

Putney High Street

Post Implementation Study
Technical Note

London Borough of Wandsworth

26th September 2025

Quality information

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1. Introduction

Background

- 1.1 London Borough of Wandsworth (LBW) constructed in early 2025 a new layout at the Putney High Street between Lacy Road and Putney Bridge, designed to improve pedestrian and cyclist connectivity along Putney High Street and the connection with Putney Bridge.
- 1.2 AECOM has supported LBW through the different stages of this study, from the baseline analysis and option identification, feasibility design, modelling assessment, and detailed design and implementation.
- 1.3 LBW has now commissioned AECOM to undertake a post-implementation study, to understand how the new junctions perform and how pedestrians, cyclists, buses and general traffic.
- 1.4 The present report documents the analysis carried out, identifies issues and opportunities to improve the performance of the junctions.
- 1.5 The rest of the present document has the following structure:
 - Scheme Overview;
 - Data Collection;
 - Data Analysis;
 - Additional Observations; and
 - Conclusions

2. Scheme Overview

Background

- 2.1 In 2021 AECOM undertook a multi-disciplinary study of Putney High Street between Montserrat Road and Gonville Street. This study highlighted several issues along the High Street, with key points below:
 - Vehicles travelling northbound on Putney High Street and Lower Richmond Road Junction merged using the cycle lane and bus stop on Putney Bridge;
 - Buses dwelling at some bus stops blocked through traffic on the adjacent lanes;
 - Some bus services had stops which were closely spaced, within 1-2 minutes walking distance;
 - Pedestrian crossings were over several stages, causing significant pedestrian delay;
 - Small pedestrian islands with significant guardrail cover;
 - Pedestrians crossed during red signals, with a false sense of security;
 - Cyclists were unprotected from traffic and often overtaken; and
 - Overall, the junction layout was unwelcoming for pedestrians and traffic.

- 2.2 Operational and capacity issues for general traffic were identified at the junction, such as the low utilisation of some flares. However, the majority of the issues identified were related to poor performance for pedestrians and cyclists and their safety. The proposed scheme focused on mitigating these issues without significantly affecting motorised users at the junction, in particular buses.

Putney High Street / Lower Richmond Road Improvements

- 2.3 Pedestrian movements at the previous junction were indirect, with some crossing requiring more than one stop on small traffic islands. For example, pedestrians travelling along the Thames Path or from Fulham to Putney High Street, had to cross in three stages, suffering delay and discomfort on small pedestrian islands at the busy junction.
- 2.4 The improvements which were implemented mean that pedestrians can now cross each arm of the junction in two stages, with larger islands increasing pedestrian comfort levels when they cannot make both crossings in the same movement.
- 2.5 The proposed scheme crossings are also more aligned with pedestrian desire lines, improving the safety of the pedestrians by encouraging use of the formal facilities.
- 2.6 In 2021, the left turn flares at Lower Richmond Road and Putney High Street were significantly underutilised as the narrow lane width and the tight left turn radii prevented them from being used effectively.
- 2.7 The new junction design has also provided Advanced Stop Lines (ASLs) on all arms and a segregated cycle lane with a cycle gate on Putney High Street. This allows greater protection for cyclists, as the Pedestrian movements have been illustrated in Figure 2-1.

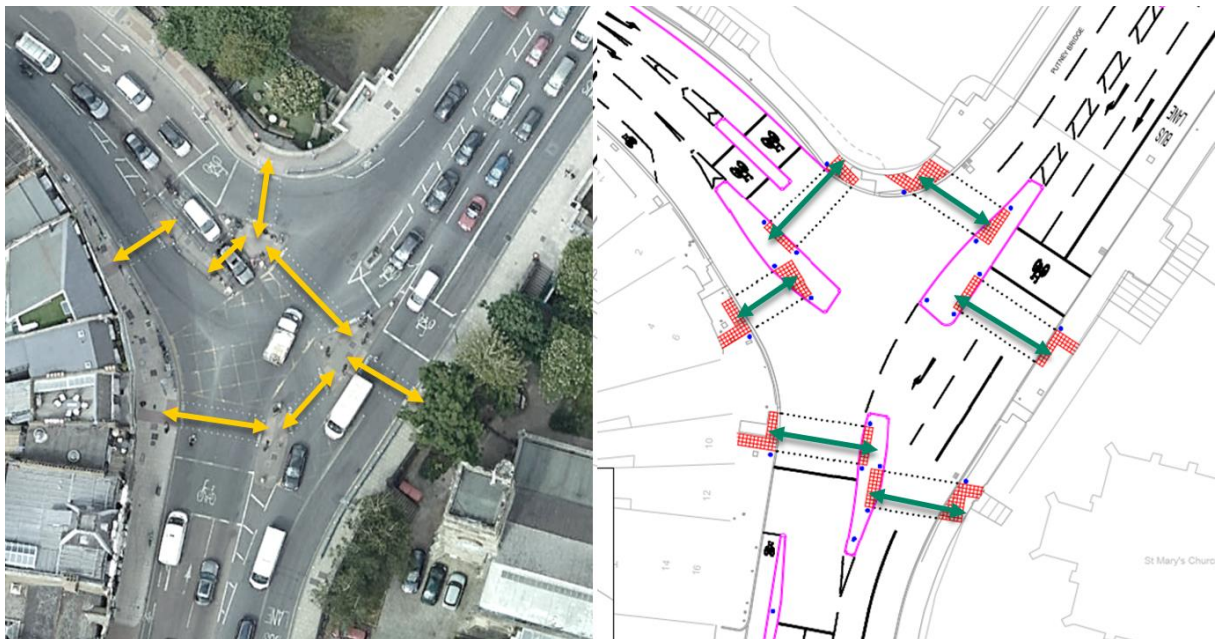


Figure 2-1 - Pedestrian movements pre-intervention (left) and currently (right), at Putney Bridge / Lower Richmond Road junction

Putney High Street / Putney Bridge Road Junction

- 2.8 The improvements which were implemented at the Putney High Street / Putney Bridge Road junction retained the pedestrian crossings as they were previously to the scheme implementation, but the narrow island was removed on Putney High Street as this was too small for pedestrians to use it to cross in two stages, so single stage crossing is encouraged.
- 2.9 The junction staging was changed and the Putney High Street pedestrian crossing phase was separated from the Putney Bridge Road phase. This allowed cyclists to turn left out of Putney Bridge Road without conflicting with the crossing pedestrians.
- 2.10 This junction also introduced not only advanced stop lines for cyclists, but also dedicated cycle lanes, improving their safety and accessibility.
- 2.11 The pedestrian movements at the Putney High Street / Putney Bridge Road junction have been illustrated in Figure 2-2 on the scheme's layout.



Figure 2-2 - Pedestrian movements at Putney High Street / Putney Bridge Road junction with the scheme in place

Other Improvements

- 2.12 In addition to the changes described above, the scheme also introduced two other changes that have been represented below in Figure 2-3:
- The bus stop on Putney Bridge northbound (St Mary's Church / Putney Pier - Stops S and T) was slightly moved to increase the merging distance available on the bridge; and
 - A dedicated cycle pocket was added to Putney High Street south of the Putney Bridge Road Junction, to allow cyclists to turn right into Felsham Road.

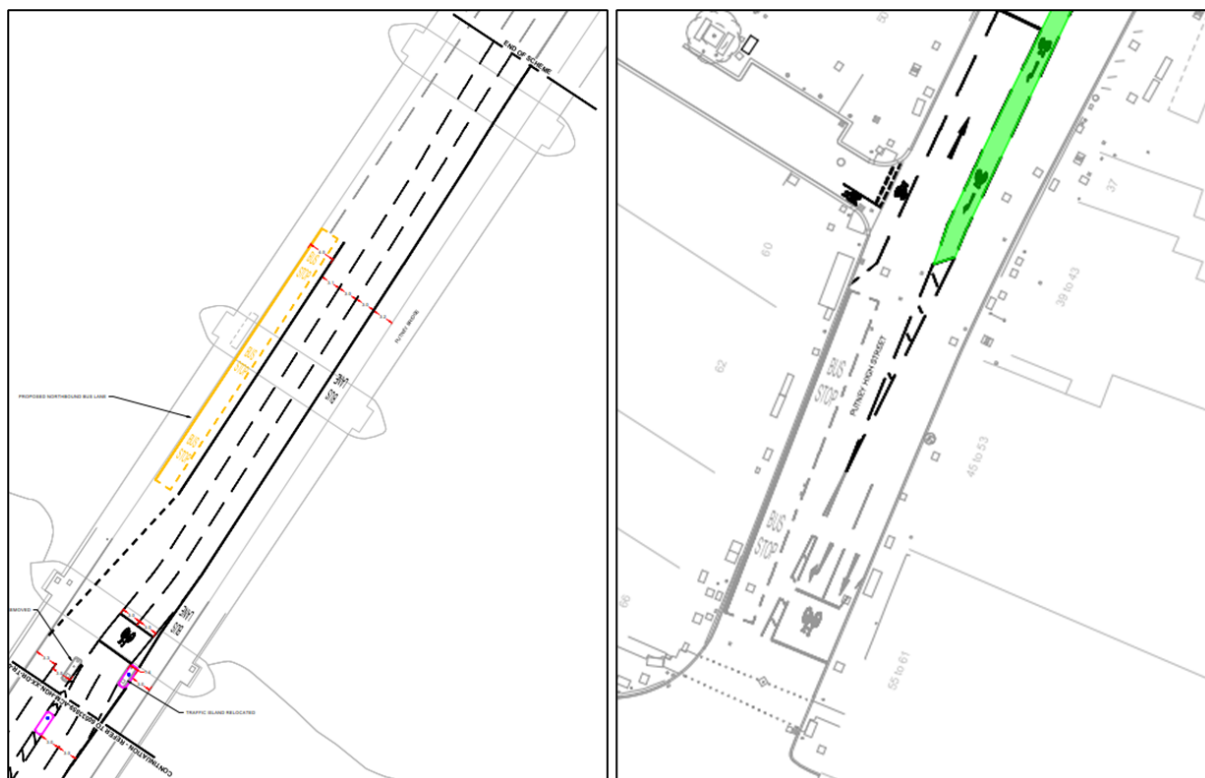


Figure 2-3 - St Mary's Church / Putney Pier (Stops S and T) moved north (left) and dedicated right turn for southbound cyclists on Putney High Street into Felsham Road.

3. Data Collection

- 3.1 Traffic data was collected by LBW to allow analysis to be conducted of the previous and post-implementation performance of the junctions. This data has been defined as consistently as possible with the data collection exercise undertaken in 2021 to allow a like-for-like comparison with the 2021 baseline analysis and the modelling assessment undertaken before scheme implementation.
- 3.2 It should be noted that the two survey dates, 15th July 2021 and 18th June 2025, fall under the same season, minimising the possible effects of different weather or characteristics of different times of year might have. Both days were noted to be sunny and dry.
- 3.3 The following data have been collected:
 - Manual Classified Turning Counts (MCTCs);
 - Automatic Number Plate Recognition (ANPR) data;
 - Pedestrian counts and observations of behaviours; and
 - Video footage at multiple locations
- 3.4 Locations for the MCTC and ANPR have been represented in Figure 3-1.

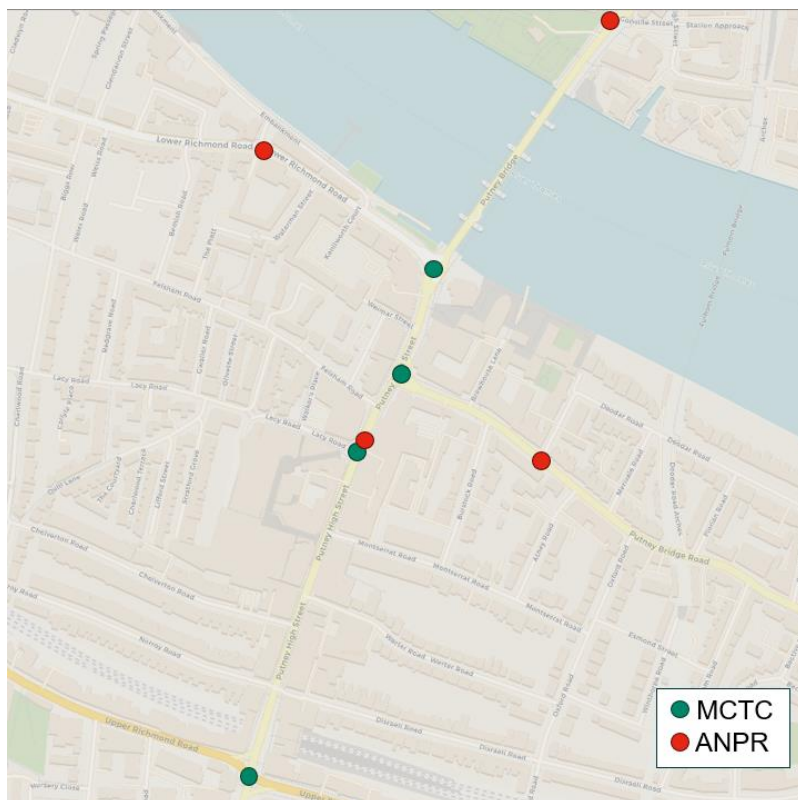


Figure 3-1 - Location of MCTC and ANPR surveys

- 3.5 iBus data, providing bus journey time and dwell time information was obtained for the week during which the surveys took place, including all services that go through the study area.
- 3.6 Signal timing sheets for the signal installations along the Putney High Street corridor have been obtained; these not only include the study area (from Montserrat Road to Gonville Street), but also the junctions between it and the A205.
- 3.7 Signal activations (SCOOT messages) were also obtained from TfL for the Putney High Street / Lower Richmond Road and Putney High Street / Putney Bridge Road junctions.

4. Data Analysis

- 4.1 The present section summarises all the analysis carried out on the data received and described above. This section has the following structure:
 - Pedestrians;
 - Cyclists;
 - General Traffic;
 - Journey Times;
 - iBus Data; and
 - Signal Operation
- 4.2 As peak hours and arrival patterns could have changed between the two years and to present a complete analysis, the overall peak period has been used for comparison where possible.

Pedestrians

- 4.3 Figure 4-1 shows the total pedestrian counts in the morning period (07:00 to 10:00, pre- and post-implementation, with their percentage change as a label.
- 4.4 The comparison shows that pedestrian flows have increased significantly overall for all arms of both junctions.
- 4.5 The number of crossings over the Putney Bridge and Putney High Street arms show significant increases, of 177% and 185% respectively, while other arms show increases closer to 20-30%.

