Pan-Regional Transport Model

Leicester City Workplace Parking Levy Forecasting Report

Quality Information

Prepared by	Checked by	Approved by
Ian Stanness	Mark Dazeley	Mark Dazeley
Associate Director	Regional Director	Regional Director

Revision History

Revision	Revision date	Details	Authorised	Name	Position
v1.0	2021-08-17	For Issue	Yes	Mark Dazeley	Regional Director

Prepared by:

Ian Stanness
Associate Director
T: 01727 530000

AECOM Limited
AECOM House
63-77 Victoria Street
St Albans
Hertfordshire
AL1 3ER

aecom.com

Table of Contents

List of Tables

List of Figures

Section 1 – Overview

1.1 Introduction

1.1.1 Leicester City Council is currently exploring options and evidence for the implementation of a workplace parking levy within the city. A workplace parking levy would most likely involve charging employers within Leicester City based on the number of employee parking spaces they provide. Some employers may pass the levy onto their staff, whereas others may absorb the cost themselves. Impacts that might ultimately affect travel patterns and traffic levels could include:

- increased spending by the local authority on transport interventions using the revenue raised by the levy;
- a reduction in the number of parking spaces provided by employers for employees to reduce the levy paid;
- relocation (in the long-term) of businesses outside the workplace parking levy area;
- a change in commuting travel mode; for instance, a shift to public transport or walking / cycling; and
- a change in parking type and location by commuters, choosing to move from employers' workplace parking to public car parks or on-street spaces.

1.1.2 AECOM has developed and maintains the Pan-Regional Transport Model (PRTM) for Leicestershire County Council, which in turn is developed from the Leicester and Leicestershire Integrated Transport Model (LLITM). Both the PRTM and LLITM have base years which represent observed travel patterns and flows in 2014 with functionality to forecast up to a horizon year of 2051.

1.1.3 Using the PRTM, a high-level assessment of the forecast impacts of a workplace parking levy within Leicester City has been undertaken considering, firstly, the introduction of the workplace parking levy in isolation and then including the forecast increases in public transport and active mode (walking and cycling) travel brought about by the increased spending within the city from the revenue raised by the scheme.

1.1.4 This report details the forecasting assumptions and methodology in undertaking this high-level assessment of the proposed Leicester City workplace parking levy scheme and the model forecasts from the Step 1 assessment (workplace parking levy only) and Step 2 assessment (workplace parking levy and public transport / active mode improvements).

1.2 Report Structure

1.2.1 Following this introduction, this report contains the following sections:

- Section 2 – Forecasting Approach and Assumptions: this section details the forecasting assumptions underpinning the assumed growth between the 2014 base year and the 2021 forecast year, the assumptions adopted in assessing the proposed workplace parking levy, and the adopted assumptions for the improvements in public transport and active modes.
- Section 3 – Step 1 Assessment (Workplace Parking Levy Only): this section details the PRTM forecasts for the Step 1 assessment considering the implementation of the proposed workplace parking levy only.
- Section 4 – Step 2 Assessment (Workplace Parking Levy & Public Transport / Active Mode Improvements): this section details the PRTM forecasts for the Step 2 assessment including both the proposed workplace parking levy and the assumed increases in public transport and active mode usage brought about by the revenue raised by the levy.
- Section 5 – Summary of Assessment: this section provides an overview and summary of the PRTM forecasts for Step 1 and Step 2.

Section 2 – Forecasting Approach and Assumptions

2.1 Introduction

2.1.1 This section sets out the forecasting assumptions and methodology adopted in the assessment of the proposed Leicester City workplace parking levy. This includes the assumptions adopted for the change in land-use and transport infrastructure between the model base year of 2014 and the assessment year of 2021, the assumptions and approach to modelling the proposed workplace parking levy, and the defined increases in public transport and active model usage due to the spending on transport interventions in these areas using the revenue received from the proposed workplace parking levy.

2.2 Core Scenario Assumptions

2.2.1 The Core Scenario assumptions detail the forecast change in land-use (households, population and employment) and transport infrastructure between the model base year of 2014 and the forecast year in this assessment of 2021. The assumed changes in land-use and transport schemes within Leicester City are those agreed with Leicester City Council as part of the parallel assessment of its proposed new Local Plan for growth.

2.2.2 Table 2.1 and Table 2.2 present the assumed number of households and population respectively for the 2014 base year and the 2021 forecast year by district, including the change between 2014 and 2021. Within Leicester City, the Core Scenario assumptions include an increase of almost 9,000 households (or 7.0% growth) and over 16,000 people (or 4.9% growth) from 2014 to 2021.

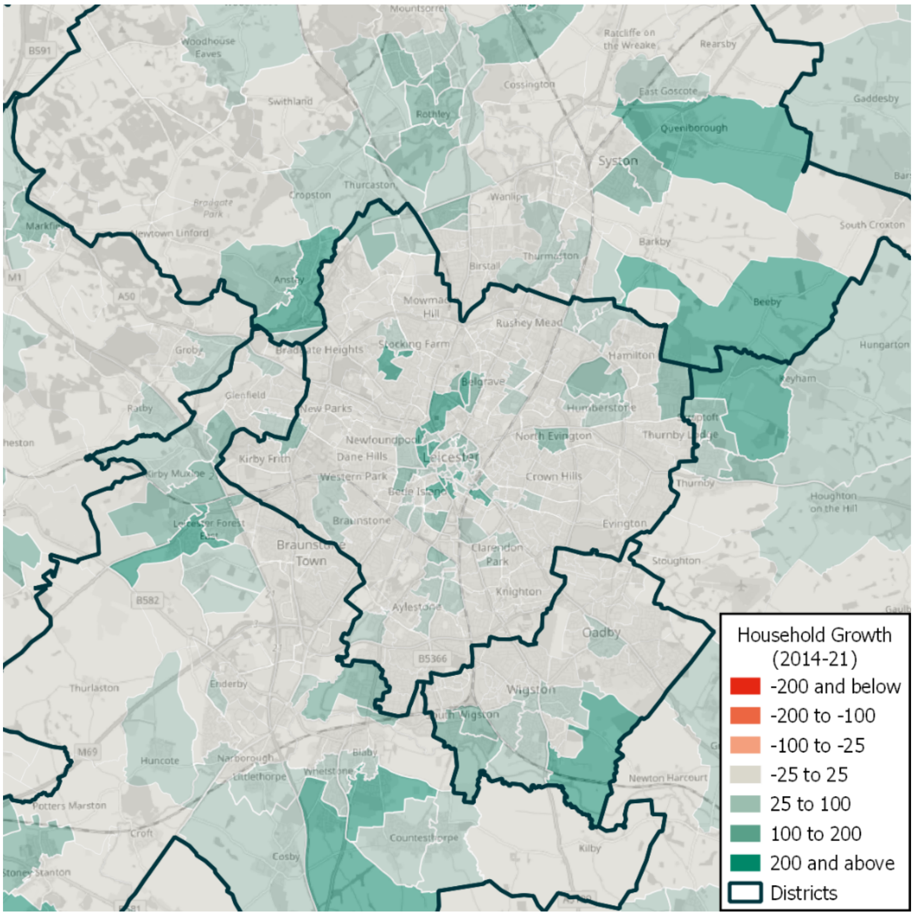
Table 2.1: Core Scenario Household Assumptions

District	2014	2021	Change	%Change
Leicester City	125,112	133,926	8,814	7.0%
Blaby	40,092	43,204	3,112	7.8%
Charnwood	69,476	76,476	7,000	10.1%
Harborough	36,311	39,311	3,000	8.3%
Hinckley and Bosworth	46,811	49,630	2,819	6.0%
Melton	22,137	25,245	3,108	14.0%
North West Leicestershire	40,045	45,559	5,514	13.8%
Oadby and Wigston	21,837	22,757	920	4.2%
Leicestershire (inc. City)	**401,821**	**436,108**	**34,287**	**8.5%**

Table 2.2: Core Scenario Population Assumptions

District	2014	2021	Change	%Change
Leicester City	330,474	346,677	16,203	4.9%
Blaby	95,821	102,190	6,369	6.6%
Charnwood	173,771	189,741	15,970	9.2%
Harborough	86,760	93,447	6,687	7.7%
Hinckley and Bosworth	107,544	113,083	5,538	5.1%
Melton	51,154	57,508	6,354	12.4%
North West Leicestershire	94,798	106,754	11,956	12.6%
Oadby and Wigston	57,591	59,114	1,523	2.6%
Leicestershire (inc. City)	**997,912**	**1,068,513**	**70,601**	**7.1%**

2.2.3 Figure 2.1 presents this assumed change in the number of households from 2014 to 2021 at a model zone level within Leicester City and the surrounding areas. This shows that the assumed growth in households within the city is concentrated to the north of the city centre and areas to the north-west (around Beaumont Leys) and east of the city centre (around Humberstone).



