



# **Solihull Traffic Impact Assessment**

Impact of Local Plan Review Sites on the  
Highway Network

October 2020

Mott MacDonald  
35 Newhall Street  
Birmingham B3 3PU  
United Kingdom

T +44 (0)121 234 1500  
mottmac.com

Solihull Metropolitan  
Borough Council  
Council House  
Manor Square  
Solihull  
B913QB

# **Solihull Traffic Impact Assessment**

Impact of Local Plan Review Sites on the  
Highway Network

October 2020

# Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	September 2020	ECW/JB	OH	TS	Draft
B	October 2020	ECW/JB	OH	TS	Final

**Document reference:** 415790 | MMD | TIA | XX | TN | TP | 001 | B

**Information class:** Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

# Contents

Executive summary	1
<b>1 Introduction</b>	<b>2</b>
1.1 Background	2
1.2 Scope of Study	2
1.3 Study Limitations	3
1.4 Report Structure	4
<b>2 Draft Local Plan Sites</b>	<b>5</b>
2.1 Introduction	5
2.2 Cluster 1 – Dorridge / Knowle / Bentley Heath Area	5
2.3 Cluster 2 – Shirley / Dickens Heath Area	8
2.4 Summary	13
<b>3 Sustainable Accessibility Review</b>	<b>14</b>
3.1 Introduction	14
3.2 Summary of Key Interventions and Opportunities	14
3.3 Summary	15
<b>4 Junctions Assessed</b>	<b>16</b>
4.1 Introduction	16
4.2 Traffic Surveys	16
4.3 Cluster 1 – Dorridge / Knowle / Bentley Heath Area	16
4.4 Cluster 2 – Shirley / Dickens Heath Area	18
4.5 Summary	20
<b>5 Background Traffic Growth</b>	<b>21</b>
5.1 Introduction	21
5.2 Cluster 1 – Dorridge / Knowle / Bentley Heath Area	21
5.3 Cluster 2 – Shirley / Dickens Heath Area	22
5.4 Summary	22
<b>6 Development Trip Generation</b>	<b>23</b>
6.1 Introduction	23
6.2 Cluster 1 Trip Rates	23
6.3 Cluster 2 Trip Rates	23
6.4 Cluster 1 Trip Generation	24
6.5 Cluster 2 Trip Generation	24

<b>7</b>	<b>Trip Distribution and Assignment</b>	<b>26</b>
7.1	Introduction	26
7.2	Network Cordons	26
7.3	Census Data	28
7.4	Cluster 1 Distribution	28
7.5	Cluster 2 Trip Distribution	30
7.6	Assignment	31
<b>8</b>	<b>Traffic Impact Assessment Methodology</b>	<b>33</b>
8.1	Introduction	33
8.2	Existing Traffic Conditions	33
8.3	Assessment Scenarios	40
8.4	Link Capacity	40
8.5	Junction Impact	41
8.6	Mitigation Cost Estimates	41
8.7	Methodology Summary	41
<b>9</b>	<b>Cluster 1 Traffic Impact Assessment</b>	<b>42</b>
9.1	Introduction	42
9.2	Traffic Impact	42
9.3	Mitigation Strategy (Including Outline Costs)	52
<b>10</b>	<b>Cluster 2 – Traffic Impact Assessment</b>	<b>55</b>
10.1	Introduction	55
10.2	Traffic Impact	55
10.3	Cluster 2 Mitigation Strategy (Including Outline Costs)	72
<b>11</b>	<b>Conclusion</b>	<b>81</b>
11.1	Summary	81
11.2	Conclusion	81
<b>A.</b>	<b>Sustainable Accessibility Review</b>	<b>85</b>
<b>B.</b>	<b>Link Capacity</b>	<b>86</b>
B.1	Cluster 1	86
B.2	Cluster 2	87
<b>C.</b>	<b>Junction Impact</b>	<b>88</b>

## Tables

Table 2.1: Cluster 1 - Dorridge / Knowle / Bentley Heath Development Details	5
Table 2.2: Cluster 2 – Shirley / Dickens Heath Development Details	8
Table 3.1: Sustainable Accessibility Enhancement Summary	14
Table 4.1: Cluster 1 Junctions to be Assessed	17
Table 4.2: Cluster 2 Junctions to be Assessed	19
Table 5.1: Cluster 1 TEMPro Growth Factors	21
Table 5.2: Cluster 2 TEMPro Growth Factors	22
Table 5.3: TEMPro Growth Factors	22
Table 6.1: Cluster 1 Residential Trip Rates (per dwelling)	23
Table 6.2: Cluster 2 Residential Trip Rates (per dwelling)	24
Table 6.3: Cluster 1 Development Quanta	24
Table 6.4: Cluster 1 Traffic Generation	24
Table 6.5: Cluster 2 Development Quanta	25
Table 6.6: Cluster 2 Traffic Generation	25
Table 7.1: Cluster 1 Distribution Summary - District Level	29
Table 7.2: Cluster 1 Distribution Summary - MSOA Level	30
Table 7.3: Cluster 2 Distribution Summary - District Level	30
Table 7.4: Cluster 2 Distribution Summary - MSOA Level	31
Table 8.1: Cluster 1 Public Consultation Concerns and Observed Delay	38
Table 8.2: Cluster 2 Public Consultation Concerns and Observed Delay	39
Table 9.1: Site 8 (Hampton Road) Traffic Impact	43
Table 9.2: Site 9 Option 1 (Arden Triangle) Traffic Impact	44
Table 9.3: Site 9 Option 2 (Arden Triangle) Traffic Impact	45
Table 9.4: Cumulative Cluster 1 Option 1 Traffic Impact	46
Table 9.5: Cumulative Cluster 1 Option 2 Traffic Impact	48
Table 9.6: Cluster 1 Mitigation Requirements - 2026	50
Table 9.7: Cluster 1 Mitigation Requirements - 2036	50
Table 9.8: Cluster 1 Mitigation Scheme Preliminary Cost Estimate Summary	53
Table 9.9: Knowle Transport Study Mitigation	53
Table 10.1: Site 4 (West of Dickens Heath) Traffic Impact	57
Table 10.2: Site 11 (The Green) Traffic Impact	59
Table 10.3: Site 12 (South of Dog Kennel Lane) Traffic Impact	61
Table 10.4: Site 26 (South of Bills Lane) Traffic Impact	63
Table 10.5: Cluster 2 (Cumulative of Sites 4, 11, 12 and 26) Traffic Impact	65
Table 10.6: Cluster 2 Mitigation Requirements - 2026	68
Table 10.7: Cluster 2 Mitigation Requirements - 2036	69
Table 10.8: Cluster 2 Mitigation Scheme Preliminary Cost Estimate Summary	79
Table 10.9: A34 Stratford Road Enhancement Study Mitigation	79
Table 11.1: Cluster 1 Mitigation Scheme Preliminary Cost Estimate Summary	83
Table 11.2: Cluster 2 Mitigation Scheme Preliminary Cost Estimate Summary	84

## Figures

Figure 1.1: Site Location Plan [Strategic Overview]	3
Figure 2.1: Cluster 1 - Dorridge / Knowle / Bentley Heath Site Location	6
Figure 2.2: Site 8 (Cluster 1) – Emerging Site Layout	7
Figure 2.3: Site 9 (Cluster 1) – Emerging Site Layout (Option 1)	8
Figure 2.4: Cluster 2 - Shirley / Dickens Heath Site Location	9
Figure 2.5: Site 4 (Cluster 2) – Emerging Site Layout	10
Figure 2.6: Site 11 (Cluster 2) – Emerging Site Layout	11
Figure 2.7: Site 12 (Cluster 2) – Emerging Site Layout	12
Figure 2.8: Site 26 (Cluster 2) – Emerging Site Layout	13
Figure 4.1: Cluster 1 – Junctions Assessed	17
Figure 4.2: Cluster 2 – Junctions Assessed	18
Figure 7.1: Cluster 1 Network Extent	27
Figure 7.2: Cluster 2 Network Extent	28
Figure 7.3: Cluster 1 Distribution Summary - MSOA Level	29
Figure 7.4: Cluster 2 Distribution Summary - MSOA Level	31
Figure 8.1: Cluster 1 – Weekday AM Peak Congestion Data	34
Figure 8.2: Cluster 1 – Weekday PM Peak Congestion Data	35
Figure 8.3: Cluster 2 – Weekday AM Peak Congestion Data	36
Figure 8.4: Cluster 2 – Weekday PM Peak Congestion Data	37
Figure 9.1: Cluster 1 Mitigation Requirements – Cumulative 2036	51
Figure 10.1: Cluster 2 Mitigation Requirements – Cumulative 2036	71
Figure 10.2: Junction 2.5 Illustrative Concept Mitigation Scheme	73
Figure 10.3: Junction 2.10 Illustrative Concept Mitigation Scheme	75
Figure 10.4: Junction 2.16 Illustrative Concept Mitigation Scheme	76
Figure 10.5: Junction X.2 Illustrative Concept Mitigation Scheme	78
Figure 11.1: Cluster 1 Mitigation Requirements – Cumulative 2036	82
Figure 11.2: Cluster 2 Mitigation Requirements – Cumulative 2036	83

# Executive summary

Mott MacDonald has been commissioned by Solihull MBC to undertake a Traffic Impact Assessment of six development sites. The sites lie within two broad clusters in the Dorridge / Knowle / Bentley Heath and Shirley / Dickens Heath areas. The objective of the study is to determine the likely impact of the sites' associated development traffic on the surrounding highway network. It does not provide a detailed analysis for each site and does not provide any junction capacity assessments.

In order to generate an indication of baseline operation on the local road networks surrounding the two cluster areas, traffic survey data has been gathered from traffic surveys or from existing sources. Background traffic growth factors have been applied to the surveyed flows to provide an indication of possible future traffic flows in the 2026 and 2036 assessment years.

Traffic generation from the sites has been forecast using trip rates that have been agreed with SMBC. Traffic has been distributed across the local road network based on 2011 Census data relating to local residents' usual workplace. Traffic has been assigned to the network based on the fastest journey times from the access at each site.

The impact of each site has been forecast individually and cumulatively for each cluster. Impacts have been forecast based on the link capacity impact at each junction and based on the overall increase in traffic that each of the sites and each cluster have at a specific junction.

The forecast percentage impacts have also been considered against existing congestion levels and against concerns raised through public consultation. This allowed for a pragmatic view to be made on junctions that are likely to require more detailed assessment and possible mitigation to facilitate development.

Where junctions have been identified to require mitigation, mitigation schemes have been considered against known constraints. Where physical highway mitigation schemes are considered to be deliverable, high-level schemes has been described. Where mitigation would appear to be unfeasible this has been stated alongside recommendations for alternative mitigation strategies or no mitigation.

The TIA concludes with high-level mitigation schemes that have been described and costed at junctions where the sites are forecast to generate greatest impacts. It is recommended that more detailed assessment work is undertaken following this Traffic Impact Assessment to generate a more refined forecast of baseline network operation and development impacts. This will involve updated traffic surveys, strategic modelling and development of preliminary design schemes to support the Draft Local Plan allocations.

# 1 Introduction

## 1.1 Background

Mott MacDonald (MM) was commissioned by Solihull Metropolitan Borough Council (SMBC) in 2017 to undertake a Traffic Impact Assessment (TIA) of proposed Local Plan site allocations within Solihull. The sites lie within two broad cluster areas; Cluster 1 in the Dorridge / Knowle / Bentley Heath area and Cluster 2 in the Shirley / Dickens Heath area.

Since 2017, the draft allocations have undergone changes and some sites have been discounted from the Draft Local Plan (DLP) process. Accordingly, SMBC has appointed MM to complete the TIA to reflect the current position and to provide an updated high-level forecast of the potential impacts of the DLP sites on the highway network in the vicinity of the cluster areas.

It was intended to update the traffic surveys in early 2020, but due to the onset of the Covid-19 pandemic, these surveys were not undertaken. This was due to the aftereffects on the transportation system following the UK entering into a period of lockdown. This in turn caused traffic levels to drop to levels far lower than would typically be expected for a prolonged period of time over the spring and summer periods in 2020. As a result, repeat traffic surveys were not undertaken as this would not have provided representative baseline traffic flows. Therefore, it was agreed with SMBC that the TIA would be completed based on existing data sources, including data that is older than 5 years.

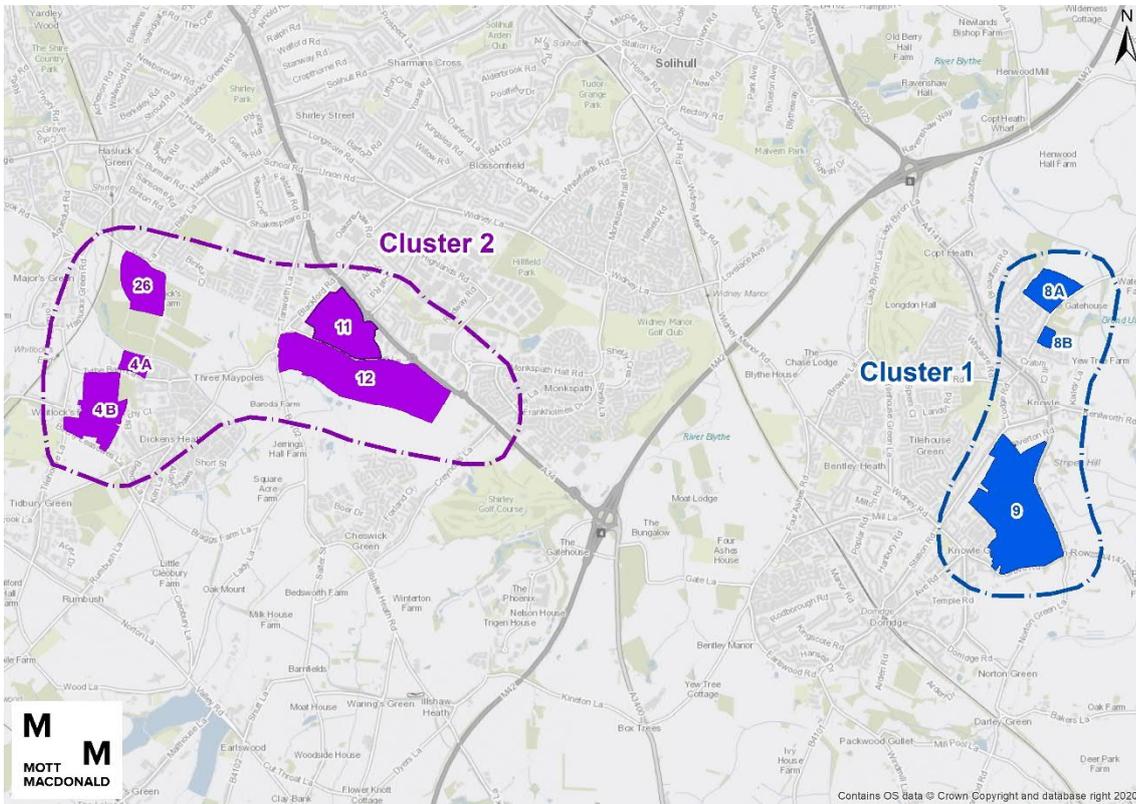
## 1.2 Scope of Study

The study area covers two cluster areas in Solihull. Cluster 1 is broadly in the area of Dorridge / Knowle / Bentley Heath. Cluster 2 is broadly in the area of Shirley / Dickens Heath. The specific sites contained within each cluster are listed below:

- Cluster 1 - Dorridge / Knowle / Bentley Heath
  - Site 8 – Hampton Road
  - Site 9 – Arden Triangle
- Cluster 2 – Shirley / Dickens Heath
  - Site 4 – West of Dickens Heath
  - Site 11 – The Green
  - Site 12 – South of Dog Kennel Lane
  - Site 26 – South of Bills Lane

The locations of Cluster 1 and 2, along with the sites within each cluster, are shown in Figure 1.1.

**Figure 1.1: Site Location Plan [Strategic Overview]**



Source: Mott MacDonald and SMBC

As Figure 1.1 shows, the DLP sites are situated in two clusters. Cluster 1 is located to the east of Knowle and comprises of Site 8, split over two land parcels, and Site 9 which is one single development parcel.

Cluster 2 is made up four sites, split over five land parcels. Site 4 is split over two development parcels; 4A which is situated north of Tythe Barn Lane and 4B which is situated south of Tythe Barn Lane and north of Birchy Leasowes Lane. Site 26 is located south of Bills Lane and north of the Site 4B, separated by the North Stratford Canal. Sites 11 and 12 are located north and south of Dog Kennel Lane respectively.

The objective of this study is to undertake a high-level assessment to predict the impact of the various DLP sites on the surrounding highway network within each cluster. This has been undertaken on both a site by site basis and on a cumulative basis based on phased delivery of development at each DLP site in 2026 and 2036.

Where the study has identified possible impacts arising as a result of development, concept level highway mitigation schemes have been developed with due consideration given to feasibility in terms of constraints and high-level cost estimates developed to determine possible funding requirements or future contribution requirements.

### 1.3 Study Limitations

This study serves to provide a high-level assessment of the likely traffic impact of the proposed DLP site allocations in the Knowle and Dickens Heath/Shirley areas of Solihull. The study has been developed based on informed assumptions relating to the DLP sites (i.e. masterplans and

access locations). The study does not provide a detailed analysis for each site and does not provide any junction capacity assessments; the conclusions drawn from this study are aimed to determine possible locations that will require further focus in terms of review, assessment and possible mitigation to enable sustainable delivery of the proposed allocation sites.

In the fullness of time, as each site is taken through the planning application process, each development will need to be supported by a bespoke and comprehensive Transport Assessment which will need to identify and address specific issues at the time of preparing. Given the timescales of the Draft Local Plan period, there may be material changes that need to be accounted for in future assessments.

This TIA study has also utilised findings from the “A34 Stratford Road Enhancement Study”, which was undertaken by Atkins on behalf of Solihull MBC dated 29 June 2018 (it is our understanding that WSP are undertaking further work on behalf of SMBC on the A34 corridor).

MM are also undertaking a more detailed assessment of the impact of the DLP sites (8 and 9) on Knowle on behalf of SMBC. Titled, “The Knowle Transport Study”, the study will identify mitigation for a number of junctions included within Cluster 1 which is assessed in the TIA study.

## 1.4 Report Structure

The structure of this report is as follows:

- Section 2 - Draft Local Plan Sites
- Section 3 - Sustainable Accessibility Review
- Section 4 - Junctions Assessed
- Section 5 - Background Traffic Growth
- Section 6 - Development Trip Generation
- Section 7 - Trip Distribution and Assignment
- Section 8 - Traffic Impact Assessment Methodology
- Section 9 - Cluster 1 Traffic Impact Assessment
- Section 10 - Cluster 2 Traffic Impact Assessment
- Section 11 - Conclusion

## 2 Draft Local Plan Sites

### 2.1 Introduction

The TIA is focussed in two clusters located within Solihull, which are summarised as follows:

- Cluster 1 - Dorridge / Knowle / Bentley Heath (see Section 2.2)
  - Site 8 – Hampton Road
  - Site 9 – Arden Triangle
- Cluster 2 – Shirley / Dickens Heath (see Section 2.3)
  - Site 4 – West of Dickens Heath
  - Site 11 – The Green
  - Site 12 – South of Dog Kennel Lane
  - Site 26 – South of Bills Lane

### 2.2 Cluster 1 – Dorridge / Knowle / Bentley Heath Area

#### 2.2.1 Cluster 1 Overview

Cluster 1 is located in the area of Dorridge / Knowle / Bentley Heath. Cluster 1 includes two development sites split over three land parcels. The number of proposed dwellings and access assumptions to each site is detailed in Table 2.1.

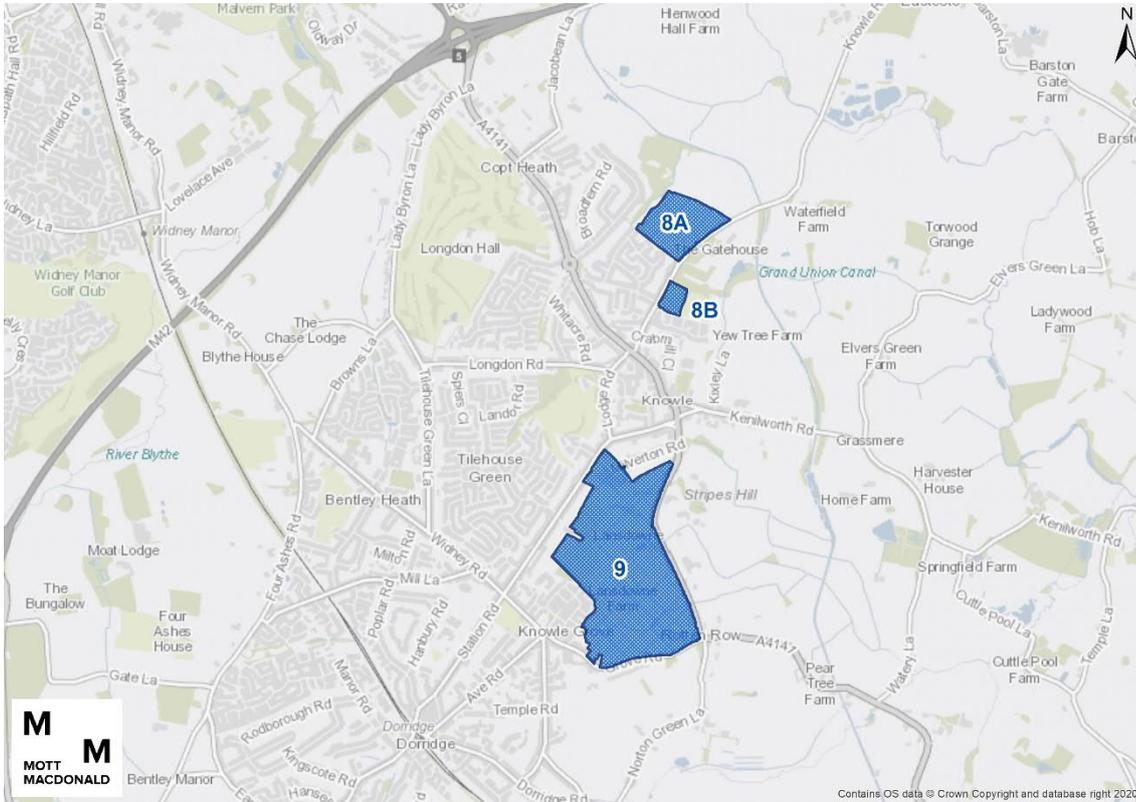
**Table 2.1: Cluster 1 - Dorridge / Knowle / Bentley Heath Development Details**

Site	Name	Area	Number of Dwellings	Access Assumption
8A	Hampton Road	9.90	150	Hampton Road
8B	Hampton Road	1.56	150	Hampton Road
9	South of Knowle	49.10	600	A4141 Warwick Road

Source: SMBC

The location of each site is displayed in Figure 2.1.

**Figure 2.1: Cluster 1 - Dorridge / Knowle / Bentley Heath Site Location**



Source: Mott MacDonald

### 2.2.2 Site 8 – Hampden Road

Site 8 is split across two development parcels, Site 8A is located north of Hampton Road and Site 8B is located south of Hampton Road. The illustrative masterplan is shown in Figure 2.2.

**Figure 2.2: Site 8 (Cluster 1) – Emerging Site Layout**



Source: SMBC

### 2.2.3 Site 9 – Arden Triangle

Site 9 is located east of Knowle, in an area of land referred to as the Arden Triangle. The site abuts Warwick Road along its eastern boundary, Grove Road along its southern boundary and Arden Academy (fronting onto Station Road) on its northern boundary.

Two masterplan options have been proposed by SMBC. The Option 1 illustrative masterplan is shown in Figure 2.3, below, and is the preferred option in terms of access from the eastern areas of the site. The Option 2 masterplan would have an additional access through the north-western boundary from Station Road with Arden Academy being relocated. Both options have been tested in this TIA.