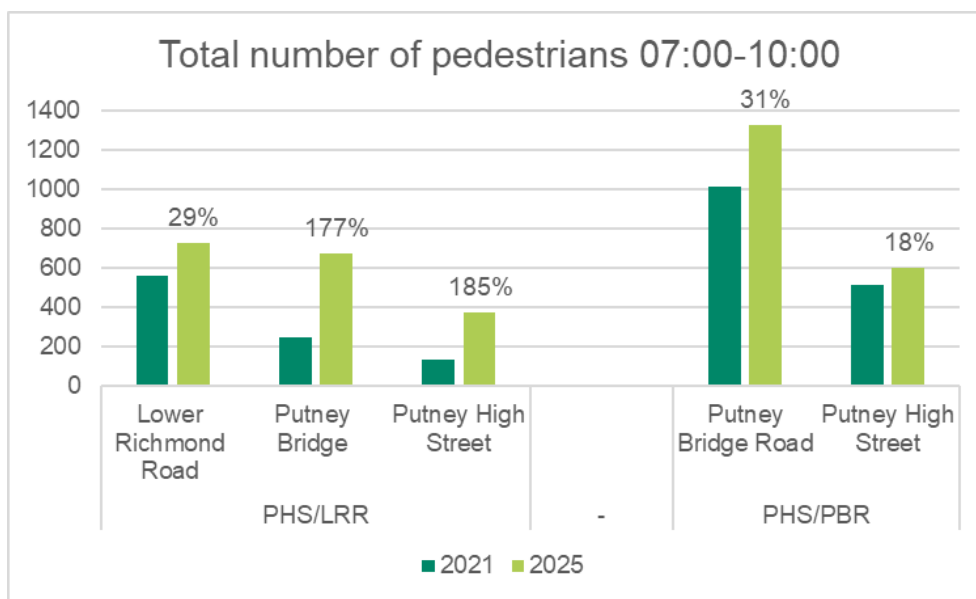


Figure 4-1 - Pedestrians crossing in the morning period (showing % change)

- 4.6 The pedestrian counts were also categorised to count how many people cross in red and green. For the AM period, this has been summarised in Figure 4-2 below.
- 4.7 The comparison shows that the number of pedestrians crossing in red has significantly reduced from 2021. This is likely to result in an improvement in safety at the junction.

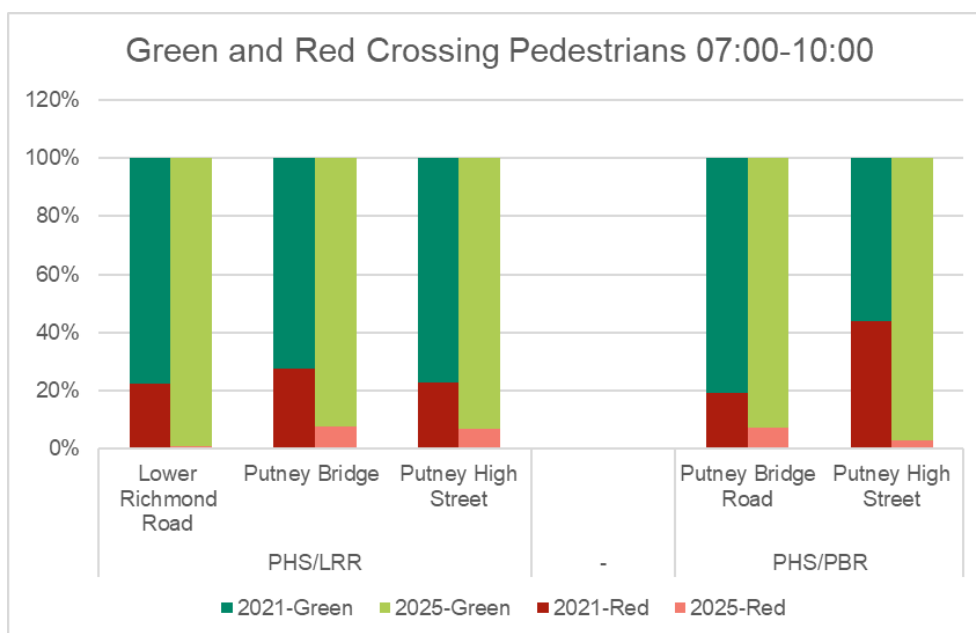


Figure 4-2 - Summary of green and red man crossing for the morning period (07:00-10:00)

- 4.8 Figure 4-3 shows the total numbers of pedestrian crossing during the afternoon period (16:00 to 19:00), with their percentage change as a label.
- 4.9 The results for the PM period are consistent with the AM period, with a significant increase in the number of pedestrians crossing at the junctions, although increases are more modest than in the morning peak period. Crossings at Putney High Street and Lower Richmond Road arms increase by 174% and a 46% respectively. The rest of the arms show increases between 7 and 14%.

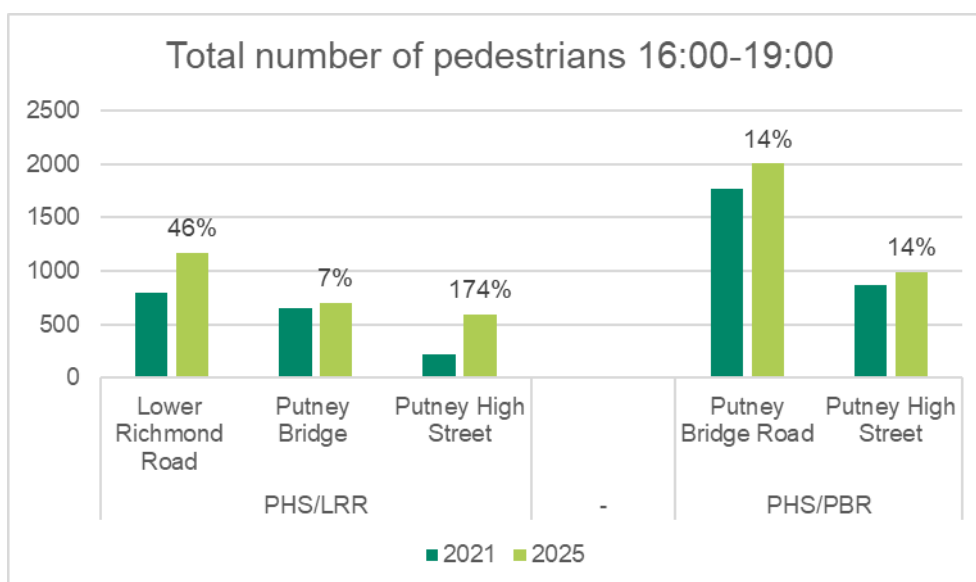


Figure 4-3 - Pedestrians crossing in the evening period (showing % change)

- 4.10 Figure 4-4 shows the comparison of pedestrians crossing in red and in green for the PM peak. Following a similar pattern as the AM peak period, most of the crossings show a significant decrease in the percentage of pedestrians crossing in red. The only exception to this is Putney High Street where the proportion is similar to that of 2021.

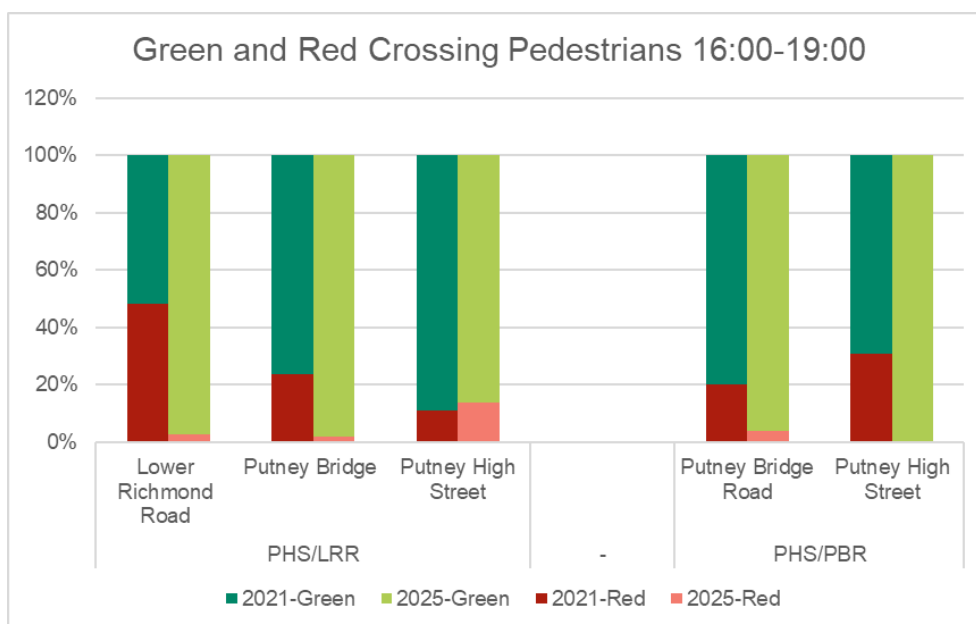


Figure 4-4 - Pedestrian summary of green and red man crossers for the evening period (16:00-19:00)

4.11 The results indicate that the junction improvements have resulted in a significant increase in the number of pedestrians travelling through the junctions, with a reduction in the number of pedestrians crossing in red, likely due to more direct and better-placed crossing facilities, with less pedestrian delay.

Pedestrian Journey Times

- 4.12 Pedestrian journey times for 2025 have been calculated from the videos and summarised below in Figure 4-5. For 2021, the times have been estimated from the calibrated base LinSig models, as the videos were not available. These have been represented as ranges, as the journey times depend heavily on when pedestrians arrive at the crossings.
- 4.13 It can be observed in the figures below that the pedestrian crossing times are estimated to reduce from 2021 levels due to the staggered three-crossing system.
- 4.14 The changes in the junction layout do not allow for a direct comparison of the different crossing movements. The comparison below, therefore, includes the pedestrian crossing points that are most comparable against the crossings in the new layout.
- 4.15 The crossing delays have been directly observed from the video footage – it should be noted that there is high variability in the observations as they depend on the arrival time and the signal stage running at the time of arrival.

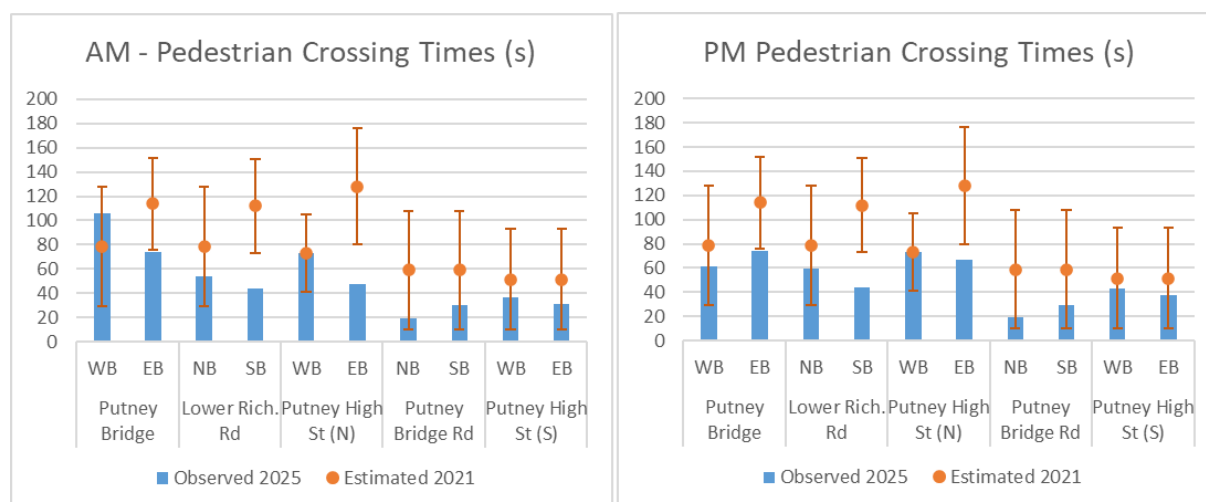


Figure 4-5 - Pedestrian Crossing Times, for 2025 and 2021, in seconds

Cyclists

- 4.16 Cyclists were not well catered for at the junction before the implementation of the new layout, with limited dedicated facilities that were affected by operational issues, such as motorised vehicles using the advisory cycle lane, increasing the risks for cyclists.
- 4.17 The cyclists turning flows for the two main junctions affected by the scheme, Putney High Street with Lower Richmond Road and Putney Bridge Road, have been compared in the figures below. Figure 4-6 and Figure 4-7 show the flow comparison for the AM period 07:00-10:00 and Figure 4-8 and Figure 4-9 show the flow comparison for the PM period, 16:00-19:00. The percentage change between 2021 and 2025 is also shown as label in the graph.
- 4.18 In the AM period, the comparison shows that the number of cyclists has increased; while there are two movements with a reduction of 10%, the rest of the movements increase by a higher proportion, resulting in an overall increase in cyclists in the area. The northbound movements from Putney High Street and Lower Richmond Road towards Putney Bridge are the dominant cycle movements and these see the highest increases, indicating that more people are now using the junctions or travelling by cycle rather than other modes to travel to the north over the river.

