

Employer Project : Thoughtworks

Cycling in major cities: Growing cycling in London

Team 5 - DataSurfers

12 June 2023



1. Background and context
2. Patterns, trends, and insights
3. Recommendations
 - Risks
 - Further areas for research
 - Next steps
4. Conclusion

1. **Background and context**
2. **Patterns, trends, and insights**
3. **Recommendations**
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- Transport for London (TfL) is a local government body responsible for most of the transport network in London
- TfL was created in 2000 as part of the Greater London Authority (GLA) and is managed by a board chaired by the Mayor of London
- They are also guided by the Mayor's Transport Strategy, which aims to transform the city's streets, improve public transport and create opportunities for new homes and jobs
- The central aim of the strategy is for 80% of all trips in London to be made on foot, by cycle or using public transport by 2041

1

How much progress has been made towards achieving our goal of 80% of all trips in London being made on foot, by cycle or using public transport by 2041 - and what actions should be taken to increase cycle transit in particular?

2

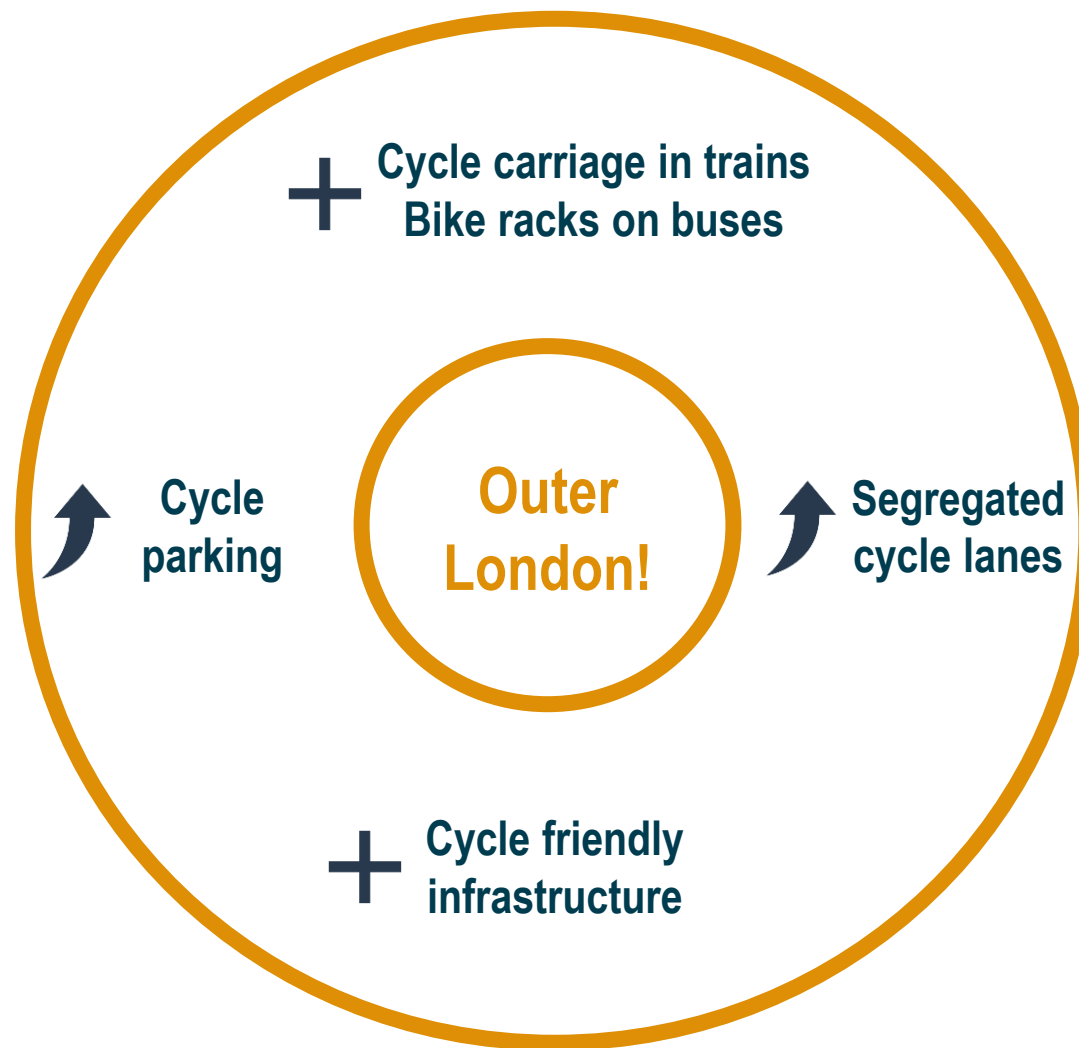
How might we also use data to support our efforts towards reaching this goal?

3

TfL has a hypothesis that there is a correlation between the availability of cycling infrastructure and the prevalence of cycling.



**TRANSPORT
FOR LONDON**
EVERY JOURNEY MATTERS



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1

How much progress has been made towards achieving our goal of 80% of all trips in London being made on foot, by cycle or using public transport - and what actions should be taken to increase cycle transit in particular?

2015

**60% OF TRIPS WERE MADE
ON FOOT, BY CYCLE OR
USING PUBLIC TRANSPORT**



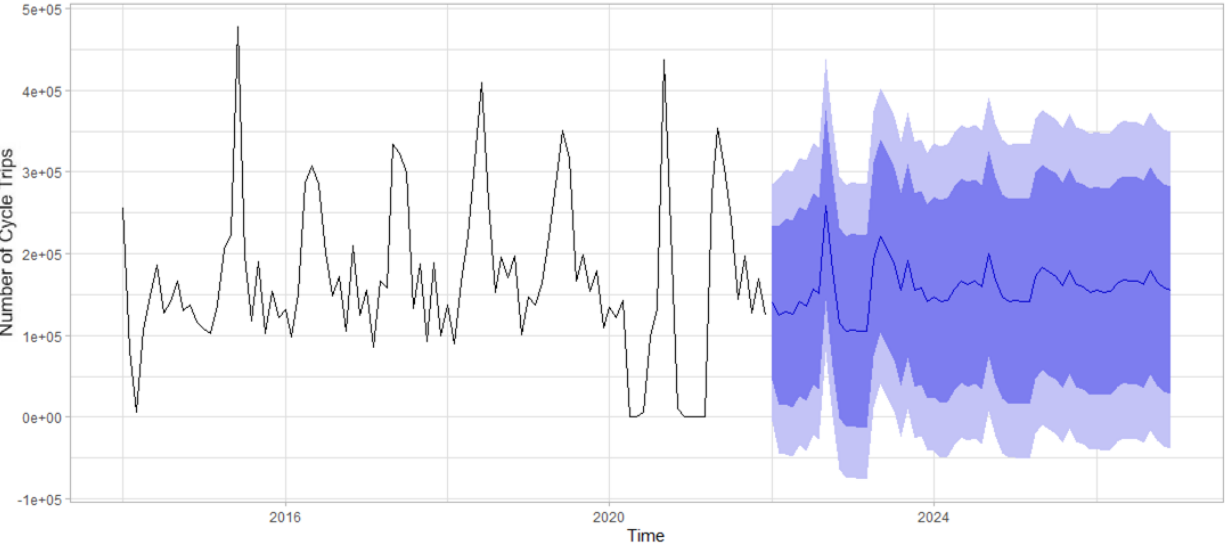
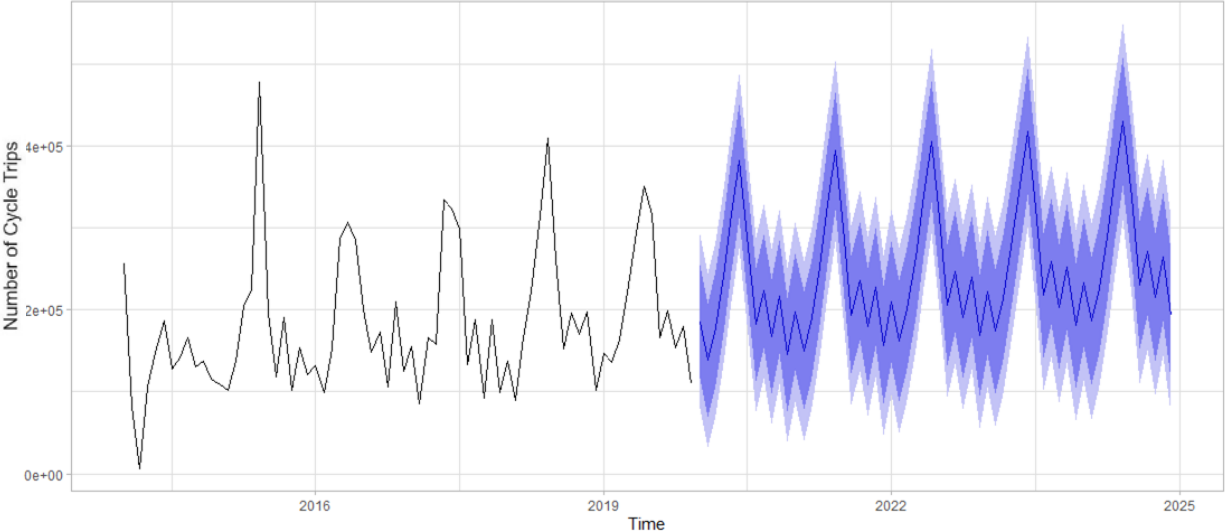
2041

