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A339 WIDENING AND LONDON ROAD INDUSTRIAL ESTATE ACCESS SCHEME

Outline Business Case - Additional Information
West Berkshire Council

11/11/2014

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	FINAL			
Date	11 November 2014			
Prepared by	Craig Drennan			
Signature				
Checked by	Various			
Signature				
Authorised by	Craig Drennan			
Signature				
Project number	70007329			
Report number				
File reference	\\ser01bas1uk.uk.wspgroup.com\projects\70008265 - WBC A339~Fleming Road\C Documents\Reports\A339 Widening and London Road Industrial Estate access scheme - OBC - Additional Information.docx			

A339 widening and London Road Industrial Estate access scheme

Outline Business Case - Additional Information

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Table of Contents

1	Introduction.....	5
2	Base transport model.....	6
3	SATURN assignments.....	9
4	TUBA economic assessment.....	13
5	Summary	19

Appendices

1 Introduction

1.1 Background

- 1.1.1 Following the devolution of major transport scheme funding from DfT, West Berkshire Council (WBC) as part of the Thames Valley Berkshire Local Enterprise Partnership (TVBLEP) (and the Berkshire Local Transport Body (BLTB) and Berkshire Strategic Transport Forum (BSTF)) were asked to prepare a business case for the A339 Widening and London Road Industrial Estate (LRIE) access scheme in Newbury. The scheme scored well in the initial prioritisation exercise and has been included in the BLTB's programme following Growth Deal announcements in July 2014.
- 1.1.2 The scheme delivers a new junction to access the industrial estate identified in the Local Plan as an area for regeneration (West Berkshire Core Strategy, Area Delivery Plan Policy 2). The access will enable the facilitation of the regeneration which will deliver economic growth creating additional jobs and improving the environment of this part of the town. Further details regarding the redevelopment of the LRIE are contained in the West Berkshire Housing Site Allocations Development Plan Document (preferred options consultation July 2014).
- 1.1.3 The TVBLEP brings together businesses, unitary authorities, education and the community sector to drive economic growth in the Thames Valley. The Thames Valley Berkshire Growth Deal will deliver growth by enhancing urban connectivity and addressing strategic infrastructure priorities across the LEP area. This will enable the delivery of essential housing at flagship sites in Newbury, Wokingham and Bracknell and improve access and reduce journey times across the LEP area.
- 1.1.4 West Berkshire Council (WBC) appointed WSP to undertake a business case looking at the strategic, economic and management impacts of the A339 widening and LRIE access scheme.
- 1.1.5 The A339 widening and LRIE access scheme is a signalised junction which will allow direct access from the strategic road network to the LRIE which is a 12 hectare edge of town site proposed for redevelopment and employment intensification. The proposal will unlock the potential for additional housing delivery and encourage an extension to the vibrant town centre.
- 1.1.6 WYG were appointed to provide an independent review of the London Road Industrial Estate (LRIE) Business Case submission on behalf of the Thames Valley Berkshire Local Enterprise Partnership. As part of their review WYG have raised three key issues which the review suggests should be taken into account when considering the overall benefits of the scheme. These issues could result in an overestimate of the economic benefits of the scheme and the issues relate to the modelling and TUBA appraisal of the scheme including:
- Specific sector to sector movements have been removed from the TUBA assessment. In turn this has led to large benefits and large disbenefits being omitted from the final benefit calculation, which highlights possible concerns regarding the reliability of the model
 - The annualisation factors used in the TUBA assessment have been derived using peak hour to peak period factor rather than the method set out within TUBA guidance
- 1.1.7 The additional information contained within this document seeks to address those issues.

2 Base transport model

- 2.1.1 The WYG review of the Kings Road link Road Business Case highlighted that the PM peak assigns 717 more modelled trips than observed trips on Mill Lane. This issue has not been raised as part of the LRIE Business Case however for completeness it is addressed within this technical note.
- 2.1.2 Further analysis was undertaken on the 2013 PM peak base model to provide an explanation of this. A select link analysis was undertaken on Mill Lane which is shown in figure 1.1.

