

Appendix G

**Extracts from 'Milton Keynes Transport Model Traffic Forecast Report',
May 2012**

Table 4.1 – ‘Committed’ Strategic Infrastructure Changes

CORE STRATEGY 2026 - STRATEGIC INFRASTRUCTURE SCHEMES	
Existing Highway Agency Schemes	
	M1 Junctions 10 – 13
	A421 Bedford to M1
Highways Agency Schemes starting work before 2015	
	None
Schemes starting work post 2015	
	A5-M1 Link Road (Dunstable North)
Local Major Transport Schemes by Other Local Authorities	
	None
Strategic Rail Schemes	
High Speed Two (HS2):- This is due to open in 2026. It will release capacity on the West Coast Main Line (WCML) to allow MK to have a more frequent train service to/from places already having through service, e.g., London, Birmingham and Manchester, and to allow new through services to places like Liverpool, Central Lancashire, Scotland and possibly even Yorkshire. If an intermediate station is built on HS2 in the Claydon area (where it crosses EWR), faster train services to/from the more distant locations in North Lancashire, Cumbria and Scotland might be possible. These would all have to be lobbied for, but if achieved would again cause transfer of journeys from car to train.	
East – West Rail:- Anticipated start date is from 2016 to 2018. The Western Section, currently being progressed, aims to have Oxford/Aylesbury – MK Central/Bedford train services, which may well run through to/from Reading or Didcot, and ultimately (many years from now, when work on the Central Section is more advanced) to/from Cambridge and further east. A Cross-Country service between Southampton and Manchester via Oxford, MK Central and the Trent Valley line has also been suggested. The effect of these services will be to divert existing and expanded rail traffic away from London (thus reducing overcrowding on routes like MK Central – Euston), and to encourage direct journeys between places like MK and Oxford to transfer from car to train.	

Table 4.2 Local Network Infrastructure Schemes

Scheme
Local Public Transport Network Schemes
CMK Public Transport Access Scheme Improvements
Station Square access changes
MK Busways between Northfield and EEA (CIF bid)
Park and Ride Sites (Coachway, Denbigh, A421 East)
Roundabouts Signalised
A5/A4146/Watling St
Kingston (URS)
Brinklow (WSP)
Monkston (WSP)
South Grafton (PFA – WEA)
H3/V9 Great Linford (WYG)
H3/V10 Blakelands (WYG)
H3/V8 Redbridge (WYG)
A422/Willen Rd Marsh End (WYG)
A422/A509 Tickford (WYG)
Roundabouts converted to Traffic Signal Junctions
Kiln Farm (JMP – WEA) – 1235
Crownhill (PFA – WEA) – 1280
Loughton (PFA – WEA) – 1312
Knowlhill – 1353
Oakhill (PFA – WEA) – 1601
Oxley Park (PFA – WEA) – 1346
New Bradwell – 1673
Coffee Hall with left slips (Jacobs Babbie) – 1433
Silbury – completed 2007 (Atkins) – 1334
Marina & Netherfield (Jacobs Babbie) – 1437/1573
Watling Street/Saxon Street (WSP) – 1501
Fairways (JMP – WEA) – 1251
Roundabouts Adjusted
The Bowl – 1392
Grange Farm – 1705
Priority converted to Traffic Signal junctions
Watling Street/Tilers Road (JMP – WEA) – 1246
Watling Street/High Street (JMP – WEA) – 1279

Appendix H

Halcrow Note: Modelling for SWMK

South West Milton Keynes Development Modelling

Project South West Milton Keynes
Subject Development Modelling

Date 06 January 2015
Ref 460478

Introduction

CH2M Hill was commissioned by Pell Frischmann to undertake the transport modelling of a proposed residential and employment development to the south west of Milton Keynes. The transport modelling utilised the Milton Keynes Transport Model, a 4 stage multi modal transport model developed in line with WebTag procedures and processes. The modelling of the development was based on the 2026 revised core strategy model which went through EiP.

The development of the transport model is contained within the Local Model Validation report and the Forecasting Report which also describes the process for combining forecasts from both the Regional and Local Demand Models.

In the base year 2009 model a RSI site was undertaken on the A421 on the eastbound approach to Bottle Dump Roundabout. The subsequent model calibration achieved the following results in terms of GEH statistic.

	AM	IP	PM
RSI Site 14: A421 Buckingham Road	3.8	0.1	0.4

Table 1. Model Calibration (GEH Statistic) adjacent to Development area

The A421 between Bottle Dump Roundabout and M1 J13 was also a journey time route for validation purposes. The journey time performance on this route is shown in Table 2.

Route	Direction	AM	IP	PM
A421 to M1 J13	Eastbound	Yes	Yes	Yes
	Westbound	Yes	No (18%)	Yes

Table 2. Journey Time Validation (within 15% of observed journey time: DMRB criteria)

Proposed Development

The detail of the proposed development was provided by in an email from Simon Wainaina of Pell Frischmann dated 21 October 2013 in the following manner, with an accompanying Site Plan (Figure 1 below):

- Up to 1,855 mixed tenure homes (C3) on 53.79 Ha of land;
- An employment area of 2 Ha (previously was 7 Ha B8 sheds, now smaller starter incubator type units);
- A local centre of 0.6 Ha; and
- Provision of 8.2 Ha of land to provide education facilities comprising a primary school (PS in the attached plan) with ancillary early years provision and a potential separate Secondary school (SS in Figure 1).

This planning data for input into the demand model was distributed amongst the following zones in the model as follows:

Zone	SATURN Zone	Zone Type	Emp	HH	Sch	Cmmrcl
1	5361	HH		450		
2	5362	HH		325		
3	5363	Emp	1160			
4	5364	HH		150		
5	5368	School Primary		0	630	
6	5369	School Secondary		0	600	
7	5370	HH		420		
8	5371	HH		410		
9	5372	HH		100		
10	5373	Commercial				200
	Total		1160	1855	1230	200

Table 3. Development Quantum and Zone Allocation

Since two previous proposals for development of the Salden Chase area had been previously tested by CH2M Hill on behalf of Pell Frischmann, this development test has been referred to the Phase 3 Development.

As can be seen from Table 3 the development comprises of up to 1855 dwellings, 1160 jobs, a commercial centre with 200 jobs and schools of 1230 pupils. The scenario was modelled in the 2026 forecast year.

The development figures were provided to Rand Europe, who developed the Local Demand Model, to establish trip generation, mode split and distribution impacts of the development. In addition the concentration of development to the south west of Milton Keynes was incorporated into the Regional Demand Model by concentrating the rural development forecasts for the Aylesbury Vale District (where it sits) within the relevant zone. The regional demand model was then rerun to revise the regional development forecasts and growth.

The distribution of the development and highway network modelled was based on a plan provided by Pell Frischmann.

Pell Frischmann requested a series of different scenarios to be modelled which were finally comprised of the following:

- Scenario S1: Without Phase 3 Developments but infrastructure changes associated with the development;
- Scenarios S2: With Phase 3 Developments and infrastructure changes associated with the development; and
- Scenario S3: Same as S2 but with Bletchley Bypass.

The proposed infrastructure changes for Phase 3 were also set out in the email provided by Simon Wainaina, described as follows

Three new junctions will be constructed for vehicular access into the site. These will be via:

- Whaddon Road
- Buckingham Road; and
- A Left in/Left Out junction on the north of the site leading onto the A421.

Whaddon Road bounds the west side of the development site. The road connects to the north to Bottle Dump Roundabout. To the south, Whaddon Road connects to Bletchley Road, in the village of Newton Longville.

The new junction connecting into the development site will be a priority T Junction with a right turn lane into the site from the northbound carriageway of Whaddon Road.

The access junction along Buckingham Road will be a roundabout.

The access junction to the north, will connect from the A421 Standing Way. The junction will be a Left In/Left Out arrangement, as is common throughout existing neighbourhoods in Milton Keynes.

The alignment of the Bletchley Southern Bypass was taken from the overview strategy diagram with an assumed speed limit of 50mph and as a single carriageway.

Following investigation of the initial Scenario S1, it was adapted to make sure that no through traffic was travelling through the development area, as the new infrastructure naturally provided a rat-run for existing A421 traffic.

Five iterations were undertaken with the demand models to ensure that the final matrices had converged within prescribed limits as specified by Webtag. The resultant demand/supply figure was 0.12 indicating that the scenario converged to an acceptable level.

