Melton Mowbray Core Strategy

Highway Infrastructure Option Modelling

Mark Dazeley and Ian Stanness

9th January 2012

AECOM

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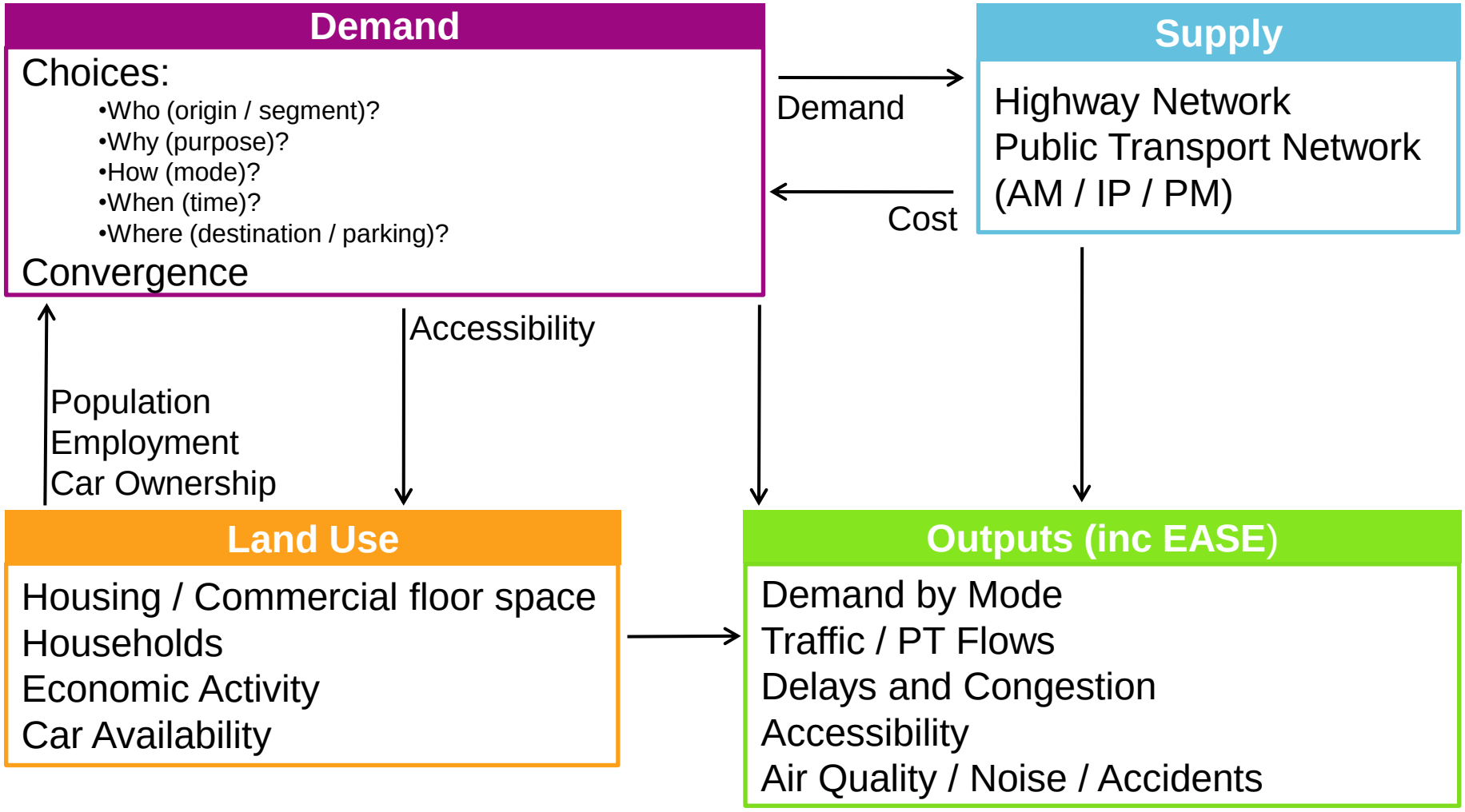
Model Overview and Forecasting Assumptions

Model Structure



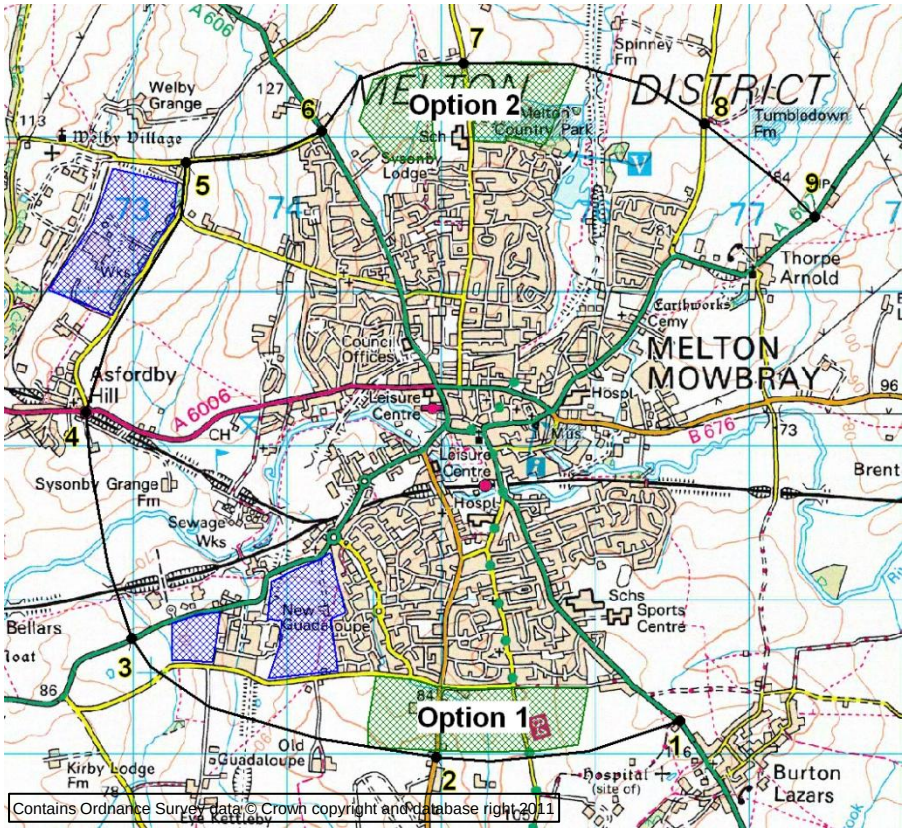
Model Inputs

- LLITM requires various model inputs when forecasting:
  - Land-use inputs to predict planning data
  - Various economic assumptions from government WebTAG guidance
    - Including values of time and fuel costs
  - Other model assumptions
    - Including public transport fares, freight growth and average car occupancy changes
  - Future year SATURN highway and CUBE public transport networks
    - These include schemes which LCC consider as ‘committed’ or ‘highly likely’ going forward

Development Options

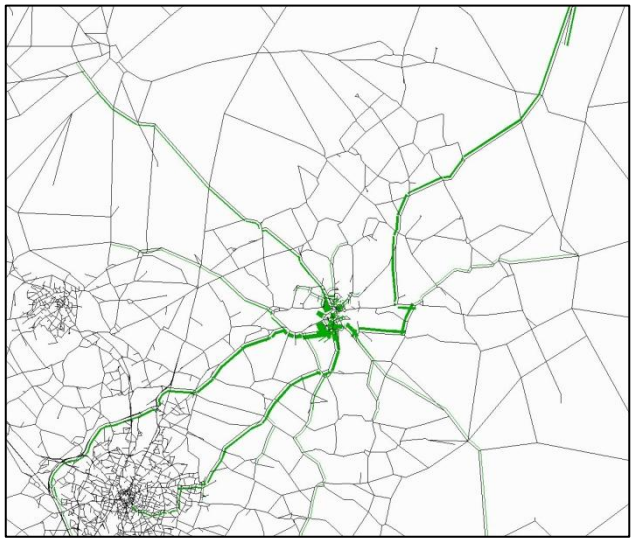
Development Options Tested

- Two 1,000 dwelling housing development options tested
  - Option 1: south of Melton
  - Option 2: north of Melton
- In each scenario additional employment:
  - to south-west of Melton
  - near Welby
- All results for 2026

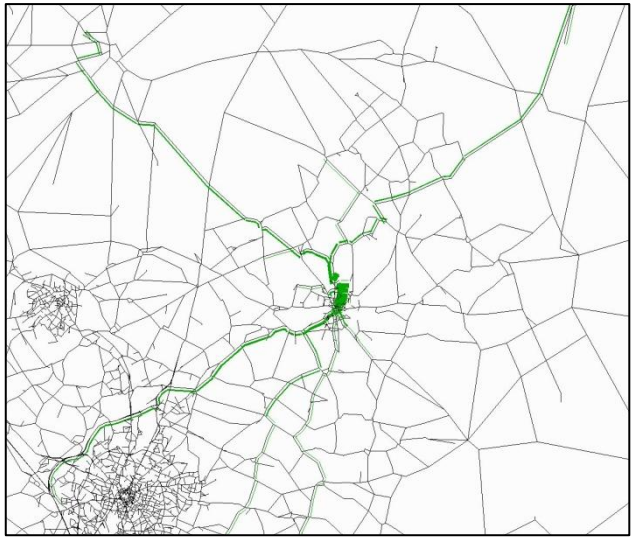


Development Results

- In Option 1, development zone contains a total of:
  - 1,131 households, population of 2,362 and 695 jobs
  - 4,181 tours over 24-hours and modes
- In Option 2, development zone contains a total of:
  - 1,175 households, population of 2,233 and 289 jobs.
  - 3,581 tours over 24-hours and modes
- Development distributions based on distributions from nearby Melton zones