**80% OF TRIPS TO BE MADE
ON FOOT, BY CYCLE OR
USING PUBLIC TRANSPORT**



20% INCREASE

Forecast 2024



Data: 2014 to 2019

Number of Cycle Trips 2015 → 2,138,165

Number of Cycle Trips 2024 → 3,238,244

34%

Data: 2014 to 2021

Number of Cycle Trips 2015 → 2,138,165

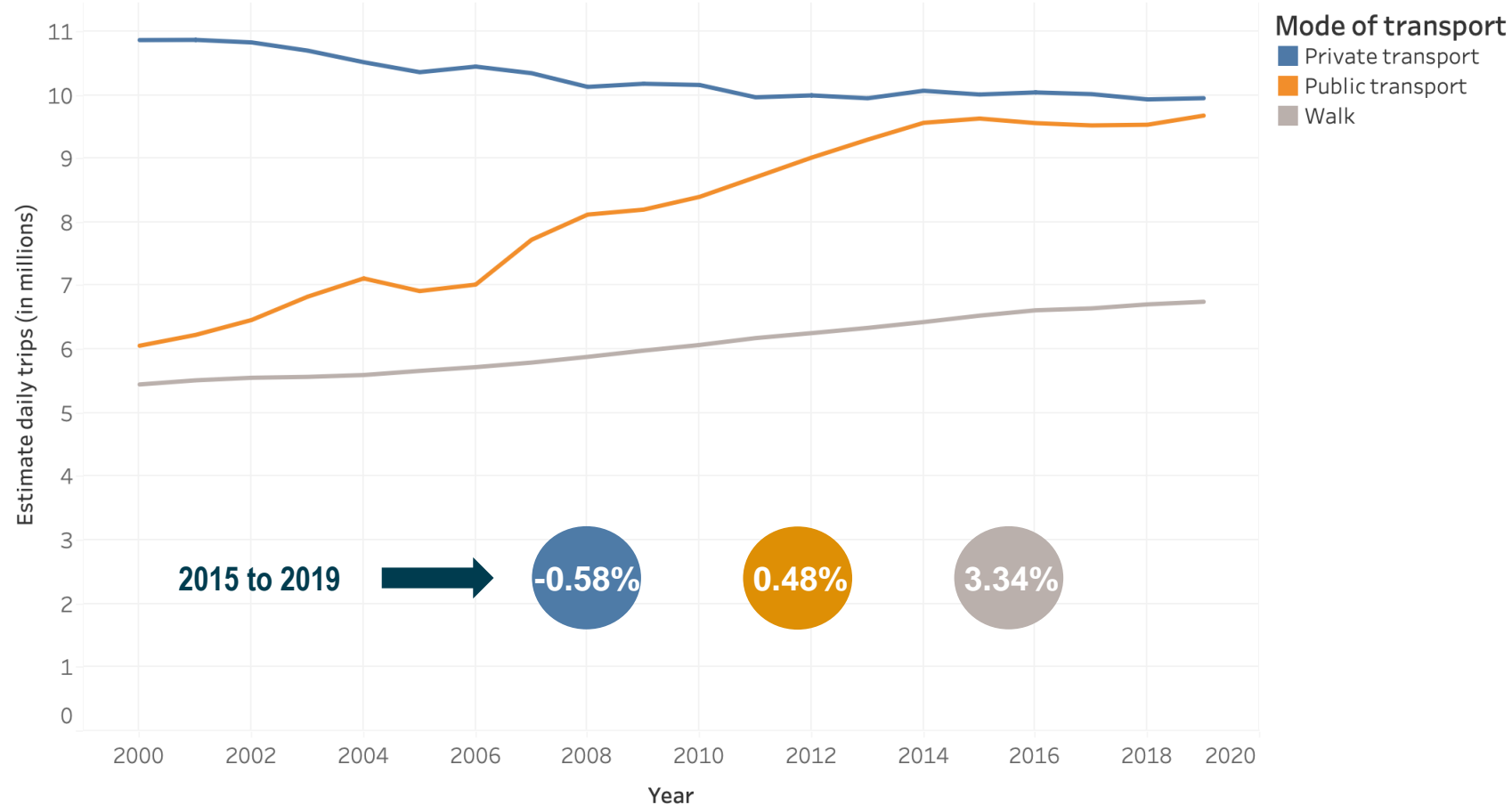
Number of Cycle Trips 2024 → 1,900,277

-12%

Source: Data provided by client

Trends in walking, public and private transport

Estimated daily average trips by mode of transport

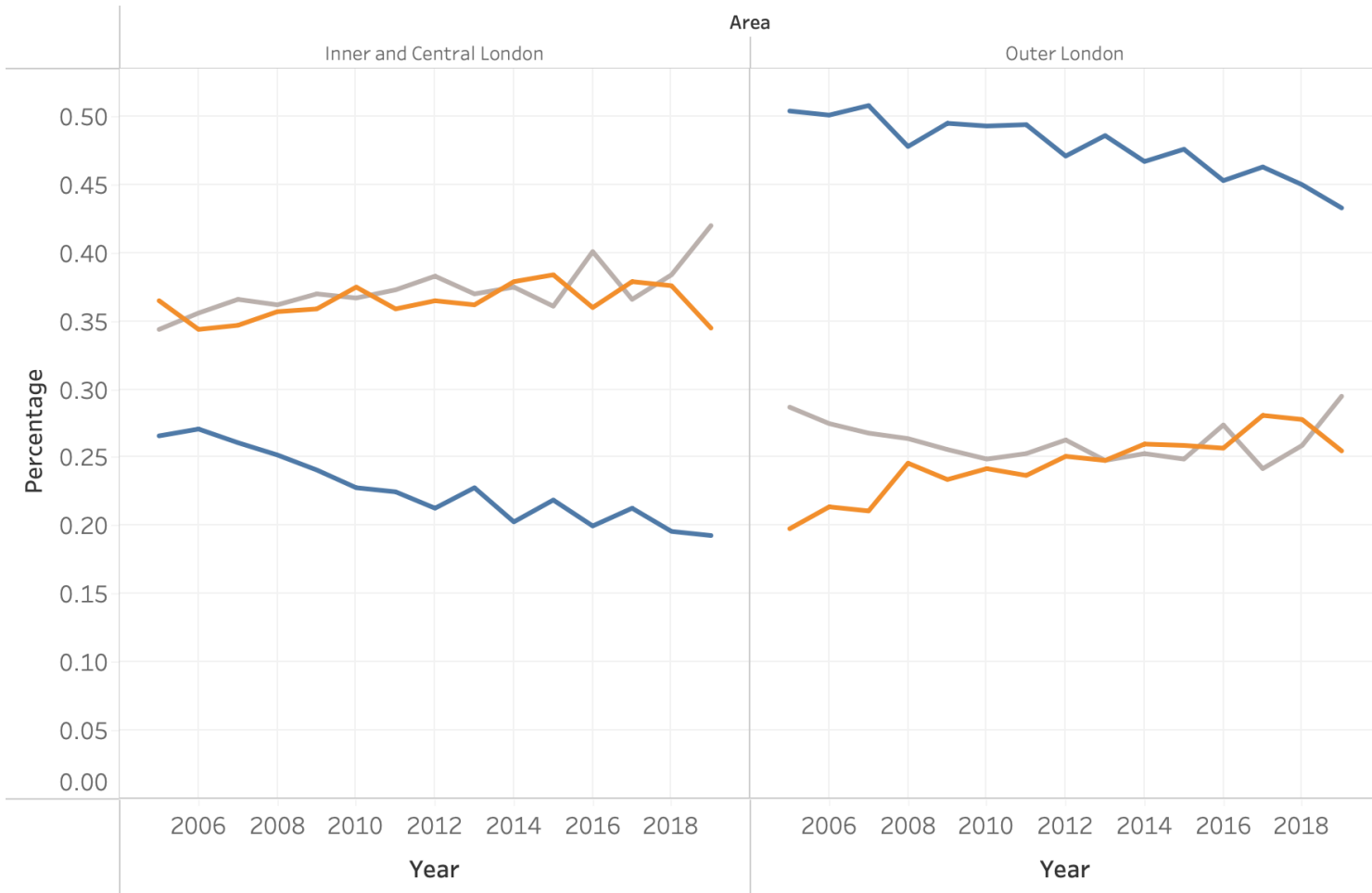


- Estimated daily average trips by mode of transport in London (in millions)
- Between 1999 and 2019
- Clear increasing trend in usage of public transport and walking
- Slowly decreasing the usage of private transport

Source: TfL City Planning - Travel in London - Report 13 (2020) - <https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports>