**Figure 2.3: Site 9 (Cluster 1) – Emerging Site Layout (Option 1)**



Source: SMBC

### 2.3 Cluster 2 – Shirley / Dickens Heath Area

Cluster 2 is located in the Shirley / Dickens Heath areas. Cluster 2 includes four sites split over five land parcels. Details of the development quanta for the sites in Cluster 2 is shown in Table 2.2. Each site has had a masterplan developed, which shows the different make-ups of each development.

#### 2.3.1 Cluster 2 Overview

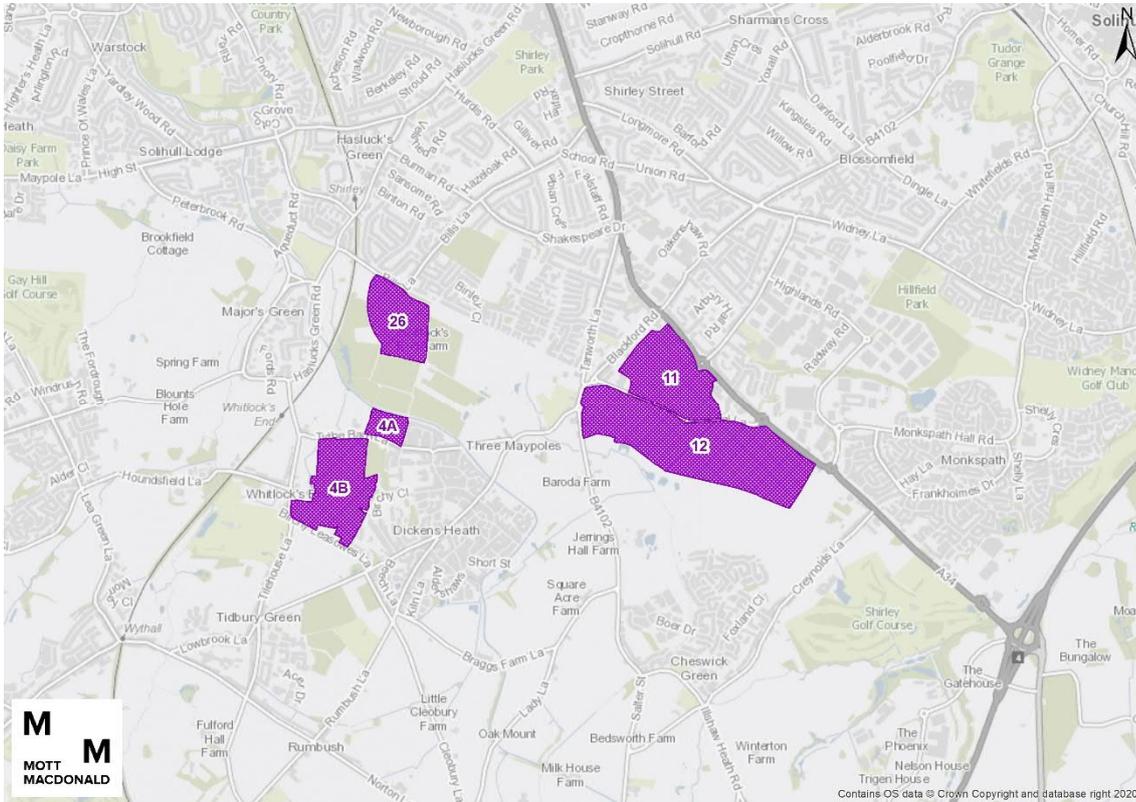
**Table 2.2: Cluster 2 – Shirley / Dickens Heath Development Details**

Site	Name	Area	Number of Dwellings	Access Assumption
4 (4A and 4B)	West of Dickens Heath	45.83	350	Tilehouse Lane
11	TRW / The Green	20.45	640	Dog Kennel Lane
12	South of Dog Kennel Lane	56.14	1000	Dog Kennel Lane A4141 Stratford Road
26	South of Shirley	13.85	450	Bills Lane

Source: SMBC

The location of each development is displayed in Figure 2.4.

**Figure 2.4: Cluster 2 - Shirley / Dickens Heath Site Location**



Source: Mott MacDonald

### 2.3.2 Site 4 – West of Dickens Heath

Site 4 is located west of Dickens Heath and split across two development parcels, Site 4A is located north of Tythe Barn Lane and Site 8B is located south of Tythe Barn Lane. A copy of the illustrative masterplan is shown in Figure 2.5.

**Figure 2.5: Site 4 (Cluster 2) – Emerging Site Layout**



Source: SMBC

### 2.3.3 Site 11 – TRW / The Green

Site 11 is located north of Dog Kennel Lane south of Shirley. A hybrid planning application has been submitted for the site, comprising of an outline application for 330 dwellings and 100,000sqft car dealership, and full planning for 242 dwellings. This application was granted permission in March 2019.

A copy of the illustrative masterplan is shown in Figure 2.6. Site 11 is shown in grey to the north of Dog Kennel Lane and site 12.

**Figure 2.6: Site 11 (Cluster 2) – Emerging Site Layout**



Source: SMBC

### 2.3.4 Site 12 – South of Dog Kennel Lane

Site 12 is located on the southern edge of Shirley. It is proposed that the site will be accessed from Dog Kennel and via a new access from the Stratford Road / Monkspath Hall Road junction. The illustrative masterplan is shown in Figure 2.7.

**Figure 2.7: Site 12 (Cluster 2) – Emerging Site Layout**



Source: SMBC

### 2.3.5 Site 26 – South of Shirley

Site 26 is located on the southern edge of Shirley. It is proposed that the site will be accessed from Bills Lane, with traffic routing from Haslucks Green Road or Stratford Road. The illustrative masterplan is shown in Figure 2.8.

**Figure 2.8: Site 26 (Cluster 2) – Emerging Site Layout**



Source: SMBC

## 2.4 Summary

The proposed DLP allocations will provide an additional 900 dwellings in the Dorridge / Knowle / Bentley Heath area of Cluster 1. Cluster 2 will provide an additional 2,440 dwellings plus additional school places and a care home on Site 11.

From the masterplans shown above, it is shown that each development is primarily of mixed density housing.

## 3 Sustainable Accessibility Review

### 3.1 Introduction

A high-level sustainable accessibility review has been undertaken by MM to provide an initial view on possible sustainable interventions that will need to be delivered to support and promote sustainable travel at and around the prospective sites.

The sustainable accessibility review considered access in and around the sites for pedestrians, cycling and public transport users. A standardised framework was developed for the review process which considered a range of factors for each mode, including safety, connections, proximity of local centres and frequency of service.

This approach enabled the sites to be considered against the same criteria, and for clear actions/requirements to be identified for each site in terms of sustainable interventions that need to be implemented to enable sustainable travel. The actions/requirements identified are not exhaustive; each site will need to be supported by a full and comprehensive Transport Assessment which will need to consider the requirements for enabling and promoting sustainable access within and around each DLP site.

### 3.2 Summary of Key Interventions and Opportunities

The key actions/requirements in terms of delivery of sustainable accessibility infrastructure for each site are listed below in Table 3.1. All information from the review for each site is summarised in **Appendix A**.

**Table 3.1: Sustainable Accessibility Enhancement Summary**

Cluster	Site	Key Actions / Requirements
Cluster 1	Site 8	<ul style="list-style-type: none"> <li>• Footways needed along site frontage to canal towpath.</li> <li>• Opportunity to include a modal filter at Alveston Grove cul-de-sac.</li> <li>• Traffic calming needed to enable safe on-road cycling on Hampton Road.</li> </ul>
	Site 9	<ul style="list-style-type: none"> <li>• Footways on Warwick Road need to be widened / upgraded.</li> <li>• Traffic calming and lower speed limit needed on Warwick Road to enable safe on-road cycling.</li> <li>• Footway and crossing improvements needed on Station Road / Grove Road for access to Dorridge Railway Station.</li> </ul>
Cluster 2	Site 4	<ul style="list-style-type: none"> <li>• Footways need to be formed and / or widened on Tilehouse Lane, Tythe Barn Lane and Birchy Leasowes Lane.</li> <li>• Crossing needed to enable safe access to Whitlocks End Railway Station.</li> <li>• New bus stop required on Birchy Leasowes Lane to enable access within 400m of southern areas of site.</li> <li>• Opportunity to create a formalised active travel route between Whitlocks End Railway Station and Dickens Heath.</li> <li>• Opportunity to link Site 4 and Site 26 by formalising off-road route over canal.</li> <li>• Opportunity to link with canal towpath for east/west link between Dickens Heath and Yardley Wood / King's Norton.</li> </ul>
	Site 11	<ul style="list-style-type: none"> <li>• Crossing facilities needed on Dog Kennel Lane.</li> <li>• Opportunity to create modal filters for active travel connection to Stratford Road.</li> </ul>
	Site 12	<ul style="list-style-type: none"> <li>• Footway needed on southern side of Dog Kennel Lane.</li> <li>• Crossings needed on Dog Kennel Lane.</li> <li>• Opportunity to create modal filters at boundary for direct access to Dickens Heath Road and Stratford Road (via Site 11).</li> </ul>

Cluster	Site	Key Actions / Requirements
	Site 26	<ul style="list-style-type: none"><li>• Footway widening and crossings needed on Bills Lane.</li><li>• Opportunity to enhance active travel connection to east via Woodloes Road.</li><li>• Opportunity to link Site 4 and Site 26 by formalising off-road route over canal.</li><li>• Opportunity to link with canal towpath for east/west link between Dickens Heath and Yardley Wood / King's Norton.</li></ul>

Source: Mott MacDonald

### 3.3 Summary

This high-level sustainable accessibility review highlighted that a number of upgrades will need to be implemented to enable and promote sustainable travel in and around the sites and cluster areas. There are also a range of opportunities to enhance sustainable travel with traffic free active travel corridors connecting the sites with each other and / or with key active travel routes.

## 4 Junctions Assessed

### 4.1 Introduction

The study area, network cordons and the junctions to be considered in the TIA were discussed and agreed with SMBC during consultation prior to commencing the assessment in 2017 and finalising the assessment in 2020.

In 2017 the SPECTRUM<sup>1</sup> database was reviewed to identify the junctions where existing traffic data had been gathered previously. The TfWM Data Insight database has also been reviewed to update the traffic data if more recent data is available for use in the TIA study.

### 4.2 Traffic Surveys

In 2017, traffic data that was less than five years old and had been collected in a neutral month or during school term-time was used for the TIA study. Where data was not available, new turning count surveys were undertaken in October 2017 to avoid any gaps in traffic data at key junctions.

Manual Classified Count (MCC) surveys were commissioned and undertaken on Tuesday 17 October 2017. The surveys were undertaken covering the AM and PM peak periods from 07:00 to 10:00 and 16:00 to 19:00. The data was provided broken down into 15-minute time intervals and broken down by vehicle type based on the COBA7 classification scheme.

Two ATCs were also undertaken over 24 hours for seven consecutive days, covering vehicle classification, speed and volume.

It was the intention that surveys older than five-years old (at the time of completing the TIA in 2020) would be repeated. However, surveys could not be undertaken due to the impact on traffic flows of the Covid-19 lockdown. Therefore, the data collected in 2017 has been used for the assessment of the impact of the DLP sites on the highway network. Upon a review of the most recent TfWM Data Insight surveys, it was apparent that more recent surveys had been carried out in the Cluster 1 study area since developing the traffic baseline in 2017. Where this was the case, the more recent survey data has been obtained and updated to inform the TIA.

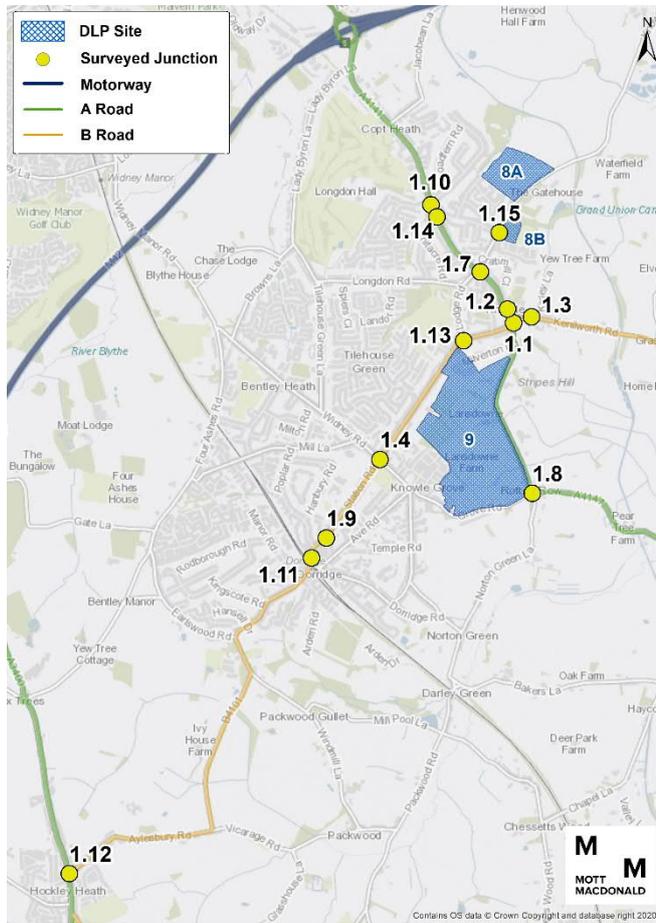
### 4.3 Cluster 1 – Dorridge / Knowle / Bentley Heath Area

The junctions where traffic survey data has been gathered in Cluster 1 are shown in Figure 4.1.

---

<sup>1</sup> SPECTRUM was a database maintained by Mott MacDonald on behalf of the West Midlands Combined Authority. This database contained traffic, pedestrian, accident and congestion data. This database is now maintained by TfWM and is called Data Insight.

**Figure 4.1: Cluster 1 – Junctions Assessed**



Source: Mott MacDonald and SMBC

A list of the junctions in Cluster 1 is shown in Table 4.1, which includes details of the junction locations, road names, junction types and survey dates.

**Table 4.1: Cluster 1 Junctions to be Assessed**

Ref	Junction Name	Junction Type	Count Type	Count Ref	Survey Data
1.1	High Street / Wilsons Road / Warwick Road / Station Road	Priority	JTC	TCN1415 <sup>2</sup>	27/01/2015
1.2	High Street / Kenilworth Road / Warwick Road	Priority	JTC	TCN1414	10/09/2013
1.3	Kenilworth Road / Wilsons Road	Priority	JTC	- <sup>3</sup>	17/10/2017
1.4	Grove Road / Station Road / Widney Road	Roundabout	JTC	Middlefield Avenue TA <sup>4</sup>	10/09/2015
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	Priority	JTC	TCN1413	09/07/2013

<sup>2</sup> References starting with 'TC' refer to the reference given by TfWM Data Insight

<sup>3</sup> Sites without a count reference were undertaken by Mott MacDonald in 2017

<sup>4</sup> SMBC Application No. 2015/52196

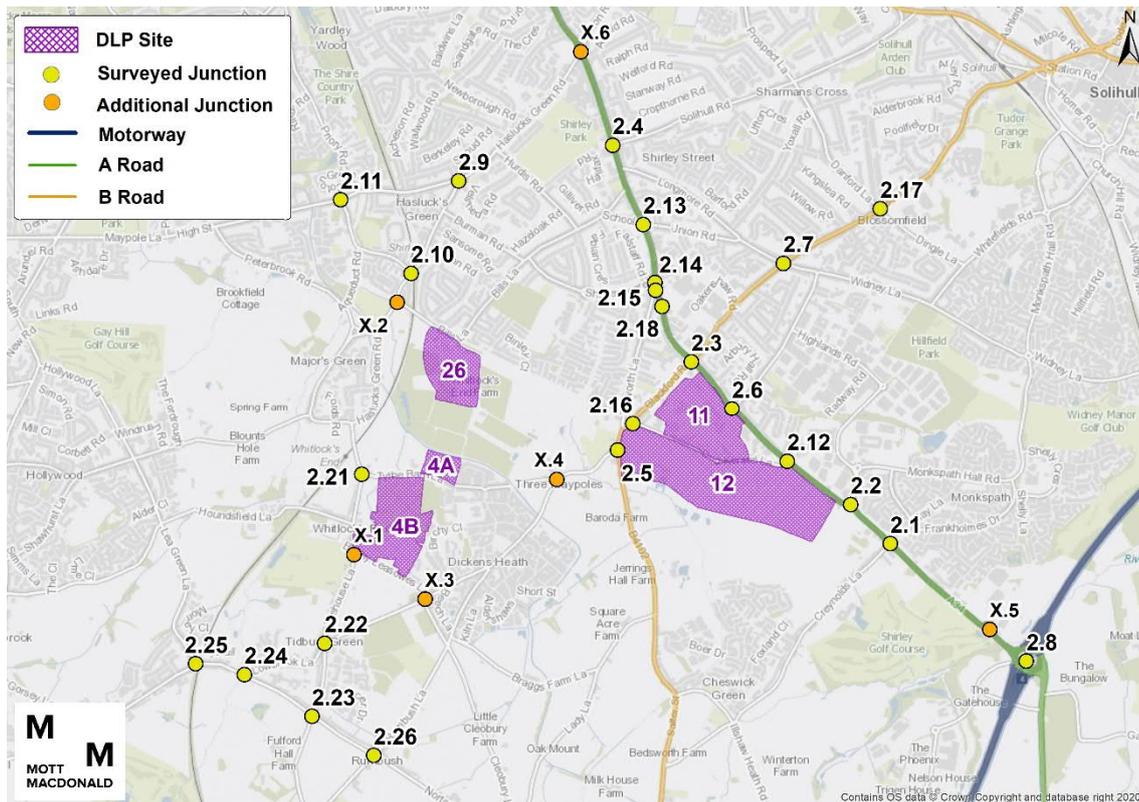
1.8	Warwick Road / Grove Road / Norton Green Lane	Priority	JTC	Middlefield Avenue TA <sup>4</sup>	1//09/2015
1.9	Station Road / Forest Road	Priority	JTC	- <sup>3</sup>	17/10/2017
1.10	Warwick Road / Wychwood Avenue / Langfield Road	Roundabout	JTC	- <sup>3</sup>	17/10/2017
1.11	Station Road / Station Approach	Priority	JTC	- <sup>3</sup>	17/10/2017
1.12	Stratford Road / Aylesbury Road	Priority	ATC	ATCs on each arm	07/2017 11/2017 11/2018
1.13	Lodge Road / Station Road	Priority	JTC	TCN3173A	24/09/2014
1.14	Arden Vale Road / A4141	Priority	JTC	- <sup>3</sup>	17/10/2017
1.15	Arden Vale Road / Hampton Road	Priority	JTC	- <sup>3</sup>	17/10/2017

Source: Mott MacDonald

#### 4.4 Cluster 2 – Shirley / Dickens Heath Area

The junctions that are being assessed in Cluster 2 are shown in Figure 4.2.

Figure 4.2: Cluster 2 – Junctions Assessed



Source: Mott MacDonald and SMBC

The junctions labelled starting with an 'X' are junctions believed to be worth consideration but without any survey data that could be used to assess them fully in this study, or additional junctions included within the A34 Corridor Study, but not included within the junctions that were agreed with SMBC to assess for this TIA study.

A list of the junctions with surveys in Cluster 2 is shown in Table 4.2 which includes details of the junction locations, road names, junction types and survey dates.

**Table 4.2: Cluster 2 Junctions to be Assessed**

Ref	Junction Name	Junction Type	Count Type	Count Ref	Survey Date
2.1	Stratford Road / Creynolds Lane	Signals	JTC	TCR349	02/12/2014
2.2	Stratford Road / Monkspath Hall Road	Roundabout	JTC	TCN1448U	11/02/2015
2.3	Stratford Road / Blackford Road / Marshall Lake Road	Roundabout	JTC	TCN1403	04/02/2015
2.4	Stratford Road / Solihull Road	Roundabout	JTC	TCN1401	11/03/2014
2.5	Dickens Heath Road / Tanworth Lane	Roundabout	JTC	TCN1499	16/10/2013
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	Roundabout	JTC	- <sup>3</sup>	17/10/2017
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	Signals	JTC	TCR959	05/11/2013
2.8	M42 / Stratford Road / Blythe Gate	Signalised Roundabout	JTC	- <sup>3</sup>	17/10/2017
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	Roundabout	JTC	- <sup>3</sup>	17/10/2017
2.10	Haslucks Green Road / Green Lane	Priority	JTC	- <sup>3</sup>	17/10/2017
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	Roundabout	JTC	TCR1864	04/12/2013
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	Roundabout	JTC	TCR4269	26/02/2013
2.13	Stratford Road / Union Road / School Road	Roundabout	JTC	TCR1207	16/07/2013
2.14	Stratford Road / Shakespeare Drive	Signals	JTC	TCR711	12/11/2014
2.15	Stratford Road / Tanworth Lane	Priority	JTC	TCN1402	09/06/2015
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	Roundabout	JTC	TCR1374	05/03/2014
2.17	Blossomfield Road / Dingle Lane / Danford Lane	Signals	JTC	TCN1446	14/05/2014
2.18	Stratford Road / Sainsburys	Roundabout	JTC	- <sup>3</sup>	17/10/2017
2.21	Tilehouse Lane / Tythe Barn Lane	Priority	JTC	TCR5798	15/10/2013
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	Priority	JTC	- <sup>3</sup>	17/10/2017
2.23	Norton Lane / Fulford Hall Road	Priority	JTC	- <sup>3</sup>	17/10/2017
2.24	Lowbrook Lane / Norton Lane	Priority	JTC	TCR5723	26/02/2014
2.25	Lea Green Lane / Station Road / Norton Lane	Priority	JTC	- <sup>3</sup>	17/10/2017
2.26	Norton Road / Rumbush Lane	Priority	JTC	- <sup>3</sup>	17/10/2017

Source: Mott MacDonald

## 4.5 Summary

It was the original intention of the TIA study that new surveys would be carried out at locations where traffic data was aged five years or older. However, due to the impact that the Covid-19 lockdown has had on traffic conditions, it was agreed with SMBC that new surveys could not be undertaken, and that the TIA study should be completed either using existing or more up to date data where available.

Therefore, traffic data has been obtained from the TfWM Data Insight database and from the transport evidence associated with planning applications that were provided by SMBC. However, due to the limited number of new counts, this has resulted in some data being included that is over five-years old and with the survey results coming from a wide range of years. The most recent collection of widespread surveys in each of the clusters was in 2017.

It should be noted though that traffic growth has been applied to baseline flows to develop a forecast of future baseline traffic in 2026 and 2036. Given the time period over which the study is considering the impact, there are many unknowns which will influence traffic growth. On this basis, MM consider that the baseline traffic survey data used to inform this high-level TIA is suitable and robust to understand indicative impacts of the proposed site allocations and to identify the need for further studies and / or more detailed assessment to determine detailed forecast impacts and specific mitigation requirements.

## 5 Background Traffic Growth

### 5.1 Introduction

In order to determine future baseline traffic levels without the DLP developments in the two clusters, a traffic growth rate has been calculated using the Trip End Model Presentation Programme (TEMPro). These growth rates will be applied to the baseline traffic flows to obtain the future year flows in 2026 and 2036, as agreed with SMBC.

TEMPro is a programme used to calculate growth rates of middle layer super output areas (MSOAs). The calculation is derived from the National Trip End Model (NTEM) datasets which determine long term forecasts representing the Department for Transport's (DfT) best estimate of long-term response to demographic and economic trends. Planning data within NTEM is taken from Local Authority (LA) plans, monitoring reports, and targets for the whole LA area and are distributed to NTEM zones according to expected growth factors and factors from historic trends. NTEM also takes 2011 census data into account, amongst other datasets. The DfT keep the datasets within TEMPro sufficiently current to ensure the most accurate outputs.

To avoid the double counting of developments trips, the number of households assumed in the DLP have been removed from the TEMPro assumptions when calculating the 2026 and 2036 growth rates. This is to provide background growth without the DLP to better determine the impact of the DLP developments.

Within TEMPro the MSOAs representing each of the clusters were selected, with a growth rate calculated for the 'Car Driver' mode over all purposes. The origin/destination trip end type was selected for the weekday AM and PM peak periods (07:00-10:00 and 16:00-19:00 respectively) and then an NTM Traffic Growth Calculation was done to get a single factor representing both origin and destination trips.