Contains OpenStreetMap data © OpenStreetMap contributors

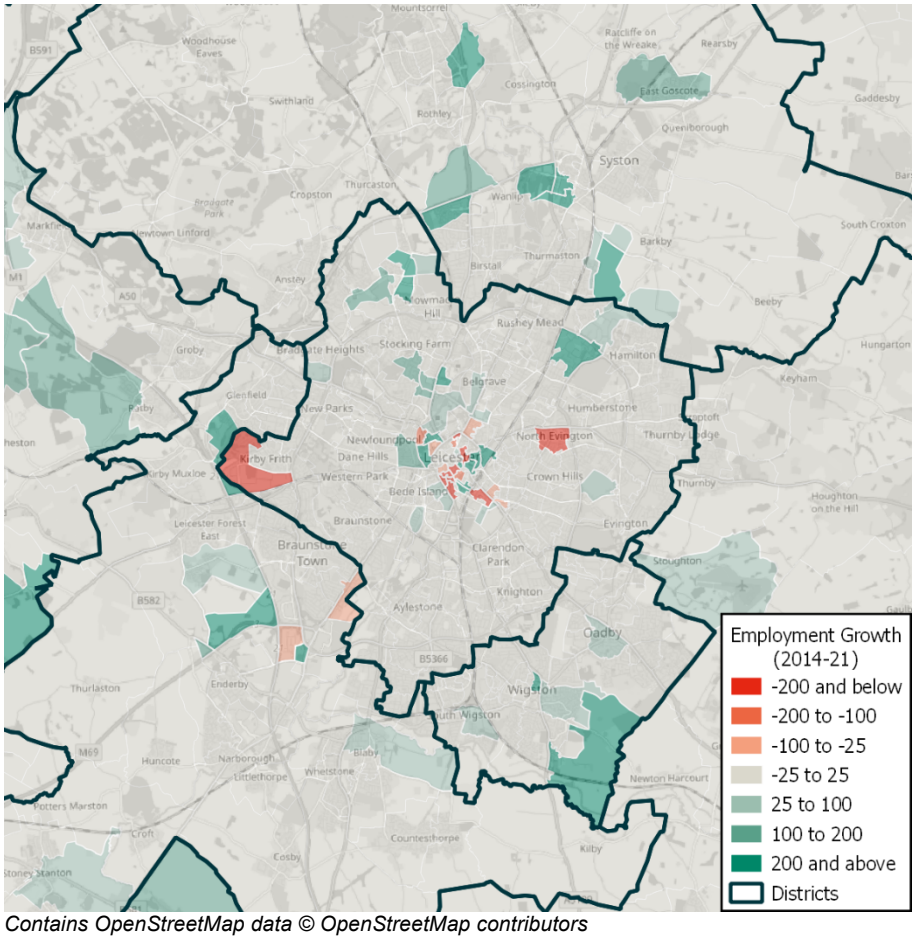
Figure 2.1: Core Scenario Household Growth, 2014 to 2021

2.2.4 In addition to the assumptions detailing growth in households and population, Table 2.3 details the assumed change in employment by district between 2014 and 2021. Within Leicester City there is forecast to be limited growth in employment between 2014 and 2021, with the Core Scenario assumptions including approximately an additional 1,750 jobs or growth of 1.1%. This compares to assumed growth of 8.5% for employment across Leicestershire (including Leicester City) between 2014 and 2021 within the Core Scenario.

Table 2.3: Core Scenario Employment Assumptions

District	2014	2021	Change	%Change
Leicester City	164,028	165,796	1,768	1.1%
Blaby	58,583	60,680	2,098	3.6%
Charnwood	67,423	71,897	4,474	6.6%
Harborough	41,099	47,705	6,606	16.1%
Hinckley and Bosworth	43,311	51,720	8,409	19.4%
Melton	21,695	25,443	3,749	17.3%
North West Leicestershire	58,042	69,651	11,609	20.0%
Oadby and Wigston	20,304	21,835	1,532	7.5%
Leicestershire (inc. City)	**474,484**	**514,728**	**40,243**	**8.5%**

2.2.5 The assumed locations of change in employment within Leicester City and the surrounding areas between 2014 and 2021 are shown in Figure 2.2. Most of the forecast change in employment within Leicester City is concentrated in and around the city centre, although there are areas of forecast change in employment at the edge of Leicester City to the north-east (around Troon Way), north-west (along Beaumont Leys Lane), and west of the city centre (around Braunstone Frith Industrial Estate).



Contains OpenStreetMap data © OpenStreetMap contributors

Figure 2.2: Core Scenario Employment Growth, 2014 to 2021

2.2.6 In addition to forecast changes in land-use within the Core Scenario, the Core Scenario also includes assumptions regarding changes to the transport infrastructure from 2014 to 2021. Table 2.4 provides a summary of the transport schemes in Leicester City included in the Core Scenario for the 2021 forecast year.

Table 2.4: Core Scenario Transport Schemes, Leicester City

Scheme Name
Removal of Belgrave Flyover
Saffron Lane, Old Velodrome Improvements
Traffic Calming Schemes
East of Hamilton Development Improvements
Pedestrianisation of Hotel Street, Pedestrianisation of St Martins
Haymarket / Charles St Bus Station Development
Traffic Calming Schemes, 20mph zones
St Nicholas Circle
Welford Road
Belgrave Gate South
Belvoir Street
York Road / Bonners Lane / Grange Road
King Street
Lancaster Road
Mansfield Street & Church Gate
Vaughan Way
Ashton Green
London Road
Ravensbridge Drive / Blackbird Road
Beaumont Leys / Anstey Lane Improvements
Granby Street / Halford Street Improvements
Ratby Lane / Wembley Road Junction
Extension of services and provision of new services for Ashton Green SUE
Leicester City Smarter Choices (LSTF and behavioural change programme)

2.3 Workplace Parking Levy Scenarios

2.3.1 As part of the assessment of the proposed workplace parking levy within Leicester City, five workplace parking levy scenarios have been defined by Leicester City Council. These five scenarios set out assumptions for the annual workplace parking levy and the number of chargeable employee parking spaces within the city.

2.3.2 The daily change for commuters is calculated based on the following:

$$Charge = \left(\frac{WPL}{WorkDays}\right) * P_{Charge} * R_P$$

where:

- WPL is the annual workplace parking levy;
- $WorkDays$ is the assumed number of working days in the year;
- P_{Charge} is the proportion of commuters who use a chargeable parking space and is calculated as $P_{Charge} = \frac{Capacity_{Charge}}{Commute_{Car}}$, where $Capacity_{Charge}$ is the assumed number of chargeable parking spaces and $Commute_{Car}$ is the forecast number of daily commuting car trips to Leicester City; and
- R_P is the assumed proportion of employers who pass on the workplace parking levy to their employees.

2.3.3 As part of the brief for this assessment, Leicester City Council has set out the assumptions detailed in Table 2.5 regarding the five workplace parking levy scenarios to be assessed.

Table 2.5: Leicester City Workplace Parking Levy Assumptions

Scenario	WPL	$WorkDays$	R_P	$Capacity_{Charge}$
1	£550	227	50%	26,000
2	£550	227	50%	22,000
3	£550	227	50%	17,000
4	£550	227	50%	13,000
5	£1,000	227	50%	17,000

2.3.4 Using the assumptions detailed in Table 2.5 and the forecast daily car commuting trips attracted to Leicester City from the 2021 Core Scenario of 76,968 vehicle trips, the daily charge in 2021 prices has been calculated. The PRTM has a price base of 2010 (in-line with current TAG advice) and therefore the 2021 daily change has been adjusted to 2010 prices using assumptions in the TAG data book. The outturn workplace parking levy daily charges in 2010 prices for the five scenarios are detailed in Table 2.6.