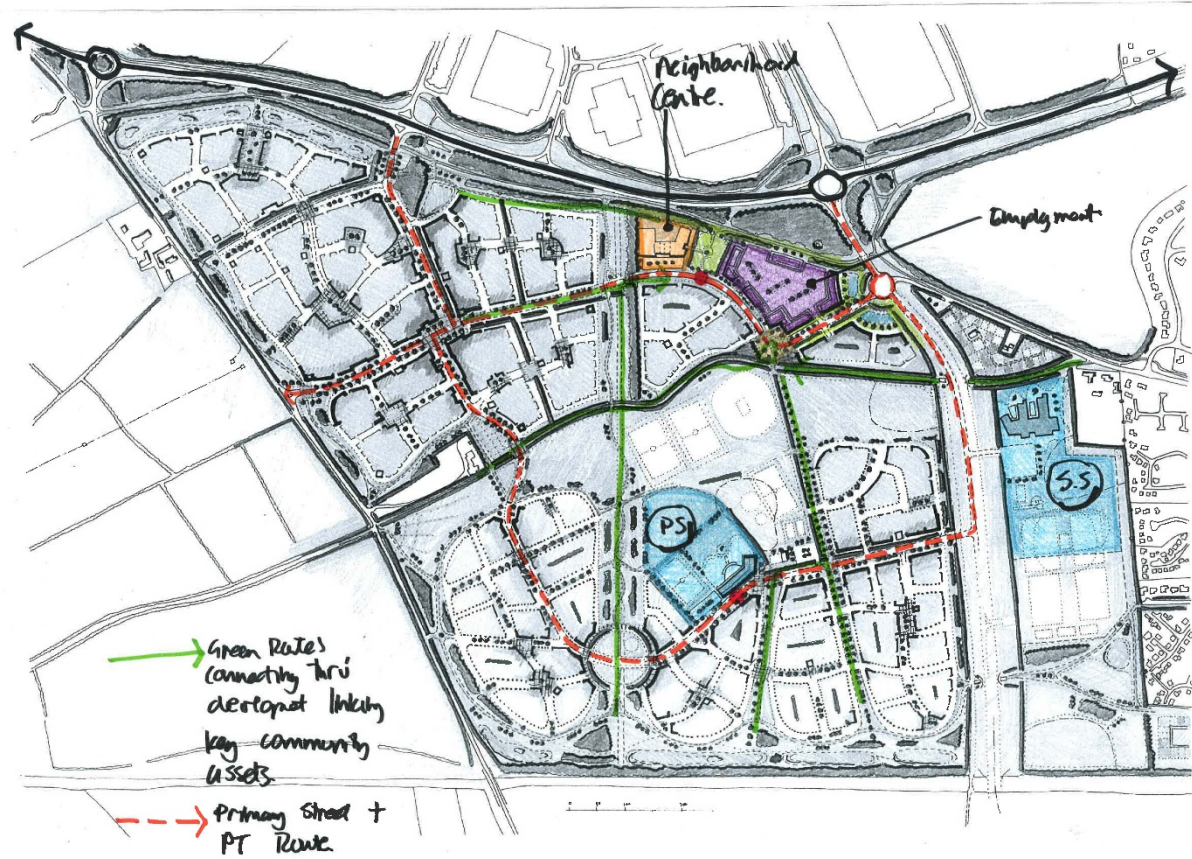
The assignment convergence also meets current acceptability guidance and can be extracted from the relevant UFS files as required.

Forecast assignments for the AM, IP and PM peaks were provided to Pell Frischmann for their own analysis as requested together with turning flows for the following junctions for each scenario:

- Redmoor Roundabout
- Portway
- Abbey Hill
- A422/A508

Within the modelling undertaken CH2M Hill did not attempt to mitigate for adverse impacts of the development proposals (besides optimising local signal timings).

Figure 1 – Site Layout (as provided by Pell Frischmann)



Appendix I

Scoping Note for the Transport Assessment

Pell Frischmann

excellence through innovation

South West Milton Keynes

November 2013

Scoping Note for the Development and Delivery of the Site

M53295/VBB/SN Rev A

Submitted by Pell Frischmann

REVISION RECORD Report Ref: South West Milton Keynes - Scoping Note Draft.doc					
Rev	Description	Date	Originator	Checked	Approved
-	Draft	May 2012	LA/SW	SW/GT	GT
A	Updated Draft	Nov 2013	LA	SW/GT	GT

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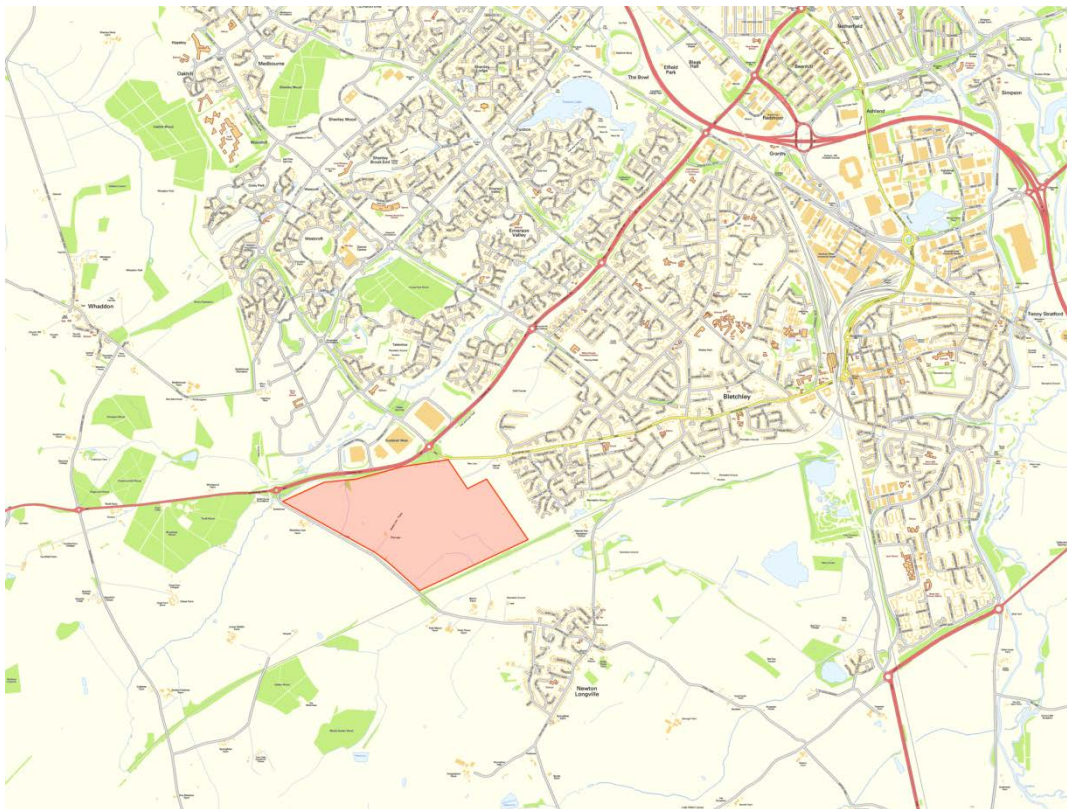
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1. INTRODUCTION

- 1.1.1 Pell Frischmann have been commissioned to prepare a Transport Assessment (TA) in support of the proposed development of a mixed-use site in north-east Aylesbury Vale to the south-west of Milton Keynes.

1.2 Site Location

- 1.2.1 The South West Milton Keynes development site is located in north-east Aylesbury Vale, Buckinghamshire, to the south-west of Milton Keynes. The site is currently mostly in agricultural use. The site is bound to the north by the A421, to the east by the existing built up area of Far Bletchley, to the south by the disused East-West railway line, and to the west by existing fields and woodlands. **Figure 1.1** shows the site location in relation to Central Milton Keynes, which is located some 7km (as the crow flies) north-east of the site. Buckingham is some 13km west of the development site.



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Figure 1.1: Approximate Site Location

1.3 Transport Network

- 1.3.1 The South West Milton Keynes development site is located to the south-west of Milton Keynes and south of the A421 Standing Way between Bottle Dump Roundabout and Tattenhoe Roundabout. Whaddon Road, which travels south-east from Bottle Dump Roundabout, bounds the western side of the development.
- 1.3.2 To the east of the South West Milton Keynes site, the A421 provides connections to Milton Keynes, the M1 and Bedford. The A421 travels north-east from the development site, crossing the A5 before continuing past Beanhill, Woughton Park, and south of Kingston to continue south-east adjacent to the M1, crossing the M1 at Junction 13 before travelling north towards Bedford.
- 1.3.3 To the west of the development site, the A421 provides links to Buckingham and the A43. The A421 travels west from Bottle Dump Roundabout, and has a number of junctions along its length providing links to minor roads that serve the surrounding villages. The A421 continues west and meets the A413 at a roundabout to the east of Buckingham, some 12.5km west of the site, before continuing around the south of Buckingham, north of the Buckingham Industrial Estate. The A421 continues west from Buckingham, bypassing to the south of Tingewick before joining the A43 approximately 4km south of the centre of Brackley.
- 1.3.4 Link and junction capacity assessments will be undertaken for major junctions in the vicinity of the site to enable an assessment of potential impacts of trips generated by the proposed development on the surrounding local and trunk road network. The specific traffic impact issues will be set out in the Transport Assessment and will be within the wider strategic level transport modelling and infrastructure strategy for the Milton Keynes.
- 1.3.5 Pell Frischmann will ensure that the proposed transport strategy for the site will follow the best practice and NPPF principles to achieve sustainable development, not only in terms of environment but also economic and social well being.

2. PROPOSED DEVELOPMENT

2.1.1 The developing Core Strategy for Milton Keynes identifies 28,000 new houses for the period up to 2026. This is due to a 24% population growth forecast in the borough in the same period. Whilst at a lower scale, the draft Vale of Aylesbury Plan identified housing growth in the range of 4,500 to 13,500 for the period of 2011 to 2031. Whilst the Core Strategy for the Vale of Aylesbury is yet to be finalised, this level of growth which needs to be accommodated comes with pressures to achieve on average 2317 houses completion per annum. Figures for the last 5 years (2006-2011) demonstrate that house completion rates are 1660 and 746 in Milton Keynes and Aylesbury respectively. This site is not identified within the Core Strategy but can help the council to meet their target as the developers are committed to deliver the site.

2.1.2 Discussions with the Council and the planning team has identified that the site needs to possess mixed-use characteristics where the site can be considered as self-sufficient with services and facilities attached within its context.

2.2 Previous

2.2.1 The previous TA completed in 2010 proposed the following:

- 5,387 dwellings,
- 37,050m² employment land,
- Four primary and 1 secondary school,
- 5,200m² food retail, and
- Leisure and community uses.