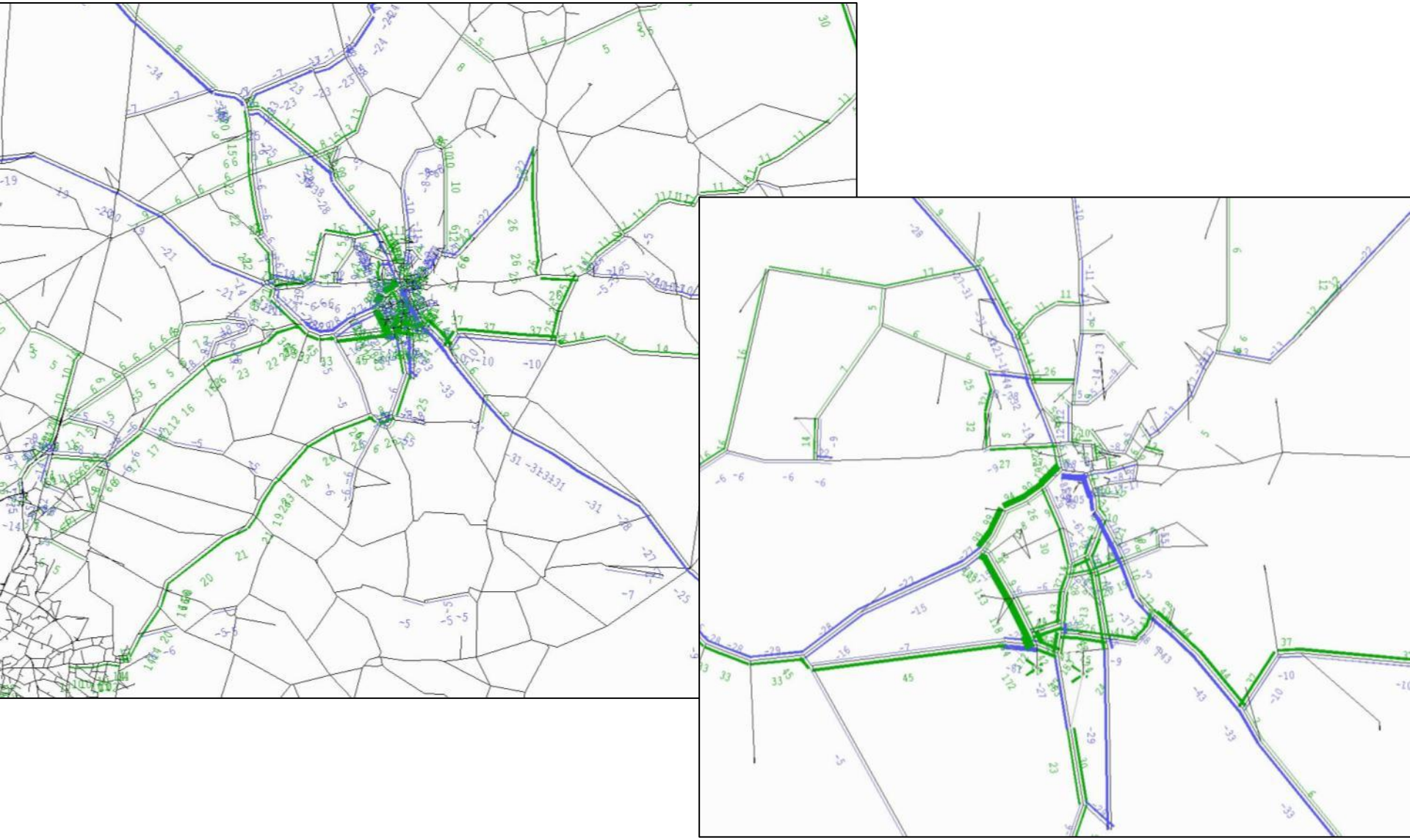


Option 1

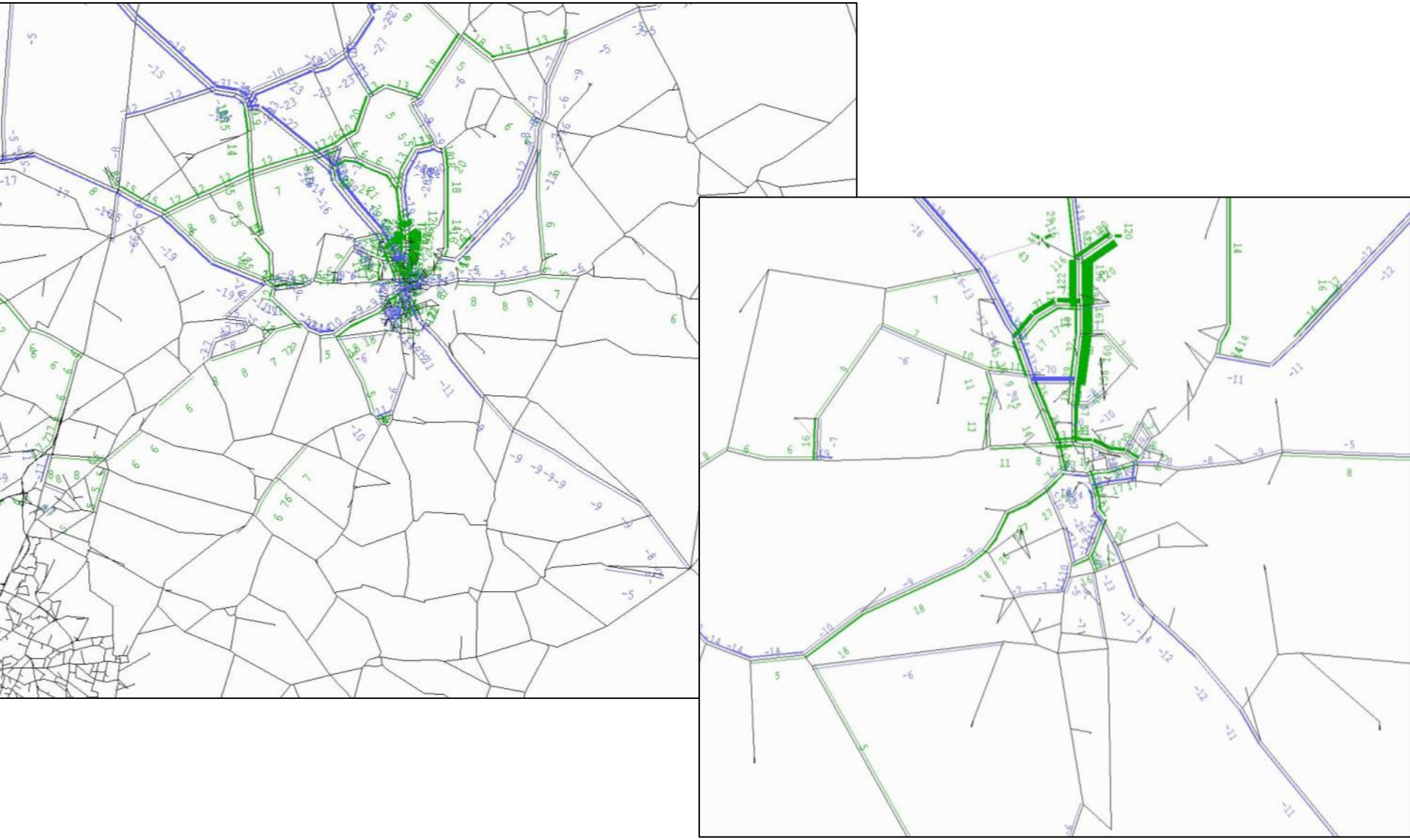


Option 2

Change in AM Peak Assignment – Option 1

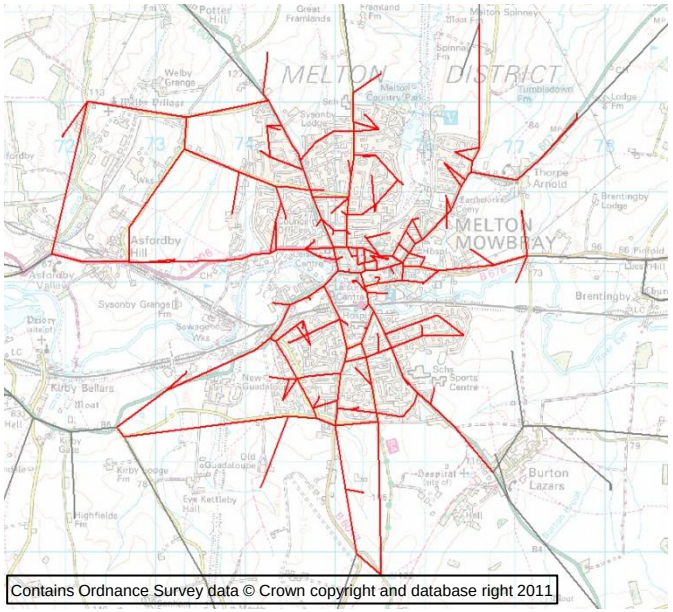


Change in AM Peak Assignment – Option 2



Highway Assignment Statistics

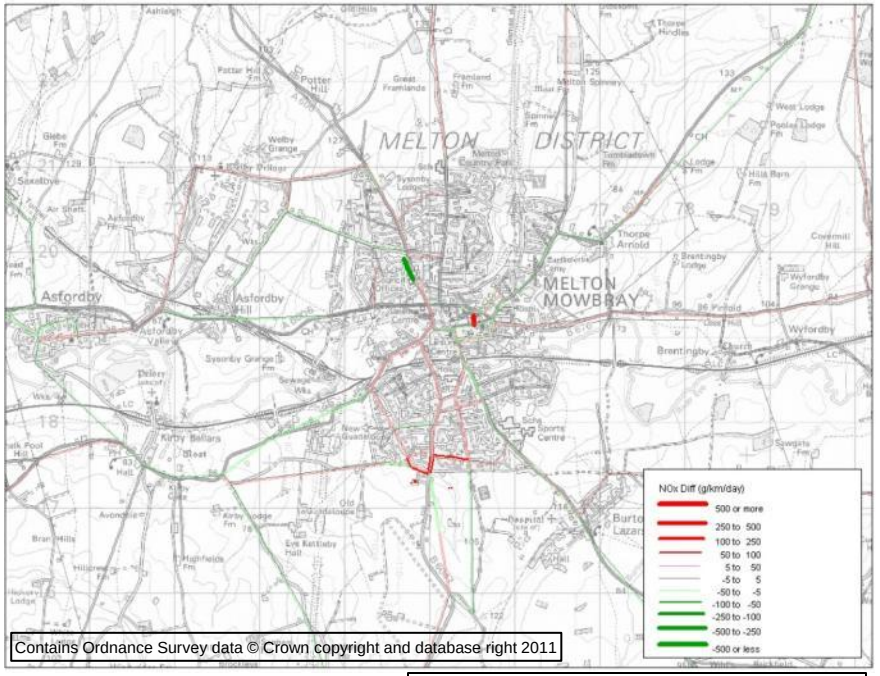
- Table shows statistics for Melton Mowbray links
  - Increase in vehicle-kms of:
    - 0.3% to 0.9% with Option 1 development
    - 1.4% to 1.8% with Option 2 development
    - (Similar increases across Melton District)
  - Decrease in average speeds of:
    - 0.5% to 0.9% in both development options



	AM Peak Hour				Interpeak Hour				PM Peak Hour			
	2008	Core	Opt 1	Opt 2	2008	Core	Opt 1	Opt 2	2008	Core	Opt 1	Opt 2
Vehicle Distance (Veh-km)	**27,340**	**34,603**	**34,927**	**35,192**	**20,445**	**26,338**	**26,413**	**26,700**	**29,569**	**36,096**	**36,292**	**36,738**
		26.6%	0.9%	1.7%		28.8%	0.3%	1.4%		22.1%	0.5%	1.8%
Vehicle Delay Time (Hours)	**240**	**365**	**378**	**380**	**158**	**227**	**232**	**234**	**282**	**437**	**444**	**452**
		52.1%	3.5%	4.1%		43.7%	2.5%	3.4%		54.7%	1.6%	3.5%