### 5.2 Cluster 1 – Dorridge / Knowle / Bentley Heath Area

For Cluster 1, the MSOAs selected within TEMPro were Solihull 026 and Solihull 028 which cover Knowle and Dorridge respectively. TEMPro assumes an increase of 195 households for the Solihull 026 MSOA (where both developments lie) between 2017 and 2026 and an increase of 420 households between 2017 and 2036.

This is less than the DLP development levels of 300 dwellings in 2026 and 900 dwellings in 2036. Therefore, for both future years the number of households used in the TEMPro assumptions has been kept the same as 2017 for the Solihull 026 MSOA. This has resulted in the following factors.

**Table 5.1: Cluster 1 TEMPro Growth Factors**

Year	AM	PM
2026	1.066 (+6.6%)	1.065 (+6.5%)
2036	1.116 (+11.6%)	1.114 (+11.4%)

Source: TEMPro (2020)

### 5.3 Cluster 2 – Shirley / Dickens Heath Area

For Cluster 2, the MSOAs selected within TEMPro were Solihull 022, 023, 027 and 029 which cover the study area. DLP Sites 4, 12 and 26 fall within Solihull 029 MSOA and Site 11 falls within Solihull 022 MSOA.

TEMPro assumes an increase of 377 households for the Solihull 029 MSOA between 2017 and 2026 and an increase of 832 households between 2017 and 2036. This is less than the number of dwellings assumed in the DLP for Sites 4, 12 and 26 for both 2026 and 2036.

For the Solihull 022 MSOA, TEMPro assumes an increase of 175 households between 2017 and 2026 and an increase of 375 households between 2017 and 2036. Again, this is less than is assumed in the DLP for Site 11.

Therefore, for both Solihull 029 and Solihull 022 MSOAs, the TEMPro assumptions have been changed so that the number of households remains the same as 2017 in both future years. This has resulted in the following growth factors for Cluster 2.

**Table 5.2: Cluster 2 TEMPro Growth Factors**

Year	AM	PM
2026	1.075 (+7.5%)	1.074 (+7.4%)
2036	1.133 (+13.3%)	1.133 (+13.3%)

Source: TEMPro (2020)

### 5.4 Summary

TEMPro has been used to derive growth factors from the 2017 base to the 2026 and 2036 assessment years to provide a forecast of future baseline traffic volumes without DLP growth. To avoid double counting the developments trips, the households within the TEMPro assumptions have been changed to negate DLP growth.

The factors for both Cluster 1 and Cluster 2 are shown below.

**Table 5.3: TEMPro Growth Factors**

Year	Cluster 1		Cluster 2	
	AM	PM	AM	PM
2026	1.066 (+6.6%)	1.065 (+6.5%)	1.075 (+7.5%)	1.074 (+7.4%)
2036	1.116 (+11.6%)	1.114 (+11.4%)	1.133 (+13.3%)	1.133 (+13.3%)

Source: TEMPro (2020)

The growth rates summarised in Table 5.3 have been applied to the baseline traffic survey data to provide future baseline traffic flows in the respective assessment years from which development impacts have been forecast.

## 6 Development Trip Generation

### 6.1 Introduction

Traffic generations have been derived based on the emerging masterplans for each site. The masterplans are illustrative in nature and may be subject to minor fluctuations in terms of development quanta. However, the quanta used to undertake this TIA is considered to present a robust estimate of development in the study areas within the Local Plan period.

Trip rates have been sourced from TRICS for residential land uses. A summary of the method used to derive the residential trip rates and the filtering selection from within TRICS for each cluster area are provided in the following sub-sections.

### 6.2 Cluster 1 Trip Rates

Trip rates have been derived from TRICS based on the following search and filtering criteria:

- Residential Developments
- Houses Privately Owned
- England (excluding Greater London)
- Development size: 60 – 1,000 dwellings
- Date range: 01/01/2011 – 24/09/2019
- Weekdays only
- Location types: Edge of town centre, suburban area and edge of town
- Population within one mile: 5,001 – 15,000
- Population within five miles: 75,001 – 250,000
- Car ownership: 1.1 – 2.0 cars per household

The resulting trip rates are summarised in Table 6.1.

**Table 6.1: Cluster 1 Residential Trip Rates (per dwelling)**

Area	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Arr	Dep	Tot	Arr	Dep	Tot
Traffic Impact Assessment Cluster 1	0.135	0.414	0.549	0.378	0.155	0.533

Source: TRICS (2020)

### 6.3 Cluster 2 Trip Rates

Trip rates have been derived from TRICS based on the following search and filtering criteria:

- Residential Developments
- Houses Privately Owned
- England (excluding Greater London)
- Development size: 60 – 1,000 dwellings
- Date range: 01/01/2011 – 24/09/2019
- Weekdays only
- Location types: Edge of town centre, suburban area and edge of town

- Population within one mile: 10,001 – 25,000
- Population within five miles: 75,001 – 250,000
- Car ownership: 1.1 – 2.0 cars per household

The resulting trip rates are summarised in Table 6.2.

**Table 6.2: Cluster 2 Residential Trip Rates (per dwelling)**

Area	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Arr	Dep	Tot	Arr	Dep	Tot
Traffic Impact Assessment Cluster 2	0.134	0.407	0.541	0.362	0.156	0.518

Source: TRICS (2020)

## 6.4 Cluster 1 Trip Generation

A summary of the preliminary development quanta at the Cluster 1 sites provided by SMBC is shown in Table 6.3.

**Table 6.3: Cluster 1 Development Quanta**

Site	Development by 2026	Development by 2036	Comments
8A	50 dwellings	150 dwellings	Sports facilities will generate off-peak traffic, not included in peak hour assessment.
8B	50 dwellings	150 dwelling	
9	200 dwellings	600 dwellings	Arden Academy to be retained. New primary school expected on site.

Source: SMBC

To calculate the trip generation, the number of dwellings for each site in 2026 and 2036 has been applied to the trip rates summarised in Table 6.1 that have been agreed previously with SMBC.

A summary of the total forecast traffic generation at Cluster 1 sites (based on maximum development in 2036) is shown in Table 6.4.

**Table 6.4: Cluster 1 Traffic Generation**

Site	Development	AM (08:00-09:00)		PM (17:00-18:00)	
		Arr	Dep	Arr	Dep
Site 8 (8A and 8B)	300 dwellings	41	124	113	47
Site 9	600 dwellings	81	248	227	93

Source: Mott MacDonald

## 6.5 Cluster 2 Trip Generation

A summary of the preliminary development quanta at the Cluster 2 sites provided by SMBC is shown in Table 6.5.

**Table 6.5: Cluster 2 Development Quanta**

Site	Development by 2026	Development by 2036	Comments
4A	100 dwellings	100 dwellings	
4B	0 dwellings	250 dwellings	
11	640 dwellings	640 dwellings	
12	250 dwellings	1,000 dwellings	
26	100 dwellings	450 dwellings	SMBC has specified that the proposal is for 300 dwellings. Development of up to 450 dwellings has been tested at request of SMBC.

Source: SMBC

To calculate the trip generation, the number of dwellings for each site in 2026 and 2036 has been applied to the trip rates summarised in Table 6.2 that have been agreed previously with SMBC.

A summary of the total forecast traffic generation at Cluster 2 sites (based on maximum development in 2036) is shown in Table 6.6

**Table 6.6: Cluster 2 Traffic Generation**

Site	Development	AM (08:00-09:00)		PM (17:00-18:00)	
		Arr	Dep	Arr	Dep
Site 4 (4A and 4B)	350 dwellings	47	142	127	55
Site 11	640 dwellings	86	260	232	100
Site 11 (Care home)	68 bedrooms	6	5	2	3
Site 12	1,000 dwellings	134	407	362	156
Site 26	450 dwellings	60	183	163	70

Source: Mott MacDonald

## 7 Trip Distribution and Assignment

### 7.1 Introduction

Traffic has been distributed between the sites and surrounding areas based on 2011 Census data extracted from the Office for National Statistics' Nomis website. Data for the '*location of usual residence and method of travel to work (by car only)*' category has been utilised for the Middle Super Output Areas (MSOAs) *Solihull 026 and 028* for the Cluster 1 sites and *Solihull 022, 023 and 027* for the Cluster 2 sites.

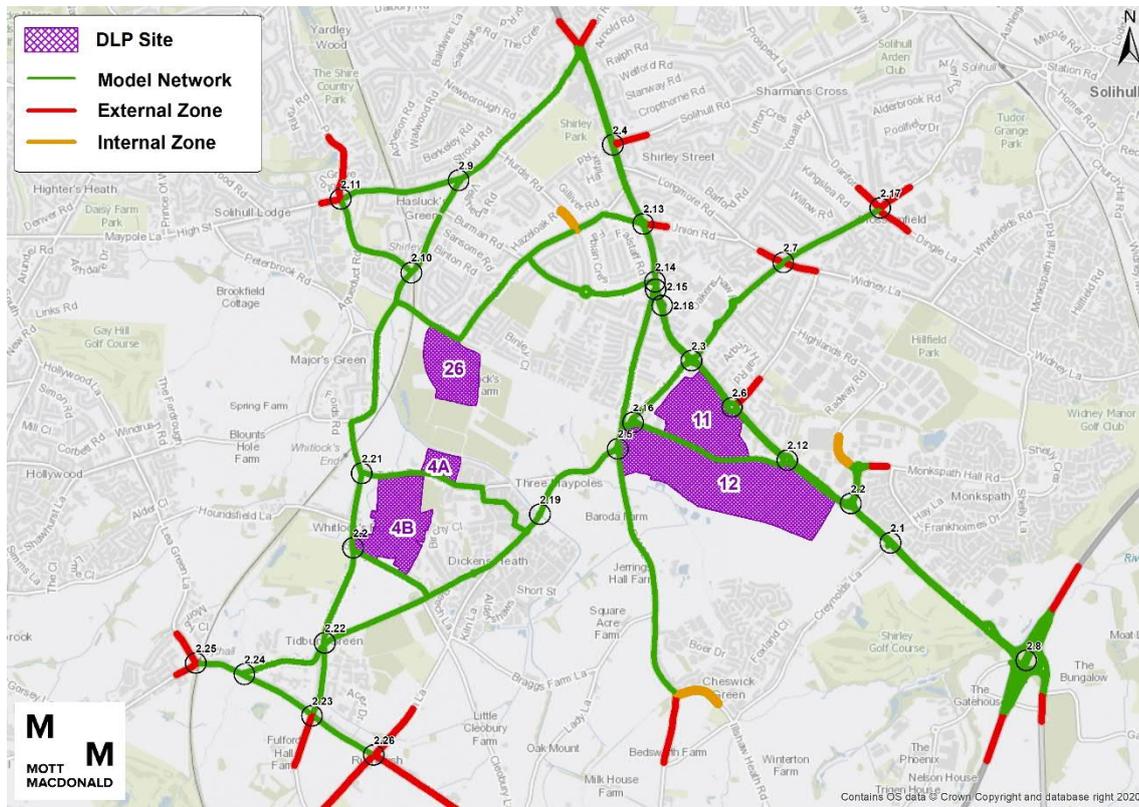
### 7.2 Network Cordons

A cordon was applied to the highway networks surrounding each cluster. The network cordons allowed cordon zones to be identified and the network to be zoned to allow traffic to be distributed to specific areas within the cordon or at the edge of the cordon.

The network and cordon zones generated for Cluster 1 are shown in Figure 7.1.



**Figure 7.2: Cluster 2 Network Extent**



Source: Mott MacDonald (Mapping from Ordnance Survey)

### 7.3 Census Data

The 2011 Census data was filtered and extracted to enable analysis to be undertaken to forecast future trip distribution. Table WU03EW - Location of usual residence and place of work by method of travel to work (MSOA level) was selected. Data was extracted from this dataset using the following filtering process:

- Method of Travel to Work – Driving a car or van
- Place of work
  - all MSOAs in Solihull
  - all districts (except for Solihull) in the West Midlands
- Usual residence – specific MSOAs in Solihull, as below
  - Cluster 1 – Solihull MSOAs 026 and 028
  - Cluster 2 – Solihull MSOAs 022, 023 and 207

This raw data was extracted separately for Cluster 1 and Cluster 2 and used to undertake analysis to forecast traffic distribution.

### 7.4 Cluster 1 Distribution

The raw data was filtered to remove any values that represented less than 1% of trips. Trips to surrounding districts outside of Solihull were summarised, and trips to MSOAs within Solihull were summarised. The distribution summary, following filtering of the data, of trips to districts outside of Solihull for Cluster 1 is shown in Table 7.1.

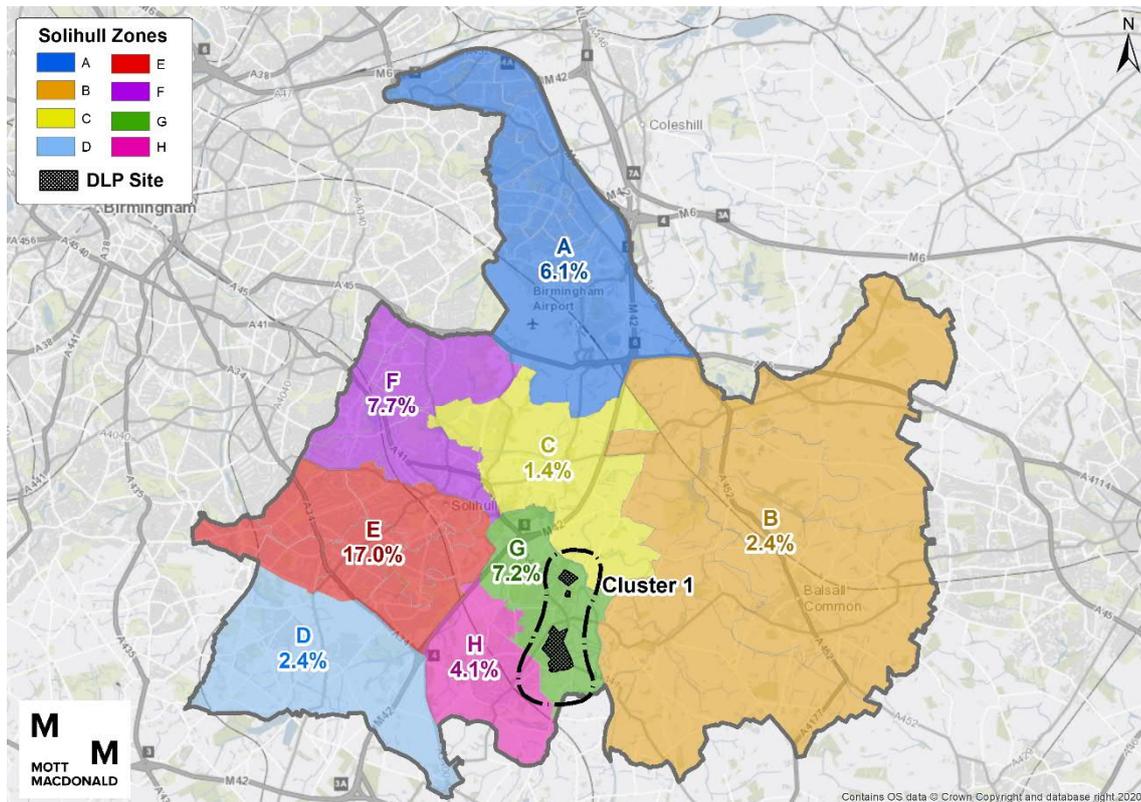
**Table 7.1: Cluster 1 Distribution Summary - District Level**

Districts	Percentage
Birmingham	26.8%
Bromsgrove	1.7%
Coventry	6.8%
North Warwickshire	1.7%
Redditch	2.0%
Sandwell	1.1%
Stratford-on-Avon	5.1%
Warwick	6.5%
Total trips to districts outside of Solihull	51.7%

Source: Mott MacDonald

Trips to MSOAs within Solihull were then analysed further and MSOAs were grouped to represent zones within Solihull where it was clear that traffic would be likely to route along a similar corridor (trips to Birmingham Airport/International Station were grouped with northern MSOAs due to consistent M42 route assignment). The distribution zones identified within Solihull are shown in Figure 7.3. The distribution summary of trips to the zones within Solihull are shown in Table 7.2 for Cluster 1.

**Figure 7.3: Cluster 1 Distribution Summary - MSOA Level**



Source: Mott MacDonald

**Table 7.2: Cluster 1 Distribution Summary - MSOA Level**

Solihull Zones	Solihull MSOAs	Percentage
A	001, 002, 003, 004, 005, 006, 007, 008, 009	6.1%
B	017, 025	2.4%
C	015	1.4%
D	029	2.4%
E	018, 019, 021, 022, 023, 024, 027, 030	17.0%
F	010, 011, 012, 013, 014, 016	7.7%
G	026	7.2%
H	028	4.1%
Total trips to all MSOAs within Solihull		48.3%

Source: Mott MacDonald

## 7.5 Cluster 2 Trip Distribution

The raw data was filtered to remove any values that represented less than 1% of trips. Trips to surrounding districts outside of Solihull were summarised, and trips to MSOAs within Solihull were summarised. The distribution summary, following filtering of the data, of trips to districts outside of Solihull for Cluster 2 is shown in Table 7.3.

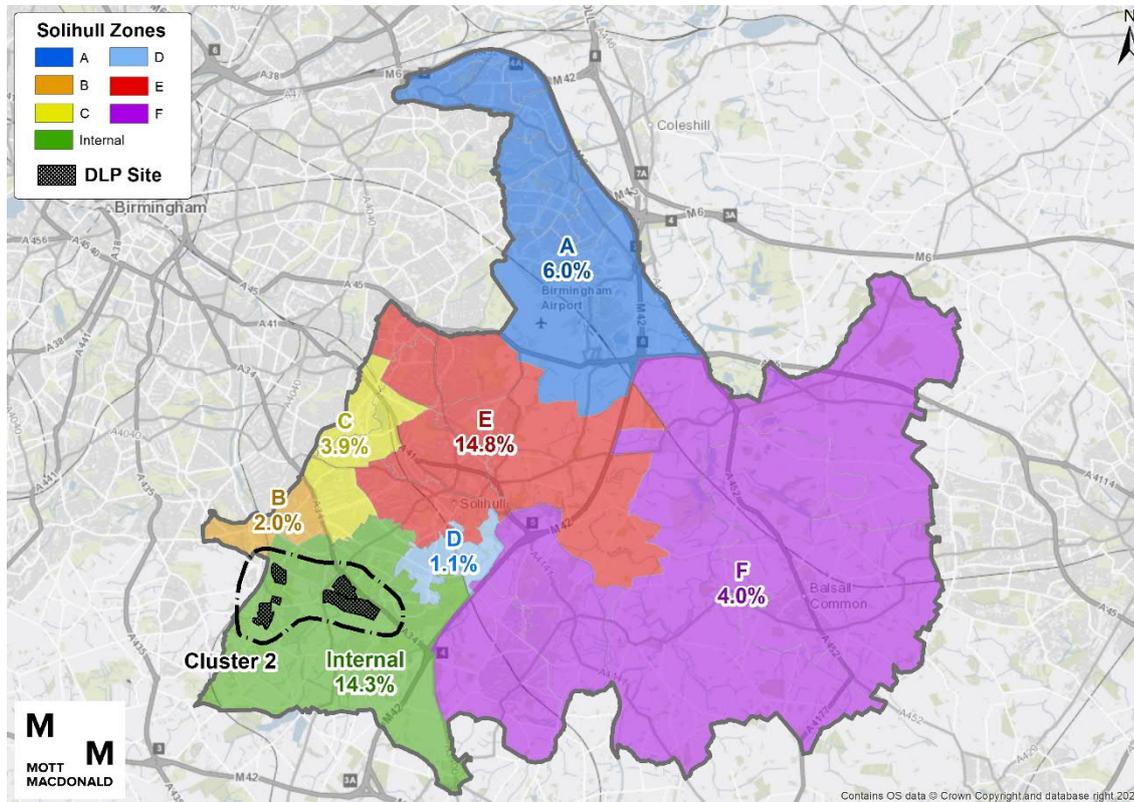
**Table 7.3: Cluster 2 Distribution Summary - District Level**

Districts	Percentage	
Birmingham	35.5%	
Bromsgrove	2.2%	
Coventry	4.2%	
North Warwickshire	1.8%	
Redditch	1.8%	
Sandwell	1.1%	
Stratford-on-Avon	3.6%	
Warwick	3.8%	
Total trips to districts outside of Solihull		53.9%

Source: Mott MacDonald

Trips to MSOAs within Solihull were then analysed further and MSOAs were grouped to represent zones within Solihull where it was clear that traffic would be likely to route along a similar corridor (trips to Birmingham Airport/International Station were grouped with northern MSOAs due to consistent M42 route assignment). The distribution zones identified within Solihull are shown in Figure 7.4. The distribution summary of trips to the zones within Solihull are shown in Table 7.4 for Cluster 2.

**Figure 7.4: Cluster 2 Distribution Summary - MSOA Level**



Source: Mott MacDonald

**Table 7.4: Cluster 2 Distribution Summary - MSOA Level**

Districts	Solihull MSOAs	Percentage
A	001, 002, 003, 004, 005, 006, 007, 008, 009,	6.0%
B	021, 030	2.0%
C	013, 014, 018	3.9%
D	024	1.1%
E	010, 011, 012, 015, 016, 019	14.8%
F	017, 025, 026, 028	4.0%
Internal	022, 023, 027, 029	14.3%
Total trips to all MSOAs within Solihull		46.1%

Source: Mott MacDonald

## 7.6 Assignment

Traffic was assigned to the network for each site within Clusters 1 and 2 individually. This involved identifying the locations of the access points for each site and undertaking a review of anticipated journey times utilising resources such as Google Maps journey planner and similar. The analysis was undertaken for trips being made in the peak hours to make route choice as realistic as possible during the busiest periods.

Trips to specific districts outside of Solihull and zones (groups of MSOAs) within Solihull were then assigned to the network based on the fastest journey route to a specific cordon. Where

some destinations could be reached along two or more route options with similar journey times, the trips have been assigned across the multiple cordon locations.

This approach enabled the distribution and assignment processes to be separated and for traffic to be assigned to routes on the highway network specifically based on the site access location and destination location for each individual site rather than per cluster.

## 8 Traffic Impact Assessment Methodology

### 8.1 Introduction

The TIA provides a high-level indication of the expected traffic impacts of the DLP site allocations on the local highway networks in the vicinity of Clusters 1 and 2.

In order to determine where developments are expected to result in impacts that will need to be assessed further, a standardised approach has been developed to appraise network operation under various development scenarios.

Data has been gathered from various sources, including network operation (congestion) data from TrafficMaster, traffic survey data and calculations of link flow capacities. SMBC has also undertaken public consultation, this also identified a range of junctions where members of the public identified issues and / or concerns relating to operation and congestion. This data and information have been used to identify junctions where congestion is, or possibly will become an issue and to develop concept stage mitigation proposals where feasible.

### 8.2 Existing Traffic Conditions

#### 8.2.1 Introduction

The first step of the methodology involves determining the current areas of congesting to highlight areas of potential concern for the DLP. This Section illustrates the existing road network conditions surrounding the development sites based on TrafficMaster Data, on-site observations and public consultations.

For each of the junctions in this study, current levels of congestion and concerns raised on site visits or in public consultation have been noted and will assist with determining the need for mitigation.

