ride-sharing with car sharing (i.e. using the asset throughout the day)

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	↓	↔	↔

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace		**Society:** Improve health, safety, wellbeing, quality of life and access to opportunities for everyone		**Environment:** Protect and enhance the South East's unique nature and historic environment	
Strategic connectivity	Min.	**Active lifestyle promotion**	Min.	**Net zero by 2050**	Min.
Reliable journeys	Min.	**Improved air quality**	Med.	**Reduce need to travel**	N/A
Resilient network	Min.	**Social inclusion promotion**	Med.	**Natural, built and historic environments protected**	Min
Integrated land use	Med.	**Seamless & integrated network**	Med.	**Biodiversity net gain**	N/A
'Smart' transport planning	Med.	**Safe network**	Min.	**Reduce resource & energy consumption**	Min.

Ride-sourcing – Sole Use

Modes Impacted In UK:	Journey Range:	<30km	UK Model Maturity:	4

Definition	*Ride-sourcing schemes match customers with available rides using a smartphone app. Users can register their desired trips and pay on account via pre-approved payment methods with prices set according to supply and demand.*
Sub-models	*Single origin & destination point-trip, single origin & multiple destination trip*

Geographical Applicability:

Existent Mobility Model Analysis

UK Best Practice

Uber, which was launched in 2009 in the USA and in the UK in 2012, offers a variety of different ride-hailing services premised around the use of an app based platform that matches private vehicle drivers to riders. Services available in regions of the UK including Brighton & Sussex, the Home Counties and on the South Coast include:

- UberX - Provides a private ride in a standard car for up to four people
- UberXL – Provides a private ride in a larger vehicle that can seat up to six people passengers
- UberAssist – Provides additional assistance from trained drivers for elderly or disabled
- UberExec – Provides premium rides in high-end cars

There are now approximately 14 million Uber trips completed each day in 63 countries and over 700 cities worldwide.

Ola launched in the UK in 2018 across South Wales and the South West of England as the UK's first ride-hailing app for both private hire vehicles and metered taxis. Ola has been expanding rapidly across the UK and is now in London. Founded in India in 2010, Ola now serves more than 2 million drivers, 200+ million customers across 250+ cities and 3 continents as the world's 3rd largest ride-hailing app. Ola uses an app-based platform that matches private vehicle drivers to riders.

Major Market Failures

In November 2019, Transport for London (TfL) announced their decision not to renew Uber's licence to operate in London. Uber initially lost its licence in 2017 but was granted two extensions. TfL said it had identified a "pattern of failures" in London that placed passenger safety at risk. Uber have appealed the decision and are currently operating in London until the outcome of the appeal. The outcome decision may be delayed due to COVID-19.

Opportunities	New operating models **//** area wide approach rather than route approach to planning // planning through partnerships can potentially support and enhance the reach of public transport, particularly for off-peak journeys
Barriers	Dependency upon technology & e-payments // regulatory changes that limit availability & use e.g. protection of established private hire // privacy concerns // equitable access // safety concerns of users // Isolating potential users who cannot use the app platform
Wider Implications	Disruption to established bus networks & taxi operators // risk of failure leads to lack of services // parking & congestion impacts // potential mode shift from public mass transit services to private hire vehicles // focus on car use over passenger transport and active modes

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	↑	↑	↑

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace		**Society:** Improve health, safety, wellbeing, quality of life and access to opportunities for everyone		**Environment:** Protect and enhance the South East's unique nature and historic environment	
Strategic connectivity	Min	**Active lifestyle promotion**	N/A	**Net zero by 2050**	Min.
Reliable journeys	Med	**Improved air quality**	Min.	**Reduce need to travel**	N/A
Resilient network	N/A	**Social inclusion promotion**	Min.	**Natural, built and historic environments protected**	Min
Integrated land use	Min	**Seamless & integrated network**	Med.	**Biodiversity net gain**	N/A
'Smart' transport planning	Min	**Safe network**	Min.	**Reduce resource & energy consumption**	Min.

Ride-sourcing - Shared

Modes Impacted In UK:	Journey Range:	UK Model Maturity:
	<30km	3

Definition	*Ride-sourcing schemes match customers with available rides using a smartphone app. Users can register their desired trips and pay on account via pre-approved payment methods with prices set according to supply and demand. When shared, the app algorithm matches journeys heading in similar directions or with the same origin and/or destination.*
Sub-models	*Multiple origins & multiple destination trips, multiple origins & single destination trips*

Geographical Applicability:

Existent Mobility Model Analysis

UK Best Practice	**UberPool** is a service that matches up to three separate riders in one car based on their destinations. A driver can pick up a user who has stated in their app preferences they are willing to share their journey, and if another Uber user along the journey is heading in a similar direction the driver can pick them up too, Although journeys for users may be longer compared to sole use ride-sharing, the cost is split between the users, making the trip cheaper. UberPool accounts for around 20% of all rides but is heavily subsidised to attract users.
	Arriva Click, which is an on-demand flexible minibus service that takes multiple passengers heading in the same direction, launched in 2017 in Sittingbourne Kent. A survey of Arriva Click customers in 2018 reported that 43% adopted service for their daily commute and 52% of customers switched from private motor transport (inclusive of own car, taxi and passenger in car). The pilot in Sittingbourne ended in November 2019, the service will now operate seven vehicles in Watford, under contract to Watford Borough Council for four years with an option of a two-year extension. Following success of the service in Kent, 25 minibuses are now in operation in South Liverpool with plans to increase as the service gains in popularity with around 1,000 downloads of the app a week.
Major Market Failures	**RATP Slide,** which launched in July 2016 in Bristol as the first micro-transit service in the UK, operated an app-based weekday service allowing commuters on a similar route to share a ride to and from work. Despite the scheme making more than 40,000 passenger trips and being popular with customers (receiving an average rating of 4.9/5 in customer ratings), the service closed in November 2018. Challenging conditions posed by roadworks which impacted journey time reliability and increased competition from two new Metrobus Rapid Transit routes no longer made the service viable.
	In May 2020, it was announced that **Oxford Bus Company** would withdraw the **PickMeUp** DRT service following a 2-year pilot. PickMeUp was launched in June 2018 and since then more than 38,000 people downloaded the app and more than 300,000 journeys were made. However, the service did not reach the commercial milestones required to make it sustainable beyond the two-year pilot. Oxford Bus Company required third party support from local authorities and the business community to make PickMeUp viable as a three-way partnership. Unfortunately, local authority support was not made available and although some businesses were supportive, others did not see it as their responsibility.
Opportunities	New operating models **//** area wide approach rather than route approach to planning // planning through partnerships can potentially support and enhance the reach of public transport, particularly for off-peak journeys // replace non-viable, under-utilised bus services in rural areas // community led in rural areas // connect users to key services not served by fixed route public transport
Barriers	Customer willingness to share vehicles **//** dependency upon technology & e-payments // regulatory changes that limit availability & use e.g. protection of established private hire // privacy concerns // equitable access // Isolating potential users who cannot use the app platform
Wider Implications	Disruption to established bus networks & taxi operators // supporting fixed route public transport operations, particularly in rural locations // risk of failure leads to lack of services if replacing under-utilised bus routes

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	↓	↓	↓

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace		**Society:** Improve health, safety, wellbeing, quality of life and access to opportunities for everyone		**Environment:** Protect and enhance the South East's unique nature and historic environment	
Strategic connectivity	Min	**Active lifestyle promotion**	Min.	**Net zero by 2050**	Med.
Reliable journeys	Med	**Improved air quality**	Med.	**Reduce need to travel**	N/A
Resilient network	N/A	**Social inclusion promotion**	Maj.	**Natural, built and historic environments protected**	Min
Integrated land use	Med.	**Seamless & integrated network**	Maj.	**Biodiversity net gain**	N/A
'Smart' transport planning	Maj.	**Safe network**	Med.	**Reduce resource & energy consumption**	Med.

Mobility Asset Sharing

Modes Impacted In UK:	Journey Range:	UK Model Maturity:
	<50km	3

Definition	*Mobility asset sharing allows customers to access and share use of different mobility modes without having to own them (e.g. car/ bicycle). Assets are generally available at permanent or semi-permanent locations and booked, paid for and located via an app.*
Sub-models	*Round-trip based services, one-way fixed-point services, one-way free-floating services, peer to peer, corporate fleets, dockless bikes/scooters, docked bikes/scooters, flexi-docked bikes/scooters, cargo-bike hire*

Geographical Applicability:

Existent Mobility Model Analysis

UK Best Practice	**Co-Wheels,** is a social enterprise operating the only independently owned national car club across 60 locations in the UK including the Isle of Wight, Eastleigh, Chichester, Horsham, Lewes, Tunbridge Wells, Maidstone, Hastings, Bracknell and Reading in the South East. The service offers members pay-as-you-go access to low-emission cars available to rent in 15 minute increments from 15 minutes up to a day. Each vehicle has its own designated bay which customers pick them up from and drop them back to the same bay at the end of the reservation. Report for Co-Wheels indicates that members are less likely to buy a car in the future and that after joining the club, 40% of members drive less.
	BTN Bikeshare Brighton & Hove, is a bike sharing scheme offering residents and visitors the opportunity to hire a bicycle from as little as 3p per minute or £72 annually for 60 minutes per day and return to any official docking station when their ride is complete. The scheme has 570 bicycles available from 66 hubs around the city, providing turn-up-and-go cycle hire. In the schemes first year 53,591 cyclists made 347,234 trips across the city.
	Bird, an electric scooter-sharing application established in 2017, allows users to unlock an electric scooter with an app, then lock it back up again once the journey is complete. People in turn pay a small fee per minute of use. The service has been launched commercially across the USA and Europe but only a trial is running in the London Olympic Park in the UK. This is because scooter use on pavements and public roads in the UK is currently illegal.
Maj or M arket Failures	**Share Now** is a Daimler and BMW owned car sharing service. It is described as a free-floating service because users can park the vehicle anywhere within the city after use. Users book via an app and the cost is all inclusive of parking, fuel, insurance and vehicle hire. In December 2019 Share Now announced it was halting all North American operations and three European cities, Florence, London and Brussels. Reasons for withdrawing include high costs of operation, lower patronage than expectations, the volatile state of the global mobility landscape and rising infrastructure complexities.
	Ofo is a Chinese dockless bike-sharing firm that allows users to hire bikes and leave them in their desired location using a phone application. However, after launching in the UK, Ofo pulled out of multiple cities including Norwich, Sheffield, Oxford and London due to bankruptcy issues. This was reportedly due to the lack of take-up and vandalism that occurred to the bikes**.**
	Derby electric-bike scheme was introduced in 2018, a partnership between Derby City Council and Hourbike, and saw more than 7,000 riders travel 150,000 miles since the launch. However, the scheme was closed in 2019, citing vandalism as the cause with more than 67% of the e-bikes fleet becoming inactive due to vandalism with the estimated costs or repairs described as significant.
Opportunities	Potential for integration at key transport hubs // models meet specific trip needs (off-peak, leisure, ad-hoc journeys) and therefore reduce the need for ownership of the second/third car // opportunity to define a vision for place and to determine how shared assets should be accessed & used within those spaces // reduced car dependency and reduced private vehicle ownership levels
Barriers	Customer willingness to share assets **//** irresponsible use and customer trust // high operational costs // safety implications // asset maintenance and condition // time-distance pricing can be deemed unattractive // economies of scale // unfamiliarity with concept // redistribution of assets // dependency upon technology & e-payments // post COVID-19 hygiene perceptions // equipment provision (helmets for cycle and scooter users) // Isolating potential users who cannot use the app platform
Wider Implications	Vehicular services support private car usage // requires digital platform with functionality to track usage and behaviour // disruption to pedestrian networks // parking & congestion impacts vary dependent on mode // cost of managing assets & misuse not currently measured and typically left to operators to self-regulate // improved environment and air quality if modal shift to active modes

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	↓	↔	↔

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace		**Society:** Improve health, safety, wellbeing, quality of life and access to opportunities for everyone		**Environment:** Protect and enhance the South East's unique nature and historic environment	
Strategic connectivity	Min.	**Active lifestyle promotion**	Maj.	**Net zero by 2050**	Maj.
Reliable journeys	Min.	**Improved air quality**	Maj.	**Reduce need to travel**	Min.
Resilient network	Min.	**Social inclusion promotion**	Med.	**Natural, built and historic environments protected**	Min.