Speed (Km/Hr)	**34**	**33**	**32**	**32**	**35**	**34**	**34**	**34**	**33**	**31**	**31**	**31**
		-4.8%	-0.9%	-0.9%		-2.4%	-0.7%	-0.6%		-7.3%	-0.5%	-0.6%

Change in Emissions

- Table shows change in emission in Melton Mowbray
  - Air pollutants increase by 1.2% to 1.7% in both options
- Carbon measured over Leicestershire
  - Decreases with developments



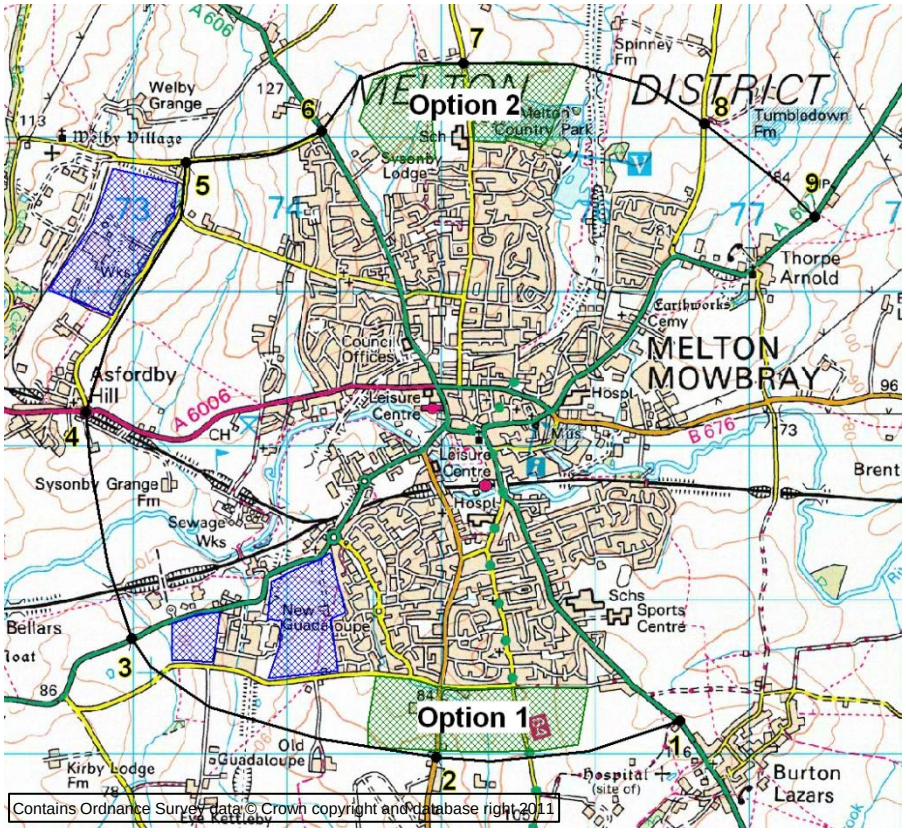
Change in NOx in Option 1

	2008	Core	Option 1	Option 2
Hydrocarbons (g/km/day)	268,604	116,438	118,454	117,864
		-56.7%	1.7%	1.2%
NOx (g/km/day)	845,113	184,745	187,178	186,950
		-78.1%	1.3%	1.2%
PM10 (g/km/day)	57,562	45,899	46,571	46,662
		-20.3%	1.5%	1.7%
PM2.5 (g/km/day)	40,747	25,703	26,078	26,129
		-36.9%	1.5%	1.7%
Carbon (tonnes/year)	823,842	1,078,765	1,076,675	1,072,570
		254,923	-2,090	-6,195
Carbon (£/year)	68,535,429	128,168,064	127,919,748	127,432,045
		59,632,635	-248,316	-736,019

Bypass Options with Option 1 Development

Bypass Options Tested with Option 1 Development

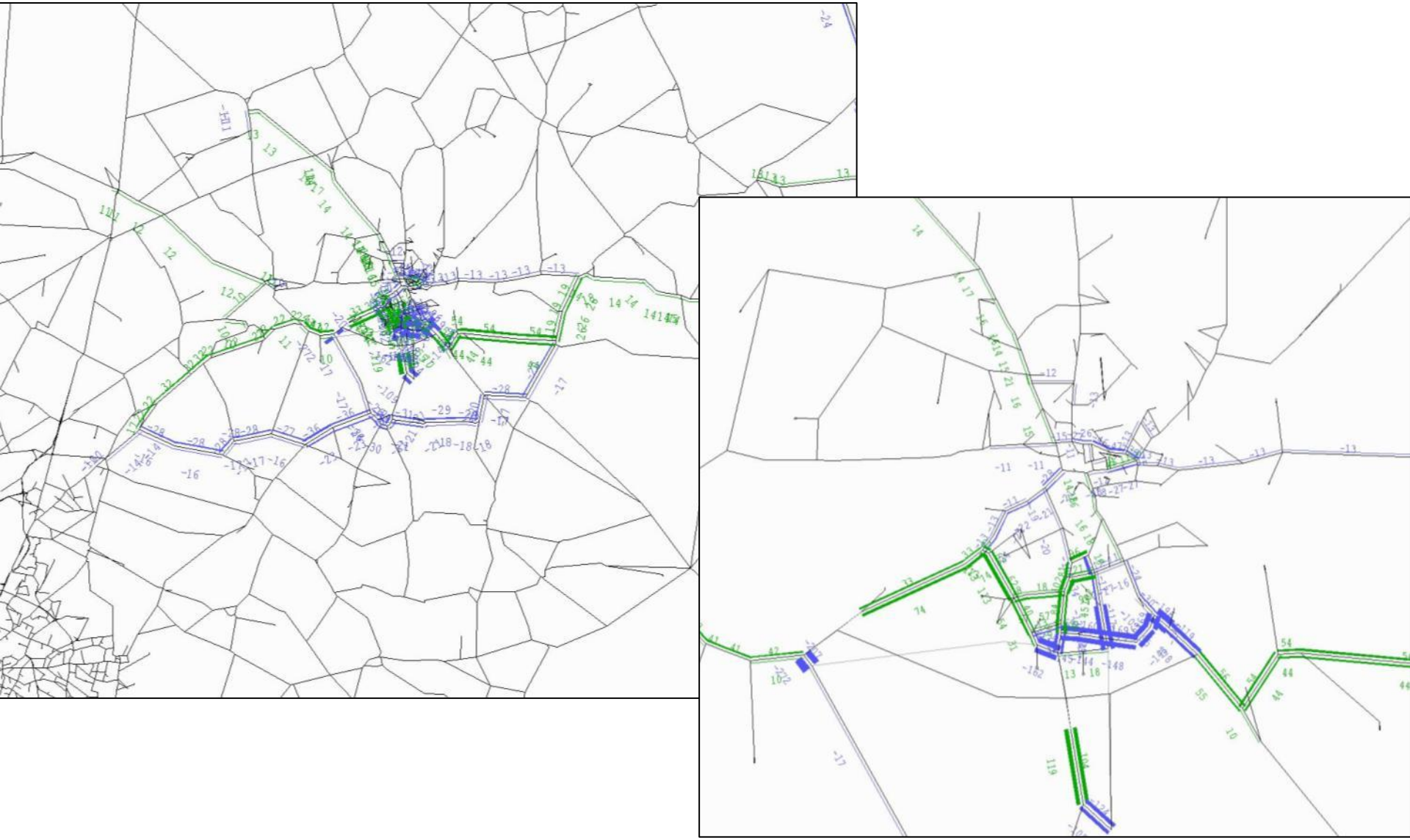
- Four bypass options tested with this development option:
  - Section 1 to 3
  - Section 1 to 4
  - Section 1 to 6
  - Section 1 to 9