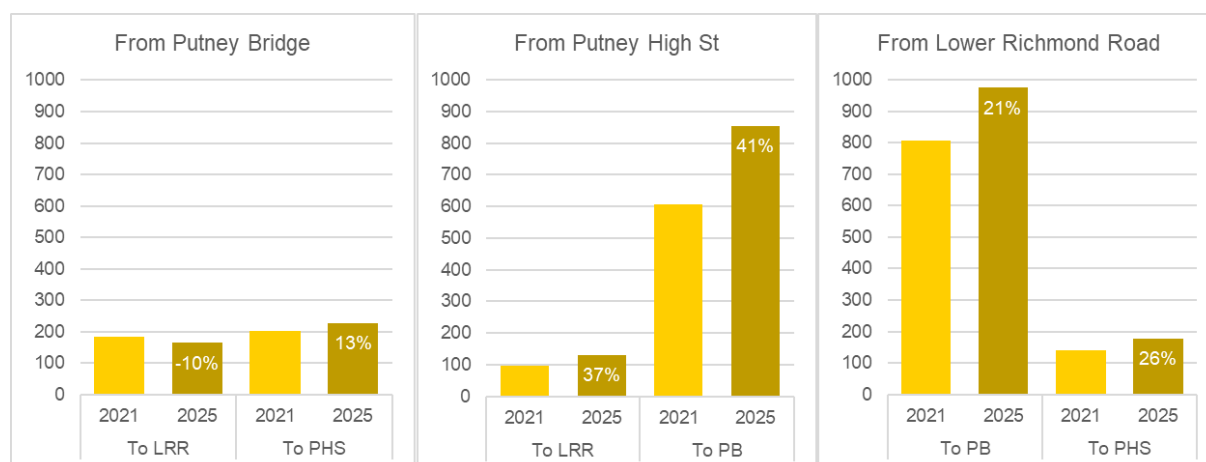


Figure 4-6 - Cyclist Turning Flows, Putney High Street / Lower Richmond Road Junction, AM period (07:00-10:00)

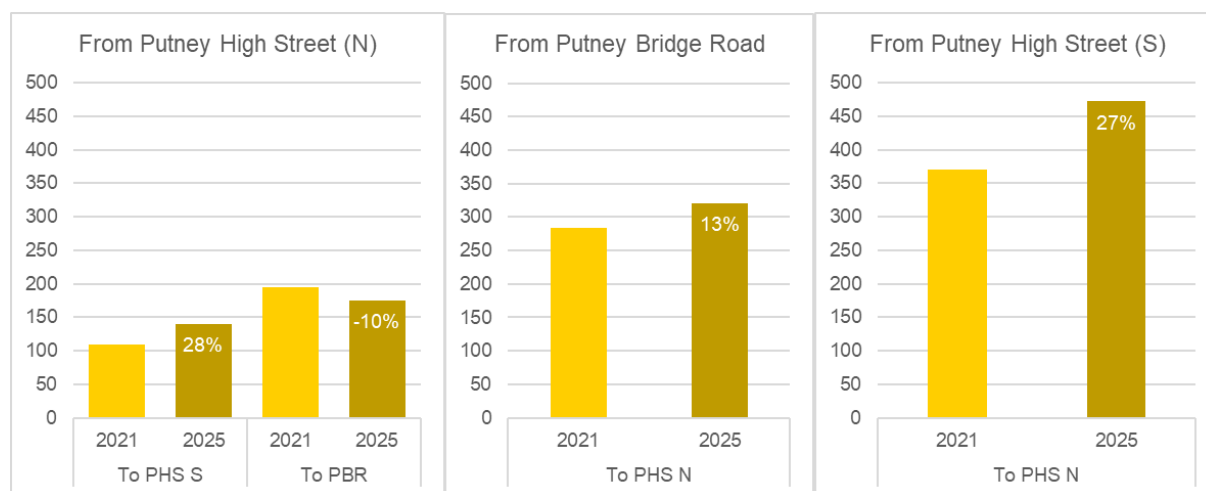


Figure 4-7 - Cyclist Turning Flows, Putney High Street / Putney Bridge Road Junction, AM period (07:00-10:00)²

4.19 In the PM period, a similar pattern can be observed in the graphs. The dominant cycle movement in this peak, the southbound movement, sees a significant increase, showing that many more cyclists choose to travel through the junction, or shift from other modes. Most of the other movements also show significant increases.

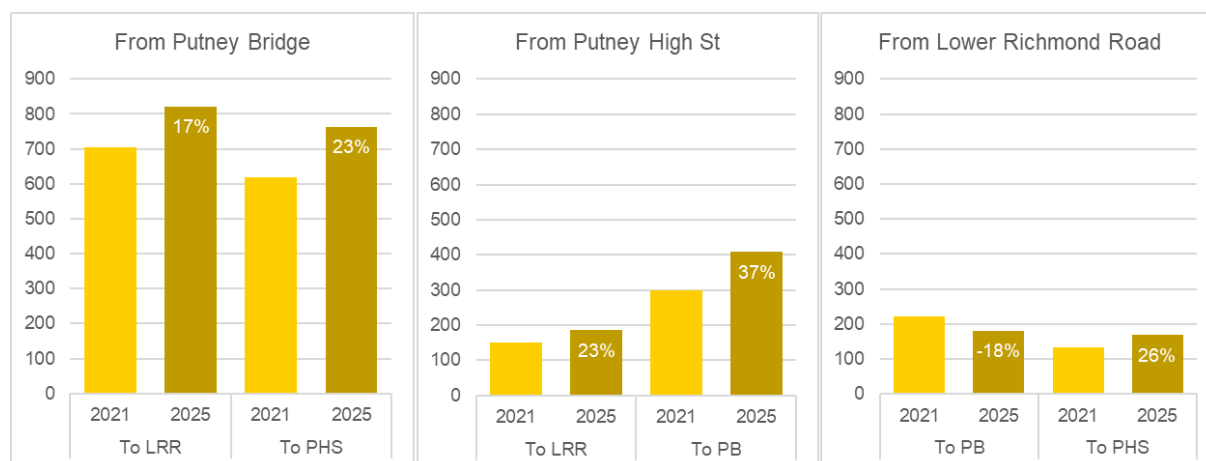


Figure 4-8 - Cyclist Turning Flows, Putney High Street / Lower Richmond Road Junction, PM period (16:00-19:00)

² The left turn out of Putney Bridge Road is allowed for cyclists in 2025 but was not allowed in 2021. This turn is reviewed in the section below, and not included in these results as a comparison wasn't possible.

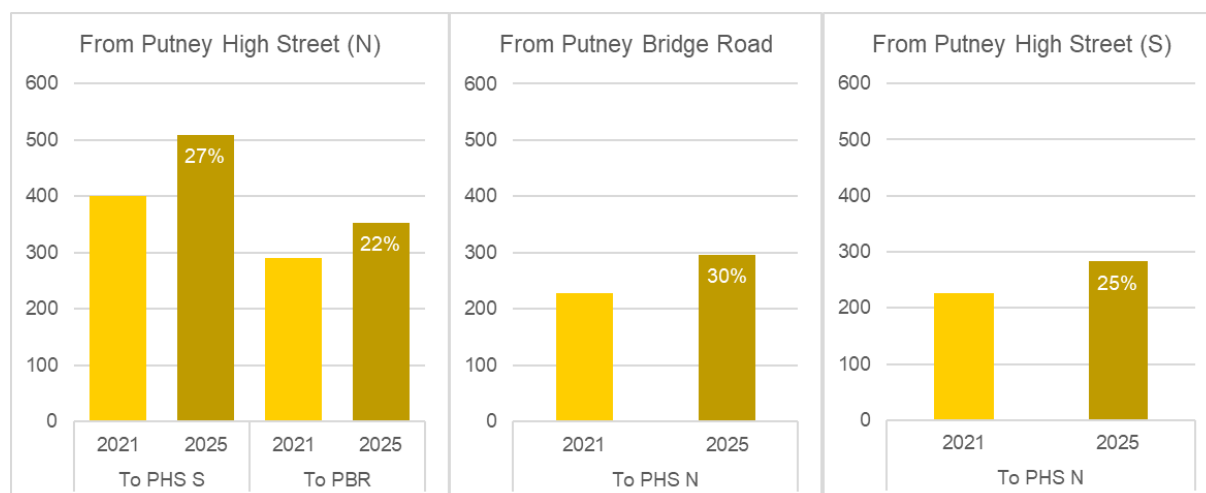


Figure 4-9 - Cyclist Turning Flows, Putney High Street / Putney Bridge Road Junction, PM period (16:00-19:00)³

- 4.20 As mentioned above (see 2.9), the signal operation at Putney High Street / Putney Bridge Road junction has been updated to allow cyclists to turn left out of Putney Bridge Road. Due to this change, the Putney High Street pedestrian crossing runs in a different stage from the Putney Bridge Road traffic/ cycle phase.
- 4.21 The number of cyclists making this turn has been captured in the surveys and is summarized in Figure 4-10. As it is shown in the figure, there is a relatively low number of cyclists making this turn.

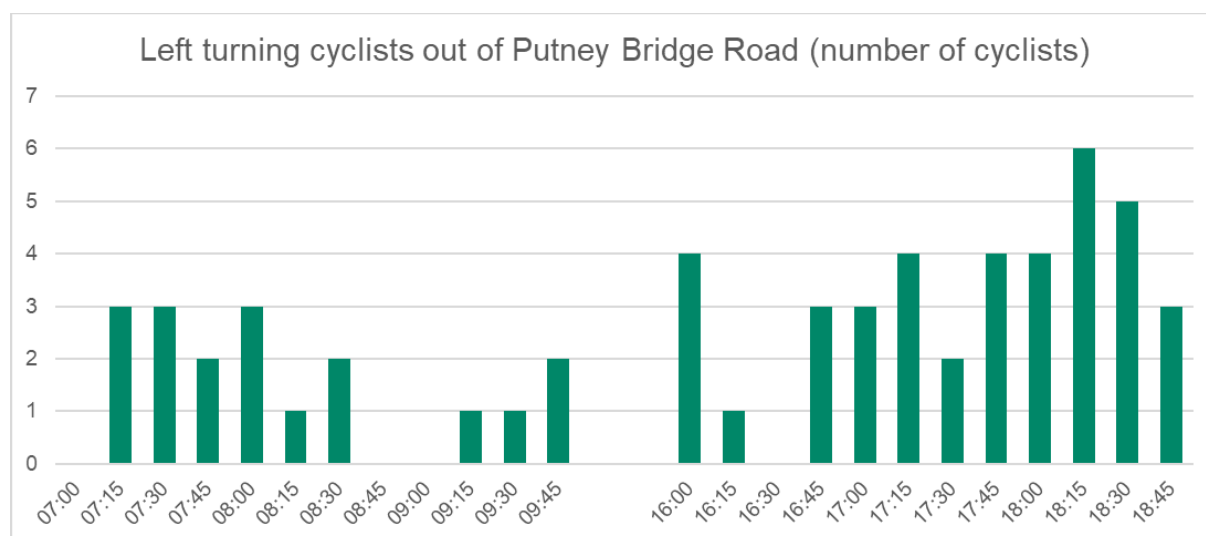


Figure 4-10 - Left-turning cyclists out of Putney Bridge Road

- 4.22 The survey videos show that left-turning cyclists from Putney Bridge Road, who then wish to turn right at Felsham Road, use the pedestrian crossing on Putney High Street and the western pavement to do so. This is shown in Figure 4-11.

³ In 2025, the left turn out of Putney Bridge Road is allowed for cyclists, this turn will be reviewed in the section below, as it is not allowed in 2021, and it would not be possible to compare it to anything.



Figure 4-11 - Cyclists using the pedestrian crossing in Putney High Street, south of Putney Bridge Road

4.23 The results indicate that layout had a large impact on the cycle volumes, as the junction is more attractive, especially at Putney High Street / Lower Richmond Road. The data comparison indicates that the new layout has encouraged cyclists to use the junction, although it is acknowledged that some of the increase could result from wider trends in cycling or other improvements in the wider area over the past four years.

Comparison of Vehicle Types

- 4.24 The turning flows have also been analysed for all vehicle types. The number of vehicles has been represented in the figures below, divided by vehicle type and grouped by junction. Figure 4-12 and Figure 4-13 show the flows at Putney High Street / Lower Richmond Road and Putney Bridge Road junctions, respectively, for the AM peak; and Figure 4-14, and Figure 4-15 show the same for the PM peak.
- 4.25 In the AM period, at the Putney High Street / Lower Richmond Road junction, it is shown that the number of motorised vehicles remains at similar levels to 2021, with the number of cyclists increasing. The only arm that sees a decrease in overall vehicles is Lower Richmond Road – as explained in the sections below, this is likely to result from a reduction in available green time for this arm.
- 4.26 For the Putney High Street / Putney Bridge Road junction, the number of vehicles is similar on all arms, with a slight reduction on Putney Bridge Road, likely for the same reason as Lower Richmond Road. There is also a reduction in flows from Putney High Street North towards Putney Bridge Road – it is assumed this reduction in eastbound flows is also caused by the lower flows travelling from Lower Richmond Road to Putney High Street to the north of this.

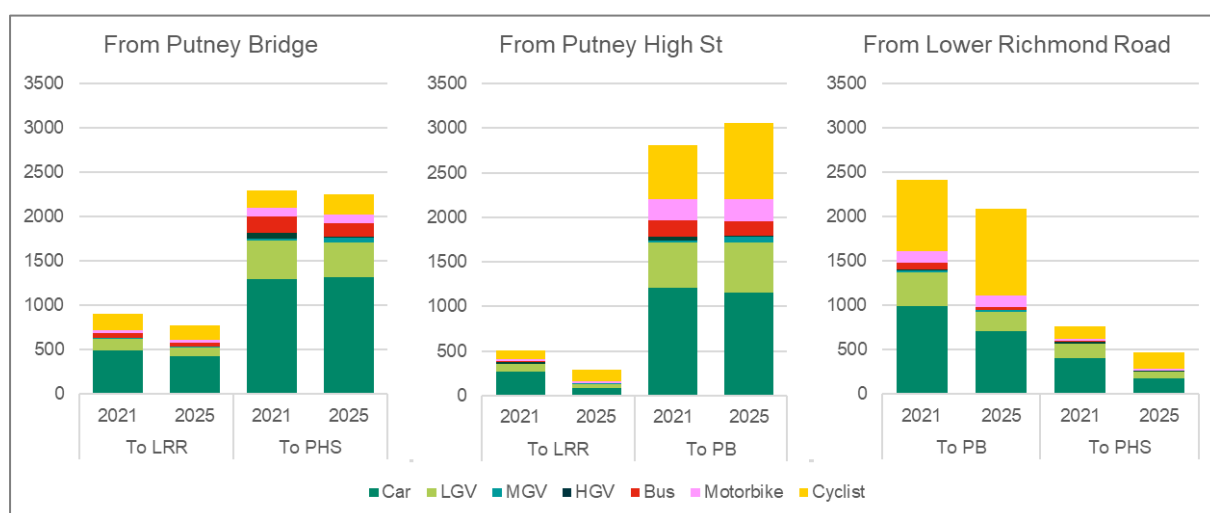


Figure 4-12 –Turning Flows for all Vehicle Types, Putney High Street / Lower Richmond Road Junction, AM period (07:00-10:00)

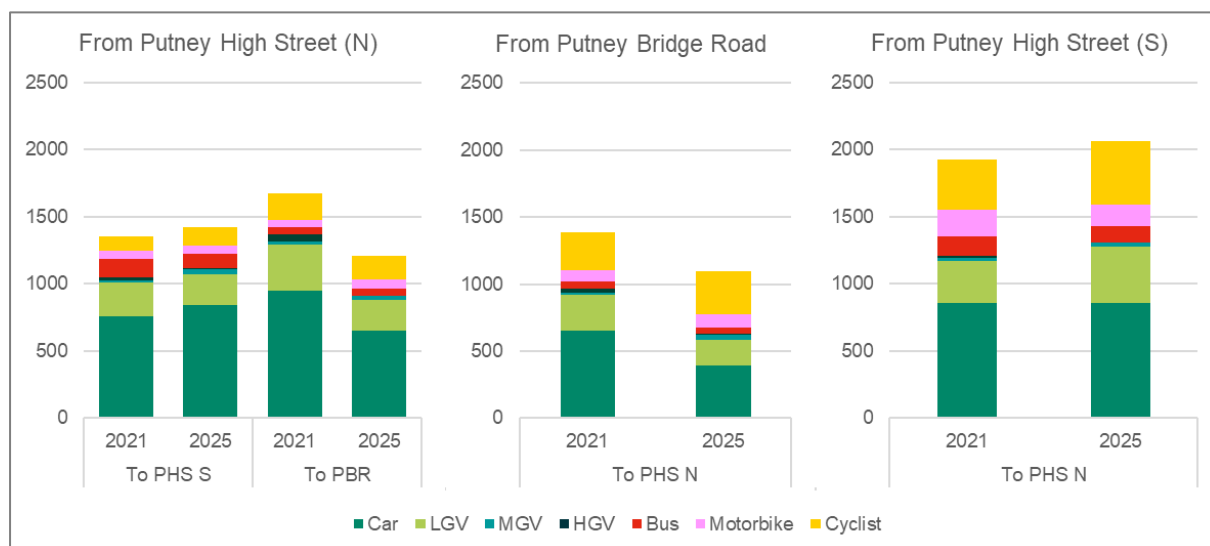


Figure 4-13 – Turning Flows for all Vehicle Types, Putney High Street / Putney Bridge Road Junction, AM period (07:00-10:00)

4.27 In the PM period, for the Putney High Street / Lower Richmond Road junction, the two main arms retain similar levels of traffic as in 2021. Lower Richmond Road also shows a reduction of overall traffic in this period, but less pronounced than in AM.

