ADC
INFRASTRUCTURE

Appendix 8
WSPTN1: Light Vehicle Trip Distribution Technical Note

M1 NORTHAMPTON GATEWAY, SRFI

TECHNICAL NOTE: M1 GATEWAY TRIP DISTRIBUTION

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INTRODUCTION

WSP have been commissioned by ADC Infrastructure Ltd, on behalf of Roxhill Developments Ltd, to undertake transport modelling for the Northampton Gateway SRFI (Strategic Rail Freight Interchange) development adjacent to M1 Junction 15 in Northamptonshire using the Northamptonshire Strategic Traffic Model (NSTM2).

The NSTM2 models were developed for an average weekday (Monday to Friday) in the AM peak hour (08:00-09:00) and in the PM peak hour (17:00-18:00).

The site is located to the west of M1 Junction 15, bounded to the east by M1 Motorway, to the south by the A508, to the north by Collingtree Road, and by the Northampton Loop line of the West Coast Mainline railway to the west. The site location is shown in figure 1.
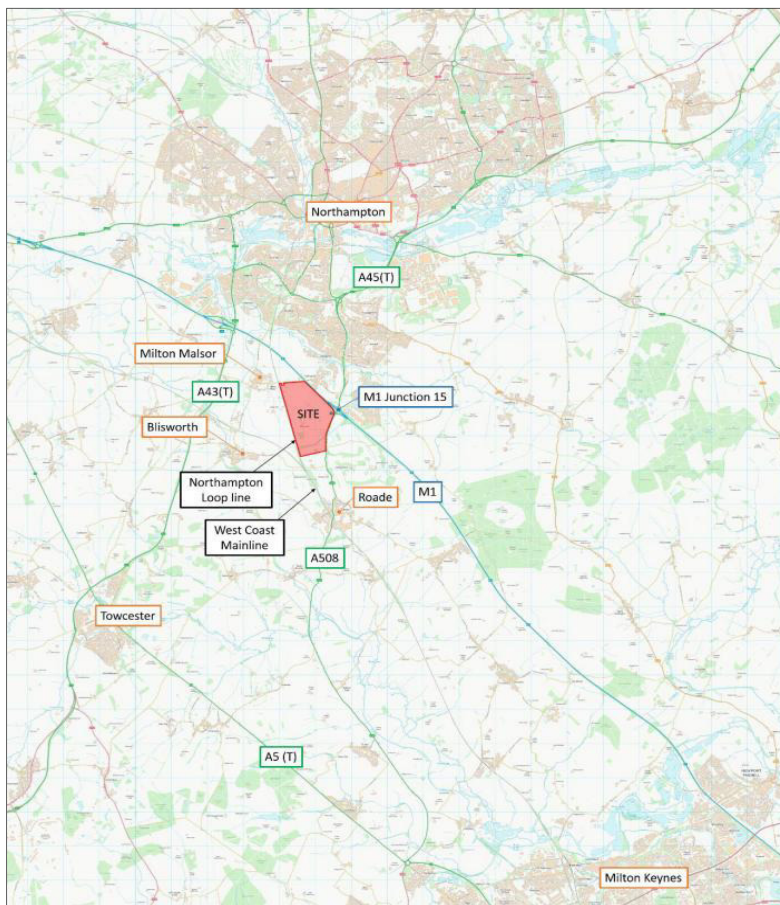

Figure 1:   M1 Northampton Gateway – Site location

ADC Infrastructure provided WSP with a:

— **Brief:** *Technical Note 1: Transport modelling methodology; Report Reference: ADC1475 TN1 (22 August 2016)* which details the scope of modelling methodology

— **Technical note:** *Technical Note 2: Trip Generation; Report Reference: ADC1475 TN2 (7 February 2017)* which sets out the trip generation for M1 Gateway development.

The development would consists of a number of large scale warehousing and distribution units and an inter-modal rail freight terminal. The site would include provision for rail sidings to serve individual buildings. The proposed warehousing and distribution area comprises 5.041m sqft of B8 use with an ancillary B1 (office) use.

STAGE 2C (DEVELOPMENT CASE ASSESSMENT)

ADC Infrastructure instructed WSP to use the 2031 Development Case assessment model to determine the distribution of vehicular trips travelling to and from the site. In order to do this the following steps are carried out:

— 2031 Development Case highway network was created with two zones for the M1 Northampton Gateway SRFI

— Demand model run with the M1 Northampton Gateway SRFI

— Matrices were adjusted to match the trip generation and local Heavy Goods Vehicles (HGV) distribution figures provided by ADC Infrastructure (*Technical Note 2: Trip Generation; Report Reference: ADC1475 TN2 (7 February 2017)*).