2.2.2 The above proposed land-use identified likely external trip generation for the site as follows:

Mode	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Car Driver	837	1182	1258	797
Car Passenger	105	149	158	100
Public Transport	95	134	142	90
Bicycle	38	54	57	36
Pedestrian	88	106	132	84

Table 1: External Trip Generation – 2010 TA

2.2.3 Whilst this is accepted at the time, the development of TRICS software continues (currently version 2012(a)) with new sites and multi-modal trip generation where an update of these and a consideration for potential modal shift trips will need be considered for a sustainable site development.

2.3 Current

2.3.1 The site will include:

- Up to 1,855 mixed tenure homes (C3) on 53.79 Ha of land;
- An employment area of 2 Ha;
- A local centre of 0.6 Ha; and
- Provision of 5.2 Ha of land to provide education facilities comprising a primary school with ancillary early years provision and a potential site for a satellite Secondary school;

2.3.2 A Master Plan of the proposed layout of the site is shown in **Appendix A**.

2.3.3 Three new vehicular junctions will be constructed for vehicular access into the site. These will be via:

- Whaddon Road
- Buckingham Road; and
- A Left in/Left Out junction on the north of the site leading onto the A421.

2.3.4 Whaddon Road bounds the west side of the development site. The road connects to the north to Bottle Dump Roundabout. To the south, Whaddon Road connects to Bletchley Road, in the village of Newton Longville.

2.3.5 The new junction connecting into the development site will be priority T Junction with a right turn lane into the site from the northbound carriageway of Whaddon Road.

2.3.6 The access junction along Buckingham Road will be a roundabout or traffic signalised junction.

2.3.7 The access junction to the north, will connect from the A421 Standing Way. The junction will be a Left In/Left Out arrangement, as is common throughout existing neighbourhoods in Milton Keynes.

3. POLICY REVIEW

- 3.1.1 The MKC Core Strategy and the LTP3 will be reviewed in line with the proposed development, an initial review has already been undertaken but a thorough review of the policies in relation to the site will be undertaken
- 3.1.2 The Development and how it complies with the MKC Core Strategy is introduced as follows:

Strategy	Development Compliance with MKC Core Strategy Policy					
	CS1	CS2	CS6	CS8	CS11	CS12
Mixed use Development	✓	✓	✓	✓	✓	✓
Development Phasing	✓	✓	✓	✓	✓	✓
Access Control			✓		✓	✓
Bus Operations and priority			✓		✓	✓
Development of Smart Corridors			✓		✓	
Park & Ride			✓		✓	
Information Systems (RTPI)			✓		✓	✓
Real-time Travel Advice			✓		✓	✓
Bus Gating and Priority			✓		✓	✓
Smarter Choices & Travel Plan Initiatives			✓		✓	✓
Walking Network Improvements			✓		✓	✓
Cycle network Improvements			✓		✓	✓
Mitigating Residual Traffic			✓		✓	

Table 2: Development Compliance with Core Strategy

- 3.1.3 A similar analysis for the development against the LTP 3 compliance has been undertaken and is shown below.

Strategy	Development Compliance with LTP3						
	Public Transport	Cycling and Walking	Smarter Choices	Highways and Traffic Management	Technology	Infrastructure Management	Development Planning
Mixed use Development							✓
Development Phasing							✓
Access Control				✓	✓	✓	
Bus Operations and priority	✓		✓				
Development of Smart Corridors	✓		✓	✓	✓	✓	
Park & Ride	✓					✓	
Information Systems (RTPI)	✓		✓	✓	✓	✓	
Real-time Travel Advice	✓		✓	✓	✓	✓	
Bus Gating and Priority	✓		✓	✓	✓	✓	
Smarter Choices & Travel Plan Initiatives	✓	✓	✓	✓			✓
Walking Network Improvements		✓	✓				✓
Cycle network Improvements		✓	✓				✓
Better Bus Area Fund	✓	✓	✓	✓	✓		✓
Mitigating Residual Traffic				✓	✓	✓	

Table 3: Development Compliance with LTP3

- 3.1.4 Also following MKC's successful bid for the Better Bus Area Fund, the proposed bus route improvements and other initiatives will be reviewed in line with the site and how they will aid the site in creating a Sustainable Urban Extension (SUE) to Milton Keynes.
- 3.1.5 With the successful BBAF bid MKC is investing in infrastructure in the area which will also support the proposed development as well the existing developments.
- 3.1.6 MKC has an Urban and Rural housing target for new homes to be provided by 2026 which is equivalent to 1640 urban and 110 rural houses per annum. The site will help MKC to meet its future housing targets.

4. TRANSPORT AND ACCESS STRATEGY

4.1 Sustainability Assessment

4.1.1 A sustainability assessment will be conducted assessing the accessibility of the site by all modes of transport. Pell Frischmann will ensure that the proposed transport strategy for the site will follow the best practice and will be NPPF compliant to deliver the strategy supported by Local policies through:

- Being Sustainable;
- Encourage Modal shift;
- Increase Accessibility; and
- Mitigate any residual impacts.

4.1.2 South West Milton Keynes presents an opportunity for a coordinated and well designed SUE site, with potential to incorporate Redway principles, sustainable transport with ability to fully mitigate its traffic impact, ability to complement future strategic link road(s) such as the "V0" link between the Bottledump Roundabout and the H7 and the Bletchley Southern Bypass. The site will incorporate social and commercial facilities for local demand, and has potential to include a P&R site on or near the A421 to improve sustainability, as well as the ability to contribute towards future infrastructure provision through the mass housing supply at future phases.

4.1.3 The site will also benefit from recent 'Better Bus Area Fund' which will help to introduce a north-south express bus service (Wolverton-Centre-Bletchley) as well as significant improvements to the major Bus to Bus Interchange locations. The Site is bounded by the A421 and the Buckingham Road to the north, the BBAF includes improvements to Route 4 which passes the northeast section of the site and this route could be extended to be accessible to more of the site. If an extension to Route 4 is considered unrealistic, then an alternative could be contribution to a new service linking Bletchley with Tattenhoe Park, Kingsmead South and the Westcroft District Centre.

4.1.4 The possibility of a shared minibus/taxi service to main locations within MK will be investigated in relation to the site. This links into MKC's LPT Public Transport Strategy Bo2 which seeks to introduce "semi-flexible, dial-a-ride style bus services covering the city estates" in 5 to 10 years.

4.1.5 The South West Milton Keynes site will be easily accessible and well connected, it will sustain existing facilities and be well-integrated with the local area. It will complement the existing Milton Keynes grid road system, both in internal and external layout.

4.1.6 It will be well designed to ensure a safe and accessible environment, and allow ease of access to nearby facilities. The site creates an SUE, complimenting the existing housing such as Tattenhoe Park and the Kingsmead development which benefit from extant permissions and it will provide a local centre for everyday needs for education, community facilities and food-retail.

- 4.1.7 In addition, an accident assessment will be conducted for the local highway network over the last 5 years. This will include key links and local junctions shown in Figure 1.

4.2 Demand Management

- 4.2.1 Alternative means of travel will be promoted to minimise vehicle trip generation. The site is to be designed to maximise the accessibility of the site by alternative means other than the private car. This includes bus route layout and positioning of the bus stops to ensure that the maximum number of properties are situated within 400m of a bus stop.
- 4.2.2 The H6, H7, H8, V2 and V3 have been identified as valid routes for A Smart Corridor Concept, this concept will be investigated along these major routes and these can be extended into the Western Expansion Area (WEA). The provision of a "Public Transport Spine" from the V0/H7 link along the western edge up to the WEA will also be investigated.
- 4.2.3 A Framework Travel Plan will be produced for the site which will set out the overall demand management strategy to reduce the number of single occupancy vehicle trips.

4.3 Mitigate residual impact

- 4.3.1 After taking into account the above measures there will still be some impact on the local road network and it's junction due to development traffic. This impact will be assessed with the relevant standard software and a mitigation strategy will be proposed based on the results.

5. TRANSPORT IMPACT ASSESSMENT

- 5.1.1 Although the South West Milton Keynes development is located on the edge of the model network area, the 2009 Milton Keynes Multi-Modal SATURN Model (MKMM) will be utilised to assess the highway and public transport impact of the South West Milton Keynes proposed development in the forecast years as most of the impact will be towards Milton Keynes Central.
- 5.1.2 In the future year scenario in MKMM model, the South West Milton Keynes proposed development will be coded using separate zones housing, employment and schools.
- 5.1.3 The MKMM current covers the base year of 2009 and future forecast years of 2026. Available modelled option runs are therefore:
- 2009 Base year AM and PM peak ;
 - 2026 Do Something AM and PM peak;
- 5.1.4 Tempro growth will be applied to uplift 2009 to 2012 Base year. The MKMM 2026 Do Something Model will be used as the base for both the Do Minimum and Do Something assessments i.e. the Do Something test will include the South West Milton Keynes Development proposals while in 2026 Do minimum will exclude South West Milton Keynes Development proposals from the total traffic.
- 5.1.5 It is anticipated that all committed highway schemes will be included in the in the Do-Something scenario. PF have been provided with a list of all future housing developments which have valid planning permission or have been allocated in the Local Plan. It is considered that these developments will be completed by 2026.
- 5.1.6 The development figures will be provided to Halcrow (the owners & operators of the MKMM), who will then provide them to Rand Europe, who developed the Local Demand Model, to establish trip generation, mode split and distribution impacts of the development. In addition the concentration of development in the area will be incorporated into the Regional Demand Model by concentrating the rural development forecasts for the Aylesbury Vale District (where it sits) within the relevant zone. The regional demand model will then be rerun to revise the regional development forecasts and growth.
- 5.1.7 Trip rates used in the MKMM for the SWMK development will be provided by Halcrow and will be based on their standard trip rates, distribution was also provided by halcrow based on existing nearby areas with the same land use.
- 5.1.8 The strategy for the site will take the previous work beyond its capacity to enable agreement with the MK Council with respect to:
- Strategic Interventions; and
 - Development of the Transport Assessment based on agreed principles.

