
Project:	A34 Perry Barr	Job No:	60569200
Subject:	Traffic Modelling		
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1. Introduction

This Technical Note has been prepared to set out the transport planning and the traffic modelling associated with the proposed highways elements of the proposed scheme.

This note is set out as follows:

- Section 2 provides an overview of the traffic modelling.
- Section 3 provides a summary of the results of the traffic modelling.

2. Traffic Modelling Overview

The Model and Extents

In order to understand how the existing highways operate and how any future scheme will operate, a microsimulation model has been developed. The modelling platform VISSIM has been used.

The model includes 8 junctions, including the two accesses to One Stop Shopping Centre as follows:

1. A34 Birchfield Road / A4040 Aston Lane / A4040 Wellington Road Roundabout - four arm grade separated roundabout junction, known locally as the Perry Barr roundabout or Birchfield roundabout;
2. A34 / A453 Perry Barr gyratory junction;
3. A453 Aldridge Road / Wellhead Lane - three arm signalised junction;
4. A453 Aldridge Road / Holford Drive - three arm signalised junction;
5. A34 Walsall Road / Cliveden Avenue - three arm signalised junction;
6. One Stop Northern Access - three arm priority junction;

7. One Stop Southern Access - three arm signalised junction; and
8. A34 mainline / A34 Birchfield Road merge diverge to (to the south of Perry Barr roundabout).

The extent of the modelled study area is shown below in Figure 2.1

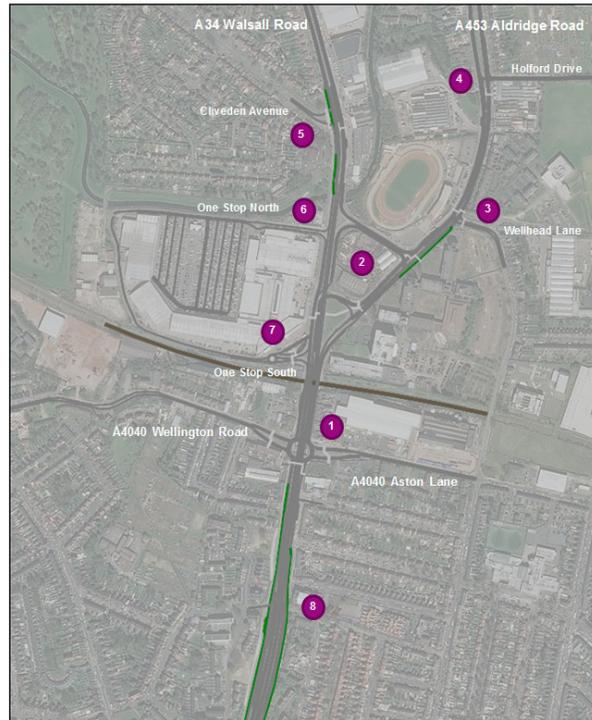


Figure 2.1 Model Extents

Base Year Model: Calibration and Validation

The base year of the model is 2018 and has been modelled for the weekday morning peak period (0700-0900), weekday evening peak period (1600-1800) and Saturday peak (1300-1500).

The model has been calibrated and validated in line with DMRB Volume 12a Section 11.4, using entry link, turning movement, travel time, link and queue length analysis selected as part of the calibration and validation approach.

Future Year Model Development

For the purpose of forecasting the future highway network performance, two future years have been assessed. These years are:

- An opening year of 2022, in line with the Commonwealth Games; and
- A post-CWG assessment year of 2026

A Do Nothing (DN) and a Do Something (DS) scenario for each future year have been developed as follows:

- DN – network as current, traffic flows based on TEMPRO and PRISM growth as set out below.
- DS – network as per the proposed scheme (the removal of the Perry Barr Flyover, removal of Aldridge Road Link, changes to One Stop, signalisation of A34 roundabout and the provision of bus lanes), traffic flows based on TEMPRO and PRISM growth as set out below.