Table 2.6: Leicester City Workplace Parking Levy Daily Charges

Scenario	WPL	$WorkDays$	R_P	P_{Charge}	Charge (2021)	Charge (2010)
1	£550	227	50%	34%	£0.41	£0.34
2	£550	227	50%	29%	£0.35	£0.28
3	£550	227	50%	22%	£0.27	£0.22
4	£550	227	50%	17%	£0.20	£0.17
5	£1,000	227	50%	22%	£0.49	£0.40

2.3.5 The PRTM represents home-based travel demand (such as commuting) as tours. A tour represents two individual trips, one from-home and one to-home, which are linked within the PRTM to ensure that mode choice is made based on the combined cost of travel for the outbound and return legs of the journey and that the same mode of travel is modelled for both legs of a tour.

2.3.6 As the costs of travel for a tour represent the total cost of both the outbound and return journeys, the daily changes shown in Table 2.6 have been applied to all commuting tours with an attraction in Leicester City.

2.3.7 No geographical variation in the workplace parking levy has been modelled within Leicester City, with the same charge applied to all model zones within Leicester City. It is expected that, if implemented, the estimated daily charge would vary across the city given the distribution of employment within the city and the varying nature of these employers, some of which may be eligible for a discount or exemption from the scheme, which will result in different values for P_{Charge} across the city.

2.3.8 As this is a high-level assessment of the proposed scheme, the same average daily change has been applied across all model zones in Leicester City within this assessment.

2.4 Public Transport & Active Mode Improvement Scenarios

2.4.1 The revenue from the workplace parking levy is to be spent on operating the scheme and transport-related infrastructure and services promoting non-car use within the city. As a result of this additional investment, an increase in travel by bus, walking and cycling is forecast within the city.

2.4.2 The forecast increases in bus, walking and cycling usage within Leicester City have been provided by Leicester City Council and are shown in Table 2.7. No independent review of these assumptions has been undertaken by AECOM as part of this study.

Table 2.7: Assumed Percentage Increases in Non-Car Trips in Step 2

Scenario	Bus	Walking	Cycling
1	10%	74%	493%
2	10%	63%	417%
3	10%	48%	322%
4	10%	37%	247%
5	10%	88%	586%

2.4.3 These increases in bus and active modes have been imposed on the PRTM forecasts through a reallocation of travel demand within the mode choice element of the model for trips produced in Leicester City. The mode choice is undertaken by trip purpose for daily demand by production zone, firstly between active and motorised modes, and then for motorised modes between car and public transport. (A subsequent public transport choice between bus and rail is applied later within the demand model after time period choice and trip distribution.)

2.4.4 Using the forecasts from the corresponding Step 1 scenarios, the number of trips assumed to be removed from car and added to bus and active modes have been calculated. These changes in trips have then been allocated across all non-freight trip purposes using the proportions of trip purposes in the Step 1 forecasts.

2.4.5 The PRTM does not represent walking and cycling separately and data from the trip-end model have been used to split the PRTM forecasts for combined active modes to walking and cycling. This allows the different forecast increases in walking and cycling defined in Table 2.7 to be represented in the model forecast and used to calculate a combined active mode increase.

2.4.6 Table 2.8 details the increases in bus and active mode trips adopted in the Step 2 assessment based on the assumptions and methodology detailed in this section.

Table 2.8: Assumed Increases in Non-Car Trips in Step 2

	Bus		Active Modes			
Scenario	Step 1	Increase	Step 1 (combined)	Step 1 (walking)	Step 1 (cycling)	Increase
1	84,573	8,457	331,970	305,702	26,268	355,720
2	84,525	8,452	331,849	305,614	26,235	301,937
3	84,470	8,447	331,736	305,534	26,201	231,025
4	84,429	8,443	331,647	305,472	26,174	177,675
5	84,625	8,462	332,104	305,801	26,303	423,241

Section 3 – Step 1 Assessment (Workplace Parking Levy Only)

3.1 Introduction

3.1.1 This section sets out the PRTM forecasts for Step 1 of the assessment of the proposed workplace parking levy in Leicester City based on the assumptions set out in Section 2.3. These forecasts include the proposed workplace parking levy only, and do not include the assumed changes to mode share due to the additional revenue for transport interventions from the proposed scheme to promote the use of sustainable modes.

3.1.2 Within this section the analysis of the PRTM forecasts focusses on the forecast mode shares for trips attracted to and produced within Leicester City and the forecast impact that the change in travel demand has on the highway network performance in terms of forecast traffic, delays and average speeds.

3.2 Mode Share Analysis

3.2.1 The introduction of the workplace parking levy in Leicester City adds to the forecast cost of travel for car commuting journeys to workplaces in the city. This is forecast to result in a decrease in car mode share for commuting trips to Leicester City and a corresponding increase in public transport and active mode (walking and cycling) mode shares.

3.2.2 Table 3.1 shows the forecast daily mode shares for commuting trips attracted to Leicester City in the Core Scenario and the five workplace parking levy scenarios, including the forecast change in mode share from the Core Scenario in each of the workplace parking scenarios. These forecasts are also presented in Figure 3.1.

3.2.3 In all workplace parking levy scenarios, the forecast car mode share reduces from the Core Scenario with the introduction of the levy. The largest forecast reduction in car mode share is 0.8 percentage points in Scenario 5, with the lowest reduction being in Scenario 4 at 0.3 percentage points. The relative reductions in car mode share for commuting trips attracted to Leicester City is aligned with the relatively level of daily charges for commuters as detailed in Table 2.6.

3.2.4 Table 3.1 and Figure 3.1 also show that the corresponding forecast increase in non-car mode share is approximately evenly split between public transport and active modes; however, there is evidence that the forecast increase in mode share for active modes is marginally larger than the forecast increase in public transport mode share.

Table 3.1: Forecast Mode Shares and Change from Core Scenario, Leicester City Commuting Attractions, Step 1

Scenario	Highway	Public Transport	Active Modes
Core	74.3%	12.6%	13.2%
1	73.6%	12.8%	13.5%
	-0.7%	0.3%	0.4%
2	73.7%	12.8%	13.5%
	-0.5%	0.2%	0.3%
3	73.9%	12.7%	13.4%
	-0.4%	0.2%	0.2%
4	74.0%	12.7%	13.4%
	-0.3%	0.1%	0.2%
5	73.5%	12.9%	13.6%
	-0.8%	0.3%	0.4%

Forecasts may not sum to 100% / 0% due to rounding

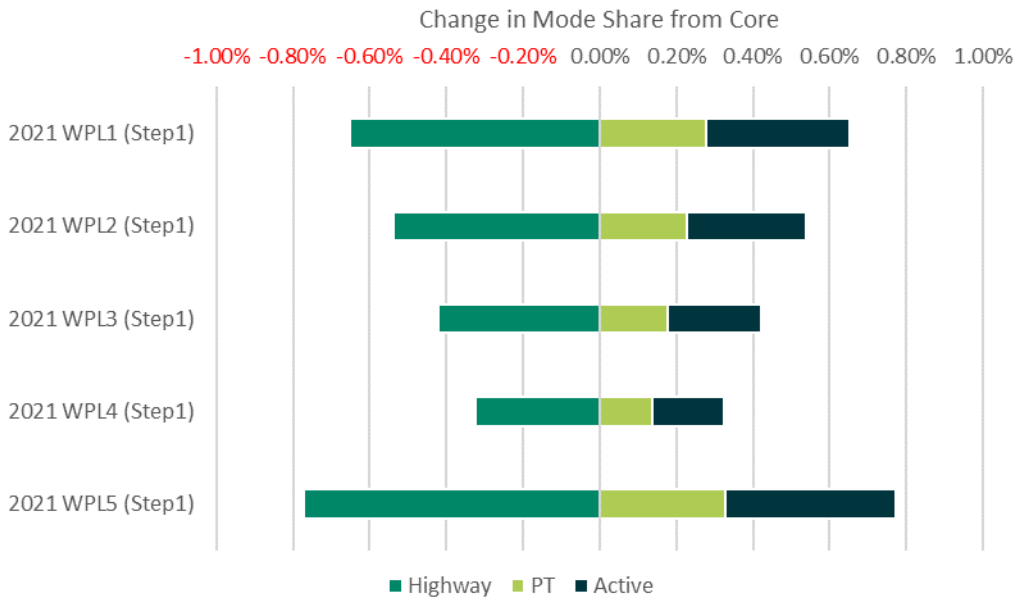


Figure 3.1: Forecast Change in Mode Share, Leicester City Commuting Attractions, Step 1

3.2.5 Considering the relative change in car commuting mode share for trips attracted to Leicester City, Figure 3.2 shows the relationship between the assumed workplace parking levy charge and the forecast reduction in mode share for car commuting to Leicester City. This shows that the relationship between the assumed charge and the reduction in car mode share for commuting to Leicester City is broadly linear, with around a 1.9 percentage point reduction in car mode share for every £1 of daily workplace parking levy.