4.28 For the southern junction, the PM period has similar levels of traffic flows in both directions on Putney High Street, with a significant decrease in Putney Bridge Road.

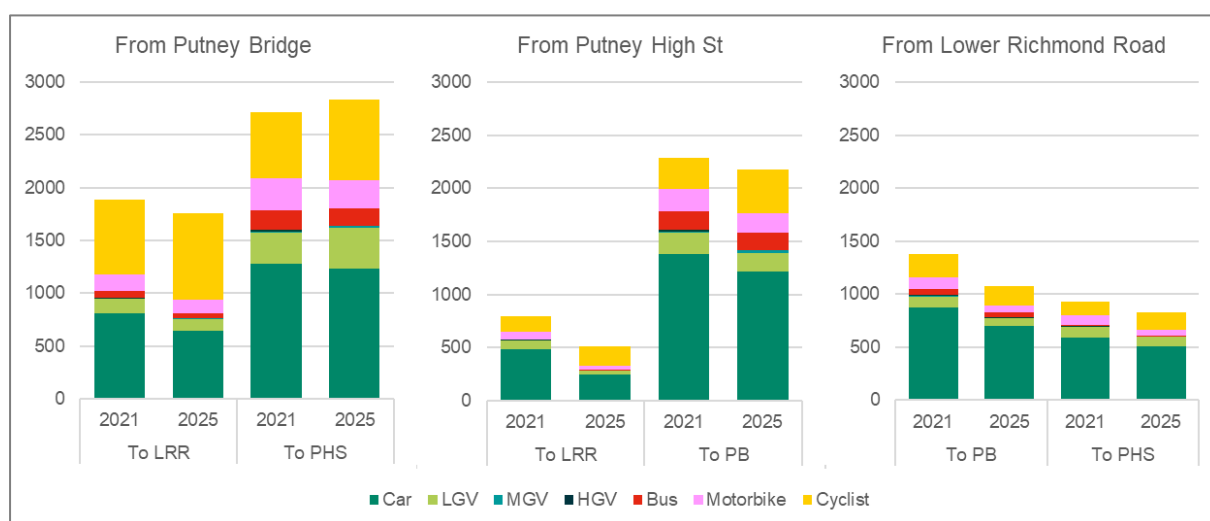


Figure 4-14 – Turning Flows for all Vehicle Types, Putney High Street / Lower Richmond Road Junction, PM period (16:00-19:00)

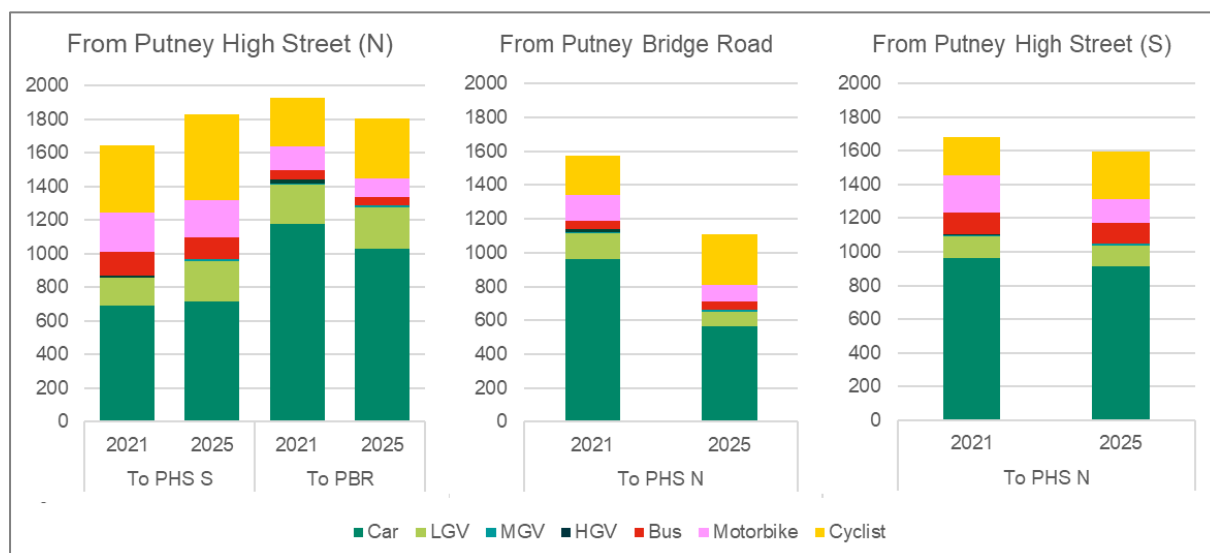


Figure 4-15 – Turning Flows for all Vehicle Types, Putney High Street / Putney Bridge Road Junction, PM period (16:00-19:00)

4.29 The results indicate that the number of private motorised vehicles has been impacted by the scheme, but not uniformly across all arms. The flows on Putney High Street and Putney Bridge have remained largely at the same level from 2021 to 2025, but the traffic flows at Lower Richmond Road and Putney Bridge Road have decreased, perhaps due to lower available green time on these approaches.

Journey Time Analysis

- 4.30 Journey times were obtained from two sources, ANPR surveys and iBus data. ANPR data was used for the journey time analysis of private traffic, and iBus data was used to derive journey times for TfL buses. The present section focuses on the journey time analysis carried out for private traffic using the ANPR, while the following section analyses the changes for the TfL buses.
- 4.31 The graphs below show the weighted average of the journey time differences for general traffic in seconds for each possible end-to-end movement. Figure 4-16, shows the results for the AM period (07:00-10:00) and Figure 4-17 for the PM period (16:00-19:00).
- 4.32 The most significant change between the years is that both periods show a significant increase in all journey times originating from Lower Richmond Road and Putney Bridge Road. Journey times from Putney Bridge and Putney High Street are relatively faster than they were in 2021, considering the short distance.

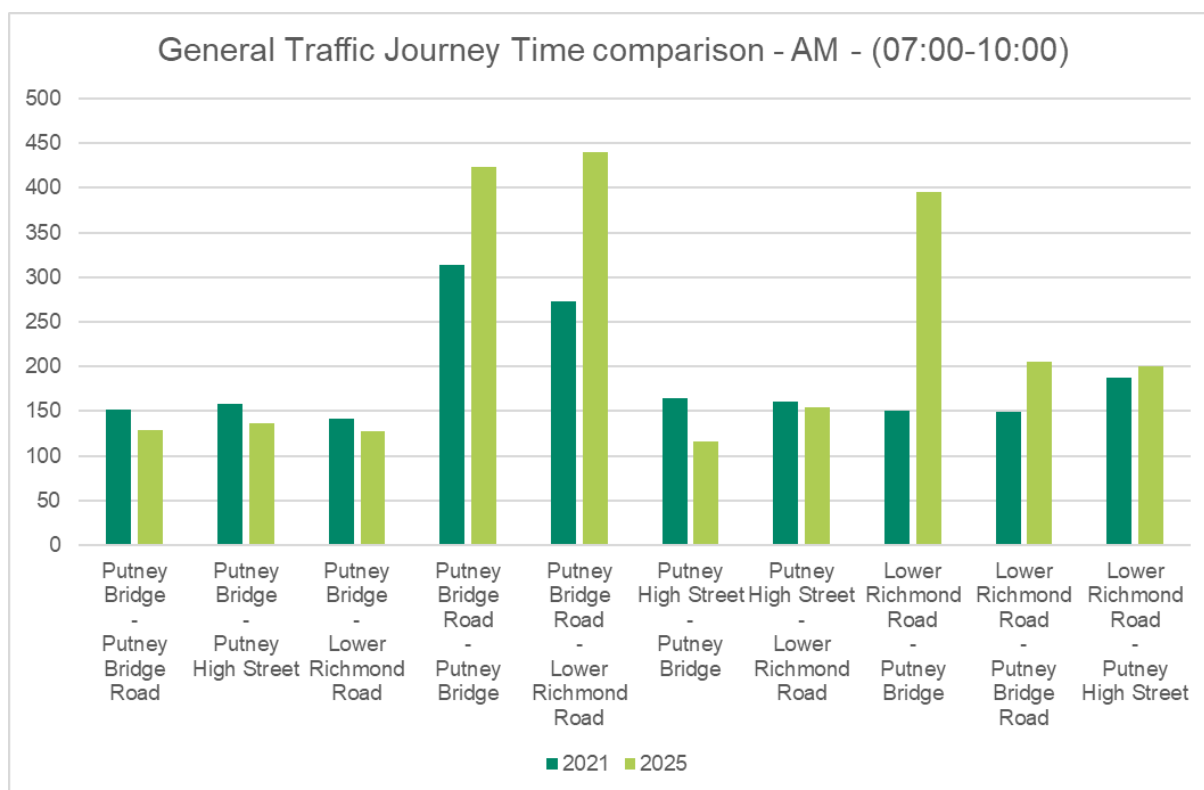


Figure 4-16 - General Traffic Journey Time comparison - AM - (07:00-10:00), in seconds

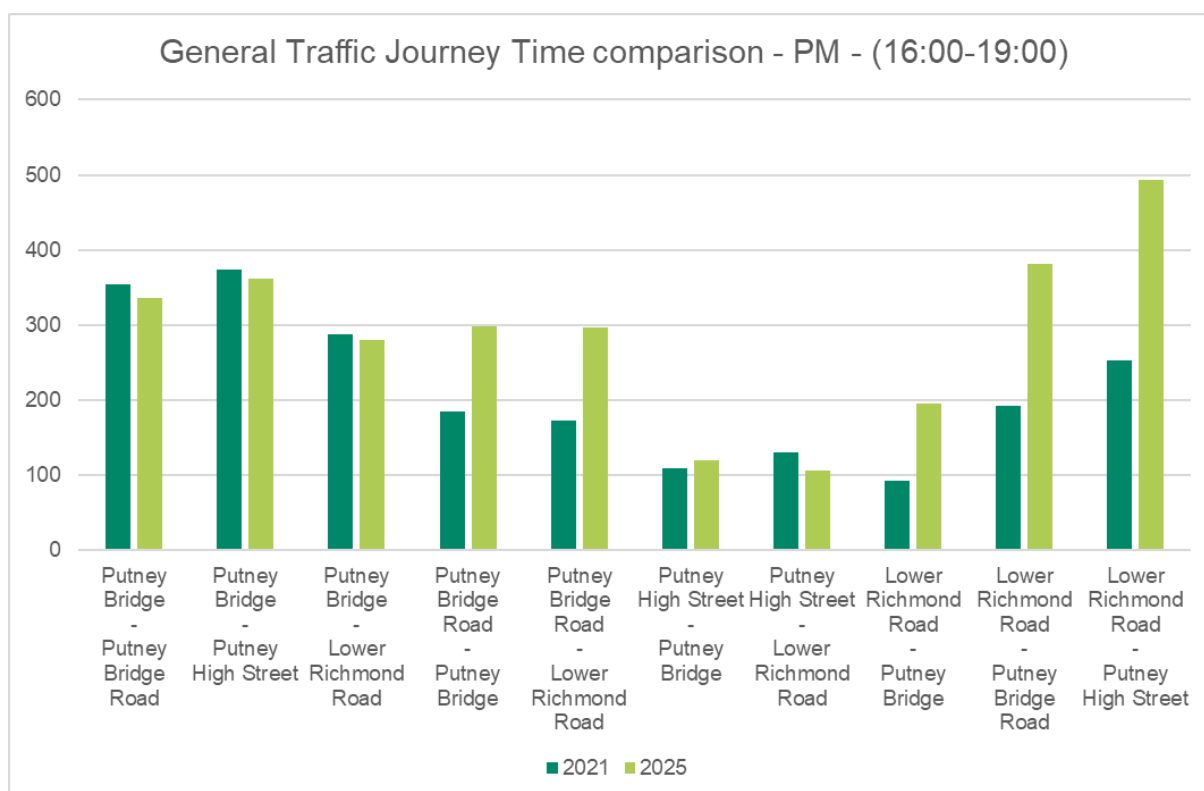


Figure 4-17 - General Traffic Journey Time comparison - PM - (16:00-19:00), in seconds

iBus Data

4.33 The iBus data obtained for the present study covers a whole week and the full extent of the bus routes beyond the study area. However, in 2021, the extent of this data only covered the study area, limiting the possible comparison between years, as there is no information south of Putney Exchange.

4.34 The iBus data has been filtered to cover the same extent in both years, the study area, and the bus services have been grouped as shown in Figure 4-18.

- Green Route includes the services: 14, 39, 74, 85, 93, 424, 430;
- Blue Route includes routes 22, 265, 378;
- Red Route includes routes 220 and 270;
- Purple Route includes route 485

4.35 Purple Route represents only one service with very low frequency (1-2 buses per hour), although the analysis has been carried out in the same manner as the other routes, the average journey times on this route are likely to be less statistically significant.



Figure 4-18 – Grouped bus routes and stops covered by the iBus data in 2021 and 2025.

4.36 To compare the bus journey times, the data has been processed to remove the dwell time, account for the different frequencies of bus services, and summarise the morning and evening periods. To carry out a consistent comparison with the 2021 survey data, only the same day of the surveys has been considered. The result of this data processing is shown in Figure 4-19 and Figure 4-20.

- 4.37 As shown in the figures, most sections show similar journey times, with a few exceptions.
- 4.38 In the AM peak, the most significant reductions observed are the northbound movement (Green Route), from Putney Exchange to St. Mary's Church / Putney Pier, and the eastbound movement (Purple Route). The northbound change is in line with the observed ANPR journey times, as the northbound movement seemed to be prioritised by the signals during this period in 2025.
- 4.39 There are some increases observed in the initial northbound sections of Blue Route and Red Route, which are in line with the increased journey times observed from Lower Richmond Road and Putney Bridge Road accessing Putney High Street in the ANPR analysis.