The traffic flows to be included within each weekday peak period model have been derived based on outputs from a number of PRISM model runs. Mott MacDonald operates and maintains the West Midlands PRISM strategic traffic model on behalf of TfWM and they have modelled the DN and DS scenarios.

These PRISM model runs have been undertaken for 2026. The 2018 PRISM base year flows have then been compared to 2026 PRISM flows for both the DN and DS scenarios and the percentage or absolute difference between the flows has been calculated. This has then been applied to the VISSIM existing year flows (2018) to provide future year traffic flows for 2026. This therefore takes into account the level of growth and reassignment effects as a result of the highway scheme.

Flows for an opening year of 2022 have also been developed, but as this future year is year not explicitly modelled in PRISM, the adjustments to apply to the 2018 VISSIM flows were derived from the 2026 PRISM matrices on a pro-rata basis. The TEMPro growth factors from 2018-2022 and 2018-2026 were acquired and the 2022 growth was calculated as a proportion of the 2026 growth. This proportional factor was then applied to the 2026 matrix adjustments in order to produce a new set of matrices suitable for the 2022-year models.

The PRISM model does not include a Saturday peak and therefore a different methodology has been developed to identify future year flows for a Saturday. The average of the change in traffic flows in the morning and evening peak hour from the PRISM model has been applied to the 2018 Saturday peak hour flows to create the two future years for the Saturday peak hour.

In addition to the above, a number of factors have been adopted to reflect other interventions and initiatives that will affect the future year traffic flows. These are as follows;

- Impact arising from the Clean Air Zone;
- Impact on mode share as a direct result of the proposed SPRINT route along the A34; and
- Impact on mode share resulting from the Birmingham Cycle Revolution (BCR), which includes the provision of a route adjacent to the A34.

The mode share arising from SPRINT and BCR is only attributed to the DS case as the highway scheme includes these two proposals, and this mode shift would not be realised without the highway scheme. None of the factors have been applied to trips to or from One Stop as these trips are less likely to be influenced.

Table 2.1 below summarises these factors and how they have been applied.

Table 2.1 : Modal Shift Reduction Factors

Scenario	SPRINT (A34 corridor only)	BCR (all but One Stop)	CAZ (all but One Stop)	Total
2022 DN	0%	0%	2%	2%
2026 DN	0%	0%	2%	2%
2022 DS	1.5%	0.5%	2%	4%
2026 DS	1.5%	5%	2%	8.5%

The Birmingham Cycle Revolution has a target of 10% cycling mode share by 2033. This is also reflected in the West Midlands Cycling Charter, which has a clear vision to realise the potential of cycling as a form of healthy and sustainable transport across the West Midlands. The targets set out in the Charter are:

- By 2023, to increase the mode share by cycling to 5% across the West Midlands
- By 2033, to increase the mode share by cycling to 10%.

Given the range of City wide initiatives that Birmingham City Council and TfWM are implementing, together with the provision on dedicated cycle infrastructure on the A34 corridor as part of the highway element of the scheme, the mode shift reductions attributable to BCR as set out in Table 2.1 are considered to be appropriate.

3. Forecast Network Operation

The future performance of the network has been considered by a comparison of journey times through the modelled network for the proposed year of opening of 2022 and for a future year assessment of 2026.

Year of Opening 2022

The journey times through the modelled network for 2022 for the morning peak hour, evening peak hour and Saturday peak hour are summarised in Tables 3.1, 3.2 and 3.3 below.

Table 3.1: 2022 Modelled Journey Times Comparison Cars and HGVs – AM Peak

From	To	Journey Time (mm:ss)			Change DS-DN
		2018 Base	2022 DN	2022 DS	
A34N	A34S	05:17	04:39	05:28	00:49
A453	A34S	06:04	05:55	06:39	00:44
A4040E	A34S	02:21	02:21	02:33	00:12
	A4040W	02:01	02:02	02:23	00:21
A4040W	A4040E	01:58	01:57	02:28	00:31
	A34S	03:03	03:04	03:23	00:19

This shows that the journey times for all movements in the network are expected to increase as a result of the proposed scheme. These changes in journey times are anticipated to be less than 50 seconds on each route.