#### 8.2.2 Congestion Data

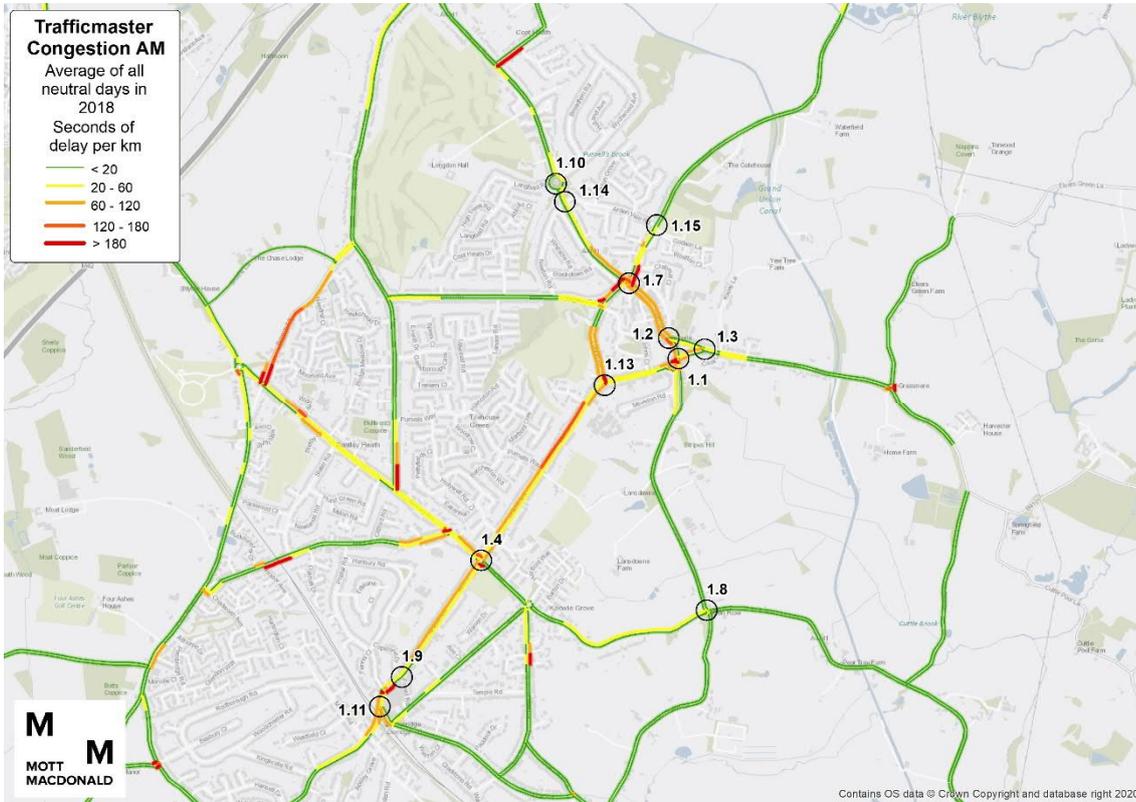
##### 8.2.2.1 Introduction

The existing average congestion experienced on the local highway networks surrounding Clusters 1 and 2 in the AM and PM peak periods is shown in Figure 8.1 to Figure 8.4. The visuals show the delay per km on each link for a neutral weekday in 2018 from 08:00 to 09:00 for the AM peak hour and from 17:00 to 18:00 for the PM peak hour.

##### 8.2.2.2 Cluster 1 – Dorridge / Knowle / Bentley Heath Area

The TrafficMaster congestion summary in the Cluster 1 study area in the AM peak hour, taken as an average across all neutral days in 2018, is shown in Figure 8.1.

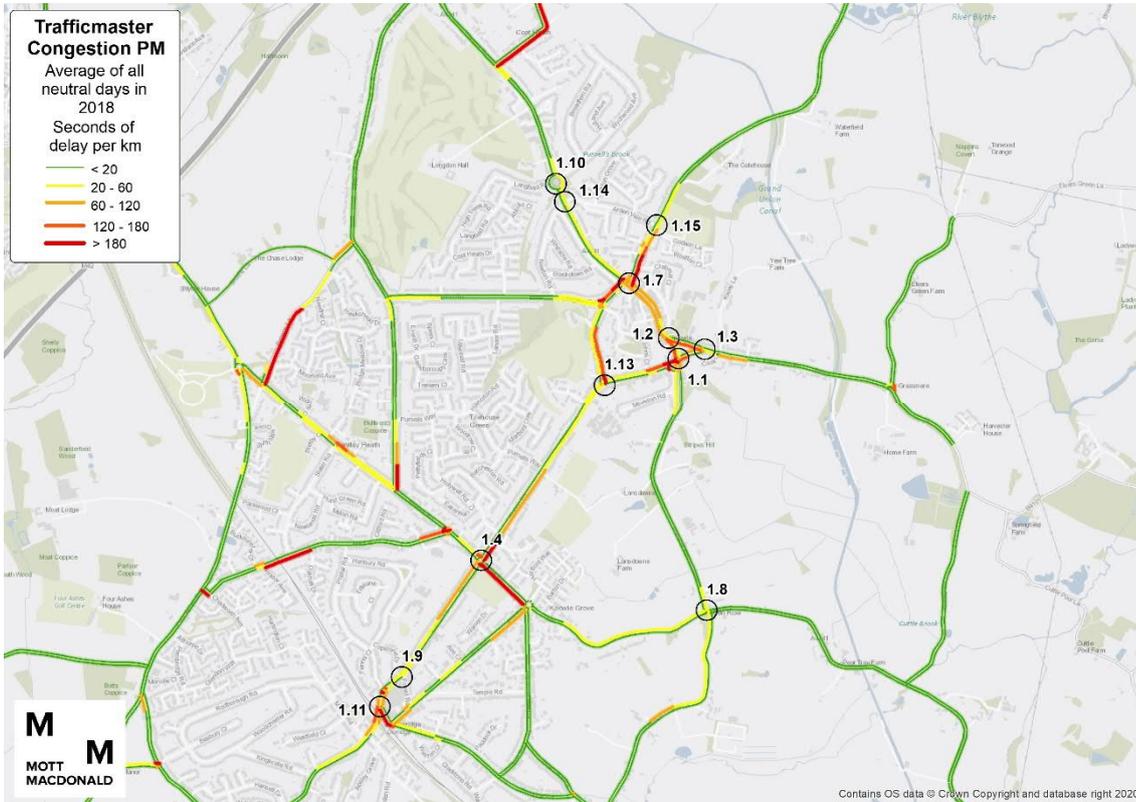
Figure 8.1: Cluster 1 – Weekday AM Peak Congestion Data



Source: TfWM

The TrafficMaster congestion summary in the Cluster 1 study area in the PM peak hour, taken as an average across all neutral days in 2018, is shown in Figure 8.2.

**Figure 8.2: Cluster 1 – Weekday PM Peak Congestion Data**

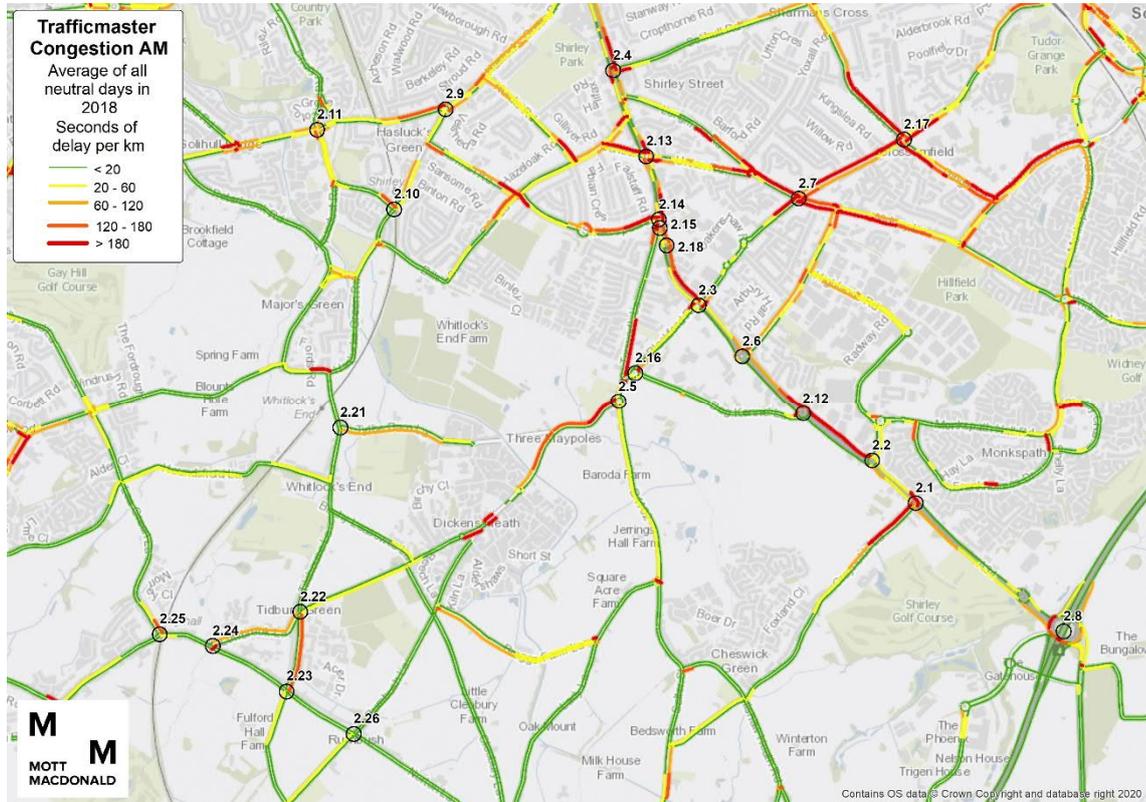


Source: TfWM

### 8.2.2.3 Cluster 2 – Shirley / Dickens Heath Area

The TrafficMaster congestion summary in the Cluster 2 study area in the AM peak hour, taken as an average across all neutral days in 2018, is shown in Figure 8.3.

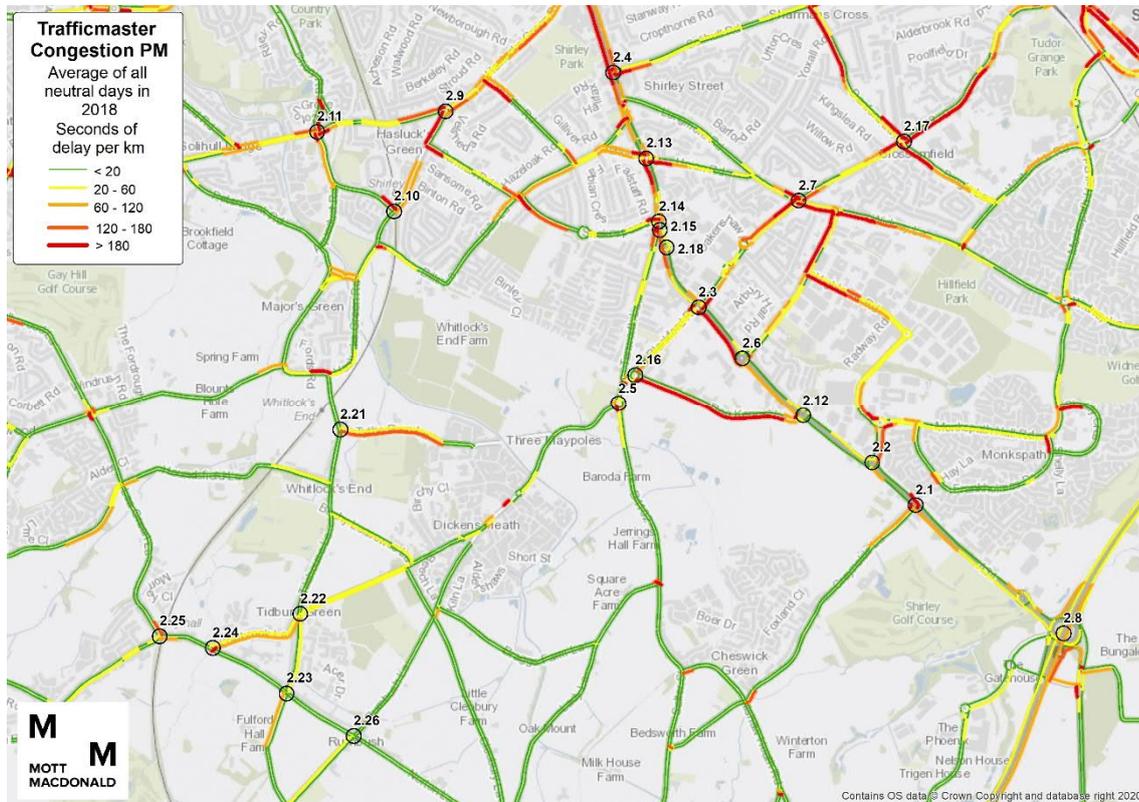
Figure 8.3: Cluster 2 – Weekday AM Peak Congestion Data



Source: TfWM

The TrafficMaster congestion summary in the Cluster 2 study area in the PM peak hour, taken as an average across all neutral days in 2018, is shown in Figure 8.4.

**Figure 8.4: Cluster 2 – Weekday PM Peak Congestion Data**



Source: TfWM

### 8.2.3 On Site Observations

A series of on-site observations were undertaken on the same day as the traffic surveys that were carried out in October 2017. Further observations were not undertaken due to the impact of the ongoing Covid-19 lockdown situation.

The site observation findings were broadly the same as the TrafficMaster visuals. The main observations are as follows:

- Vehicle speeds in Knowle were generally lower through the High Street and some delays were noticeable at the A4141 junctions with Station Road, Wilson Road and Kenilworth Road. These patterns occurred during both the AM and PM peak hours;
- In the Cluster 2 area during the AM peak hour, the noticeable delay was to the southbound traffic on the A34 heading towards the M42 junction. This was particularly noticeable on the approach to the Monkspath Hall Road junction, but slow-moving traffic was observed along the majority of the southbound route;
- In the Cluster 2 area during the PM peak hour, the noticeable delay was to the northbound traffic on the A34 north-west of the Dog Kennel Lane junction. Vehicle speeds were particularly slow on the northbound approach to the Stratford Road / Blackford Road roundabout; however, it was clear that some of the delay was due to queue blocking back into the roundabout from upstream junctions.

## 8.2.4 Public Consultation Comments

### 8.2.4.1 Cluster 1

SMBC provided a summary table setting out junctions that had been raised as concerns specific to delivery of the various site allocations. A summary of the junctions where concerns were raised by the public in relation to Site 8 and Site 9 (Options 1 and 2) is provided in Table 8.1. The junctions experiencing observed delay in the TrafficMaster data (as discussed in Section 8.2.2.2) have also been included for reference.

**Table 8.1: Cluster 1 Public Consultation Concerns and Observed Delay**

Ref	Junction	Site 8	Site 9 (Options 1 and 2)	Observed Delay
1.1	High Street / Wilsons Road / Warwick Road / Station Road	Y	Y	Y
1.2	High Street / Kenilworth Road / Warwick Road	Y	Y	Y
1.3	Kenilworth Road / Wilsons Road	Y	Y	N
1.4	Grove Road / Station Road / Widney Road	N	Y	Y
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	Y	Y	Y
1.8	Warwick Road / Grove Road / Norton Green Lane	N	Y	N
1.9	Station Road / Forest Road	N	Y	N
1.10	Warwick Road / Wychwood Avenue / Langfield Road	N	Y	N
1.11	Station Road / Station Approach	N	Y	Y
1.12	Stratford Road / Aylesbury Road	N	N	N/A
1.13	Lodge Road / Station Road	N	Y	Y
1.14	Arden Vale Road / A4141	Y	Y	N
1.15	Arden Vale Road / Hampton Road	Y	Y	N

Source: SMBC

Table 8.1 shows that Site 8 is not anticipated to result in the same degree of impacts as Site 9 by members of the public engaged with through consultation. This would be expected given the lower quanta of development of Site 8 compared to Site 9, and the location of Site 8 being on the periphery of Knowle with direct access east and northbound journeys only having limited impacts in Knowle.

Site 9 is anticipated to result in wider impacts by members of the public, with concerns raised at all but one junction. This is also expected given the relatively central location of the site, with the site intended to be accessed primarily from Warwick Road.

### 8.2.4.2 Cluster 2

SMBC provided a summary table setting out junctions that had been raised as concerns specific to delivery of the various site allocations. A summary of the junctions where concerns were raised by the public in relation to Site 4, 11, 12 and 26 in Cluster 2 is provided in Table 8.2. The

junctions experiencing observed delay in the TrafficMaster data (as discussed in Section 8.2.2.3) have also been included for reference.

**Table 8.2: Cluster 2 Public Consultation Concerns and Observed Delay**

Ref	Junction	Site 4	Site 11	Site 12	Site 26	Observed Delay
2.1	Stratford Road / Creynolds Lane	N	Y	Y	N	Y
2.2	Stratford Road / Monkspath Hall Road	N	Y	Y	N	Y
2.3	Stratford Road / Blackford Road / Marshall Lake Road	N	Y	Y	N	Y
2.4	Stratford Road / Solihull Road	N	Y	Y	N	Y
2.5	Dickens Heath Road / Tanworth Lane	Y	Y	Y	N	Y
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	N	Y	Y	N	Y
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	N	N	N	N	Y
2.8	M42 / Stratford Road / Blythe Gate	N	Y	Y	N	N
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	N	N	N	N	Y
2.10	Haslucks Green Road / Green Lane	Y	N	N	Y	Y
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	N	N	N	N	Y
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	N	Y	Y	N	Y
2.13	Stratford Road / Union Road / School Road	N	Y	Y	N	Y
2.14	Stratford Road / Shakespeare Drive	N	Y	Y	N	Y
2.15	Stratford Road / Tanworth Lane	N	Y	Y	N	Y
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	N	Y	Y	N	Y
2.17	Blossomfield Road / Dingle Lane / Danford Lane	N	N	N	N	Y
2.18	Stratford Road / Sainsburys	N	Y	Y	N	N
2.21	Tilehouse Lane / Tythe Barn Lane	Y	N	N	Y	Y
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	N	N	N	N	N
2.23	Norton Lane / Fulford Hall Road	N	N	N	N	N
2.24	Lowbrook Lane / Norton Lane	N	N	N	N	N
2.25	Lea Green Lane / Station Road / Norton Lane	N	N	N	N	N
2.26	Norton Road / Rumbush Lane	N	N	N	N	N
X.1	Tilehouse Lane / Birchy Leasowes Lane	Y	N	N	N	
X.2	Haslucks Green Road / Bills Lane	N	N	N	Y	
X.3	Dickens Heath Road / Birchy Leasowes Lane	N	N	N	N	
X.4	Dickens Heath Road / Tythe Barn Lane	N	N	N	N	
X.5	A34 Stratford Road / Tesco	N	N	N	N	
X.6	Stratford Road / Olton Road	N	N	N	N	

Source: SMBC

Table 8.2 shows that the majority of concerns are raised in relation to junctions along the A34 Stratford Road corridor, and are in relation to Sites 11 and 12. Where concerns have been raised in relation to Sites 4 and 26, the primarily relate to local junctions along the Tilehouse

Lane and Haslucks Green Lane corridor, alongside concerns about cross boundary impacts north and south of Solihull in neighbouring Birmingham, Warwickshire and Worcestershire.

### 8.2.5 Summary

The TrafficMaster data has been reviewed to determine delay at junctions within each study area. Where junctions are identified as experiencing queuing (marked by red) in either the AM or PM peak hours, this has been noted.

Upon a more detailed reviewed to determine possible mitigation requirements, this has been judged alongside other information. This includes considering the arm on which congestion is shown against the arms where development traffic is forecast to have the greatest impact and / or where background traffic is heaviest.

## 8.3 Assessment Scenarios

Traffic flows have been forecast for various future scenarios across the network, with adjusted background traffic growth applied to develop future baseline link flows on each arm at each junction in the study areas (without development). Development traffic has been generated based on the agreed trip rates and has been assigned to the network to determine link impacts of the DLP sites individually and cumulatively. The scenarios forecast and tested are as follows:

- 2017 base flows
- 2026 base flows
- 2026 base plus individual sites
- 2026 base plus Cluster 1 sites
- 2026 base plus Cluster 2 sites
- 2036 base flows
- 2036 base plus individual sites
- 2036 base plus Cluster 1 sites
- 2036 base plus Cluster 2 sites

## 8.4 Link Capacity

Link capacities at each of the junctions have been calculated for each of the scenarios described in Section 8.3.

The methodology adopted to determine link flow capacity has been developed based on the approach described in DMRB TA 79/99. Comparative analysis has been undertaken between the scenarios to develop a high-level forecast of the impacts of each site, and the cumulative impact of each cluster, in terms of link capacity.

Link capacities on all links has been estimated using the standard methodology described in DMRB TA 79/99. The baseline link capacities have been extracted from DMRB 79/99 based on a high-level appraisal of the links, considering road features to determine the most appropriate road type. The link flow capacity will range along different sections of the same link and will fluctuate depending on the frequency of junctions, frontage accesses and other local characteristics. The capacities apply to links and take no account of the effects of junctions.

The estimated degree of saturation for each link has been derived by calculating the volume of traffic within each scenario as a proportion of its estimated capacity. This assessment provides an indicative representation of the links that could potentially experience additional congestion

under the various scenarios. The estimated link capacities and the resultant degrees of saturation are summarised in Appendix B. Links forecast to be operating below 75% capacity have been marked in green, links forecast to operate between 75% and 90% have been marked in amber, and links forecast to operate above 90% have been marked in red.

## 8.5 Junction Impact

The percentage impact of traffic caused by the DLP has been calculated for each of the junctions in this study to determine the impact of the DLP. This has been done for each development site individually and collectively for each cluster in 2026 and 2036. The results are shown in Appendix C.

Generally, a 5% impact is considered to constitute an impact large enough to warrant further review and so mitigation schemes have been considered for junctions where development traffic would generate an increase in traffic of 5% or more, where considered feasible.

## 8.6 Mitigation Cost Estimates

High-level cost estimates have been developed for junctions where concept mitigation scheme have been identified in this TIA.

The cost estimates are preliminary and have not been undertaken based on any detailed information or preliminary design drawings. The costs are therefore subject to review following further feasibility studies, preliminary design, topographic surveys, stats surveys and associated assessment work.

The costings have been based on high level concept descriptions on what improvements could be made to improve junction capacity. The costings are high level only and will require refinement as the process continues as more detailed technical work is undertaken. Exclusions from the costings are as follows:

- Optimum bias, inflation beyond the base date
- VAT, taxes, levies, fees or licences
- 3<sup>rd</sup> party compensation costs
- Planning and approval charges
- Land purchase or rental and utility diversions, relocation and protection
- Allowances for unforeseen ground conditions / provisions for ground stabilisation
- Environmental mitigation works, archaeological digs, disposal of contaminated material
- Demolition of existing buildings
- Operational, maintenance and renewal costs

## 8.7 Methodology Summary

A proportionate approach has been applied to determining the high-level development impacts at junctions and on links. This has involved an iterative process of reviewing junctions against TrafficMaster congestion data, concerns raised through public consultation, link capacity, and link flow impacts. This approach has been applied and used to determine where junctions may experience significant impacts and therefore where highway mitigation solutions should be reviewed in further detail in future studies.

## 9 Cluster 1 Traffic Impact Assessment

### 9.1 Introduction

The local highway network in Cluster 1 has been assessed to a high-level based on the methodology that is set out in Section 8. The Traffic Impact Assessment has been considered against the TrafficMaster congestion data, issues raised in public consultation relating to specific junctions and sites, the link impact analysis undertaken by Mott MacDonald and the link capacity assessments prepared by Mott MacDonald. The data and information that has been considered to identify impacts that may warrant further study or possible future mitigation in the Cluster 1 study area is set out in this Section.

### 9.2 Traffic Impact

The individual and cumulative impacts of the developments have been assessed to determine which junctions require mitigation.

As set out in Section 8, the percentage impact of development traffic on the worst-case link at each junction in the study area has been determined for each assessment scenario compared to the corresponding baseline flows (with growth, without development). The full calculations and outputs, showing the worst-case impact in both the AM and PM peak hours for each site can be seen in Appendix B.

Additionally, the link capacity on all links at junctions identified in the study area have been assessed with each site individually and cumulatively. In this section the baseline link capacities in the 2017, 2026 and 2036 scenarios are shown alongside the link capacities following the addition of development traffic associated with each of the sites and cumulatively in 2026 and 2036. The full calculations and outputs, showing the worst-case impact in both the AM and PM peak hours for each site can be seen in Appendix C.