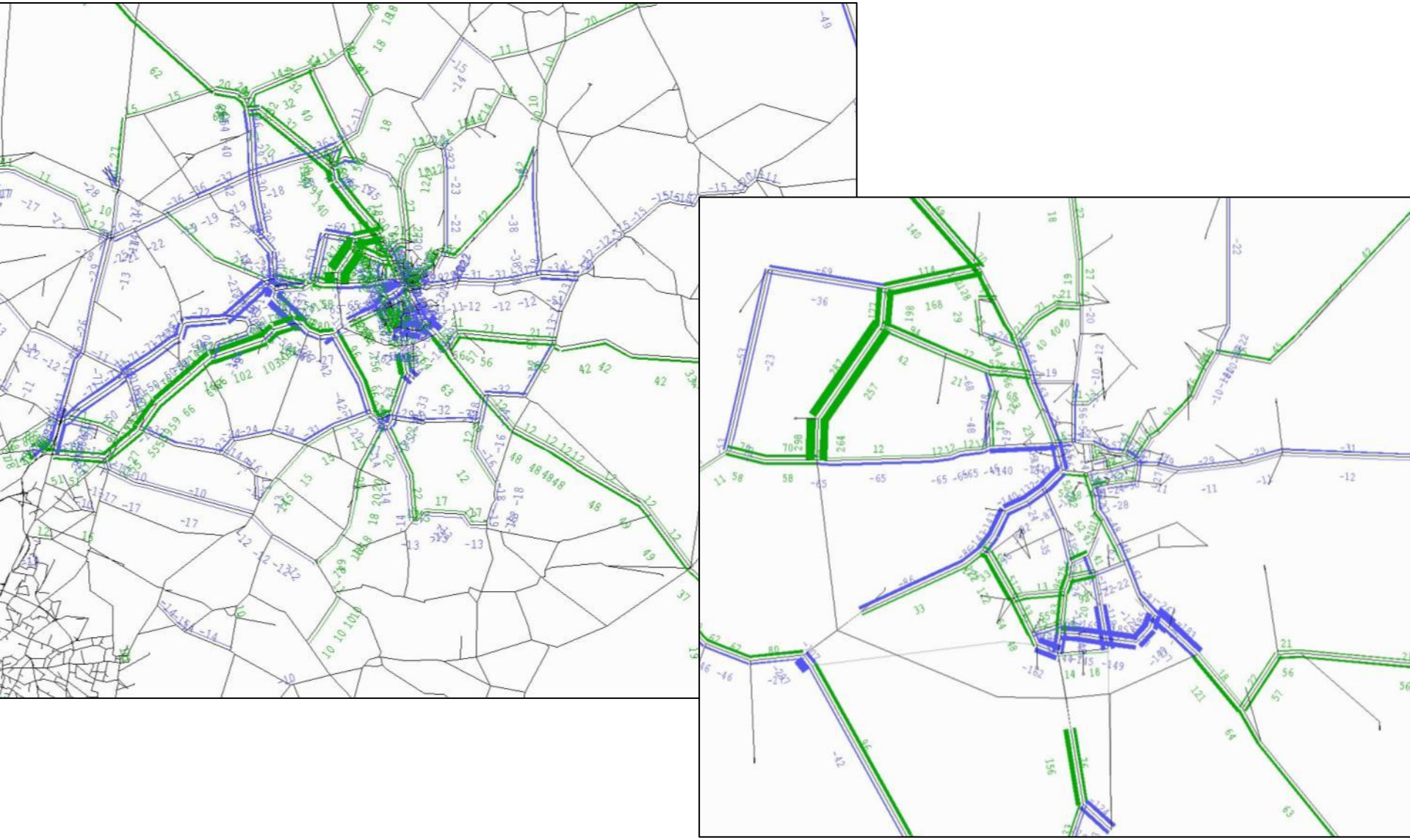
Changes in Demand

- In general, introduction of bypass options increases highway demand for Melton Borough
  - Very small reduction with Section 1 to 3
  - Increase in productions of 0.3%, and increases in attractions of 0.6%-0.7%, with Section 1 to 4 and Section 1 to 6
  - Increase in productions of 0.4%, and increase in attractions of 1.2% with Section 1 to 9
- Compensating reduction in active mode trips
- Little forecast change in public transport as a result of the bypass options
- Overall increase in attractions to Melton Borough of up to 0.5%

Change in AM Peak Assignment – Option 1 Section 1 to 3



Change in AM Peak Assignment – Option 1 Section 1 to 4



Change in AM Peak Assignment – Option 1 Section 1 to 6

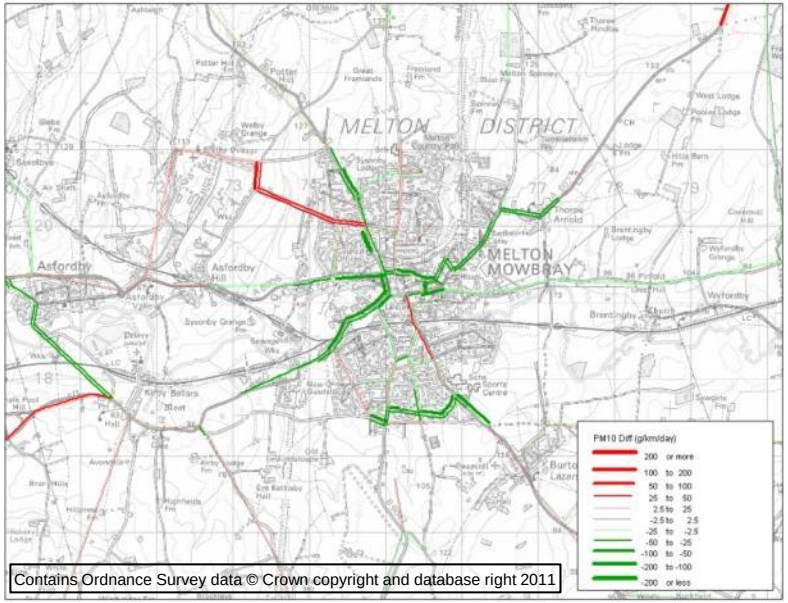
Change in AM Peak Assignment – Option 1 Section 1 to 9

Highway Assignment Statistics (Melton Mowbray)

		Base	Core	Opt 1	Sc1 to 3	Sc1 to 4	Sc1 to 6	Sc1 to 9
AM Peak Hour	Vehicle Distance (Veh-km)	27,340	34,603	34,927	35,159	38,219	37,852	44,061
			26.6%	0.9%	0.7%	9.4%	8.4%	26.2%
	Vehicle Delay Time (Hours)	240	365	378	381	361	369	366
			52.1%	3.5%	0.9%	-4.5%	-2.2%	-3.1%
	Speed (Km/Hr)	34	33	32	32	34	34	37
			-4.8%	-0.9%	-0.2%	6.5%	4.9%	14.1%
Interpeak Hour	Vehicle Distance (Veh-km)	20,445	26,338	26,413	26,308	28,196	28,013	32,735
			28.8%	0.3%	-0.4%	6.8%	6.1%	23.9%
	Vehicle Delay Time (Hours)	158	227	232	238	218	219	220
			43.7%	2.5%	2.4%	-6.3%	-5.6%	-5.1%
	Speed (Km/Hr)	35	34	34	34	36	36	39
			-2.4%	-0.7%	-1.0%	5.5%	4.8%	13.5%
PM Peak Hour	Vehicle Distance (Veh-km)	29,569	36,096	36,292	36,427	40,610	39,889	47,663
			22.1%	0.5%	0.4%	11.9%	9.9%	31.3%
	Vehicle Delay Time (Hours)	282	437	444	445	428	435	406
			54.7%	1.6%	0.2%	-3.5%	-2.0%	-8.5%
	Speed (Km/Hr)	33	31	31	31	33	33	37
			-7.3%	-0.5%	0.0%	7.7%	5.9%	19.4%