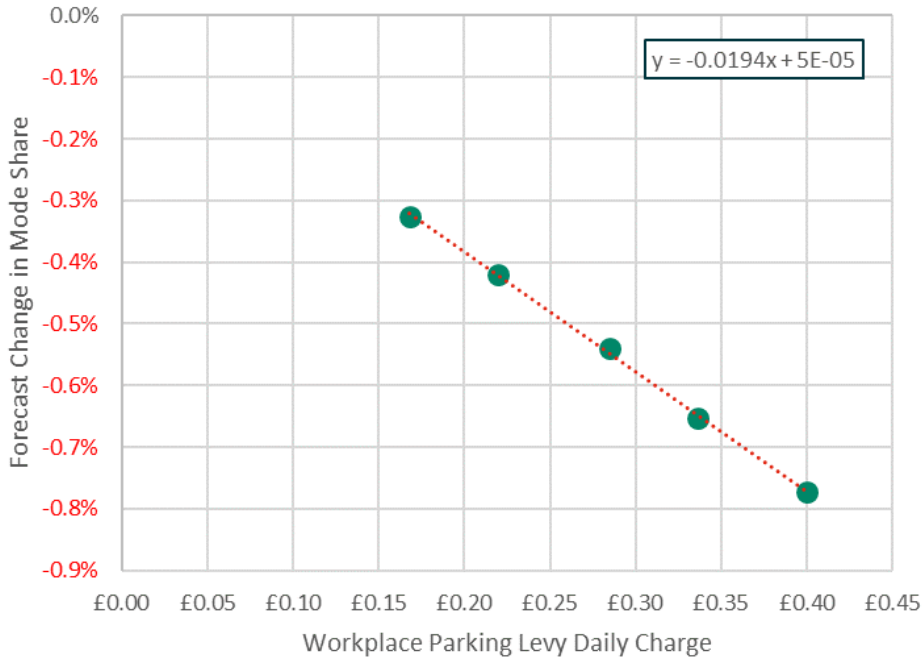


Figure 3.2: Relationship in Forecast Change in Car Commuting Mode Share to Leicester City and Workplace Parking Levy, Step 1

3.2.6 In addition to the analysis of forecast mode shares for commuting trips attracted to Leicester City, analysis has also been undertaken to assess the forecast change in mode shares for all non-freight trips produced within Leicester City. The results of this analysis are shown in Table 3.2 and Figure 3.3.

3.2.7 The forecast reduction in car mode share across all non-freight trips produced in Leicester City is relatively small in magnitude, with no forecast reduction in car mode share of more than 0.1 percentage points. As with the analysis of commuting trips attracted to Leicester City, the scale of the forecast reduction in car mode share for all non-freight trips produced in Leicester City is aligned with the assumed daily charge for the proposed workplace parking levy, with the largest forecast decrease in car mode share in Scenario 5 and the smallest forecast decrease in Scenario 4.

3.2.8 The forecast reduction in car mode share for all non-freight trips produced within Leicester City results in a forecast increase in mode share for public transport and active modes. In general, across the five workplace parking levy scenarios, the forecast increases in mode share for active modes is broadly three times the forecast increases in public transport mode share. This implies that around three-quarters of the non-freight trips produced in Leicester City which change their mode of travel from car are forecast to use active modes.

Table 3.2: Forecast Mode Shares and Change from Core Scenario, Leicester City Non-Freight Productions, Step 1

Scenario	Highway	Public Transport	Active Modes
Core	64.6%	7.7%	27.7%
1	64.6%	7.7%	27.7%
	-0.07%	0.02%	0.05%
2	64.6%	7.7%	27.7%
	-0.06%	0.02%	0.04%
3	64.6%	7.7%	27.7%
	-0.05%	0.01%	0.03%
4	64.6%	7.7%	27.7%
	-0.04%	0.01%	0.03%
5	64.6%	7.7%	27.7%
	-0.09%	0.02%	0.07%

Forecasts may not sum to 100% / 0% due to rounding

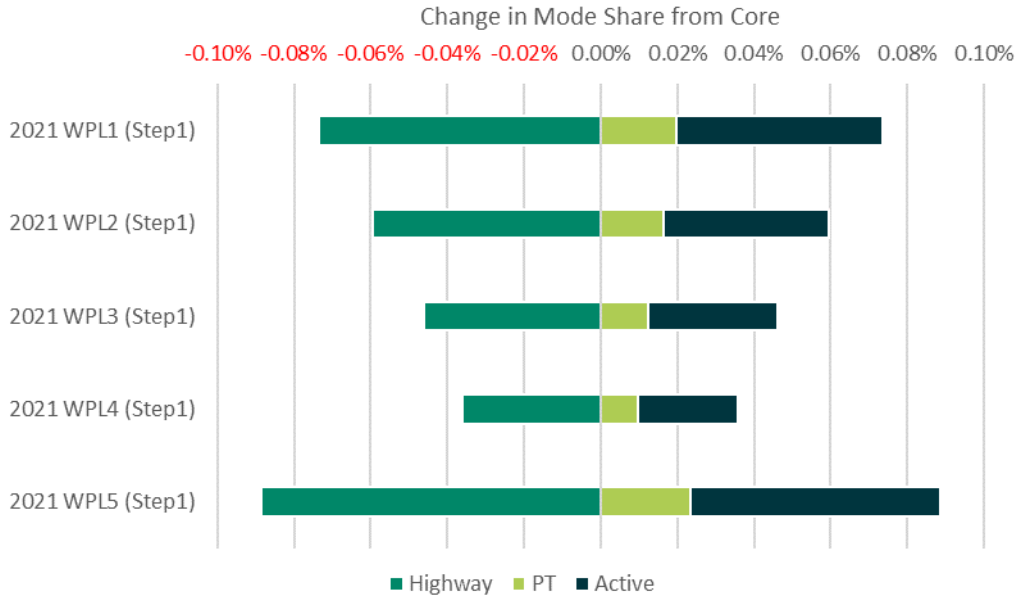


Figure 3.3: Forecast Change in Mode Share, Leicester City Non-Freight Productions, Step 1

3.3 Highway Network Performance Analysis

3.3.1 In addition to the analysis of forecast mode shares, the performance of the highway network within Leicester City has also been assessed. This has considered the forecast traffic (measured in terms of vehicle-miles), delay (measures in vehicle-hours) and average speeds (measured in miles per hour) within Leicester City.

3.3.2 Table 3.3 shows the forecast traffic in Leicester City in the Core Scenario and the five workplace parking levy scenarios in the three modelled time periods: AM Peak hour (08:00 to 09:00); average interpeak hour (between 10:00 and 16:00); and the PM Peak hour (17:00 to 18:00).

3.3.3 Considering the two peak hours, traffic is forecast to reduce across the city in all workplace parking levy scenarios except in the AM Peak hour for Scenario 4 (where a small 0.01% increase in traffic is forecast). Whilst there is some variation, there is a general trend for the forecast reductions in traffic in the city to correspond with the daily workplace parking levy applied in each scenario, with the largest forecast reduction in Scenario 5 and the smallest impact in Scenario 4.

3.3.4 There is limited forecast change in traffic within Leicester City in the interpeak hour with the introduction of the proposed workplace parking levy. This is due to majority of commuting travel, which is influenced by the proposed scheme, occurring in the AM Peak and PM Peak hours.

Table 3.3: Forecast Traffic (veh-miles) and Change from Core Scenario, Leicester City, Step 1

Scenario	AM Peak Hour	Interpeak Hour	PM Peak Hour
Core	176,570	134,820	174,733
1	176,427	134,821	174,567
	-0.08%	0.00%	-0.09%
2	176,517	134,818	174,516
	-0.03%	0.00%	-0.12%
3	176,498	134,809	174,596
	-0.04%	-0.01%	-0.08%
4	176,589	134,839	174,662
	0.01%	0.01%	-0.04%
5	176,374	134,836	174,473
	-0.11%	0.01%	-0.15%

3.3.5 With the forecast reduction in traffic in Leicester City, there is forecast to be a reduction in delays within the city. Table 3.4 shows the forecast change in vehicle-delay within the city from the Core Scenario to the five workplace parking levy scenarios in the three modelled hours. As with the forecast change in traffic, the scale of the forecast change in delay from the Core Scenario is small with the forecast change varying between a decrease in delay of 0.54% in the Scenario 5 PM Peak hour and an increase of 0.22% in the Scenario 4 AM Peak hour.