5.2 Modelling Scenarios to Undertake Strategy for the Site

- 5.2.1 The main access to the site will be gained off the Tattenhoe Roundabout/A421/ Buckingham Road and in so doing creating the first leg of a Bletchley southern bypass, facilitating the connectivity of the full link between the A421 and the A4146 as shown in Figure 2. The development proposal will enable vehicular connectivity with Whaddon Road and pedestrian/cycle connectivity with Far Bletchley.
- 5.2.2 The SATURN demand flows will be used to:
- Identified junction improvements, park and ride and information Technologies (possibly in the form of MS4);
 - Identified junction improvements & 'Bletchley Bypass' link
 - Identified junction and links improvements and Smarter choices (similar to the Council's LSTF DfT bid) to achieve modal shift targets; and
 - Bus network improvements (frequency and/or priority/gating);
- 5.2.3 In order to forecast the traffic impact of the development on the surrounding road network and junctions, Turning Counts experienced at key junctions, will be extracted from the Saturn Model.
- 5.2.4 The below scenarios will be tested:
- **S1:** 2026 DM Base + Permitted Committed Developments + without proposed development but with committed infrastructure (i.e. planned junction/highway improvements);
 - **S2:** 2026 DS Base + Permitted Committed Developments + with proposed development with committed infrastructure (i.e. planned junction/highway improvements);
 - **S3:** 2026 DS Base + Permitted Committed Developments + with proposed development with committed infrastructure (i.e. planned junction/highway improvements) and with Bletchley Southern Bypass;

5.2.5 The following junctions will be assessed using the above scenarios:

Site Accesses

- Whaddon Road Access Junction
- Buckingham Road
- A421 Left In/Left Out

Offsite Junctions

- Bottle Dump Roundabout
- Tattenhoe Roundabout
- Kingsmead Roundabout
- Westcroft Roundabout
- Windmill Hill Roundabout
- Emerson Roundabout
- Furzton Roundabout
- Elfield Park Roundabout
- Bleak Hall Roundabout
- Whaddon Crossroads
- Caldecotte & Bletcham Roundabouts
- Abbey Hill Roundabout
- Portway Roundabout
- Redmore Roundabout

5.2.6 Any mitigation identified at these locations will be undertaken in line with the principals of the traffic management and control in the MKC network.

5.2.7 The link and junction capacity will be assessed for the key scenarios by use of Arcady for roundabouts and Linsig/Transyt for signalised junctions.

6. NEXT STEP:

6.1.1 We will contact Halcrow to agree runs of the MKMM to include the SWMK development.

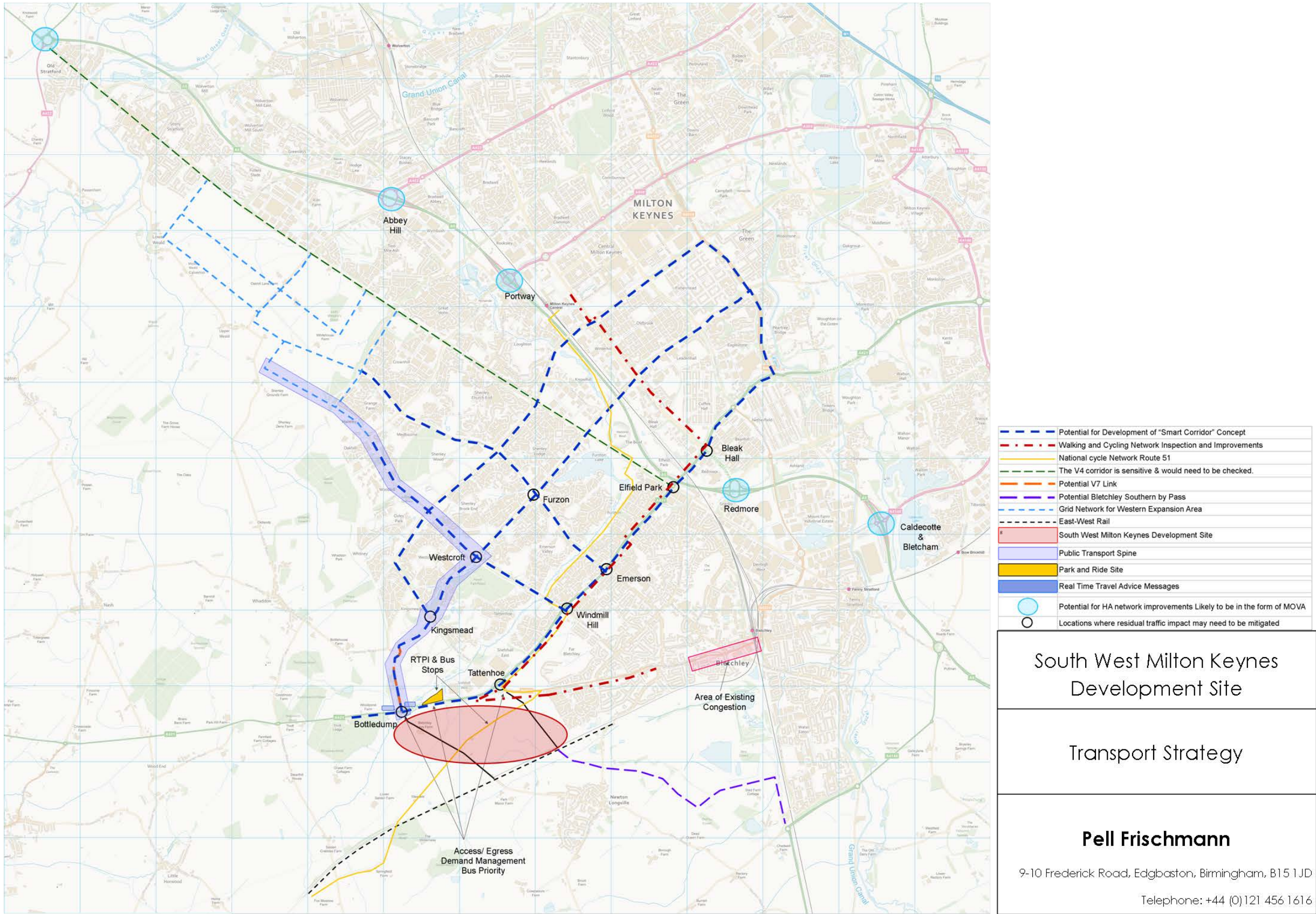


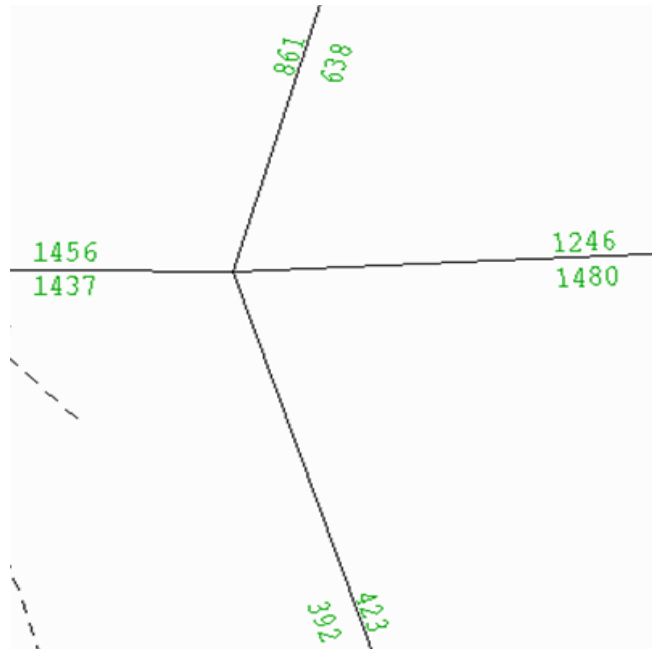
Figure 2: Key Junctions and Interventions

Appendix J

Traffic Flow Diagrams

Whaddon Crossroads Roundabout

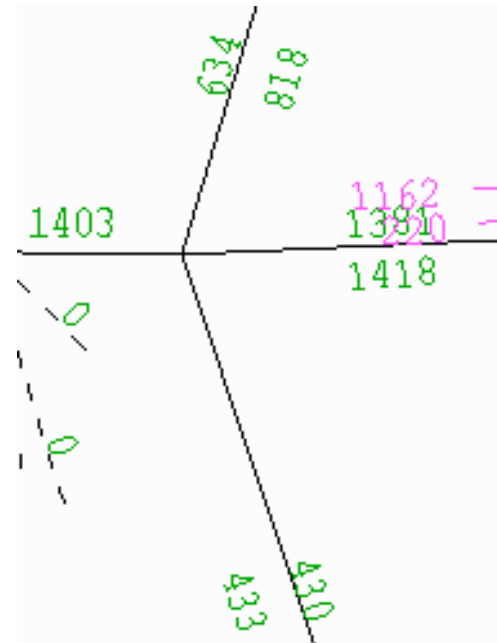
Scenario 1 - AM Peak



	A	B	C	D	Total
A	0.00%	24.90%	35.40%	39.70%	100.00%
B	4.60%	0.00%	9.70%	85.70%	100.00%
C	57.30%	36.50%	0.00%	6.20%	100.00%
D	22.20%	76.80%	1.00%	0.00%	100.00%
Total					

	A	B	C	D	Total
A	0	160	223	255	638
B	59	0	148	1273	1480
C	223	145	0	24	392
D	320	1121	15	0	1456
Total	602	1426	386	1552	

