

TECHNICAL NOTE

WEST OXFORDSHIRE LOCAL PLAN 2043 MODELLING

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Document history

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1.0	Sensitivity Test 4 Final TN	CB	JB	CLFL	CB	15/09/2026

This document and its contents have been prepared and are intended solely as information for Oxfordshire County Council and West Oxfordshire District Council and use in relation to report the strategic transport modelling work completed for the West Oxfordshire Local Plan 2043. This technical note has been prepared to document a sensitivity test of the strategic transport model and should be considered an addendum to the main report, which remains the primary source of information on the strategic transport modelling work undertaken for the West Oxfordshire Local Plan 2043.

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Client signoff

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Project	WEST OXFORDSHIRE LOCAL PLAN 2043 MODELLING	Project No.	100124996
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TECHNICAL NOTE

1. Introduction

- 1.1.1 The transport modelling results presented in the West Oxfordshire Local Plan 2043 Strategic Transport Modelling Report¹ (hereafter the Strategic Transport Modelling Report) are based on the assumptions and information available at the time of model development. As with all model forecasts of future travel demand and network performance, there is an inherent degree of uncertainty associated with future growth patterns, travel behaviour and the timing and extent of infrastructure delivery.
- 1.1.2 To provide greater confidence in the findings presented in the main report compiled for the West Oxfordshire Local Plan 2043 (WOLP2043), a series of sensitivity tests have been undertaken to assess the impact of alternative assumptions relating to future highway infrastructure provision, development growth and travel demand. The results of these tests are presented in separate technical notes, which should be read as addendums to the main report. Collectively, these assessments provide an indication of the robustness of the main report conclusions under a range of plausible future scenarios.
- 1.1.3 The following sensitivity test scenarios have been undertaken:
- **Sensitivity Test 1 (ST1)** – WOLP2043 scenario 2 (DS2) without access restrictions on Witney Road to prioritise cycle and bus (Access to Carterton Scheme).
 - **Sensitivity Test 2 (ST2)** – WOLP2043 scenario 2 (DS2) without access restrictions on Witney Road to prioritise cycle and bus (Access to Carterton Scheme), and without A40 Bus Lanes: Witney to Eynsham.
 - **Sensitivity Test 3 (ST3)** – WOLP2043 scenario 2 (DS2) without access restrictions on Witney Road to prioritise cycle and bus (Access to Carterton Scheme), without A40 Bus Lanes: Witney to Eynsham, with high growth local plan demand.
 - **Sensitivity Test 4 (ST4)** – WOLP2043 scenario 2 (DS2) without access restrictions on Witney Road to prioritise cycle and bus (Access to Carterton Scheme), and without A40 Bus Lanes: Witney to Eynsham, with Witney West End Link (Phase 2) and Bridge Street Improvements (Gyratory Operation) (highway only).
 - **Sensitivity Test 5 (ST5)** – WOLP2043 scenario 2 (DS2) without access restrictions on Witney Road to prioritise cycle and bus (Access to Carterton Scheme), and without A40 Bus Lanes: Witney to Eynsham, with reduced travel demand and improved public transport cost.

¹ West Oxfordshire Local Plan 2043 Strategic Transport Modelling Report v4.0

TECHNICAL NOTE

2. Sensitivity Test 4: Scenario

Sensitivity Test 4 (ST4): Do Something 2 Scenario without access restrictions on Witney Road to prioritise cycle and bus (Access to Carterton Scheme), and without A40 Bus Lanes: Witney to Eynsham, with Witney West End Link (Phase 2) and Bridge Street Improvements (Gyratory Operation).

- 2.1.1 This sensitivity test has been undertaken to understand the impact of the proposed Witney West End Link (WEL) river crossing and associated Bridge Street improvements. The test builds on Sensitivity Test 2 (ST2, as documented in WOLP 2043 Sensitivity Test 2 Technical Note ST2²), 2043 West Oxfordshire Local Plan Do Something 2 (DS2) scenario without access restrictions on Witney Road between Downs Road and Minster Road and without A40 bus lanes between Witney Shores Green and West Eynsham/Salt Cross.
- 2.1.2 The purpose of this test is to determine whether the inclusion of the proposed WEL river crossing and associated Bridge Street improvements would have a material impact on highway network performance compared with the current modelled scenario, in which they are not included.
- 2.1.3 The location of the WEL scheme is shown in Figure 2-1 with more details about the scheme presented in Figure 2-2. This sensitivity test has been implemented by adding in a new two-way West End Link across the River Windrush to the north of Bridge Street (between the Burford Road/Mill Street/Woodford Way junction and the Crawley Road/ Hailey Road/West End junction). In addition, West End, Bridge Street and Mill Street are assumed to operate as one-way roads for general traffic in a clockwise direction. This arrangement was the preferred option recommended in the Bridge Street Option Assessment Study³ prepared by Pell Frischmann in 2023 on behalf of Oxfordshire County Council.
- 2.1.4 Under this proposed gyratory traffic arrangement buses and cyclists are permitted to travel northbound on Bridge Street. This results in changes to the bus routing affecting northbound services travelling between the Mill Street/Bridge Street/High Street junction and the Crawley Road/Hailey Road/West End junction. Previously, these services operated via Bridge Street and West End. However, following the introduction of a one-way restriction on West End, services have been redirected to operate via Mill Street and the newly constructed West End Link.
- 2.1.5 The WEL scheme also involves converting several junctions to become traffic signal controlled, namely: West End Link north junction (Crawley Road/Hailey Road/West End), West End/Woodgreen/Newland/Bridge Street junction and Mill Street/Bridge Street/High Street junction. The signalised junction at the south of the West End Link (Burford Road/Mill Street /Woodford Way) has also been

² WOLP 2043 Sensitivity Test 2 Technical Note v1.0

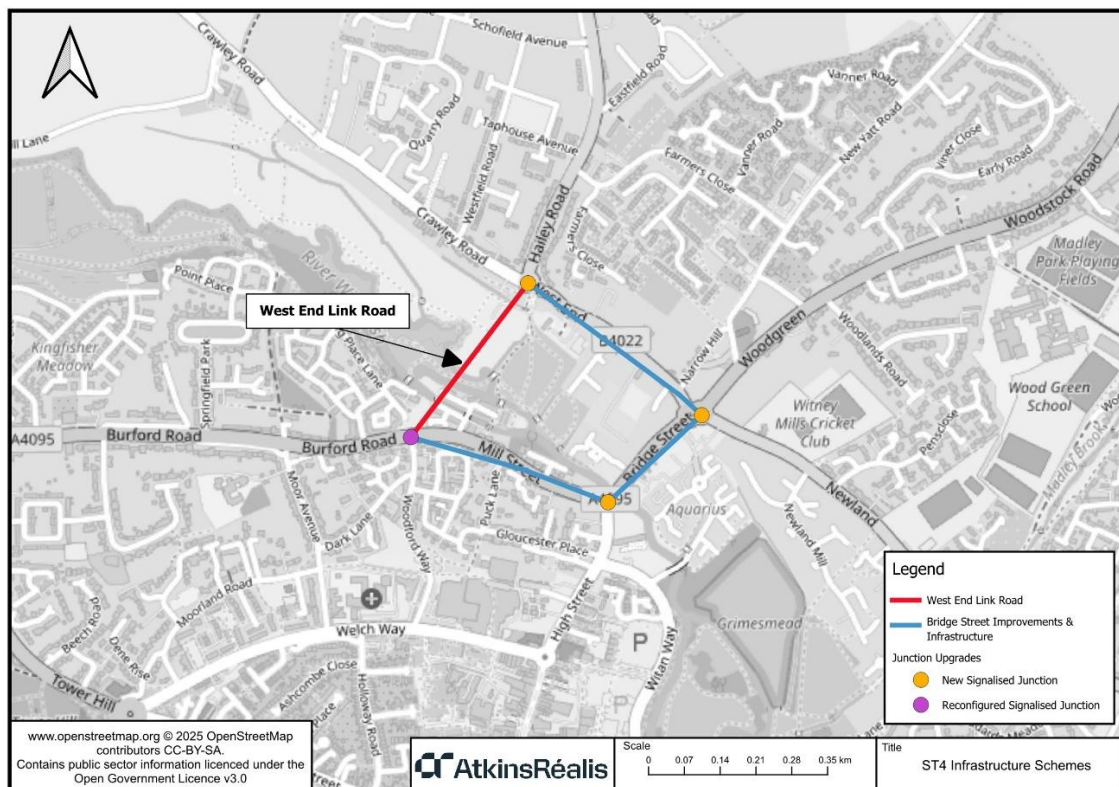
³ Bridge Street Option Assessment Study (Pell Frischmann, 2023)

TECHNICAL NOTE

reconfigured to accommodate the additional arm associated with the West End Link. No other changes have been made to the highway network and all other assumptions from ST2 have been retained.

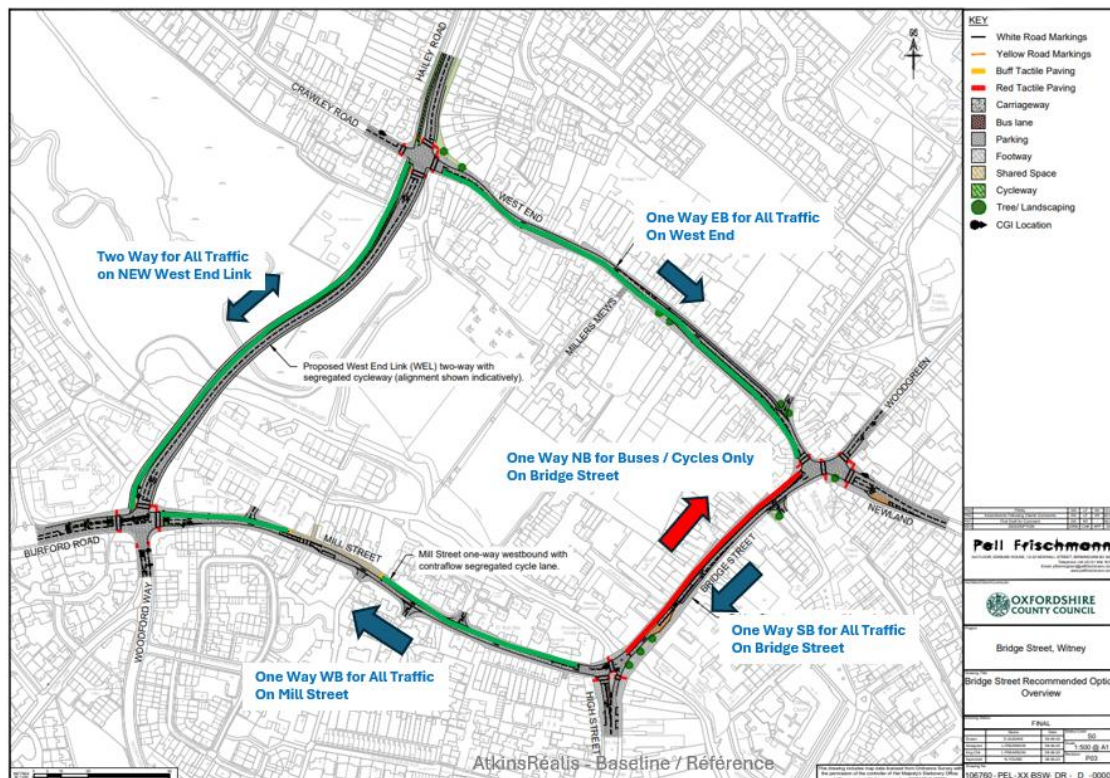
- 2.1.6 Development and travel demand assumptions are unchanged, with the 2043 forecast demand consistent with that used in ST2, ST1 (Sensitivity Test 1) and DS2. This sensitivity test uses the highway demand matrices from ST2, which were previously processed through the Variable Demand Model (VDM). No further VDM run has been undertaken; instead, only the highway assignment has been re-run following the network amendment. Results are compared directly with ST2 to assess the impact of the new link road on highway network performance and overall findings.

Figure 2-1 – Sensitivity Test 4: Location of intervention for Sensitivity Test 4



TECHNICAL NOTE

Figure 2-2 – Sensitivity Test 4: Witney West End Link and Bridge Street improvements



Source: Witney Bridge Street Area Options Appraisal Report, Pell Frischmann & Oxfordshire County Council

3. Sensitivity Test 4: Results

Demand by mode

3.1.1 As the highway trip matrices for cars and goods vehicles are unchanged between ST2 and ST4, there are no differences in travel demand between the two scenarios. Consequently, no demand-by-mode changes have been assessed or reported, and any differences observed are attributable solely to the reassignment of traffic on the amended highway network and the resulting changes in highway network performance.

Network impacts

3.1.2 The highway results below include an active travel adjustment. The adjustment reflects a generic assumption that walking and cycling infrastructure is improved across the main settlements of West Oxfordshire and is not intended to represent the direct impact of the scheme being tested. Under this assumption, some shorter car journeys are assumed to transfer to cycling. Further information on this is provided in the main report.