Integrated land use	Med.	**Seamless & integrated network**	Med.	**Biodiversity net gain**	N/A
'Smart' transport planning	Maj.	**Safe network**	Min.	**Reduce resource & energy consumption**	Med.

MaaS Platforms

Modes Impacted In UK:	Journey Range:	UK Model Maturity:
	***N/A (enabler only)***	2

Definition	*MaaS is the integration of multi-modal public and private sector mobility services, delivered through one or more digital platforms. It incorporates travel information, payments, reservation of demand responsive modes and authentication. MaaS is designed to enable customers to seamlessly access and consume mobility services to undertake end-to-end journeys meeting the individual's quality, cost and time preferences.*
Sub-models	*Monthly subscription models, pay-per ride, journey planning platforms,*

Geographical Applicability:

Existent Mobility Model Analysis

UK Best Practice	**Whim,** which launched in the West Midlands region in April 2018, is a Mobility as a Service operator offering a single access point, via smartphone application, to multiple transport options in Birmingham. This launch followed the service debut in Helsinki in 2016, which as of October 2018 had 60,000 active users per month, with users booking 1.8 million trips. Whim in Birmingham offers a pay as you go service, 'Whim to Go' which is free to sign up, and offers pay-per-ride access to public transport, taxi and car hire. Other all-inclusive services are planned to be rolled out soon but timescales may have been impacted by COVID-19. Whim in the West Midlands is partnered with National Express, West Midlands Combined Authority, Gett, Enterprise car rental and Sixt.
	NaviGoGo, is Scotland's first MaaS pilot which ran with 98 young people in Dundee and North East Fife from October 2017 to March 2018. Pilot participants were given access to streamlined and personalised information and payment (where available) for trains, taxis, bike schemes, buses, car clubs and walking via a WebApp. During the trial the NaviGoGo service was used to plan over 2,000 journeys with more than £3,500 spent through the platform.
Major Market Failures	Transport for the North (TfN) had plans to deliver contactless pay-as-you-go travel integrating rail, bus and other modes. However, bus operators declined to sign up so TfN are now focussing on implementing contactless pay-as-you-go travel on rail with the potential to be integrated with bus and other modes at a future date.
Opportunities	New operating models **//** multi-modal approach to journey planning // integrates public and private transport services // discourages private car use // reduced parking & congestion impacts // biggest commercial market is the 'flexi traveller' not those who are daily dependent on their car or well suited by the current public transport offering (shown in numerous trials) // support mobility hubs with multiple transport offerings for journeys // increased accessibility of users to multiple transport options including multi-modal journeys // offers rural locations greater accessibility to transport options and therefore less reliant on infrequent public transport
Barriers	Dependency upon technology & e-payments // requires public/private transport provider buy in and coordination // requires large scale sharing of data // requires the resolution of technical, regulatory and business-model issues across a full range of transport modes and services // accessing multiple private/public operators' data onto a common platform // platform ownership & accountability // Isolating potential users who cannot use the app platform // unwillingness of operators to share data // lack of operator buy in to partner
Wider Implications	Disruption to established bus and rail networks // risk of failure leads to lack of services // parking & congestion impacts // impacts for ongoing ticketing programmes such as SmartCards which could potentially be leapfrogged by MaaS type solutions rendering investments obsolete // potential to influence travel behaviour through information and pricing to help deliver strategic objectives // reduced private vehicle ownership due to less car dependence // improved local area due to mobility hub area improvements // improved accessibility to key services for rural locations

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	↑	↑	↔

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace		**Society:** Improve health, safety, wellbeing, quality of life and access to opportunities for everyone		**Environment:** Protect and enhance the South East's unique nature and historic environment	
Strategic connectivity	Min.	**Active lifestyle promotion**	Maj.	**Net zero by 2050**	Med.
Reliable journeys	Med.	**Improved air quality**	Maj.	**Reduce need to travel**	Min.
Resilient network	Min.	**Social inclusion promotion**	Med.	**Natural, built and historic environments protected**	Min.
Integrated land use	Med.	**Seamless & integrated network**	Maj.	**Biodiversity net gain**	N/A
'Smart' transport planning	Maj.	**Safe network**	Min.	**Reduce resource & energy consumption**	Med.

Parking and Kerb Space Management Platforms

Modes Impacted In UK:	Journey Range:	N/A	UK Model Maturity:	3

Definition	*Parking and kerb space management platforms provide consumers with information and app-based payment functions to reduce the traditional problems associated with finding and paying for parking.*
Sub-models	*Platform-based parking services*

Geographical Applicability:

Existent Mobility Model Analysis

UK Best Practice	**AppyWay** was founded in London in 2013 and provides parking apps and services for drivers. Its products involve software that shows on-street and off-street parking (including disabled, electric and motorcycle bays) as well as yellow line and loading rules in major cities in the UK. Additionally, products include digital kerbside maps, cashless parking applications and real-time analytics to monitor on-street and car park occupancy. AppyWay have partnered with Visa on "One Click Parking" which enables drivers to start and pay for sessions that will automatically end when they drive away, with just a single click of the app. In 2019, AppyWay has been deployed in Harrogate, Halifax and Portsmouth.
	JustPark was founded in 2006 and enables drivers to find, reserve and pay for available parking spaces. The app boasts over 45,000 reservable parking locations and 2.5 million registered drivers. Additionally, the service (primarily WebApp) enables space owners to rent out their parking spaces (e.g. driveways) to make profits. The service also offers parking management solutions to help companies with under-utilised car parks. This involves real time reporting on car park performance, online payment platforms and targeted promotion. During the COVID-19 pandemic, NHS workers could book 13,000 of the spaces free of charge.
	RingGo is the largest mobile phone parking payment company in the UK, offered in more than 400 towns and cities nationwide. Many car parks throughout the country have chosen to use its system to enable drivers to pay for their parking without coins. The app enables you to check space availability in real time using the colour-coded map, navigate to a chosen car park within the app and pay for a parking session in advance. If users need to stay later than anticipated, they can extend a session or set up helpful reminders to let them know when they are running out of time.
Major Market Failures	**No significant market failures to report**
Opportunities	Subject to legislation can enable dynamic usage of kerbside and dynamic pricing // potential to adapt for future technologies (AVs) // potential to significantly reduce parking enforcement costs // customer satisfaction improvement as only pay for the time they require parking // potential for improved user experience and congestion benefits through reductions in vehicles circulating the find parking spaces // dynamic kerbside parking can allow for improved efficiencies for freight deliveries // priority kerb space for EVs
Barriers	Dependency upon technology & e-payments // requires potentially private data to be made available // requires large scale sharing of data // will need constant monitoring to keep up to date // if dynamic and kerbside allocation changes, those without access to technology, such as app, may not realise
Wider Implications	Services support private car usage // requires large sensor network to track bay usage and behaviour // requires digital platform for ticketing and bay location // remove parking for certain times of day to open up space to cycle users or pedestrians // use kerb space for other activities, such as leisure, when not used for parking.

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	⟷	⟷	⟷

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace		**Society:** Improve health, safety, wellbeing, quality of life and access to opportunities for everyone		**Environment:** Protect and enhance the South East's unique nature and historic environment	
Strategic connectivity	N/A	**Active lifestyle promotion**	N/A	**Net zero by 2050**	Min.
Reliable journeys	Med.	**Improved air quality**	N/A	**Reduce need to travel**	N/A
Resilient network	Min.	**Social inclusion promotion**	N/A	**Natural, built and historic environments protected**	Min.
Integrated land use	Med.	**Seamless & integrated network**	Med.	**Biodiversity net gain**	N/A
'Smart' transport planning	Maj.	**Safe network**	Min.	**Reduce resource & energy consumption**	Min.

Digital as a Mode

Modes Impacted In UK:	All modes	Journey Range:	*Unlimited*	UK Model Maturity:	4

Definition	*The use of digital connectivity to reduce / remove the need to travel can be referred to as 'digital as a mode'. Digital access to work, education and healthcare provides for similar opportunities without physical movement.*
Sub-models	*Work, Education and Health based services*

Geographical Applicability:

Existent Mobility Model Analysis

UK Best Practice	The **Open University** was established in April 1969 and enables flexible, distance teaching in the UK and in 157 countries worldwide. The university has seen over 2 million students receive an education which they may have otherwise been denied at campus-based universities. The Open Universities distance learning works using online study materials such as online tutorial rooms, online forums and recorded lectures and broadcasts. Additionally, the University has an online library and provides each student with a tutor who can provide advice and guidance.
	Babylon Health is the UK's leading digital health provider. It aims to make healthcare more accessible and affordable by using digital and online platforms to connect healthcare professionals to their patients. This can be through video and audio chats and can involve sharing photos and materials to aid consultations. Additionally, doctors can send prescriptions to their customers desired pharmacy so that they can be easily collected. Babylon also offers an online "Healthcheck" service which includes answering lifestyle and family history questions to create personalised health reports and to get practical insights to stay healthy. The service also enables users to build a "Digital Twin" so that they can get a better insight to their body and its functions.
	To remain competitive and responsive, **BT** has adapted the way it manages people and the way they work. The company has what it believes is one of the largest flexible working projects in Europe called 'BT Workstyle'. Flexible working is available to almost everyone and the company now has more than 70,000 flexible workers.
	Fiit is a fitness app where users can access on-demand fitness classes led by high profile fitness experts all from a mobile device that either streams to a TV or can be used on the move while out and about. The app offers fitness classes (strength, cardio and rebalance e.g. yoga) and contact with personal trainers, amongst other services, digitally through the app platform. The fitness app comes with a heart-strap wearable tracker and fitness mat so it can track participant progress as they complete a workout, gamifying exercise by integrating stats on screen, offering "fitness points" depending on effort levels, giving personal best goals to beat and the ability to compete against friends around the world with a live leader board.
Major Market Failures	**No significant market failures to report**
Opportunities	New operating models **//** area wide approach rather than route approach to planning // planning through partnerships can potentially support and enhance the reach of public transport, particularly for off-peak journeys
Barriers	Dependency upon technology implementation and responsible use // regulatory changes that limit availability & use // privacy concerns // equitable access // Attitudes, traditional ways of working may be preferred to some
Wider Implications	Disruption to established bus networks & taxi operators // increasingly flexible work patterns potentially reduce likelihood of dependable shared services // parking & congestion impacts // increasing focus on digitised services potentially reduced non-digital service provision // mental health risks due to less interaction with peers, colleagues and face-to-face services // Isolating potential users who cannot use the app platform // reduced physical health if people are walking and cycling less to access services

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	↓	↓	↓

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy: Improve productivity and attract investment to grow our economy and better compete in the global marketplace		**Society:** Improve health, safety, wellbeing, quality of life and access to opportunities for everyone		**Environment:** Protect and enhance the South East's unique nature and historic environment	
Strategic connectivity	N/A	**Active lifestyle promotion**	N/A	**Net zero by 2050**	Med.
Reliable journeys	Med.	**Improved air quality**	Med.	**Reduce need to travel**	Maj.
Resilient network	Maj.	**Social inclusion promotion**	Min.	**Natural, built and historic environments protected**	Med.
Integrated land use	Med.	**Seamless & integrated network**	N/A	**Biodiversity net gain**	N/A
'Smart' transport planning	Maj.	**Safe network**	N/A	**Reduce resource & energy consumption**	Med.