Scenario 1 - PM Peak

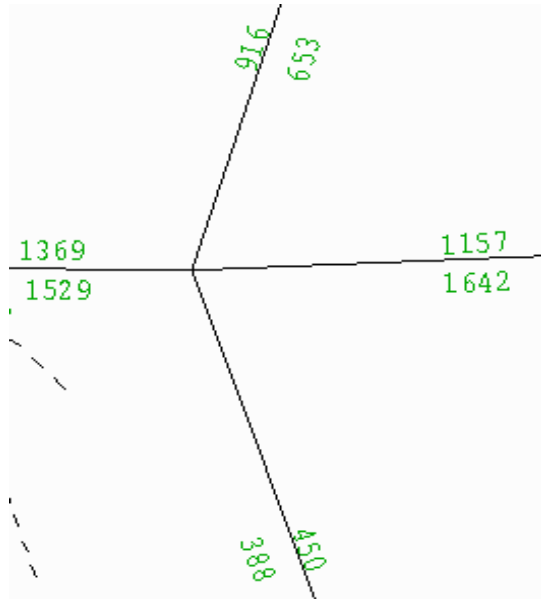


	A	B	C	D	Total
A	0.00%	10.00%	42.00%	48.00%	100.00%
B	4.90%	0.00%	11.80%	83.30%	100.00%
C	64.40%	32.90%	0.00%	2.70%	100.00%
D	20.30%	77.80%	1.90%	0.00%	100.00%
Total					

	A	B	C	D	Total
A	0	82	344	393	818
B	69	0	167	1181	1418
C	279	142	0	12	433
D	285	1092	27	0	1403
Total	634	1384	430	1626	

Whaddon Crossroads Roundabout

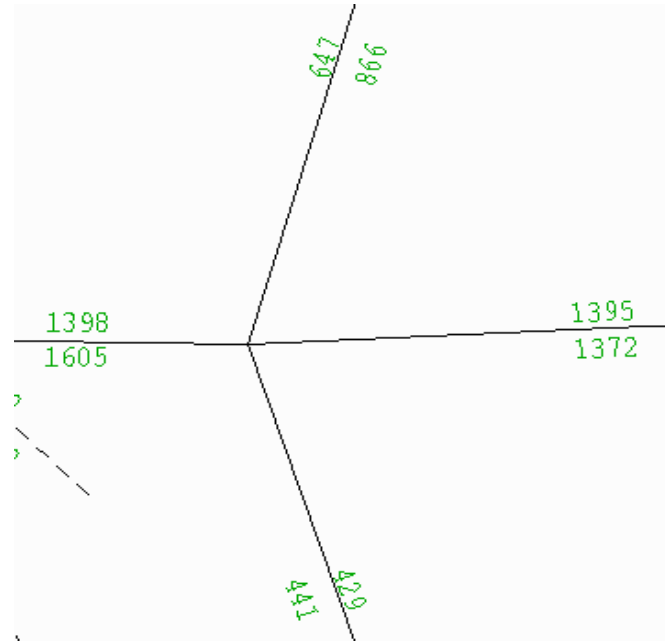
Scenario 2 - AM Peak



	A	B	C	D	Total
A	0.00%	26.60%	34.60%	38.80%	100.00%
B	10.50%	0.00%	7.30%	82.20%	100.00%
C	59.50%	34.10%	0.00%	6.40%	100.00%
D	20.50%	77.60%	1.90%	0.00%	100.00%
Total					

	A	B	C	D	Total
A	0	174	226	253	653
B	172	0	120	1350	1642
C	231	132	0	25	388
D	281	1062	26	0	1369
Total	916	1151	450	1529	

Scenario 2 - PM Peak

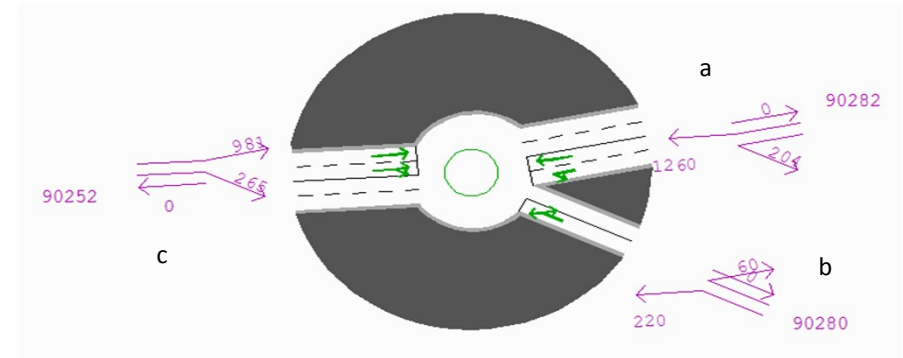


	A	B	C	D	Total
A	0.00%	14.10%	40.00%	45.90%	100.00%
B	11.70%	0.00%	9.40%	78.90%	100.00%
C	66.80%	30.40%	0.00%	2.80%	100.00%
D	20.50%	77.60%	1.90%	0.00%	100.00%
Total					

	A	B	C	D	Total
A	0	122	346	397	866
B	161	0	129	1083	1372
C	295	134	0	12	441
D	287	1085	27	0	1398
Total	742	1341	502	1492	

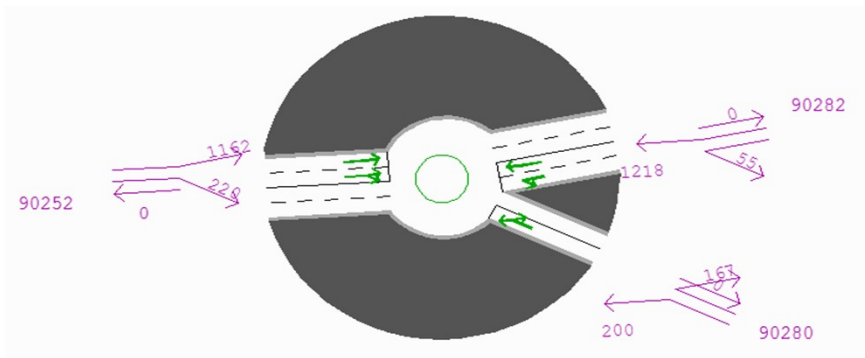
Bottle Dump Roundabout

Scenario 1 - AM Peak



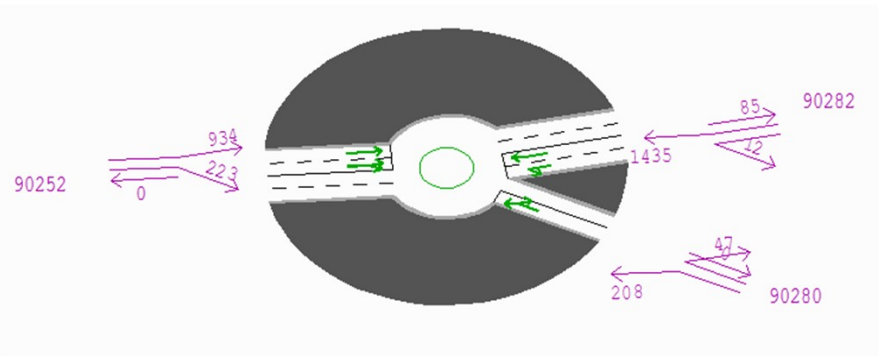
	A	B	C	Total
A	-	204	1260	1464
B	60	-	220	280
C	981	265	-	1246
Total	1041	469	1480	

Scenario 1 - PM Peak



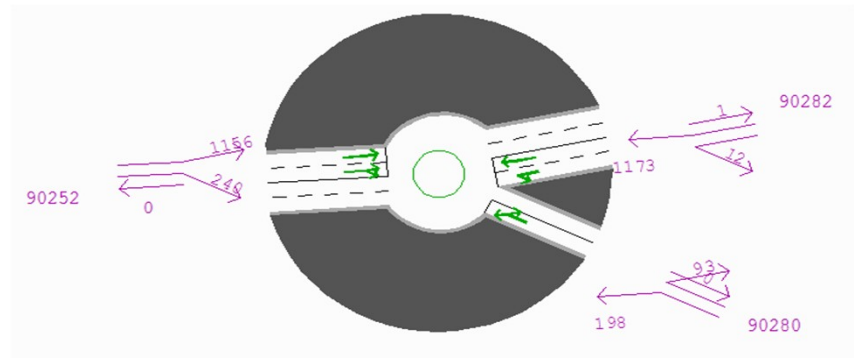
	A	B	C	Total
A	-	55	1218	1273
B	167	-	200	367
C	1162	220	-	1382
Total	1329	275	1418	

Scenario 2 - AM Peak



	A	B	C	Total
A	85	12	1435	1447
B	47	-	208	255
C	934	223	-	1157
Total	981	235	1643	

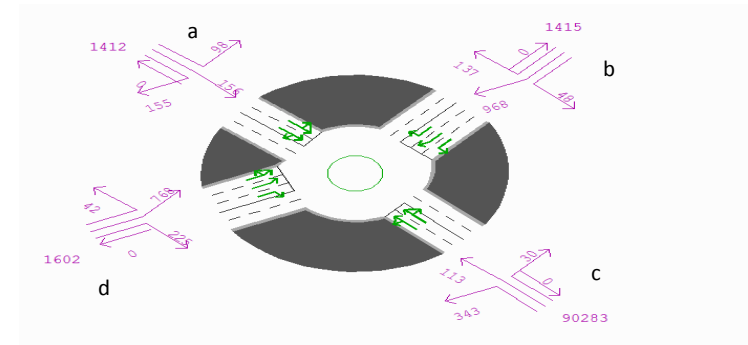
Scenario 2 - PM Peak



	A	B	C	Total
A	1	12	1173	1186
B	93	-	198	291
C	1156	240	-	1396
Total	1249	252	1371	