3.1.3 As this is a highway-only sensitivity test, the same active travel adjustment applied in ST2 has been retained. The adjustment therefore reflects the same assumed transfer of shorter car trips to cycling, and the resulting reduction in highway demand is therefore consistent with that reported for ST2. As

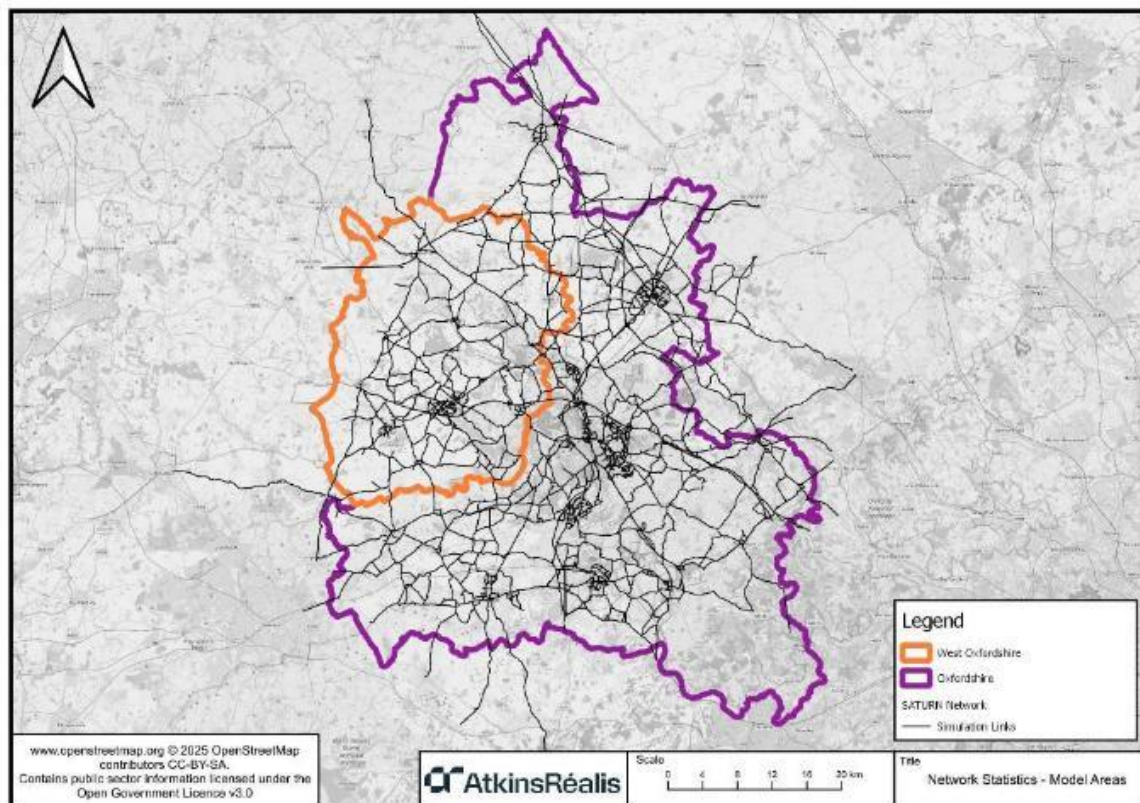
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such, any differences in network performance between the scenarios are attributable to the highway network changes tested rather than differences in demand assumptions.

Network performance

3.1.4 Table 3-1 presents the forecast year network statistics from the Sensitivity Test 4 scenario, with the new West End Link and Bridge Street improvements, for all modelled roads in Oxfordshire, as shown in Figure 3-1, and the change compared with the ST2 scenario. Table 3-2 presents the corresponding statistics for only the roads modelled in West Oxfordshire, while Table 3-3 presents the same for the A40 Corridor from Burford to the Wolvercote roundabout. Table 3-4 presents the same statistics but focussed on Witney. These are presented for all car trips in West Oxfordshire across the 12-hour period from 07:00 to 19:00, with the total on the roads also including LGV and HGV trips. Figure 3-1 and Figure 3-2 show the full extent of the roads considered, with those inside the West Oxfordshire border being used to provide the West Oxfordshire statistics. For the Witney area, all roads within Witney have been included in the assessment, except for the A40 links, which have been excluded.

Figure 3-1 – Model links included in network statistics



TECHNICAL NOTE

Figure 3-2 – Model links included in network statistics – Witney (excluding A40)

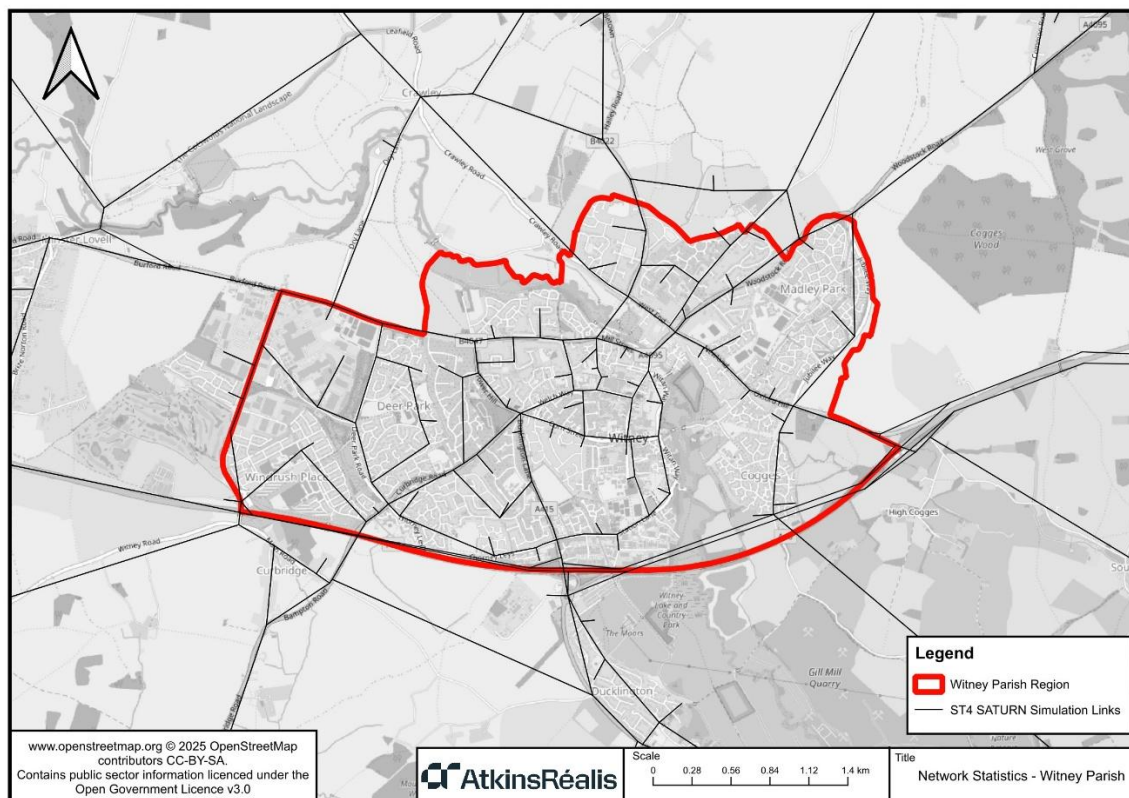


Table 3-1 – Key highway network statistics – Full Model

Metric	ST4		% Change from ST2	
	Car	All vehicles	Car	All vehicles
Total Travel Time (hr)	365,700	445,300	0.0%	0.0%
Cruise Time (hr)	307,900	376,600	0.0%	0.0%
Delay (hr)	57,700	68,800	0.0%	0.0%
Delay (sec per km)	10.2	9.8	0.0%	0.0%
Total Distance (km)	20,328,300	25,155,000	0.0%	0.0%
Average Speed (km/h)	55.6	56.5	0.0%	0.0%

TECHNICAL NOTE

Table 3-2 – Key highway network statistics – West Oxfordshire

Metric	ST4		% Change from ST2	
	Car	All vehicles	Car	All vehicles
Total Travel Time (hr)	62,300	77,200	-0.1%	-0.1%
Cruise Time (hr)	54,600	67,300	0.0%	0.0%
Delay (hr)	7,700	9,900	-0.5%	-0.5%
Delay (sec per km)	9.2	9.6	-0.5%	-0.5%
Total Distance (km)	3,017,200	3,715,600	0.0%	0.0%
Average Speed (km/h)	48.4	48.1	0.1%	0.1%

Table 3-3 – Key highway network statistics – A40 Corridor

Metric	ST4		% Change from ST2	
	Car	All vehicles	Car	All vehicles
Total Travel Time (hr)	13,100	16,600	0.2%	0.3%
Cruise Time (hr)	11,200	14,300	0.3%	0.3%
Delay (hr)	1,800	2,300	0.1%	0.0%
Delay (sec per km)	10.4	10.4	-0.2%	-0.3%
Total Distance (km)	632,200	803,500	0.3%	0.3%
Average Speed (km/h)	48.4	48.3	0.0%	0.0%

Table 3-4 – Key highway network statistics – Witney (excluding A40)

Metric	ST4		% Change from ST2	
	Car	All vehicles	Car	All vehicles
Total Travel Time (hr)	6,700	8,800	-0.1%	-0.5%
Cruise Time (hr)	5,000	6,700	-1.1%	-1.4%
Delay (hr)	1,700	2,200	3.0%	2.4%
Delay (sec per km)	27.8	27.8	3.8%	3.6%
Total Distance (km)	214,200	281,300	-0.9%	-1.2%
Average Speed (km/h)	32.0	31.8	-0.8%	-0.7%

- 3.1.5 The statistics indicate that the new West End Link and Bridge Street improvements results in negligible change in overall highway demand across the full model area. In West Oxfordshire, the model shows minimal reductions in travel time and delay for cars and all vehicles. The slight decrease in total travel time (-0.1%) and delay (-0.5%) is unlikely to be noticeable to most road users.

TECHNICAL NOTE

- 3.1.6 The A40 corridor sees small increases across the network performance statistics (+0.1% to 0.3%) except for delay which decreases by -0.2% for cars and -0.3% for all vehicles. This is driven by the redistribution of traffic, mainly in the AM peak, with users now utilising the West End Link to travel through Witney instead of routing to use the A40 between Shores Green and Ducklington Lane. This results in small improvements in network operation along the A40 in this area, reflected in reductions in delay per km. Overall, however, the results indicate that the new West End Link and Bridge Street improvements have minimal impact on the A40.
- 3.1.7 The network statistics for the Witney area (excluding A40 links) suggests that the West End Link attracts more traffic through, and redistributes traffic within, Witney. Total travel time reduces slightly for cars and all vehicles (-0.1% and -0.5% respectively), indicating that the additional link provides some slight network benefits and additional routing opportunities. However, delays (hr) increase by +3.0% for cars and +2.4% for all vehicles, while delay per kilometre rises by +3.8% and +3.6% and average speeds reduce slightly. This indicates that, although traffic is accommodated within the network, the WEL scheme results in increased queuing and delay at key town centre junctions, particularly those associated with the town centre gyratory and the introduction of signal-controlled junctions. Overall, the West End Link appears to draw traffic onto the Witney network and redistribute movements through the town. The benefits of improved connectivity are offset by increased congestion at critical junctions, resulting in a broadly neutral effect on overall journey times but a deterioration in delay-related performance metrics.

A40 travel times by section

- 3.1.8 Table 3-5 sets out the average journey time along the A40 in the eastbound direction. Table 3-6 sets out the corresponding data for the westbound direction, with the sections listed in reverse. The results indicate very little change in journey time in all periods in the eastbound direction. The AM peak shows the greatest change, albeit still small (circa -1%). Traffic flows in the AM between Witney and Eynsham P&R increase slightly (around +1%), as the introduction of the West End Link results in route reassignment and a corresponding increase in trips on this section of the A40. In contrast, the other sections of the A40 experience slight reductions (circa -1%) in the AM. During the interpeak period, flows between Witney and Cassington increase marginally (around +1%). Impacts during the PM peak are negligible.
- 3.1.9 For the same sections, there is very little change in journey time in any time periods in the westbound direction. Eynsham P&R to Witney decreases slightly (circa -1% in the AM) as some trips that previously used the A40 between Shores Green and Ducklington Lane are reassigned to the new West End Link, with vehicles instead routing through Witney to access the wider network. In the PM there are small increases (circa 1%) between Cassington and Witney. The interpeak impact to journey time is negligible.

Table 3-5 – A40 Eastbound journey time change from 2043 ST2 to 2043 ST4 (minutes)

Journey time route section	ST4			% Change from ST2		
	AM	IP	PM	AM	IP	PM
Section 1 - Burford to Witney (Ducklington Lane)	11.0	8.8	9.1	-1%	0%	0%
Section 2 - Witney to Eynsham P&R	10.5	8.2	8.4	1%	1%	0%
Section 3 - Eynsham P&R to Cassington	5.6	4.8	5.4	-1%	1%	0%
Section 4 - Cassington to Wolvercote Rdbt	8.0	6.9	7.2	-1%	0%	0%
Full Route	35.0	28.7	30.0	-1%	0%	0%

TECHNICAL NOTE

Table 3-6 – A40 Westbound journey time change from 2043 ST2 to 2043 ST4 (minutes)

Journey time route section	ST4			% Change from ST2		
	AM	IP	PM	AM	IP	PM
Section 4 – Wolvercote Rdbt to Cassington	6.5	6.0	6.5	0%	0%	0%
Section 3 - Cassington to Eynsham P&R	5.4	4.7	5.8	0%	0%	1%
Section 2 - Eynsham P&R to Witney	8.7	8.0	9.5	-1%	0%	1%
Section 1 - Witney (Ducklington Lane) to Burford	8.8	8.7	9.3	0%	0%	0%
Full Route	29.3	27.5	31.0	0%	0%	0%

Highway flow and delay

- 3.1.10 All figures in this section show a zoomed in map of the Witney area. Figures showing the West Oxfordshire district can be found in Appendix B and Appendix C. Those figures show the West Oxfordshire district boundary as a red line for context.

Flow

- 3.1.11 Figure 3-3 to Figure 3-5 show the change in traffic flows between the ST2 and ST4 scenarios for each time period in the Witney area. The WEL scheme introduces access restrictions for general traffic by closing West End to westbound movements, Bridge Street to northbound movements, and Mill Street to eastbound movements. As a result, all general traffic previously using these links in the ST2 scenario is reassigned to alternative routes within the network as shown by the green shading in the maps. The flow using the West End Link is, in the AM peak, 908 PCUs northbound and 335 PCUs southbound. In the PM peak, these flows are 992 PCUs northbound and 333 PCUs southbound. The lower southbound flows reflect the fact that Bridge Street remains open to general traffic in the southbound direction, reducing the need for traffic to use the link road. Corresponding increases in traffic flows are observed on roads connecting to the new West End Link road, including Woodford Way, Burford Road and the B4022 (Hailey Road), as traffic reroutes via these corridors to access the link road and the wider highway network.
- 3.1.12 The redistribution of traffic results in an increase in trips travelling through Witney town centre between the northern and southern parts of the town, as shown by the green shading in the maps. The most noticeable increases are observed on Moor Avenue, Ducklington Lane, Welch Way and Curbridge Road. In the ST2 scenario, delays within Witney town centre during the AM peak are forecast to lead some southbound vehicles to avoid the town centre, as shown by the blue shading in the maps, and instead to route via the A40 to the South of Witney between Shores Green and Ducklington Lane. With the introduction of the West End Link river crossing, many of these trips are reassigned to routes via the link road and Bridge Street, accessing southern Witney through the town centre rather than using the A40 bypass route. There is also an increase along West End in the eastbound direction in all periods (+161 PCU/h in the AM peak).