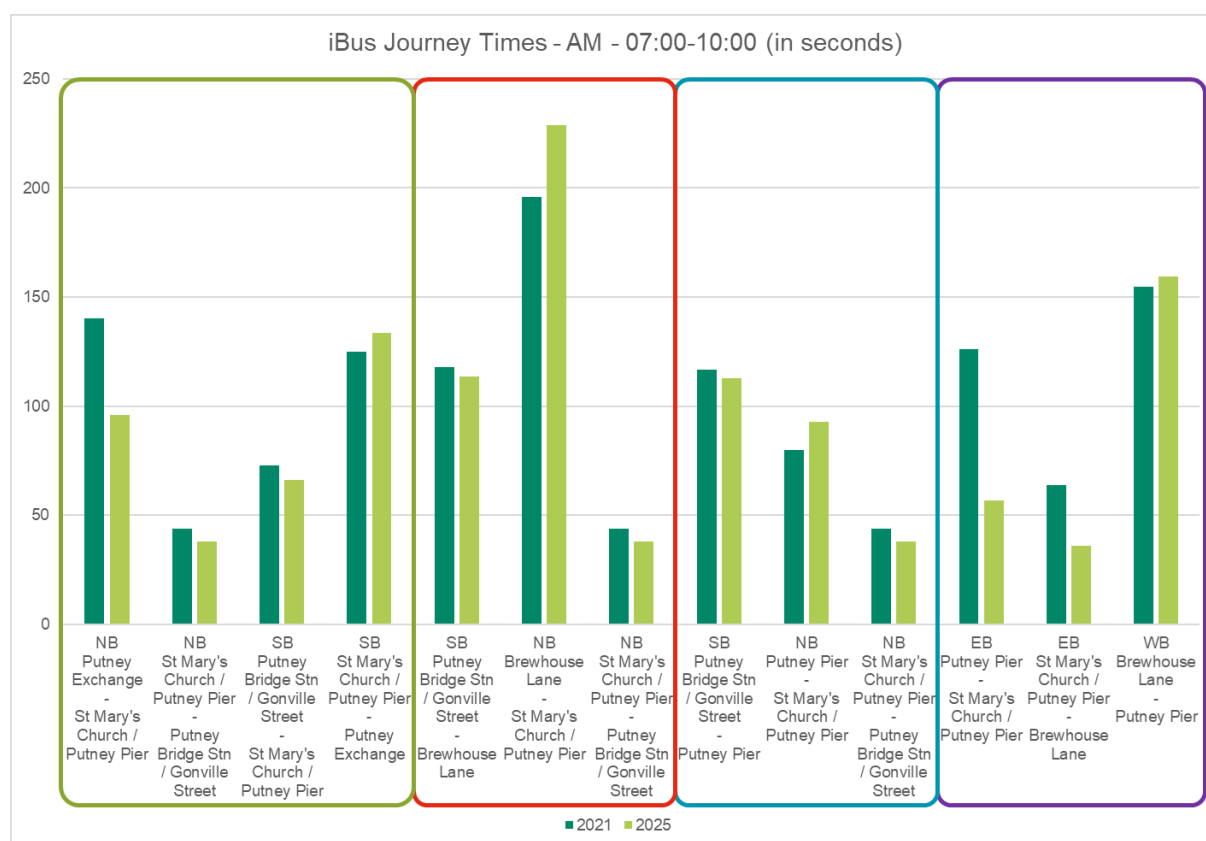


Figure 4-19 - Bus journey time comparison AM, weighted average in seconds, discounting dwell times.

- 4.40 The PM period shows a similar picture to the AM, with a decrease in the main movement of this peak (southbound) and an increase in journey times for buses starting their trip in Lower Richmond Road and Putney Bridge Road.

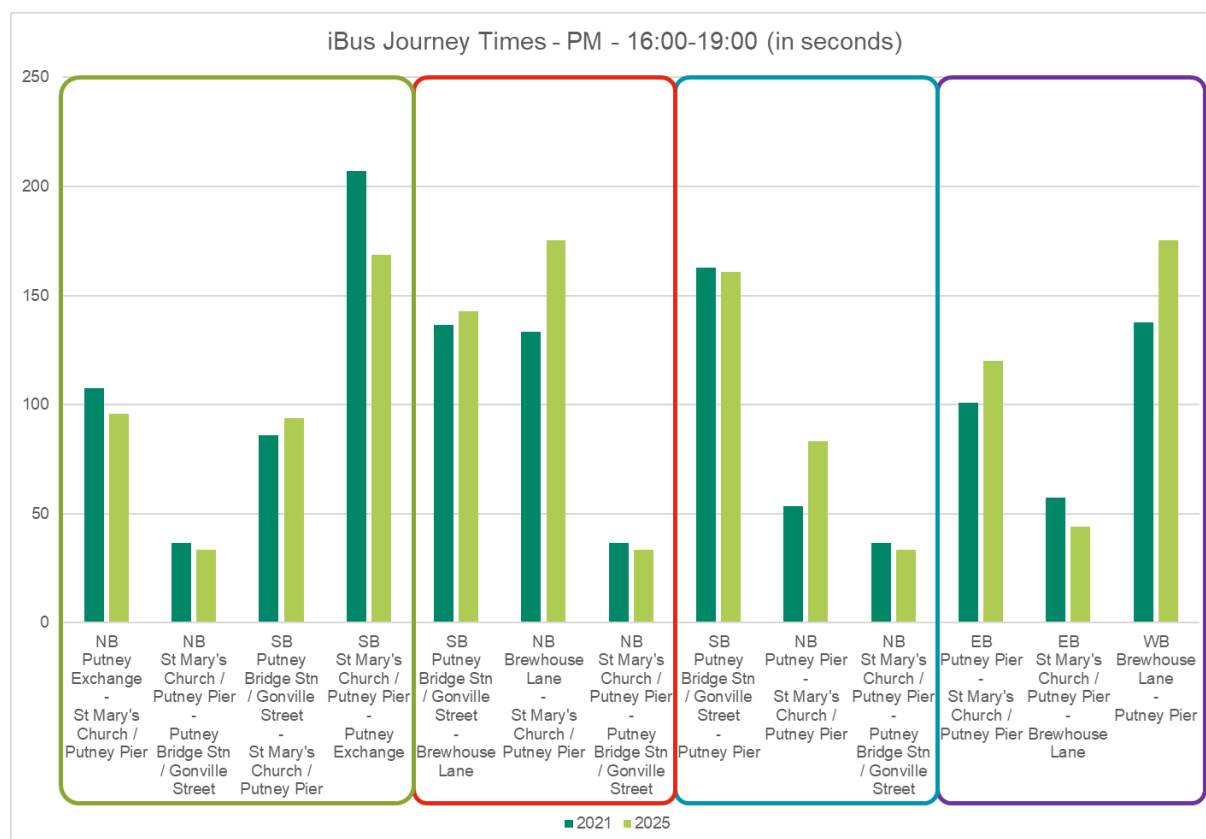


Figure 4-20 - Bus journey time comparison PM, weighted average in seconds, discounting dwell times.

4.41 The frequency of the buses has also been analysed, and the differences in bus numbers between the two years are shown in Figure 4-21

4.42 The comparison shows that most services have a reduction in the number of buses between 10% and 20%, with the exceptions of Service 39 (Green Route) that has a 30% increase, and Services 22 and 378 (both from Blue Route), which are reduced by 29% and 49%, respectively

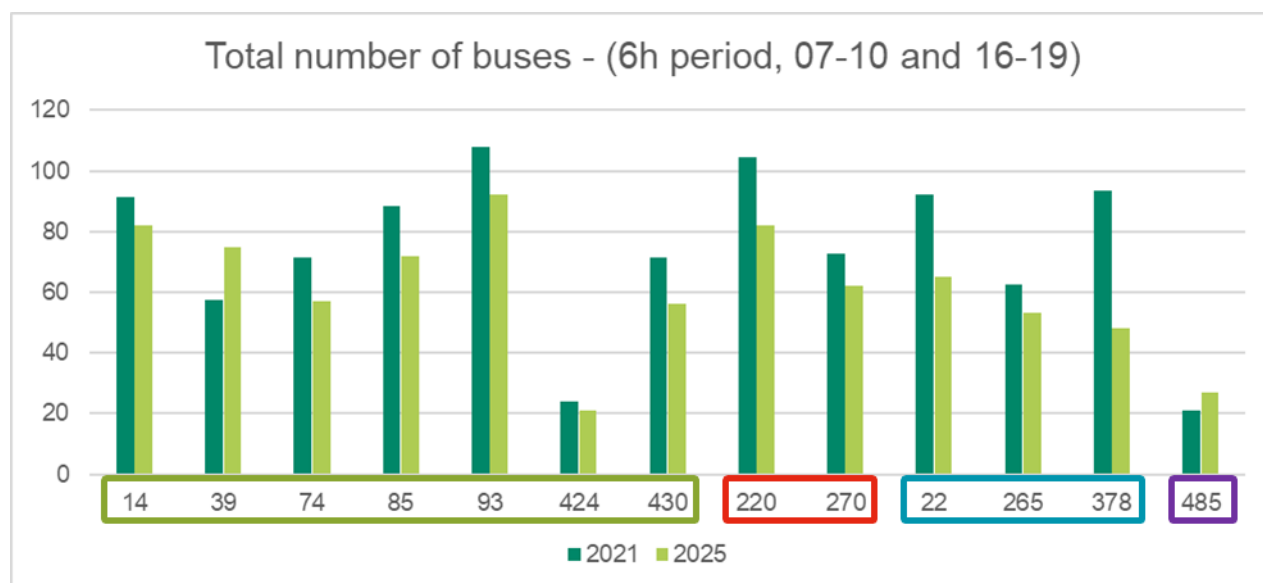


Figure 4-21 - Number of buses in the two peak periods for each year (2021, 2025)

Signal Operation Analysis

- 4.43 Timing sheets and signal activations were obtained for the Lower Richmond Road / Putney High Street and the Putney Bridge Road / Putney High Street junctions.
- 4.44 Timing Sheets define the operation of the junctions as set up in their controllers – showing the defined phases, stages and signal logic.
- 4.45 The signal activation logs, which were obtained, cover a period of 2h for each one of the peak periods, 07:00-09:00 and 17:00-19:00, and indicate which stages were called and for how long. These activations have been analysed to understand the green time allocated to each movement.

Putney High Street / Lower Richmond Road – J10/0028

- 4.46 With the implementation of the new layout, the stages and phases from the Lower Richmond Road junction have changed. The figure below, Figure 4-22, shows the phases and stages for both years 2021 (top) and 2025 (bottom).
- 4.47 It can be observed that Stages 1, 3 and 4 in 2021 have a direct correspondence with Stages 1, 4 and 5 in 2025, in that order. The difference between the two layouts is that while Stage 2 (2021) is equivalent to Stage 3 (2025), if pedestrian crossing “I” is called, then Stage 2 (2025) is called. Consequently, when there is a higher demand for pedestrian crossing “I”, the time allowed for the Lower Richmond Road left turn decreases

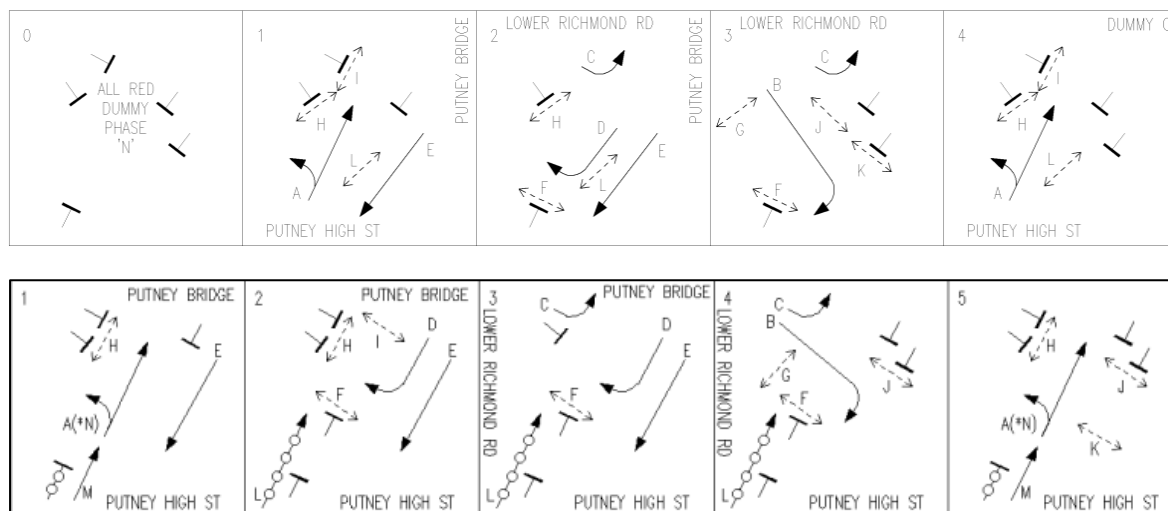


Figure 4-22 – Phases and stages for Putney High Street / Lower Richmond Road junction, 2021 top, 2025 bottom.

- 4.48 Using the SCOOT messages provided and the stages shown above, the average green time per hour for each movement have been calculated. Similarly, using the SCOOT messages used for the Vissim model validation in 2021, the same average green time per hour were calculated and compared. This is shown in Figure 4-23 for the AM peak period and Figure 4-24 for the PM peak period.
- 4.49 As it is shown in the figures, in the AM peak, the average green time for the main movements (Putney High Street and Putney Bridge) has slightly increased overall, while the average green time has significantly reduced for Lower Richmond Road, due to the calls for Stage 2 in 2025.
- 4.50 The PM peak period shows a very similar picture. It is worth noting that the controllers in this peak are operating with a lower cycle time (96s) compared to the AM (104s). In

2021, both the AM and PM periods operated with a 104s cycle time. This may also affect the capacity of the junction as intergreens make up a higher proportion of the green time with a lower cycle time.

- 4.51 It is worth noting that for the total green time has been calculated considering intergreens, phase delays and the number of activations of the demand dependent stages. Underutilised green time has not been considered for this calculation.