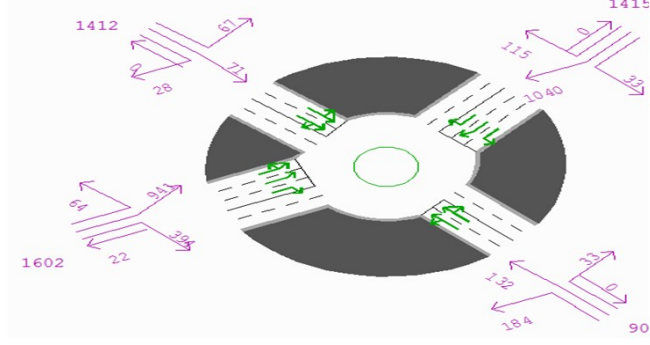
Tattenhoe Roundabout

Scenario 1 - AM Peak



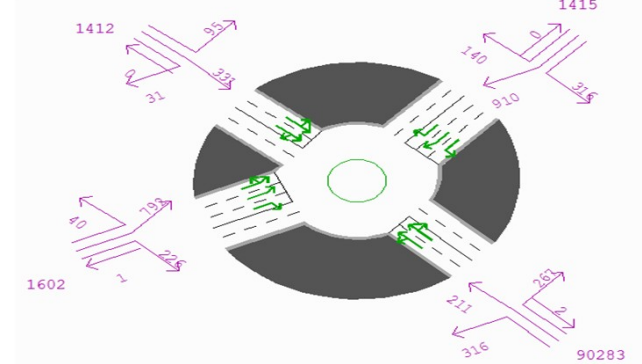
	A	B	C	D	Total
A	-	98	156	155	409
B	137	-	48	968	1153
C	113	30	-	343	486
D	42	768	225	-	1035
Total	292	896	429	1466	

Scenario 1 - PM Peak



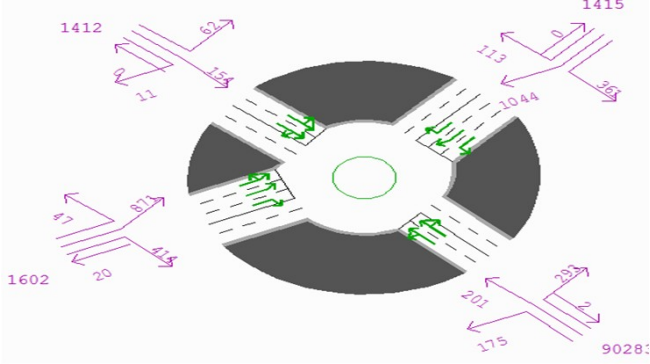
	A	B	C	D	Total
A	-	67	71	28	166
B	115	-	33	1040	1188
C	132	33	-	184	349
D	64	941	394	22	1399
Total	311	1041	498	1252	

Scenario 2 - AM Peak



	A	B	C	D	Total
A	-	95	331	31	457
B	140	-	316	910	1366
C	211	267	2	316	794
D	40	792	226	1	1058
Total	391	1154	873	1257	

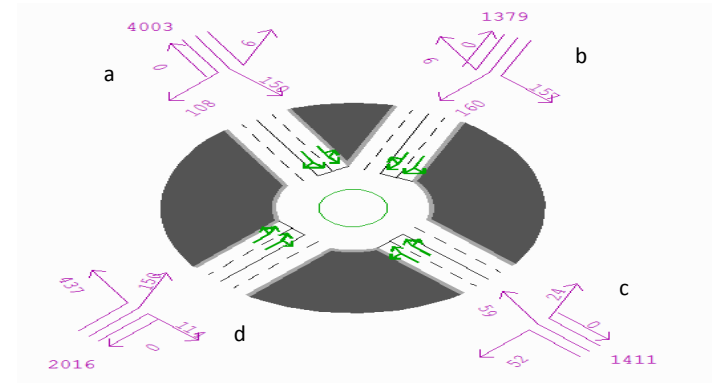
Scenario 2 - PM Peak



	A	B	C	D	Total
A	-	62	154	11	227
B	113	-	361	1044	1518
C	201	293	2	175	669
D	47	871	414	20	1332
Total	361	1226	929	1230	

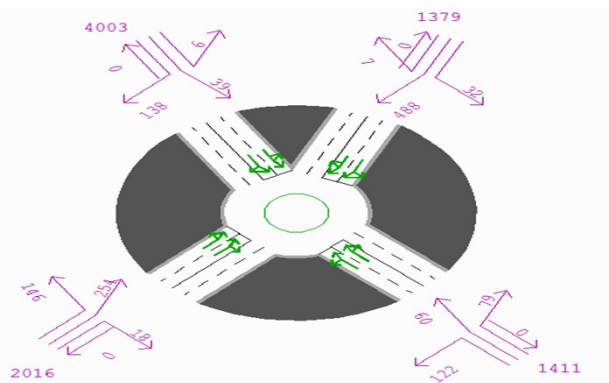
Kingsmead Roundabout

Scenario 1 - AM Peak



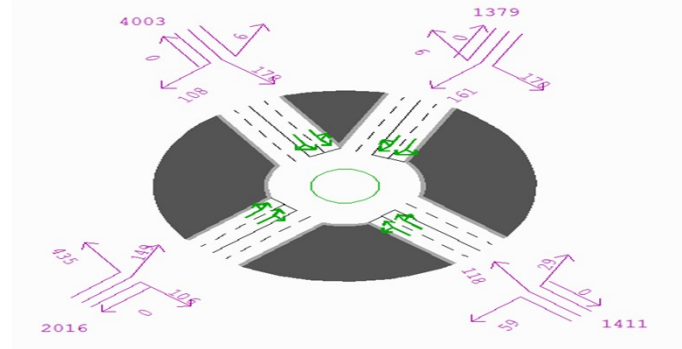
	A	B	C	D	Total
A	-	6	150	108	264
B	6	-	157	160	323
C	59	24	-	52	135
D	437	150	114	-	701
Total	502	180	421	320	

Scenario 1 - PM Peak



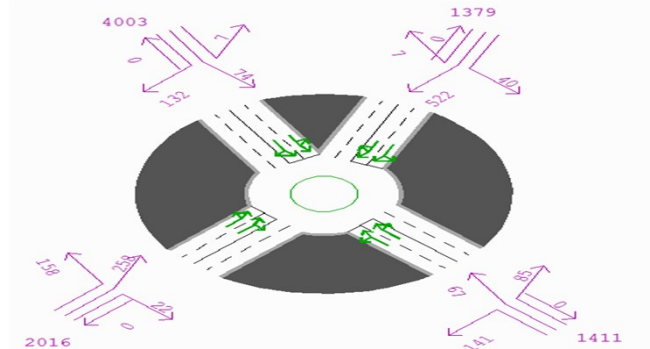
	A	B	C	D	Total
A	-	6	39	138	183
B	7	-	32	488	527
C	60	79	-	122	261
D	146	254	18	-	418
Total	213	339	89	748	

Scenario 2 - AM Peak



	A	B	C	D	Total
A	-	6	178	108	292
B	6	-	170	161	337
C	118	29	-	59	206
D	435	149	106	-	690
Total	559	184	454	328	

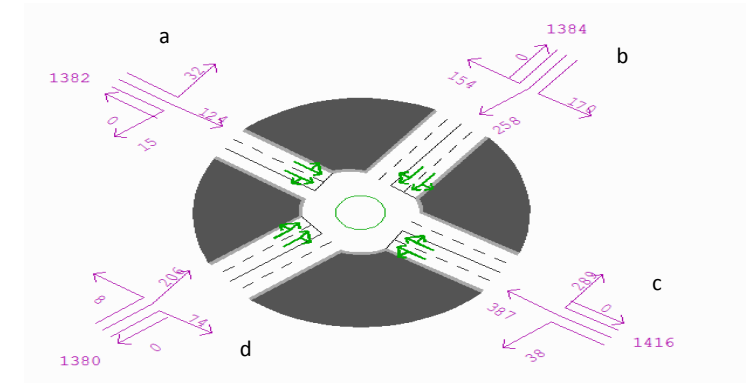
Scenario 2 - PM Peak



	A	B	C	D	Total
A	-	7	74	132	213
B	7	-	40	522	569
C	67	85	-	141	293
D	158	258	22	-	438
Total	232	350	136	795	

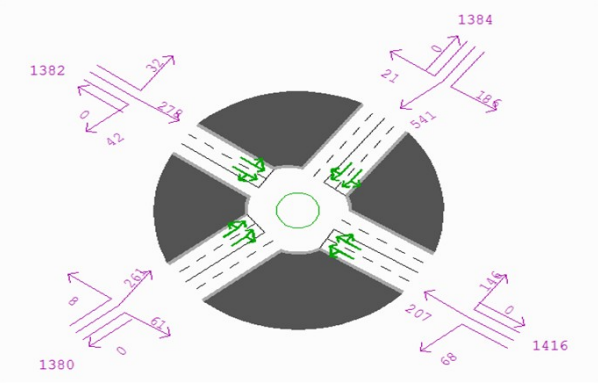
Westcroft Roundabout

Scenario 1 - AM Peak



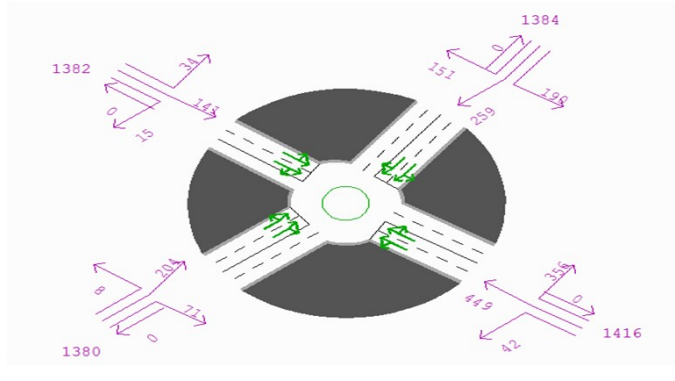
	A	B	C	D	Total
A	-	32	124	15	171
B	154	-	170	258	582
C	387	289	-	38	714
D	8	206	74	-	288
Total	549	527	368	311	