Trends in walking, public and private transport

Mode share of trips in Outer, Inner and Central London

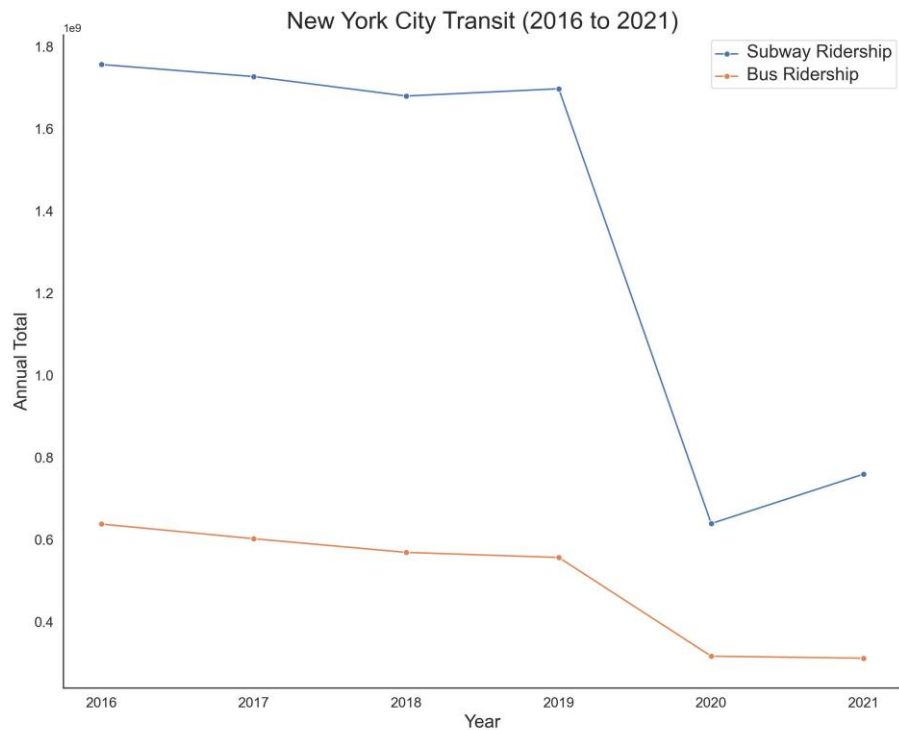


Mode of transport

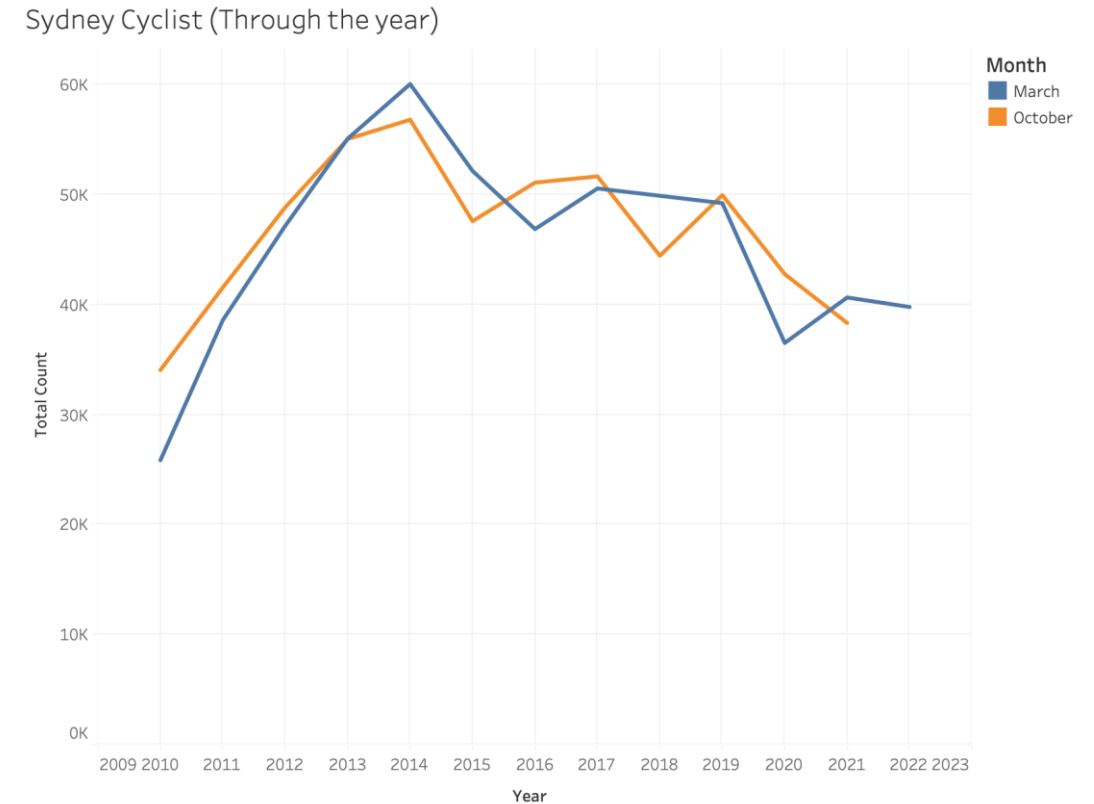
- Private transport
- Public transport
- Walk

- Proportion of population using each mode of transport across years (2005-2019) in Outer and Inner and Central London
- More usage of public transport and walking in inner and central than Outer
- Decreasing trends in both areas for private transport
- Increasing trends in usage of public transport and walking in both areas

Source: TfL City Planning - Travel in London - Report 13 (2020) - <https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports>



- New York City has a similar population as London
- However, it is surprising that Subway and Bus annual trips are decreasing over the years, even prior the unprecedented Covid-19 pandemic
- As further research, it would be interesting to investigate how New York City is planning its recovery from the pandemic numbers promoting the use of public transport



- Sydney has approximately half the population of London
- The available data is limited, but it suggests a negative trend in cycling behaviour in Sydney

Source: MTA - Subway and bus ridership for 2021 - <https://new.mta.info/agency/new-york-city-transit/subway-bus-ridership-2021#>

Source: Data provided by client

2

How might we also use data to support our efforts towards reaching this goal?

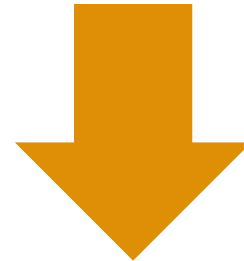
3

TfL has a hypothesis that there is a correlation between the availability of cycling infrastructure and the prevalence of cycling.

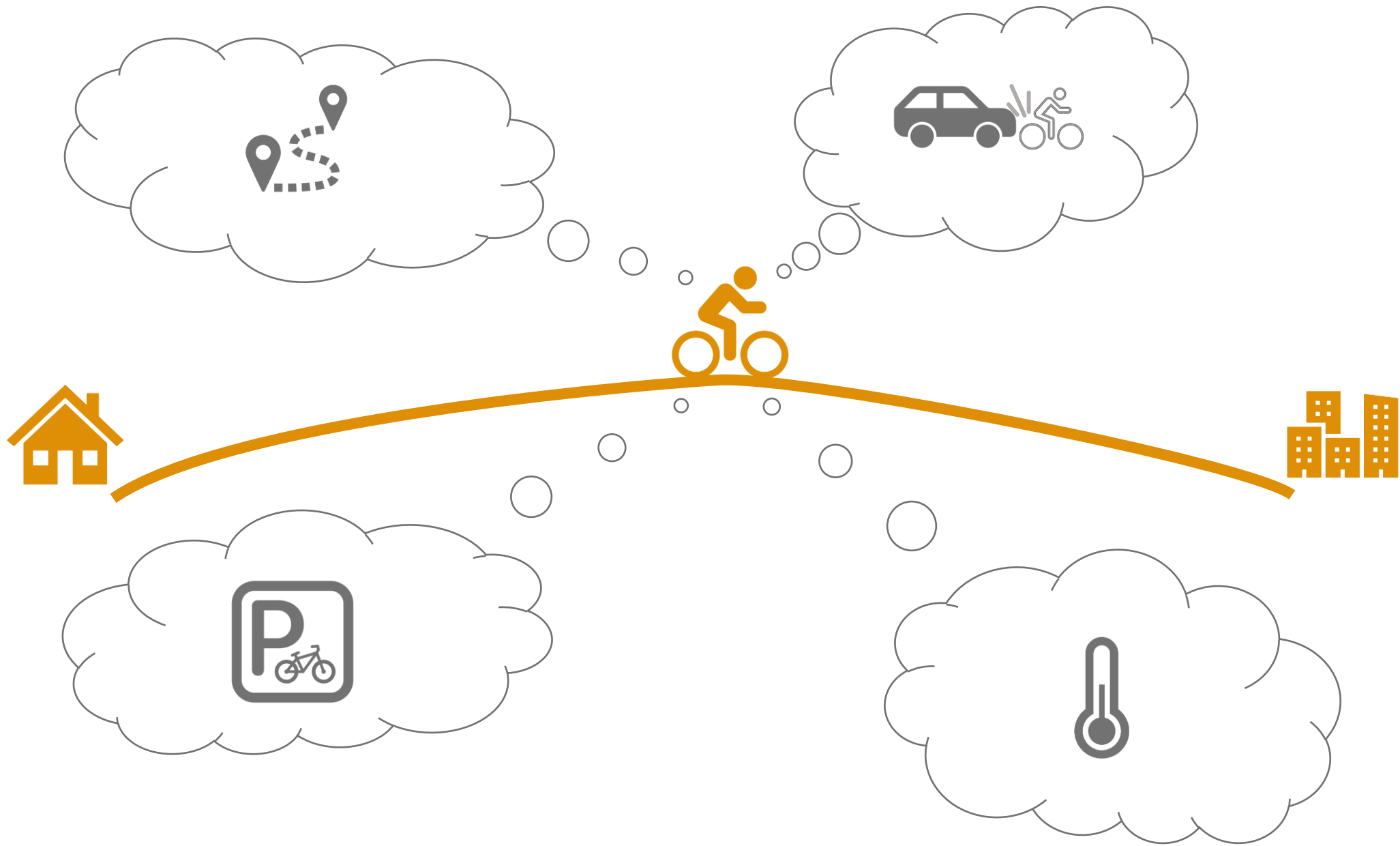


TRANSPORT FOR LONDON

EVERY JOURNEY MATTERS



And the JOURNEY begins...