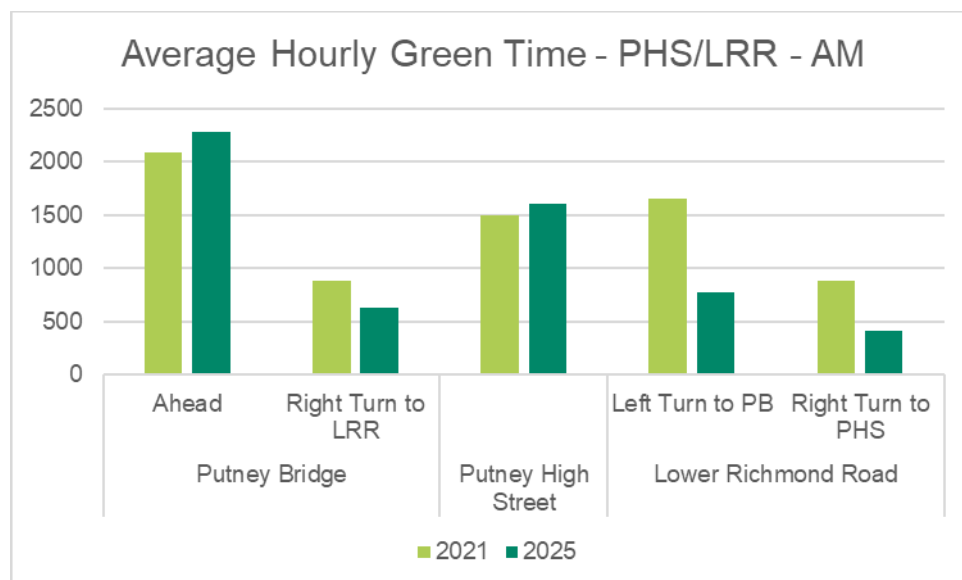


Figure 4-23 – Green time comparison, 2021 and 2025, for Putney High Street/Lower Richmond Road Junction, 07:00-09:00, seconds of green time per hour

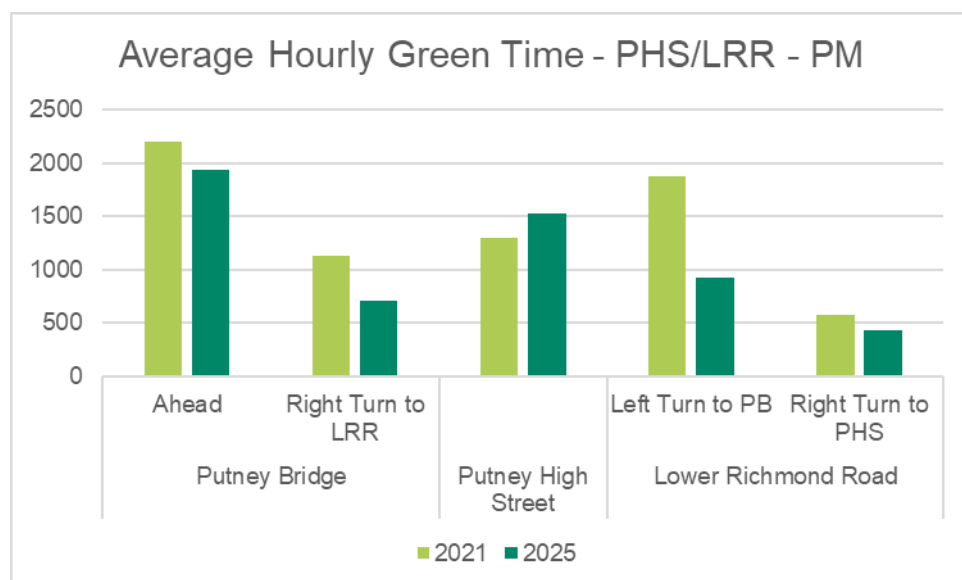


Figure 4-24 – Green time comparison, 2021 and 2025, for Putney High Street/Lower Richmond Road Junction, 17:00-19:00, seconds of green time per hour

Putney High Street / Putney Bridge Road – J10/0029

- 4.52 The phases and stages for the Putney High Street / Putney Bridge Road are shown in Figure 4-25 for the 2021 (top) and for 2025 (bottom).

- 4.53 Most of the stages show a direct correspondence in both years. Stages 0, 1, 3 and 5 in 2021 are equivalent to the Stages 0, 1, 2 and 4 in 2025 in that order.

- 4.54 However, due to the cyclists being able to turn left in Stage 2 in 2025, pedestrians at Putney High Street (Phase “D”) cannot run at the same time as the Putney Bridge Road traffic (Phase “C”).
- 4.55 Comparing the two years, the 2021 operation allowed for a more efficient performance of the junction, while 2025 layout caters better for pedestrians and cyclists.

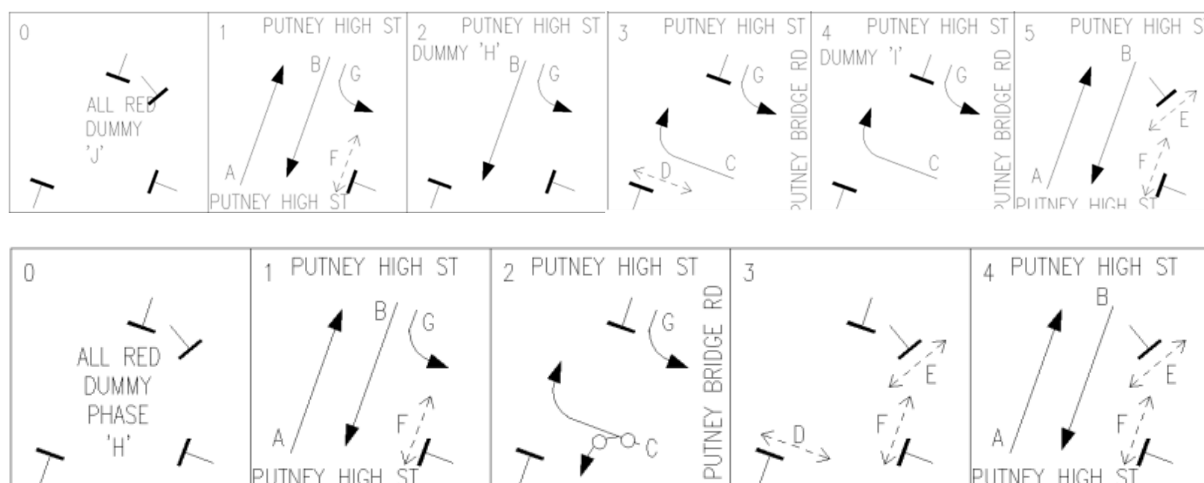


Figure 4-25 – Phases and stages for Putney High Street / Putney Bridge Road junction, 2021 top, 2025 bottom

- 4.56 SCOOT messages were analysed to determine the frequency with which each stage was called. With cycle times around 100 seconds, the maximum number of activations is approximately 36. Either Stage 3 (2025) or Stage 4 (2025) is typically called; however, as both serve pedestrians, there is no need for both to be activated within the same cycle. The choice depends on demand at the Putney High Street crossing (Phase “D”). However, during both peak periods, it has been observed that pedestrian Stages 3 (2025) and 4 (2025) are called more than 36 times combined.
- 4.57 During the AM period (07:00–09:00), pedestrian Stages 3 (2025) and 4 (2025) are called between 28 and 40 times per hour, depending on the specific hour. In the PM peak period, they are called between 54 and 58 times. Although this does not significantly affect the green time on the main corridor, reducing the number of these activations could be a potential area for overall improvement, as it would decrease time spent on intergreens.
- 4.58 Phase “D” also impacts the total green time available to traffic, as it is a long pedestrian crossing requiring a long following intergreen (11 seconds). In the AM period, Phase “D” (Stage 3 in 2025) is called on average 16 times per hour, increasing to 29 times per hour in the PM.
- 4.59 Using the SCOOT messages from 2021 and 2025, the average green times for each movement have been calculated. This is shown in Figure 4-26 for the AM peak and Figure 4-27 for the PM peak period.
- 4.60 It can be observed that while in the AM the levels of green time are relatively similar, in the PM, some green times have been reduced significantly on the main corridor.

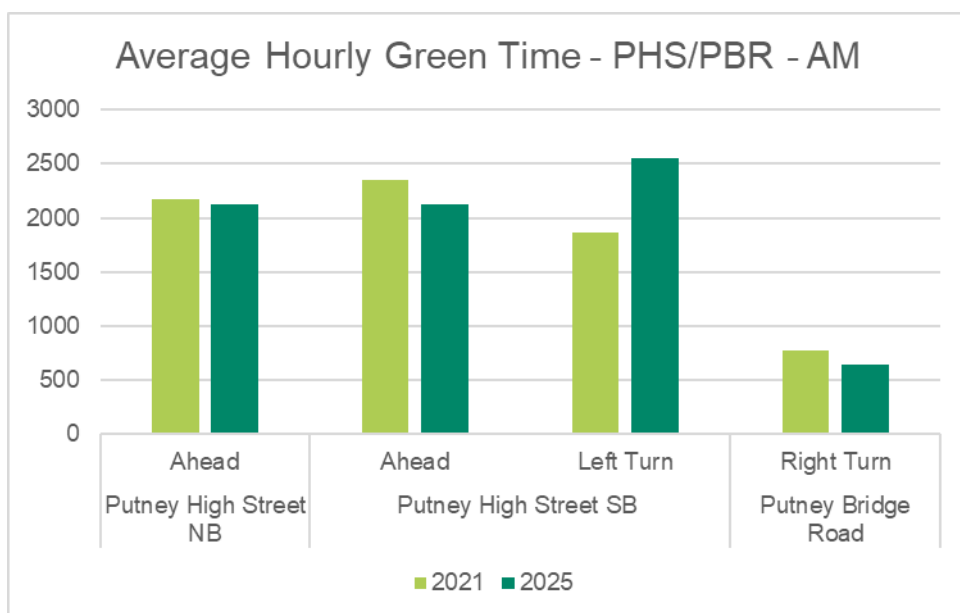


Figure 4-26 – Green time comparison, 2021 and 2025, Putney High Street/Putney Bridge Road Junction, 07:00-09:00, seconds of green time per hour

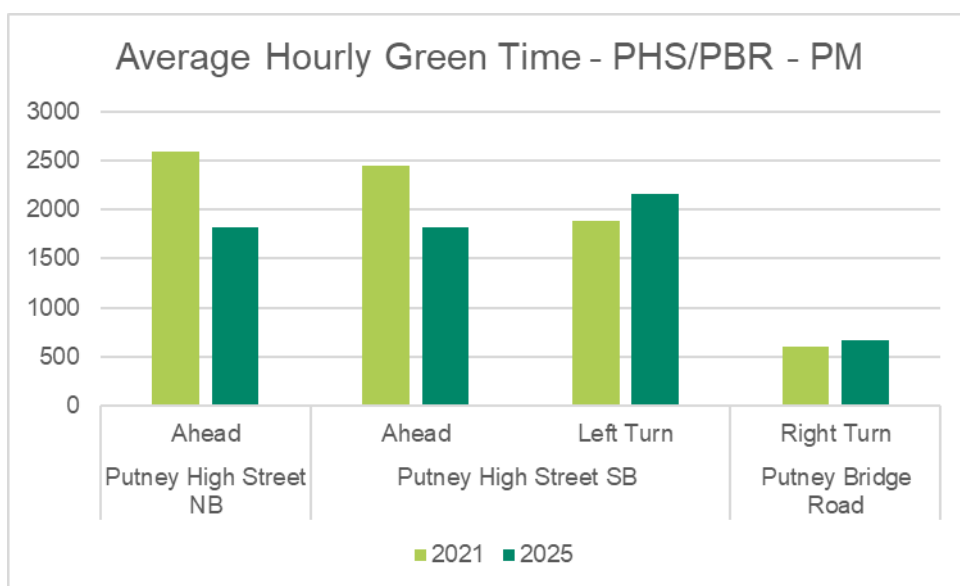


Figure 4-27 - Green time comparison, 2021 and 2025, Putney High Street/Putney Bridge Road Junction, 17:00-19:00, seconds of green time per hour

5. Additional observations

Bus Driver Changes

- 5.1 There are some instances/ locations where stopped buses can have a large impact on the operation of the network, where it is difficult for other vehicles to pass them. Typical dwell times for buses are relatively short (30 seconds to 2 minutes); however, several stops in the study area appear to facilitate driver changes, which result in significantly longer stopping times.

5.2 Using the iBus data referenced above, dwell times were analysed. This analysis showed that the bus driver changes were not included in this data. The reason for much longer dwell times was investigated visually using the survey videos.

5.3 Three stops in particular were observed during site visits to involve driver changes. These stops have been represented in Figure 5-1 and are:

- Putney Pier – Stop Q (ID:220) – Located in Lower Richmond Road before its junction with Putney High Street.
- Putney Bridge – Stop FE (ID:20798) – Located on Putney Bridge just south of Gonville Street.
- Putney Exchange – Stop M (ID:11143) – Located on Putney High Street north of Lacy Road

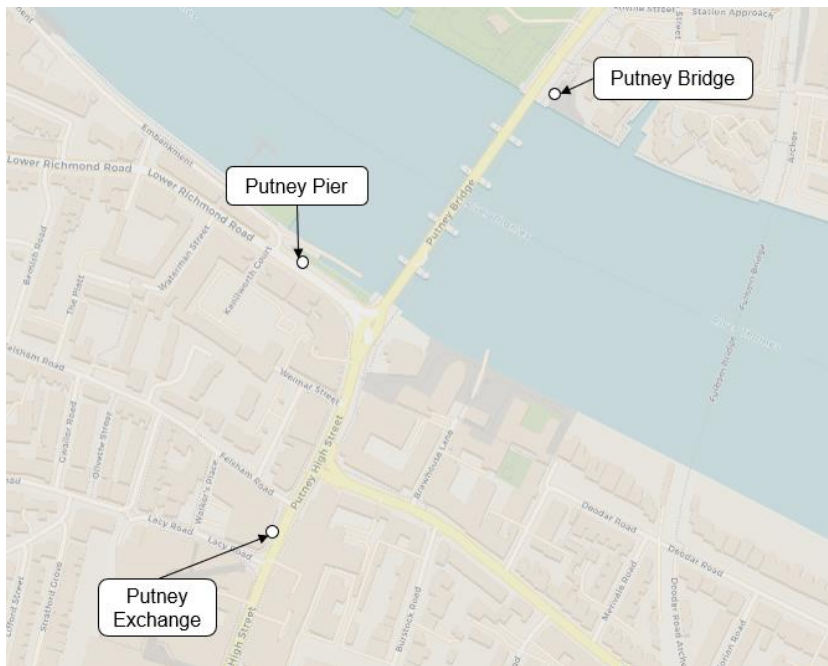


Figure 5-1 - Bus Stops with Driver changes

5.4 The Putney Bridge stop is located on the southbound bus lane. On the day of the surveys, a bus remained at this location from 15:16 to 15:43 (27 minutes). This caused several following buses to stop further back, allow passengers to alight and board, and then wait for gaps in southbound traffic to overtake. This situation was observed to create significant congestion for buses, as shown Figure 5-2.