Table 1, Table 2 and Table 3 show the number of arrivals and departures from the site provided by ADC Infrastructure during the AM peak and PM peak for the main access (unit 1 to unit 6), main access (unit 7) and total M1 respectively.

Table 1: Trip Generation – Main access (Unit 1 to Unit 6) (in vehicles)

PEAK	TARGET TRIP GENERATION				MODELLED TRIP GENERATION			
	Lights		Heavy (Veh)		Lights		Heavy (Veh)	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
AM Peak	625	67	127	121	628	76	127	121
PM Peak	206	719	129	121	211	720	127	121

Table 2: Trip Generation – Main access (Unit 7) (in vehicles)

PEAK	TARGET TRIP GENERATION				MODELLED TRIP GENERATION			
	Lights		Heavy (Veh)		Lights		Heavy (Veh)	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
AM Peak	74	8	11	10	74	11	11	10
PM Peak	24	85	9	9	25	80	11	10

Table 3: Trip Generation – Total M1 Gateway Development (in vehicles)

PEAK	TARGET TRIP GENERATION				MODELLED TRIP GENERATION			
	Lights		Heavy (Veh)		Lights		Heavy (Veh)	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
AM Peak	699	75	138	131	702	87	138	131
PM Peak	230	804	138	130	236	800	138	131

Modelled trip generations closely match with the given trip generations apart from AM peak departure which show slightly higher modelled trip generations compared to the given trip generations. The distribution of development trips in the AM peak and PM peak 2031 Development Case models have been produced for:

— Lights (cars + Light Goods Vehicles) which combines User Class 1 to User Class 4
   — User Class 1 – Car Work (Commute)
   — User Class 2 – Car Employer's Business (EB)
   — User Class 3 – Car Other
   — User Class 4 – Light Goods Vehicles.

M1 DEVELOPMENT (LIGHT) TRIP DISTRIBUTION AND ADJUSTMENT

The trip distribution for the M1 Northampton Gateway SRFI for light vehicles, as derived from the Demand Model, is shown in Table 4.

Table 4: Trip Distribution (Lights) – M1 Gateway Development (from Demand model)

AM PEAK

M1	A45	M1 (S)	M1 (N)	A508
Destination	59%	3%	22%	16%
Origin	48%	1%	37%	14%

PM PEAK

M1	A45	M1 (S)	M1 (N)	A508
Destination	65%	3%	21%	11%
Origin	39%	2%	44%	15%

It shows predominately less development trips using the M1 South. The modelling area, east of the M1 South, is mostly buffer and less detailed (in terms of zoning). Therefore, the model has some limitations to how it calculates a realistic modelled travel cost for those zones and hence produces less trips from the M1 South. It is proposed that light vehicle distributions from the model are used mostly, but the M1 South trips would be improved based on the 2011 Journey to Work (JTW) data.

A comparison of the M1 NSTM2 light vehicle distribution to the 2011 JTW Census data was therefore undertaken using nearby large scale employment sites, such as Brackmills and Saxon Avenue which are shown in Table 5 and Table 6 respectively. This comparison showed that a greater proportion of trips associated with these similar sites have origins to the east of M1 Junction 15, and hence would be likely to travel to and from the area using M1 south. This proportion varies from 10% to 26%.

Table 5: Trip Distribution – Brackmills Employment (Journey to work data)

AM PEAK

M1	A45	M1 (S)	M1 (N)	A508
Destination	55%	12%	24%	9%
Origin	62%	15%	15%	8%

PM PEAK (ASSUME PM IS THE OPPOSITE)

M1	A45	M1 (S)	M1 (N)	A508
Destination	62%	15%	15%	8%
Origin	55%	12%	24%	9%

Table 6: Trip Distribution – Saxson Avenue Employment (Journey to work data)

AM PEAK

M1	A45	M1 (S)	M1 (N)	A508
Destination	60%	10%	18%	13%
Origin	49%	26%	10%	14%

PM PEAK (ASSUME PM IS THE OPPOSITE)

M1	A45	M1 (S)	M1 (N)	A508
Destination	49%	26%	10%	14%
Origin	60%	10%	18%	13%

An assumption has therefore been made that the M1 trip distribution would be similar to the employment site just north east of M1 junction 15 (Saxon Avenue) due to its close proximity of the M1 Gateway development. The NSTM2 M1 trip distribution has been verified with the Saxon Avenue employment site JTW distribution mostly.