— Cycle Routes

Number of cycle trips

0 - 50000

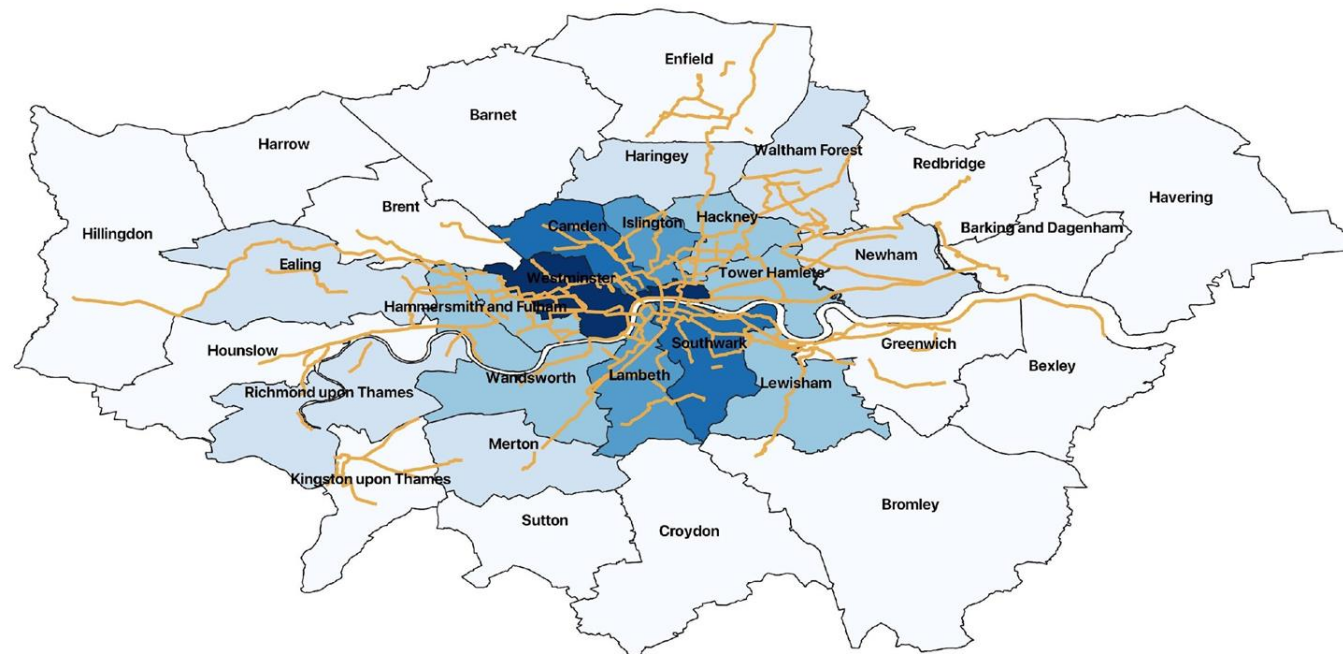
50000 - 100000

100000 - 1000000

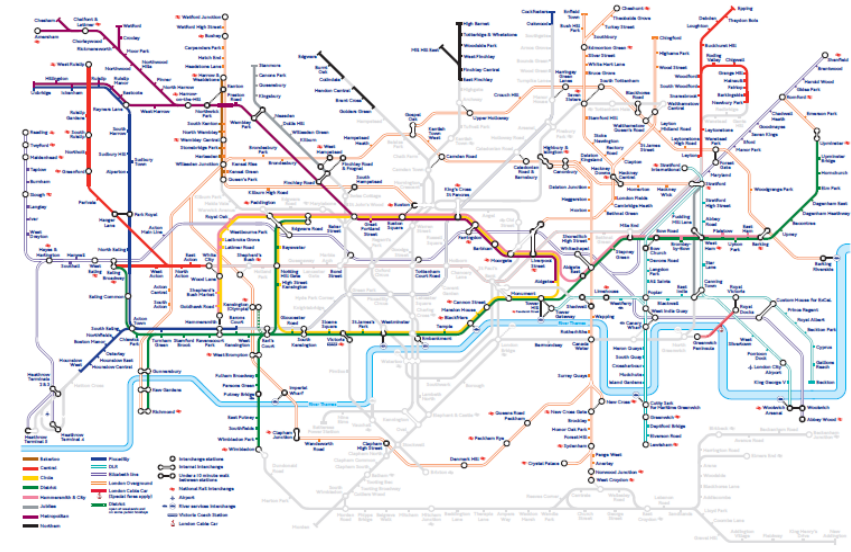
1000000 - 2000000

2000000 - 3000000

3000000 - 4000000



Source: TfL - Cycling Infrastructure Database - <https://cycling.data.tfl.gov.uk/>



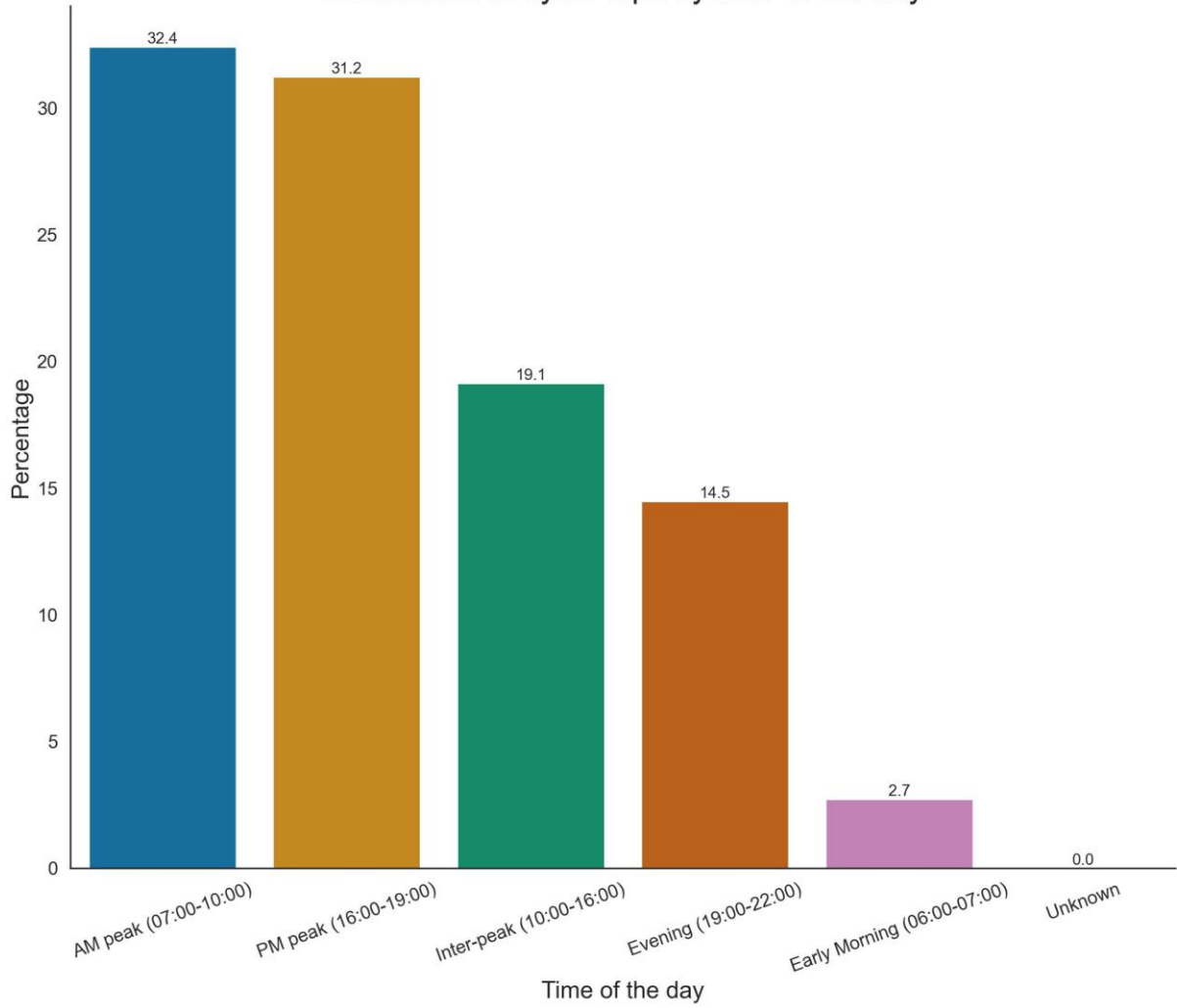
© Transport for London. Siles Map November 2022. 232750-401

Folded cycles can be taken on any train at any time

| | | |
|--|---|--|
| <p>Cycles on the Underground and DLR</p> <p>On weekdays non-folding cycles cannot be taken on any train 07:30 - 09:30 or 16:00 - 19:00, except public holidays.</p> | <p>Cycles on London Overground</p> <p>Non-folding cycles may be taken, but not 07:30 - 09:30 or 16:00 - 19:00 on weekdays, except public holidays, apart from:</p> <ul style="list-style-type: none">• 07:30 - 09:30 on trains leaving Liverpool Street• 16:00 - 19:00 on trains arriving at Liverpool Street | <p>Cycles on Elizabeth line</p> <p>Non-folding cycles cannot be taken Monday - Friday between 07:30 - 09:30 and 16:00 - 19:00, except:</p> <ul style="list-style-type: none">• On westbound trains which leave Paddington between 07:30 - 09:30• On eastbound trains which arrive at Paddington between 16:00 - 19:00• On eastbound trains towards Shenfield which leave Liverpool Street between 07:30 - 09:30• On westbound trains which arrive at Liverpool Street from Shenfield between 16:00 - 19:00 |
|--|---|--|

- Current TfL rules don't allow cycles on public network at peak times and only in certain parts of the network, excluding most of Central London where it is most used
- Could this be improved?

Distribution of cycle trips by time of the day

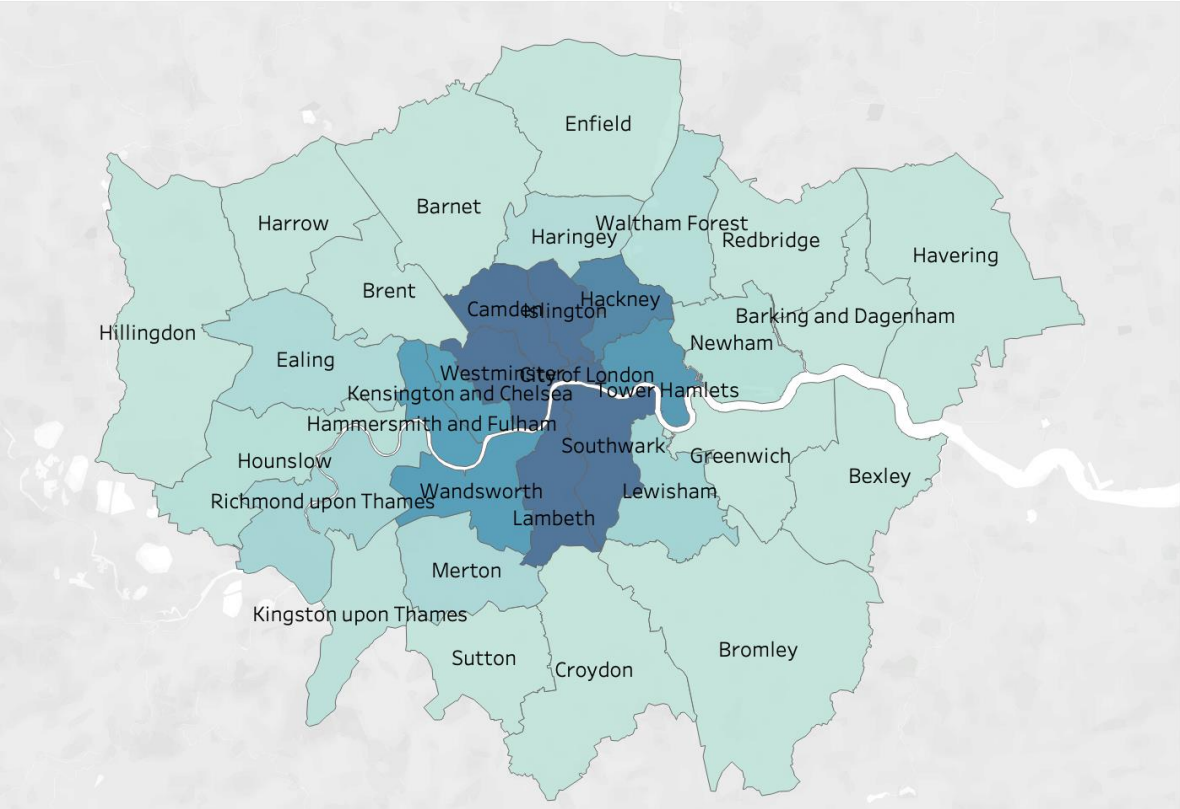


Source: TfL - Cycles on public transport - Taking cycles on rail services map extract