Operator-focussed Freight Models

Modes Impacted In UK:	Journey Range:	N/A	UK Model Maturity:	2

Definition	*Operator-focussed freight models (i.e. accessed online, in-vehicle or through mobile devices) offer customers easier access to real-time and price transparent freight services. In turn, data-driven models improve supply chain visibility and asset utilisation for operators through the likes of integrated fleet management systems.*
Sub-models	*Fleet management systems, transport management systems, tender platforms, digital marketplaces (shipper to carrier & carrier to carrier)*

Geographical Applicability:

Existent Mobility Model Analysis

UK Best Practice	**Uship** is an open marketplace running in the UK than connects customers with customer-reviewed service providers and couriers who have extra trunk space, specialising in transporting large/bulky items e.g. vehicles, pianos, and animals. The platform does not offer automated matching of supply and demand but allows customers to choose from a variety of different offers and book accordingly. Transportation service providers in turn place competing bids for the right to haul a customer's shipment on Uship. For some categories, customers can select an upfront quote for transport services or enter an acceptable price to be matched with a transporter. Customers can book a shipment immediately from these quotes or opt to wait for auction bids. 3.5million UK customers have used Uship to connect with 788,000 transporters and ship 5.7million listings.
	Quiqup is a crowd shipping platform that was founded in 2014 and provides on-demand delivery services through a network of self-employed drivers in London & Dubai through an online platform. The Quiqup browser dashboard allows users to easily book and manage their deliveries, with access to a courier in minutes and enabling them to track the progress of live orders and schedule deliveries in advance. The platform is free to use with no obligatory subscriptions.
	Freightos is an online freight marketplace that uses a Software as a service (SaaS) model to help leading logistics automate their internal freight management, pricing/routing and business intelligence. Freightos aims to make global shipping faster, more cost-effective and smoother. Using a marketplace model, Freightos consolidates multiple logistics providers that compete for business.
	Haulage Exchange is the UK's Leading Haulage Platform for Haulage Solutions which uses a platform where users can access real-time freight exchange information. Users include a network of over 7,000 owner drivers, haulage companies and forwarders delivering over 170,000 loads each month. How H. Nickolls and Son Ltd in Stafford uses Haulage Exchange's platform to consolidate their large freight fleet integrated telematics providers.
	Returnloads.net claims to be the leading UK haulage exchange and freight exchange website powered by one of the world's most advanced computerised load matching systems. The Returnloads.net freight exchange platform is not only open to haulage companies and couriers but also to freight forwarders, manufacturers and commercial businesses who are looking for transport companies to deliver their goods. This means haulage companies and couriers can find back loads or return loads along with haulage contracts, regular haulage work and outgoing delivery work. Over 100,000 loads per month are scheduled through Returnloads.net.
Major Market Failures	**Freight Share Lab** was a collaborative research project focused on tackling the transport inefficiencies associated with empty and partially laden truck-running. The platform integrated freight systems and included a web portal, mobile app, user database, algorithm, messaging and internal interfaces for each component. The Freight Share Lab investigated how co-mobility solutions could reduce the number of empty fleet vehicles in use and improve supply chain management.
Opportunities	Enhanced supply chain visibility // efficiency and utilisation improvements // less administrative burden // optimised choice of transport services // improved sustainability // updates customer interfaces
Barriers	Non-interoperable standards // lack of interconnected systems // process digitalisation and re-engineering // data ownership // trust issues // data confidentiality and protection // requirement for change in organisation and behaviour // economies of scale // perceived costs of changing operations from suppliers/operators
Wider Implications	Congestion impacts through better utilisation of vehicles // incumbents must respond to digital challengers or risk being left behind // potential industry consolidation around major players & platforms // positive environmental implications if better utilised freight vehicles with less half-full vehicles

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	↔	↓	↓

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy:	Society:	Environment:
	Improve health, safety, wellbeing, quality of life and access to opportunities for everyone	Protect and enhance the South East's unique nature and historic environment

Improve productivity and attract investment to grow our economy and better compete in the global marketplace					
Strategic connectivity	Med.	**Active lifestyle promotion**	Min.	**Net zero by 2050**	Med.
Reliable journeys	Min.	**Improved air quality**	Med.	**Reduce need to travel**	Min.
Resilient network	N/A	**Social inclusion promotion**	N/A	**Natural, built and historic environments protected**	N/A
Integrated land use	Min.	**Seamless & integrated network**	Med.	**Biodiversity net gain**	N/A
'Smart' transport planning	Med.	**Safe network**	N/A	**Reduce resource & energy consumption**	Min.

Consumer-focussed Freight Models

Modes Impacted In UK:		Journey Range:	<10km	UK Model Maturity:	2

Definition	*Consumer-focussed freight services using increasing amounts of data and automated technologies to provide customers with a wider selection of flexible last-mile delivery and collection options.*
Sub-models	*Digitally enabled last mile delivery*

Geographical Applicability: 

Existent Mobility Model Analysis

UK Best Practice

	Starship Technologies operate a robot delivery service that is available to users through an app. Users are able to control where and when their packages arrive, with deliveries which are then delivered straight to the customers front door. The robot's journey can also be tracked using real-time technology through the app. The delivery service launched in Milton Keynes in October 2018. The Co-op have been using Starship autonomous robot deliveries in Milton Keynes to deliver groceries from local stores to customers' homes. Between April 2018 and June 2019 the robots had made over 15,000 deliveries in Milton Keynes. Starship robots cover a number of estates in Milton Keynes including Broughton, Middleton, Monkston, Kents Hill, Walnut Tree, Furzton, Shenley Brook End, Shenley Lodge, Furzton, Emerson Valley, Tattenhoe and the City Centre.
	InPost provides a UK network of nearly 1,200 fully automated parcel lockers that are accessible 24/7 which can temporarily store goods for customers to pick up at a later time. Expansion plans will see an increase to 6,000 locker locations in the UK within a few years. All lockers are located in safe and secure locations e.g. Transport for London sites, Esso petrol stations and Morrisons supermarkets and enable Customers can collect, send and return parcels to the lockers. InPost aims to change customers' shopping behaviour and create greener communities through more sustainable and convenient delivery.
	We Deliver is part of the Volkswagen We range of digital services which allows users to register their parked Volkswagen as a delivery location for a parcel or service with a courier or service partner being granted one-off access to the boot of the vehicle. Volkswagen has partnered with Hermes in Milton Keynes where they are trialling car boot deliveries. Customers piloting the scheme will have the option to have their parcel delivered to their car. The courier is given a single-use, time-specific digital access to open the car which can only be used by them, and GPS co-ordinates for the car are sent to the courier to carry out the delivery.
	Pedals is a cargo bike delivery service operating in London that offers same hour delivery deliveries to businesses and consumers from retailers, food and drinks providers and more. The delivery can cost as little as £2 and deliveries can be consolidated.
	Urban Relay is a parcel management system that uses delivery lockers. Delivery drivers deposit parcels into the lockers and then the users are instantly notified via a cloud-based portal which provides a single use code for parcel retrieval.
	Bringme offers delivery lockers to offices, residential buildings, hospitals, schools and retail stores. There are now over 1,000 bring me lockers. For residencies, a smart door bell can be integrated which gives the courier delivery instructions for the box, the box acts as a virtual concierge and the box can sign for parcels on a residents behalf.
	Zedify offers scheduled first & last mile deliveries for businesses using a network of city logistics operators including cargo bikes and electric vans. The service is underpinned by a technology platform that addresses the specific demands of providing predominantly cargo bike-based city logistics. Routes are optimised daily meaning deliveries are made as quickly and efficiently as possible. Barcode scanning enables consistency with other systems in the supply chain. Digital proof of delivery capture provides end-to-end tracking and client login means deliveries can be booked and tracked and reports accessed directly.
	The Load Star is trialling the delivery of urgent medical cargo, such as COVID-19 test kits and Personal Protective Equipment (PPE), between remote medical facilities by delivery drone. Skyports will conduct the trial and operate the flights using delivery drones supplied by unmanned aircraft-maker Wingcopter. This service will see delivery times of the 16km journey cut from up to 6 hours one-way by ground transport and ferry to around 15 minutes, on-demand, by drone.
Major Market Failures	**Waitrose** 'While You're Away' was a trial occurring in South London, where during the first phase, the company initially fitted 'smart door locks' on 50 customers homes located within the vicinity of its dotcom fulfilment centre in Coulsdon, south London. The locks give drivers temporary access to customers' homes to unpack groceries while they are out for "in-fridge delivery". Phase 2 extended the service with a 200% increase in the number of participants. However, While You're Away was run as a trial service, which was brought to a close due to COVID-19.
Opportunities	Opportunity to reduce last mile delivery costs // increased flexibility for customer
Barriers	Trust issues // requirement for change in organisation and behaviour // physical obstacles regulation (e.g. preventing delivery droids from operating on some pavements)// public acceptance // regulations // vandalism and theft
Wider Implications	Congestion impacts // land use planning // reduced vehicles on network if using robots/droids // less missed deliveries if consumers can track parcel // increased smaller deliveries

Potential Future Mobility Model Impacts Analysis

Impact on Baseline Total VKT (Vehicle Kilometres Travelled)	*Short term to 2025*	*Medium term to 2035*	*Long term to 2050*
	⟷	⟷	⟷

Potential Contribution of Mobility Model to achieving TfSE Strategic Principles

Economy:	Society:	Environment:
Improve productivity and attract investment to grow our economy and better compete in the global marketplace	Improve health, safety, wellbeing, quality of life and access to opportunities for everyone	Protect and enhance the South East's unique nature and historic environment

Strategic connectivity	Min.	**Active lifestyle promotion**	N/A	**Net zero by 2050**	Min.
Reliable journeys	Min.	**Improved air quality**	Min.	**Reduce need to travel**	Min.
Resilient network	Min.	**Social inclusion promotion**	Min.	**Natural, built and historic environments protected**	Min.
Integrated land use	Min,	**Seamless & integrated network**	Med.	**Biodiversity net gain**	N/A
'Smart' transport planning	Med.	**Safe network**	N/A	**Reduce resource & energy consumption**	Min.