A Select Link Analysis (SLA) was undertaken for the M1 South trips which was then uplifted by applying an adjustment factor and then applying corresponding reductions on the other routes on a pro-rata basis so that they closely match the JTW Saxon Avenue distribution. The M1 light vehicle distributions for other approaches are predominately coming from the NSTM2 Demand Model. The adjusted M1 development (Lights) trip distribution is shown in Table 7.

Table 7: Trip Distribution (Lights) – M1 Gateway Development (after alternations)

AM PEAK

M1	A45	M1 (S)	M1 (N)	A508
Destination	51%	14%	17%	19%
Origin	38%	26%	21%	15%

PM PEAK

M1	A45	M1 (S)	M1 (N)	A508
Destination	51%	19%	16%	14%
Origin	44%	11%	28%	18%

M1 DEVELOPMENT (LIGHT) TRIP DISTRIBUTION PLOTS

Figure 2 and Figure 3 show the trip arrival distribution plots for the AM peak before and after the adjustment.
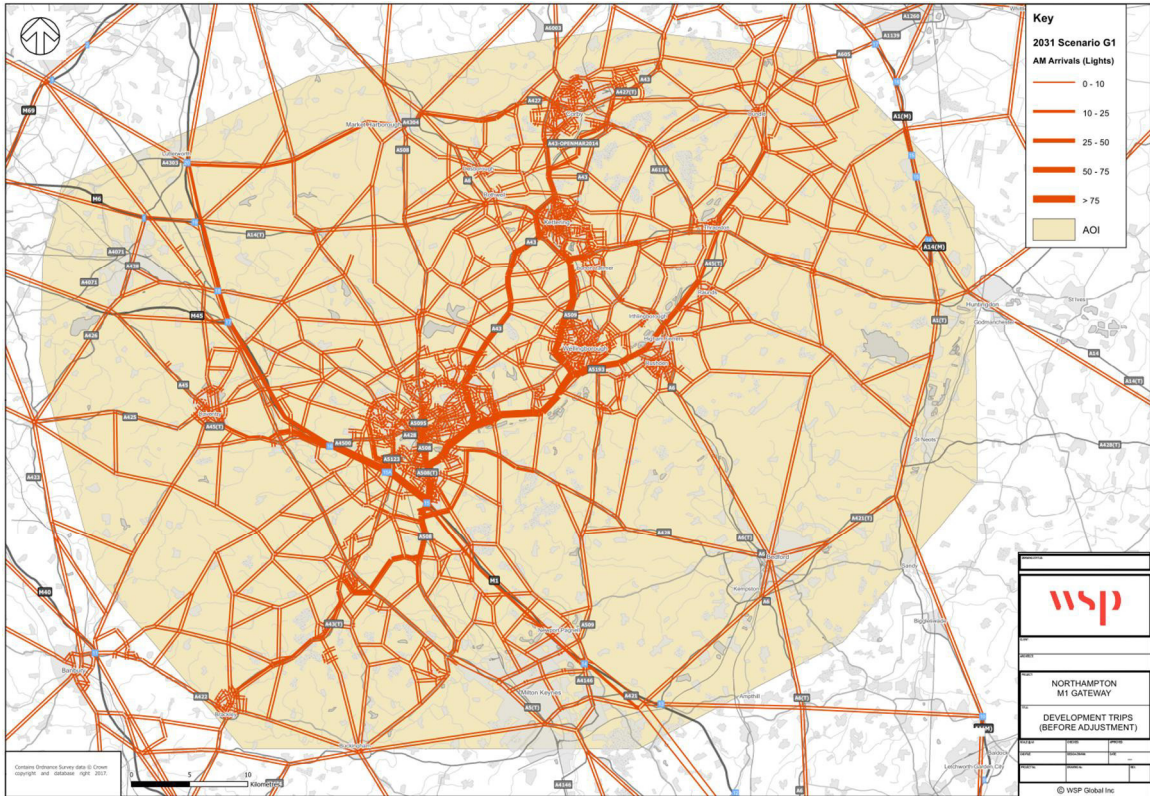
Figure 2: M1 Northampton Gateway Arrival Distribution (before adjustment) – AM Peak
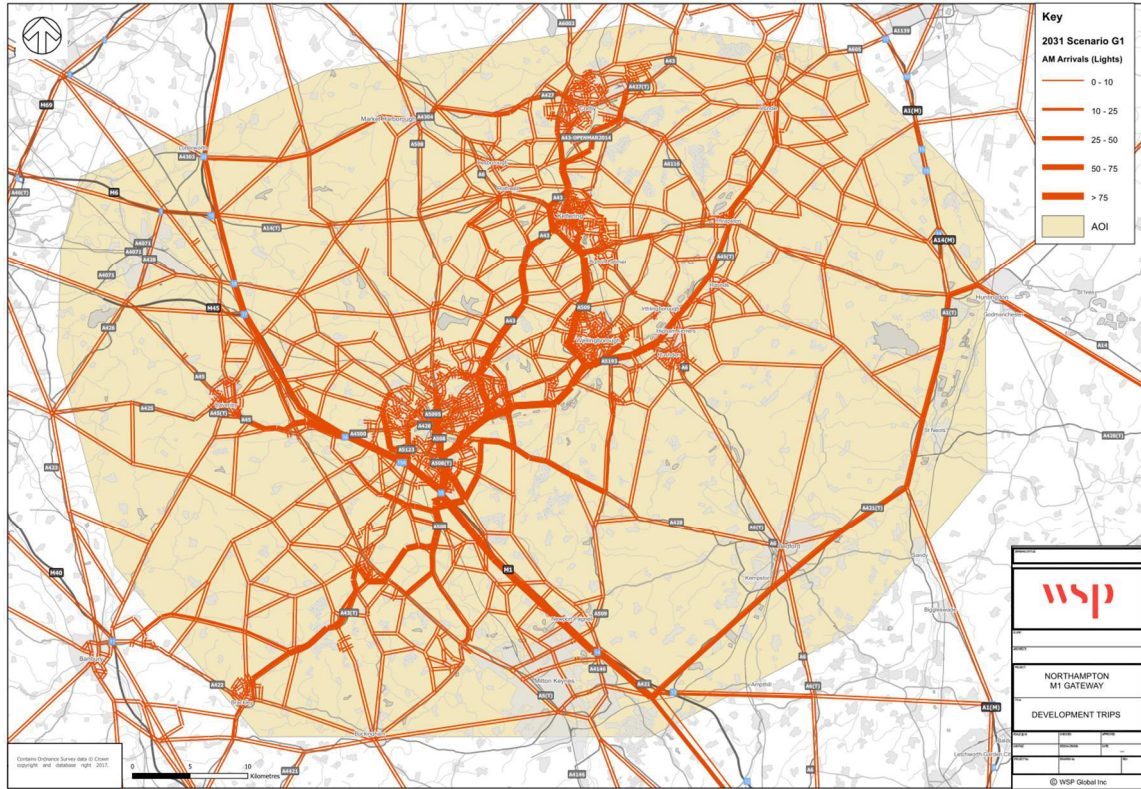