In order to consider the likely magnitude of impacts and therefore where mitigation may be required to provide additional capacity or relieve congestion that may otherwise be exacerbated by development, the analysis in terms of link flow impacts and link capacity impacts has been considered jointly with the public consultation and congestion information. This has enabled a balanced view to be developed, considering observed congestion, public opinion and high-level forecasting, to determine where the sites could individually or cumulatively result in impacts that may require further assessment and possible future mitigation.

Alongside this TIA, a separate parallel study has been undertaken in the Knowle Transport Study. The following junctions have been assessed as part of the Knowle Transport Study, and therefore, will be included in the final mitigation strategy presented in that report:

- Junction 1.1: High Street / B4101 Wilsons Road / A4141 Warwick Road / Station Road
- Junction 1.2: High Street / Kenilworth Road / A4141 Warwick Road
- Junction 1.7: High Street / Hampton Road / Warwick Road / Lodge Road
- Junction 1.8: Warwick Road / Grove Road / Norton Green Lane
- Junction 1.15: Arden Vale Road / Hampton Road

Table 9.1 to Table 9.5 provide a summary for each site and the cluster as a whole. The junctions where mitigation is required have their ID and junction name highlighted in red.

### 9.2.1 Site 8 – Hampton Road

A summary of predicted impact of Site 8 along with the current congestion and consultation is shown in Table 9.1.

**Table 9.1: Site 8 (Hampton Road) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Site 8		Junction Impact		Observed Congestion	Concerns Raised by Public	In Knowle Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
1.1	High Street / Wilsons Road / Warwick Road / Station Road	55%	59%	62%	59%	62%	0.3%	1.0%	Y	Y	Y	N
1.2	High Street / Kenilworth Road / Warwick Road	69%	74%	77%	74%	79%	0.5%	1.2%	Y	Y	Y	N
1.3	Kenilworth Road / Wilsons Road	40%	42%	46%	42%	46%	0.1%	0.2%	N	Y	-	N
1.4	Grove Road / Station Road / Widney Road	57%	61%	64%	61%	64%	0.2%	0.5%	Y	-	-	N
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	88%	94%	98%	94%	100%	0.6%	1.8%	Y	Y	Y	Y
1.8	Warwick Road / Grove Road / Norton Green Lane	44%	47%	49%	47%	49%	0.5%	1.3%	N	-	Y	N
1.9	Station Road / Forest Road	49%	52%	54%	52%	55%	0.2%	0.5%	N	-	-	N
1.10	Warwick Road / Wychwood Avenue / Langfield Road	62%	66%	69%	66%	71%	2.2%	6.3%	N	-	-	Y
1.11	Station Road / Station Approach	66%	70%	73%	70%	74%	0.1%	0.4%	Y	-	-	N
1.12	Stratford Road / Aylesbury Road	76%	81%	85%	81%	85%	0.0%	0.1%	N/A	-	-	N
1.13	Lodge Road / Station Road	77%	82%	85%	82%	86%	0.2%	0.7%	Y	-	-	N
1.14	Arden Vale Road / A4141	62%	66%	69%	66%	71%	2.2%	6.3%	N	Y	-	Y
1.15	Arden Vale Road / Hampton Road	31%	33%	34%	34%	38%	7.2%	20.5%	N	Y	Y	Y

The results summarised in Table 9.1 show that four junctions have been identified for mitigation as a result of impacts related to Site 8, of which two are being considered in the Knowle Transport Study.

### 9.2.2 Site 9 Option 1 - Arden Triangle

A summary of predicted impact of Site 9 Option 1 along with the current congestion and consultation is shown in Table 9.2.

**Table 9.2: Site 9 Option 1 (Arden Triangle) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Site 9 (Option 1)		Junction Impact		Observed Congestion	Concerns Raised by Public	In Knowle Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
1.1	High Street / Wilsons Road / Warwick Road / Station Road	55%	59%	62%	64%	78%	6.5%	18.7%	Y	Y	Y	Y
1.2	High Street / Kenilworth Road / Warwick Road	69%	74%	77%	76%	90%	5.8%	15.8%	Y	Y	Y	Y
1.3	Kenilworth Road / Wilsons Road	40%	42%	46%	42%	46%	0.3%	0.8%	N	Y	-	N
1.4	Grove Road / Station Road / Widney Road	57%	61%	64%	61%	65%	1.4%	4.0%	Y	Y	-	Y
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	88%	94%	98%	95%	103%	3.1%	8.7%	Y	Y	Y	Y
1.8	Warwick Road / Grove Road / Norton Green Lane	44%	47%	49%	47%	51%	2.3%	6.6%	N	Y	Y	Y
1.9	Station Road / Forest Road	49%	52%	54%	52%	55%	0.3%	0.7%	N	Y	-	N
1.10	Warwick Road / Wychwood Avenue / Langfield Road	62%	66%	69%	67%	73%	3.6%	10.3%	N	Y	-	Y
1.11	Station Road / Station Approach	66%	70%	73%	70%	74%	0.2%	0.5%	Y	Y	-	N
1.12	Stratford Road / Aylesbury Road	76%	81%	85%	81%	85%	0.0%	0.0%	N/A	-	-	N
1.13	Lodge Road / Station Road	77%	82%	85%	82%	87%	1.6%	4.6%	Y	Y	-	N
1.14	Arden Vale Road / A4141	62%	66%	69%	67%	73%	3.6%	10.3%	N	Y	-	Y
1.15	Arden Vale Road / Hampton Road	31%	33%	34%	33%	36%	1.3%	3.7%	N	-	Y	Y

The results summarised in Table 9.2 show that eight junctions have been identified for mitigation as a result of Site 9 Option 1, of which five are being considered in the Knowle Transport Study.

### 9.2.3 Site 9 Option 2 - Arden Triangle

A summary of predicted impact of Site 9 Option 2 along with the current congestion and consultation is shown in Table 9.3.

**Table 9.3: Site 9 Option 2 (Arden Triangle) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Site 9 (Option 2)		Junction Impact		Observed Congestion	Concerns Raised by Public	In Knowle Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
1.1	High Street / Wilsons Road / Warwick Road / Station Road	55%	59%	62%	62%	72%	4.2%	12.0%	Y	Y	Y	Y
1.2	High Street / Kenilworth Road / Warwick Road	69%	74%	77%	75%	84%	3.6%	9.9%	Y	Y	Y	Y
1.3	Kenilworth Road / Wilsons Road	40%	42%	46%	42%	46%	0.3%	0.9%	N	Y	-	N
1.4	Grove Road / Station Road / Widney Road	57%	61%	64%	61%	65%	1.5%	4.3%	Y	Y	-	Y
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	88%	94%	98%	95%	101%	3.2%	9.2%	Y	Y	Y	Y
1.8	Warwick Road / Grove Road / Norton Green Lane	44%	47%	49%	47%	51%	2.3%	6.5%	N	Y	Y	Y
1.9	Station Road / Forest Road	49%	52%	54%	52%	55%	0.3%	0.7%	N	Y	-	N
1.10	Warwick Road / Wychwood Avenue / Langfield Road	62%	66%	69%	67%	73%	3.6%	10.5%	N	Y	-	Y
1.11	Station Road / Station Approach	66%	70%	73%	70%	74%	0.2%	0.5%	Y	Y	-	N
1.12	Stratford Road / Aylesbury Road	76%	81%	85%	81%	85%	0.0%	0.0%	N/A	-	-	N
1.13	Lodge Road / Station Road	77%	82%	85%	84%	92%	3.7%	10.7%	Y	Y	-	Y
1.14	Arden Vale Road / A4141	62%	66%	69%	67%	73%	3.6%	10.4%	N	Y	-	Y
1.15	Arden Vale Road / Hampton Road	31%	33%	34%	33%	36%	1.3%	3.7%	N	-	Y	Y

The results summarised in Table 9.3 show that nine junctions have been identified for mitigation as a result of Site 9 Option 2, of which five are being considered in the Knowle Transport Study.

### 9.2.4 Cluster 1 Option 1 – Site 8 and Site 9 Option 1

A summary of predicted impact of Cluster 1 (with Option 1 for Site 9) along with the current congestion and consultation is shown in Table 9.4.

**Table 9.4: Cumulative Cluster 1 Option 1 Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity Site 8 + Site 9 (Option 1)		Junction Impact		Observed Congestion	Concerns Raised by Public	In Knowledge Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
1.1	High Street / Wilsons Road / Warwick Road / Station Road	55%	59%	62%	56%	60%	6.9%	19.7%	Y	Y	Y	Y
1.2	High Street / Kenilworth Road / Warwick Road	69%	74%	77%	76%	91%	6.2%	17.9%	Y	Y	Y	Y
1.3	Kenilworth Road / Wilsons Road	40%	42%	46%	42%	46%	0.4%	1.0%	N	Y	-	N
1.4	Grove Road / Station Road / Widney Road	57%	61%	64%	61%	65%	1.6%	4.4%	Y	Y	-	Y
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	88%	94%	98%	96%	106%	3.6%	10.4%	Y	Y	Y	Y
1.8	Warwick Road / Grove Road / Norton Green Lane	44%	47%	49%	47%	51%	2.8%	7.9%	N	Y	Y	Y
1.9	Station Road / Forest Road	49%	52%	54%	52%	55%	0.4%	1.3%	N	Y	-	N
1.10	Warwick Road / Wychwood Avenue / Langfield Road	62%	66%	69%	68%	77%	5.8%	16.6%	N	Y	-	Y
1.11	Station Road / Station Approach	66%	70%	73%	70%	74%	0.3%	0.9%	Y	Y	-	N
1.12	Stratford Road / Aylesbury Road	76%	81%	85%	81%	85%	0.0%	0.1%	N/A	-	-	N
1.13	Lodge Road / Station Road	77%	82%	85%	82%	87%	1.8%	5.2%	Y	Y	-	Y
1.14	Arden Vale Road / A4141	62%	66%	69%	82%	87%	5.8%	16.5%	N	Y	-	Y
1.15	Arden Vale Road / Hampton Road	31%	33%	34%	34%	39%	8.4%	24.2%	N	Y	Y	Y

The results summarised in Table 9.4 show that nine junctions have been identified for mitigation as a result of Cluster 1 Option 1, of which five are being considered in the Knowle Transport Study. The reasons for the sites being chosen for mitigation are as follows:

- Junction 1.1 (High Street / Wilsons Road / Warwick Road / Station Road) has a significant junction impact in both 2026 and 2036, with a 19.7% impact in 2036. It also has observed congestion and has been raised as a concern in public consultation. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.2 (High Street / Kenilworth Road / Warwick Road) has a significant junction impact in both 2026 and 2036 and is forecast to have an arm with link capacity at 90% in 2036. It also has observed congestion and has been raised as a concern in public consultation. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.4 (Grove Road / Station Road / Widney Road) has observed congestion and has been highlighted in public consultation, along with a 4.4% junction impact.
- Junction 1.7 (High Street / Hampton Road / Warwick Road / Lodge Road) is forecast to be over operational capacity in the baseline with the DLP developments then having a significant junction impact. Additionally, there is already observed congestion and it was raised as a concern in the public consultation. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.8 (Warwick Road / Grove Road / Norton Green Lane) has been identified in public consultation and it is forecast to have a 7.9% junction impact in 2036. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.10 (Warwick Road / Wychwood Avenue / Langfield Road) has a significant development flow impact (16.6%) in 2036 and has been highlighted in public consultation.
- Junction 1.13 (Lodge Road / Station Road) is forecast to get close to capacity in 2036 with the DLP developments and has a 5.2% junction impact. The junction also currently has observed delay and has been raised as a concern in the public consultation.
- Junction 1.14 (Arden Vale Road / A4141) also has a significant development flow impact (16.5%) in 2036 and has been highlighted in public consultation.
- Junction 1.15 (Arden Vale Road / Hampton Road) has a high development impact in both 2026 and 2036, with there being a 24.2% impact in 2036. This junction is being reviewed as part of the Knowle Transport Study.

### 9.2.5 Cluster 1 Option 2 – Site 8 and Site 9 Option 2

A summary of predicted impact of Cluster 1 (with Option 2 for Site 9) along with the current congestion and consultation is shown in Table 9.5.

**Table 9.5: Cumulative Cluster 1 Option 2 Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity Site 8 + Site 9 (Option 2)		Junction Impact		Observed Congestion	Concerns Raised by Public	In Knowledge Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
1.1	High Street / Wilsons Road / Warwick Road / Station Road	55%	59%	62%	63%	72%	4.5%	13.0%	Y	Yes	Yes	Y
1.2	High Street / Kenilworth Road / Warwick Road	69%	74%	77%	75%	85%	4.1%	11.7%	Y	Yes	Yes	Y
1.3	Kenilworth Road / Wilsons Road	40%	42%	46%	42%	46%	0.4%	1.1%	N	Yes	-	N
1.4	Grove Road / Station Road / Widney Road	57%	61%	64%	61%	65%	1.7%	4.8%	Y	Yes	-	Y
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	88%	94%	98%	95%	103%	3.8%	11.0%	Y	Yes	Yes	Y
1.8	Warwick Road / Grove Road / Norton Green Lane	44%	47%	49%	47%	51%	2.7%	7.8%	N	Yes	Yes	Y
1.9	Station Road / Forest Road	49%	52%	54%	52%	55%	0.4%	1.3%	N	Yes	-	N
1.10	Warwick Road / Wychwood Avenue / Langfield Road	62%	66%	69%	68%	77%	5.8%	16.8%	N	Yes	-	Y
1.11	Station Road / Station Approach	66%	70%	73%	70%	74%	0.3%	0.9%	Y	Yes	-	N
1.12	Stratford Road / Aylesbury Road	76%	81%	85%	81%	85%	0.0%	0.1%	N/A	-	-	N
1.13	Lodge Road / Station Road	77%	82%	85%	84%	93%	4.0%	11.3%	Y	Yes	-	Y
1.14	Arden Vale Road / A4141	62%	66%	69%	68%	75%	5.8%	16.7%	N	Yes	-	Y
1.15	Arden Vale Road / Hampton Road	31%	33%	34%	34%	39%	8.4%	24.2%	N	Yes	Yes	Y

The results summarised in Table 9.5 show that nine junctions have been identified for mitigation as a result of Cluster 1 Option 2, of which five are being considered in the Knowle Transport Study.

The reasons for the sites being chosen for mitigation are as follows:

- Junction 1.1 (High Street / Wilsons Road / Warwick Road / Station Road) has a significant junction impact in both 2026 and 2036, with a 13.0% impact in 2036. It also has observed congestion and has been raised as a concern in public consultation. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.2 (High Street / Kenilworth Road / Warwick Road) has a significant junction impact in both 2026 and 2036, with a 11.7% impact in 2036. It also has observed congestion and has been raised as a concern in public consultation. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.4 (Grove Road / Station Road / Widney Road) has observed congestion and has been highlighted in public consultation, along with a 4.8% junction impact.
- Junction 1.7 (High Street / Hampton Road / Warwick Road / Lodge Road) is forecast to be over operational capacity in the baseline with the DLP developments then having a significant junction impact. Additionally, there is already observed congestion and it was raised as a concern in the public consultation. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.8 (Warwick Road / Grove Road / Norton Green Lane) has been identified in public consultation and it is forecast to have a 7.8% junction impact in 2036. This junction is being reviewed as part of the Knowle Transport Study.
- Junction 1.10 (Warwick Road / Wychwood Avenue / Langfield Road) has a significant development flow impact (16.8%) in 2036 and has been highlighted in public consultation.
- Junction 1.13 (Lodge Road / Station Road) is forecast to be over capacity in 2036 with the DLP developments and has a 11.3% junction impact. The junction also currently has observed delay and has been raised as a concern in the public consultation.
- Junction 1.14 (Arden Vale Road / A4141) also has a significant development flow impact (16.7%) in 2036 and has been highlighted in public consultation.
- Junction 1.15 (Arden Vale Road / Hampton Road) has a high development impact in both 2026 and 2036, with there being a 24.2% impact in 2036. This junction is being reviewed as part of the Knowle Transport Study

### 9.2.6 TIA Study Recommendations for Cluster 1

The TIA study has identified the following junctions which will require mitigation (excluding any identified that are part of the Knowle Transport Study):

- Junction 1.4: Grove Road / Station Road / Widney Road
- Junction 1.10: Warwick Road / Wychwood Avenue / Langfield Road
- Junction 1.13: Lodge Road / Station Road
- Junction 1.14: Arden Vale Road / A4141

A summary of the junctions where impacts are likely to need further assessment and possible future mitigation in 2026, not covered by the separate Knowle Transport Study, are shown in Table 9.6.

**Table 9.6: Cluster 1 Mitigation Requirements - 2026**

Ref	Junction	Site 8	Site 9 (Option 1)	Site 9 (Option 2)	Cumulative (Option 1)	Cumulative (Option 2)
1.1	High Street / Wilsons Road / Warwick Road / Station Road					
1.2	High Street / Kenilworth Road / Warwick Road					
1.3	Kenilworth Road / Wilsons Road					
1.4	Grove Road / Station Road / Widney Road	X	X	X	X	X
1.7	High Street / Hampton Road / Warwick Road / Lodge Road					
1.8	Warwick Road / Grove Road / Norton Green Lane					
1.9	Station Road / Forest Road					
1.10	Warwick Road / Wychwood Avenue / Langfield Road					
1.11	Station Road / Station Approach					
1.12	Stratford Road / Aylesbury Road					
1.13	Lodge Road / Station Road					
1.14	Arden Vale Road / A4141					
1.15	Arden Vale Road / Hampton Road					

Source: Mott MacDonald

A summary of the junctions where impacts are likely to need further assessment and possible future mitigation in 2036, not covered by the separate Knowle Transport Study, are shown in Table 9.7.

**Table 9.7: Cluster 1 Mitigation Requirements - 2036**

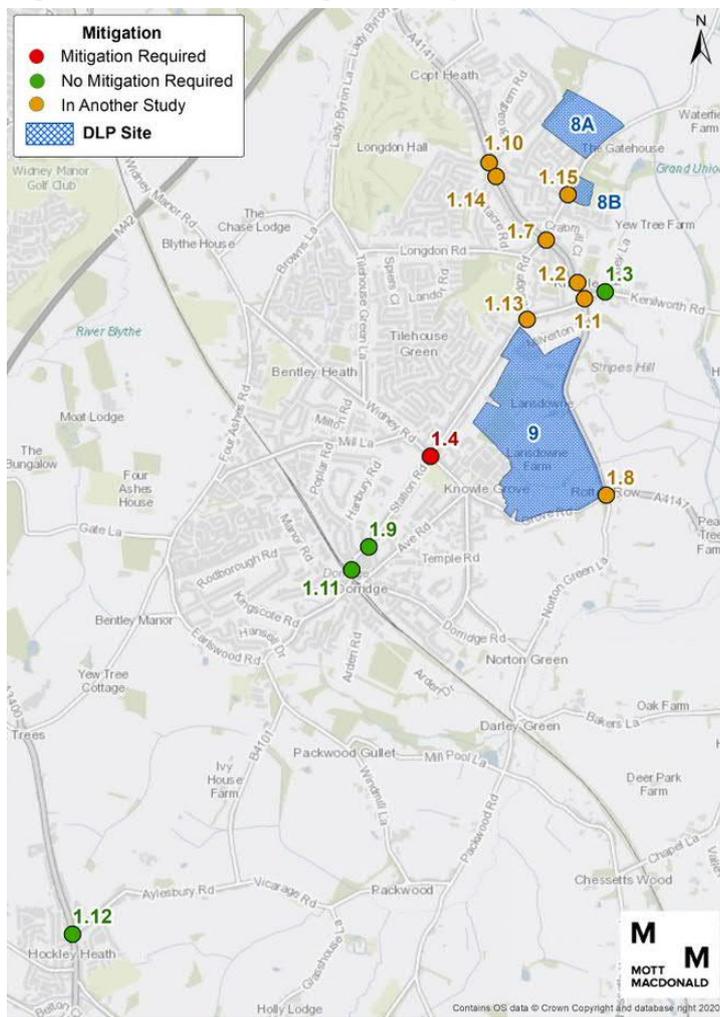
Ref	Junction	Site 8	Site 9 (Option 1)	Site 9 (Option 2)	Cumulative (Option 1)	Cumulative (Option 2)
1.1	High Street / Wilsons Road / Warwick Road / Station Road					
1.2	High Street / Kenilworth Road / Warwick Road					
1.3	Kenilworth Road / Wilsons Road					
1.4	Grove Road / Station Road / Widney Road	X	✓	✓	✓	✓
1.7	High Street / Hampton Road / Warwick Road / Lodge Road					
1.8	Warwick Road / Grove Road / Norton Green Lane					
1.9	Station Road / Forest Road					
1.10	Warwick Road / Wychwood Avenue / Langfield Road					
1.11	Station Road / Station Approach					
1.12	Stratford Road / Aylesbury Road					
1.13	Lodge Road / Station Road					

Ref	Junction	Site 8	Site 9 (Option 1)	Site 9 (Option 2)	Cumulative (Option 1)	Cumulative (Option 2)
1.14	Arden Vale Road / A4141					Knowle Transport Study
1.15	Arden Vale Road / Hampton Road					Knowle Transport Study

Source: Mott MacDonald

A summary of the information in Table 9.7 for the cumulative options is shown spatially in Figure 9.1.

**Figure 9.1: Cluster 1 Mitigation Requirements – Cumulative 2036**



Source: Mott MacDonald

## 9.3 Mitigation Strategy (Including Outline Costs)

### 9.3.1 TIA Study Mitigation and Costs

#### 9.3.1.1 Introduction

The Cluster 1 impacts at specific junctions have been reviewed in context of the existing junction layout, the arms on which impacts are forecast to be greatest and baseline and development flows on each arm.

Where impacts are considered to warrant further assessment and possible mitigation, concept schemes have been developed and high-level preliminary costings for the schemes have been estimated. This is set out below for each junction in Cluster 1.

#### 9.3.1.2 Junction 1.4 - B4101 Station Road (N) / Grove Road / B4101 Station Road (S) / Widney Road

Junction 1.4 is an existing four-arm compact roundabout, located where Station Road meets Grove Road and Widney Road. The junction is forecast to experience the greatest impacts as a result of Site 9, and cumulative Cluster 1 impacts. The methodology used to undertake the TIA suggests that operation will not be significantly impacted until 2036.

The junction and surrounding highway land have been reviewed. Statutory undertaker (BT) apparatus in the footway north of the junction would make widening into this area of land costly, any benefit would likely only be marginal and so it is not recommended that minor junction enlargement this is explored further at this stage. **No mitigation scheme has been identified for Junction 1.4.**

It is recommended that alternative solutions for mitigation are explored further in a future study. This could encompass traffic calming to slow traffic, creating larger gap times for improve all round operation.

#### 9.3.1.3 Junction 1.10 - A4141 Warwick Road (N) / Wychwood Avenue / A4141 Warwick Road (S) / Langfield Road

Junction 1.10 is an existing four-arm roundabout, located where the A4141 Warwick Road meets Langfield Road and Wychwood Avenue. The junction is forecast to experience the greatest impacts as a result of Site 9, and cumulative Cluster 1 impacts. The methodology used to undertake the TIA suggests that operation will be impacted by 2026 if the envisaged occupation rate is realised.

**No mitigation scheme has been identified for Junction 1.10 as this has been undertaken in the Knowle Transport Study (418452-MMD-ZZ-ZZ-TN-Z-004).**

#### 9.3.1.4 Junction 1.13 - Lodge Road / B4101 Station Road (E) / B4101 Station Road (W)

Junction 1.13 is an existing simple priority junction with a ghost island right turn lane on the major arm (Station Road east). The junction is forecast to experience the greatest impacts as a result of particularly Site 9 Option 2, where an access would be provided on Station Road. The methodology used to undertake the TIA suggests that operation will not be significantly impacted until 2036.

**No mitigation scheme has been identified for Junction 1.13 as this has been undertaken in the Knowle Transport Study (418452-MMD-ZZ-ZZ-TN-Z-004).**

### 9.3.1.5 Junction 1.14 - Arden Vale Road / A4141 Warwick Road (N) / A4141 Warwick Road (S)

Junction 1.14 is an existing simple priority junction with a ghost island right turn lane on the major arm (Warwick Road south). The junction is forecast to experience the greatest impacts as a result of the cumulative Cluster 1 sites in 2036. This is due to Site 9 traffic routeing via Warwick Road on the mainline, and northbound Site 8 traffic using Arden Vale Road.