Appendix C - Dashboards - impact on baseline VKT

Appendix C – Dashboards – impact on baseline VKT

Model	Short term to 2025	Medium term to 2035	Long term to 2050
Ride sharing (e.g. Liftshare, Faxi)	Direct substitute for single-car occupancy journeys thereby reducing VKT but small proportion of trips Insignificant mode shift from long-distance bus, rail (slight increases in VKT)	Some users drawn to public transport & ride-sourcing enabled by MaaS instead Public willingness to share growing but overall level ultimately stifling sector growth. Countered to some extent by high cost of technology (price sensitive consumers potentially need to ride-share to overcome high cost of private CAV and ULEV vehicles) Automation and electrification are adopted quicker by fleet operators and provide attractive mobility options	Becomes a more redundant model as private car ownership reduces Automation and electrification are adopted quicker by fleet operators and provide attractive mobility options Users revert to public transport & ride-sourcing enabled by MaaS and encouraged by MaaS integration with societal goals
Ride-sourcing – sole user (Uber, Ola. Gett)	Continued private sector disruption. Some use as direct substitute for private car/hire services Mode shift from mass transit services thereby increasing VKT Geographical extent of service offering increased, offering point-to-point transport to more people, producing more trips (increasing VKT)	Preliminary fleet introduction of L4/5 CAVs by operators leads to increased utilisation (increase VKT) Mainstream MaaS introduction adds VKT as easier access to ride sourcing. Regulations & mechanisms put in place to start nudging trips towards shared and active modes making sole use vehicle trips less desirable (reduced VKT) Ride sourcing services incur empty miles searching for/attending reservations (increase VKT) Convergence of ride sourcing and car sharing models with the preliminary penetration of L4/5 CAVs in private hire/car sharing fleets.	Large scale fleet penetration of L4/5 CAVs by operators leads to increased utilisation (increase VKT) Convergence of ride sourcing and car sharing models with the preliminary penetration of L4/5 CAVs in private hire/car sharing fleets. Mainstream MaaS introduction adds VKT as easier access to ride sourcing. Regulations & mechanisms put in place to start nudging trips towards shared and active modes making sole use vehicle trips less desirable (reduced VKT) Ride sourcing services incur empty miles searching for/attending reservations (increase VKT) Pooling may prevail in dense urban areas over single occupancy trips
Ride-sourcing – shared (e.g. ArrivaClick, Via, Zeelo, etc.)	Some use as direct substitute for private car/hire services Mode shift from traditional mass transit services (e.g. bus) for first/last miles trips and events. Geographical extent of service offering increased but mainly still in dense urban centres, offering point-to-point transport to more people. Preliminary fleet introduction of L4/5 CAVs into controlled environments by operators leads to increased utilisation (increase VKT) PRICE	Further fleet introduction of L4/5 CAVs by operators leads to increased utilisation (increase VKT) Mainstream MaaS introduction adds VKT as easier access to ride sourcing. Direct substitute for private car/hire services (reduces VKT) Mode shift from traditional mass transit services (e.g. bus) for first/last miles trips and events. Geographical extent of service offering increased to peri-urban and some rural areas, offering point-to-point transport to more people. Regulations & mechanisms put in place to start nudging trips towards shared and active modes	Large scale fleet penetration L4/5 CAVs by operators leads to increased utilisation and reduced sole occupancy private vehicle VKT Mainstream MaaS introduction adds VKT as easier access to shared ride sourcing and integrate in journey planning process Regulations & mechanisms put in place to start nudging trips towards shared and active modes making pooled rise-sourcing trips more desirable e.g. mobility credits Direct substitute for private car/hire services (reduces VKT)

				making pooled rise-sourcing trips more desirable e.g. mobility credits		Mode shift from traditional mass transit services (e.g. bus) for first/last miles trips and events. Geographical extent of service offering increased to peri-urban and some rural areas, offering point-to-point transport to more people. Publicly funded schemes replace traditional static bus routes in some areas
Mobility asset sharing (car clubs, bike share, e-scooters)	↓	With preliminary introduction of L4/5 CAVs by operators in ride-sourcing fleets in controlled environments, car-sharing and ride-sourcing models start to converge as they essentially offer the same service (accounted for in ride-sourcing VKT). Underlying lack of will from the public to share assets undermines sharing to some extent Any reduction in VKT from micro-mobility asset sharing negated by redistribution services Car sharing only significant impact in urban/suburban areas where parking is at a premium & there is a critical mass Not all car club users previously used private vehicles (small increase in VKT)	↔	Further introduction of L4/5 CAVs by operators in ride-sourcing fleets, car-sharing and ride-sourcing models converge as they essentially offer the same service (accounted for in ride-sourcing VKT). Increasing will of the public to share assets promotes sharing of other assets (e.g. peer to peer car sharing) Asset sharing increasingly integrated in wider planning of mobility hubs	↔	Large scale fleet penetration L4/5 CAVs by operators in ride-sourcing fleets, car-sharing and ride-sourcing models converge as they essentially offer the same service (accounted for in ride-sourcing VKT). Increasing will of the public to share assets promotes sharing of other assets (e.g. peer to peer car sharing Any reduction in VKT from micro-mobility asset sharing negated by redistribution services Asset sharing increasingly integrated in wider planning of mobility hubs
MaaS platforms	↑	Integration of booking and payments becoming more commonplace in urban and peri-urban areas. MaaS enables easier access to ride-sourcing and asset sharing options in locations it is operational (VKT increases) MaaS unlocks public transport services in certain areas, some customers assumed to use ride-sourcing services to reach public transport (VKT increases) Origin-destination data allows for enhanced planning and deployment of transport services in line with demand to combat surge in single occupancy ride-sourcing (reduces VKT)	↑	MaaS service offer expands to integrate the service offer in bundling/subscriptions, contracts etc. which encourages use of shared and active transport (reduces VKT) however could also stimulate more person trips. MaaS enables easier access to ride-sourcing and asset sharing options in locations it is operational (VKT increases) MaaS unlocks public transport services in certain areas, some customers assumed to use ride-sourcing services to reach public transport (VKT increases) Origin-destination data allows for enhanced planning and deployment of transport services in line with demand to combat surge in single occupancy ride-sourcing (reduces VKT)	↔	MaaS service offer expands to integrate societal goals through policies and incentives e.g. mobility credits which encourages further use of shared and active transport (reduces VKT) whilst also promoting combined function trips e.g. school run with parcel pick up MaaS enables easier access to ride-sourcing and asset sharing options in locations it is operational (VKT increases) MaaS unlocks public transport services in certain areas, some customers assumed to use ride-sourcing services to reach public transport (VKT increases) Origin-destination data allows for enhanced planning and deployment of transport services in line with demand to combat surge in single occupancy ride-sourcing (reduces VKT)
Parking and kerb space management platforms	↔	Platforms gradually integrated into private, shared and logistics journey planning, preventing excess vehicle circulation from searching for a parking space (rather than simply being used a payment platform). Thus causing slight reduction in VKT. Platforms enable parking spaces to be used more efficiently and therefore facilitating reduction in	↔	Platforms gradually integrated into private, shared and logistics journey planning, preventing excess vehicle circulation from searching for a parking space (rather than simply being used a payment platform). Thus causing slight reduction in VKT. Platforms enable parking spaces to be used more efficiently and therefore facilitating a reduction in	↔	Platforms gradually integrated into private, shared and logistics journey planning, preventing excess vehicle circulation from searching for a parking/drop-off space (rather than simply being used a payment platform). Thus causing slight reduction in VKT.

		space given over for parking or enabling more trips (negating any reductions in VKT)		space given over for parking or enabling more trips (negating any reductions in VKT)	Platforms integrated with L4/5 vehicle fleets to enable parking spaces to be used more efficiently, facilitating a reduction in space given over for parking or enabling more trips (negating any reductions in VKT)
Digital as a mode	↓	Workplace, education, leisure and healthcare culture changes only adopted by certain proportions of the population and geographies. Infrastructure a limiting factor Reduction in trips for some purposes may be replaced by other journeys taking advantage of time released (e.g. from the commute)	↓	Increasing proportion of population digitally literate and can maximise opportunities Cost of digital communications technology falls Reduction in trips for some purposes may be replaced by other journeys taking advantage of time released (e.g. from the commute)	↓	Increasing proportion of population digitally literate and can maximise opportunities Cost of digital communications technology falls Reduction in trips for some purposes may be replaced by other journeys taking advantage of time released (e.g. from the commute)
Operator-focussed freight models	↔	Business models still in their infancy Open market means innovation is rife but no regulation prevents widescale adoption and transparency Accelerated by low emission initiatives in urban areas (scheme specific) impacting freight resulting in small reductions in VKT Unwillingness to share data prevents widescale adoption	↓	Business models increasingly established Accelerated by low emission, efficiency and consolidation initiatives in urban and peri-urban areas (scheme specific) impacting freight resulting in small reductions in VKT Government data sharing oversight increases willingness to share data and promotes widescale adoption	↓	Business models increasingly established Accelerated by low emission, efficiency and consolidation initiatives in urban and peri-urban areas (scheme specific) impacting freight resulting in small reductions in VKT Government data sharing oversight increases willingness to share data and promotes widescale adoption
Consumer-focussed freight models	↔	Business models still in their infancy Technology costs are high and not widely implemented Pavement devices only applicable in urban/semi-urban places and have a negligible impact on VKT as only capture a small margin of deliveries. Drone use for remote rural areas and time critical deliveries e.g. blood samples (negligible impact on VKT) Last-mile delivery solutions increasingly integrated in wider planning of mobility hubs (e.g. parcel lockers) Lockers, in-boot and in-house deliveries prevent multiple delivery attempts and consolidate deliveries into one (although negligible impact on VKT)	↔	Business models become more established Technology costs are high and not widely implemented Pavement devices only applicable in urban/semi-urban places and have a negligible impact on VKT as only capture a small margin of deliveries. Drone use for remote rural areas and time critical deliveries e.g. blood samples (negligible impact on VKT) Last-mile delivery solutions increasingly integrated in wider planning of mobility hubs (e.g. parcel lockers) Lockers, in-boot and in-house deliveries prevent multiple delivery attempts and consolidate deliveries into one (although negligible impact on VKT)	↔	Business models become more established Pavement devices only applicable in urban/semi-urban places and have a negligible impact on VKT as only capture a small margin of deliveries. Drone use for remote rural areas and time critical deliveries e.g. blood samples (negligible impact on VKT) Lockers, in-boot and in-house deliveries prevent multiple delivery attempts and consolidate deliveries into one (although negligible impact on VKT) but potentially become less desirable due to opportunity for L4/5 autonomous vehicles to carry out direct deliveries. Last-mile delivery solutions increasingly integrated in wider planning of mobility hubs (e.g. parcel lockers)

Appendix D - Trends data sources

Appendix D – Trends data sources

Chatterjee, K. (2018). *Young People's Travel, What's Changed and Why.*

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Appendix E - Future transport for the south east population segments: pen portraits

Appendix E - Future transport for the south east population segments: pen portraits

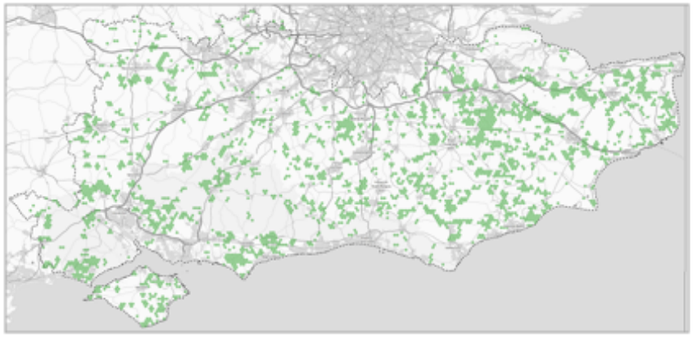
0.29m South East Region residents

Village Life

4% of the South East Region population in 2035

The population of this segment live in areas that are less densely populated, typically in a village or small town. They tend to be older and well educated and to live in detached properties which they own, though an above average proportion live in retirement homes. Each household is likely to have multiple motor vehicles, and these will be the most common method of transport to their places of work.

Locations within the South East Region **typical properties**



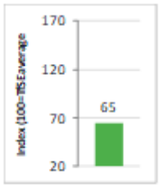
Use of main modes and new mobility models relative to the TfSE average

Bus	Rail	Cycle	Walk	Car driver
well below average	well below average	below average	average	well above average

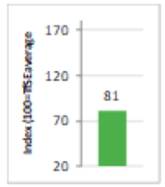
Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
well below average	well below average	below average	well below average	below average	well below average	well above average	above average

Attitudes and behaviour

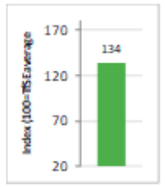
Are your travel choices influenced by your concern over climate change? **(% strongly agree)**



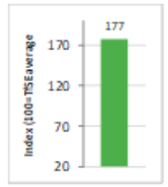
People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**



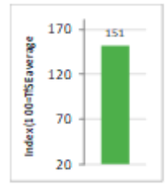
Undertake main weekly grocery shop online



Work mainly from home



Work flexible hours



0.77m South East Region residents

Central Connectivity

9% of the South East Region population

The majority of people in the Central Connectivity segment live in relatively densely populated urban areas and by 2035 will be very unlikely to own a car but are likely to have an MaaS subscription which satisfied their motorised travel needs. They include an above average proportion of young adults without children.