Delay

- 3.1.13 Figure 3-6 to Figure 3-8 show the change in link delay between the ST2 and ST4 scenarios for each time period in the Witney area. Changes across West Oxfordshire are generally limited, with the most significant impacts occurring around the West End Link and its connecting junctions. As expected, the

TECHNICAL NOTE

plots show an increase in delay on the new link road and on the approaches to the junctions at the north and south of the link road, as shown in green shading on the maps. However, the increases shown on the new link road represent the total delay in ST4, rather than a relative increase to ST2, as the link did not exist in ST2 and therefore has no delay to compare against. The largest increases are observed at the southern junction (Burford Road/Mill Street/Woodford Way). Delays on Burford Road increase by 70 seconds in the AM peak and 71 seconds in the PM peak, while Woodford Way experiences increases of 52 seconds and 82 seconds respectively. Mill Street sees increases of around 29 seconds in both peak periods. Similar trends are evident during the interpeak period. Delays also increase on approaches to the northern junction (Crawley Road/Hailey Road/West End) and on approaches to the junction north of Bridge Street, although these impacts are less pronounced.

- 3.1.14 Bridge Street itself sees decreases in delay, as shown in blue shading on the maps, in the AM in both directions (-74 seconds northbound and -86 seconds southbound), whereas in the PM it only sees decreases northbound (-86 seconds) and has a +3 second increase in the southbound direction. The interpeak sees increases in delay northbound (+35 seconds), affecting buses only, due to interpeak traffic conditions being less congested in ST2, meaning the introduction of a signalised junction results in higher delays. These changes are associated with the revised operation of Bridge Street, which becomes one-way southbound for general traffic, while buses and cyclists retain the ability to travel northbound.
- 3.1.15 Further away from Witney, Dry Lane sees decreases in delay southbound in the AM (-76 seconds) and increases in delay southbound in the PM (+19 seconds), despite limited traffic flow changes. This is driven by changes in traffic flow along Burford Road at its junction with Dry Lane. Reduced traffic volumes on Burford Road during the AM peak allow more opportunities for vehicles to emerge from Dry Lane, resulting in lower delays. Woodstock Road sees an increase southbound in the AM (+34 seconds). This is likely due to vehicles choosing to access Witney from different directions in this scenario now that the roads around Witney town centre are one way. Overall, the delay impacts are concentrated around the WEL and the new signalised junctions and associated network changes, with limited effects elsewhere across the study area.

Junction metrics

- 3.1.16 Junction performance has been assessed for key locations across West Oxfordshire. Performance is reported in terms of average delay and volume-to-capacity (V/C) ratio. Delay represents the flow-weighted average delay across all turning movements, while the V/C ratio indicates the proportion of total demand relative to the combined capacity of the junction entry arms. The tables can be found in Appendix A.
- 3.1.17 As seen in Table A-1, the most notable impacts are at the junctions that are affected by the WEL scheme, as expected. Reductions in delay, as shown by the darker blue shading in the maps, can be seen at Bridge Street / High Street / Mill Street in the AM period where there are decreases of -43 seconds. In the ST2 scenario, significant delays were observed on the Bridge Street approach during the AM peak. The introduction of the West End Link provides an alternative route to Bridge Street, reducing demand on this approach and consequently alleviating congestion and delays at the junction. The interpeak and PM peak have minimal changes as delays were already low in ST2.
- 3.1.18 The largest increases in delay are observed at the junctions located to the north (Crawley Road/Hailey Road/West End) and south (Burford Road/Mill Street/Woodford Way) of the WEL river crossing. These increases are attributable to a combination of factors, including additional traffic demand associated with the new link road, the conversion of the northern junction from a roundabout to signal control, and the reconfiguration of the southern signalised junction to accommodate the new arm. As a result, delays at

TECHNICAL NOTE

the northern junction increase by approximately 25 seconds during both the AM and PM peaks, while delays at the southern junction increase by around 50 seconds in both peak periods.

- 3.1.19 Another notable change in delay in ST4 occurs where there is a replacement of two existing roundabouts arrangement with a single signal-controlled junction. In ST2, the network operated with two separate roundabouts: Bridge Street/Newland/Woodgreen Hill, which experienced delays of under 13 seconds in all peak periods, and West End/Bridge Street, where delays of between 60 and 70 seconds were seen during the AM and PM peaks. In ST4, these junctions have been consolidated into a single signalised junction, with average delays of approximately 30-40 seconds across all peak periods. This indicates an overall improvement in operational performance with the new layout. Delays are now primarily associated with signal control rather than network congestion, as evidenced by the V/C ratios discussed below. However, introducing signal control at these junctions would provide significant benefits for people walking and cycling. It would also provide greater bus priority and traffic network management opportunities.
- 3.1.20 Table A-2 presents the impact of the West End Link on junction V/C ratios. The most notable increases are observed at the junctions immediately to the north and south of the new WEL. In ST2, both junctions operated with relatively low V/C ratios (below 50%). Following the introduction of the link road, V/C ratios increase to 89% in the AM peak and 82% in the PM peak at the northern junction and to 72% in both peak periods at the southern junction. However, several individual turning movements at these junctions are now operating at or close to capacity. The biggest reduction is seen at the signalised junction, Bridge Street/Newland/Woodgreen Hill - mentioned above, that has been converted from the two roundabouts. In ST2, West End/Bridge Street had high V/C ratios with 97% and 92% in the AM and PM peaks respectively. In ST4, the signalised roundabout reduced V/C ratio to 77% and 69% respectively, suggesting the junction is operating better under the new scheme. Other impacts to V/C ratios are between +6% and -9%.
- 3.1.21 Overall, the highway flow, delay and junction metrics analysis suggests that the scheme influences traffic distribution across Witney, leading to increased delays at specific signal-controlled junctions, while delivering localised operational benefits elsewhere on the network.

Select link analysis

- 3.1.22 Appendix D presents select link analysis (SLA) for key locations within Witney during the AM peak for both ST2 and ST4. SLA plots illustrate the volume of traffic using a selected link and identifies the origins and destinations of those trips across the highway network.
- 3.1.23 Figure D-7 shows the northbound river crossing movements for ST2 (Bridge Street) and ST4 (West End Link). Consistent with the flow difference plots, the largest increase is observed on movements between south Witney (Ducklington Lane) and north Witney (Hailey Road). A localised route shift is also evident within the town centre, with trips using Moor Avenue/Woodford Way rather than High Street.
- 3.1.24 Figure D-8 and Figure D-9 show the corresponding southbound movements, including Bridge Street flows in ST2 and both Bridge Street and West End Link flows in ST4. The results forecast that Bridge Street would remain the primary river crossing route, with only a modest reduction in flows compared with ST2. The addition of the West End Link attracts approximately 300 additional southbound trips across the river. Similar to the northbound direction, increases are concentrated on movements between north and south Witney, with higher flows also seen on connecting routes reflecting the additional river crossing capacity.

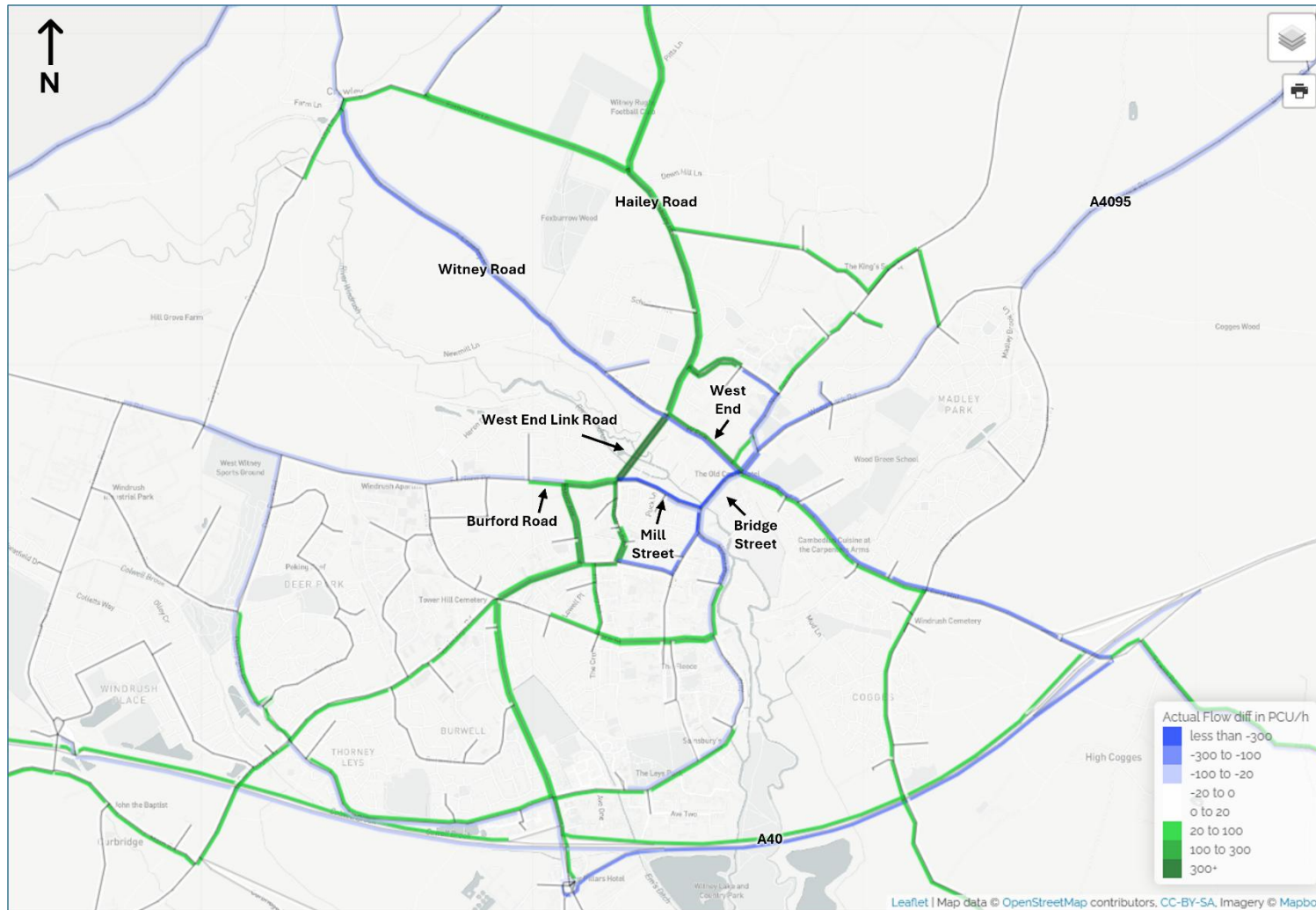
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- 3.1.25 Figure D-10 and Figure D-11 present SLA plots for the two local plan development sites in Witney. For the North Witney Strategic Development Area (SDA), AM peak origin plots are shown, while PM peak destination plots are provided for Witney Local Plan Site A Land north of Burford Road. These peak periods and trip directions have been selected as they represent the highest levels of southbound river-crossing demand associated with each development. In the West End Link scheme scenario, the total northbound river-crossing capacity remains the same, where only WEL facilitates northbound journeys. The southbound river-crossing facility capacity increases (both WEL & Bridge Street facilitate southbound journeys). Therefore, southbound movements are expected to be affected to a greater extent by the WEL scheme, resulting in greater changes in travel patterns and route choice. For the North Witney SDA, which is located northeast of the West End Link, the highest southbound river-crossing demand occurs during the AM peak for origin trips travelling from the site. For Witney Local Plan Site A (Land north of Burford Road), which is located west of the West End Link, the equivalent movement occurs during the PM peak for destination trips travelling to the site. The results show that relatively few vehicle trips from the North Witney SDA are forecast to use Bridge Street in ST2 with more trips forecast to use the A4095 and to a lesser extent the A40. In ST4, there is only a slight increase in development vehicle trips crossing the river through the town centre, as some demand is drawn back into the town centre from using the A40 to the south of Witney as well as a small amount from Dry Lane.
- 3.1.26 Vehicle trips associated with Witney Local Plan Site A Land north of Burford Road are forecast make limited use of Bridge Street in ST2 and are forecast to impact more on routes to the south (Downs Road, Tower Hill/Ducklington Lane) and west (Burford Road) which provide access to/from the A40. Similarly in ST4 (with the West End Link) very limited vehicle trips generated by this site are forecast to use routes via the WEL and Bridge Street.