**No mitigation scheme has been identified for Junction 1.14 as part of the TIA study as this has undertaken in the Knowle Transport Study (418452-MMD-ZZ-ZZ-TN-Z-004).**

### 9.3.1.6 Cluster 1 Cost Estimates

The preliminary cost estimate summary that has been prepared for the Cluster 1 mitigation schemes identified in this TIA are provided in Table 9.8.

**Table 9.8: Cluster 1 Mitigation Scheme Preliminary Cost Estimate Summary**

Ref	Location	Proposed Layout	Rounded Cost Estimate		Comments
			Low	High	
1.4	Grove Road / Station Road / Widney Road	None proposed	N/A	N/A	
1.10	Warwick Road / Wychwood Avenue / Langfield Road	TBC	N/A	N/A	Further studies to identify potential options
1.13	Lodge Road / Station Road	TBC	N/A	N/A	Further studies to identify potential options
1.14	Arden Vale Road / A4141	None proposed	N/A	N/A	

Source: Mott MacDonald

### 9.3.2 Knowle Transport Study Mitigation and Costs

In addition to the study recommendations identified above, the Knowle Transport Study also identified mitigation at the junctions highlighted in orange in Figure 9.1. This study primarily focussed on mitigation for all users, not just motor vehicles, and put an emphasis on placemaking.

A summary of the mitigation for each junction, along with an indicative cost, is show in Table 9.9. The costs have been broken down into three ranges, based on bronze, silver and gold packages. The packages range from upgrades on the essential areas (the bronze package) to full upgrades throughout (the gold package).

**Table 9.9: Knowle Transport Study Mitigation**

Ref	Junction	Mitigation	Bronze	Silver	Gold
1.1	High Street / Wilsons Road / Warwick Road / Station Road	Limited room for traffic improvement, so the junction has been tightened for better pedestrian accessibility and placemaking	£260,000	£340,000	£490,000
1.2	High Street / Kenilworth Road / Warwick Road	Two potential options, both involve reducing the size of the junction by removing the slip lanes and island to provide more available land for	£1,860,000	£1,980,000	£2,810,000

Ref	Junction	Mitigation	Bronze	Silver	Gold
		either improved public realm or for development. Option one has the Station Road arm as a smaller priority junction and option two has it as a signalised junction. The costs are shown for option two.			
1.7	High Street / Hampton Road / Warwick Road / Lodge Road	Limited land to allow for traffic improvements, so the junction has been tightened for better pedestrian accessibility and placemaking.	£490,000	£620,000	£900,000
1.8	Warwick Road / Grove Road / Norton Green Lane	After detailed junction modelling, it was determined no mitigation was required.	-	-	-
1.15	Arden Vale Road / Hampton Road	After detailed junction modelling, it was determined no mitigation was required. However, improvements for pedestrians and cyclists have been recommended on Hampton Road from the DLP sites to the High Street.	-	-	-

Source: Mott MacDonald Knowle Transport Study

# 10 Cluster 2 – Traffic Impact Assessment

## 10.1 Introduction

The local highway network in Cluster 2 has been assessed to a high-level based on the methodology that is set out in Section 8. The Traffic Impact Assessment has been considered against the TrafficMaster congestion data, issues raised in public consultation relating to specific junctions and sites, the link impact analysis undertaken by Mott MacDonald and the link capacity assessments prepared by Mott MacDonald. The data and information that has been considered to identify impacts that may warrant further study or possible future mitigation in the Cluster 1 study area is set out in this Section.

## 10.2 Traffic Impact

The individual and cumulative impacts of the developments have been assessed to determine which junctions require mitigation.

As set out in Section 8, the percentage impact of development traffic on the worst-case link at each junction in the study area has been determined for each assessment scenario compared to the corresponding baseline flows (with growth, without development). The full calculations and outputs, showing the worst-case impact in both the AM and PM peak hours for each site can be seen in Appendix B.

Additionally, the link capacity on all links at junctions identified in the study area have been assessed with each site individually and cumulatively. In this section the baseline link capacities in the 2017, 2026 and 2036 scenarios are shown alongside the link capacities following the addition of development traffic associated with each of the sites and cumulatively in 2026 and 2036. The full calculations and outputs, showing the worst-case impact in both the AM and PM peak hours for each site can be seen in Appendix C.

In order to consider the likely magnitude of impacts and therefore where mitigation may be required to provide additional capacity or relieve congestion that may otherwise be exacerbated by development, the analysis in terms of link flow impacts and link capacity impacts has been considered jointly with the public consultation and congestion information. This has enabled a balanced view to be developed, considering observed congestion, public opinion and high-level forecasting, to determine where the sites could individually or cumulatively result in impacts that may require further assessment and possible future mitigation.

A separate 'A34 Stratford Road Enhancement Study' has been undertaken by Atkins on behalf of SMBC. The following junctions have been considered by Atkins in the A34 Stratford Road Enhancement Study, and therefore have not been considered in terms of mitigation requirements in this study:

- Junction 2.1: Stratford Road / Creynolds Lane
- Junction 2.2: Stratford Road / Monkspath Hall Road
- Junction 2.3: Stratford Road / Blackford Road / Marshall Lake Road
- Junction 2.4: Stratford Road / Solihull Road
- Junction 2.6: Stratford Road / Cranmore Boulevard / Industrial Estate
- Junction 2.12: Stratford Road / Dog Kennel Lane / Friars Gate
- Junction 2.13: Stratford Road / Union Road / School Road

- Junction 2.14: Stratford Road / Shakespeare Drive
- Junction 2.15: Stratford Road / Tanworth Lane
- Junction 2.18: Stratford Road / Sainsburys
- Junction X.5: Stratford Road / Tesco
- Junction X.6: Stratford Road / Olton Road

Table 10.1 to Table 10.5 provide a summary for each site and the cluster as a whole. The junctions where mitigation is required have their ID and junction name highlighted in red.

### 10.2.1 Site 4 – West of Dickens Heath

A summary of predicted impact of Site 4 along with the current congestion and consultation is shown in Table 10.1.

**Table 10.1: Site 4 (West of Dickens Heath) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Site 4		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.1	Stratford Road / Creynolds Lane	79%	85%	89%	85%	90%	0.3%	1.0%	Y	N	Y	N
2.2	Stratford Road / Monkspath Hall Road	73%	79%	83%	79%	84%	0.4%	1.2%	Y	N	Y	N
2.3	Stratford Road / Blackford Road / Marshall Lake Road	109%	117%	124%	118%	125%	0.3%	1.0%	Y	N	Y	N
2.4	Stratford Road / Solihull Road	46%	49%	52%	49%	52%	0.0%	0.0%	Y	N	Y	N
2.5	Dickens Heath Road / Tanworth Lane	106%	114%	120%	116%	125%	1.2%	4.0%	Y	Y	N	Y
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	73%	78%	83%	79%	83%	0.1%	0.4%	Y	N	Y	N
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	82%	88%	92%	88%	92%	0.3%	0.9%	Y	N	N	N
2.8	M42 / Stratford Road / Blythe Gate	71%	76%	80%	76%	80%	0.3%	0.8%	N	N	N	N
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	79%	85%	90%	85%	90%	0.5%	1.6%	Y	N	N	N
2.10	Haslucks Green Road / Green Lane	43%	46%	49%	46%	50%	1.5%	5.0%	Y	Y	N	Y
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	58%	62%	66%	62%	66%	0.4%	1.4%	Y	N	N	N
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	57%	62%	65%	62%	65%	0.5%	1.7%	Y	N	Y	N
2.13	Stratford Road / Union Road / School Road	67%	72%	75%	72%	75%	0.0%	0.0%	Y	N	Y	N
2.14	Stratford Road / Shakespeare Drive	71%	77%	81%	77%	81%	0.0%	0.0%	Y	N	Y	N
2.15	Stratford Road / Tanworth Lane	56%	60%	63%	60%	63%	0.0%	0.0%	Y	N	Y	N
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	104%	111%	117%	113%	122%	1.2%	3.8%	Y	N	N	Y

ID	Junction	Base Link Capacity			Link Capacity with Site 4		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.17	Blossomfield Road / Dingle Lane / Danford Lane	60%	64%	67%	64%	69%	0.3%	0.8%	Y	N	N	N
2.18	Stratford Road / Sainsburys	91%	98%	103%	98%	103%	0.0%	0.0%	N	N	Y	N
2.21	Tilehouse Lane / Tythe Barn Lane	42%	45%	48%	46%	49%	2.0%	6.6%	Y	Y	N	Y
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	47%	50%	53%	51%	55%	0.4%	1.4%	N	N	N	N
2.23	Norton Lane / Fulford Hall Road	42%	46%	48%	46%	48%	0.1%	0.4%	N	N	N	N
2.24	Lowbrook Lane / Norton Lane	50%	54%	57%	54%	57%	0.4%	1.3%	N	N	N	N
2.25	Lea Green Lane / Station Road / Norton Lane	68%	73%	77%	73%	78%	0.3%	0.9%	N	N	N	N
2.26	Norton Road / Rumbush Lane	40%	43%	45%	43%	46%	0.2%	0.5%	N	N	N	N
X.1	Tilehouse Lane / Birchy Leasowes Lane									Y	N	Y
X.2	Haslucks Green Road / Bills Lane									N	N	N
X.3	Dickens Heath Road / Birchy Leasowes Lane									N	N	N
X.4	Dickens Heath Road / Tythe Barn Lane									N	N	N
X.5	A34 Stratford Road / Tesco									N	Y	N
X.6	Stratford Road / Olton Road									N	Y	N

The results summarised in Table 10.1 show that five junctions have been identified for mitigation as a result of Site 4, of which none are being considered in the A34 Stratford Road Enhancement Study.

### 10.2.2 Site 11 – The Green

A summary of predicted impact of Site 11 along with the current congestion and consultation is shown in Table 10.2.

**Table 10.2: Site 11 (The Green) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Site 11		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.1	Stratford Road / Creynolds Lane	79%	85%	89%	86%	90%	2.6%	2.5%	Y	Y	Y	N
2.2	Stratford Road / Monkspath Hall Road	73%	79%	83%	81%	85%	3.6%	3.4%	Y	Y	Y	N
2.3	Stratford Road / Blackford Road / Marshall Lake Road	109%	117%	124%	121%	128%	4.1%	3.9%	Y	Y	Y	Y
2.4	Stratford Road / Solihull Road	46%	49%	52%	50%	53%	2.9%	2.7%	Y	Y	Y	N
2.5	Dickens Heath Road / Tanworth Lane	106%	114%	120%	114%	120%	0.4%	0.4%	Y	Y	N	N
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	73%	78%	83%	80%	84%	0.8%	0.8%	Y	Y	Y	N
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	82%	88%	92%	88%	92%	1.5%	1.4%	Y	N	N	N
2.8	M42 / Stratford Road / Blythe Gate	71%	76%	80%	76%	80%	2.3%	2.2%	N	Y	N	N
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	79%	85%	90%	85%	90%	0.0%	0.0%	Y	N	N	N
2.10	Haslucks Green Road / Green Lane	43%	46%	49%	46%	49%	0.0%	0.0%	Y	N	N	N
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	58%	62%	66%	62%	66%	0.0%	0.0%	Y	N	N	N
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	57%	62%	65%	66%	69%	5.8%	5.5%	Y	Y	Y	Y
2.13	Stratford Road / Union Road / School Road	67%	72%	75%	72%	76%	3.4%	3.3%	Y	Y	Y	N
2.14	Stratford Road / Shakespeare Drive	71%	77%	81%	78%	82%	3.1%	3.0%	Y	Y	Y	N
2.15	Stratford Road / Tanworth Lane	56%	60%	63%	61%	64%	3.5%	3.3%	Y	Y	Y	N
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	104%	111%	117%	112%	118%	6.3%	5.9%	Y	Y	N	Y
2.17	Blossomfield Road / Dingle Lane / Danford Lane	60%	64%	67%	66%	69%	1.3%	1.2%	Y	N	N	N
2.18	Stratford Road / Sainsburys	91%	98%	103%	98%	103%	3.7%	3.5%	N	Y	Y	N
2.21	Tilehouse Lane / Tythe Barn Lane	42%	45%	48%	45%	48%	0.0%	0.0%	Y	N	N	N

ID	Junction	Base Link Capacity			Link Capacity with Site 11		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	47%	50%	53%	50%	53%	0.8%	0.8%	N	N	N	N
2.23	Norton Lane / Fulford Hall Road	42%	46%	48%	46%	48%	0.8%	0.8%	N	N	N	N
2.24	Lowbrook Lane / Norton Lane	50%	54%	57%	54%	57%	0.0%	0.0%	N	N	N	N
2.25	Lea Green Lane / Station Road / Norton Lane	68%	73%	77%	73%	77%	0.0%	0.0%	N	N	N	N
2.26	Norton Road / Rumbush Lane	40%	43%	45%	44%	46%	1.1%	1.0%	N	N	N	N
X.1	Tilehouse Lane / Birchy Leasowes Lane									N	N	N
X.2	Haslucks Green Road / Bills Lane									N	N	N
X.3	Dickens Heath Road / Birchy Leasowes Lane									N	N	N
X.4	Dickens Heath Road / Tythe Barn Lane									N	N	N
X.5	A34 Stratford Road / Tesco									N	Y	N
X.6	Stratford Road / Olton Road									N	Y	N

The results summarised in Table 10.2 show that three junctions have been identified for mitigation as a result of Site 11, of which two are being considered in the A34 Stratford Road Enhancement Study.

### 10.2.3 Site 12 – South of Dog Kennel Lane

A summary of predicted impact of Site 12 along with the current congestion and consultation is shown in Table 10.3.

**Table 10.3: Site 12 (South of Dog Kennel Lane) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Site 12		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.1	Stratford Road / Creynolds Lane	79%	85%	89%	85%	91%	1.0%	3.8%	Y	Y	Y	N
2.2	Stratford Road / Monkspath Hall Road	73%	79%	83%	80%	86%	0.7%	2.6%	Y	Y	Y	N
2.3	Stratford Road / Blackford Road / Marshall Lake Road	109%	117%	124%	119%	130%	1.6%	6.2%	Y	Y	Y	Y
2.4	Stratford Road / Solihull Road	46%	49%	52%	50%	54%	1.1%	4.2%	Y	Y	Y	N
2.5	Dickens Heath Road / Tanworth Lane	106%	114%	120%	114%	121%	0.2%	0.6%	Y	Y	N	N
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	73%	78%	83%	79%	85%	0.3%	1.2%	Y	Y	Y	N
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	82%	88%	92%	88%	92%	0.6%	2.1%	Y	N	N	N
2.8	M42 / Stratford Road / Blythe Gate	71%	76%	80%	76%	81%	0.9%	3.3%	N	Y	N	N
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	79%	85%	90%	85%	90%	0.0%	0.0%	Y	N	N	N
2.10	Haslucks Green Road / Green Lane	43%	46%	49%	46%	49%	0.0%	0.0%	Y	N	N	N
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	58%	62%	66%	62%	66%	0.0%	0.0%	Y	N	N	N
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	57%	62%	65%	62%	65%	0.1%	0.3%	Y	Y	Y	N
2.13	Stratford Road / Union Road / School Road	67%	72%	75%	72%	76%	1.3%	5.0%	Y	Y	Y	N
2.14	Stratford Road / Shakespeare Drive	71%	77%	81%	77%	83%	1.2%	4.5%	Y	Y	Y	N
2.15	Stratford Road / Tanworth Lane	56%	60%	63%	61%	65%	1.3%	5.0%	Y	Y	Y	Y
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	104%	111%	117%	111%	118%	2.5%	9.6%	Y	Y	N	Y
2.17	Blossomfield Road / Dingle Lane / Danford Lane	60%	64%	67%	65%	70%	0.5%	1.9%	Y	N	N	N
2.18	Stratford Road / Sainsburys	91%	98%	103%	98%	103%	1.4%	5.3%	N	Y	Y	Y
2.21	Tilehouse Lane / Tythe Barn Lane	42%	45%	48%	45%	48%	0.0%	0.0%	Y	N	N	N

ID	Junction	Base Link Capacity			Link Capacity with Site 12		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	47%	50%	53%	50%	53%	0.3%	1.2%	N	N	N	N
2.23	Norton Lane / Fulford Hall Road	42%	46%	48%	46%	48%	0.3%	1.2%	N	N	N	N
2.24	Lowbrook Lane / Norton Lane	50%	54%	57%	54%	57%	0.0%	0.0%	N	N	N	N
2.25	Lea Green Lane / Station Road / Norton Lane	68%	73%	77%	73%	77%	0.0%	0.0%	N	N	N	N
2.26	Norton Road / Rumbush Lane	40%	43%	45%	43%	46%	0.4%	1.6%	N	N	N	N
X.1	Tilehouse Lane / Birchy Leasowes Lane									N	N	N
X.2	Haslucks Green Road / Bills Lane									N	N	N
X.3	Dickens Heath Road / Birchy Leasowes Lane									N	N	N
X.4	Dickens Heath Road / Tythe Barn Lane									N	N	N
X.5	A34 Stratford Road / Tesco									N	Y	N
X.6	Stratford Road / Olton Road									N	Y	N

The results summarised in Table 10.3 show that four junctions have been identified for mitigation as a result of Site 12, of which three are being considered in the A34 Stratford Road Enhancement Study.

#### 10.2.4 Site 26 – South of Bills Lane

A summary of predicted impact of Site 26 along with the current congestion and consultation is shown in Table 10.4.

**Table 10.4: Site 26 (South of Bills Lane) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Site 26		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.1	Stratford Road / Creynolds Lane	79%	85%	89%	85%	90%	0.2%	0.9%	Y	N	Y	N
2.2	Stratford Road / Monkspath Hall Road	73%	79%	83%	79%	83%	0.2%	1.0%	Y	N	Y	N
2.3	Stratford Road / Blackford Road / Marshall Lake Road	109%	117%	124%	117%	124%	0.5%	2.0%	Y	N	Y	N
2.4	Stratford Road / Solihull Road	46%	49%	52%	49%	52%	0.4%	1.8%	Y	N	Y	N
2.5	Dickens Heath Road / Tanworth Lane	106%	114%	120%	114%	120%	0.0%	0.0%	Y	N	N	N
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	73%	78%	83%	79%	84%	0.5%	2.3%	Y	N	Y	N
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	82%	88%	92%	88%	92%	0.1%	0.3%	Y	N	N	N
2.8	M42 / Stratford Road / Blythe Gate	71%	76%	80%	76%	80%	0.2%	0.7%	N	N	N	N
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	79%	85%	90%	85%	90%	0.0%	0.0%	Y	N	N	N
2.10	Haslucks Green Road / Green Lane	43%	46%	49%	46%	50%	0.9%	4.0%	Y	Y	N	N
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	58%	62%	66%	62%	66%	0.7%	2.8%	Y	N	N	N
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	57%	62%	65%	62%	65%	0.3%	1.4%	Y	N	Y	N
2.13	Stratford Road / Union Road / School Road	67%	72%	75%	72%	76%	0.6%	2.7%	Y	N	Y	N
2.14	Stratford Road / Shakespeare Drive	71%	77%	81%	77%	81%	0.5%	2.1%	Y	N	Y	N
2.15	Stratford Road / Tanworth Lane	56%	60%	63%	61%	65%	0.6%	2.4%	Y	N	Y	N
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	104%	111%	117%	111%	117%	0.0%	0.0%	Y	N	N	N
2.17	Blossomfield Road / Dingle Lane / Danford Lane	60%	64%	67%	64%	68%	0.1%	0.2%	Y	N	N	N
2.18	Stratford Road / Sainsburys	91%	98%	103%	98%	103%	0.6%	2.5%	N	N	Y	N
2.21	Tilehouse Lane / Tythe Barn Lane	42%	45%	48%	46%	49%	0.5%	2.3%	Y	Y	N	N

ID	Junction	Base Link Capacity			Link Capacity with Site 26		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	47%	50%	53%	51%	55%	0.5%	1.9%	N	N	N	N
2.23	Norton Lane / Fulford Hall Road	42%	46%	48%	46%	48%	0.1%	0.6%	N	N	N	N
2.24	Lowbrook Lane / Norton Lane	50%	54%	57%	54%	58%	0.4%	1.6%	N	N	N	N
2.25	Lea Green Lane / Station Road / Norton Lane	68%	73%	77%	73%	78%	0.2%	0.7%	N	N	N	N
2.26	Norton Road / Rumbush Lane	40%	43%	45%	43%	46%	0.2%	0.7%	N	N	N	N
X.1	Tilehouse Lane / Birchy Leasowes Lane									N	N	N
X.2	Haslucks Green Road / Bills Lane										N	Y
X.3	Dickens Heath Road / Birchy Leasowes Lane										N	N
X.4	Dickens Heath Road / Tythe Barn Lane										N	N
X.5	A34 Stratford Road / Tesco										N	Y
X.6	Stratford Road / Olton Road										N	Y

The results summarised in Table 10.4 show that one junction has been identified for mitigation as a result of Site 26, which is not being considered in the A34 Stratford Road Enhancement Study.

### 10.2.5 Cluster 2 – Cumulative of Sites 4, 11, 12 and 26

A summary of predicted cumulative impact of Cluster 2 along with the current congestion and consultation is shown in Table 10.5.

**Table 10.5: Cluster 2 (Cumulative of Sites 4, 11, 12 and 26) Traffic Impact**

ID	Junction	Base Link Capacity			Link Capacity with Cluster 2		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.1	Stratford Road / Creynolds Lane	79%	85%	89%	86%	93%	4.1%	8.1%	Y	Y	Y	Y
2.2	Stratford Road / Monkspath Hall Road	73%	79%	83%	82%	88%	4.9%	8.2%	Y	Y	Y	Y
2.3	Stratford Road / Blackford Road / Marshall Lake Road	109%	117%	124%	123%	135%	6.5%	13.2%	Y	Y	Y	Y
2.4	Stratford Road / Solihull Road	46%	49%	52%	51%	57%	4.4%	8.7%	Y	Y	Y	Y
2.5	Dickens Heath Road / Tanworth Lane	106%	114%	120%	116%	126%	1.8%	5.0%	Y	Y	N	Y
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	73%	78%	83%	81%	88%	1.8%	4.7%	Y	Y	Y	N
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	82%	88%	92%	88%	92%	2.4%	4.7%	Y	N	N	Y
2.8	M42 / Stratford Road / Blythe Gate	71%	76%	80%	77%	86%	3.6%	7.0%	N	Y	N	Y
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	79%	85%	90%	85%	90%	0.5%	1.6%	Y	N	N	N
2.10	Haslucks Green Road / Green Lane	43%	46%	49%	47%	51%	2.4%	9.0%	Y	Y	N	Y
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	58%	62%	66%	62%	66%	1.1%	4.2%	Y	N	N	N
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	57%	62%	65%	67%	73%	6.7%	8.9%	Y	Y	Y	Y
2.13	Stratford Road / Union Road / School Road	67%	72%	75%	72%	77%	5.4%	11.0%	Y	Y	Y	Y
2.14	Stratford Road / Shakespeare Drive	71%	77%	81%	79%	85%	4.8%	9.6%	Y	Y	Y	Y
2.15	Stratford Road / Tanworth Lane	56%	60%	63%	62%	67%	5.4%	10.7%	Y	Y	Y	Y
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	104%	111%	117%	113%	123%	9.9%	19.3%	Y	Y	N	Y
2.17	Blossomfield Road / Dingle Lane / Danford Lane	60%	64%	67%	67%	73%	2.1%	4.2%	Y	N	N	Y
2.18	Stratford Road / Sainsburys	91%	98%	103%	98%	103%	5.6%	11.2%	N	Y	Y	Y
2.21	Tilehouse Lane / Tythe Barn Lane	42%	45%	48%	46%	50%	2.5%	8.9%	Y	Y	N	Y

ID	Junction	Base Link Capacity			Link Capacity with Cluster 2		Junction Impact		Observed Congestion	Concerns Raised by Public	In A34 Study	Mitigation Required
		2017	2026	2036	2026	2036	2026	2036				
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	47%	50%	53%	51%	56%	2.0%	5.2%	N	N	N	N
2.23	Norton Lane / Fulford Hall Road	42%	46%	48%	46%	48%	1.4%	3.0%	N	N	N	N
2.24	Lowbrook Lane / Norton Lane	50%	54%	57%	54%	58%	0.7%	2.7%	N	N	N	N
2.25	Lea Green Lane / Station Road / Norton Lane	68%	73%	77%	74%	78%	0.4%	1.6%	N	N	N	N
2.26	Norton Road / Rumbush Lane	40%	43%	45%	44%	48%	1.8%	3.8%	N	N	N	N
X.1	Tilehouse Lane / Birchy Leasowes Lane									Y	N	Y
X.2	Haslucks Green Road / Bills Lane									Y	N	Y
X.3	Dickens Heath Road / Birchy Leasowes Lane									N	N	N
X.4	Dickens Heath Road / Tythe Barn Lane									N	N	N
X.5	A34 Stratford Road / Tesco									N	Y	N
X.6	Stratford Road / Olton Road									N	Y	N

The results summarised in Table 10.5 show that 18 junctions have been identified for mitigation as a result of Cluster 2, of which nine are being considered in the A34 Stratford Road Enhancement Study.