Table 3.4: Forecast Delay (veh-hours) and Change from Core Scenario, Leicester City, Step 1

Scenario	AM Peak Hour	Interpeak Hour	PM Peak Hour
Core	5,060	3,095	5,010
1	5,058	3,086	5,007
	-0.05%	-0.29%	-0.04%
2	5,055	3,094	4,987
	-0.10%	-0.03%	-0.45%
3	5,060	3,098	5,004
	0.00%	0.08%	-0.11%
4	5,071	3,089	5,004
	0.22%	-0.21%	-0.10%
5	5,053	3,086	4,983
	-0.14%	-0.30%	-0.54%

3.3.6 Finally, Table 3.5 shows the forecast change in the average speed within the city from the Core Scenario to the five workplace parking levy scenarios in the three modelled hours. As with the forecast change in traffic and delay, the scale of the forecast change in average speed from the Core Scenario is small, with the forecast change varying between a decrease in delay of 0.08% in the Scenario 4 AM Peak hour and an increase of 0.2% in the Scenario 5 PM Peak hour.

Table 3.5: Forecast Average Speed (mph) and Change from Core Scenario, Leicester City, Step 1

Scenario	AM Peak Hour	Interpeak Hour	PM Peak Hour
Core	15.4	16.9	15.4
1	15.4	16.9	15.4
	0.00%	0.12%	0.00%
2	15.4	16.9	15.5
	0.05%	0.01%	0.16%
3	15.4	16.9	15.4
	-0.01%	-0.03%	0.03%
4	15.3	16.9	15.4
	-0.08%	0.09%	0.04%
5	15.4	16.9	15.5
	0.04%	0.13%	0.20%

Section 4 – Step 2 Assessment (Workplace Parking Levy & Public Transport / Active Mode Improvements)

4.1 Introduction

4.1.1 This section sets out the PRTM forecasts for Step 2 of the assessment of the proposed workplace parking levy in Leicester City based on the assumptions set out in Section 2.4. These forecasts include the proposed workplace parking levy and the assumed changes to mode share due to the revenue for transport interventions to promote the use of sustainable modes from the proposed scheme.

4.1.2 Within this section the analysis of the PRTM forecasts focusses on the forecast mode shares for trips produced within Leicester City and the forecast impact that the change in travel demand has on the highway network performance in terms of forecast traffic, delays and average speeds.

4.2 Mode Share Analysis

4.2.1 The assumed changes to mode choice set out in Table 2.8 are applied within the demand model for each iteration of the PRTM runs; however, secondary responses to the assumed changes in mode share are allowed within the forecasts. With the reduction in car travel in Leicester City in Step 2, there will be a reduction in congestion within the city which will reduce travel costs for car, making this mode more attractive.

4.2.2 This effect is shown in Table 4.1 which details the forecast daily person trip totals produced in Leicester City for all non-freight purposes in the Step 1 and Step 2 assessments. Table 4.1 includes the forecast change between Step 1 and Step 2, along with the input change in trips based on the defined percentage increases in bus, walking and cycling trips provided by Leicester City Council (as shown in Table 2.8).

4.2.3 Table 4.1 shows that the modelled reductions in highway trips produced within Leicester City are smaller than the input reductions in highway trips, with corresponding smaller modelled increases in public transport and active modes than input into the model runs. This reflects the mode shift response towards highway due to the forecast reductions in congestion brought about by the assumed move towards sustainable modes.

4.2.4 In all five workplace parking levy scenarios, the modelled reduction in daily car trips produced in Leicester City is 95% of the reduction detailed in Table 2.8 based on the assumptions provided by Leicester City Council.

Table 4.1: Forecast Daily Person Trips From Step 1 and Step 2, Leicester City Productions

Scenario		Highway	Public Transport	Active Modes
1	Step 1	772,887	92,095	331,970
	Step 2	425,678	99,971	670,280
	Change	-347,209	7,876	338,311
	Input	-364,177	8,457	355,720
2	Step 1	773,070	92,055	331,849
	Step 2	477,294	99,766	619,001
	Change	-295,777	7,711	287,151
	Input	-310,389	8,452	301,937
3	Step 1	773,228	92,009	331,736
	Step 2	545,121	99,608	551,594
	Change	-228,107	7,599	219,858
	Input	-239,472	8,447	231,025
4	Step 1	773,346	91,975	331,647
	Step 2	596,017	99,577	500,864
	Change	-177,329	7,602	169,217
	Input	-186,118	8,443	177,675
5	Step 1	772,703	92,138	332,104
	Step 2	360,650	100,316	734,822
	Change	-412,053	8,178	402,718
	Input	-432,704	8,462	423,241

Forecast changes may not sum to 0 due to rounding

4.2.5 The assumed change in mode share is targeted at trips produced within Leicester City and Table 4.2 details the forecast mode shares and change in mode share from the Core Scenario to the Step 2 workplace parking levy scenarios for all non-freight trips produced in Leicester City. The forecast change in mode shares from the Core Scenario are also shown in Figure 4.1.

4.2.6 Table 4.2 shows that in the Core Scenario, around 65% of non-freight trips are made by car, with around 28% using active modes (walking and cycling) and 8% using public transport. Due to the assumed increases in non-car trips in the Step 2 assessment, significant changes to the mode shares in Leicester City are forecast, with car mode share reducing to below 50% in all workplace parking levy scenarios.

4.2.7 In all workplace parking levy scenarios except Scenario 4, walking and cycling is forecast to have the highest mode share across the three defined modes, with mode shares for walking and cycling forecast to be above 50% in workplace parking levy Scenarios 1, 2 & 5. In Scenario 5, the forecast mode share for walking and cycling is 61.5%, which is slightly lower than the Core Scenario mode share forecast for car at 64.6%.

4.2.8 Both Table 4.2 and Figure 4.1 show that the majority of the reduction assumed for car trips produced in Leicester City is countered by an assumed increase in walking and cycling. The forecast mode share for public transport trips produced in Leicester City increases by around 0.7 percentage points in all five workplace parking levy scenarios. This reflects the assumptions detailed in Table 2.8 with assumed increases in bus trips of around 8,500 compared with increases of between around 175,000 and 425,000 active mode trips.

Table 4.2: Forecast Mode Shares and Change from Core Scenario, Leicester City Non-Freight Productions, Step 2

Scenario	Highway	Public Transport	Active Modes
Core	64.6%	7.7%	27.7%
1	35.6%	8.4%	56.0%
	-29.1%	0.7%	28.4%
2	39.9%	8.3%	51.8%
	-24.7%	0.7%	24.1%
3	45.6%	8.3%	46.1%
	-19.1%	0.7%	18.4%
4	49.8%	8.3%	41.9%
	-14.8%	0.6%	14.2%
5	30.2%	8.4%	61.5%
	-34.5%	0.7%	33.8%

Forecasts may not sum to 100% / 0% due to rounding

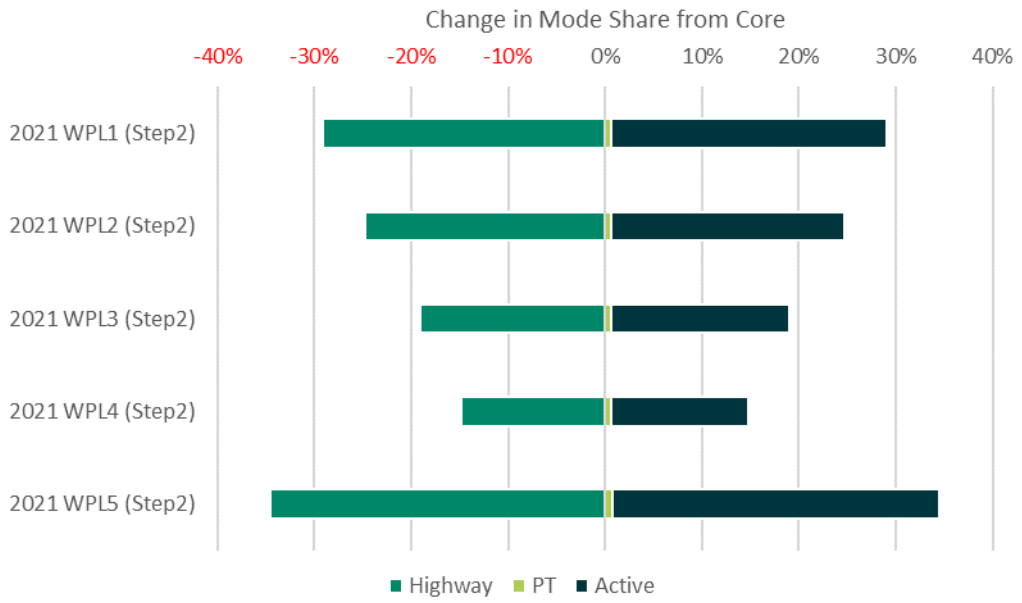


Figure 4.1: Forecast Change in Mode Share, Leicester City Non-Freight Productions, Step 2

4.3 Highway Network Performance Analysis

4.3.1 Using the forecast highway travel demand including the assumed reduction in car trips produced within Leicester City, the performance of the highway network within Leicester City has been assessed. This has considered the forecast traffic (measured in terms of vehicle-miles), delay (measures in vehicle-hours) and average speeds (measured in miles per hour) within Leicester City.