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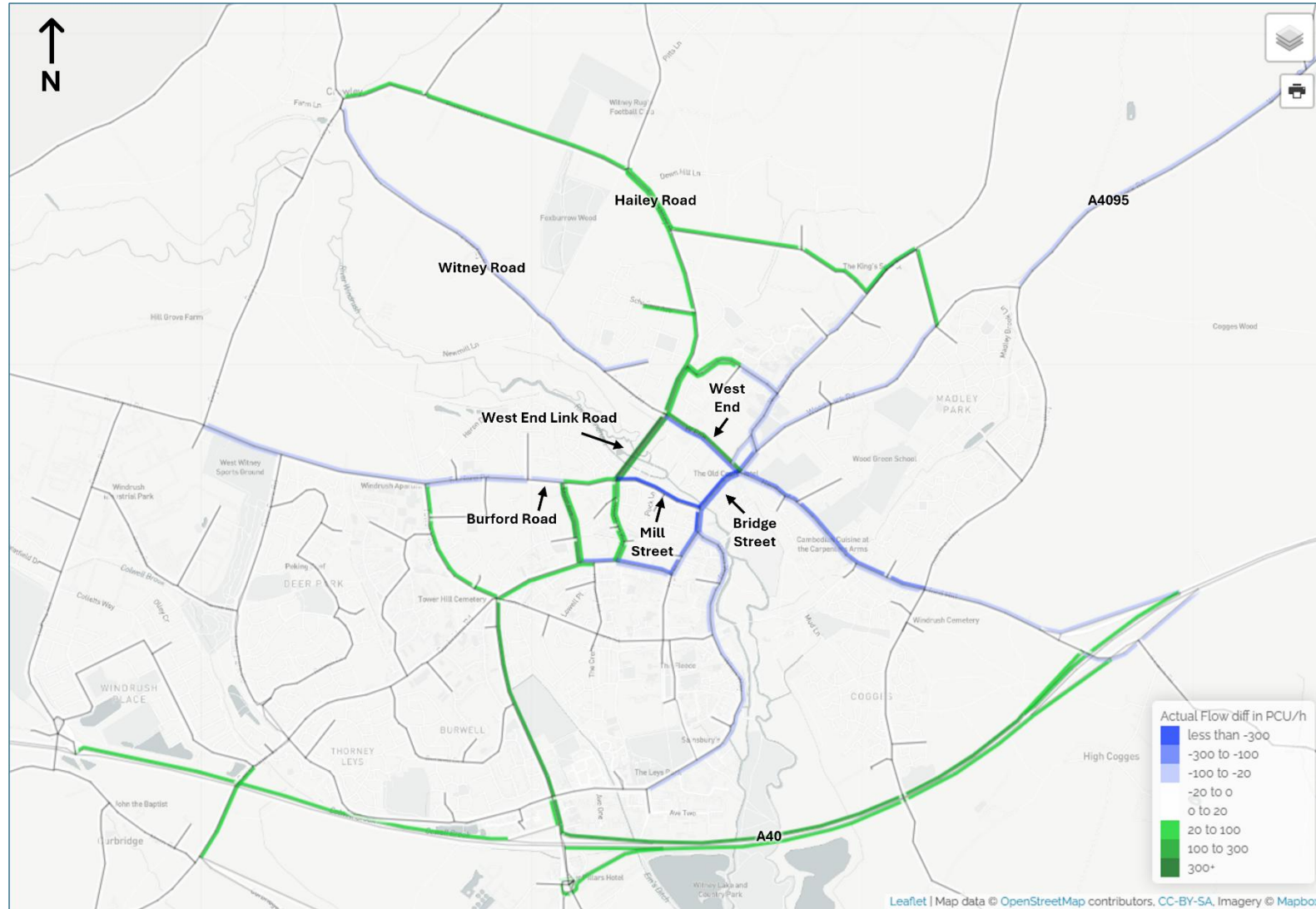
Plots

Figure 3-3 – AM peak – change in flow in Witney from 2043 ST2 to 2043 ST4



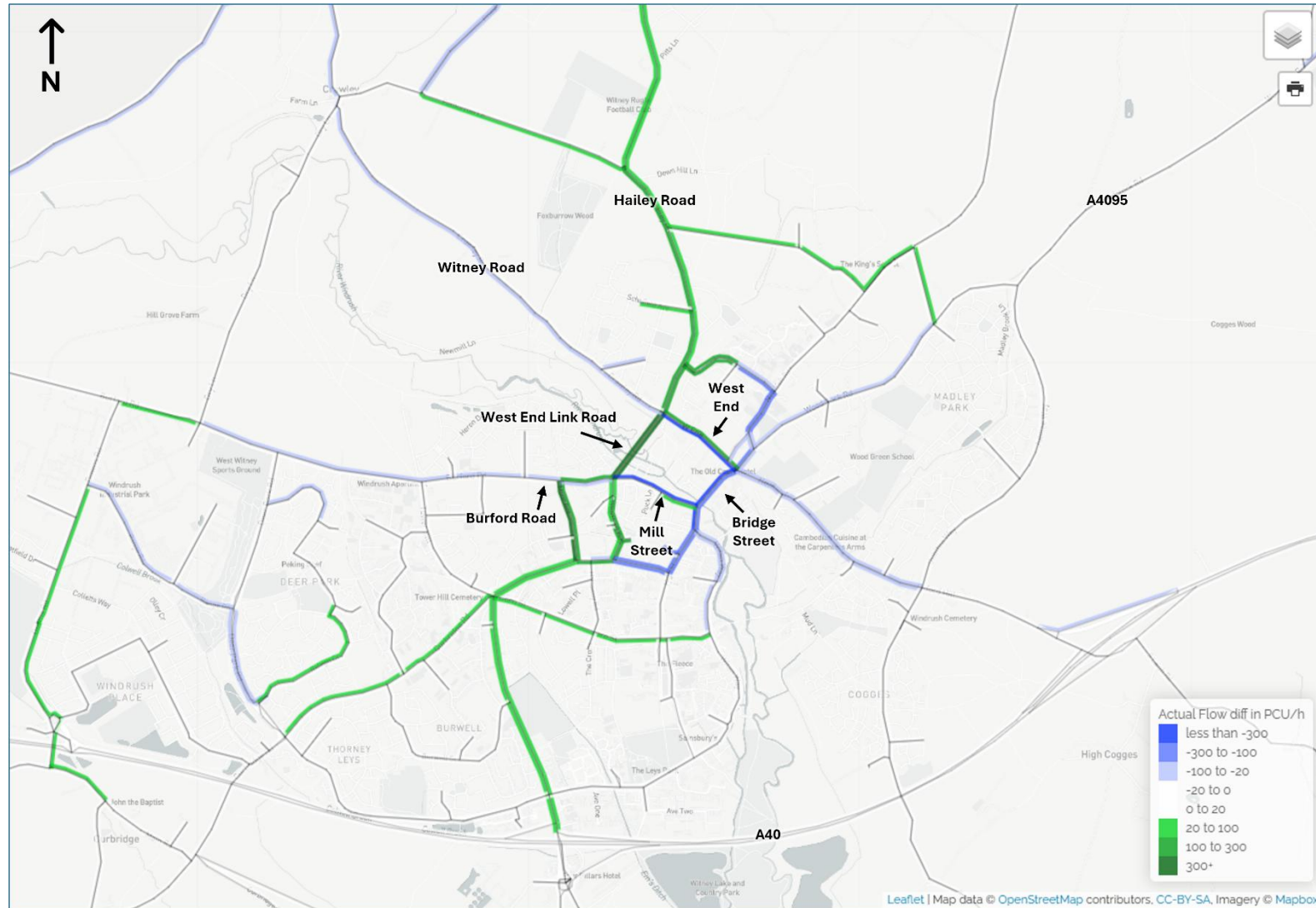
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Figure 3-4 – Interpeak – change in flow in Witney from 2043 ST2 to 2043 ST4



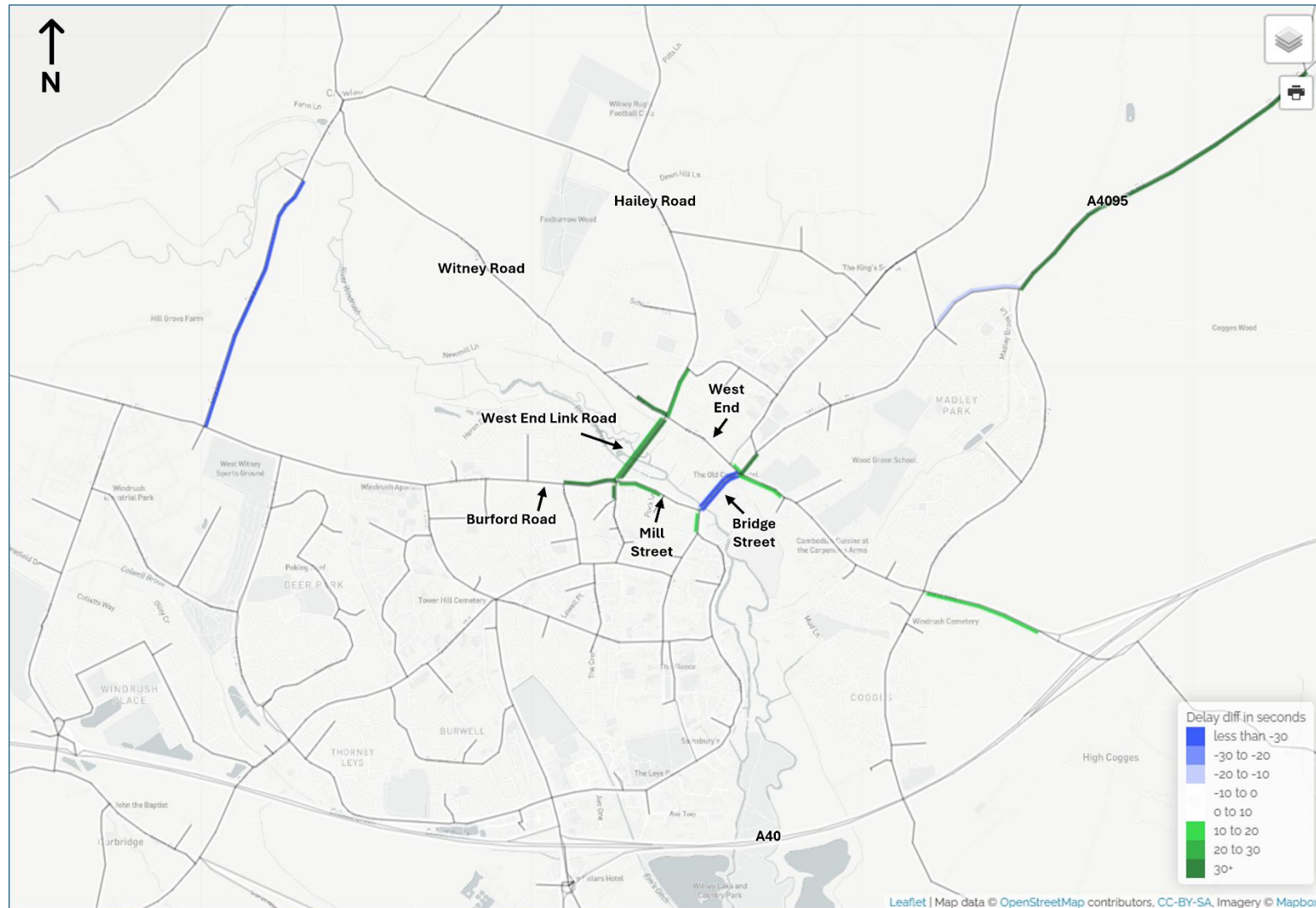
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Figure 3-5 – PM peak – change in flow in Witney from 2043 ST2 to 2043 ST4



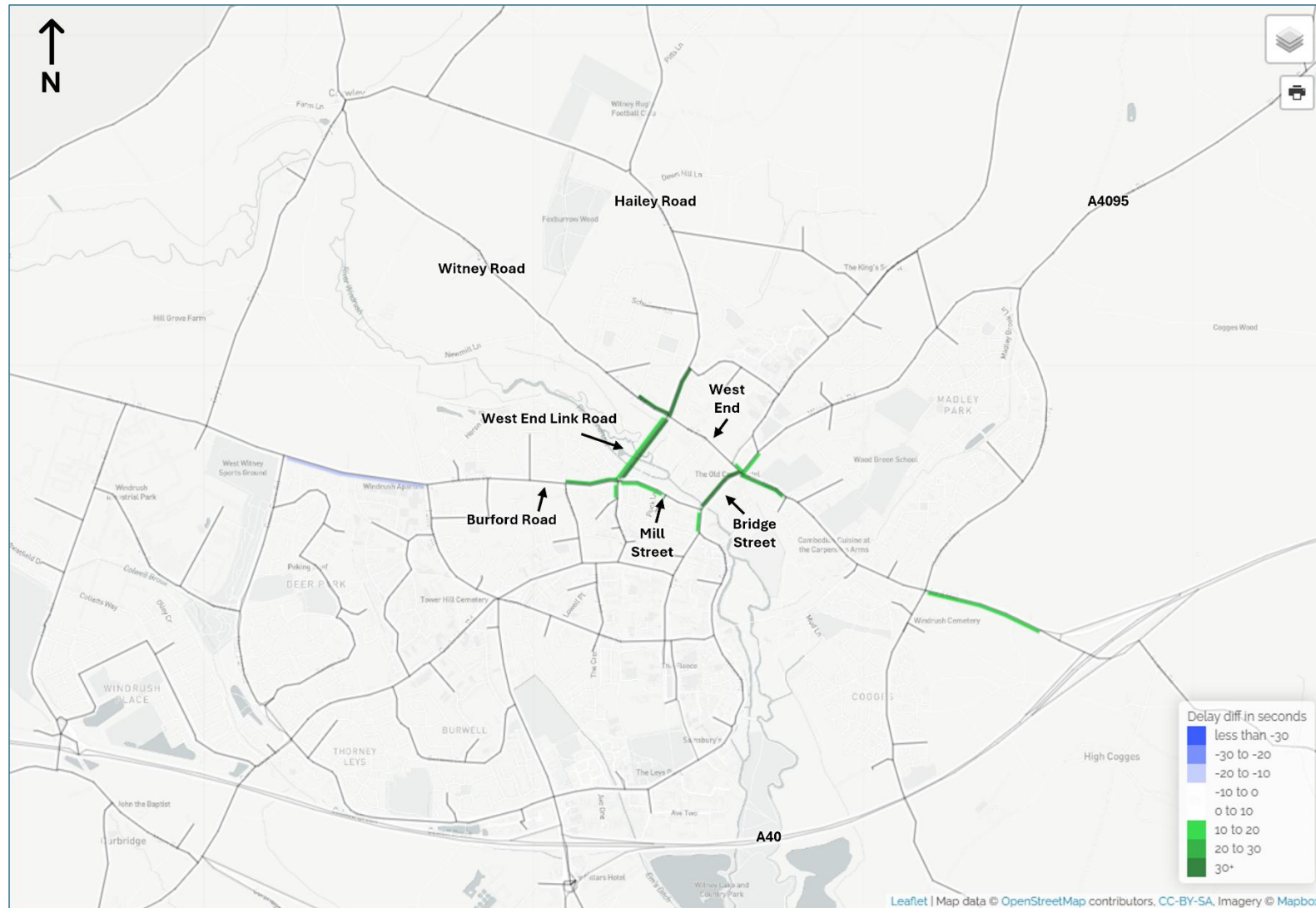
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Figure 3-6 – AM peak – link delay change in Witney from 2043 ST2 to 2043 ST4