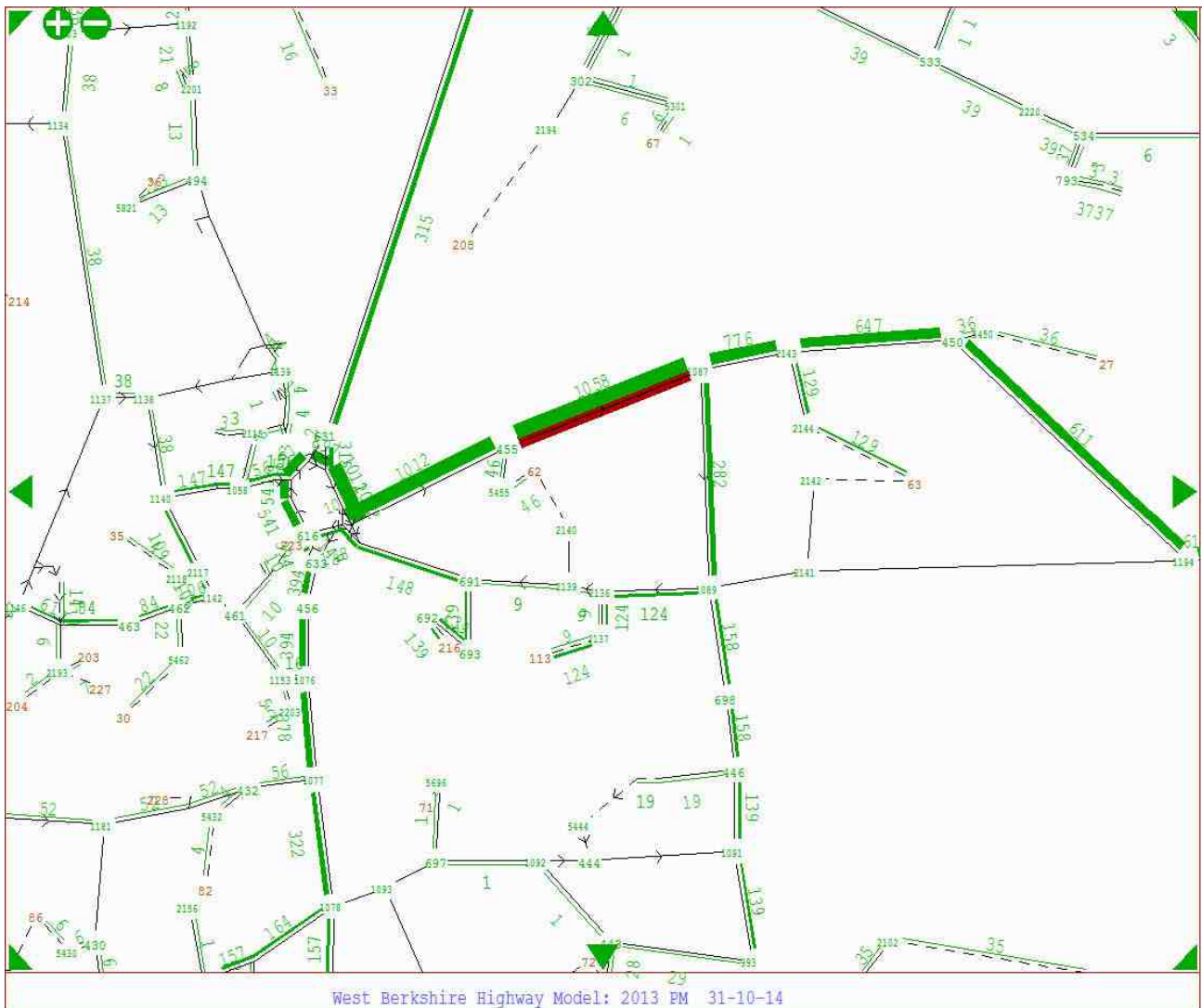


Figure 2.1: 2013 PM peak select link analysis on Mill Lane

2.1.3 Figure 1.1 shows that traffic:

- from the A339 (S) is using Mill Lane from the A339 (S) rather than using the Boundary Road junction due to the delays on the northern approach to the junction
- from the A339 (N) is using Mill Lane and Boundary Road rather than using the A339 and turning left at the St John's Road junction due to the southbound delays on the A339 approach to the St John's Road junction

2.1.4 Figure 1.2 shows that there is a delay on the:

- northbound approach to the B3421 Kings Road/B3421 Hambridge Road/Boundary Road priority junction of 191 seconds which is due to the narrow road crossing the railway line to the south of the junction
- southbound approach to the St John's Road roundabout of 213 seconds. This means that there is a localised re-routing of traffic to avoid junctions where there are large delays