Table 3.2 : 2022 Modelled Journey Times Comparison Cars and HGVs - PM Peak

From	To	Journey Time (mm:ss)			
		2018 Base	2022 DN	2022 DS	Change DS-DN
A4040E	A34N	03:59	04:10	04:20	00:10
	A4040W	02:22	02:28	03:04	00:36
A34S	A34N	06:19	06:17	09:20	03:03
	A453	10:09	08:38	10:49	02:11
A4040W	A34N	04:51	05:28	04:21	-01:07
	A4040E	03:22	03:54	02:27	-01:27
One Stop	A34N	03:48	04:10	06:31	02:21
	A453	07:47	06:28	04:47	-01:41
	A4040E	05:22	05:21	08:12	02:51
	A34S	05:08	05:12	07:30	02:18
	A4040W	05:28	05:36	08:40	03:04

This shows that there will be reductions in journey times between the A4040W to A34N and A4040E and One Stop to A453. The remainder of the routes are expected to result in an increase in journey times. Two routes will experience an increase of less than 2 minutes and six routes over two minutes.

Table 3.3: 2022 Modelled Journey Times Comparison Cars and HGVs - SAT Peak

From	To	Journey Time (mm:ss)			
		2018 Base	2022 DN	2022 DS	Change DS-DN
A34N	A34S	03:48	03:48	05:45	01:57
	One Stop	08:36	08:33	08:07	-00:26
A453	A34S	06:33	06:32	06:44	00:12
	One Stop	09:37	09:29	11:46	02:17
A4040E	One Stop	04:32	04:34	06:20	01:46
A34S	A34N	02:46	02:46	03:44	00:58
	A453	03:26	03:26	05:35	02:09
	One Stop	05:22	05:10	06:34	01:24
A4040W	One Stop	04:52	05:25	06:29	01:04
One Stop	A34N	03:27	03:23	06:42	03:19
	A453	07:55	07:59	07:17	-00:42
	A4040E	09:37	09:42	07:19	-02:23
	A34S	08:30	08:39	07:36	-01:03
	A4040W	09:54	09:54	08:16	-01:38

This shows that the journey time for 5 out of the 14 movements are expected to experience a decrease in journey time. This includes four out of the five movements from One Stop, where a decrease of between 00:42 and 01:38 are predicted. The remaining nine movements are expected to experience an increase in journey times as a result of the highway element of the scheme. Of these nine movements, six will experience an increase in journey times of up to 2 minutes.

Future Year of Assessment 2026

The journey times through the modelled network for 2026 for the morning peak hour, evening peak hour and Saturday peak hour are summarised in Tables 3.4, 3.5 and 3.6 below.

Table 3.4 : 2026 Modelled Journey Times Comparison Cars and HGVs – AM Peak

From	To	Journey Time (mm:ss)			
		2018 Base	2026 DN	2026 DS	Change DS-DN
A34N	A34S	05:17	04:22	04:54	00:32
A453	A34S	06:04	05:52	05:58	00:06
A4040E	A34S	02:21	02:30	02:34	00:04
	A4040W	02:01	02:06	02:21	00:15
A4040W	A4040E	01:58	01:58	02:33	00:35
	A34S	03:03	03:09	03:28	00:19

This shows that the journey times for all movements in the network are expected to increase as a result of the proposed scheme. These changes in journey times are anticipated to be less than 35 seconds on each route.