Scenario 1 - PM Peak



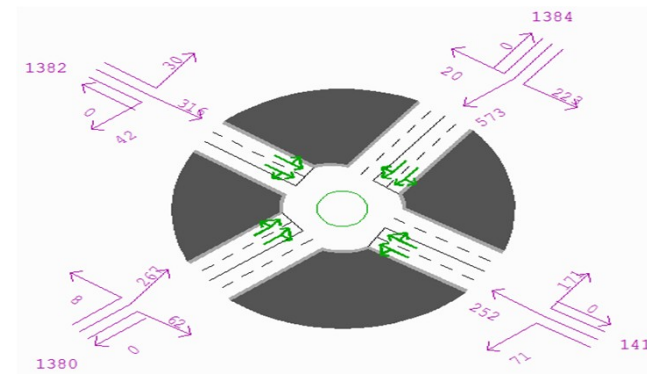
	A	B	C	D	Total
A	-	32	278	42	352
B	21	-	186	541	748
C	207	146	-	68	421
D	8	261	61	-	330
Total	236	439	525	651	

Scenario 2 - AM Peak



	A	B	C	D	Total
A	-	34	141	15	190
B	151	-	190	259	600
C	449	356	-	42	847
D	8	204	71	-	283
Total	608	594	402	316	

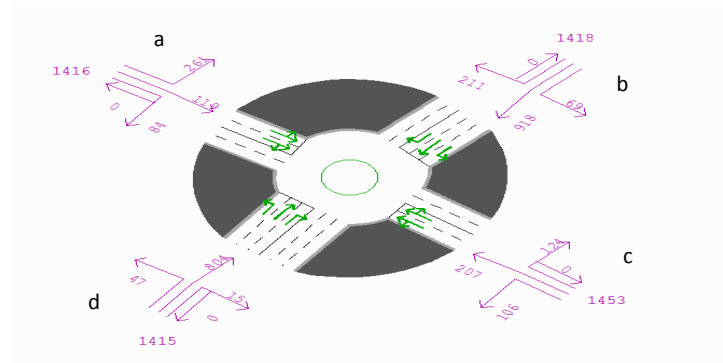
Scenario 2 - PM Peak



	A	B	C	D	Total
A	-	30	316	42	388
B	20	-	223	573	816
C	252	171	-	71	494
D	8	267	62	-	337
Total	280	468	601	686	

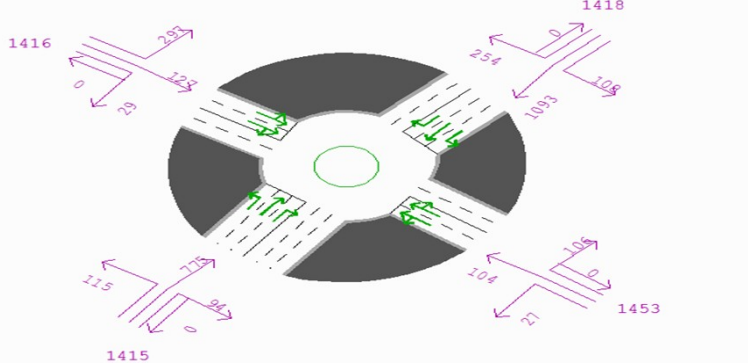
Windmill Hill Roundabout

Scenario 1 - AM Peak



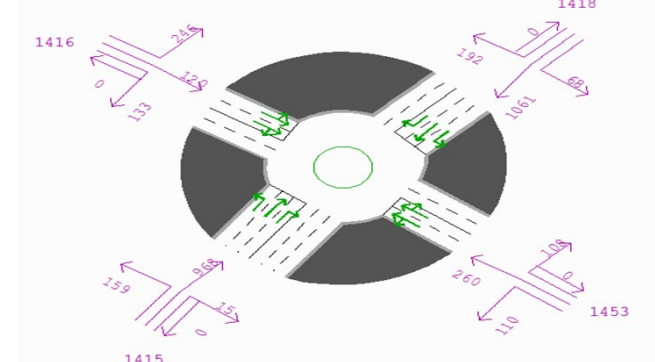
	A	B	C	D	Total
A	-	261	119	84	464
B	211	-	69	918	1198
C	207	124	-	106	437
D	47	804	15	-	866
Total	465	1189	203	1108	

Scenario 1 - PM Peak



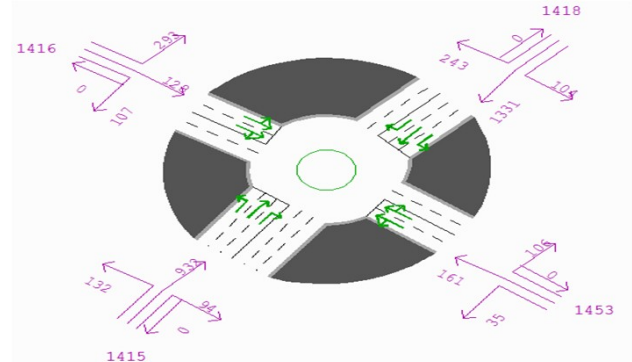
	A	B	C	D	Total
A	-	297	127	29	453
B	254	-	108	1093	1455
C	104	106	-	27	237
D	115	775	94	-	984
Total	473	1178	329	1149	

Scenario 2 - AM Peak



	A	B	C	D	Total
A	-	246	120	133	499
B	192	-	68	1061	1321
C	260	108	-	110	478
D	159	968	15	-	1142
Total	611	1322	203	1304	

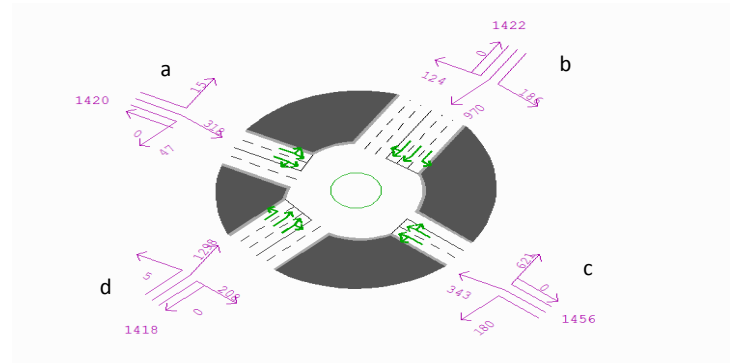
Scenario 2 - PM Peak



	A	B	C	D	Total
A	-	293	128	107	528
B	243	-	104	1331	1678
C	161	106	-	35	302
D	132	932	94	-	1158
Total	536	1331	326	1473	

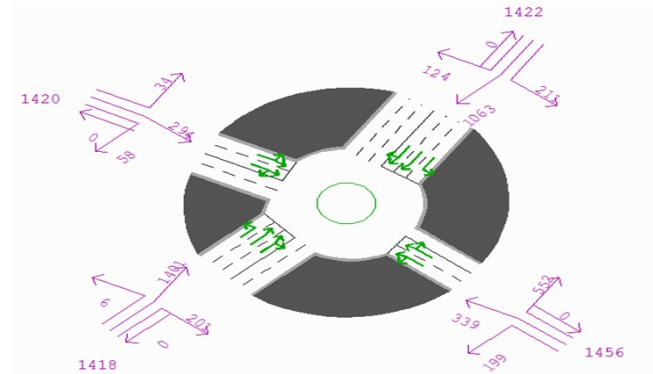
Emerson Roundabout

Scenario 1 - AM Peak



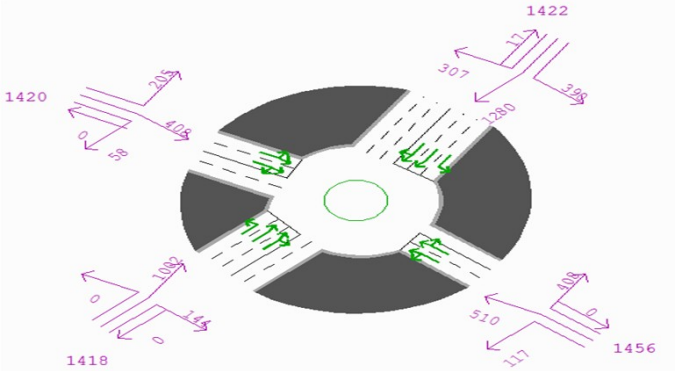
	A	B	C	D	Total
A	-	15	318	47	380
B	124	-	186	970	1280
C	343	621	-	180	1144
D	5	1298	208	-	1511
Total	472	1934	712	1197	