Source: Data provided by client

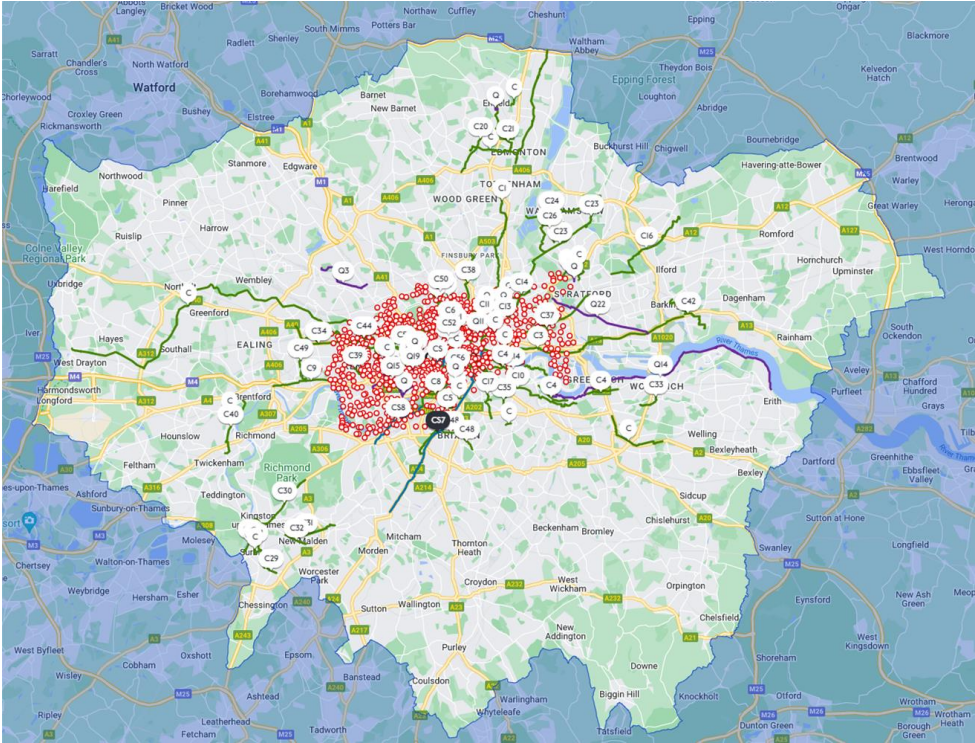


Cycle Trips



Total Cycle Trips
20,000 500,000

Source: Data provided by client



Since there are no docking stations beyond Central and certain areas of Inner London, renting a cycle becomes challenging for residents in those locations. We believe that increasing the number of Santander docking stations throughout Inner and Outer London will encourage more people to cycle.

Source: TfL – Maps - Cycle - <https://tfl.gov.uk/maps/cycle?intcmp=40402>



Central London

Total number of cycle trips:

12.625.719

Private

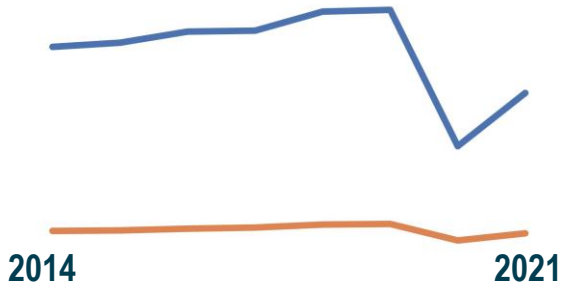


89%

Hire



11%



Inner London

Total number of cycle trips:

3.245.530

Private

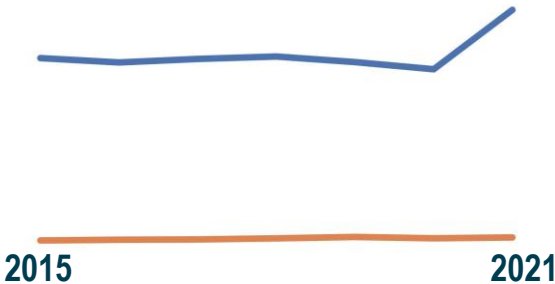


95.7%

Hire



4.3%



Outer London

Total number of cycle trips:

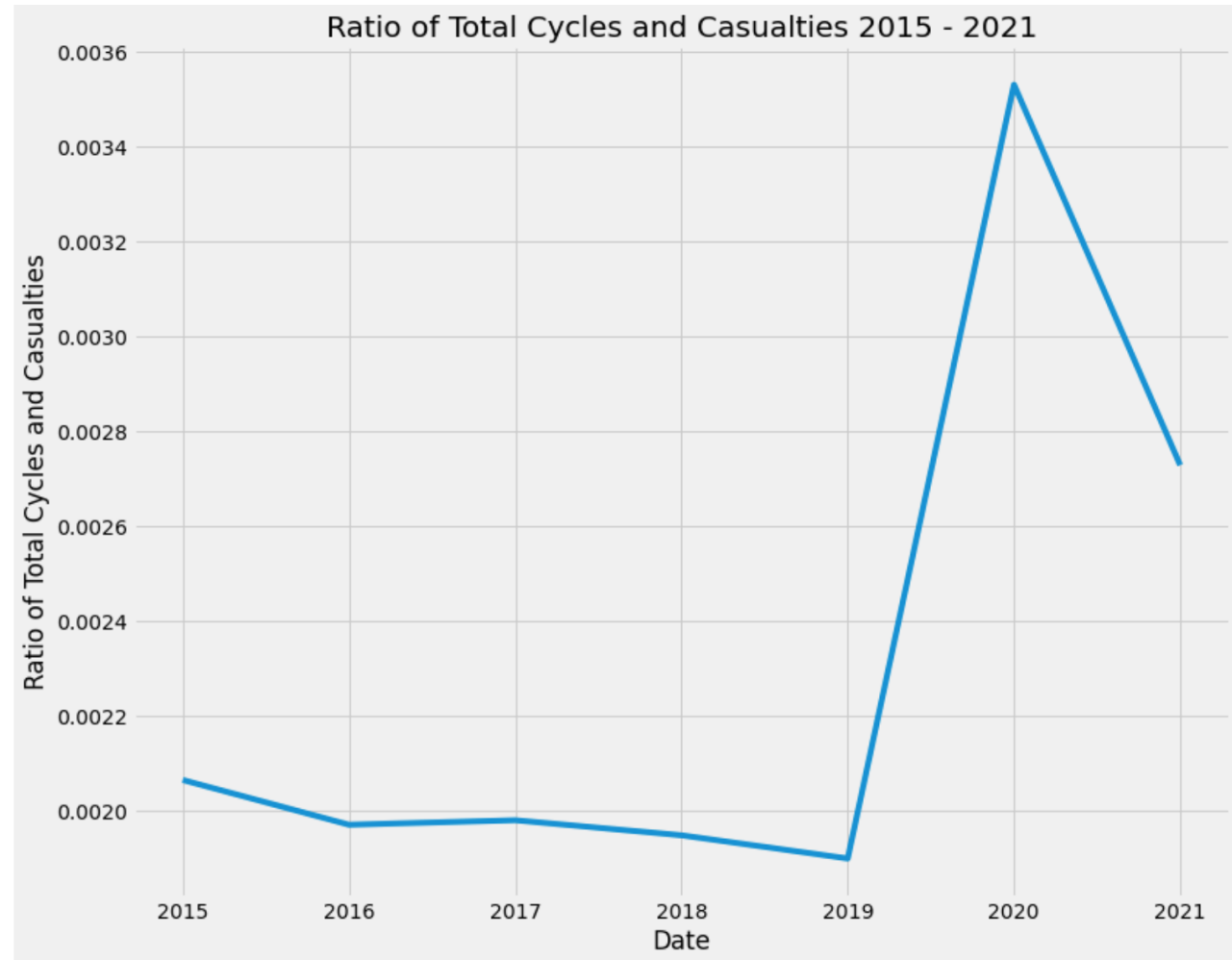
597.185

We don't have data covering the split between private and hire cycles but considering the absence of docking stations in Outer London, we can assume that this split is likely to be even lower.