Figure 3: M1 Northampton Gateway Arrival Distribution (After adjustment) – AM Peak

Figure 4 and Figure 5 show the trip departure distribution plots for the AM peak before and after the adjustment.
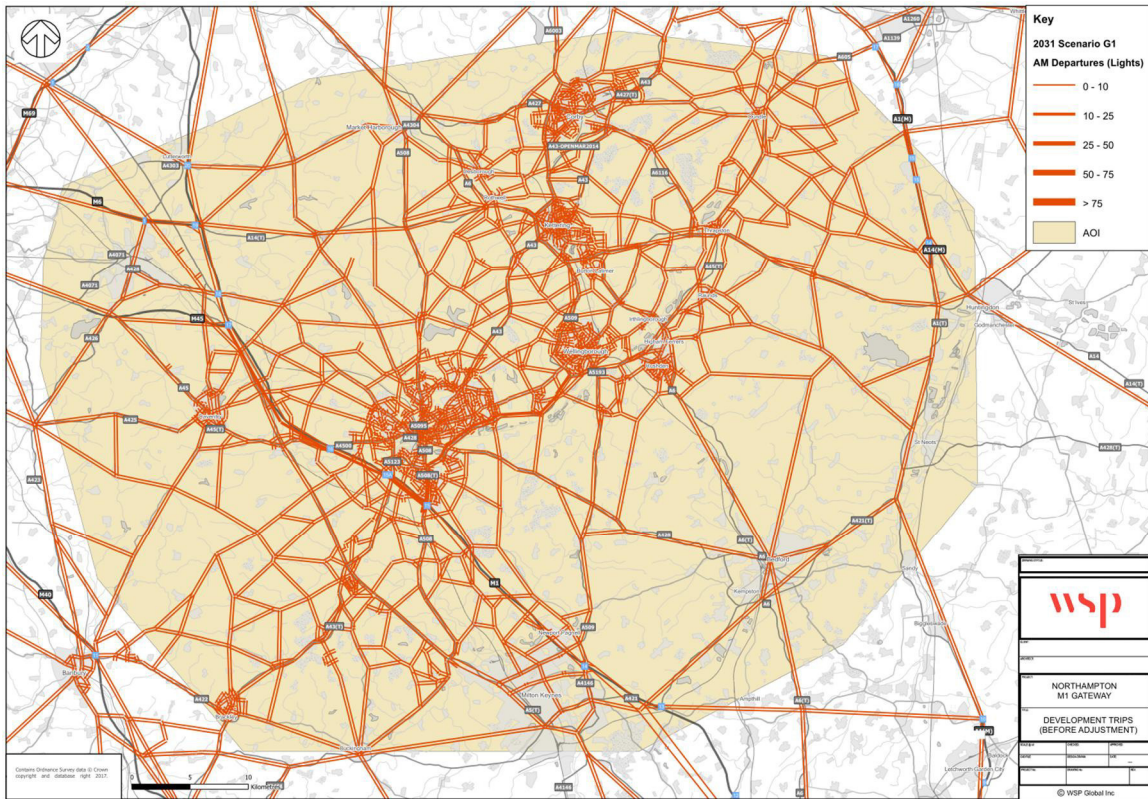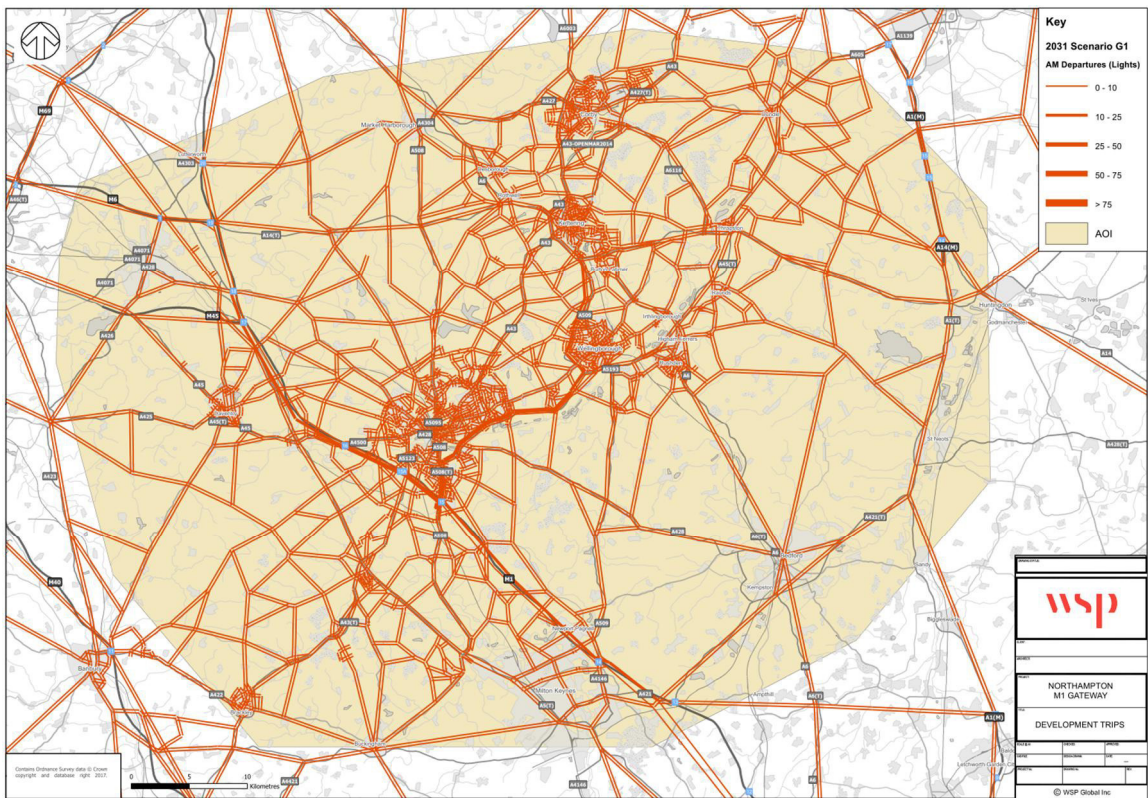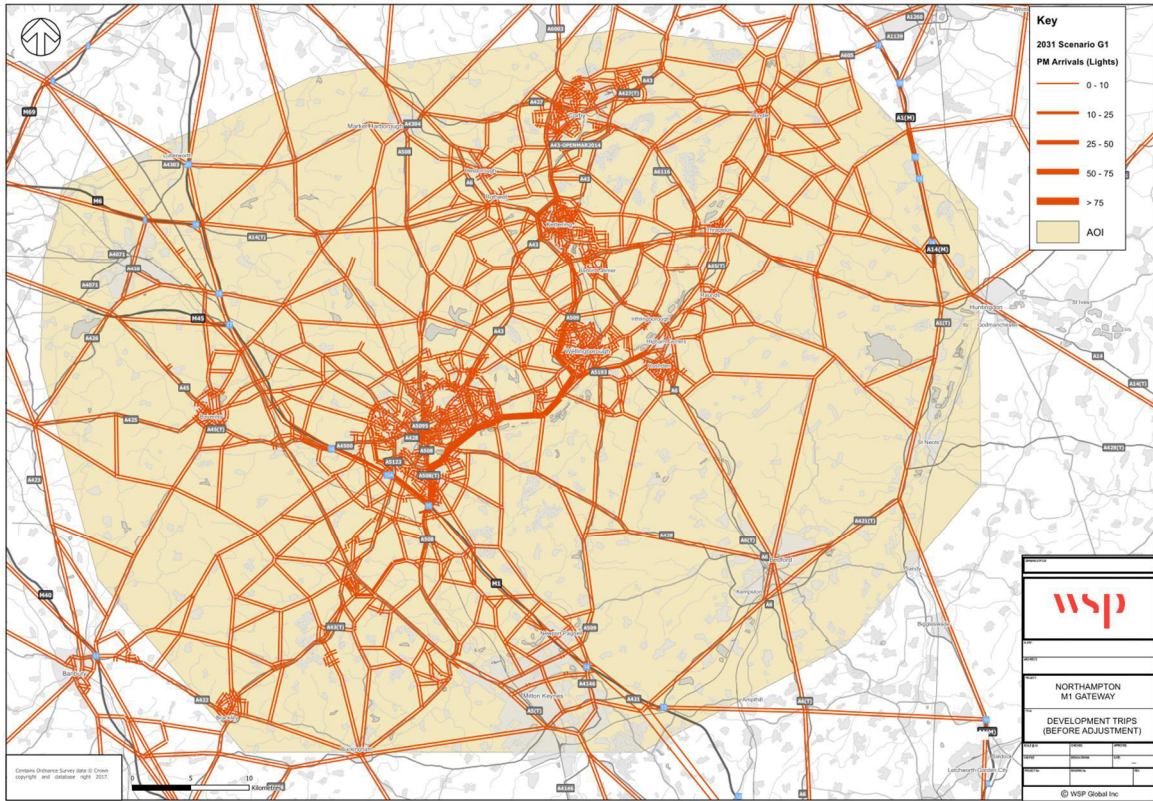