Locations within the South East Region **typical properties**

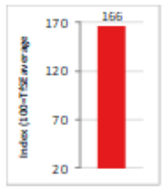
Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
well above average	well above average	well above average	above average	well below average

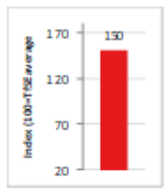
Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
average	well above average	well above average	well above average	well above average	below average	above average	well above average

Attitudes and behaviour

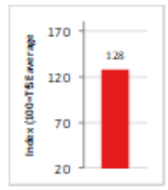
Are your travel choices influenced by your concern over climate change? **(% strongly agree)**



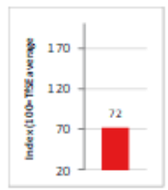
People should be allowed to use their cars as much as they like even if it damages the environment **(% strongly disagree)**



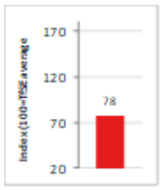
Undertake main weekly grocery shop online



Work mainly from home



Work flexible hours



Family Terraces

0.5m South East Region residents

6% of the South East Region population

This segment typically live on the edge of a town centre, in the transitional areas between the core and the suburbs, There is an above average proportion of families with pre-school or school age children. Typically there will be two working adults in the household, with one tending to either work from home or work locally, the other using public transport if available, or otherwise using an EV.

Locations within the South East Region

typical properties

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
well above average	well above average	well above average	average	below average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
average	average	below average	average	above average	average	above average	average

Attitudes and behaviour

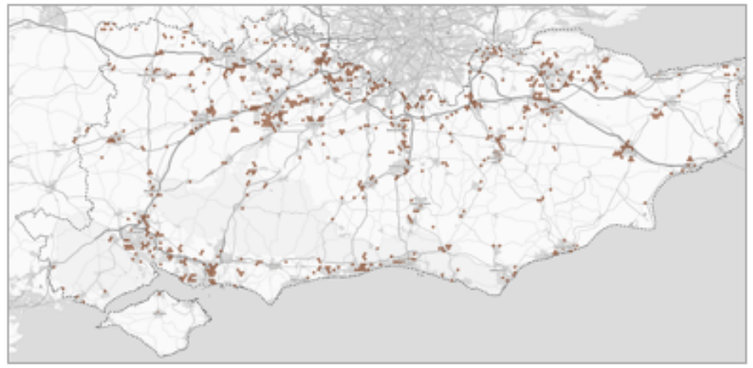
Service sector workers

0.96m South East Region residents

12% of the South East Region population

The Service Sector Workers segment tend to live in urban areas and work in the information and communication, financial, public administration and education related sectors. There is an above average likelihood of there being children in the household.

Locations within the South East Region



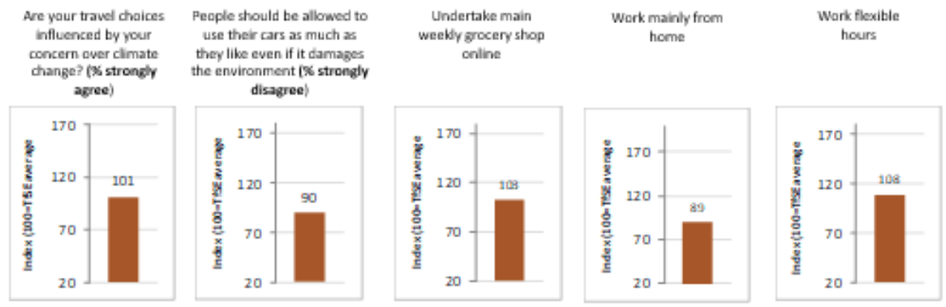
typical properties

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
above average	above average	average	above average	above average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
average	average	average	well above average	well above average	above average	average	above average

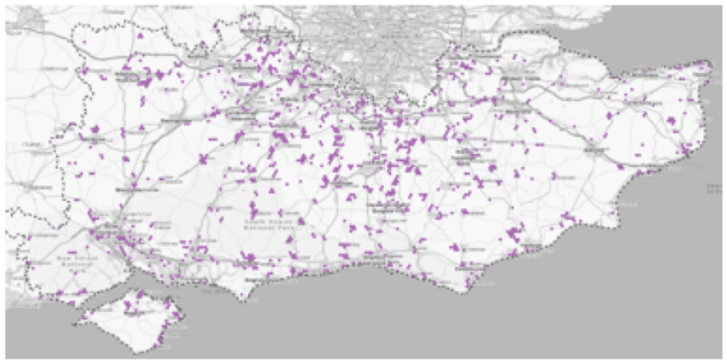
Attitudes and behaviour



1.17m South East Region residents — Comfortable Self-sufficiency — 14% of the South East Region population

Those in the Comfortable Self-sufficiency segment are typically approaching retirement age or already retired. They tend to live in a detached property or flat and are quite likely to have paid off their mortgage and have no dependent children, so while they may have a modest income are still quite likely to have both time and money.

Locations within the South East Region



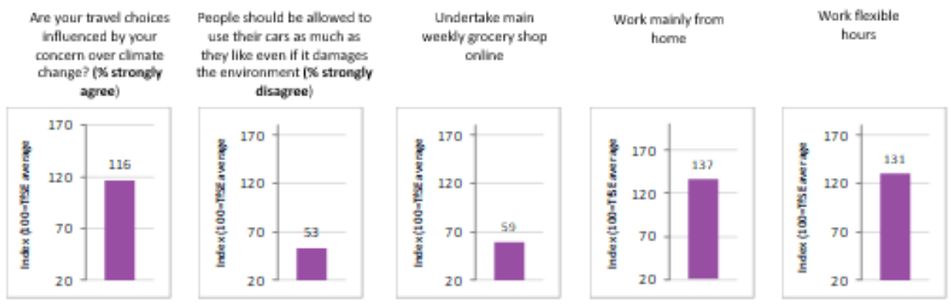
typical properties

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
well below average	below average	below average	above average	well above average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
well below average	below average	below average	below average	below average	above average	below average	below average

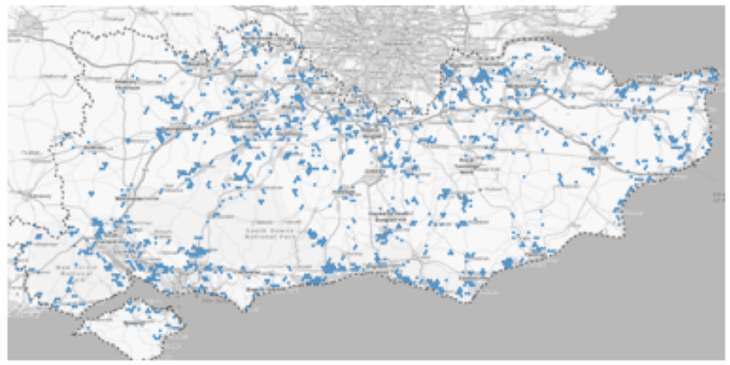
Attitudes and behaviour



1.71m South East Region residents — Semi Detached Suburbia — 21% of the South East Region population

People living in areas of Semi Detached Suburbia will typically have older children living independently and have at least one car in the household. It also includes some approaching retirement and recently retired people typically living in semi-detached properties.

Locations within the South East Region



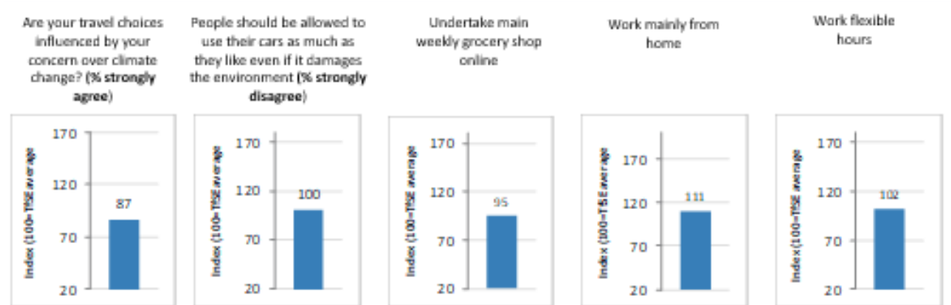
typical properties

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
well below average	below average	below average	average	well above average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
below average	below average	below average	average	below average	above average	average	average

Attitudes and behaviour



0.69m South East Region residents

Traditional towns

8% of the South East Region population

Households in this segment are more likely than average to have older non-dependent children and to live in semi-detached or terraced property. Their level of qualifications tend to be lower than average with jobs typically in industries where automation is becoming increasingly common.

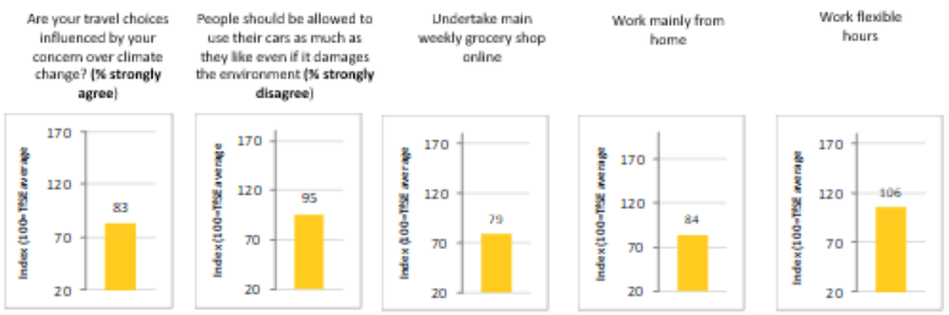
Locations within the South East Region **typical properties**

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
below average	well below average	below average	below average	average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
average	below average	average	below average	below average	average	average	average

Attitudes and behaviour



0.5m South East Region residents in 2035

Pre School

6% of the South East Region population in 2035

Under 30's contemplating starting a family who would like to bring children into a better and more sustainable world. They tend to live in well connected urban areas where they have access to good public transport and there is therefore no need to own a car. They are happy to make maximum use of technology to minimise their carbon footprint, and when they do need to use car are likely to use a car club vehicle, preferably an EV.

Locations within the South East Region **typical properties**

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
well above average	well above average	well above average	average	well below average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
above average	well above average	well above average	well above average	well above average	below average	above average	well above average

Attitudes and behaviour

0.39m South East Region residents in 2035

Semi-retired flexibility

5% of the South East Region population in 2035

Relatively affluent mature professionals who are looking to wind down their careers and perhaps work part time. They are looking to make use of the time they free up to participate in a range of activities and experiences, many of which will involve travelling. They typically live in a detached house on the outskirts of a pleasant town or village where they are close to the countryside. They are very likely to own a car but will travel by rail if the service is good.

Locations within the South East Region

typical properties

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
well below average	well above average	well below average	well above average	well above average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
below average	average	below average	below average	average	above average	well above average	well above average

Attitudes and behaviour

0.92m South East Region residents in 2035

School run suburbia

11% of the South East Region population in 2035

Families with school age children typically living in a suburban area, ideally with a rail station to provide links to their local centre as well as London. Encouraged by their children, they like to use local produce and to shop locally. They are avid recyclers and try to avoid unnecessary travel. They are quite likely to own a car, though it is also likely to be a low emission vehicle and they are happy to give lifts to neighbours and fellow parents.