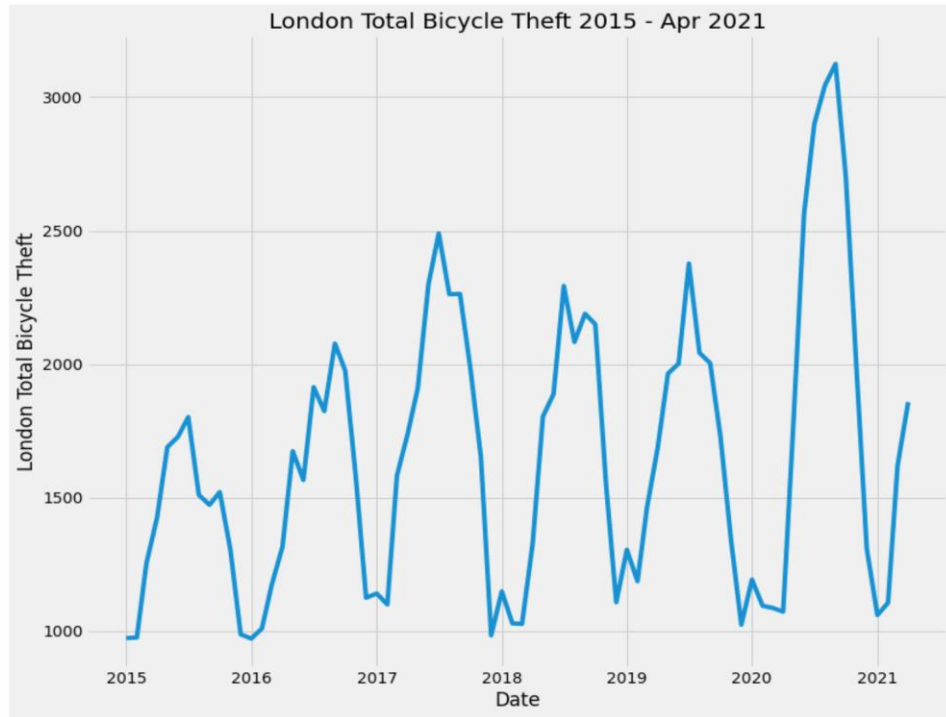
Source: Data provided by client



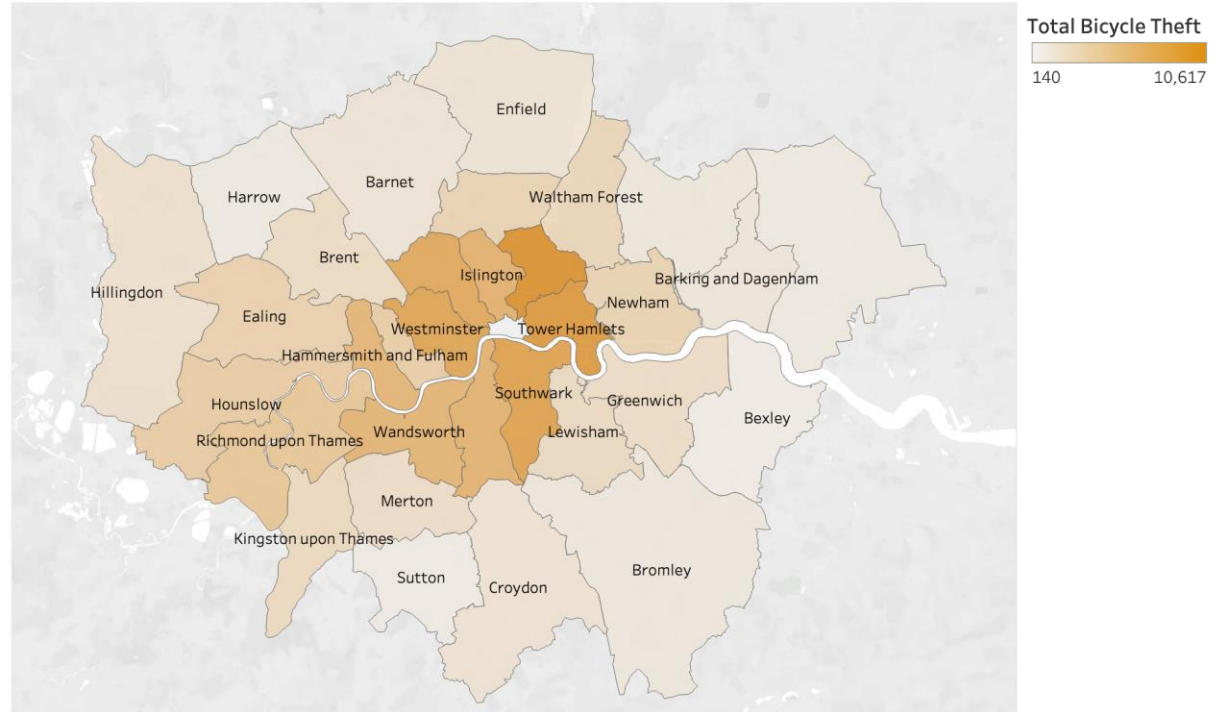
- This shows the ratio of all casualties in London for cyclists, ranging from minor accidents to accidents that have resulted in death or serious injury, combined with the Total Cycles.
- From 2015 – 2019, the ratio of casualties decreased slightly. However, for 2020 and 2021, the decrease in total cycles combined with the number of casualties remaining constant led to an increase in the ratio of Total Cycles and Casualties.



Source: Data provided by client and GOV.UK, Passenger Casualty Rates <https://www.gov.uk/government/statistical-data-sets/tsgb01-modal-comparisons#passenger-casualty-rates>



Bicycle Theft 2015-2021

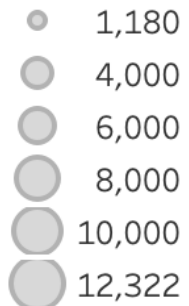


- Bicycle Theft has increased in general in London from 2015-2021. Additionally, there seems to be seasonal peaks as the summer months seem to have increased bicycle theft compared to the winter months. Although this could be due to the number of cycle trips going up in summer. We would like to compare this seasonality trends of bicycle theft with total cycle trips however data has not been collected for winter months in Inner and Outer London and it won't be a true reflection of the reality
- Looking at the bicycle theft by borough, this seems to be more prevalent in Inner London (Westminster, Tower Hamlets and Southwark)

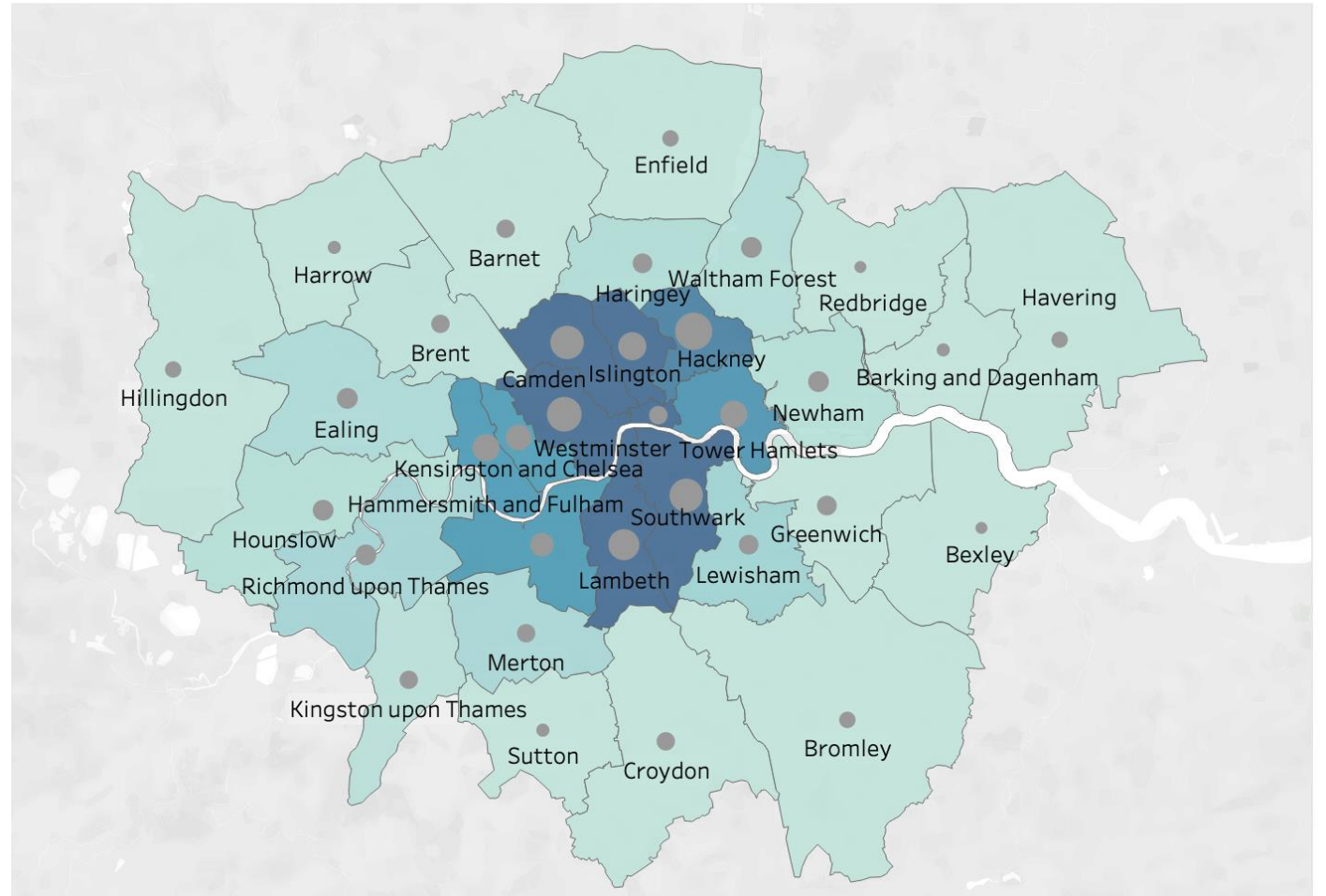
Source: London Datastore, Bicycle Theft - https://data.london.gov.uk/dataset/recorded_crime_summary

Total Cycle Trips and Parking Capacity

Total Parking Capacity



Total Cycle Trips



Source: TfL - Cycling Infrastructure Database - <https://cycling.data.tfl.gov.uk/>



Total Bicycle Theft

140 10,617

| Borough | Total Bicycle Theft |
|------------------------|---------------------|
| Enfield | 0 |
| Harrow | 0 |
| Barnet | 0 |
| Waltham Forest | 9 |
| Redbridge | 4 |
| Havering | 5 |
| Barking and Dagenham | 1 |
| Newham | 1 |
| Bexley | 0 |
| Sutton | 0 |
| Croydon | 1 |
| Bromley | 2 |
| Lewisham | 3 |
| Lambeth | 10 |
| Wandsworth | 20 |
| Richmond upon Thames | 3 |
| Hounslow | 11 |
| Kingston upon Thames | 2 |
| Merton | 1 |
| HammerSmith and Fulham | 7 |
| Kensington and Chelsea | 0 |
| Ealing | 0 |
| Brent | 6 |
| Camden | 15 |
| Islington | 13 |
| Hackney | 31 |
| Tower Hamlets | 30 |