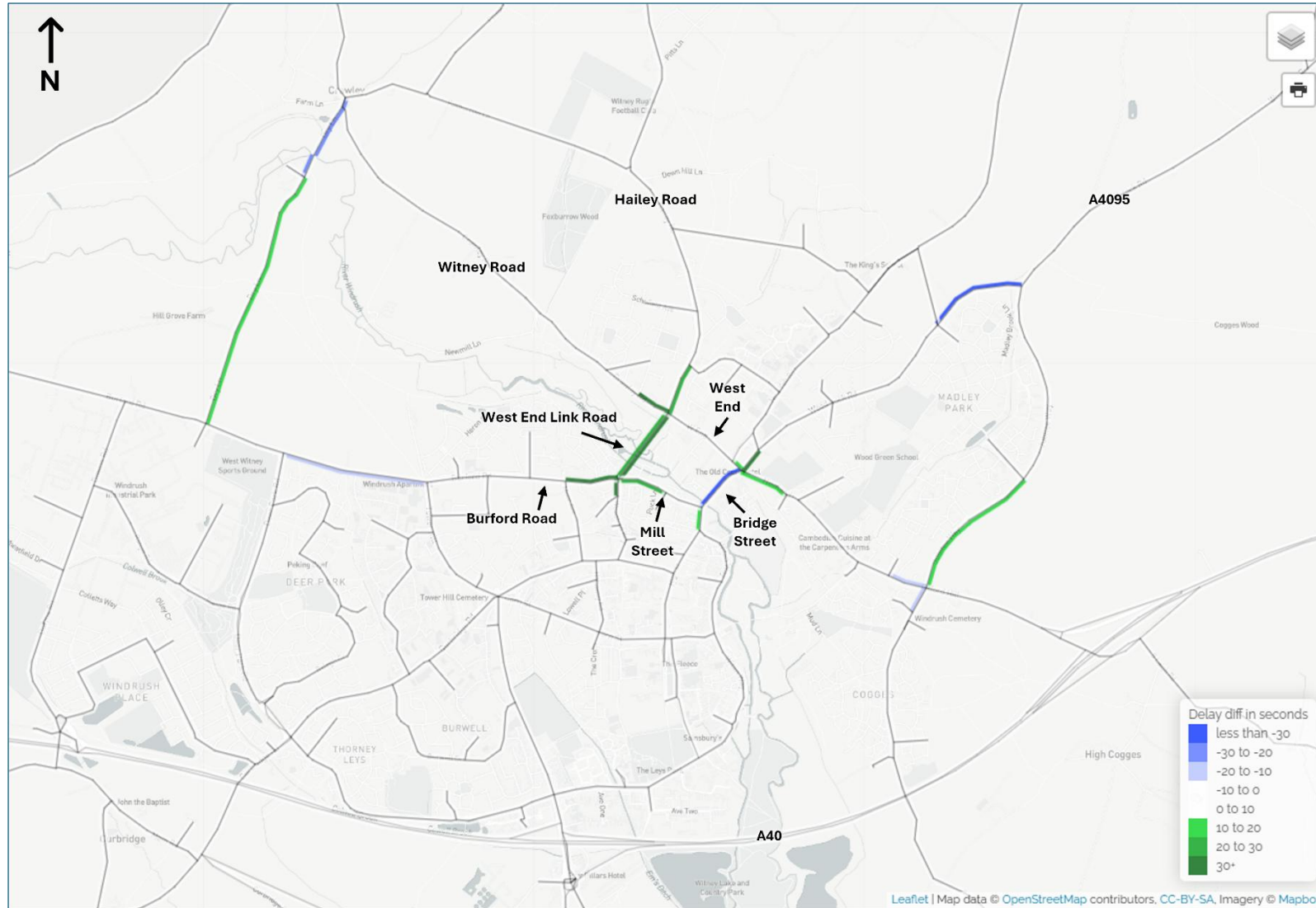
TECHNICAL NOTE

Figure 3-7 – Interpeak – link delay change in Witney from 2043 ST2 to 2043 ST4



TECHNICAL NOTE

Figure 3-8 – PM peak – link delay change in Witney from 2043 ST2 to 2043 ST4



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Bus flows and journey times

- 3.1.27 As this is a highway-only sensitivity test, no changes to bus mode share / patronage have been assumed. The introduction of the new gyratory results in some minor changes to bus routing and journey times; however, these are not considered sufficient to materially affect mode choice or public transport demand. As such, bus patronage remains unchanged between the scenarios.
- 3.1.28 As mentioned earlier, the network changes affect the bus routing of northbound services travelling between the Mill Street/Bridge Street/High Street junction and the Crawley Road/Hailey Road/West End junction. The bus journey times will also be impacted by the junction changes on the gyratory, specifically the new signal-controlled junctions.
- 3.1.29 Based on the forecast changes in traffic flows and junction performance, the proposed network changes are expected to influence bus journey times within the West End Link and Bridge Street corridor. Services operating between High Street and Hill Close are likely to experience journey time improvements in both directions. This is primarily due to Bridge Street becoming bus-only in the northbound direction, reduced traffic demand in the southbound direction, and the provision of an alternative route via West End Link. In addition, the junctions at either end of Bridge Street are forecast to operate more efficiently in Scenario ST4. Services operating between High Street and Hailey Road are also expected to benefit from reduced journey times in the southbound direction, reflecting the same improvements observed on Bridge Street and at the adjacent junctions. However, northbound journey times are likely to increase, as these services are required to utilise West End Link, where higher traffic volumes and increased junction delays are forecast.

4. Key Findings and Conclusions

- 4.1.1 This sensitivity test has been undertaken as a highway-only assignment to assess the impact of introducing the proposed Witney West End Link river crossing and associated Bridge Street improvements, while retaining all other assumptions associated with Sensitivity Test 2 (ST2). The test assesses whether the inclusion of the proposed West End Link and the Bridge Street improvements would have a material impact on highway network performance compared with the current modelled scenario, in which they are not modelled.

Highway

- 4.1.2 As this is a highway-only sensitivity test, there are no changes to travel demand, development assumptions or mode choice. The assessment therefore isolates the effect of the Witney West End Link and Bridge Street improvements on highway network operation.
- 4.1.3 The results indicate that the introduction of the Witney West End Link and Bridge Street improvements has a negligible impact on overall highway performance across West Oxfordshire and the wider model area. Changes in travel time, delay, distance travelled and average speed are generally less than 1%, indicating that the scheme does not materially alter strategic network operation.
- 4.1.4 The most significant impacts are observed within Witney, where the WEL scheme changes vehicle route choice and traffic distribution through the town. Traffic reassigns onto the new West End Link and connecting routes, while flows reduce on sections of Bridge Street and West End as a consequence of the revised highway layout. The results indicate that the scheme provides additional connectivity and route choice opportunities within the Witney network, resulting in a redistribution of traffic movements through the town. This redistribution of traffic would unlock an opportunity to redistribute road space in the Bridge Street area to introduce enhanced and segregated facilities for people walking and cycling alongside bus lanes and other bus priority measures. This opportunity was demonstrated in the preferred option recommended in the Bridge Street Option Assessment Study⁴ (prepared by Pell Frischmann in 2023 on behalf of Oxfordshire County Council).
- 4.1.5 Despite these changes in routing, the assessment indicates that the scheme does not deliver a material improvement in overall highway network performance within Witney. Whilst overall journey times remain broadly unchanged, delays increase within the Witney network, suggesting that the benefits of improved connectivity are offset by additional queuing associated with the additional trips drawn through the town centre, the revised town centre traffic arrangement and new signal-controlled junctions. This indicates that the principal benefit of the scheme is improved connectivity and route choice (and the opportunity this provides to redistribute road space in the town centre to provide segregated facilities for active travel and public transport use alongside placemaking schemes) rather than delivering significant highway network performance benefits or a reduction in congestion. Overall, the junction performance results suggest a redistribution of operational benefits and disbenefits across the Witney network rather than a clear overall improvement in performance.
- 4.1.6 Junction-level results indicate a mixed but generally localised pattern of impacts. Some locations within Witney town centre benefit from reduced delay and improved volume-to-capacity ratios, particularly around Bridge Street and West End where traffic is redistributed across the network. However, increases in delay are observed at other locations, particularly at the junctions and approach roads e.g. Hailey Rd, Woodford

⁴ Bridge Street Option Assessment Study (Pell Frischmann, 2023)

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Way, Burford Rd at either end of the WEL river crossing, meaning that the scheme benefits remain localised and do not translate into a material improvement in overall highway conditions.

- 4.1.7 Select link analysis indicates that the West End Link primarily benefits existing local movements between north and south Witney by providing an additional river crossing and route choice option. However, trips associated with the North Witney SDA and the Burford Road and west Witney Local Plan allocations show only limited changes in routing, suggesting that the scheme provides relatively limited benefits to these developments and does not materially reduce use of routes such as Dry Lane.

Bus performance

- 4.1.8 As this sensitivity test was undertaken as a highway-only assignment and was not processed through the Variable Demand Model, changes in bus patronage and A40 corridor bus journey times have not been assessed. Bus demand therefore remains unchanged between the scenarios.
- 4.1.9 The scheme requires a local change to bus routing within Witney town centre, with northbound services diverted from Bridge Street and West End to Mill Street and the new West End Link. While this alters local bus movements, the changes are not considered sufficient to materially influence public transport demand or the strategic conclusions of the modelling.
- 4.1.10 However, the proposed network changes are expected to improve bus journey times for services operating via Bridge Street, as a result of reduced traffic demand and improved junction performance, while services between High Street and Hailey Road are expected to experience increased northbound journey times due to rerouting via the more congested West End Link.

Overall conclusions

- 4.1.11 Overall, the sensitivity test indicates that the Witney West End Link and Bridge Street improvements result in relatively minor and localised changes to overall network performance. The principal effects are concentrated within Witney where traffic is redistributed onto the new link road and through the revised town centre highway arrangement. This redistribution of traffic would unlock an opportunity to redistribute road space in the Bridge Street area to introduce enhanced and segregated facilities for people walking and cycling alongside bus lanes and other bus priority measures. This could provide significant benefits to those users and help encourage more active and sustainable travel in line with the objectives of Oxfordshire County Council's Local Transport Connectivity Plan⁵ (LTCP).
- 4.1.12 While some localised junction benefits are evident as a result of the WEL, particularly at locations previously experiencing congestion within the town centre, these are offset by increases in delay at other locations associated with the new river crossing and signalised junction layouts. The modelling suggests that the scheme's primary contribution is to provide additional connectivity and route choice within Witney rather than delivering significant reductions in traffic congestion.
- 4.1.13 The assessment therefore demonstrates that the Witney West End Link and Bridge Street improvements change how traffic moves around Witney and improves connectivity across the river, however, it does not materially provide significant highway network performance benefits or reduce congestion. Other findings include:
- Strategic highway performance across West Oxfordshire and the wider model area remains largely unchanged.

⁵ Oxfordshire Local Transport and Connectivity Plan, adopted July 2022 : [Local Transport and Connectivity Plan](#)

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- The Witney West End Link provides additional connectivity and route choice within Witney, resulting in traffic reassignment and redistribution through the local network.
- The scheme does not deliver a material improvement in overall highway performance within Witney, with improvements at some locations offset by increased delay elsewhere in the network.
- Improvements in junction performance are largely confined to specific locations/junctions within Witney town centre and do not translate into substantial network-wide benefits.
- The scheme attracts and redistributes traffic within Witney, resulting in increased delay at some signalised junctions despite localised improvements elsewhere in the network.
- The scheme is expected to improve bus journey times along the Bridge Street corridor, although some northbound services rerouted via West End Link may experience increased delays.
- Select link analysis indicates that the West End Link provides limited benefits to vehicle trips associated with the North Witney SDA and north-west Witney Local Plan allocations, with only modest changes in routing patterns.
- The strategic transport conclusions of the West Oxfordshire Local Plan 2043 modelling are not materially affected by uncertainty regarding the delivery of the Witney West End Link and Bridge Street improvements.

Appendix A. Junction Metrics

Junction performance has been assessed for key locations across West Oxfordshire, presented in Table A-1 and Table A-2.