Figure 4: M1 Northampton Gateway departure distribution (Before adjustment) – AM Peak

Figure 5: M1 Northampton Gateway departure distribution (After adjustment) – AM Peak

Figure 6 and Figure 7 show the trip arrival distribution plots for the PM peak before and after the adjustment.

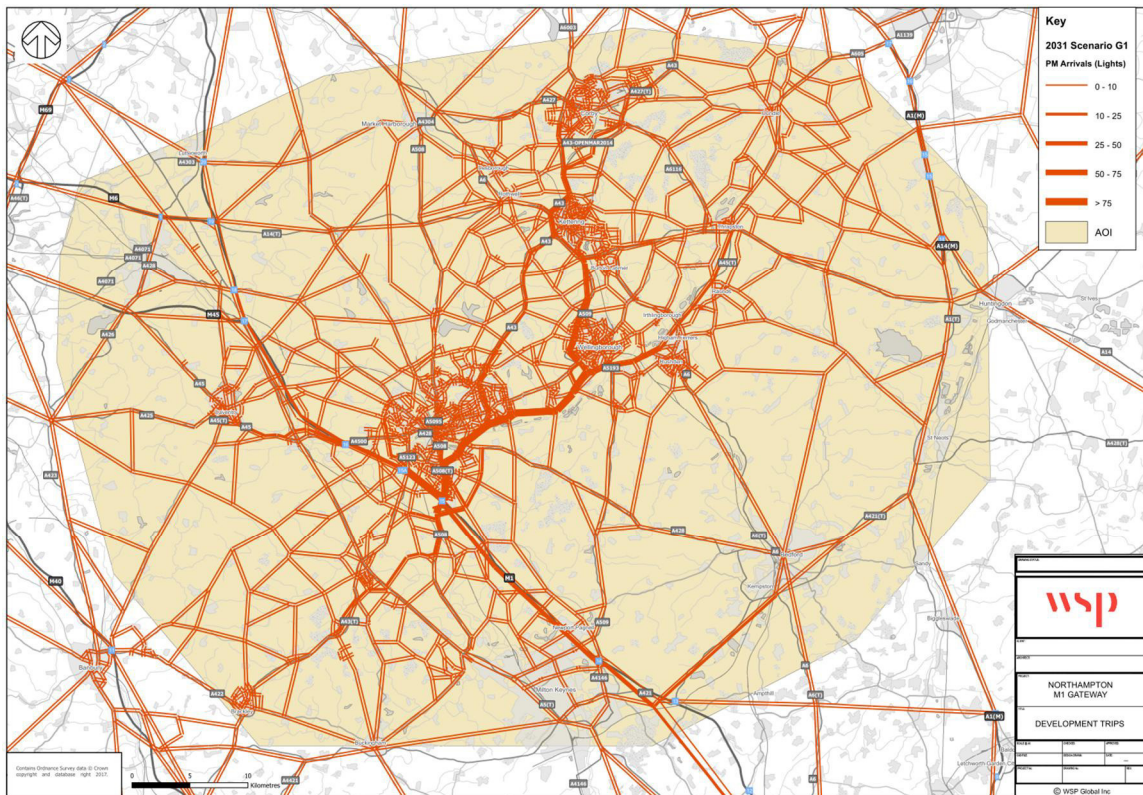**Figure 6: M1 Northampton Gateway Arrival distribution (Before adjustment) – PM Peak**

Figure 7: M1 Northampton Gateway Arrival distribution (After adjustment) – PM Peak

Figure 8 and Figure 9 show the trip departure distribution plots for the PM peak before and after the adjustment.
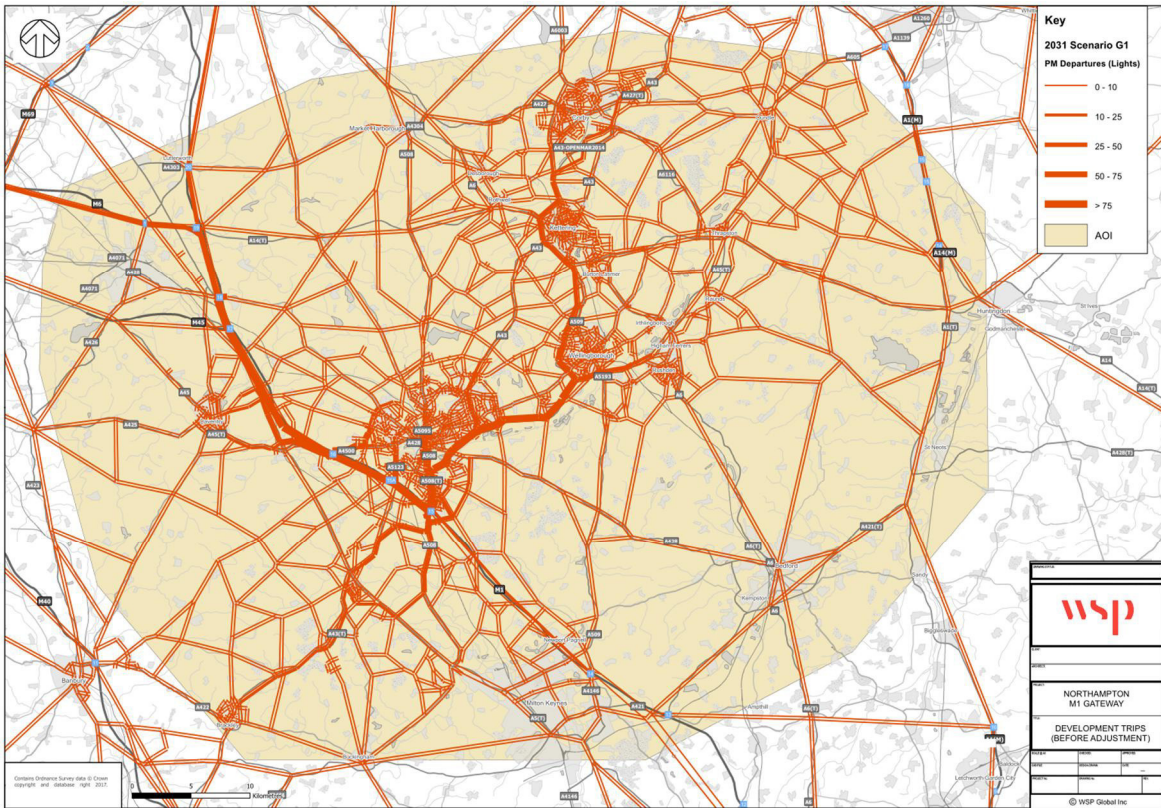