The reasons for the sites being chosen for mitigation, excluding the sites covered in the A34 Stratford Road Enhancement Study, are as follows:

- Junction 2.5 (Dickens Heath Road / Tanworth Lane) has observed congestion and is predicted to be over capacity in the baseline scenarios. The DLP then has a large development impact, 13.2% in 2036.
- Junction 2.7 (Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road) has observed congestion and is predicted to have an arm at 92% capacity in 2036 with DLP developments. This is along with a 4.7% junction impact in 2036.
- Junction 2.8 (M42 / Stratford Road / Blythe Gate) has had concerns raised in public consultation, is forecast to be close to capacity and is forecast to have a 7% development junction impact in 2036.
- Junction 2.10 (Haslucks Green Road / Green Lane) has observed congestion, has had concerns raised in public consultation and is forecast to have a 9% development junction impact in 2036.
- Junction 2.16 (Blackford Road / Dog Kennel Lane / Tanworth Lane) has observed congestion and is predicted to be over capacity in the baseline scenarios. The DLP has a 19.3% junction impact in 2036.
- Junction 2.17 (Blossomfield Road / Dingle Lane / Danford Lane) has observed congestion and is forecast to have a 4.2% development junction impact in 2036.
- Junction 2.21 (Tilehouse Lane / Tythe Barn Lane) has observed congestion and is forecast to have an 8.9% development junction impact in 2036.
- Junction X.1 (Tilehouse Lane / Birchy Leasowes Lane) was not assessed for link capacity or junction impact due to no data being available. There has been a concern raised at public consultation, so this has been looked at for mitigation.
- Junction X.2 (Haslucks Green Road / Bills Lane) was not assessed for link capacity or junction impact due to no data being available. The minor arm at the junction will experience the greatest impact in 2036 as a result of Site 26. There has been a concern raised at public consultation, so this has been looked at for mitigation.

### 10.2.6 TIA Study Recommendations for Cluster 2

The TIA study has identified the following junctions which will require mitigation:

- Junction 2.5: Dickens Heath Road / Tanworth Lane
- Junction 2.7: Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road
- Junction 2.8: M42 / Stratford Road / Blythe Gate
- Junction 2.10: Haslucks Green Road / Green Lane
- Junction 2.16: Blackford Road / Dog Kennel Lane / Tanworth Lane
- Junction 2.17: Blossomfield Road / Dingle Lane / Danford Lane
- Junction 2.21: Tilehouse Lane / Tythe Barn Lane)
- Junction X.1: Tilehouse Lane / Birchy Leasowes Lane
- Junction X.2: Haslucks Green Road / Bills Lane

A summary of the junctions where impacts are likely to need further assessment and possible future mitigation in 2026, not covered by the A34 Stratford Road Enhancements Study, are shown in Table 10.6.

**Table 10.6: Cluster 2 Mitigation Requirements - 2026**

Ref	Junction	Site 4	Site 11	Site 12	Site 26	Cluster 2
2.1	Stratford Road / Creynolds Lane	A34 Stratford Road Enhancement Study				
2.2	Stratford Road / Monkspath Hall Road	A34 Stratford Road Enhancement Study				
2.3	Stratford Road / Blackford Road / Marshall Lake Road	A34 Stratford Road Enhancement Study				
2.4	Stratford Road / Solihull Road	A34 Stratford Road Enhancement Study				
2.5	Dickens Heath Road / Tanworth Lane	X	X	X	X	✓
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	A34 Stratford Road Enhancement Study				
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	X	X	X	X	X
2.8	M42 / Stratford Road / Blythe Gate	X	X	X	X	X
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road	Impacts not forecast to require mitigation				
2.10	Haslucks Green Road / Green Lane	X	X	X	X	X
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road	Impacts not forecast to require mitigation				
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	A34 Stratford Road Enhancement Study				
2.13	Stratford Road / Union Road / School Road	A34 Stratford Road Enhancement Study				
2.14	Stratford Road / Shakespeare Drive	A34 Stratford Road Enhancement Study				
2.15	Stratford Road / Tanworth Lane	A34 Stratford Road Enhancement Study				
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	X	✓	✓	X	✓
2.17	Blossomfield Road / Dingle Lane / Danford Lane	X	X	X	X	X
2.18	Stratford Road / Sainsburys	A34 Stratford Road Enhancement Study				
2.21	Tilehouse Lane / Tythe Barn Lane	X	X	X	X	X
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road	Impacts not forecast to require mitigation				
2.23	Norton Lane / Fulford Hall Road	Impacts not forecast to require mitigation				
2.24	Lowbrook Lane / Norton Lane	Impacts not forecast to require mitigation				
2.25	Lea Green Lane / Station Road / Norton Lane	Impacts not forecast to require mitigation				
2.26	Norton Road / Rumbush Lane	Impacts not forecast to require mitigation				
X.1	Tilehouse Lane / Birchy Leasowes Lane	X	X	X	X	X
X.2	Haslucks Green Road / Bills Lane	X	X	X	✓	✓
X.3	Dickens Heath Road / Birchy Leasowes Lane	Impacts not forecast to require mitigation				
X.4	Dickens Heath Road / Tythe Barn Lane	Impacts not forecast to require mitigation				
X.5	A34 Stratford Road / Tesco	A34 Stratford Road Enhancement Study				
X.6	Stratford Road / Olton Road	A34 Stratford Road Enhancement Study				

Source: Mott MacDonald

A summary of the junctions where impacts are likely to need further assessment and possible future mitigation in 2036, not covered by the A34 Stratford Road Enhancements Study, are shown in Table 10.7.

**Table 10.7: Cluster 2 Mitigation Requirements - 2036**

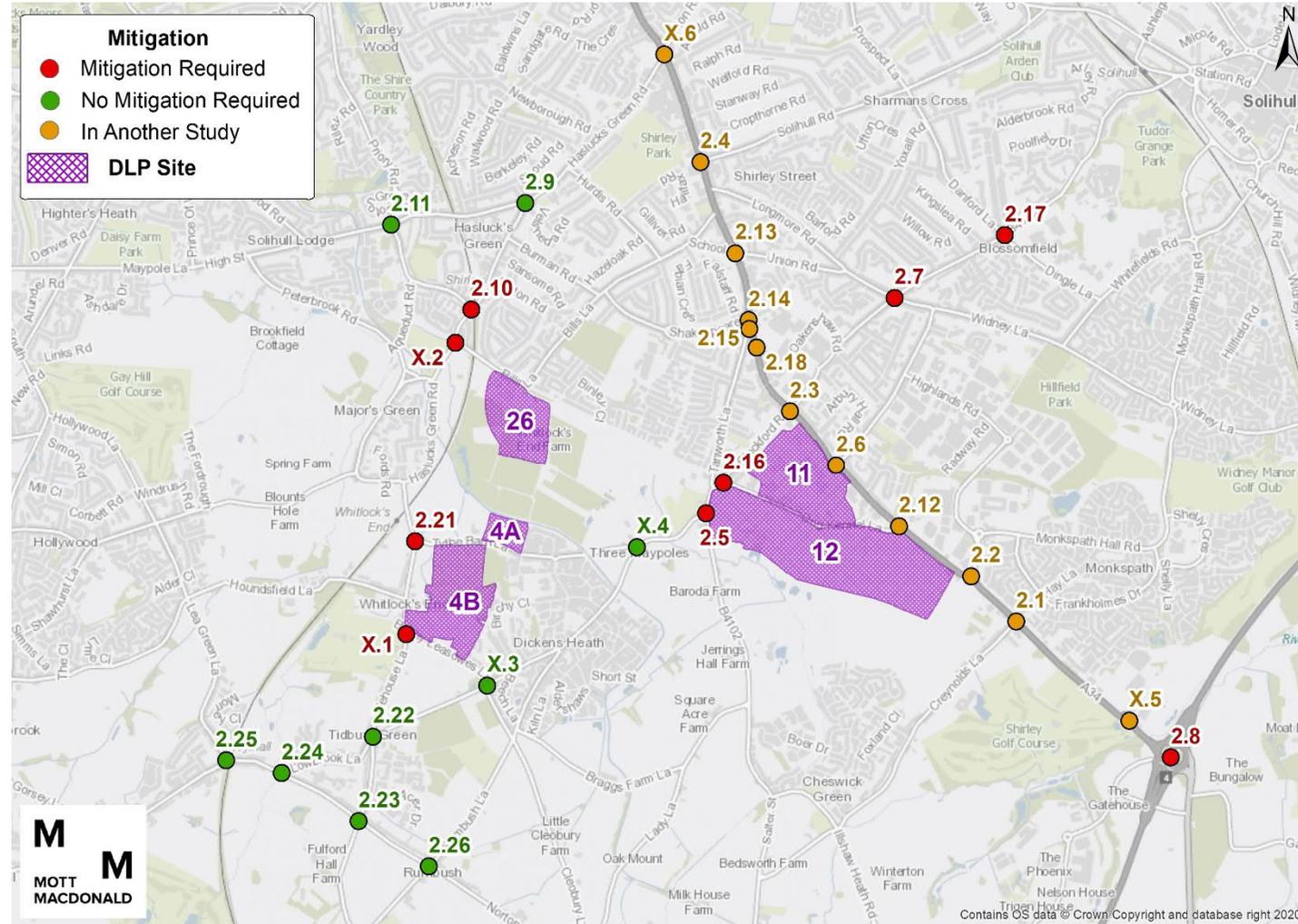
Ref	Junction	Site 4	Site 11	Site 12	Site 26	Cluster 2
2.1	Stratford Road / Creynolds Lane					A34 Stratford Road Enhancement Study
2.2	Stratford Road / Monkspath Hall Road					A34 Stratford Road Enhancement Study
2.3	Stratford Road / Blackford Road / Marshall Lake Road					A34 Stratford Road Enhancement Study
2.4	Stratford Road / Solihull Road					A34 Stratford Road Enhancement Study
2.5	Dickens Heath Road / Tanworth Lane	✓	X	X	X	✓
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate					A34 Stratford Road Enhancement Study
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	X	X	X	X	✓
2.8	M42 / Stratford Road / Blythe Gate	X	X	X	X	✓
2.9	Colebrook Road / Haslucks Green Road / Horell Road / Velsheda Road					Impacts not forecast to require mitigation
2.10	Haslucks Green Road / Green Lane	✓	X	X	X	✓
2.11	High Street / Colebrook Road / Windmill Road / Aqueduct Road					Impacts not forecast to require mitigation
2.12	Stratford Road / Dog Kennel Lane / Friars Gate					A34 Stratford Road Enhancement Study
2.13	Stratford Road / Union Road / School Road					A34 Stratford Road Enhancement Study
2.14	Stratford Road / Shakespeare Drive					A34 Stratford Road Enhancement Study
2.15	Stratford Road / Tanworth Lane					A34 Stratford Road Enhancement Study
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	✓	✓	✓	X	✓
2.17	Blossomfield Road / Dingle Lane / Danford Lane	X	X	X	X	✓
2.18	Stratford Road / Sainsburys					A34 Stratford Road Enhancement Study
2.21	Tilehouse Lane / Tythe Barn Lane	✓	X	X	X	✓
2.22	Lowbrook Lane / Dickens Heath Road / Tilehouse Lane / Fulford Hall Road					Impacts not forecast to require mitigation
2.23	Norton Lane / Fulford Hall Road					Impacts not forecast to require mitigation
2.24	Lowbrook Lane / Norton Lane					Impacts not forecast to require mitigation
2.25	Lea Green Lane / Station Road / Norton Lane					Impacts not forecast to require mitigation
2.26	Norton Road / Rumbush Lane					Impacts not forecast to require mitigation
X.1	Tilehouse Lane / Birchy Leasowes Lane	✓	X	X	X	✓
X.2	Haslucks Green Road / Bills Lane	X	X	X	✓	✓
X.3	Dickens Heath Road / Birchy Leasowes Lane					Impacts not forecast to require mitigation
X.4	Dickens Heath Road / Tythe Barn Lane					Impacts not forecast to require mitigation

Ref	Junction	Site 4	Site 11	Site 12	Site 26	Cluster 2
X.5	A34 Stratford Road / Tesco	A34 Stratford Road Enhancement Study				
X.6	Stratford Road / Olton Road	A34 Stratford Road Enhancement Study				

Source: Mott MacDonald

A summary of the information in Table 10.7 for the cumulative options is shown spatially below.

Figure 10.1: Cluster 2 Mitigation Requirements – Cumulative 2036



Source: Mott MacDonald

## 10.3 Cluster 2 Mitigation Strategy (Including Outline Costs)

### 10.3.1 TIA Study Mitigation and Costs

#### 10.3.1.1 Introduction

The Cluster 2 impacts at specific junctions have been reviewed in context of the existing junction layouts, the arms on which impacts are forecast to be greatest and baseline and development flows on each arm at the junctions.

Where impacts are considered to warrant further assessment and possible mitigation, concept schemes have been developed and high-level preliminary costings for the schemes have been estimated. This is set out below for each junction in Cluster 1.

#### 10.3.1.2 Junction 2.5 - Dickens Heath Road / Tanworth Lane

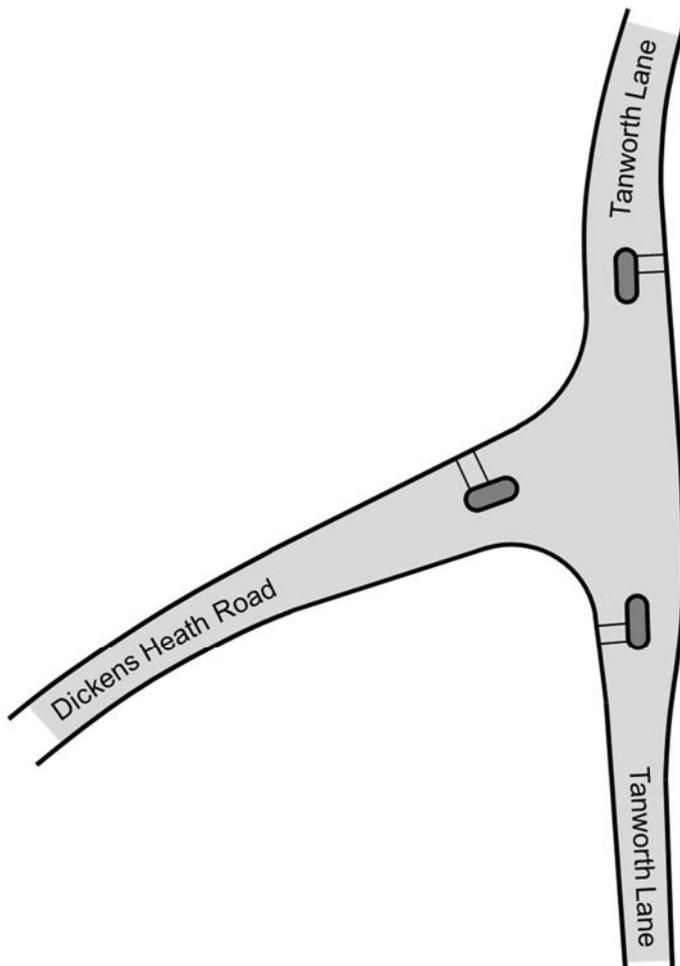
Junction 2.5 is an existing three-arm roundabout, located where the Tanworth Lane meets Dickens Heath Road. The junction is forecast to experience the greatest impacts as a result of Site 4, and cumulative Cluster 2 impacts. The methodology used to undertake the TIA suggests that mitigation is required due to the cumulative impact of development in both 2026 and 2036.

The junction and surrounding highway land have been reviewed. There is an existing off-road shared-use path north-west of the junction on Dickens Heath Road. There is an excellent opportunity to integrate this with any mitigation scheme and connect the existing route with new infrastructure in Sites 11 and 12.

The junction cannot be enlarged in its existing form without additional land take to the east (into Site 12). However, a more efficient use of the existing junction area would be to rearrange the junction into a three-arm signal-controlled junction. This will provide an opportunity for dedicated crossing facilities for pedestrians and cyclists whilst also ensuring minor arm operation for additional traffic to and from Dickens Heath.

An illustrative sketch of the concept mitigation scheme is shown in Figure 10.2.

**Figure 10.2: Junction 2.5 Illustrative Concept Mitigation Scheme**



Source: Mott MacDonald

#### 10.3.1.3 Junction 2.7 - Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road

Junction 2.7 is an existing signalised crossroads where Marshall Lake Road meets Blossomfield Road, Widney Lane and Longmore Road. The junction is forecast to require possible mitigation as a result of the cumulative impact of the Cluster 2 sites in 2036.

The junction and surrounding highway land have been reviewed. The existing junction would appear to have been maximised in terms of effective operation, there are already directional lanes on all approaches with a dedicated left turn lane from the west and east to the north and south respectively. There are crossover accesses to private driveways that will need to be maintained. There is therefore limited opportunity to implement an effective physical highway improvement mitigation scheme to accommodate additional traffic at the existing junction.

It is recommended that alternative mitigation is explored through a future study. This should identify possible alternative solutions to improve capacity and operation. Solutions may involve prohibiting certain movements and looking at a wider reassignment strategy to reduce conflicting movements at the junction and / or optimising signal timings further if possible.

#### 10.3.1.4 Junction 2.8 - M42 (N) / A34 Stratford Road (E) / A34 Stratford Road (W) / Blythe Gate / M42(S) Junction 2.8: M42 / Stratford Road / Blythe Gate

Junction 2.8 is an existing grade separated signalised roundabout where Stratford Roads meets the M42 motorway. The junction is forecast to require possible mitigation as a result of the cumulative impact of the Cluster 2 sites in 2036.

This junction has been highlighted as part of the strategic PRISM modelling work. Engagement with Highways England (HE) is currently underway, with HE developing a model for the junction.

#### 10.3.1.5 Junction 2.10 - Haslucks Green Road / Green Lane

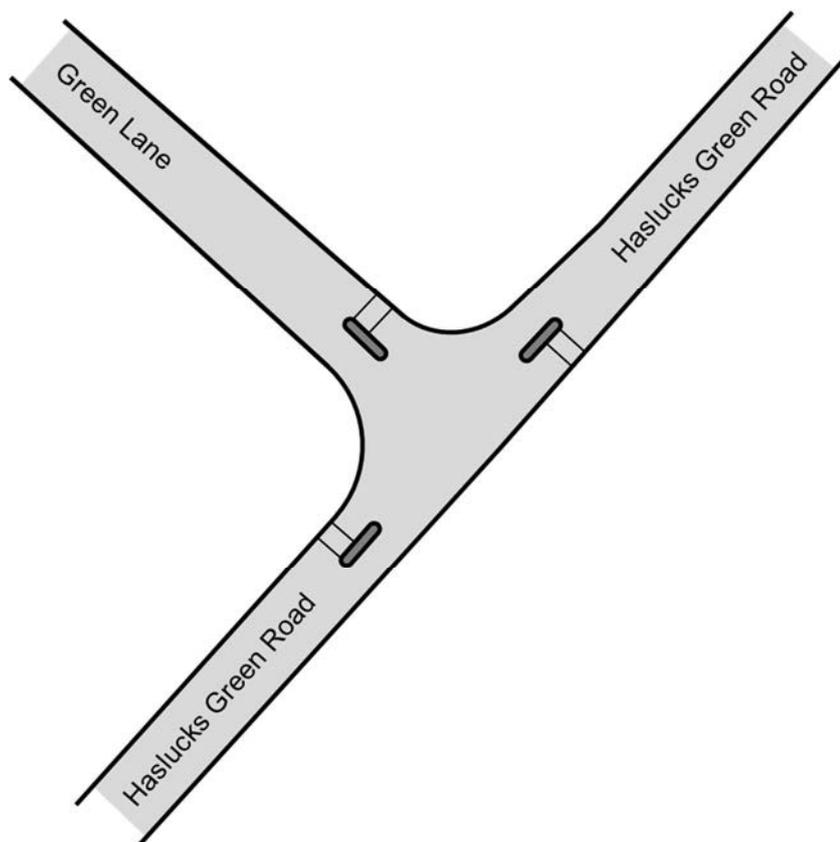
Junction 2.10 is an existing priority junction, located where the Haslucks Green Road meets Green Lane. The junction is forecast to experience the greatest impacts as a result of Site 4 and require possible mitigation to accommodate 2036 development flows.

The junction and surrounding highway land have been reviewed. Junction improvements will need to be delivered within the confines of the existing road over rail bridge structure. A desktop review of the structure would suggest that there is sufficient width to integrate a simple signalised solution, this will need to be reviewed in further detail to confirm feasibility.

Minor arm operation is expected to suffer due to heavier north/south flows on Haslucks Green Road. It is therefore suggested that the junction is reconfigured to a three-arm signalised junction with minor kerb realignment on each arm to facilitate signal heads with a single-phase crossing on all arms.

An illustrative sketch of the concept mitigation scheme is shown in Figure 10.3.