Change in Emissions

- Table shows change in emission in Melton Mowbray
  - Reductions in emissions, with greater reductions with longer bypass
- Carbon over Leicestershire generally increases with bypass



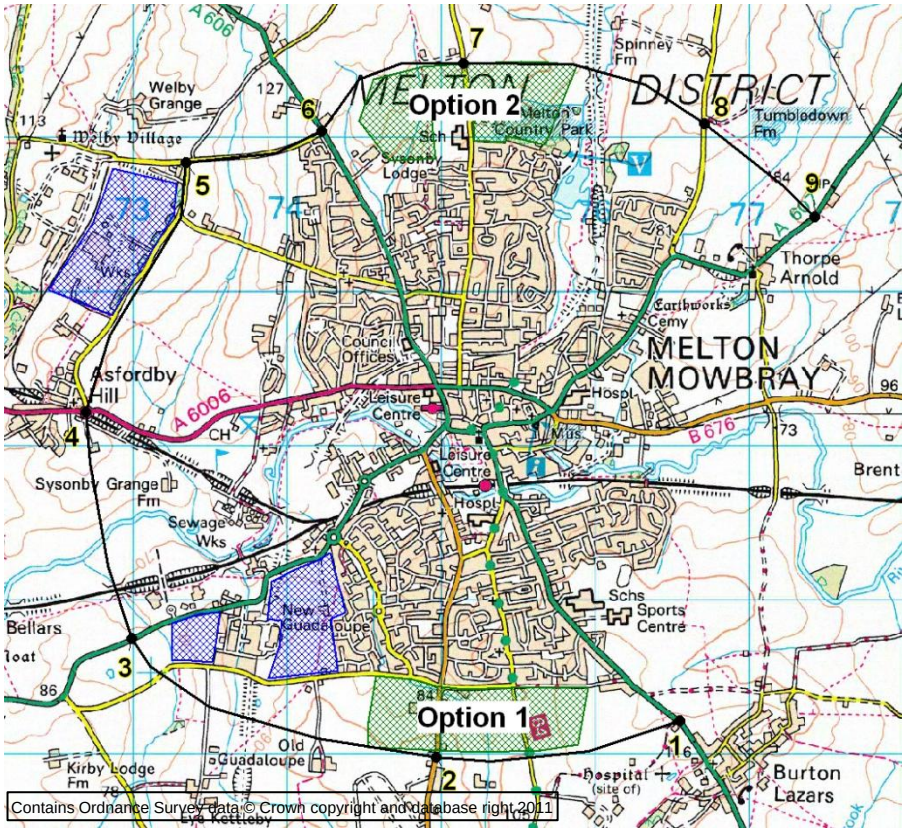
Change in PM10 with Sc1 to 9

	2008	Core	Option 1	Sc1 to 3	Sc1 to 4	Sc1 to 6	Sc1 to 9
Hydrocarbons (g/km/day)	268,604	116,438	118,454	116,136	109,195	105,206	97,070
		-56.7%	1.7%	-2.0%	-7.8%	-11.2%	-18.1%
NOx (g/km/day)	845,113	184,745	187,178	185,332	179,936	175,834	171,469
		-78.1%	1.3%	-1.0%	-3.9%	-6.1%	-8.4%
PM10 (g/km/day)	57,562	45,899	46,571	45,786	45,245	44,679	42,387
		-20.3%	1.5%	-1.7%	-2.8%	-4.1%	-9.0%
PM2.5 (g/km/day)	40,747	25,703	26,078	25,671	25,397	25,075	23,867
		-36.9%	1.5%	-1.6%	-2.6%	-3.8%	-8.5%
Carbon (tonnes/year)	823,842	1,078,765	1,076,675	1,073,345	1,085,048	1,079,568	1,084,929
		254,923	-2,090	-3,330	8,373	2,893	8,254
Carbon (£/year)	68,535,429	128,168,064	127,919,748	127,524,145	128,914,513	128,263,521	128,900,361
		59,632,635	-248,316	-395,602	994,765	343,774	980,613

Bypass Options with Option 2 Development

Bypass Options Tested with Option 2 Development

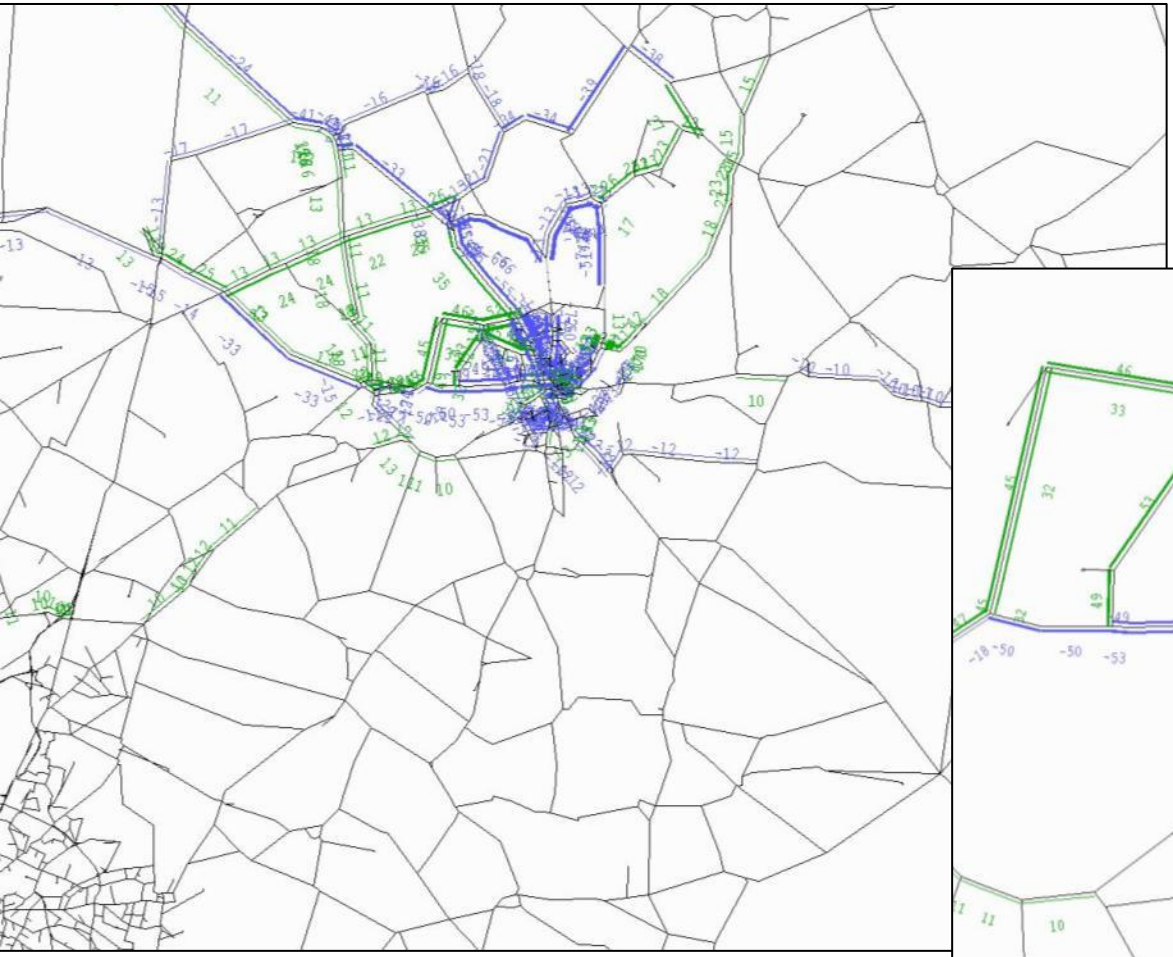
- Seven bypass options tested with this development option:
  - Section 6 to 8
  - Section 4 to 8
  - Section 3 to 8
  - Section 6 to 9
  - Section 4 to 9
  - Section 3 to 9
  - Section 1 to 9