Figure 5-2 - Bus stopped at Putney Bridge stop (green arrow). Significant bus queue reaching Gonville Street (left side).

- 5.5 The Putney Pier bus stop provides sufficient space for vehicles to overtake stationary buses, so the impact of longer bus stoppages is generally limited to other buses. However, it is worth noting that on the day video footage was collected for this location (2nd July, following a resurvey), one bus remained stopped for over 27 minutes (08:15–08:42) due to a driver change.
- 5.6 In contrast, the Putney Exchange stop has been observed to have a significant impact on general traffic. This is due to the limited carriageway width at this junction - once a bus stops, there is insufficient space for other vehicles to overtake easily. As a result, heavy vehicles—particularly other buses—struggle to pass without encroaching into the opposing lane.
- 5.7 An example of this is shown in Figure 5-3 below. In the figure, a bus overtaking a stopped bus at Putney Exchange encroaches on the southbound lane, while an oncoming southbound bus gives way. The stopped bus, therefore, affected not only northbound traffic but also southbound movements, causing a significant impact on the overall capacity of the link.
- 5.8 Another example of this, in Figure 5-4, shows three buses at this same section. In this situation, buses at either side had to remain stationary to allow the middle one to pass, which can only be done at a very low speed and blocking the section while the manoeuvre takes place.
- 5.9 While the high volume of buses at this stop contributes to the issue, extended bus driver changes have a particularly significant impact. On the survey day, between 09:00 and 10:00, buses were observed to dwell at this stop for a total of 31 minutes due to multiple driver changes of varying duration.



Figure 5-3 - Bus overtakes another bus (stopped) at Putney Exchange northbound stop, using the opposite direction.



Figure 5-4 - Three buses by the Putney Exchange bus stop.

Signal operation

- 5.10 The general operation of the junctions has also been observed from the survey videos. The north–south directions appear to be prioritised in the signal operation over the two side roads, with less time allocated to Lower Richmond Road and Putney Bridge Road. This has been confirmed by the signal data analysis presented above.
- 5.11 In addition, signal stop lines on Putney High Street between Lacy Road and Lower Richmond Road have been observed to have underutilised green time.
- 5.12 In the northbound direction, the signal synchronisation appears to create empty pockets, particularly between Lacy Road and Putney Bridge Road, resulting in underutilised green time. This results in empty gaps further downstream, as shown in Figure 5-5-5. This figure shows empty gaps on Putney High Street between Putney Bridge Road and Lower Richmond Road junctions.



Figure 5-5-5 - Unsaturated pockets between Putney Bridge Road and Lower Richmond Road junctions with Putney High Street. Image points northbound.

- 5.13 In the southbound direction, empty pockets have also been observed, though less frequently. External queues extending from the south have additionally been noted, especially during the PM peak, which reduces the effective use of available green time.

Indicative Modelling Assessment

5.14 As an indicative test, the observed green times were input to the LinSig model developed during the 2021 design development. The results closely replicate the queues observed on site and show that the scheme's operation is broadly consistent with the proposed modelling. There have been differences between the proposed signal operation and the actual signal operation. These have been summarized in Appendix A.

Potential Signal Optimisation

5.15 The modelling also indicates there is some scope for improvement in signal control. As noted above, the current signal operation appears to favour the north–south movements to the detriment of the east/west approaches, which suggests potential for a rebalancing of green times. Additionally, the PM peak could have an increased cycle time of 104s, as the AM and the 2021 controllers do.

5.16 These changes have been tested in the LinSig model, and the Degree of Saturation (the measure of congestion within the software) is presented in Figure 5-6 and Figure 5-7.

5.17 In both peak periods, the modelling indicates that an improved operation could be achieved with the two proposed changes, with the Lower Richmond Road left-turn movement showing a significant benefit in the AM peak.

5.18 It should be noted that this is only an indicative assessment and is not based on a fully calibrated and validated LinSig base model. A robust modelling process would be required to confirm the optimal operation of the junctions, including recalibration of the base model and appropriate forecasting.

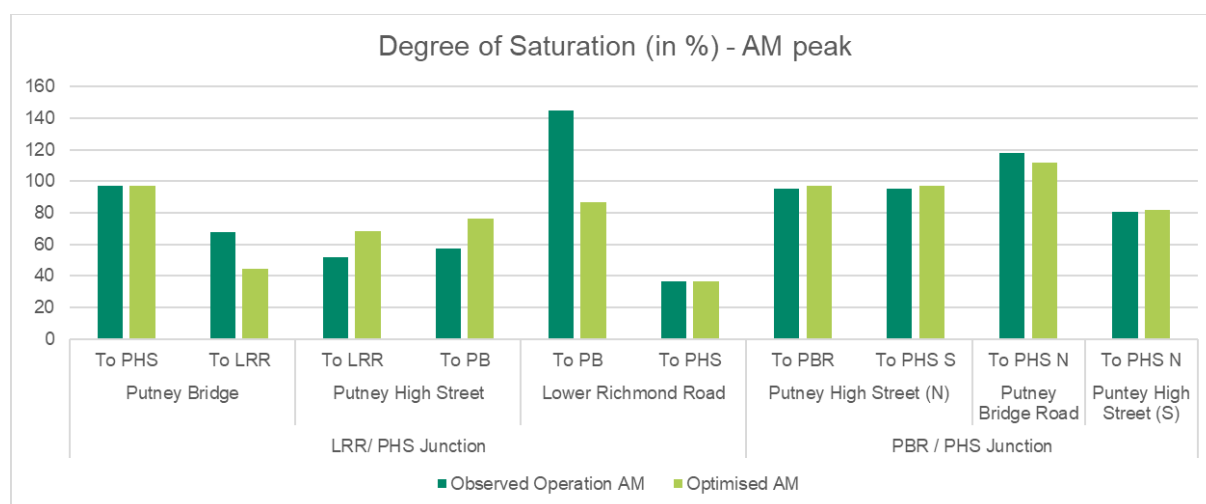


Figure 5-6 – LinSig Degree of Saturation with the observed times and the proposed changes, AM peak.

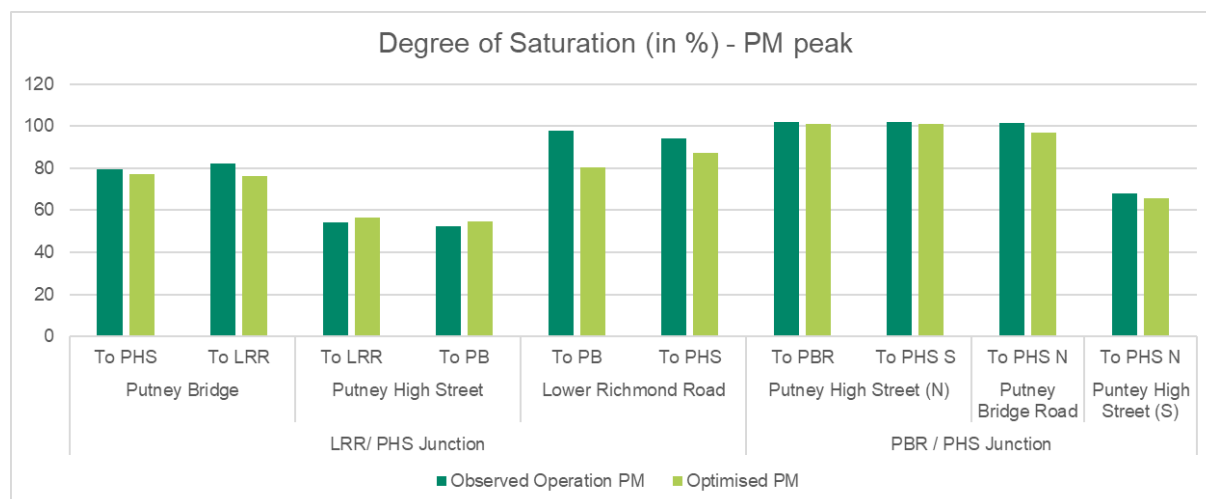


Figure 5-7 – LinSig Degree of Saturation with the observed times and the proposed changes, PM peak.

Lower Richmond Road Junction - Alternative Method of Control

- 5.19 The increase in pedestrian flows observed in the area, and especially at Putney High Street / Lower Richmond Road junction, results in higher number of activations of the demand dependent stages included in the current Method of Control (MoC), adding an element of variability that reduces signal synchronisation.
- 5.20 The potential alternative MoC for the Putney High Street / Lower Richmond Road junction shown in Figure 5-8, combines the previous Stages 3 and 5 in a single stage (3), which will likely be activated every cycle. This revised MoC simplifies the signal operation and reduces variability which could allow for a better optimisation and synchronisation.

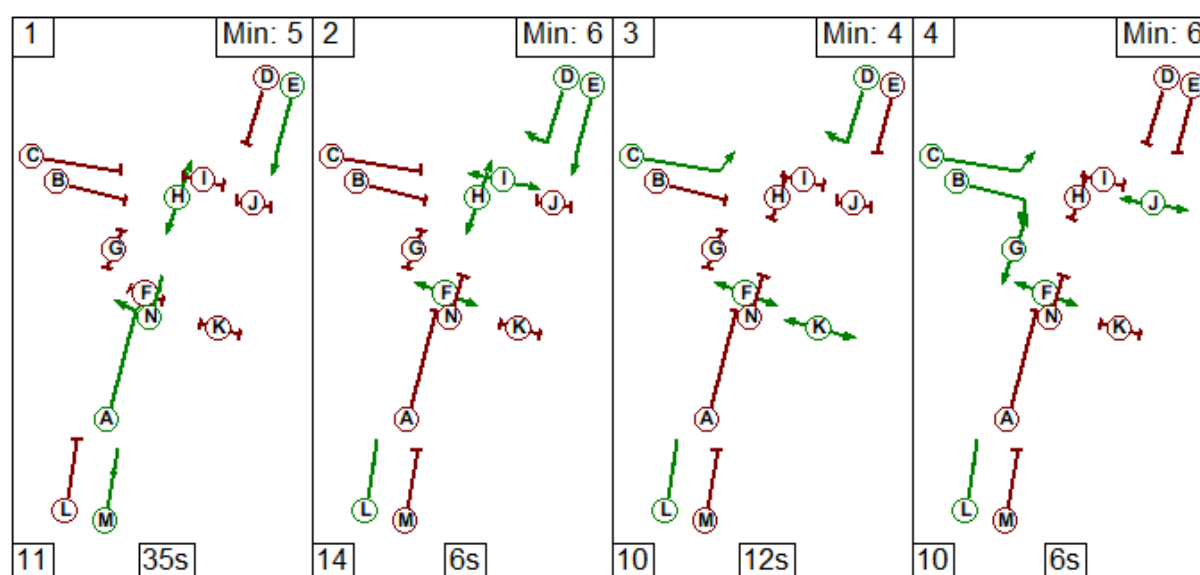


Figure 5-8 - Proposed method of control for Putney High Street / Lower Richmond Road

- 5.21 This MoC allows for better green time balance as pedestrian crossings run with different traffic stages. Indicative Linsig Model results show that the revised MoC has the potential to improve the operation of the junction and alleviate the congestion on some of the arms. Indicative DoS results have been compiled in Figure 5-9 for AM and Figure 5-10 for PM.

5.22 As shown in the figures, the revised MoC results in a similar performance compared to the current operation on the north-south movements, while reducing the DoS on the congested side arms. Overall, the revised MoC maintains all the arms below the 85% DoS threshold. The alternative Method of Control provides similar overall junction performance, with higher flexibility in allocating green times, which should improve synchronisation.

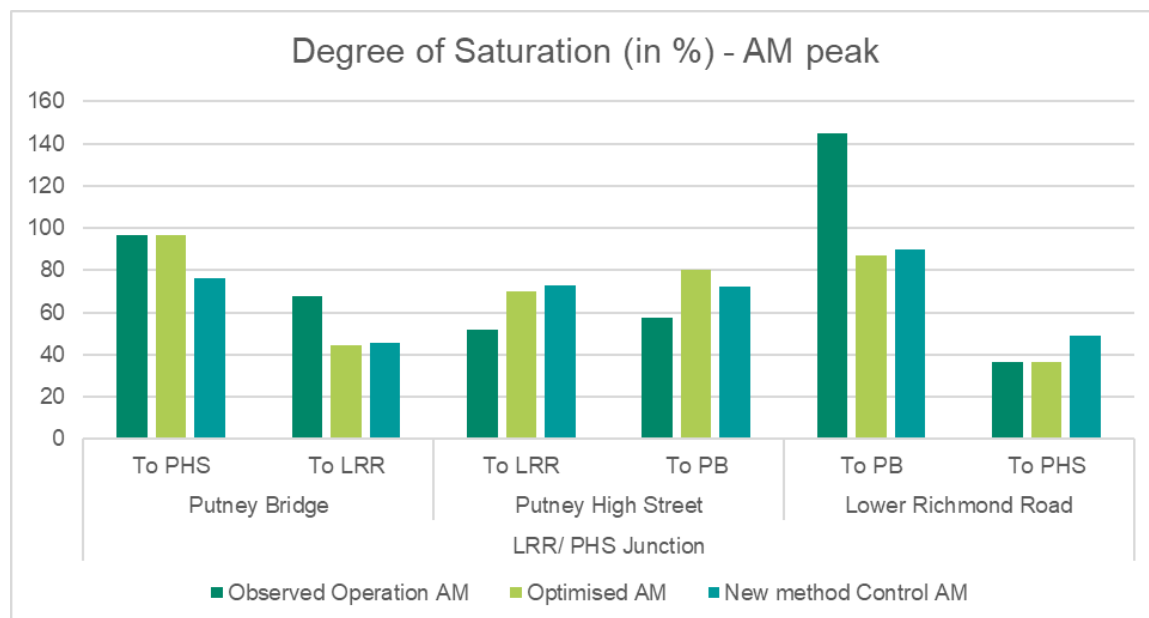


Figure 5-9 – LinSig Degree of Saturation with the observed times, the proposed changes and the new method of control on Lower Richmond Road Junction, AM peak.