4.3.2 Table 4.3 shows the forecast traffic in Leicester City in the Core Scenario and the five workplace parking levy scenarios including the assumed reductions in car trips in the three modelled time periods: AM Peak hour (08:00 to 09:00); average interpeak hour (between 10:00 and 16:00); and the PM Peak hour (17:00 to 18:00).

4.3.3 Across all workplace parking levy scenarios there are forecast reductions in traffic in Leicester City, reflecting the assumed reduction in car trips. The modelled reductions in car trips produced in Leicester City are between 23% in Scenario 4 and 53% in Scenario 5; however, the forecast reductions in traffic within Leicester City shown in Table 4.3 are lower than this at between 10.4% in the Scenario.4 PM Peak hour and 27.4% in the Scenario 5 interpeak hour.

4.3.4 This is primarily due to two factors: freight traffic and inbound / through traffic. The assumed reductions in highway trips produced in Leicester City have been applied to all non-freight trip purposes and therefore no adjustment has been applied to freight demand within Step 2 of the assessment.

4.3.5 Secondly, the reductions in car trips have been applied to trips produced within Leicester City and therefore trips attracted to Leicester City and through movements have not been adjusted directly. With the forecast reduction in congestion within the city, this will reduce travel costs for trips to and through the city and it is therefore likely to increase the number of car trips attracted to the city and travelling through the city.

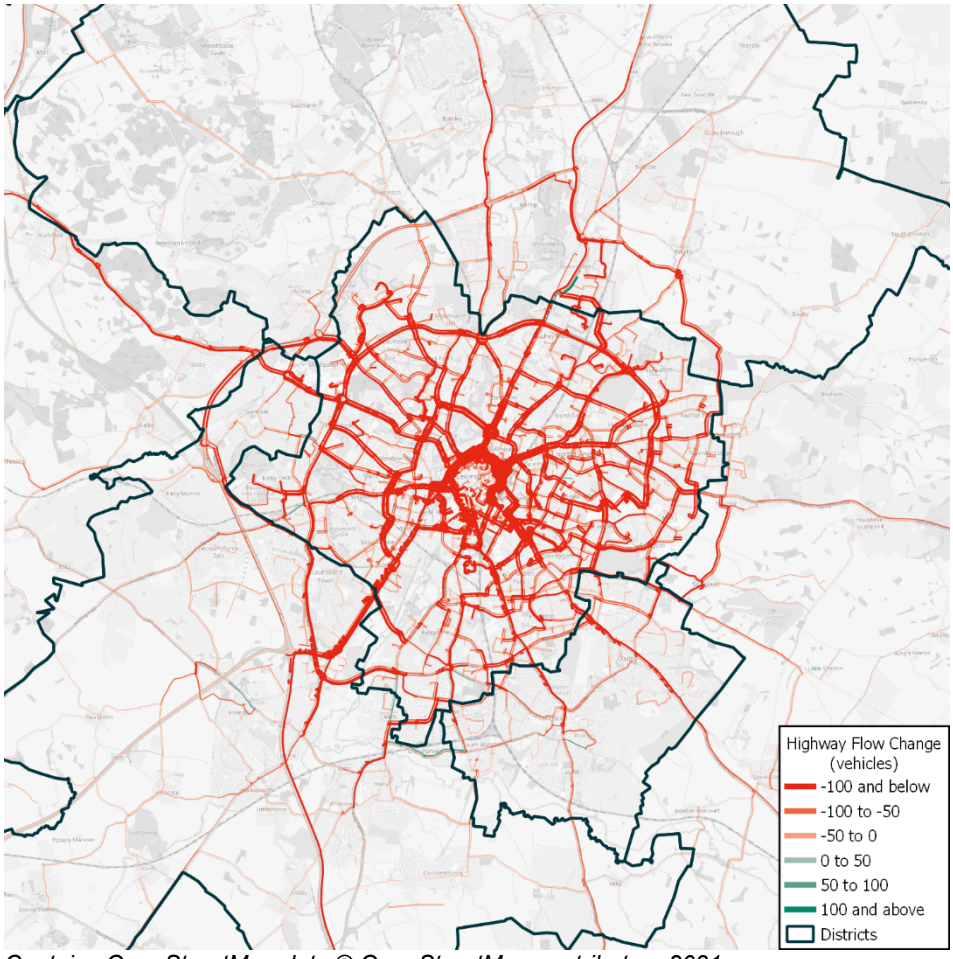
4.3.6 Table 4.3 shows that there is limited variation in the forecast reduction in traffic across the three time periods with similar forecast reductions in the two peak hours and marginally higher forecast reductions in the interpeak hour. The forecast reductions in traffic are aligned with the input assumptions regarding the reduction in car trips (and ultimately the assumed daily workplace parking levy), with the largest forecast reductions in Scenario 5 and the smallest forecast reductions in Scenario 4.

Table 4.3: Forecast Traffic (veh-miles) and Change from Core Scenario, Leicester City, Step 2

Scenario	AM Peak Hour	Interpeak Hour	PM Peak Hour
Core	176,570	134,820	174,733
1	138,534	103,718	138,166
	-21.5%	-23.1%	-20.9%
2	144,438	108,399	143,798
	-18.2%	-19.6%	-17.7%
3	151,969	114,542	151,060
	-13.9%	-15.0%	-13.5%
4	157,690	119,122	156,507
	-10.7%	-11.6%	-10.4%
5	131,155	97,832	130,985
	-25.7%	-27.4%	-25.0%

4.3.7 Figure 4.2 shows the forecast change in highway flows in and around Leicester City in the AM Peak hour between the 2021 Core Scenario and the workplace parking levy Scenario 1 including the assumed move to sustainable modes of travel. This shows that there are forecast to be flow reductions across the city, with some flow reductions extending beyond the city into neighbouring authorities. As the distance from the city increases, the forecast impact of the assumed mode to sustainable modes of travel on highway link volumes reduces.

4.3.8 The forecast pattern of highway flow change in the other modelled time periods (interpeak and PM Peak hours) and across the five workplace parking levy scenarios is similar, with the key differences being the magnitude of the forecast flow decreases. Aligned with the analysis in Table 4.3, the forecast flow decreases are largest in Scenario 5 and lowest in Scenario 4.



Contains OpenStreetMap data © OpenStreetMap contributors 2021

Figure 4.2: Forecast Highway Flow Change Core Scenario to Workplace Parking Levy Scenario 1, AM Peak hour, Step 2

4.3.9 Figure 4.3 shows the relationship between the forecast reduction in traffic in Leicester City and the assumed reduction in car trips produced in the city. For this analysis an approximation of 12-hour (07:00 to 19:00) weekday traffic has been used and calculated using factors adopted in other applications of the PRTM. This multiplies the peak hour flows by around 2.5 and the interpeak hour flows by six to estimate 12-hour traffic.

4.3.10 This shows that the relationship is broadly linear, with an increase in the assumed reduction in car trips resulting in an increase in the forecast reduction in traffic within the city. The relationship suggests that for every 100,000 car trips produced in Leicester City which move to sustainable modes, there is a forecast 6.2% reduction in traffic across the 12-hour period in the city.