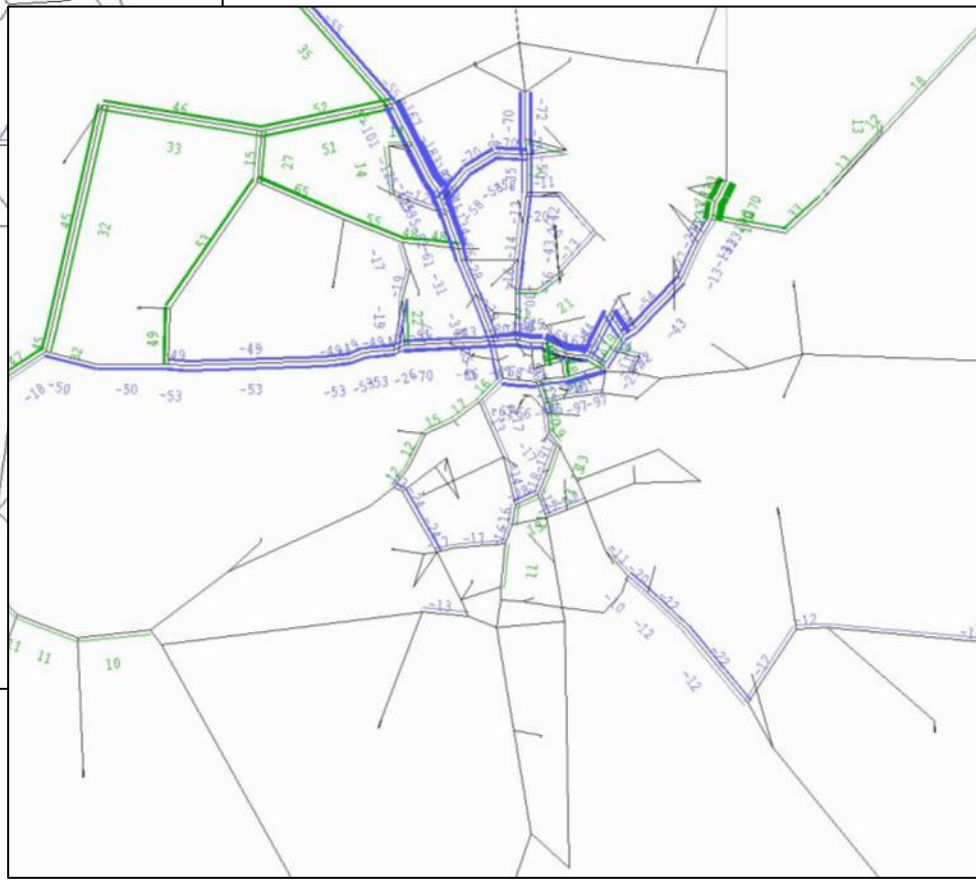


Changes in Demand

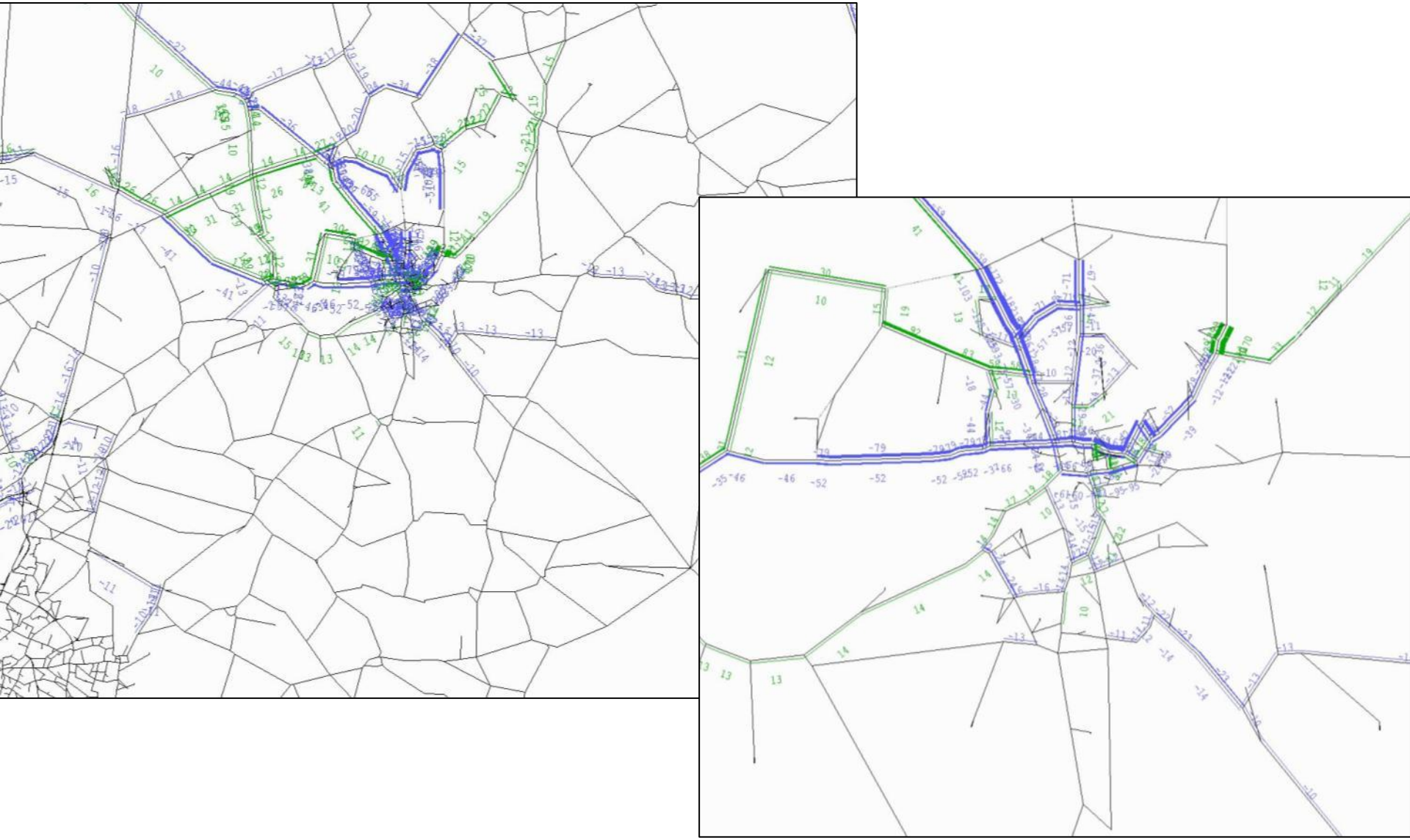
- Introduction of bypass options increases highway demand for Melton Borough
  - Increase in productions of 0.1%-0.2%, and increases in attractions of 0.4%-0.6%, with Section 6 to 8, Section 4 to 8, Section 6 to 9 and Section 4 to 9
  - Increase in productions of 0.4%-0.5%, and increase in attractions of 1.1%-1.3% with Section 3 to 8, Section 3 to 9 and Section 1 to 9
- Compensating reduction in active mode trips
- Little forecast change in public transport as a result of the bypass options
- Overall increase in attractions to Melton Borough of up to 0.6%