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Total Bicycle Theft

140 10,617

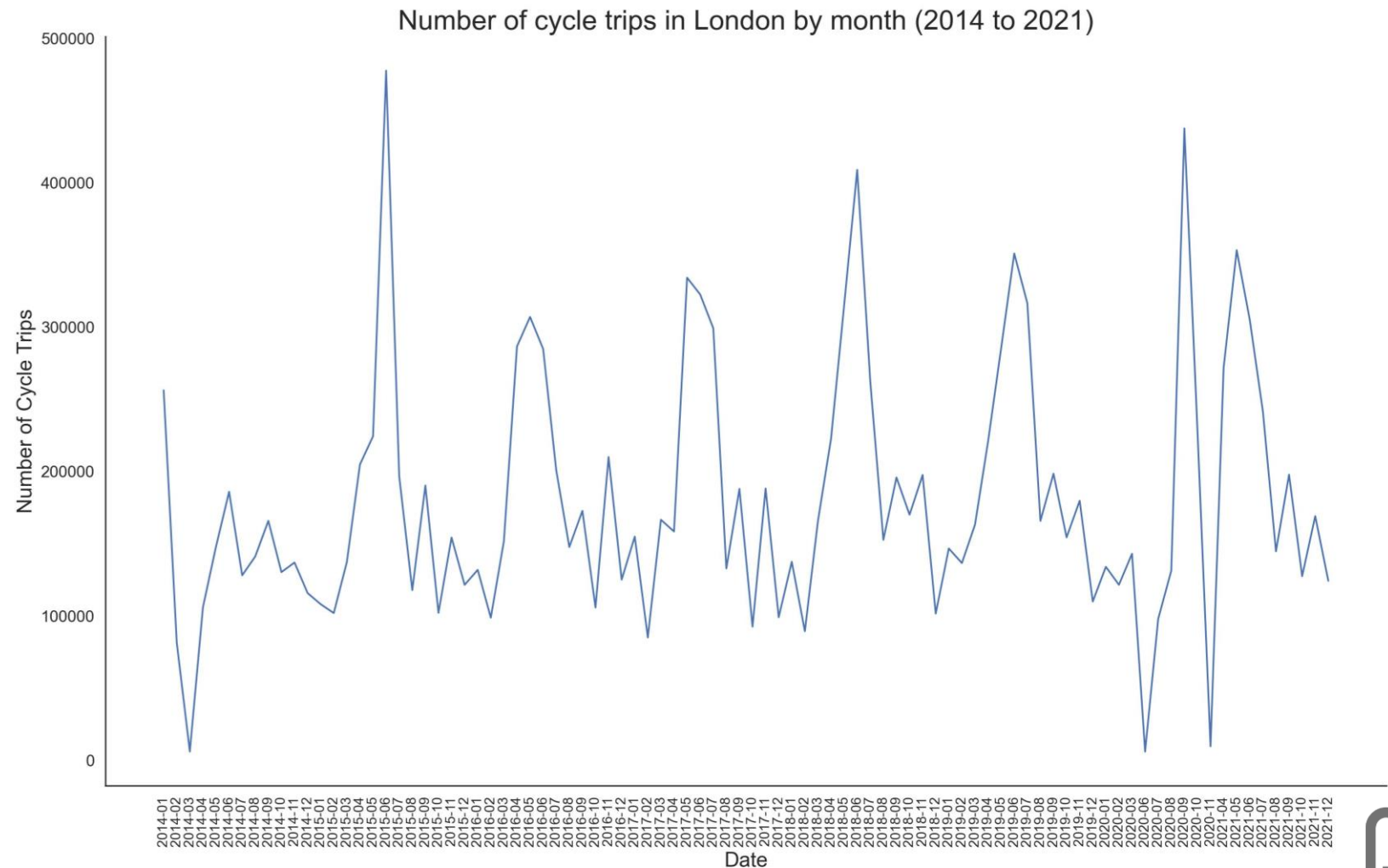
| Borough | Total Bicycle Theft |
|------------------------|---------------------|
| Enfield | 4 |
| Barnet | 13 |
| Harrow | 0 |
| Hillingdon | 2 |
| Brent | 4 |
| Camden | 18 |
| Islington | 8 |
| Hackney | 102 |
| Haringey | 46 |
| Waltham Forest | 102 |
| Redbridge | 6 |
| Havering | 1 |
| Barking and Dagenham | 6 |
| Newham | 38 |
| Tower Hamlets | 299 |
| Westminster | 2 |
| Kensington and Chelsea | 12 |
| Ealing | 19 |
| Hammersmith and Fulham | 10 |
| Hounslow | 13 |
| Richmond upon Thames | 4 |
| Wandsworth | 5 |
| Southwark | 99 |
| Greenwich | 16 |
| Bexley | 0 |
| Lambeth | 148 |
| Lewisham | 16 |
| Merton | 0 |
| Kingston upon Thames | 7 |
| Sutton | 0 |
| Croydon | 0 |
| Bromley | 22 |

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- This indicates that secure parking, while available in most boroughs in inner London. This kind of parking is not available for people who live in the outer boroughs of North London
- For Hangars, this is a similar story, this kind of parking is readily available for most boroughs in inner London. However, there is no such parking in South London boroughs such as Croydon, Merton and Sutton

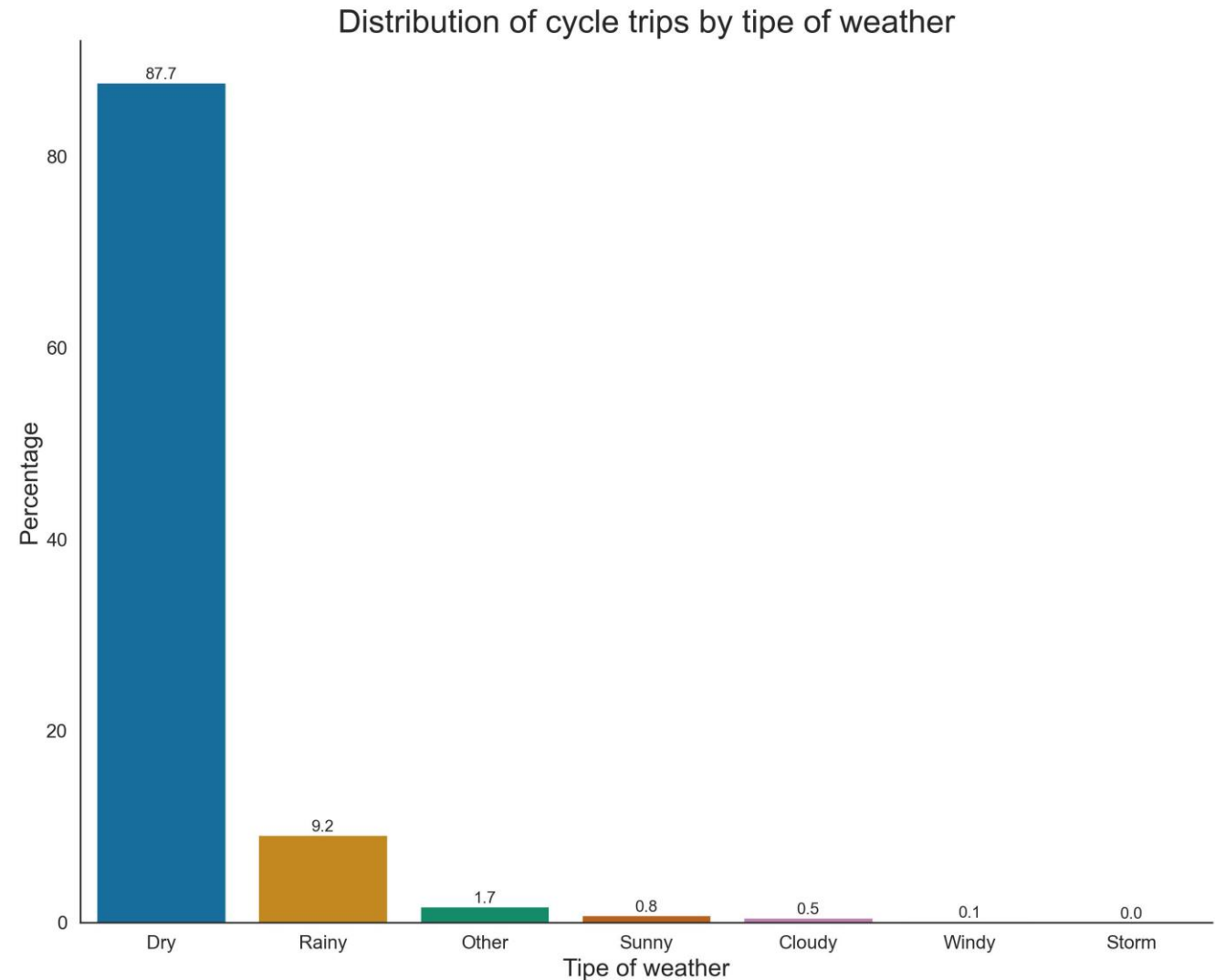


- Before the pandemic, it seemed that there was a seasonal trend, with May and June being the most popular months of the year for cycle trips.
- However, this timeline is not long enough to provide a comprehensive representation



Source: Data provided by client

- Although the Dry weather is the preferred option for most people, there is still a percentage of cyclists that will ride despite the rain
- Rain is almost a constant variable throughout the year in London, leaving cycle routes slippery even after the rain has stopped
- For these reasons we believe TfL should improve conditions to ensure drainage and safety is at its best on dry days but also after rainy days