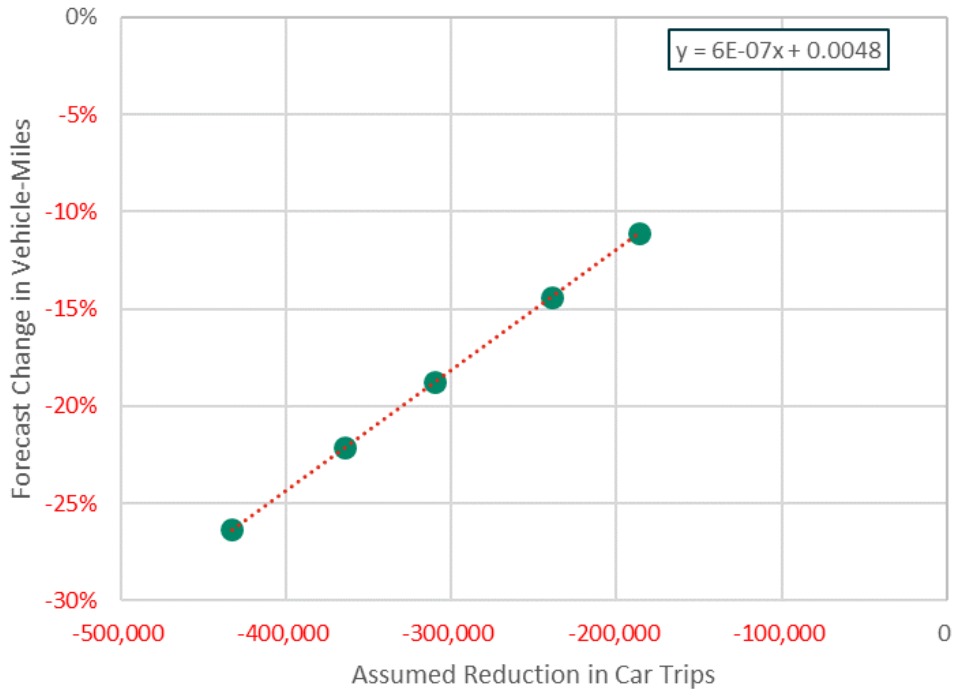


Figure 4.3: Relationship in Forecast Change in Traffic (vehicle-miles) and Assumed Reduction in Leicester City Car Trips, Step 2

4.3.11 With the forecast reduction in traffic in Leicester City there is forecast to be a reduction in delay in the city as shown in Table 4.4. The forecast reductions in delay are aligned with the forecast reductions in traffic in Leicester City, with the highest forecast reductions in delay in Scenario 5 (at between 41.5% in the interpeak hour and 44.1% in the AM Peak hour) and the lowest forecast reductions in delay in Scenario 4 (at between 19.6% in the interpeak hour and 21.4% in the AM Peak hour).

4.3.12 Considering the variation in the forecast reduction in delay in Leicester City by time period, the forecast reductions in delay are similar in the three modelled time periods, with the lowest forecast reductions in delay in the interpeak hour. This reflects the lower forecast congestion and delay in the interpeak hour.

Table 4.4: Forecast Delay (veh-hours) and Change from Core Scenario, Leicester City, Step 2

Scenario	AM Peak Hour	Interpeak Hour	PM Peak Hour
Core	5,060	3,095	5,010
1	3,112	1,986	3,173
	-38.5%	-35.8%	-36.7%
2	3,350	2,135	3,410
	-33.8%	-31.0%	-31.9%
3	3,695	2,335	3,733
	-27.0%	-24.6%	-25.5%
4	3,976	2,488	3,996
	-21.4%	-19.6%	-20.2%
5	2,831	1,812	2,893
	-44.1%	-41.5%	-42.3%

4.3.13 Figure 4.4 shows the relationship between the forecast reduction in delay in Leicester City and the assumed reduction in car trips produced in the city. As with the corresponding analysis for traffic, this analysis using an approximation of 12-hour (07:00 to 19:00) weekday delay using the same approach and assumptions as adopted for the estimate of 12-hour Leicester City traffic.

4.3.14 This shows that the relationship is broadly linear whereby an increase in the assumed reduction in car trips resulting in an increase in the forecast reduction in delay within the city. The relationship suggests that for every 100,000 car trips produced in Leicester City which move to sustainable modes, there is a forecast 9.0% reduction in delay across the 12-hour period.

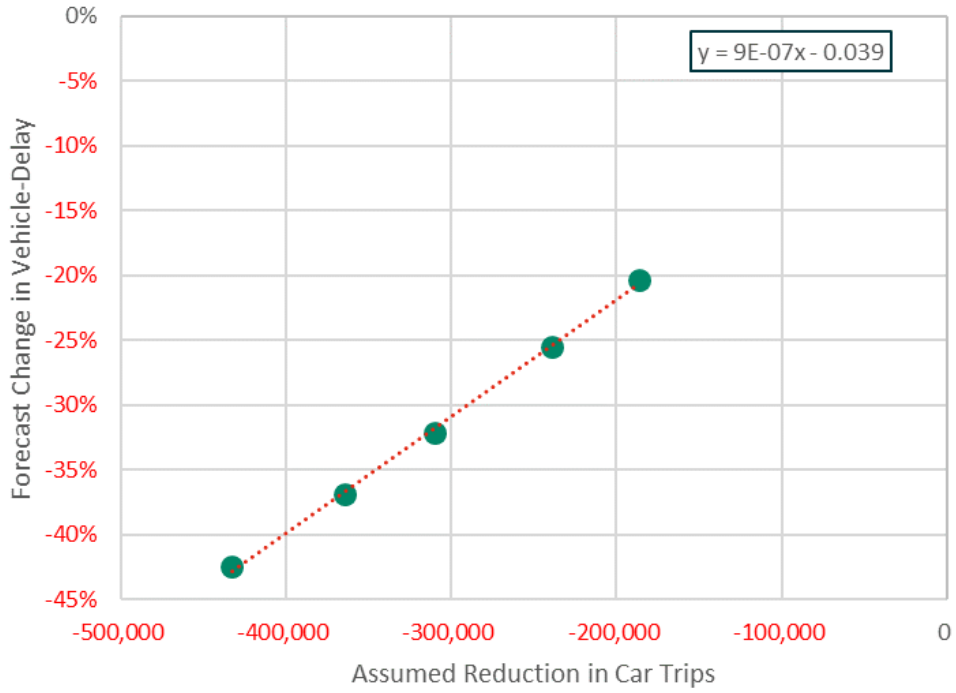


Figure 4.4: Relationship in Forecast Change in Delay (vehicle-hours) and Assumed Reduction in Leicester City Car Trips, Step 2

4.3.15 Finally, Table 4.5 shows the forecast change in the average network speeds in Leicester City from the Core Scenario to the five workplace parking levy scenarios including the assumed reductions in car trips produced in the city. This shows that average speeds in Leicester City are forecast to increase in all workplace parking levy scenarios with the largest increases in Scenario 5 (at between 11.6% in the interpeak hour and 16.2% in the AM Peak hour) and the smallest increases in Scenario 4 (at between 4.8% in the interpeak hour and 6.9% in the AM Peak hour).

4.3.16 As with the analysis of delay within Leicester City, the forecast increases in average speeds are highest in the peak hours and lowest in the interpeak hour, reflecting the relative level of forecast congestion across the modelled time periods.

Table 4.5: Forecast Average Speed (mph) and Change from Core Scenario, Leicester City, Step 2

Scenario	AM Peak Hour	Interpeak Hour	PM Peak Hour
Core	15.4	16.9	15.4
1	17.5	18.5	17.4
	13.7%	9.6%	12.7%
2	17.2	18.2	17.1
	11.7%	8.0%	10.7%
3	16.7	17.9	16.7
	9.0%	6.1%	8.3%
4	16.4	17.7	16.4
	6.9%	4.8%	6.4%
5	17.8	18.8	17.8
	16.2%	11.6%	15.2%

4.3.17 Figure 4.5 shows the relationship between the forecast increase in average speed in Leicester City and the assumed reduction in car trips produced in the city. As with the corresponding analysis for traffic and delay, this analysis using an approximation of average 12-hour (07:00 to 19:00) weekday speeds using the same assumptions as adopted for Leicester City traffic and delay.

4.3.18 This shows that the relationship is broadly linear, with an increase in the assumed reduction in car trips resulting in an increase in the forecast improvement in average speeds within the city. The relationship suggests that for every 100,000 car trips produced in Leicester City which move to sustainable modes, there is a forecast 3.2% increase in average speed across the 12-hour period.