Locations within the South East Region

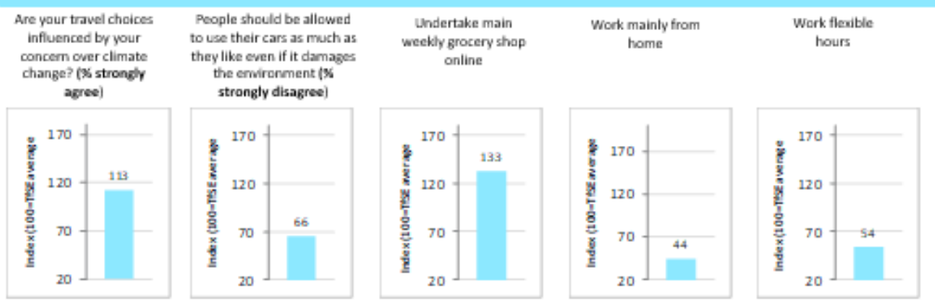
typical properties

Use of main modes and new mobility models

Bus	Rail	Cycle	Walk	Car driver
well below average	well above average	below average	average	well above average

Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
above average	average	above average	average	average	above average	average	above average

Attitudes and behaviour



Appendix F - Future transport for the south east population segments: maps

Appendix F - Future transport for the south east population segments: maps

Figure F1 – Village Life

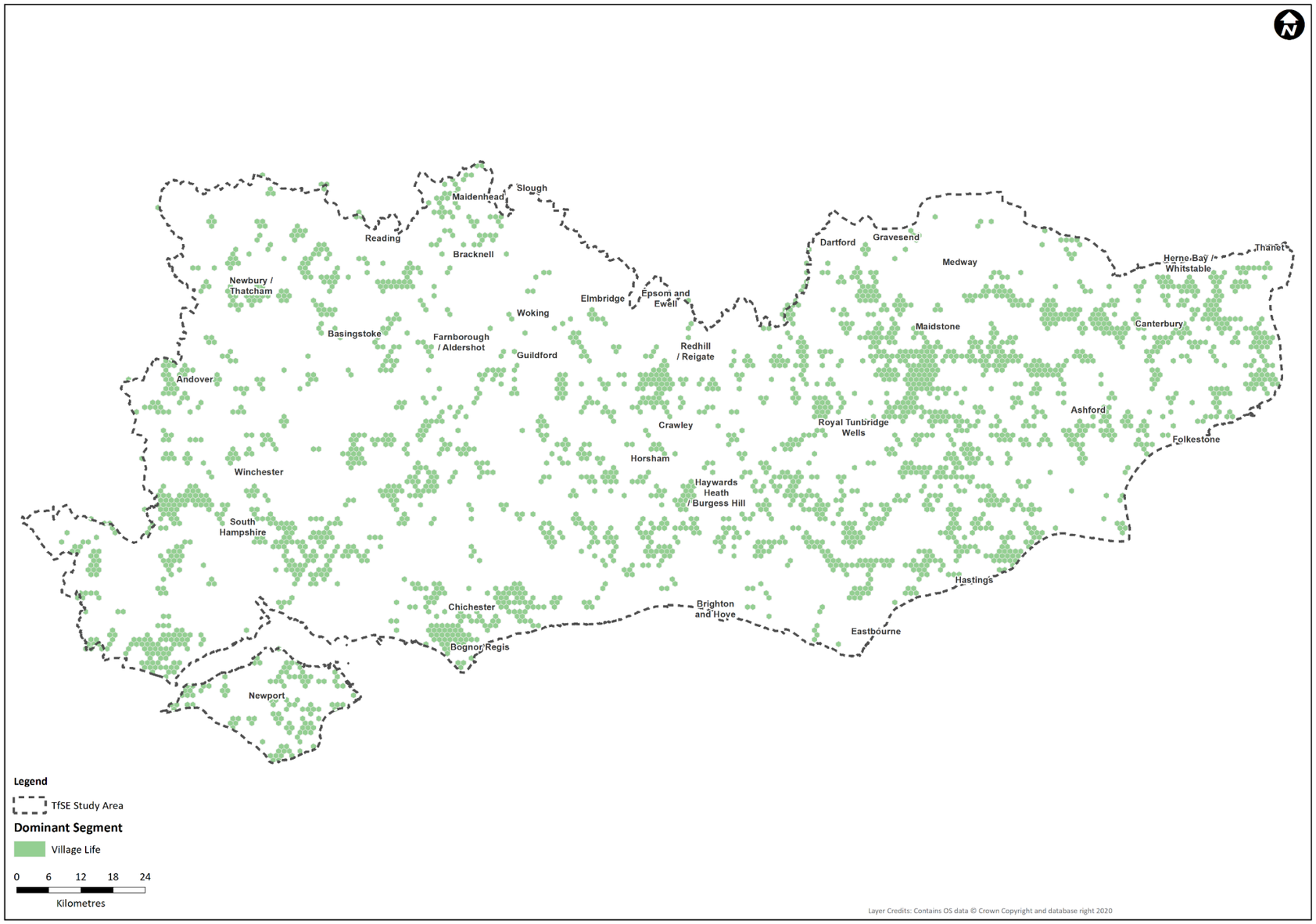


Figure F2 – Central Connectivity

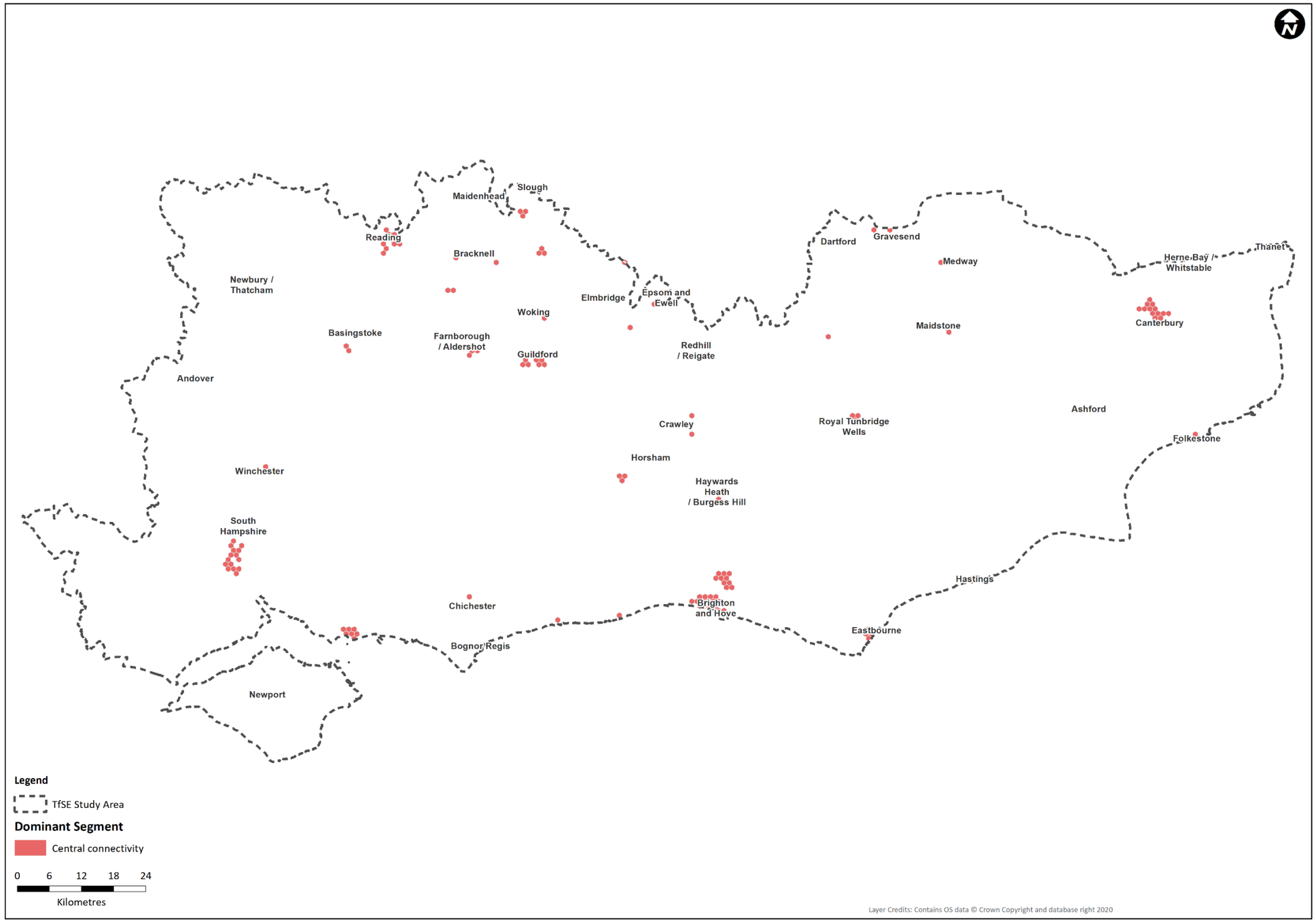


Figure F3 – Comfortable self sufficiency

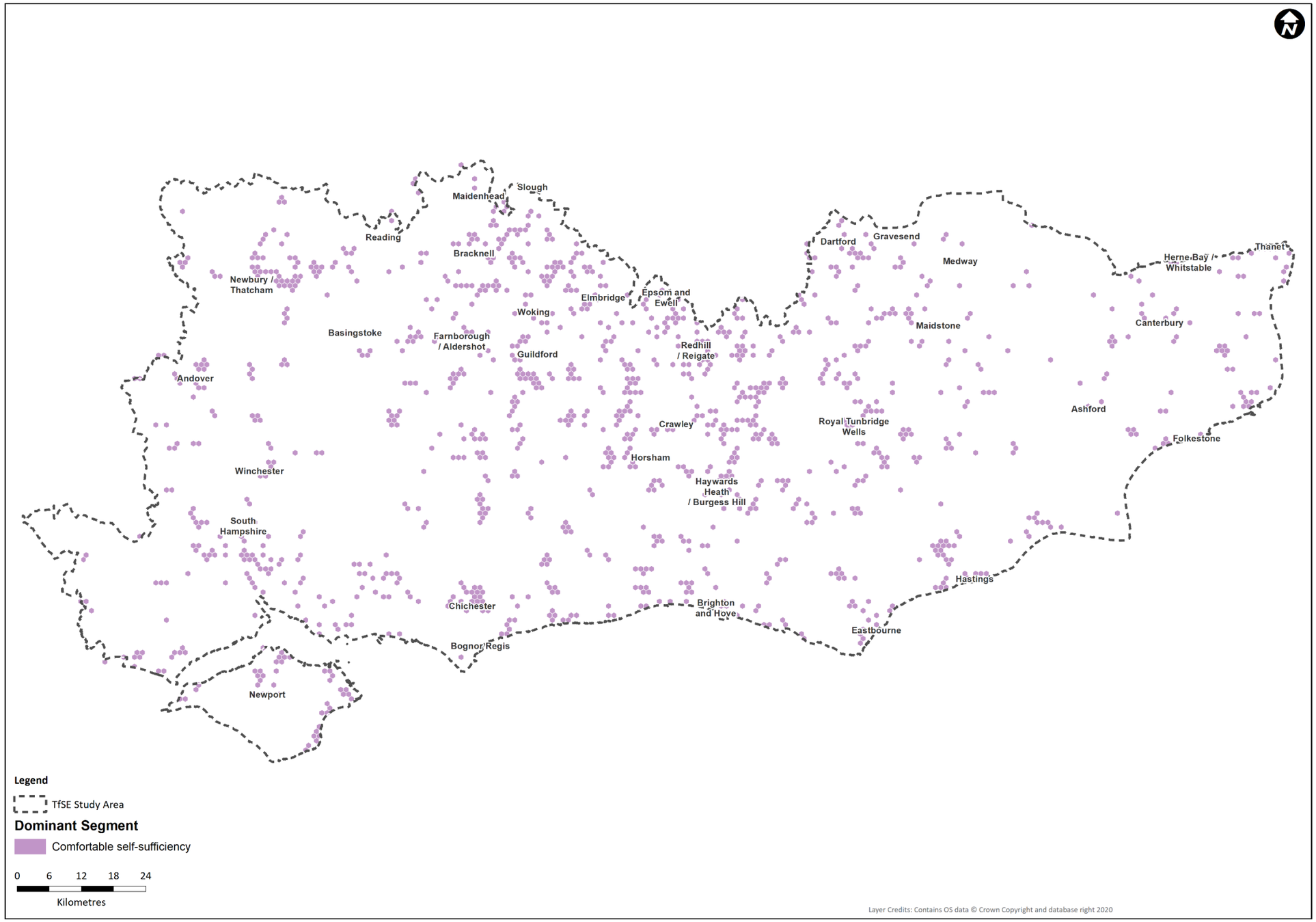


Figure F4 – Family terraces

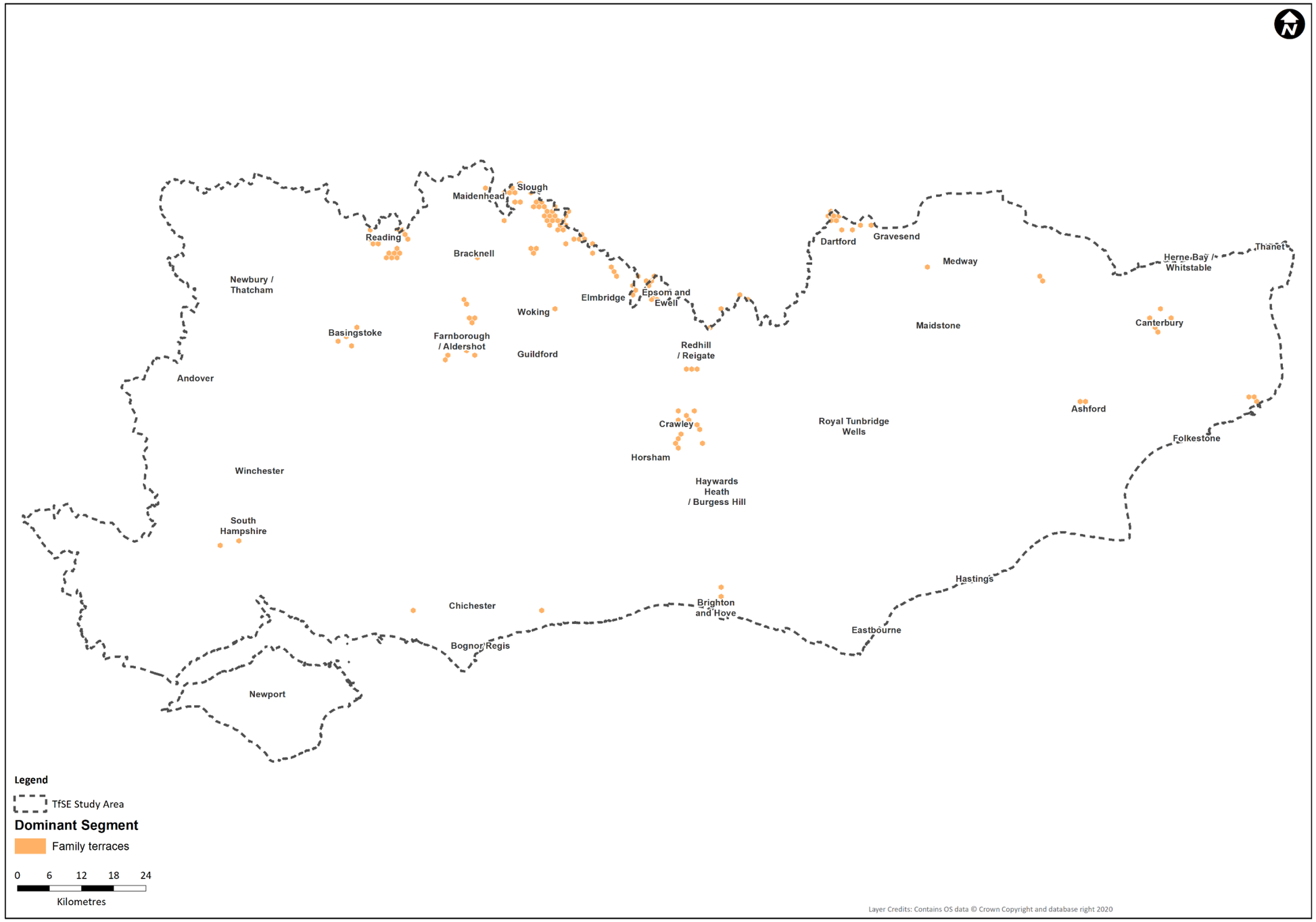