Source: Data provided by client

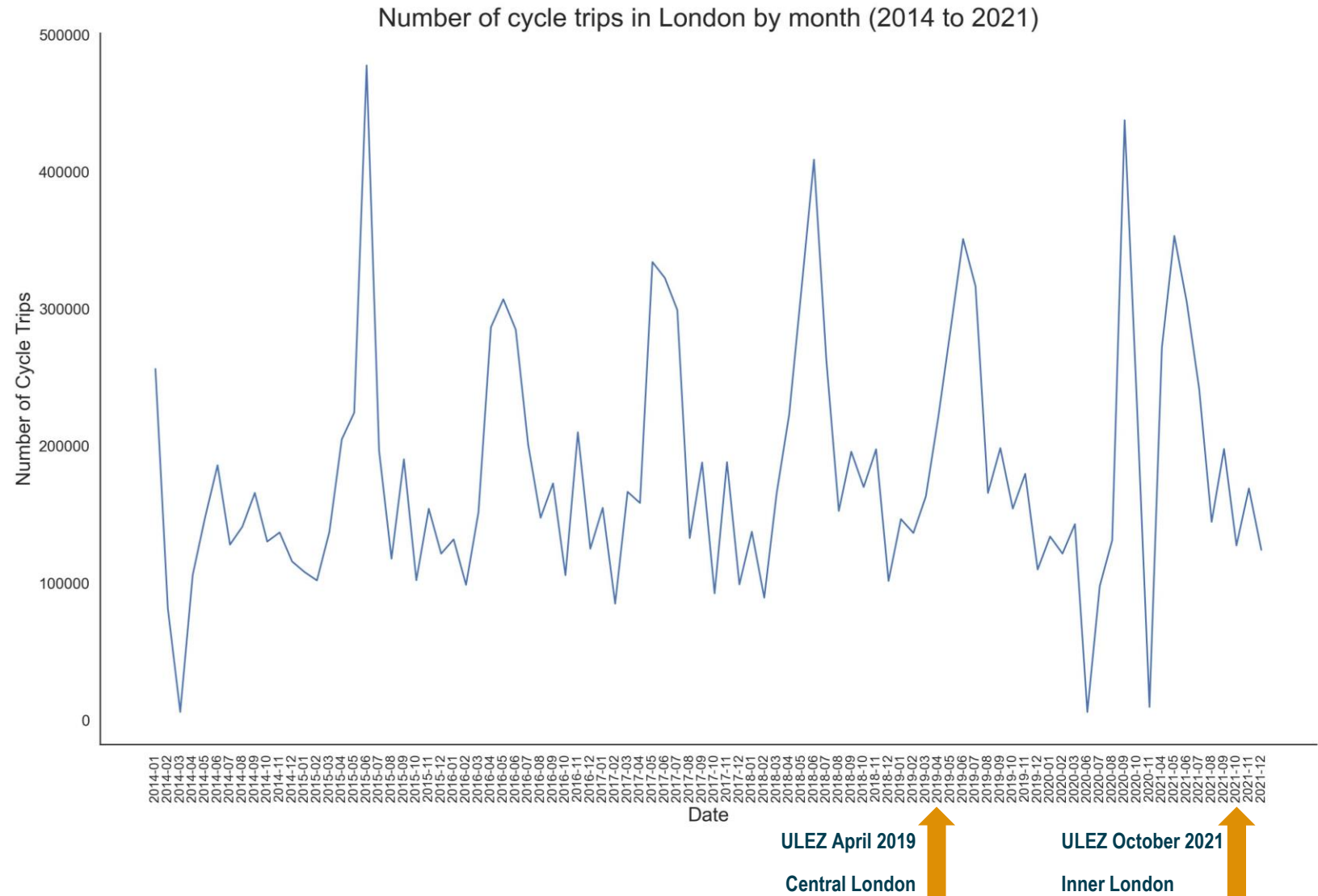
THE LONDON PLAN



- The London Plan 2021 outlines policies for sustainable development, emphasizing vibrant, walkable communities with access to public transport, cycling infrastructure, and pedestrian-friendly streets
- The plan encourages compact neighbourhoods to reduce car travel and promote sustainable transportation
- It also focuses on enhancing public transport networks, improving walking and cycling infrastructure, and promoting active travel
- The London Plan 2021 plays a significant role in realizing the Mayor's vision for a greener, healthier, and more sustainable transport system in the city

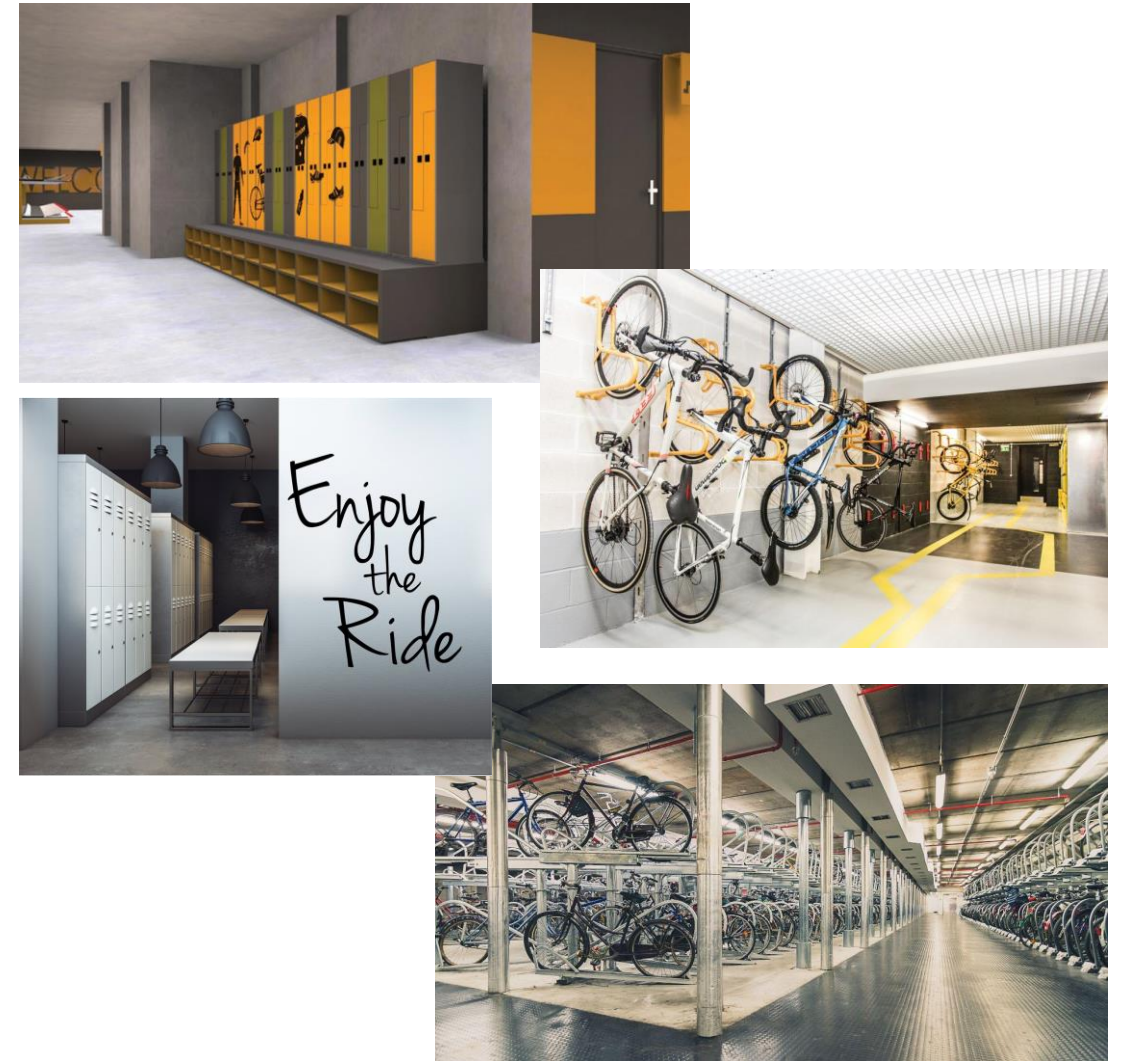


The introduction of the ULEZ (Ultra Low Emission Zone) does not have a direct impact on the number of cycle trips, but it does contribute to improving safety, air quality, and traffic congestion. As a result, it aligns with the Mayor's goal



Source: Data provided by client

- Private investors support cycle parking initiatives in London by participating in car-free developments and adhering to cycle standards
- Car-free developments prioritize sustainable transportation by minimizing or eliminating on-site parking for private vehicles
- Instead, they provide secure and convenient cycle parking facilities, encouraging cycling as the primary mode of transport



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- Include a dedicated cycle carriage in the train network and bike racks on buses to allow non-folded bikes onboard at any time of the day. It will increase accessibility in both directions, into Central London and out of Central London



- Increase the number of secure cycle parking facilities (as it has been done in central and inner London) in the Outer boroughs may increase the number of people cycling in these areas. It will reduce the risk of bikes thefts which has been increasing during the past 5 years



- Increase the number of segregated cycle lanes to reduce the number of cycle accidents which has been increasing during the past 2 years



- Cycle friendly infrastructure like in-kerb gullies should be used in cycling routes to improve drainage and safety



Outer London

Increase cycling infrastructure:
cycle lanes, parking and docking
stations.

- **Outer London may exhibit different behaviours compared to Central London or Inner London due to variations in:**
 - Demographics**
 - Density**
 - Distance to public transport**
- **However, there is a specific opportunity to make progress towards the primary goal of the Mayor's transport strategy by actively encouraging commuters from Outer London to incorporate cycling into their journeys to Central London, along with the current public transport they already use**
- **By effectively tapping into this niche, we can enhance the overall numbers and achieve the desired outcomes outlined in the strategy**

Future Proof

Cycling infrastructure able to adapt
to future climate, demographic and
working pattern changes.

- **A growing elderly population is expected in the future. Better accessibility will make public transport system more resilient**
- **More frequent extreme climate is expected in the future. Cycling friendly infrastructure able to manage both extreme heat waves and extreme rainfall will promote cycling in cities**
- **Cycling and public transport infrastructure able to evolve and adapt to changing working patterns**

1

Risks

- ARIMA forecast using short timeseries can outperform and provide inaccurate outcomes

Further research:

- Further analysis using a longer timeseries
- Undertake a sensitivity analysis using other time series forecasting methods
- Gather more data in order to perform a forecast by area

2

Risks

- Limited financial resources
- Dedicated cycle carriage in trains and bike racks in buses can delay current services and add a new safety risk

Further research:

- Further analysis of interventions in other major cities (Sydney, New York)
- Further investigation on diversity and inclusion factors

3

Short Term Moderate cost



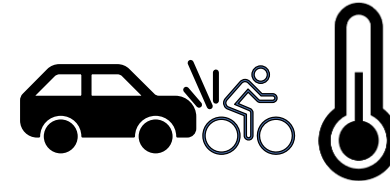
- Include a dedicated cycle carriage in the train network and bike racks on buses
- It can be switched to passenger carriages easily if it is not well received by public

Medium Term Low cost



- Increase the number of secure cycle parking facilities
- Where? By transport hubs to maximise multi-modal journeys, residential areas and workplaces
- Start by the top 5 boroughs in Outer London by cycle trips: Richmond upon Thames, Ealing, Hounslow, Newham and Kingston upon Thames

Long Term High cost



- Increase the number of segregated cycle lanes
- Cycle friendly infrastructure like in-kerb gullies should be used in cycling routes to improve drainage and safety

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- We believe the Mayor's vision is achievable, given the positive trend in cycling, walking, and public transport use
- However, there is still room for improvement in infrastructure and accessibility
- The interventions implemented in Central and Inner areas have shown positive results and should be extended to the Outer area, which lags behind