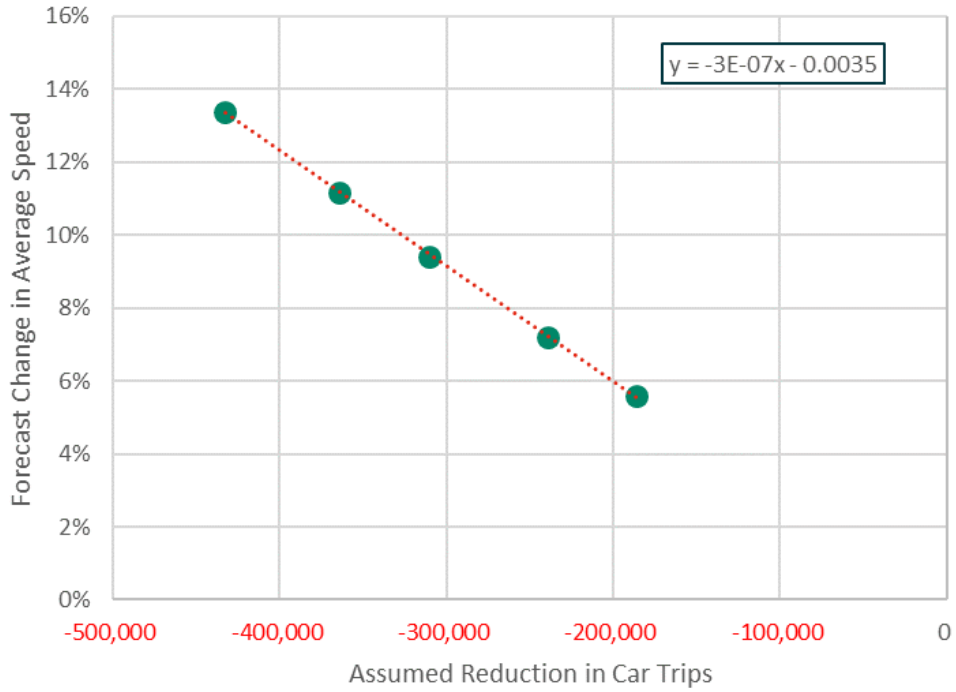


Figure 4.5: Relationship in Forecast Change in Average Speed and Assumed Reduction in Leicester City Car Trips, Step 2

Section 5 – Summary of Assessment

5.1 Introduction

5.1.1 This report details a high-level assessment of the proposed workplace parking levy scheme in Leicester City using the PRTM. This assessment has considered two sets of forecasts for 2021: one considering the proposed workplace parking levy only; and one considering the proposed workplace parking levy and assumed reductions in car trips due to spending on transport interventions promoting use of sustainable modes using the revenue raised by the proposed scheme.

5.1.2 Each set of forecasts considers five workplace parking levy scenarios. These five scenarios consider different annual charges for the proposed scheme and different estimates of the number of chargeable parking spaces within Leicester City. These assumptions for the annual workplace parking levy, along with other assumptions regarding the scheme, have been used to estimate an average daily charge for a car commuting trip to Leicester City.

5.1.3 The revenue raised by the proposed scheme is assumed to be used to operate the scheme and invested in transport interventions which promote the use of public transport and active modes (walking and cycling) within the city. This assumed shift away from car and towards bus, walking and cycling has been imposed within the model forecasts and does not reflect the modelling of any specific proposed interventions to promote the use of bus, walking and cycling.

5.1.4 The assumptions for the both workplace parking levy and the shift towards sustainable modes of travel have been provided by Leicester City Council as part of this study. AECOM has not independently reviewed these assumptions as part of this assessment.

5.2 Step 1: Workplace Parking Levy Only

5.2.1 In isolation, the proposed workplace parking levy does not have a significant forecast impact on travel demand and highway network conditions within Leicester City. Based on the assumptions provided by Leicester City Council, the assumed average daily change varies from between £0.17 and £0.40 in 2010 prices within the five workplace parking levy scenarios, which has been applied to all car commuting trips to Leicester City.

5.2.2 The forecast car mode share for commuting trips to Leicester City is 74.3% in the Core Scenario and this is forecast to reduce by between 0.3 and 0.8 percentage points with the introduction of the proposed workplace parking levy. This reduction in car commuting trips is countered by an increase in the mode share for public transport and active modes.

5.2.3 This forecast reduction in car mode share is directly related to the assumed daily charge in the workplace parking scenarios. The higher the assumed daily average change, the higher the forecast reduction in car mode share for commuting trips attracted to Leicester City. Analysis of the PRTM forecasts suggests that for every £1 of average daily workplace parking levy, car commuting mode share for trips attracted to Leicester City reduces by 1.9 percentage points.

5.2.4 As the proposed workplace parking levy is assumed to only be paid by commuters, the forecast impact of this reduction in car commuting mode share results in a small forecast reduction in traffic on the road network in Leicester City. The forecast change in traffic on the highway network in Leicester City varies by time of day and between the five workplace parking levy scenarios, but the largest forecast reduction in traffic is 0.15% from the Core Scenario.

5.2.5 This small forecast reduction in traffic also leads to a small forecast change in delay and average speed within Leicester City of up to a 0.54% reduction in delay and a 0.2% improvement in average speeds.

5.2.6 The magnitude of these forecast changes in highway network conditions due to the introduction of the proposed workplace parking levy scenarios are small and are not considered to be a significant change to the highway network performance in Leicester City.

5.3 Step 2: Workplace Parking Levy and Public Transport / Active Mode Improvements

5.3.1 Based on the forecast revenue for each of the proposed workplace parking levy scenarios, assumed increases in bus, walking and cycling trips (and corresponding reductions in car trips) produced in Leicester City have been defined by Leicester City Council. These have been implemented in the model forecasts by a reallocation of travel demand between modes based on the assumed increases in sustainable modes provided.

5.3.2 The assumed changes in mode choice within the city results in a significant change in the forecast mode share for non-freight trips produced in Leicester City. In the Core Scenario 64.6% of trips produced in the city are forecast to use car, with 7.7% forecast to use public transport and 27.7% forecast to use active modes (walking and cycling). With the assumed changes in mode choice, the forecast mode share for car reduces to between 49.8% and 30.2% of trips produced in Leicester City with most of the corresponding increase occurring in active modes which are forecast to increase to between 41.9% and 61.5% of trips produced in the city.

5.3.3 These assumed reductions in the car trips produced in the city result in a significant forecast reduction in traffic and delay and a forecast increase in average speeds within Leicester City. Traffic is forecast to reduce by up to 27.4% from the Core Scenario, with delays forecast to reduce by up to 44.1% and average speeds forecast to increase by up to 16.2%.

5.3.4 The reductions in traffic are forecast to be higher in the interpeak than the two peak hours; however, the forecast reductions in delay and increases in average speed are highest in the peak hours. This reflects the relative level of forecast congestion across the day. Due to the different levels of congestion, similar percentage decreases in traffic across the three modelled time periods will result in greater improvements in network performance in the peak hours than in the interpeak hour.

5.3.5 As with the forecast reduction in car mode share for commuting trips attracted to Leicester City in Step 1, the forecast changes in traffic, delay and average speed in Leicester City are aligned with the assumed reduction in car trips in the Step 2 assessment (which are ultimately driven by the assumed daily workplace parking levy charge). Analysis of the model forecasts suggests that for every 100,000 car trips produced in Leicester City which move to sustainable modes of travel, across the 12-hour period (07:00 to 19:00) there is:

- a forecast 6.2% reduction in traffic;
- a forecast 9.0% reduction in delay; and
- a forecast 3.2% increase in average speeds.

5.3.6 These forecast changes in traffic, delay and average network speeds are greater in magnitude than those forecast in Step 1. This shows that the impact of the assumed changes to mode choice in Leicester City due to the transport interventions funded by the proposed workplace parking levy is forecast to be the key driver of change rather than the proposed workplace parking levy itself.

This page is intentionally blank

About AECOM

AECOM is the world's trusted infrastructure consulting firm, delivering professional services throughout the project lifecycle — from planning, design and engineering to program and construction management. On projects spanning transportation, buildings, water, new energy and the environment, our public- and private-sector clients trust us to solve their most complex challenges. Our teams are driven by a common purpose to deliver a better world through our unrivalled technical expertise and innovation, a culture of equity, diversity and inclusion, and a commitment to environmental, social and governance priorities. AECOM is a Fortune 500 firm and its Professional Services business had revenue of $13.2 billion in fiscal year 2020. See how we are delivering sustainable legacies for generations to come at aecom.com and @AECOM.