Table A-1 – Junction performance: Delay (seconds)

Area	Junction	ST4			Change from ST2		
		AM	IP	PM	AM	IP	PM
A40	A40 / Wolvercote Roundabout (West)	16	17	16	0	0	0
A40	A40 / Canalside Quarter Junction	59	46	47	-3	0	0
A40	A40 / Eynsham Road	14	9	22	0	0	0
A40	A40 / Cassington Road	7	4	11	0	0	0
A40	A40 / Approach to Cassington Road	18	0	0	-2	0	0
A40	A40 / Eynsham Roundabout	24	16	26	0	0	0
A40	A40 / Witney Road	19	7	25	0	0	0
A40	A40 / Eynsham P&R	9	10	20	0	0	0
A40	A40 / West Eynsham / Salt Cross (New junction)	33	19	23	0	0	0
A40	A40 / Shores Green (EB on-slip)	8	1	1	8	0	0
A40	A40 / Shores Green (WB off-slip)	0	0	0	0	0	0
A40	A40 / Shores Green (WB on-slip)	1	1	9	0	0	3
A40	A40 / Shores Green (EB off-slip)	0	0	0	0	0	0
A40	Shores Green (EB off-slip) / B4022	18	15	19	0	0	0
A40	Shores Green (WB on-slip) / B4022	19	9	35	-5	0	2
A40	A40 / Ducklington Lane (WB on-slip)	1	1	1	0	0	0
A40	A40 / Downs Road	38	4	6	-2	0	0
A40	A40 / Brize Norton Road	11	11	11	0	0	0
A40	New A40 Roundabout (Carterton Site F)	10	11	11	0	0	0
A40	A40 / Asthall Barrow Roundabout	15	15	15	0	0	0
Eynsham*	Stanton Harcourt Road / West Eynsham (New junction)	3	3	3	0	0	0
Witney	Jubilee Way / Cogges Hill Road / Oxford Hill	82	53	73	6	6	-5
Witney	Jubilee Way / A4095	45	24	23	9	-1	-6
Witney	Crawley Road / Hailey Road / West End	32	22	30	25	16	24
Witney	Burford Road / Mill Street / Woodford Way	65	36	73	50	21	51
Witney	Bridge Street / Newland / Woodgreen Hill	36	31	34	27	20	21
Witney	West End / Bridge Street	36	31	34	-24	22	-31
Witney	Bridge Street / High Street / Mill Street	10	9	11	-43	2	4
Witney	Burford Road / Deer Park Road	38	24	41	3	-5	-5
Witney	Deer Park Road / Curbridge Road / Thorney Leys	46	10	33	-1	0	0
Witney	Ducklington Lane / Station Lane / Thorney Leys	38	33	49	0	0	1
Carterton	Burford Road / Alvescot Road / Brize Norton Road / Black Bourton Road	21	21	26	0	0	0
Carterton	Monahan Way / Upavon Way	24	27	29	0	0	0
Brize Norton	B4477 / Burford Road	1	1	1	0	0	0
Brize Norton	B4477 / Minster Road / Brize Norton Road	9	9	10	0	0	0
Chipping Norton	Horsefair / London Road / Banbury Road / Over Norton Road	97	9	139	1	0	1
Chipping Norton	Market Place / West Street / New Street	15	6	33	0	0	0

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Table A-2 – Junction performance: Volume/Capacity (%)

Area	Junction	ST4			Change from ST2		
		AM	IP	PM	AM	IP	PM
A40	A40 / Wolvercote Roundabout (West)	72	70	69	0	0	0
A40	A40 / Canalside Quarter Junction	72	65	70	0	0	0
A40	A40 / Eynsham Road	61	52	66	-2	0	0
A40	A40 / Cassington Road	57	49	60	0	0	0
A40	A40 / Approach to Cassington Road	86	73	86	-1	0	0
A40	A40 / Eynsham Roundabout	80	73	93	-1	0	0
A40	A40 / Witney Road	57	60	67	0	0	0
A40	A40 / Eynsham P&R	54	49	53	0	0	0
A40	A40 / West Eynsham / Salt Cross (New junction)	74	56	69	1	0	0
A40	A40 / Shores Green (EB on-slip)	67	57	58	1	1	0
A40	A40 / Shores Green (WB off-slip)	38	36	42	0	0	0
A40	A40 / Shores Green (WB on-slip)	77	65	88	-6	2	1
A40	A40 / Shores Green (EB off-slip)	55	41	51	1	3	0
A40	Shores Green (EB off-slip) / B4022	39	36	50	-4	1	0
A40	Shores Green (WB on-slip) / B4022	66	54	78	-9	0	0
A40	A40 / Ducklington Lane (WB on-slip)	39	31	45	-1	0	-1
A40	A40 / Downs Road	82	54	75	0	1	0
A40	A40 / Brize Norton Road	43	37	48	1	0	0
A40	New A40 Roundabout (Carterton Site F)	27	23	31	0	0	0
A40	A40 / Asthall Barrow Roundabout	46	34	48	0	0	0
Eynsham*	Stanton Harcourt Road / West Eynsham (New junction)	63	37	59	0	0	0
Witney	Jubilee Way / Cogges Hill Road / Oxford Hill	67	58	81	-5	-4	-2
Witney	Jubilee Way / A4095	85	50	57	0	-2	-1
Witney	Crawley Road / Hailey Road / West End	89	52	84	59	34	59
Witney	Burford Road / Mill Street / Woodford Way	72	49	72	23	8	22
Witney	Bridge Street / Newland / Woodgreen Hill	77	60	69	-3	-15	-14
Witney	West End / Bridge Street	77	60	69	-20	-21	-22
Witney	Bridge Street / High Street / Mill Street	83	64	73	6	-2	1
Witney	Burford Road / Deer Park Road	93	59	64	-2	-4	-3
Witney	Deer Park Road / Curbridge Road / Thorney Leys	87	40	91	4	0	0
Witney	Ducklington Lane / Station Lane / Thorney Leys	61	48	73	3	3	3
Carterton	Burford Road / Alvescot Road / Brize Norton Road / Black Bourton Road	61	45	69	0	0	-1
Carterton	Monahan Way / Upavon Way	32	19	30	0	0	0
Brize Norton	B4477 / Burford Road	39	28	42	0	0	0
Brize Norton	B4477 / Minster Road / Brize Norton Road	38	28	45	0	0	0
Chipping Norton	Horsefair / London Road / Banbury Road / Over Norton Road	82	73	87	0	0	0
Chipping Norton	Market Place / West Street / New Street	75	69	89	0	0	0

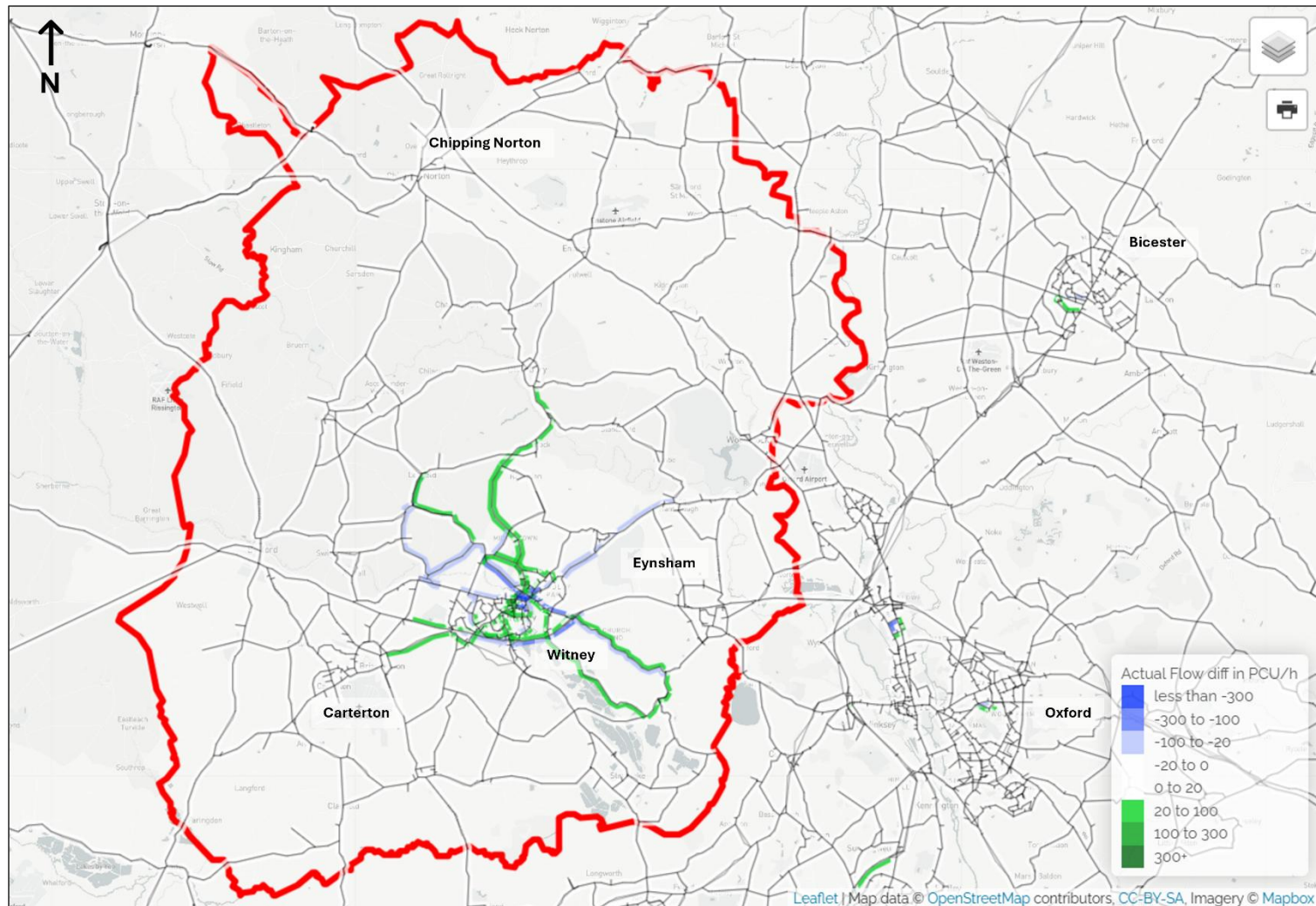
*Stub Connector Delay Methodology and Rationale

Consistent with the Strategic Modelling Report, delays reported on the sub-connector representing the wider industrial area at the Stanton Harcourt Road / Eynsham junction have been excluded from the junction performance assessment. Sensitivity testing confirmed that these delays are a modelling artefact arising from the network coding and do not reflect a genuine junction capacity constraint. Their exclusion ensures consistency with the approach adopted in the Strategic Modelling Report.

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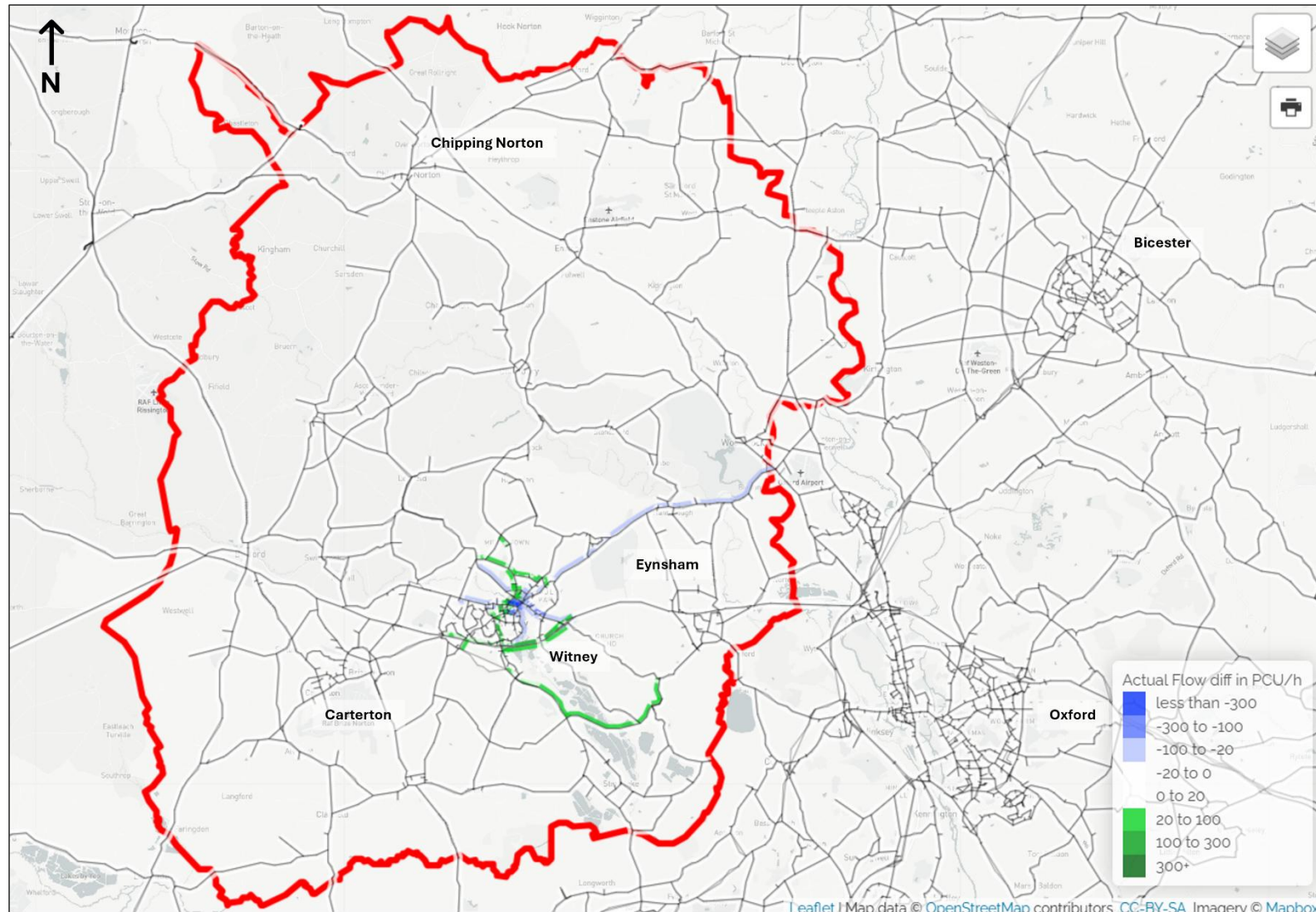
Appendix B. Flow Plots