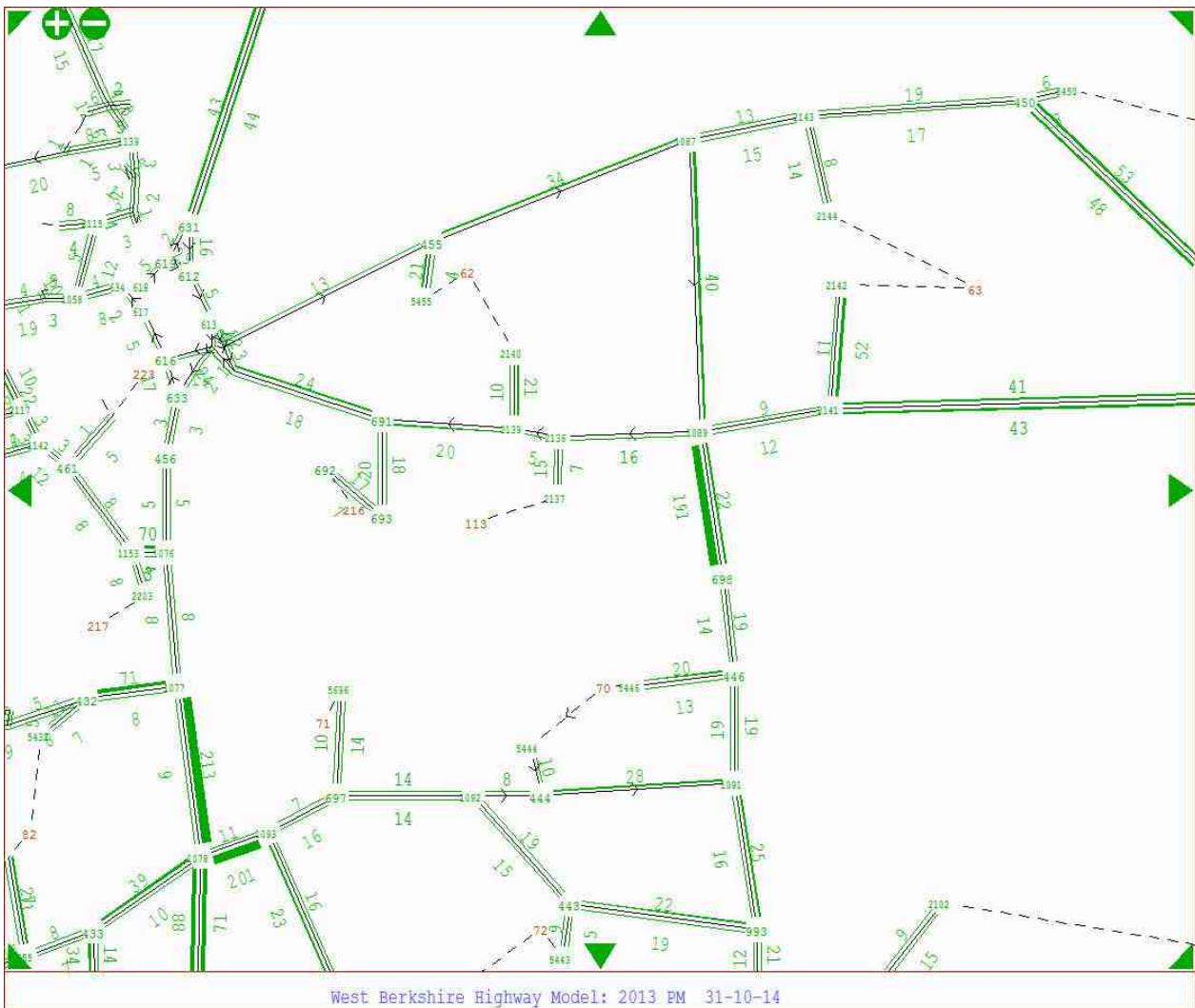


Figure 2.2: 2013 PM peak – total time plus queues on links

2.1.5 Figure 1.3 shows the select link analysis over a wider area and shows that modelled traffic from the A339 is using Mill Lane and the B3421 Hambridge Road to access the A4 at the A4 London Road/B3421 Hambridge Road junction to avoid the delays on the A4 London Road as shown in figure 1.4.