Figure F5 – Traditional Towns

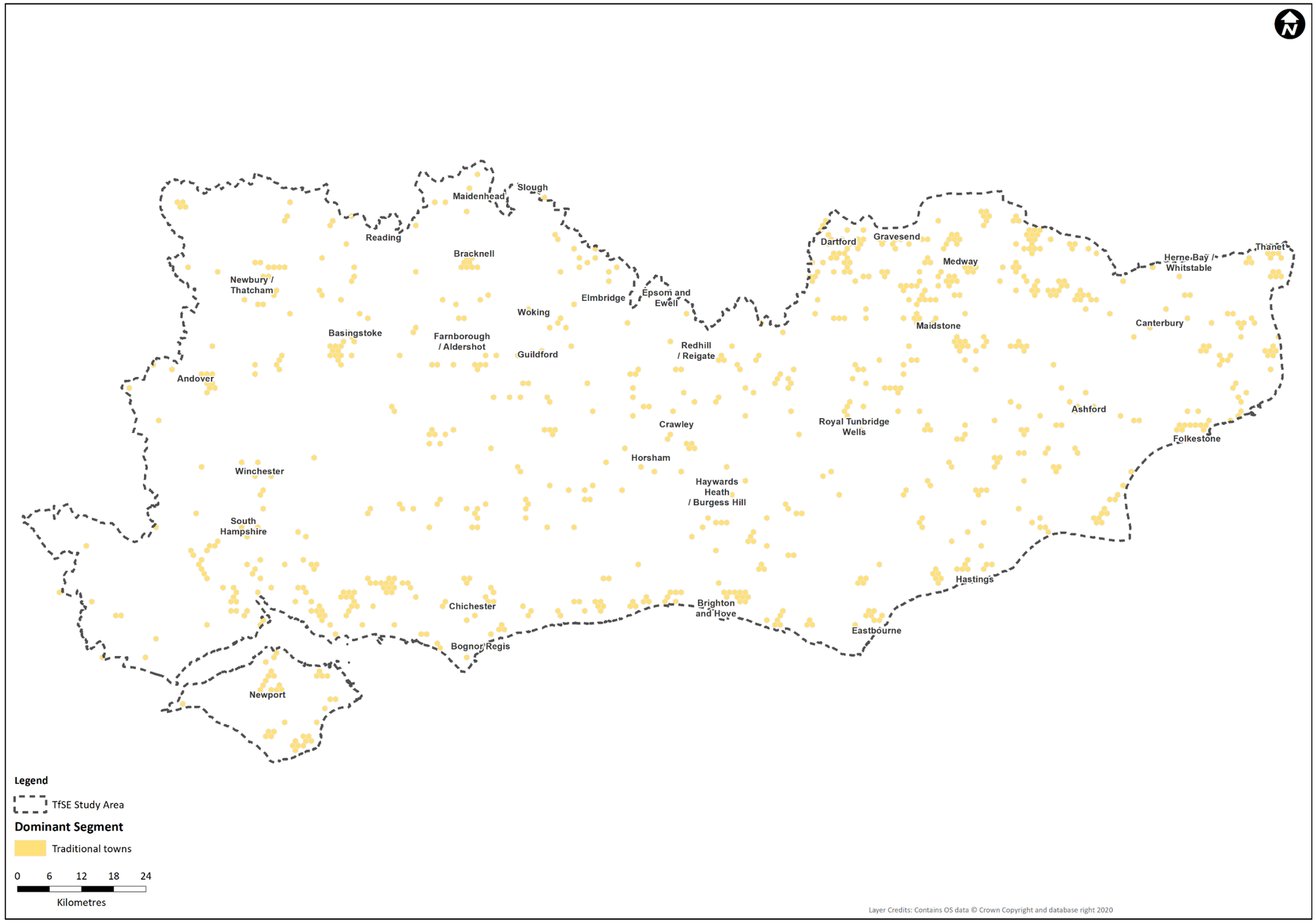


Figure F6 – Service sector workers

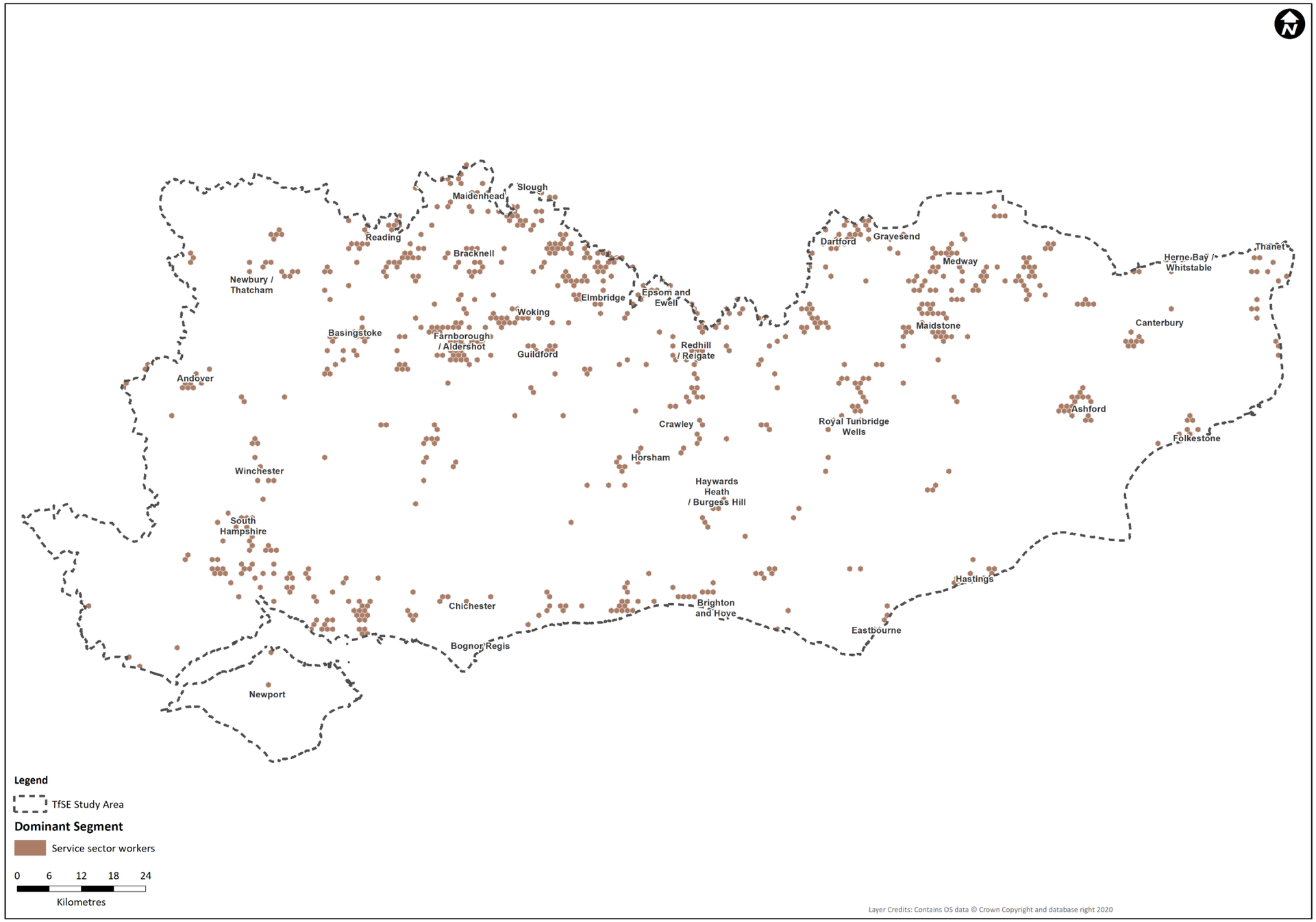


Figure F7 – Semi-retired flexibility

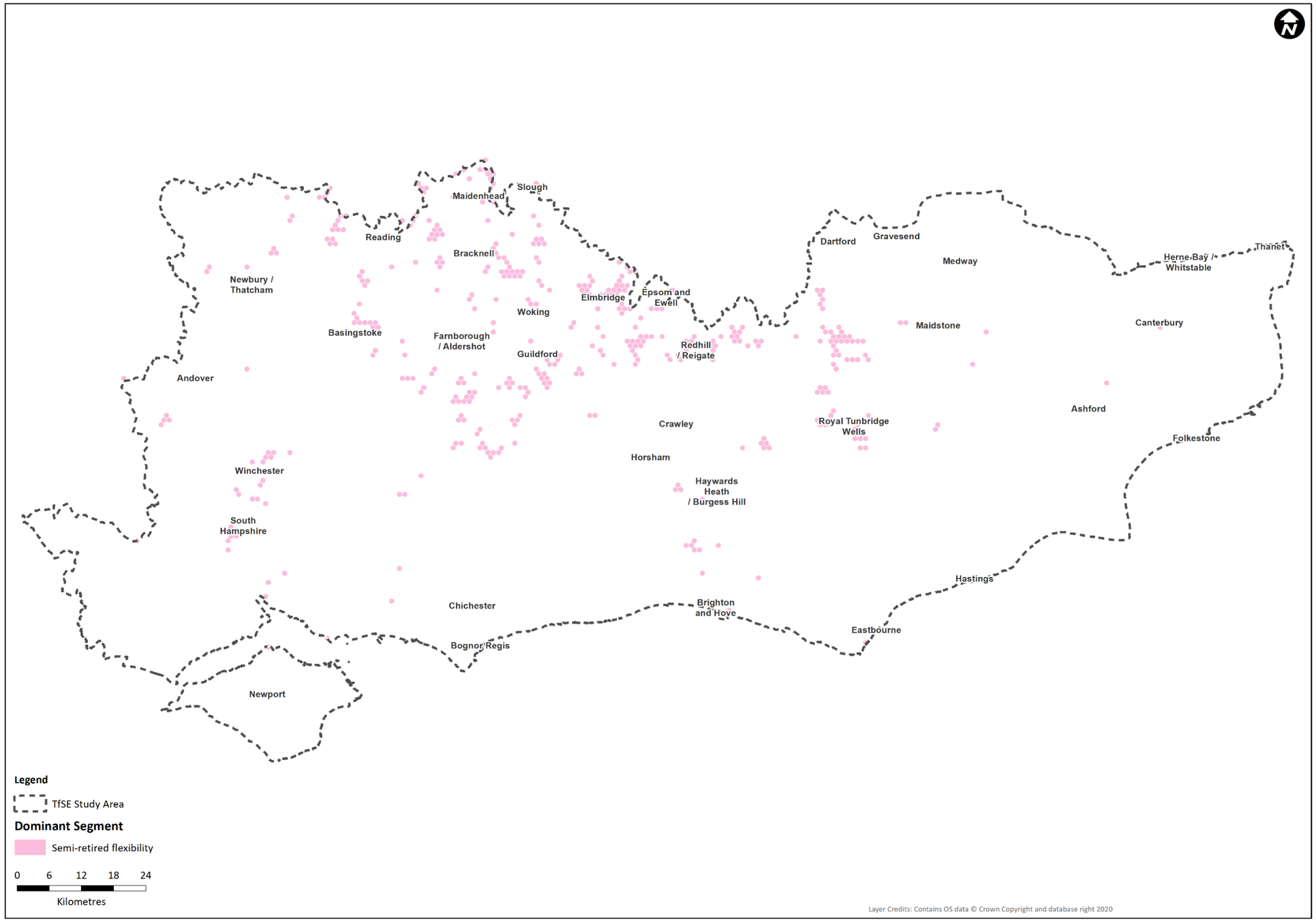


Figure F8 – Semi-detached suburbia

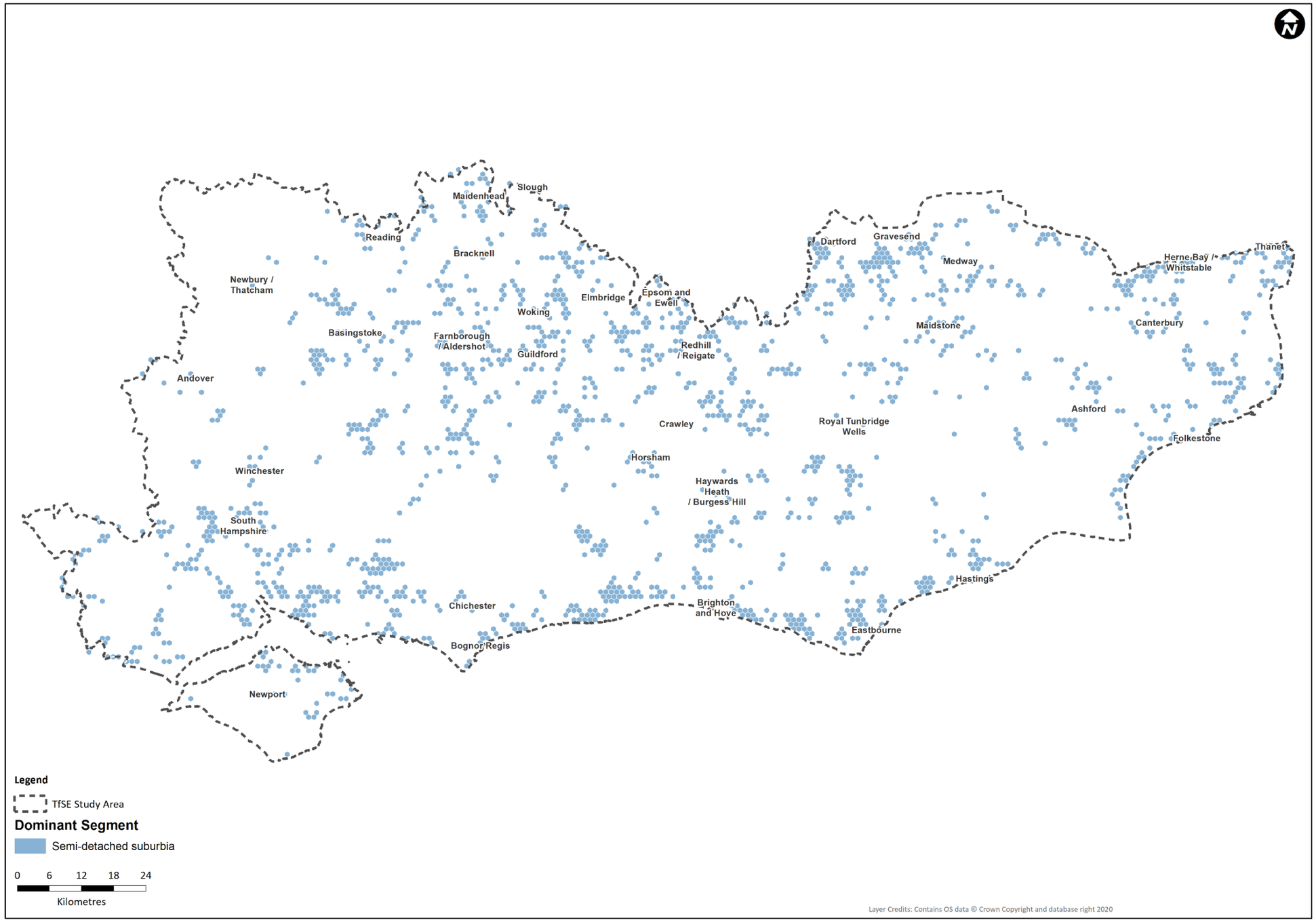
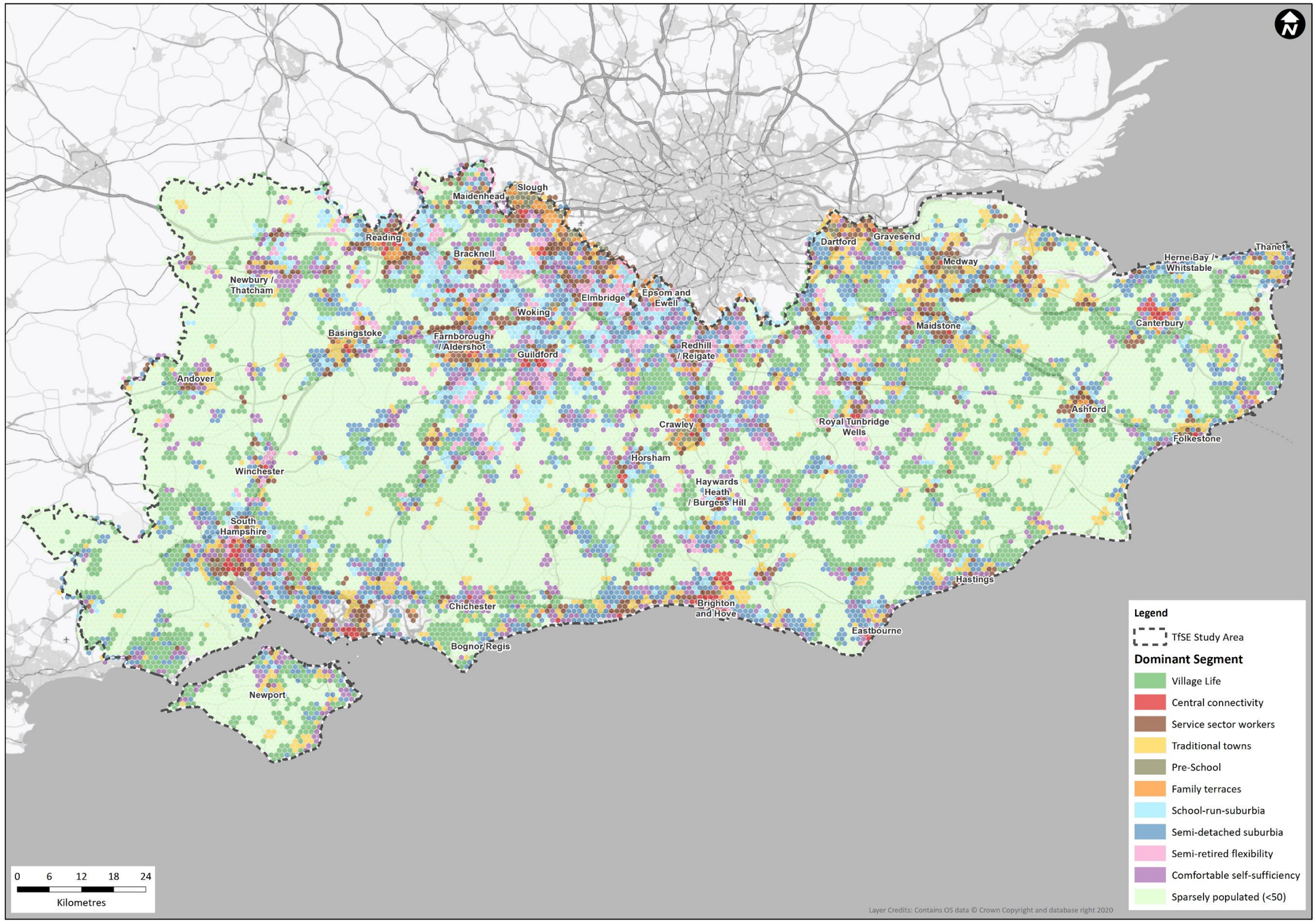


Figure F10 – All segments



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