Table 3.5 : 2026 Modelled Journey Times Comparison Cars - PM Peak

From	To	Journey Time (mm:ss)			
		2018 Base	2026 DN	2026 DS	Change DS-DN
A4040E	A34N	03:59	04:27	04:28	00:01
	A4040W	02:22	02:39	03:04	00:25
A34S	A34N	06:19	06:16	08:01	01:45
	A453	10:09	08:09	10:38	02:29
A4040W	A34N	04:51	05:37	04:31	-01:06
	A4040E	03:22	04:02	02:28	-01:34
One Stop	A34N	03:48	03:58	04:20	00:22
	A453	07:47	06:02	06:08	00:06
	A4040E	05:22	05:26	05:01	-00:25
	A34S	05:08	05:16	04:53	-00:23
	A4040W	05:28	05:38	06:03	00:25

This shows that there will be reductions in journey times between the A4040W to A34N and A4040E and One Stop to A453 and A34S. The remainder of the routes are expected to result in an increase in

journey times. Six routes will experience an increase of less than 2 minutes and one route over two minutes.

Table 3.6 : 2026 Modelled Journey Times Comparison Cars - SAT Peak

From	To	Journey Time (mm:ss)			Change DS-DN
		2018 Base	2026 DN	2026 DS	
A34N	A34S	03:48	03:48	05:11	01:23
	One Stop	08:36	08:38	07:39	-00:59
A453	A34S	06:33	06:40	06:15	-00:25
	One Stop	09:37	09:35	11:49	02:14
A4040E	One Stop	04:32	04:22	06:49	02:27
A34S	A34N	02:46	02:47	03:39	00:52
	A453	03:26	03:26	04:48	01:22
	One Stop	05:22	05:18	06:48	01:30
A4040W	One Stop	04:52	05:05	06:53	01:48
One Stop	A34N	03:27	03:11	07:16	04:05
	A453	07:55	08:08	06:38	-01:30
	A4040E	09:37	09:47	08:27	-01:20
	A34S	08:30	08:47	07:49	-00:58
	A4040W	09:54	10:14	09:07	-01:07

This shows that there will be reductions in journey times on six routes, including four out of the five routes from One Stop. The remainder of the routes are expected to result in an increase in journey times. Five routes will experience an increase of less than 2 minutes and three routes over two minutes.

Public Transport Operation

One of the highway scheme objectives is to improve bus journey times and bus reliability within the corridor. The micro simulation model has been used to assess the impact on bus journey times through the modelled network and this is set out in Tables 3.7 - 3.9 below for 2022.

Table 3.7 : 2022 Modelled Bus Journey Times Comparison - AM Peak

From	To	Journey Time (mm:ss)		
		2022 DN	2022 DS	Change DS-DN
A34N	A34S (local)	09:17	06:39	-02:38
	A34S (mainline)	05:05	05:11	00:06
A453	A34S (local)	08:30	08:22	-00:08
	A34S (mainline)	06:49	07:03	00:14
A34S (mainline)	A34N	03:14	03:17	00:03
	A453	04:48	05:20	00:32
A4040W	A4040E	02:44	03:09	00:25
A4040E	A4040W	02:55	03:09	00:14
A34S (local)	A34N	05:40	06:03	00:23
	A453	08:33	07:55	-00:38

This shows that there will be reductions in bus journeys on three movements through the modelled network with reductions of up to 02:38 minutes. There are predicted to be increases on 7 movements, all of which are under 32 seconds.

Table 3.8 : 2022 Modelled Bus Journey Times Comparison - PM Peak

From	To	Journey Time (mm:ss)		
		2022 DN	2022 DS	Change DS-DN
A34N	A34S (local)	08:18	08:13	-00:04
	A34S (mainline)	04:32	06:31	02:00
A453	A34S (local)	08:11	07:10	-01:01
	A34S (mainline)	07:06	06:22	-00:44
A34S (mainline)	A34N	03:24	04:58	01:34
	A453	06:10	07:04	00:54
A4040W	A4040E	04:36	03:14	-01:23
A4040E	A4040W	03:14	03:08	-00:07
A34S (local)	A34N	06:53	06:39	-00:13
	A453	10:22	08:04	-02:18

This shows that there will be reductions in bus journeys on seven movements through the modelled network with reductions of up to 02:18 minutes. There are predicted to be increases on three movements where the journey time increases by 02:00 minutes.