Figure B-1 – AM peak – change in flow from 2043 ST2 to 2043 ST4



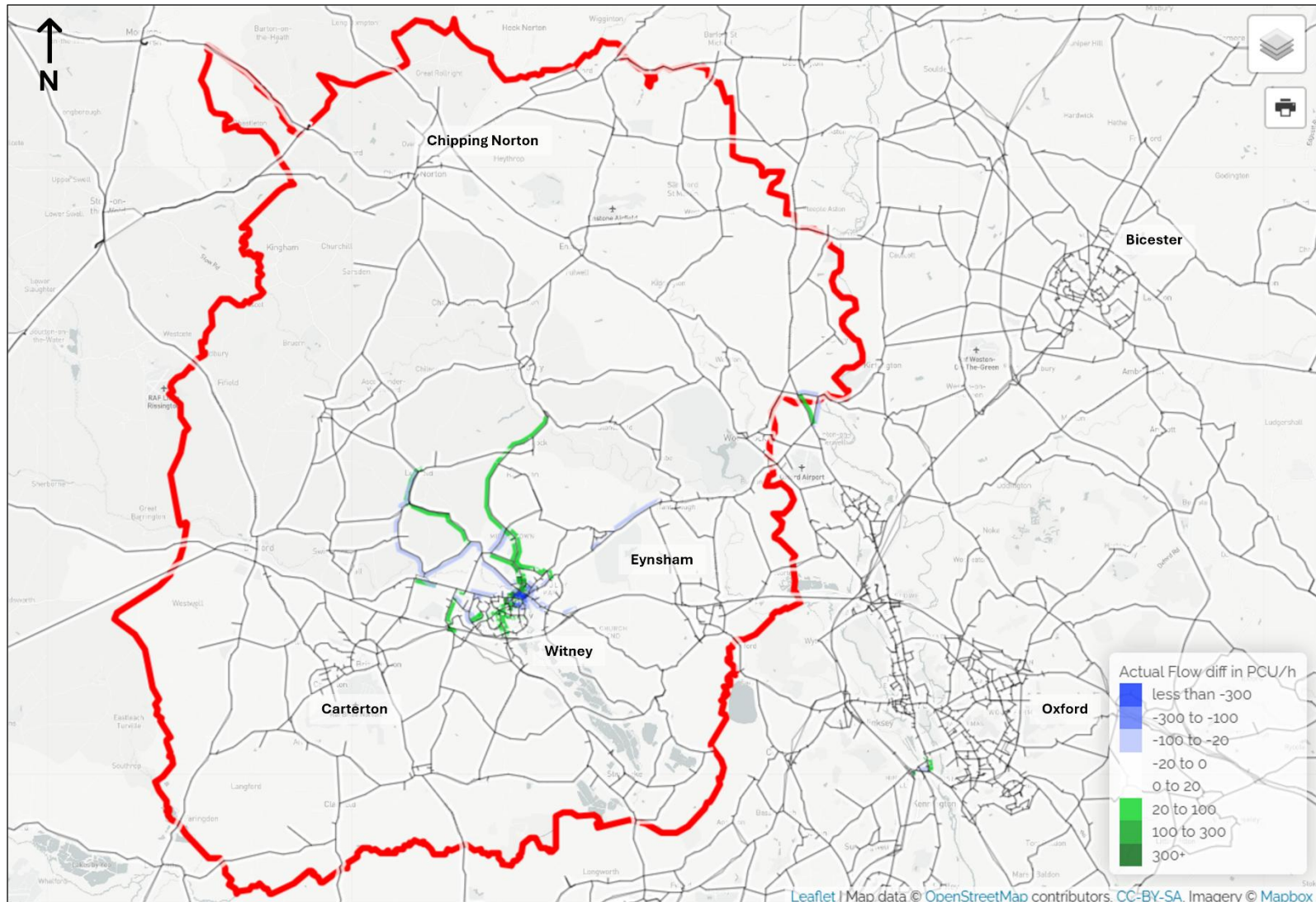
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Figure B-2 – Interpeak – change in flow from 2043 ST2 to 2043 ST4



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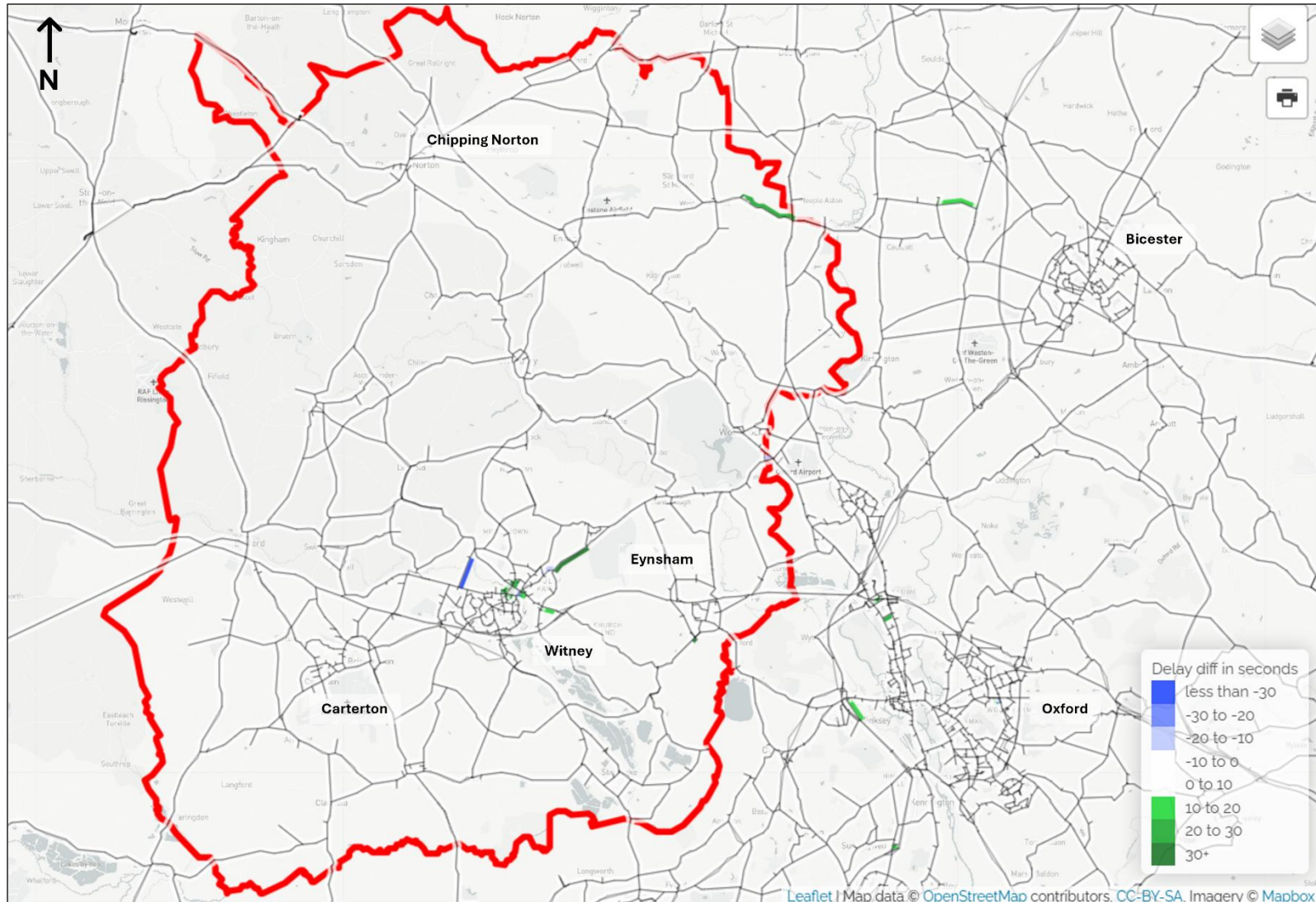
Figure B-3 – PM peak – change in flow from 2043 ST2 to 2043 ST4



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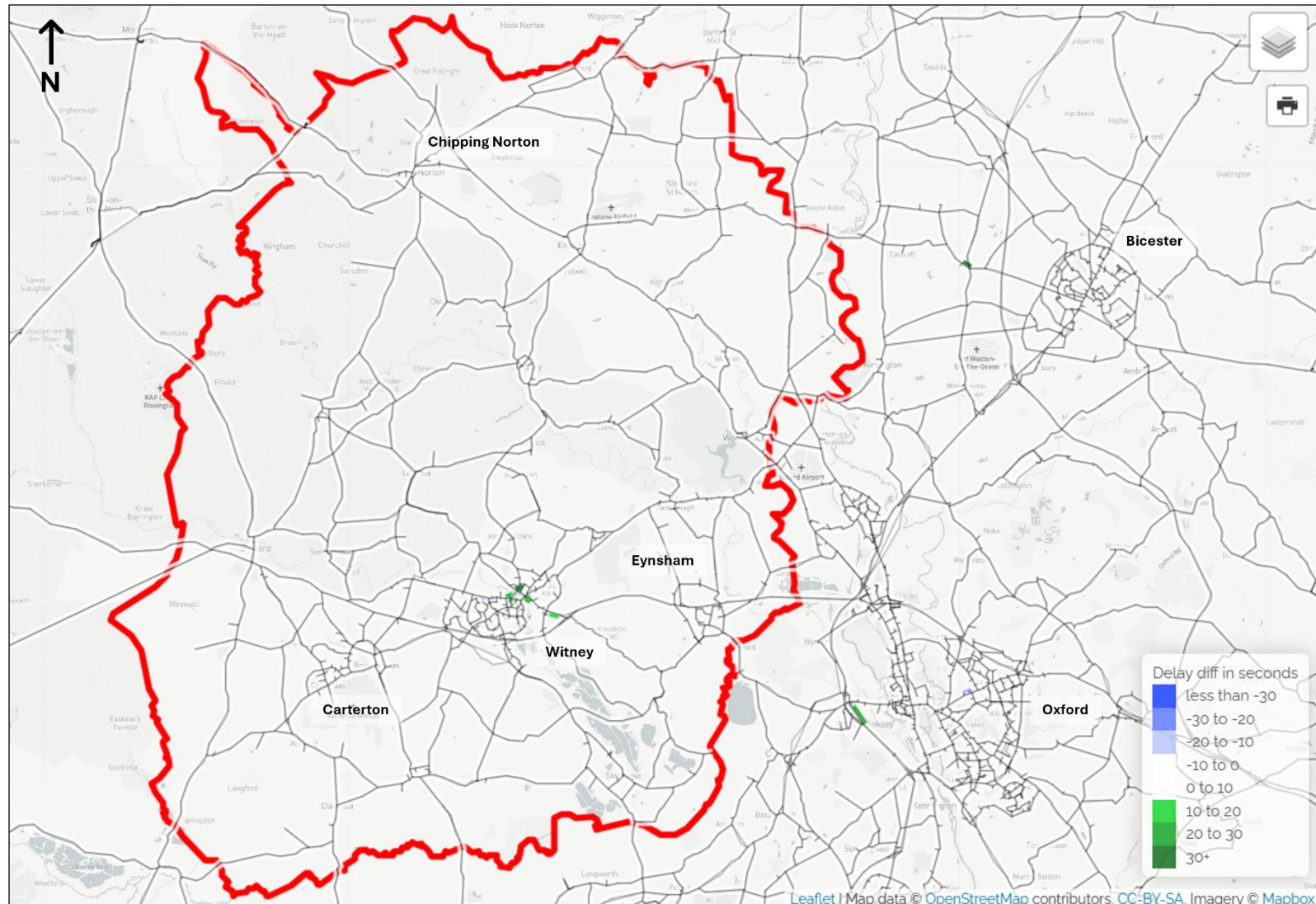
Appendix C. Delay Plots

Figure C-4 – AM peak – link delay change from 2043 ST2 to 2043 ST4



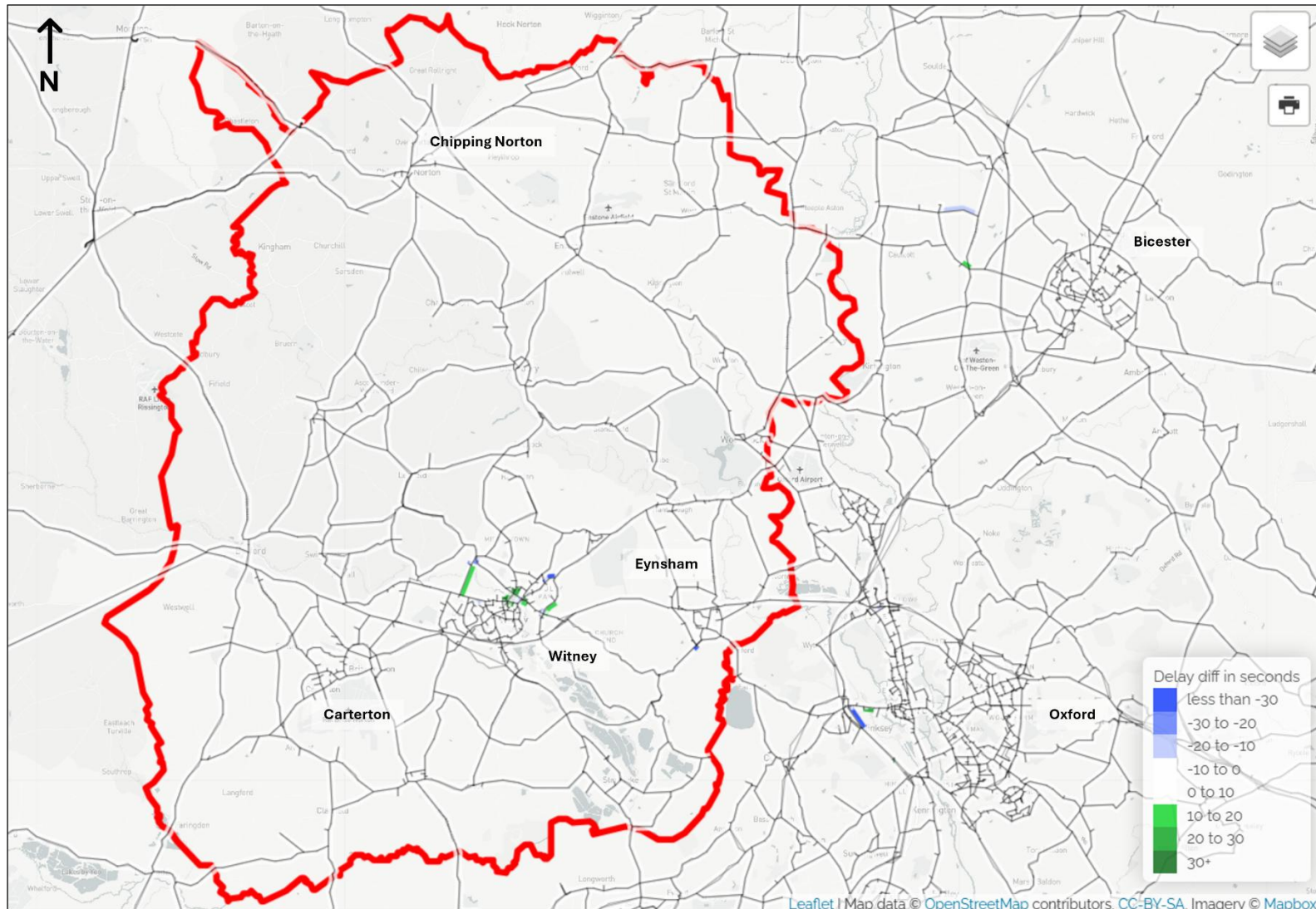
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Figure C-5 – Interpeak – link delay change from 2043 ST2 to 2043 ST4