Change in AM Peak Assignment – Option 2 Section 6 to 8

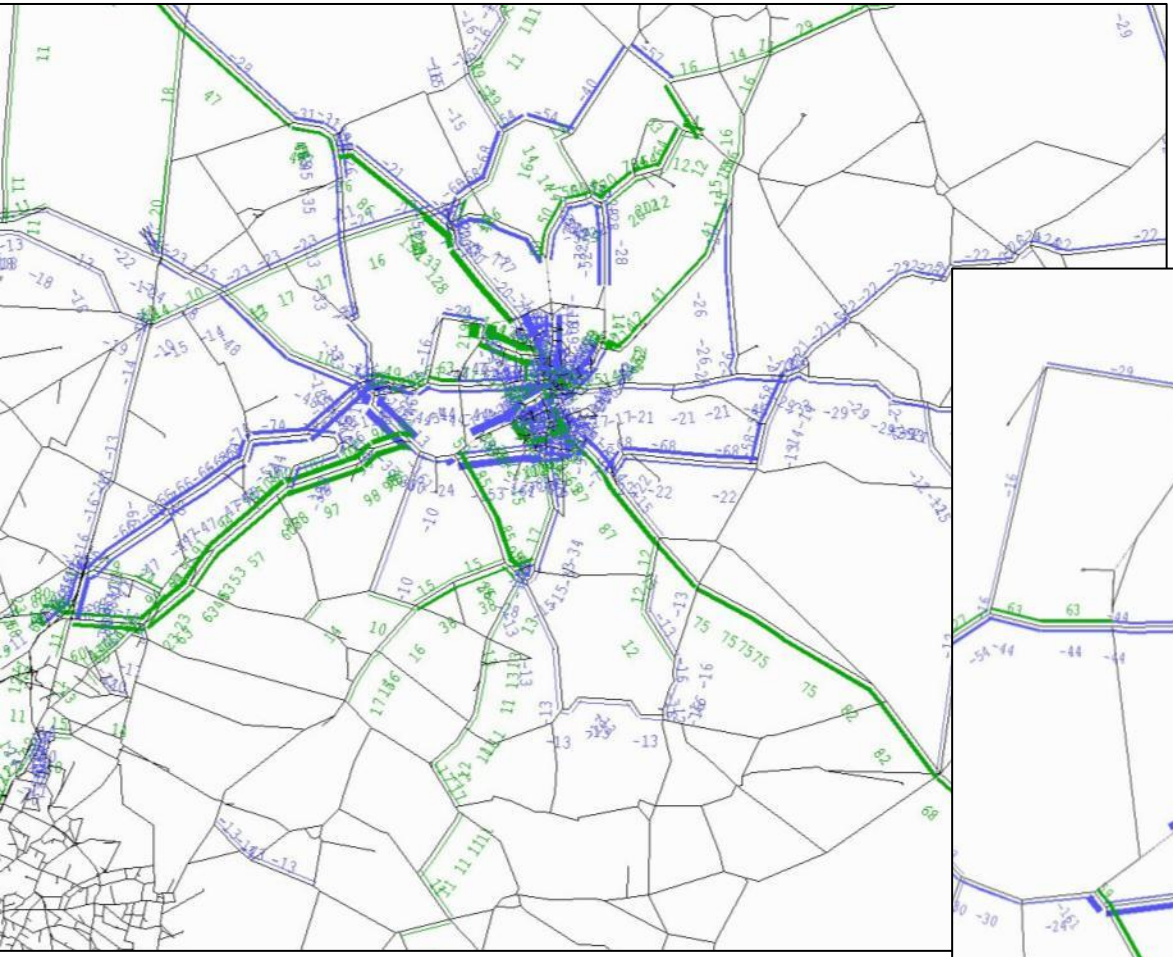


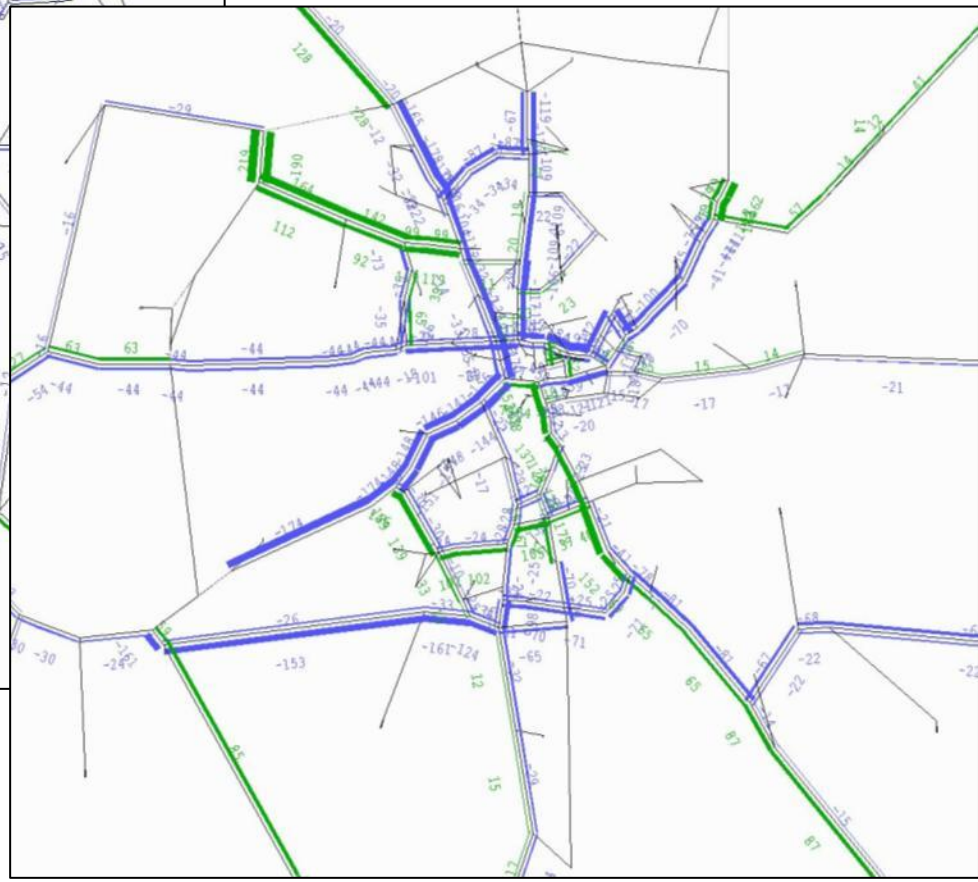


Change in AM Peak Assignment – Option 2 Section 4 to 8

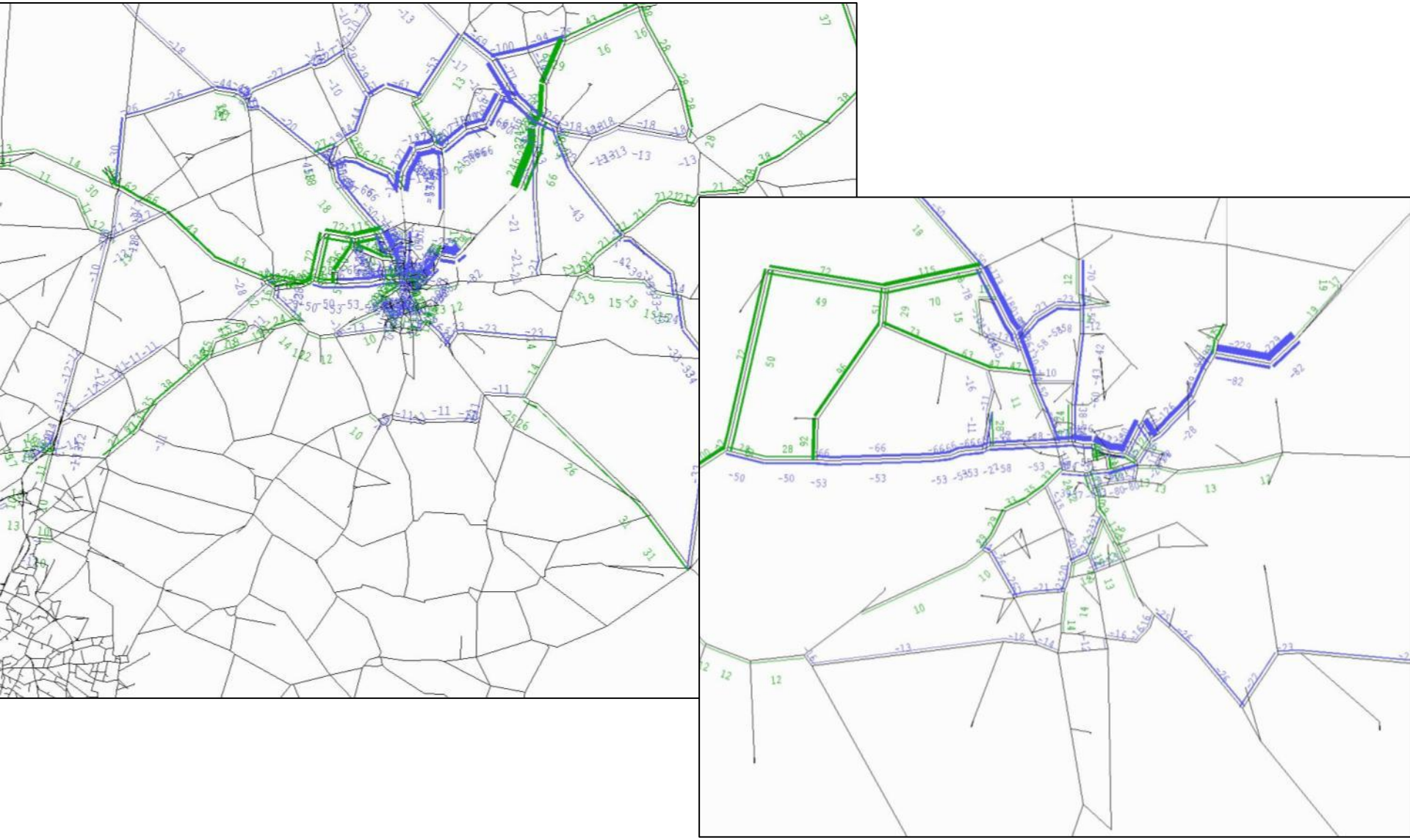


Change in AM Peak Assignment – Option 2 Section 3 to 8

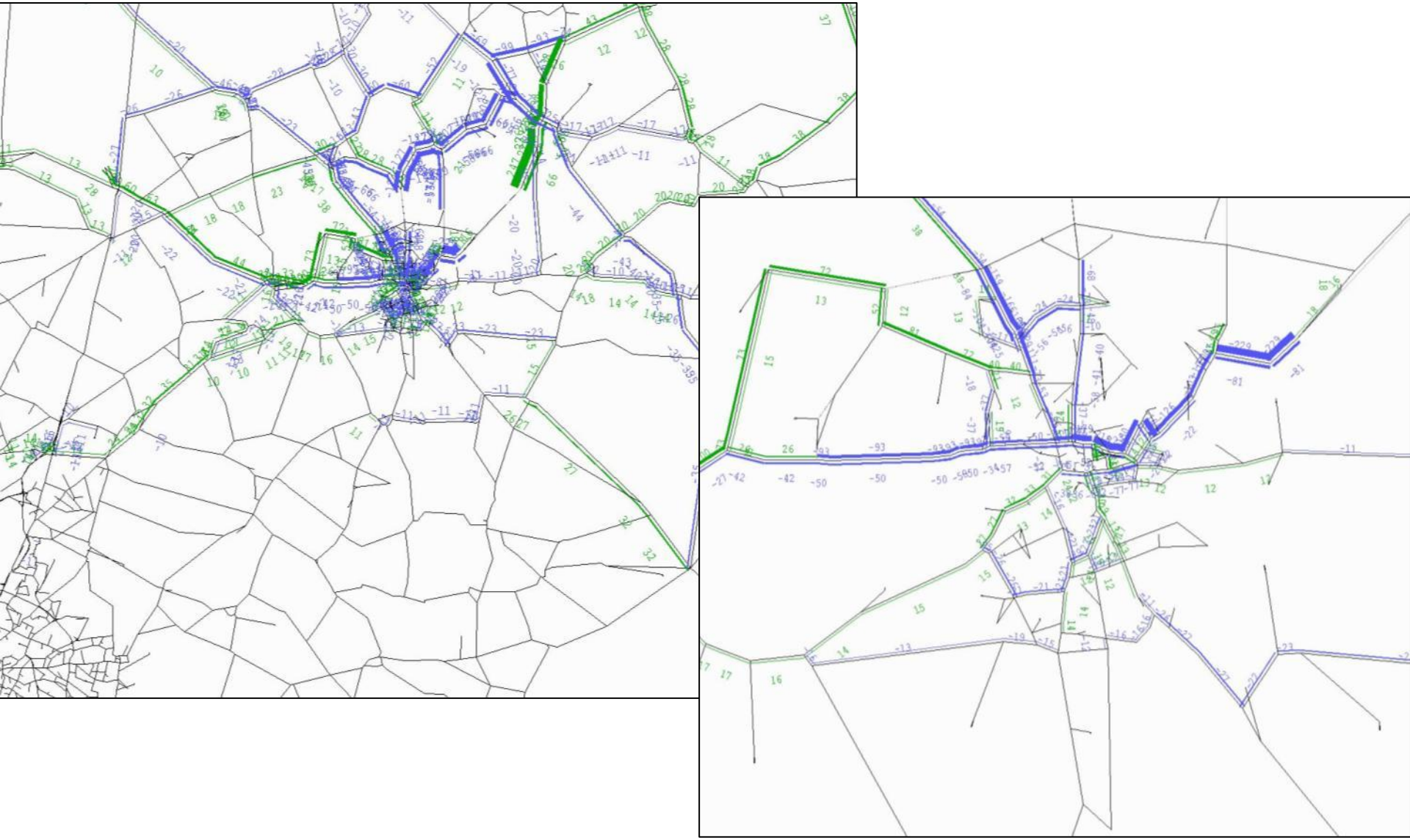




Change in AM Peak Assignment – Option 2 Section 6 to 9



Change in AM Peak Assignment – Option 2 Section 4 to 9



Change in AM Peak Assignment – Option 2 Section 3 to 9

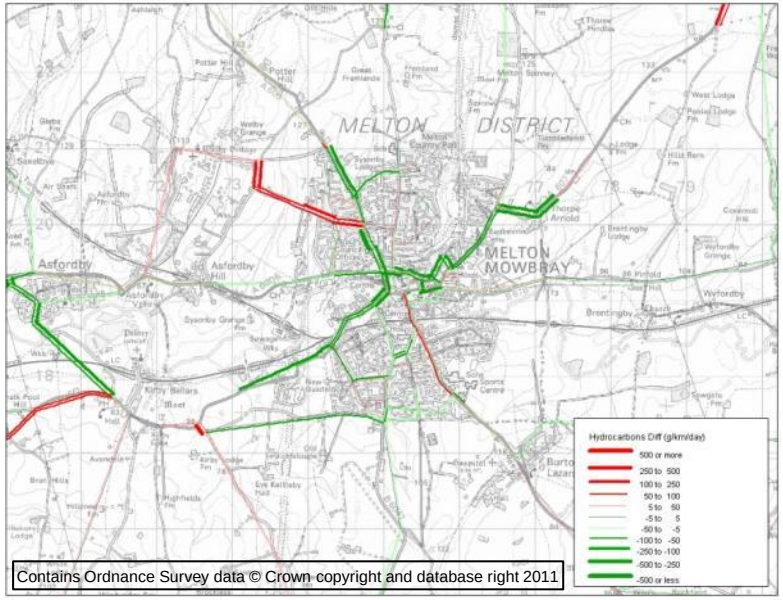
Change in AM Peak Assignment – Option 2 Section 1 to 9

Highway Assignment Statistics (Melton Mowbray)

		Base	Core	Opt 2	Sc6 to 8	Sc4 to 8	Sc3 to 8	Sc6 to 9	Sc4 to 9	Sc3 to 9	Sc1 to 9
AM Peak Hour	Vehicle Distance (Veh-km)	27,340	34,603	35,192	36,590	36,451	38,902	41,353	41,207	43,880	44,317
			26.6%	1.7%	4.0%	3.6%	10.5%	17.5%	17.1%	24.7%	25.9%
	Vehicle Delay Time (Hours)	240	365	380	365	366	345	371	370	349	345
			52.1%	4.1%	-4.0%	-3.7%	-9.2%	-2.5%	-2.7%	-8.2%	-9.3%
	Speed (Km/Hr)	34	33	32	34	33	35	36	35	37	38
			-4.8%	-0.9%	3.8%	3.3%	9.1%	10.1%	9.8%	15.6%	16.5%
Interpeak Hour	Vehicle Distance (Veh-km)	20,445	26,338	26,700	27,654	27,550	29,300	31,274	31,175	33,127	33,139
			28.8%	1.4%	3.6%	3.2%	9.7%	17.1%	16.8%	24.1%	24.1%
	Vehicle Delay Time (Hours)	158	227	234	234	236	218	236	238	219	219
			43.7%	3.4%	-0.2%	0.6%	-6.8%	0.8%	1.7%	-6.5%	-6.7%
	Speed (Km/Hr)	35	34	34	35	35	37	37	37	39	39
			-2.4%	-0.6%	2.2%	1.7%	7.5%	8.6%	8.0%	14.0%	14.2%
PM Peak Hour	Vehicle Distance (Veh-km)	29,569	36,096	36,738	38,862	38,791	41,556	44,545	44,463	47,916	48,233
			22.1%	1.8%	5.8%	5.6%	13.1%	21.2%	21.0%	30.4%	31.3%
	Vehicle Delay Time (Hours)	282	437	452	439	423	412	422	424	419	410
			54.7%	3.5%	-2.8%	-6.4%	-8.9%	-6.6%	-6.3%	-7.3%	-9.2%
	Speed (Km/Hr)	33	31	31	32	32	34	35	35	36	37
			-7.3%	-0.6%	4.4%	5.4%	10.7%	13.9%	13.5%	18.6%	19.7%

Change in Emissions

- Table shows change in emission in Melton Mowbray
  - Reductions in emissions, with greater reductions with longer bypass
- Carbon measured across Leicestershire



Change in Hydrocarbons with Sc3 to 9

	2008	Core	Option 2	Sc6 to 8	Sc4 to 8	Sc3 to 8	Sc6 to 9	Sc4 to 9	Sc3 to 9	Sc1 to 9
Hydrocarbons (g/km/day)	268,604	116,438	117,864	119,156	119,043	102,513	115,141	115,033	104,483	98,971
		-56.7%	1.2%	1.1%	1.0%	-13.0%	-2.3%	-2.4%	-11.4%	-16.0%
NOx (g/km/day)	845,113	184,745	186,950	189,166	189,586	177,951	188,796	189,209	183,492	175,079
		-78.1%	1.2%	1.2%	1.4%	-4.8%	1.0%	1.2%	-1.8%	-6.4%
PM10 (g/km/day)	57,562	45,899	46,662	46,036	46,160	43,965	46,101	46,217	44,534	42,811
		-20.3%	1.7%	-1.3%	-1.1%	-5.8%	-1.2%	-1.0%	-4.6%	-8.3%
PM2.5 (g/km/day)	40,747	25,703	26,129	25,831	25,903	24,696	25,878	25,947	25,056	24,119