Scenario 2 - AM Peak



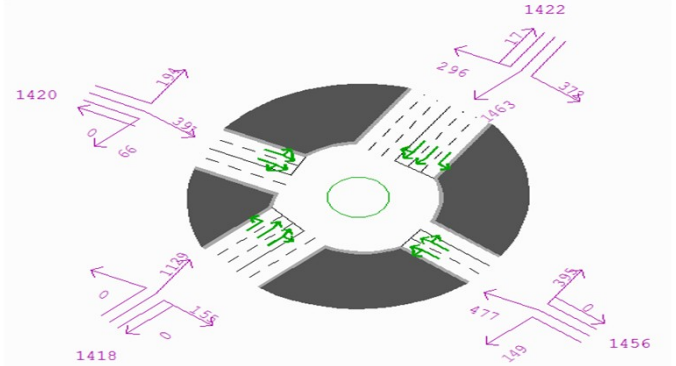
	A	B	C	D	Total
A	-	34	294	58	386
B	124	-	211	1063	1398
C	339	552	-	199	1090
D	6	1401	201	6	1608
Total	469	1987	706	1320	

Scenario 1 - PM Peak



	A	B	C	D	Total
A	-	205	408	58	671
B	307	17	391	1280	1995
C	510	408	-	117	1035
D	0	1002	144	-	1146
Total	817	1632	943	1455	

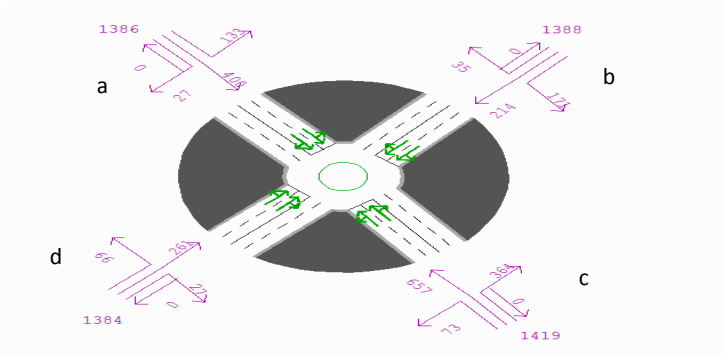
Scenario 2 - PM Peak



	A	B	C	D	Total
A	-	194	391	66	651
B	296	17	372	1463	2131
C	477	395	-	149	1021
D	0	1129	155	-	1284
Total	773	1718	918	1678	

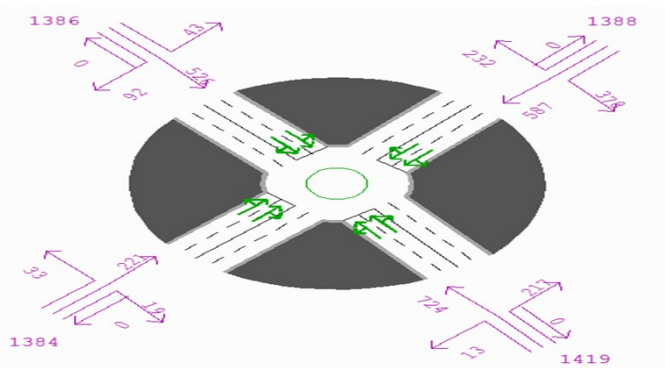
Furzton Roundabout

Scenario 1 - AM Peak



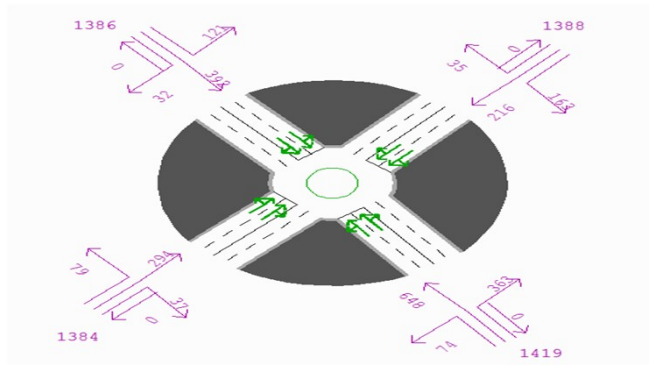
	A	B	C	D	Total
A	-	133	400	27	560
B	35	-	171	214	420
C	657	364	-	73	1094
D	66	261	27	-	354
Total	758	758	598	314	

Scenario 1 - PM Peak



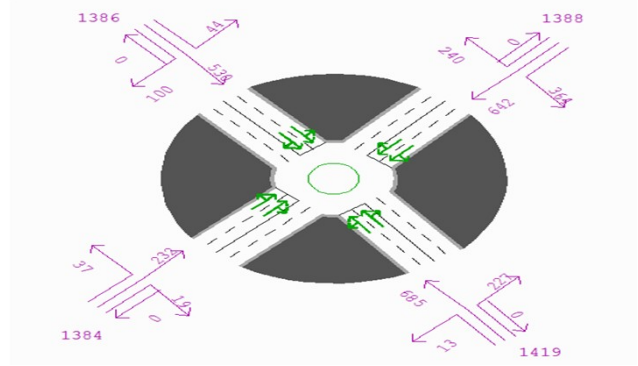
	A	B	C	D	Total
A	-	43	526	92	661
B	232	-	378	587	1197
C	724	217	-	13	954
D	33	221	19	-	273
Total	989	481	923	692	

Scenario 2 - AM Peak



	A	B	C	D	Total
A	-	121	392	32	545
B	35	-	163	216	414
C	648	363	-	74	1085
D	79	294	37	-	410
Total	762	778	592	322	

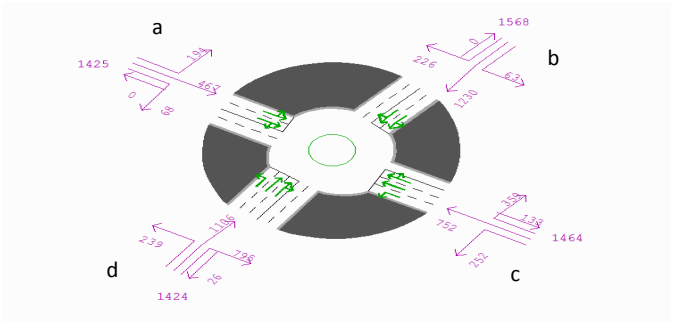
Scenario 2 - PM Peak



	A	B	C	D	Total
A	-	44	530	100	674
B	240	-	364	642	1246
C	685	227	-	13	925
D	37	232	19	-	288
Total	962	503	913	755	

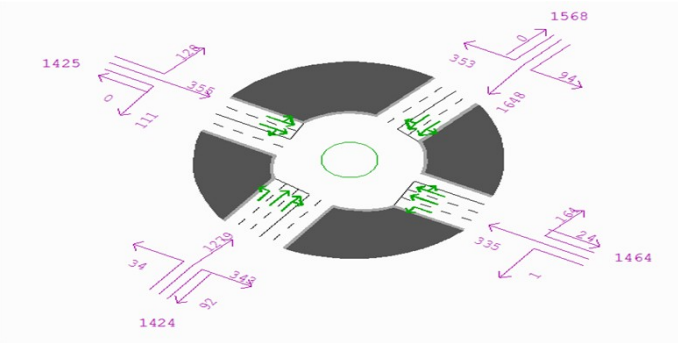
Elfield Park Roundabout

Scenario 1 - AM Peak



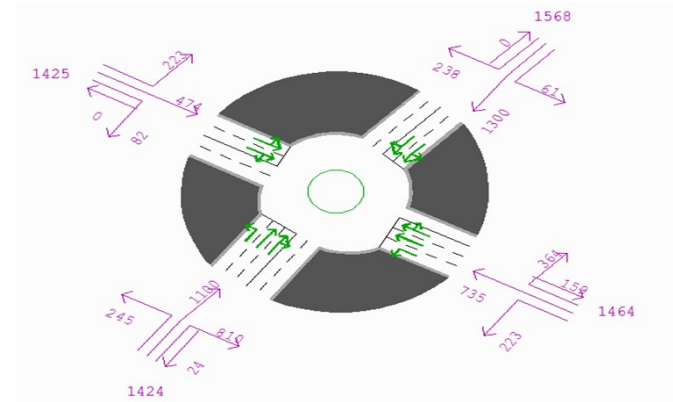
	A	B	C	D	Total
A	-	194	467	68	729
B	226	-	63	1230	1519
C	752	359	133	252	1496
D	239	1106	795	26	2166
Total	1217	1659	1458	1576	

Scenario 1 - PM Peak



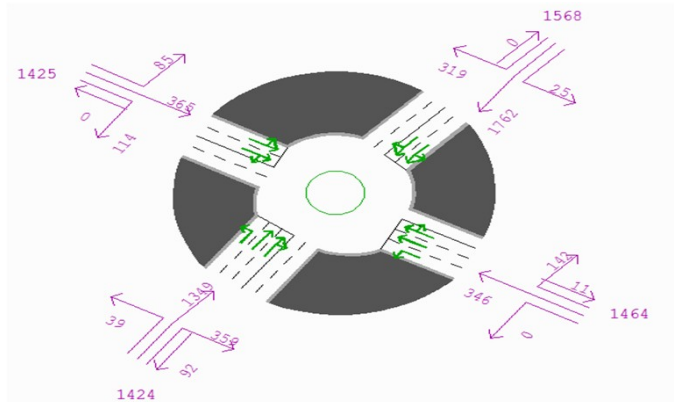
	A	B	C	D	Total
A	-	128	355	111	594
B	353	-	94	1648	2095
C	335	164	24	1	524
D	34	1279	343	92	1748
Total	722	1571	816	1852	

Scenario 2 - AM Peak



	A	B	C	D	Total
A	-	223	474	82	779
B	238	-	61	1300	1599
C	735	364	150	223	1322
D	245	1100	810	24	2155
Total	1218	1687	1345	1605	

Scenario 2 - PM Peak



	A	B	C	D	Total
A	-	85	365	114	564
B	319	-	25	1762	2106
C	346	142	11	0	488
D	39	1349	359	92	1747
Total	704	1576	749	1876	