Figure 8: M1 Northampton Gateway Departure distribution (Before adjustment) – PM Peak
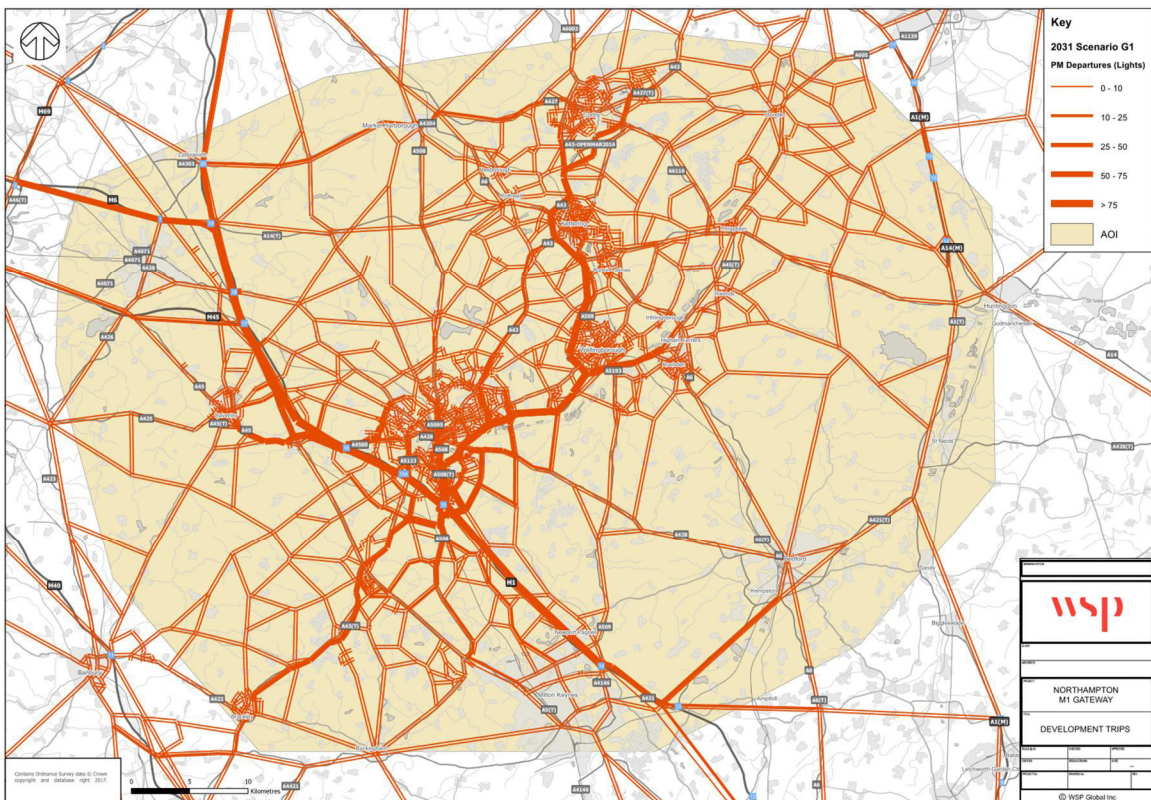

Figure 9: M1 Northampton Gateway Departure distribution (After adjustment) – PM Peak

It can be seen from the above figures that the overall Northampton Gateway development distribution does not alter much after adjustment. Also adjusted M1 South trips represent more realistic travel pattern that can provide a robust basis for the assessment of the M1 gateway development.

SUMMARY

The proposed development distribution for light vehicles has been derived from the NSTM2 Demand Model and verified with 2011 JTW data. The trip distribution compares well for local roads, such as the A45 and the A508. It shows less trips using the M1 (S) therefore it has been uplifted by applying adjustment factors so that it closely matches the 2011 JTW distribution of the nearby Saxon Avenue employment site.

By comparing the trip distribution before and after the M1(S) adjustment it can be concluded that the overall trip distributions for the Northampton Gateway Development have not altered significantly, whilst also providing a realistic travel pattern when compared to JTW Census data for nearby employment sites. It is therefore concluded that the distributions are suitable for development assessment purposes.