		-36.9%	1.7%	-1.1%	-0.9%	-5.5%	-1.0%	-0.7%	-4.1%	-7.7%
Carbon (tonnes/year)	823,842	1,078,765	1,072,570	1,073,577	1,077,742	1,079,681	1,078,565	1,076,901	1,081,821	1,079,017
		254,923	-6,195	-3,323	5,172	664	5,995	-841	2,140	6,447
Carbon (£/year)	68,535,429	128,168,064	127,432,045	127,551,713	128,046,524	128,276,912	128,144,285	127,946,575	128,531,141	128,198,065
		59,632,635	-736,019	-394,863	614,479	78,847	712,240	-99,949	254,229	766,020

Summary of Results

Core Scenario and Development Options

- The core scenario forecasts that within Melton Mowbray:
  - Traffic will increase by between 22% and 29% depending on the time period
  - Average speeds will reduce by between 2.5% and 7.3% depending on the time period
- Development options are forecast to increase traffic by:
  - Between 0.3% and 0.9% in Option 1
  - Between 1.4% and 1.8% in Option 2
  - (Similar results across the district of increases of between 0.1% and 0.3% in both development options)
- The highway trips related to Option 2 are, on average, shorter by between 2.5 and 5.5km (14% and 26%) and more contained within Melton Mowbray.

Bypass Options – Option 1 Development

- Improvements from Sections 1 to 3 are insufficient to mitigate the additional vehicle-delay for Melton Mowbray resulting from the Option 1 development
- Sections 1 to 4 is forecast to:
  - reduce the vehicle-delay to, or below, the 2026 core scenario in all three modelled time periods
  - Increase average speeds on the Melton Mowbray network compared to the 2026 core scenario
  - Similarly, Section 1 to 6 and 1 to 9 bypass configurations are forecast to mitigate the Option 1 development traffic
- No bypass options reduce vehicle-delay to at, or below, 2008 levels
  - Section 1 to 4 and 1 to 6 average speeds comparable to base year
  - Section 1 to 9 improves average speeds compared to base year

Bypass Options – Option 2 Development

- To mitigate the increase in vehicle-delays due to the development:
  - Section 6 to 8 bypass is forecast to reduce vehicle-delays to the level forecast in the 2026 core scenario in the two peak periods
  - Section 3 to 8 is forecast to reduce vehicle-delay in all three time periods compared to the core scenario
  - Average speeds increase in all bypass options
- To mitigate the overall traffic growth from the 2008 base year:
  - None of the bypass options reduce the forecast vehicle-delay hours to, or below, the 2008 base year in any time period
  - Section 6 to 9 may be considered to be sufficient based on forecast average speeds
  - If further mitigation, particularly in terms of vehicle-delays, was required, then Section 3 to 9 or Section 1 to 9 should be considered