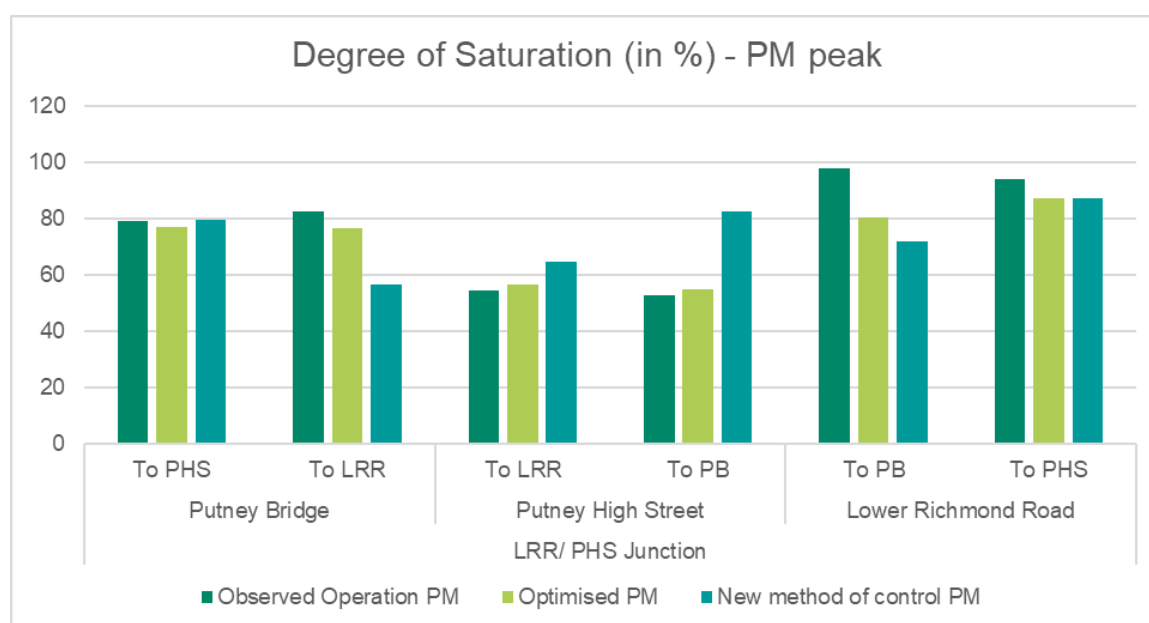


Figure 5-10 – LinSig Degree of Saturation with the observed times, the proposed changes and the new method of control on Lower Richmond Road Junction, PM peak.

Putney Bridge Road Junction – Alternative Method of Control

5.23 In addition to the changes above, at the Putney High Street / Putney Bridge Road junction, if it were possible to remove the left-turn phase for cyclists out of Putney Bridge Road or allow this phase to run concurrently with the pedestrian crossing on Putney High Street, this would have a beneficial effect.

5.24 Removing this left turn for cyclists, effectively reverting to the original operation of the junction, would prevent the need for an all-red stage, allowing for a more efficient operation. The results of this test are shown in Figure 5-11 and Figure 5-12.

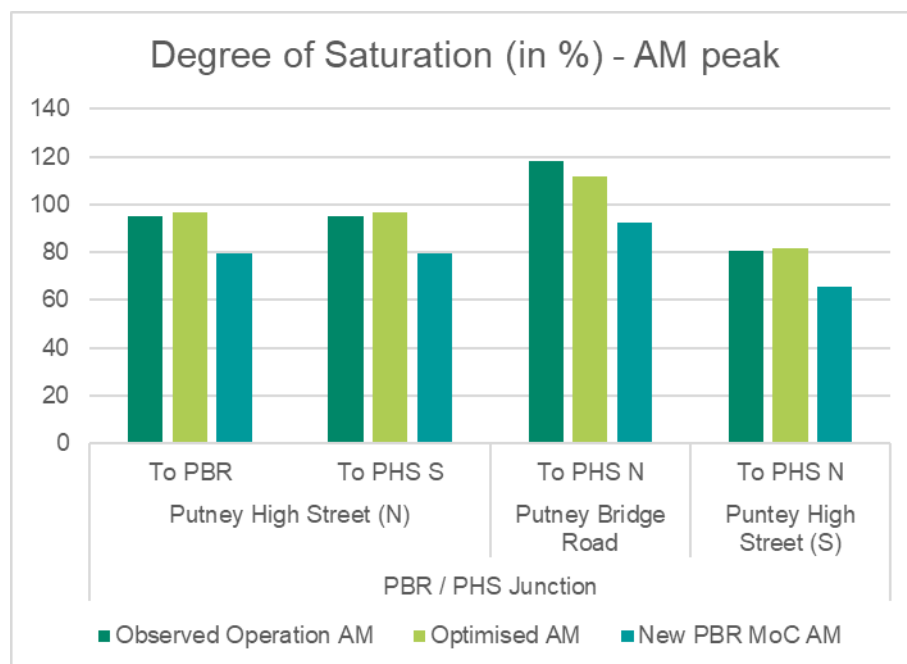


Figure 5-11 – LinSig Degree of Saturation with the observed times, the proposed changes and the new method of control on Putney Bridge Road Junction, AM peak

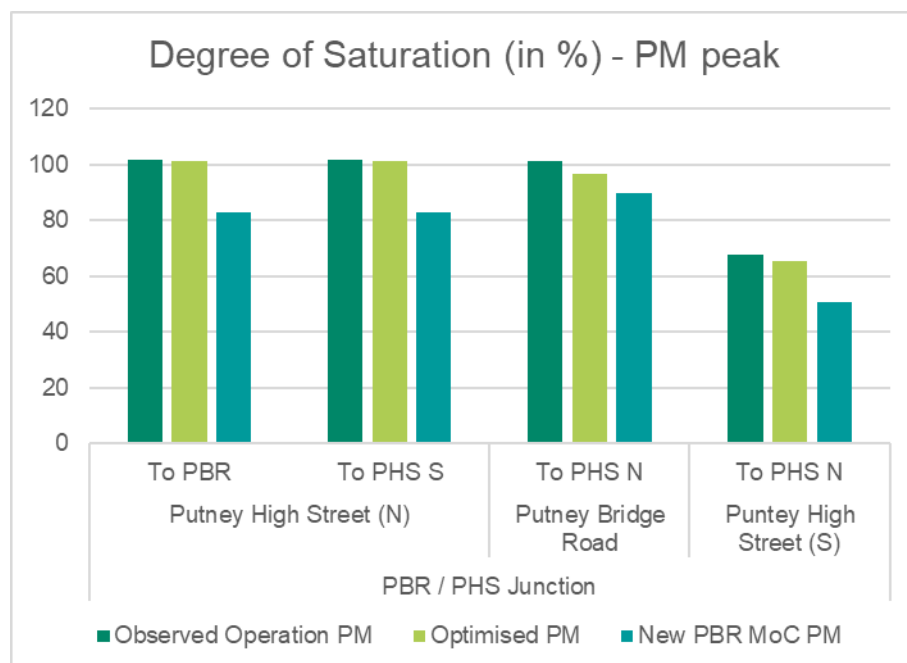


Figure 5-12 – LinSig Degree of Saturation with the observed times, the proposed changes and the new method of control on Putney Bridge Road Junction, PM peak

Other

Bus stop - Merging

5.25 As part of the scheme, the St Mary's Church / Putney Pier bus stops (Stops S and T) were relocated further north to improve traffic merging conditions, as vehicles previously used the cycle lane for merging.

- 5.26 The combination of the cycle gate, the early release for cyclists, and the additional space for vehicles to merge before the bus stop has improved this issue. Traffic now flows more smoothly in these sections, while cyclists benefit from greater space and improved protection under the new layout.

Cycle Right Turn Pocket at Putney High Street

- 5.27 Another element of the scheme is the right-turn pocket for cyclists accessing Felsham Road. Both video footage and site observations indicate that this pocket is underused. Instead, cyclists often wait at the Putney High Street crossing near Putney Bridge Road to travel to the western pavement, which is used to reach Felsham Road.

Overall congestion

- 5.28 During the site visit and in the survey videos, higher levels of congestion and longer queues were observed on Lower Richmond Road, Putney Bridge Road, and Putney High Street compared with the 2021 situation.
- 5.29 The congestion begins before and extends beyond the survey analysis periods (07:00–10:00 and 16:00–19:00), making detailed analysis beyond these times impossible.
- 5.30 It is assumed that on the Lower Richmond Road and Putney Bridge Road approaches, shorter green times and non-optimal junction synchronisation are the main causes. However, on Putney High Street, two factors are believed to be contributing to the additional congestion:
- Buses at Putney Exchange, which were already identified in 2021 as a source of considerable delay, and
 - Signal synchronisation issues, as underutilised green time has been observed in this direction.

6. Summary and conclusions

- 6.1 LBW commissioned AECOM to carry out a post-implementation study of a new layout on Putney High Street between Lacy Road and Putney Bridge. The scheme was designed to improve pedestrian and cyclist connectivity along Putney High Street and its connection with Putney Bridge.
- 6.2 The scheme aimed to address several issues previously identified by pedestrians and cyclists, particularly concerning their safety and use of the junction.
- 6.3 Post-implementation data was collected and compared to the data collected in the 2021 study.
- 6.4 The surveys show that the new layout has had a positive impact on pedestrians and cyclists, as the number of both groups has increased significantly across the network. Pedestrians have also been observed to be more compliant with signals, with fewer instances of crossing on red. There has been a large increase in cyclists on the dominant movements through the junctions, indicating that cyclists are more comfortable using the junctions as part of their route, and potentially, mode shift has occurred to cycling; although wider trends and other improvements elsewhere may also contribute to this.
- 6.5 While there is a decrease in motorised vehicle volumes on some approaches, namely in Lower Richmond Road and Putney Bridge Road, this is due to several factors. Firstly, the signals have been optimised to prioritise movements along the Putney High

Street and Putney Bridge corridor, resulting in less green time for Putney Bridge Road and Lower Richmond Road. The number of motorised vehicles along the main corridor remains very similar to 2021 levels, when the previous surveys were carried out.

- 6.6 ANPR survey data from the 18th of June 2025 showed that general traffic journey times on the main north-south corridor are slightly quicker than in 2021, whereas longer journey times are seen on Lower Richmond Road and Putney Bridge Road.
- 6.7 An analysis of signal timings and operation shows that Lower Richmond Road has experienced a significant reduction in available green time, particularly for the left turn towards Putney Bridge (a reduction of around 50%). Putney Bridge Road also shows a small reduction in green time during the AM peak, and similar levels to 2021 during the PM peak.
- 6.8 iBus data presents a similar picture: buses on the main corridor have slightly faster journey times compared to 2021, while buses starting their journeys on Lower Richmond Road or Putney Bridge Road are experiencing increased delays.
- 6.9 These factors explain the higher levels of congestion on Lower Richmond Road and Putney Bridge Road, where queues have significantly increased. It is possible that rebalancing of green time could improve the operation of Lower Richmond Road and Putney Bridge Road, whilst still protecting journey times on Putney High Street and Putney Bridge.
- 6.10 Putney High Street also experiences increased congestion south of the scheme area. This is believed to be linked to a lack of synchronisation of signals and buses stopping for long periods at Lacy Road, which in some cases accounts for more than 50% of the time, including passenger boarding and alighting as well as driver changes.

Further investigation

6.11 The review has highlighted that several other improvements may be possible, subject to further analysis and investigation:

- a. Rebalancing of green times at Putney High Street / Lower Richmond Road or changing the Methods of Control.
- b. Investigate ways to remove the conflict between left-turning cyclists from Putney Bridge Road and the Putney High Street pedestrian crossing, so that the crossing can run with Putney Bridge Road. Rebalance the green times at this junction
- c. Improve synchronisation at the junctions so there is less underutilised green time, and
- d. Investigate alternatives to driver changes at the Putney Exchange stop e.g. the St Mary's Church / Putney Pier – Stops S and T where there is less conflict, or investigate layout changes to facilitate overtaking.

Appendix A – Differences in signal operation in the Linsig models

6.12 Observed signal operation has changed from the proposed model (LMAP5).

6.13 In Putney High Street with Lower Richmond Road junction, which has the following stage operation, the stage timings have changed as shown in Table 6-1:

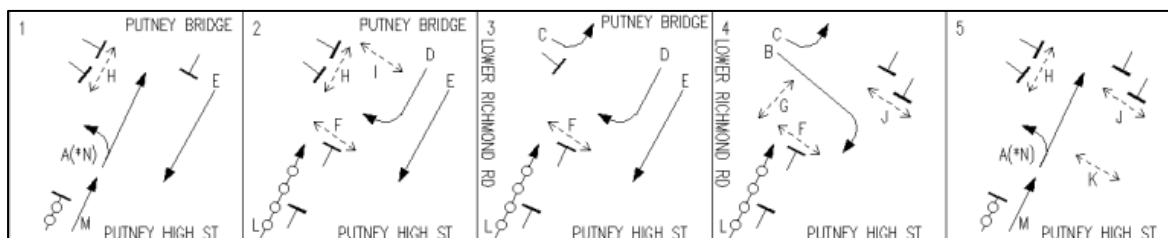


Figure 6-1 - Signal stages at Putney High Street with Lower Richmond Road.

Table 6-1 - Putney High Street / Lower Richmond Road Stage length changes

PHS/LRR Stage length including intergreen						
	Cycle time	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
LMAP5 - AM	104	23	20	17	18	26
Obs 2025 AM	104	39	20	11	16	18
LMAP5 - PM	104	22	20	21	16	25
Obs 2025 PM	96	30	20	12	16	18

6.14 It is worth noting that both models include 100% of activations which is a worse case scenario.

6.15 The same summary has been carried out for Putney Bridge Road with Putney High Street junction, with its stages shown in Figure 6-2, and the different stage lengths shown in Table 6-2.

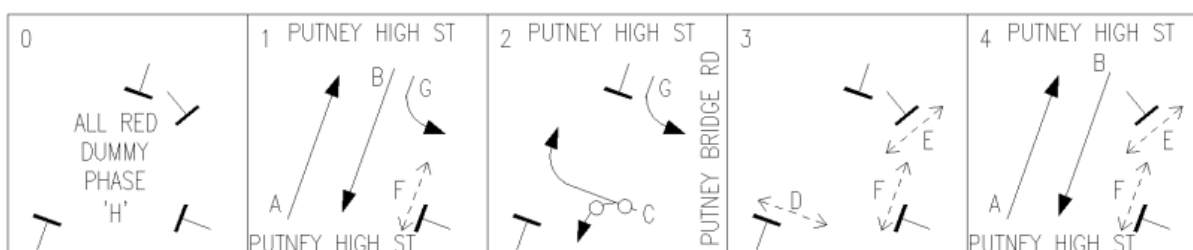


Figure 6-2 - Signal Stages at Putney High Street with Putney Bridge Road

Table 6-2 - Putney High Street / Putney Bridge Road Stage length changes

PHS/PBR Stage length including intergreen					
	Cycle time	Stage 1	Stage 2	Stage 3	Stage 4
LMAP5 - AM	104	35	45	14	10
Obs 2025 AM	104	52	26	14	12
LMAP5 - PM	104	27	36	14	27
Obs 2025 PM	96	44	26	14	12

6.16 It is worth noting that although stage lengths can be calculated from the models and the observed data, offsets cannot be calculated in the 2025 data.