Table 3.9 : 2022 Modelled Bus Journey Times Comparison - SAT Peak

From	To	Journey Time (mm:ss)		
		2022 DN	2022 DS	Change DS-DN
A34N	A34S (local)	08:24	06:50	-01:34
	A34S (mainline)	04:32	05:26	00:54
A453	A34S (local)	09:33	07:44	-01:49
	A34S (mainline)	07:58	07:06	-00:52
A34S (mainline)	A34N	03:19	04:25	01:06
	A453	04:38	06:55	02:17
A4040W	A4040E	03:42	03:14	-00:28
A4040E	A4040W	03:25	03:50	00:25
A34S (local)	A34N	07:44	07:28	-00:16
	A453	08:51	09:08	00:17

This shows that there will be reductions in bus journeys on five movements through the modelled network with reductions of up to 01:49 minutes. There are predicted to be increases on five movements, of up to 02:17 minutes.

The micro simulation model has also been used to assess the impact on bus journey times for the future year of 2026 and these are summarised Tables 3.10 - 3.13 below.

Table 3.10 : 2026 Modelled Bus Journey Times Comparison - AM Peak

From	To	Journey Time (mm:ss)		
		2026 DN	2026 DS	Change DS-DN
A34N	A34S (local)	09:44	06:29	-03:15
	A34S (mainline)	04:48	05:06	00:18
A453	A34S (local)	08:25	08:07	-00:18
	A34S (mainline)	06:48	06:38	-00:10
A34S (mainline)	A34N	03:15	03:16	00:01
	A453	04:52	05:18	00:26
A4040W	A4040E	02:43	03:17	00:34
A4040E	A4040W	02:54	03:11	00:17
A34S (local)	A34N	05:40	05:58	00:18
	A453	08:49	07:49	-01:00

This shows that there will be reductions in bus journeys on four movements through the modelled network with reductions of up to 03:15 minutes. There are predicted to be increases on 6 movements, all of which are less than 40 seconds.

Table 3.11 : 2026 Modelled Bus Journey Times Comparison - PM Peak

From	To	Journey Time (mm:ss)		
		2026 DN	2026 DS	Change DS-DN
A34N	A34S (local)	08:27	07:58	-00:29
	A34S (mainline)	04:31	06:01	01:30
A453	A34S (local)	08:32	06:59	-01:33
	A34S (mainline)	07:20	06:20	-01:00
A34S (mainline)	A34N	03:20	04:45	01:25
	A453	05:48	07:43	01:55
A4040W	A4040E	04:46	03:18	-01:28
A4040E	A4040W	03:25	04:47	00:22
A34S (local)	A34N	06:47	06:51	00:04
	A453	09:55	09:27	-00:28

This shows that there will be reductions in bus journeys on five movements through the modelled network with reductions of up to 01:33 minutes. There are predicted to be increases on 5 movements, the maximum being an increase of 01:55 minutes.

Table 3.12 : 2026 Modelled Bus Journey Times Comparison - SAT Peak

From	To	Journey Time (mm:ss)		
		2026 DN	2026 DS	Change DS-DN
A34N	A34S (local)	08:34	06:40	-01:54
	A34S (mainline)	04:33	05:14	00:41
A453	A34S (local)	09:46	07:22	-02:24
	A34S (mainline)	07:35	06:48	-00:47
A34S (mainline)	A34N	03:20	04:40	01:20
	A453	04:31	06:18	01:47
A4040W	A4040E	03:31	03:13	-00:18
A4040E	A4040W	03:25	03:53	00:28
A34S (local)	A34N	06:41	07:45	01:04
	A453	08:35	09:06	00:31

This shows that there will be reductions in bus journeys on four movements through the modelled network with reductions of up to 02:24 minutes. There are predicted to be increases on six movements, of up to 01:47 minutes.

Overall, with respect to bus journey times, the highway element of the scheme will result in an increase in some routes compared to the DN scenario, but these increases tend to be limited. This is outweighed by the decreases in journey times on other routes.