**Figure 10.3: Junction 2.10 Illustrative Concept Mitigation Scheme**



Source: Mott MacDonald

#### 10.3.1.6 Junction 2.16 - Blackford Road / Dog Kennel Lane / Tanworth Lane

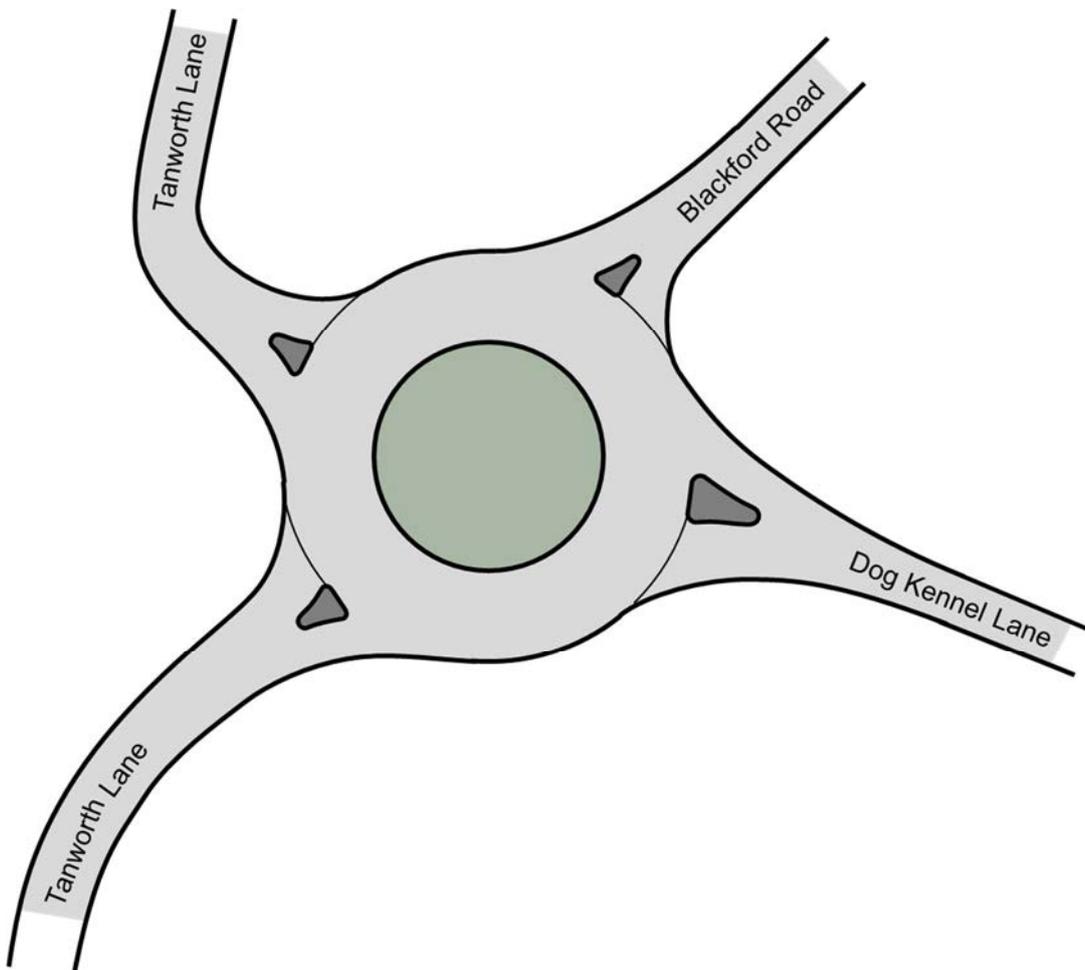
Junction 2.16 is an existing three-arm roundabout junction, with the south-western arm providing a connection to Tanworth Lane via a ghost island right turn lane formed shortly on exit from the circulatory. The junction is forecast to experience the greatest impacts as a result of Sites 11 and 12, both located east of the junction and accessed from Dog Kennel Lane. The distribution analysis carried out suggests that a 43% of traffic from either site will route via Junction 2.16. This level of impact is expected to require mitigation to facilitate development traffic in 2026.

The junction and surrounding highway land have been reviewed. There is a large area of grassland north-west of the existing junction. It is unclear if this is highway boundary, which will need to be established to determine feasibility due to land ownership constraints. For the purposes of identifying a mitigation scheme of a suitable scale to provide additional capacity to accommodate traffic from all Cluster 2 sites the land north-west of the junction has been used.

By utilising this land, the ICD of the roundabout can be increased significantly, this will enable realignment of all approaches to provide two-lane entries to the roundabout and a two-lane circulatory for improve efficiency. This arrangement would also enable for the ghost-island right turn lane on the south-western arm to be removed, and a dedicated entry and exit for Tanworth Lane to be formed on the roundabout.

An illustrative sketch of the concept mitigation scheme is shown in Figure 10.4.

**Figure 10.4: Junction 2.16 Illustrative Concept Mitigation Scheme**



Source: Mott MacDonald

#### 10.3.1.7 Junction 2.17 - Blossomfield Road / Dingle Lane / Danford Lane

Junction 2.17 is an existing signalised crossroads where Blossomfield Road meets Dingle Lane and Danford Lane. The junction is forecast to require possible mitigation as a result of the cumulative impact of the Cluster 2 sites in 2036.

The junction and surrounding highway land have been reviewed. The existing junction would appear to have been maximised in terms of effective operation, there are already directional lanes on all approaches with right turn bays for right turners from the north and south. The minimum distance across the junction is insufficient to provide a roundabout whilst maintaining footways, crossings and existing private access locations. Furthermore, the heavy eastbound and westbound flows are best catered for by signals to facilitate movements from the northern and southern arms. There is therefore limited opportunity to implement an effective physical highway improvement mitigation scheme to accommodate additional traffic at the existing junction.

It is recommended that alternative mitigation is explored through a future study. This should identify possible alternative solutions to improve capacity and operation. Solutions may involve

prohibiting certain movements and looking at a wider reassignment strategy to reduce conflicting movements at the junction and / or optimising signal timings further if possible.

#### 10.3.1.8 Junction 2.21 - Tilehouse Lane / Tythe Barn Lane

Junction 2.21 is an existing simple priority junction, located where Tythe Barn Lane meets Tilehouse Lane. The junction is forecast to experience the greatest impacts as a result of Site 4, and cumulative Cluster 2 impacts. The methodology used to undertake the TIA suggests that mitigation is required due to the cumulative impact of development in 2036, albeit this will likely form part of the Site 4 access strategy.

The proposed scheme developed by David Tucker has been reviewed (David Tucker Drawing 16432-04). This shows a three-arm roundabout formed south of the existing alignment of Tythe Barn Lane to avoid a pinch point on Tilehouse Lane north of the proposed junction. The junction and surrounding highway land have been reviewed, subject to further detailed review using topographic survey information, the junction form and scale appears to be feasible.

During the review, it was noted that the leisure access (north of the junction on Tilehouse Lane) will be on the opposite side of the road and in close proximity of the Whitlocks End Railway Station Car Park. It is therefore suggested that Tilehouse Lane is widened locally to accommodate a ghost island right turn lane in the centre of the carriageway for access to both the Station Car Park and Leisure Centre, this will prevent blocking of mainline traffic. The same approach is recommended on the Tythe Barn Lane proposed site access

#### 10.3.1.9 Junction X.1 - Tilehouse Lane / Birchy Leasowes Lane

Junction X.1 is an existing simple priority junction, located where Birchy Leasowes Lane meets Tilehouse Lane. The junction is forecast to experience the greatest impacts as a result of Site 4, and cumulative Cluster 2 impacts. The methodology used to undertake the TIA suggests that mitigation is required due to the cumulative impact of development in 2036, albeit this will likely form part of the Site 4 access strategy.

The proposed scheme developed by David Tucker has been reviewed (David Tucker Drawing 16432-05). This shows a three-arm roundabout formed north of the existing alignment of Birchy Leasowes Lane to enable sufficient spacing between the eastern and southern arms. The junction and surrounding highway land have been reviewed, subject to further detailed review using topographic survey information, the junction form and scale appears to be feasible.

During the review, it was noted that the site access (east of the junction on Birchy Leasowes Lane) would result in right turning traffic blocking the mainline if giving way to oncoming traffic. It is therefore suggested that Birchy Leasowes Lane is widened locally to accommodate a ghost island right turn lane in the centre of the carriageway for access to Site 4 to prevent blocking of mainline traffic.

#### 10.3.1.10 Junction X.2 - Haslucks Green Road / Bills Lane

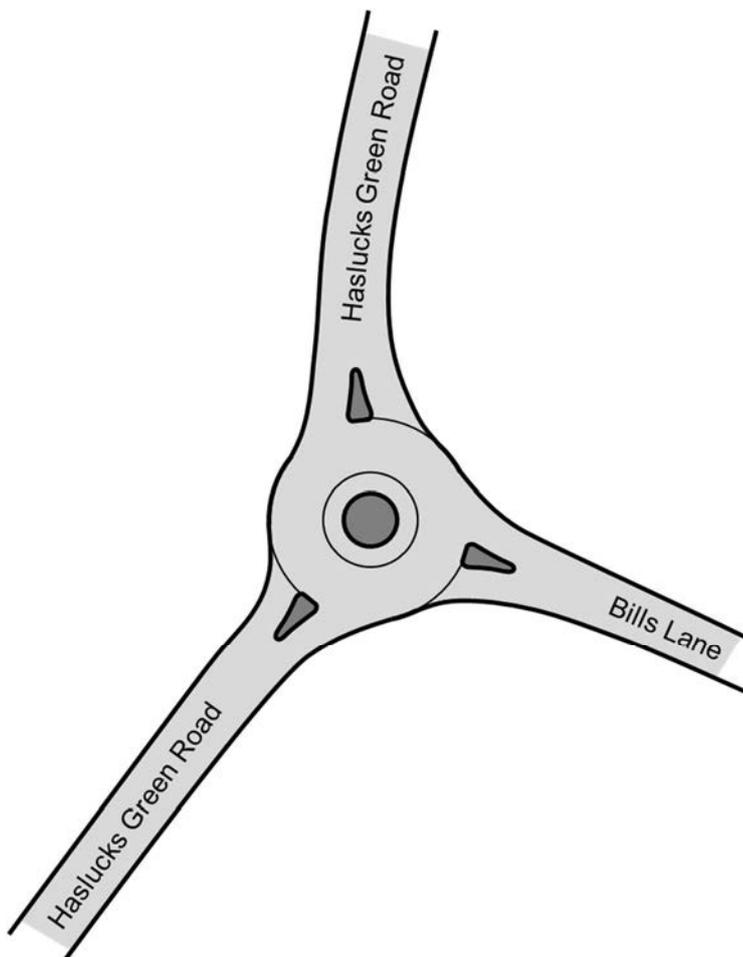
Junction X.2 is an existing priority junction with a ghost island right turn lane on the major arm (Station Road east). No impacts have been forecast due to lack of baseline survey data. However, Site 26 is accessed via Bills Lane. Haslucks Green Lane will experience increased traffic levels resulting from general background growth, along with phased delivery of Site 4. Junction operation is therefore expected to deteriorate given the current junction arrangement and increased traffic demand on both the minor and major arms.

Given that Site 26 will be accessed using Bills Lane, a junction improvement is considered necessary to enable full development of the 450 dwellings that have been considered in this TIA.

The junction and surrounding highway land have been reviewed. The enlarged nature of the priority junction provides significant land in which to deliver an improvement or reconfiguration of the junction. The presence of 'slow' markings on the carriageway suggest that speeding and safety concerns have been experienced in this location.

The proposed concept mitigation scheme is to replace the existing junction with a three-arm compact roundabout or mini roundabout. This will offer improved gaps in traffic for minor arm traffic turning right, manage queue lengths and bring about a reduction of traffic speeds on Haslucks Green Road. An illustrative sketch of the concept mitigation scheme is shown in Figure 10.5.

**Figure 10.5: Junction X.2 Illustrative Concept Mitigation Scheme**



Source: Mott MacDonald

#### 10.3.1.11 Cluster 2 Cost Estimates

The preliminary cost estimate summary that has been prepared for the Cluster 1 mitigation schemes identified in this TIA are provided in Table 10.8.

**Table 10.8: Cluster 2 Mitigation Scheme Preliminary Cost Estimate Summary**

Ref	Location	Proposed Layout	Rounded Cost Estimate		Comments
			Low	High	
2.5	Dickens Heath Road / Tanworth Lane	3-arm signals	£400,000	£700,000	
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	Prohibition of movements, signal optimisation	£50,000	£100,000	Junction modelling, signing strategy, signal design work
2.10	Haslucks Green Road / Green Lane	3-arm signals	£280,000	£500,000	
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	Larger roundabout and increased entry/ exit widths	£1,160,000	£2,030,000	Assumed 60m diameter roundabout
2.17	Blossomfield Road / Dingle Lane / Danford Lane)	Prohibition of movements, signal optimisation	£50,000	£100,000	Junction modelling, signing strategy, signal design work
2.21	Tilehouse Lane / Tythe Barn Lane	New roundabout plus ghost island right turn lanes	£760,000	£1,320,000	
X.1	Tilehouse Lane / Birchy Leasowes Lane	New roundabout plus ghost island right turn lanes	£540,000	£940,000	
X.2	Haslucks Green Road / Bills Lane	3-arm signals	£130,000	£220,000	

Source: Mott MacDonald

### 10.3.2 A34 Stratford Road Enhancement Study Mitigation

In addition to the study recommendations identified above, the A34 Stratford Road Enhancement Study identified mitigation at the junctions highlighted in orange in Figure 10.1. A summary of mitigation proposed in this study is shown in Table 10.9.

**Table 10.9: A34 Stratford Road Enhancement Study Mitigation**

Ref	Junction	Mitigation
2.1	Stratford Road / Creynolds Lane	Allow right turn out of Creynolds Lane onto A34, including cycle turn. High quality cycle infrastructure on A34.
2.2	Stratford Road / Monkspath Hall Road	Junction capacity improvement. High quality cycle infrastructure and improved pedestrian crossing facilities on A34.
2.3	Stratford Road / Blackford Road / Marshall Lake Road	Signalise junction and improve safety. Provide bus priority left turn on to Marshall Lake Road at roundabout. High quality cycle infrastructure and priority bus lane on A34.
2.4	Stratford Road / Solihull Road	High quality cycle infrastructure, priority bus lane, improved pedestrian crossing facilities and highway efficiency improvements on A34.
2.6	Stratford Road / Cranmore Boulevard / Industrial Estate	High quality cycle infrastructure and improved pedestrian crossing facilities on A34.
2.12	Stratford Road / Dog Kennel Lane / Friars Gate	High quality cycle infrastructure and improved pedestrian crossing facilities on A34.
2.13	Stratford Road / Union Road / School Road	Increase capacity of roundabout and improve safety.

Ref	Junction	Mitigation
		High quality cycle infrastructure, priority bus lane, improved pedestrian crossing facilities and highway efficiency improvements on A34.
2.14	Stratford Road / Shakespeare Drive	Increase capacity at junction. High quality cycle infrastructure and priority bus lane on A34.
2.15	Stratford Road / Tanworth Lane	High quality cycle infrastructure and priority bus lane on A34.
2.18	Stratford Road / Sainsburys	High quality cycle infrastructure and priority bus lane on A34.
X.5	A34 Stratford Road / Tesco	Junction improvement. High quality cycle infrastructure on A34.
X.6	Stratford Road / Olton Road	Safety/signal improvements. High quality cycle infrastructure and priority bus lane on A34.

Source: A34 Stratford Road Enhancement Study

# 11 Conclusion

## 11.1 Summary

Mott MacDonald was commissioned by SMBC to undertake a high-level Traffic Impact Assessment of six prospective Local Plan site allocations. The sites lie within two broad clusters in the Dorridge / Knowle / Bentley Heath and Shirley / Dickens Heath areas. The objective of the study is to determine the likely impact of the sites' associated development traffic on the surrounding highway network and to identify to a concept level the possible highway-based mitigation schemes that could be delivered.

Traffic data collection was undertaken at junctions within each cluster to establish a baseline traffic flow scenario. The traffic generation for each site has been determined using TRICS trips rates, that were agreed with SMBC, and has been distributed and assigned to the local highway network using Census data information.

The impact of each site individually and cumulatively for each Cluster has been carried out on the link capacities and as percentage impacts at junctions within the highway network. This impact has then been considered against the existing congestion levels, determined using TrafficMaster data, and against areas where concerns have been raised through public consultation. This composite approach has been applied across the network to identify junctions that are likely to require mitigation.

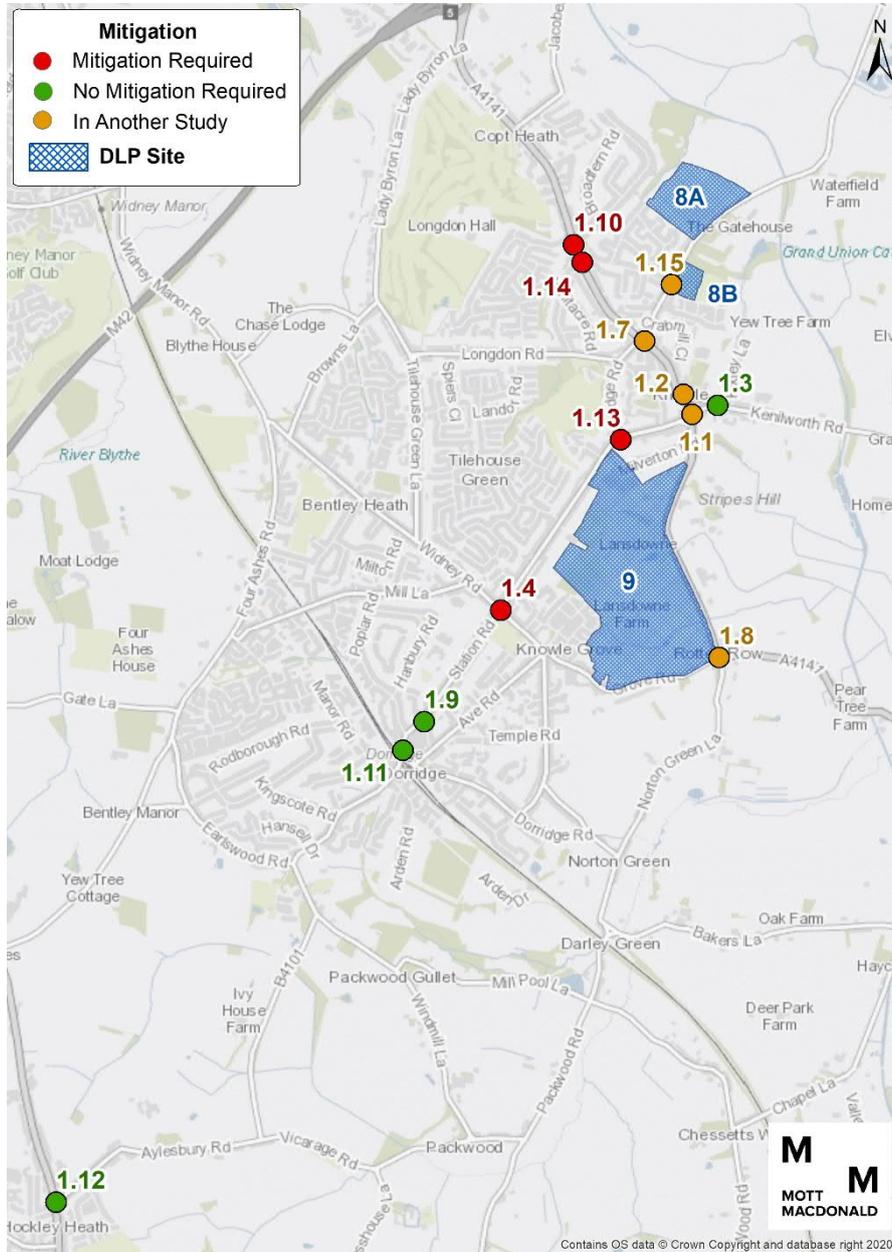
Where impacts have been identified at junctions, possible mitigation solutions have been considered to a high-level in terms of feasibility, constructability, impact/benefit, cost and safety. Where mitigation appears to be deliverable (subject to further review, design and assessment) potential mitigation has been identified. The level of mitigation identified varies between each site based on its respective impact.

## 11.2 Conclusion

### 11.2.1 Cluster 1 Conclusions

The junctions that have been identified for mitigation are shown in Figure 11.1 for Cluster 1.

**Figure 11.1: Cluster 1 Mitigation Requirements – Cumulative 2036**



Source: Mott MacDonald

The proposed mitigation for each of the red junctions in Figure 11.1 is shown in Table 11.1. A range of indicative costs for the mitigation have also been included. This table does not include the junctions included in the Knowle Transport Study.

**Table 11.1: Cluster 1 Mitigation Scheme Preliminary Cost Estimate Summary**

Ref	Location	Proposed Layout	Rounded Cost Estimate	
			Low	High
1.4	Grove Road / Station Road / Widney Road	None proposed	N/A	N/A
1.10	Warwick Road / Wychwood Avenue / Langfield Road	TBC	N/A	N/A
1.13	Lodge Road / Station Road	TBC	N/A	N/A
1.14	Arden Vale Road / A4141	None proposed	N/A	N/A

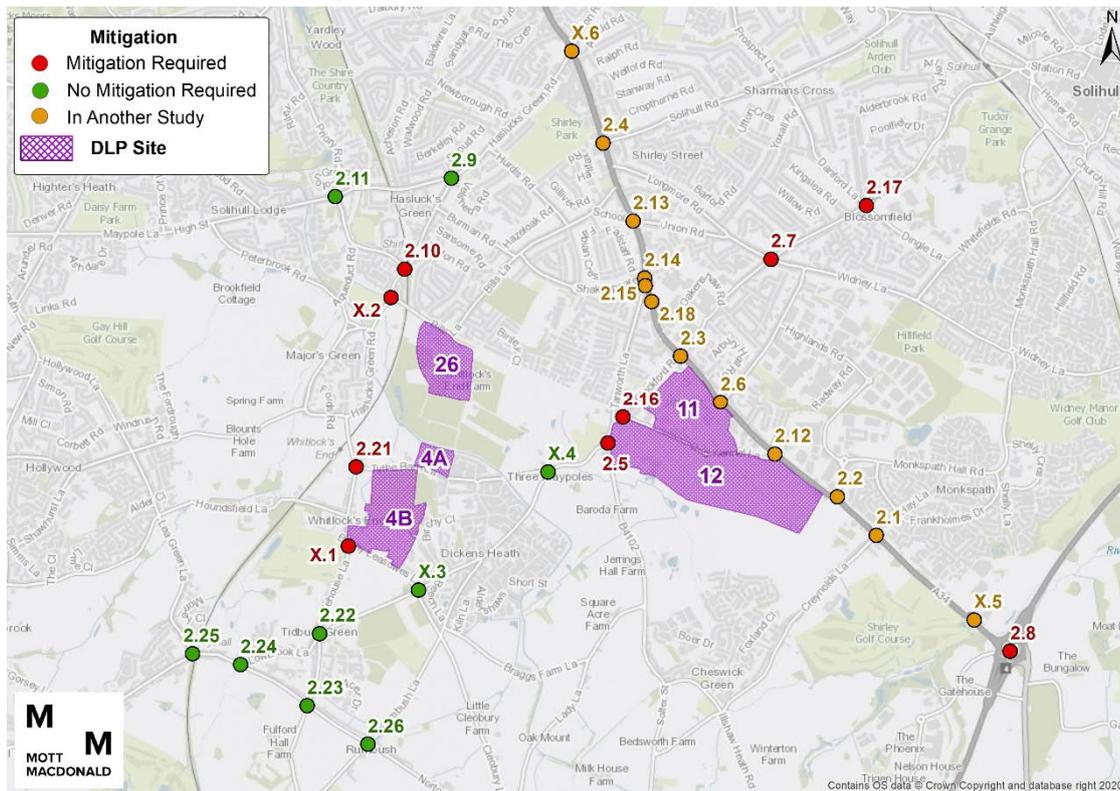
Source: Mott MacDonald

Reasons for why no mitigation has been proposed can be found in Section 9.3.

**11.2.2 Cluster 2 Conclusions**

The junctions that have been identified for mitigation are shown in Figure 11.2 for Cluster 1.

**Figure 11.2: Cluster 2 Mitigation Requirements – Cumulative 2036**



Source: Mott MacDonald

The proposed mitigation for each of the red junctions in Figure 11.2 is shown in Table 11.2. A range of indicative costs for the mitigation have also been included. This table does not include the junctions included in the A34 Stratford Road Enhancement Study.

**Table 11.2: Cluster 2 Mitigation Scheme Preliminary Cost Estimate Summary**

Ref	Location	Proposed Layout	Rounded Cost Estimate	
			Low	High
2.5	Dickens Heath Road / Tanworth Lane	3-arm signals	£400,000	£700,000
2.7	Widney Lane / Longmore Road / Blossomfield Road / Marshall Lake Road	Prohibition of movements, signal optimisation	£50,000	£100,000
2.10	Haslucks Green Road / Green Lane	3-arm signals	£280,000	£500,000
2.16	Blackford Road / Dog Kennel Lane / Tanworth Lane	Larger roundabout and increased entry/ exit widths	£1,160,000	£2,030,000
2.17	Blossomfield Road / Dingle Lane / Danford Lane)	Prohibition of movements, signal optimisation	£50,000	£100,000
2.21	Tilehouse Lane / Tythe Barn Lane	New roundabout plus ghost island right turn lanes	£760,000	£1,320,000
X.1	Tilehouse Lane / Birchy Leasowes Lane	New roundabout plus ghost island right turn lanes	£540,000	£940,000
X.2	Haslucks Green Road / Bills Lane	3-arm signals	£130,000	£220,000

Source: Mott MacDonald

## **A. Sustainable Accessibility Review**

## B. Link Capacity

### B.1 Cluster 1

## B.2 Cluster 2

## C. Junction Impact