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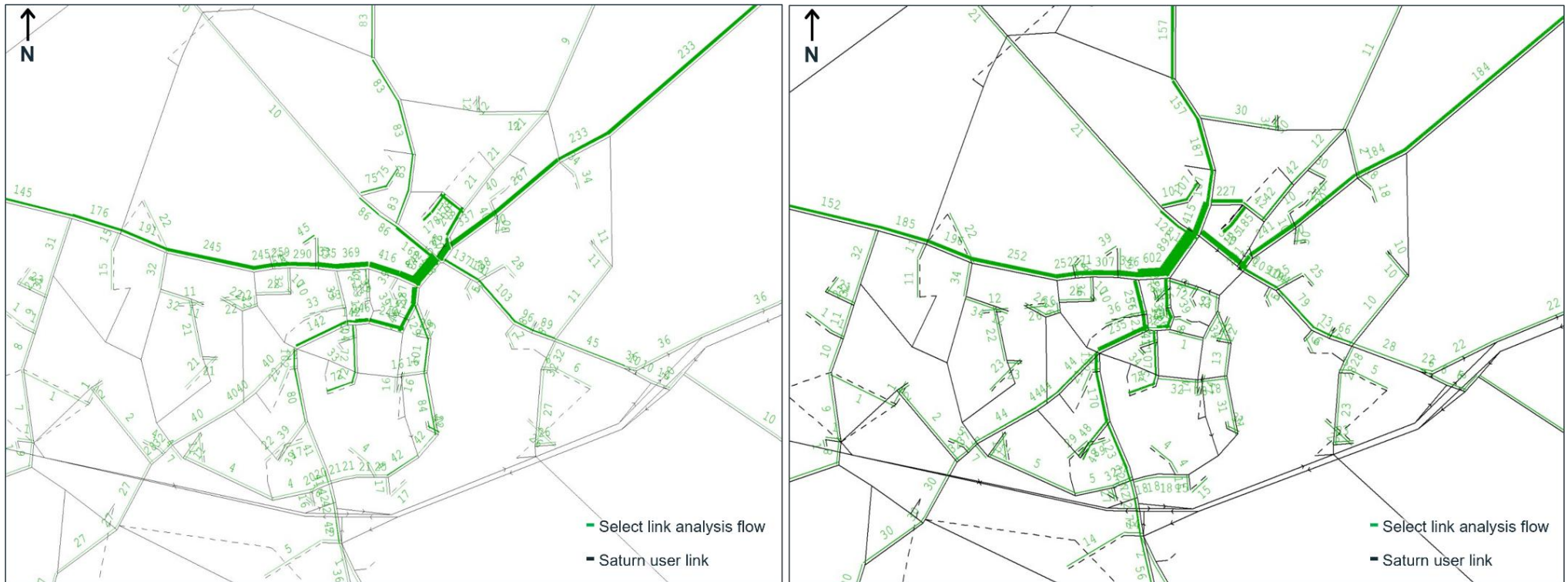
Figure C-6 – PM peak – link delay change from 2043 ST2 to 2043 ST4



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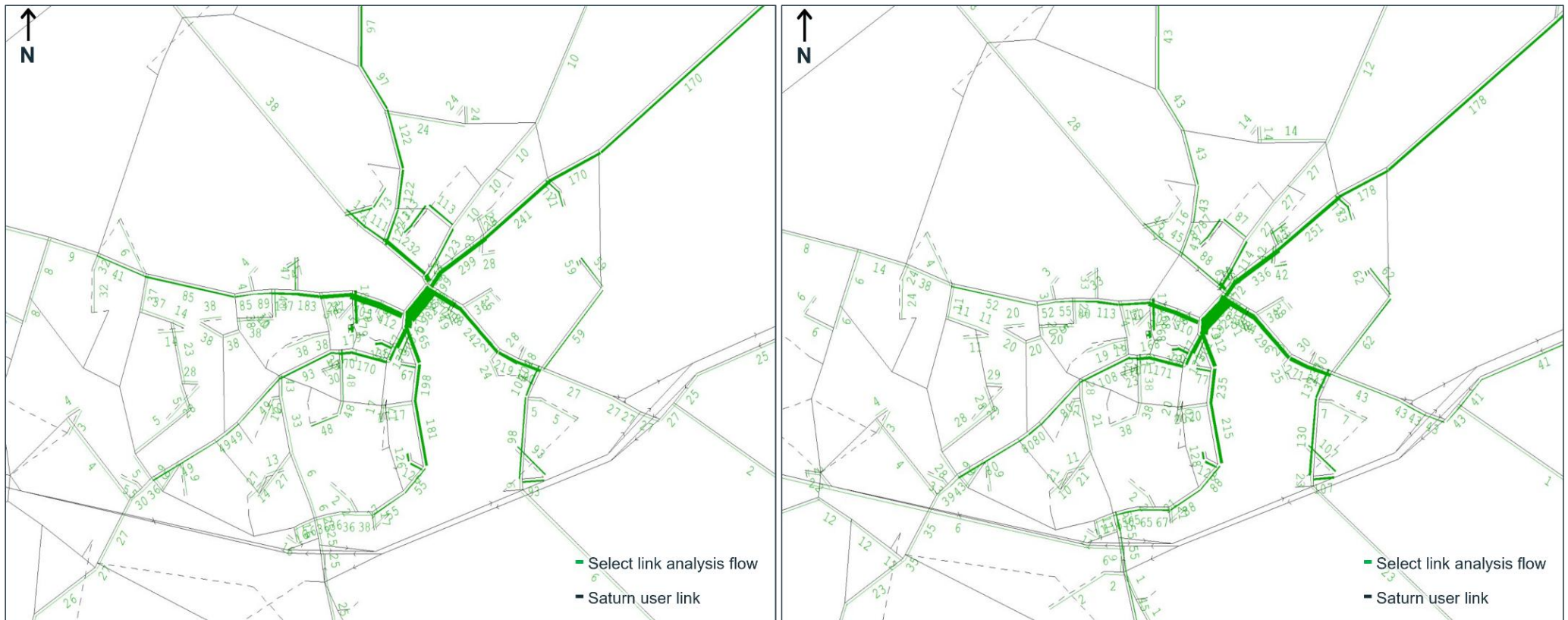
Appendix D. Select Link Analysis Plots

Figure D-7 – Bridge Street / West End Link Northbound AM (Left = ST2, Right = ST4)



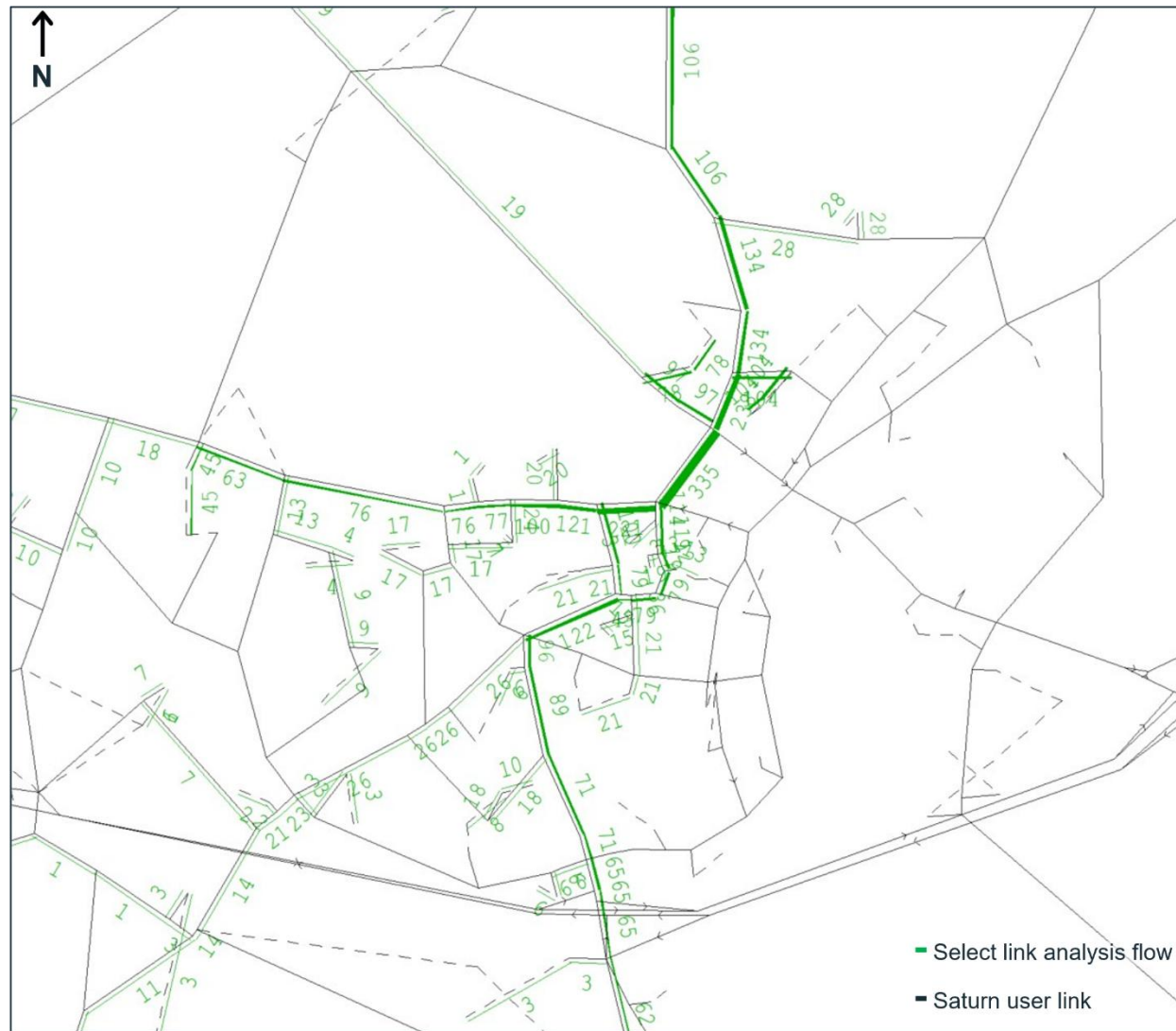
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Figure D-8 – Bridge Street Southbound AM (Left = ST2, Right = ST4)



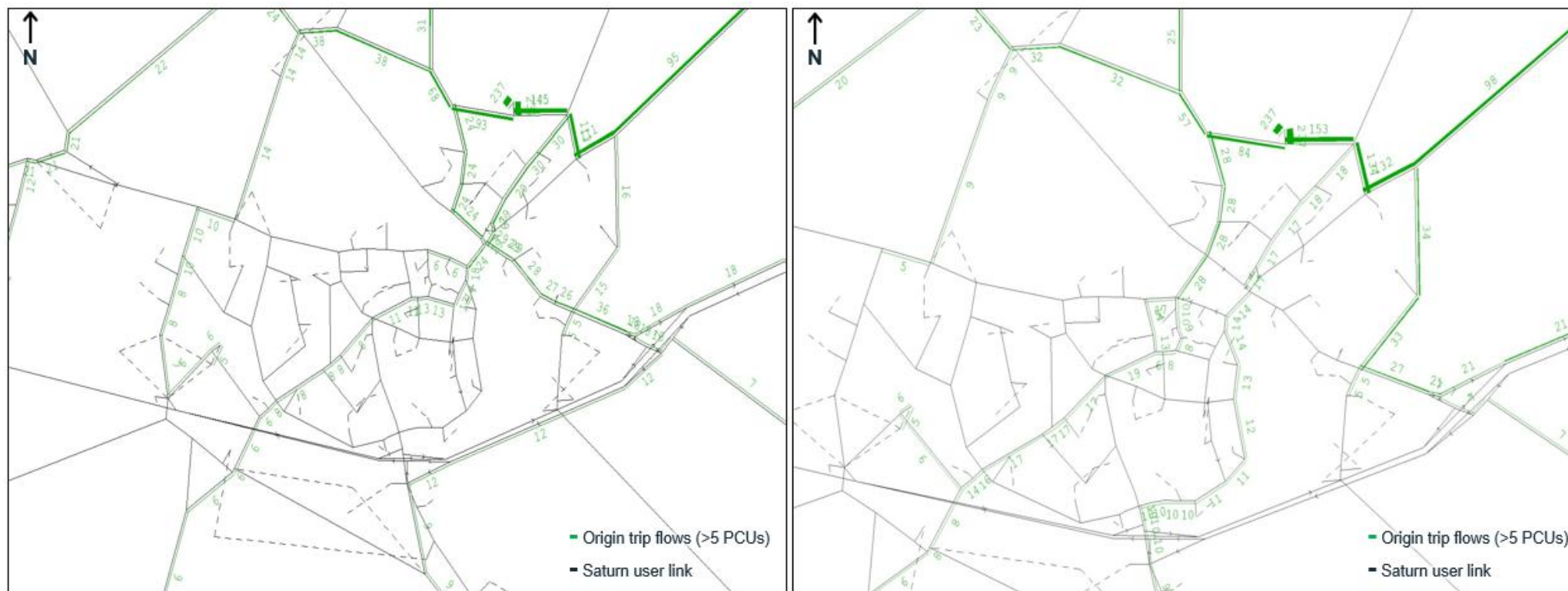
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Figure D-9 – West End Link Southbound AM (ST4)



TECHNICAL NOTE

Figure D-10 – North Witney SDA Origin Trips AM (Left = ST2, Right = ST4)



TECHNICAL NOTE

Figure D-11 – Witney Site A Land north of Burford Road Destination Trips PM (Left = ST2, Right = ST4)