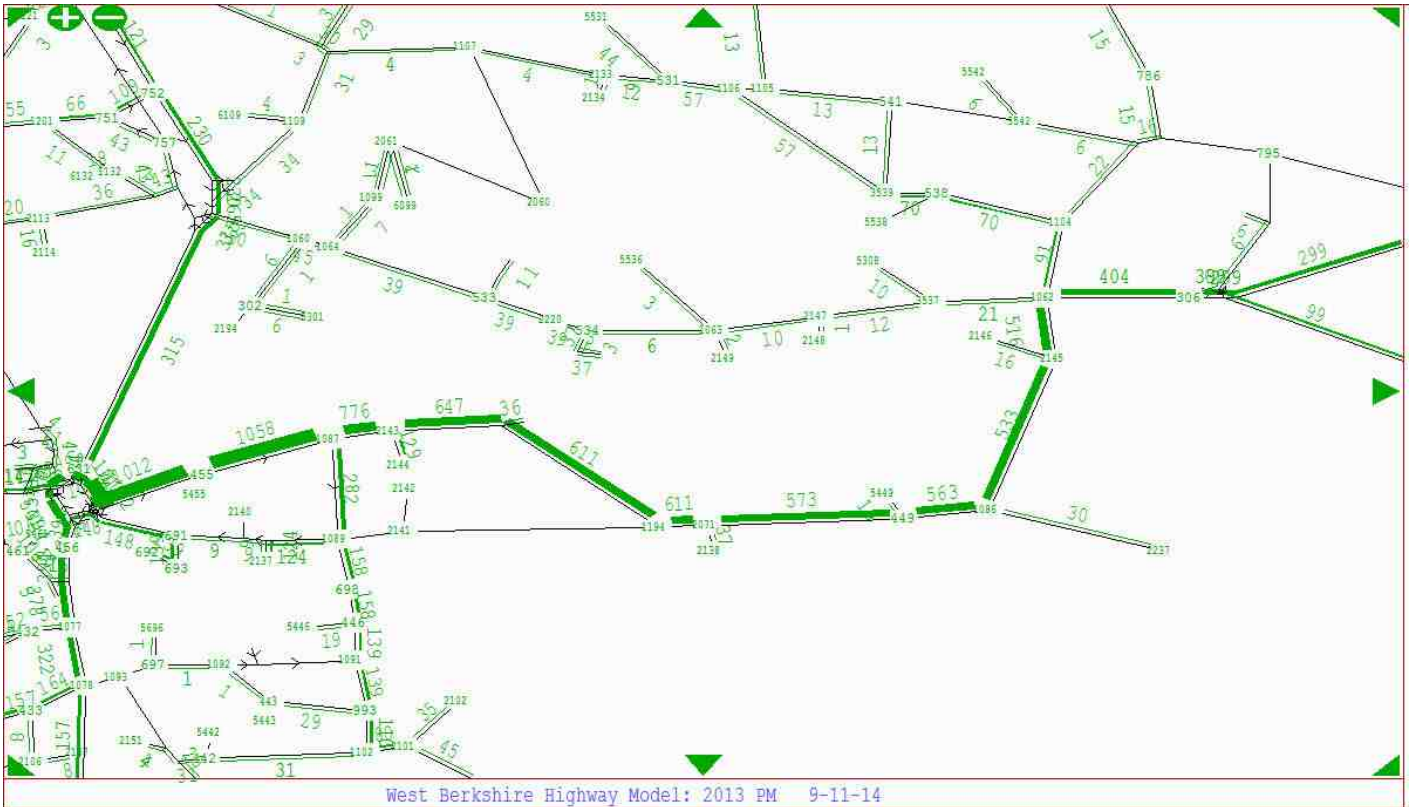


Figure 2.3: 2013 PM peak select link analysis on Mill Lane

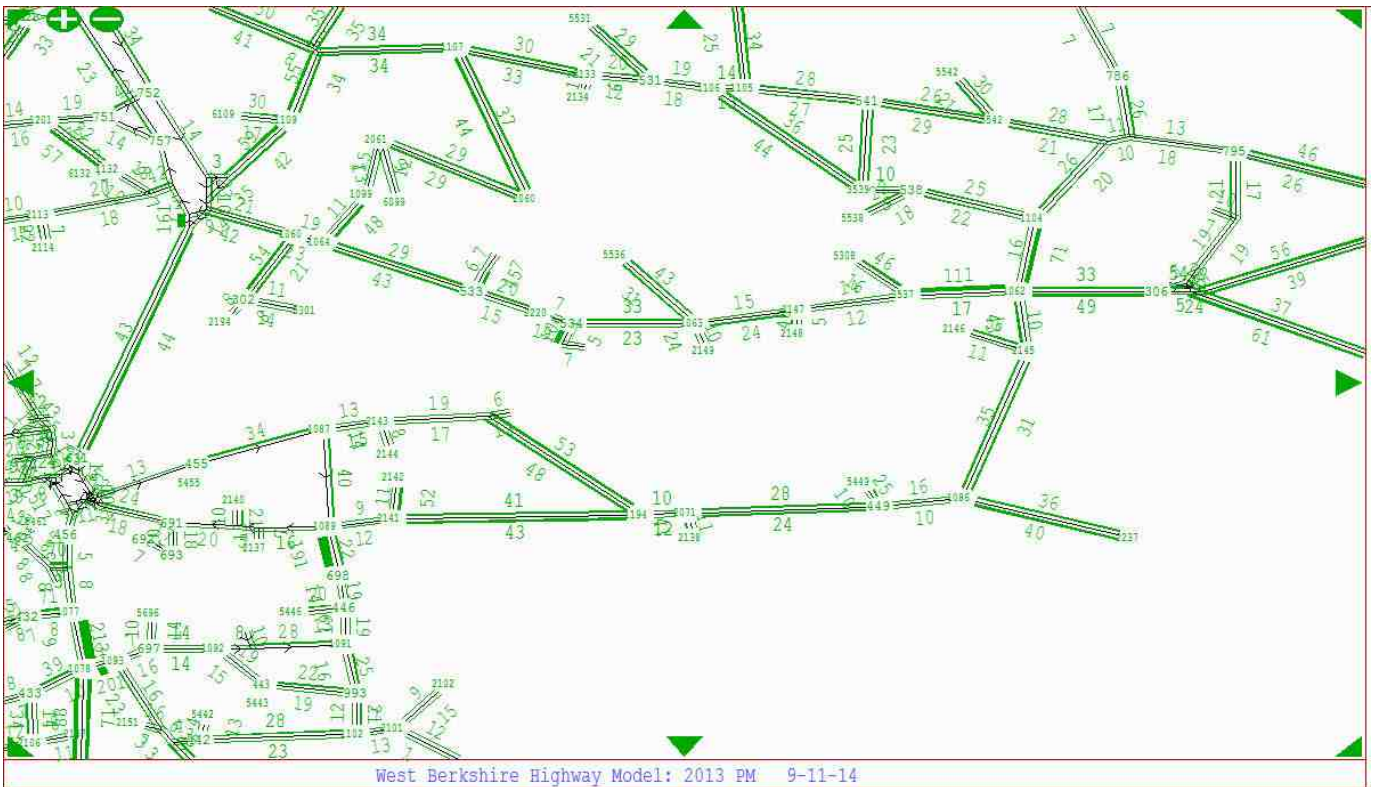


Figure 2.4: 2013 PM peak – total time plus queues on links

3 SATURN assignments

- 3.1.1 WYG have raised concerns that the TUBA assessment results included within the business case may highlight concerns regarding the reliability of the traffic model. The traffic assignments that have been used to output the required information for the TUBA assessment have used the following convergence criteria:
 - ISTOP (98%), STPGAP (0.1), UNCRTS (0.05) and AUTONA=T
- 3.1.2 These are in line with WebTAG guidance (WebTAG Unit M3.1 and WebTAG Unit M2) and are used to demonstrate that the whole model converges to a satisfactory degree and avoid model 'noise' as much as possible. The SATURN model assignments have been set up so that both these criteria have to be met before the traffic model converges.
- 3.1.3 However it could be argued that the current TUBA economic assessment is based on a traffic model where a certain level of model 'noise' is evident. With this in mind the assignment convergence parameters have been reviewed and changed to:
 - ISTOP (98%) and STPGAP (0.03), UNCRTS (0.02) and AUTONA=T
- 3.1.4 The SATURN assignments have been re-run using the much stricter convergence criteria detailed in paragraph 1.3.3 so that the traffic model results are as free from error and model 'noise' as possible.
- 3.1.5 Figure 1.5 and figure 1.6 show the impact in the 2026 forecast year for the AM peak and PM peak in terms of actual flow differences with anything less than a 10 passenger car unit (pcu) flow excluded when the LRIE access scheme is included. The effect of the LRIE access scheme is localised and restricted to the area of interest which would indicate that the traffic model is behaving as you would expect.

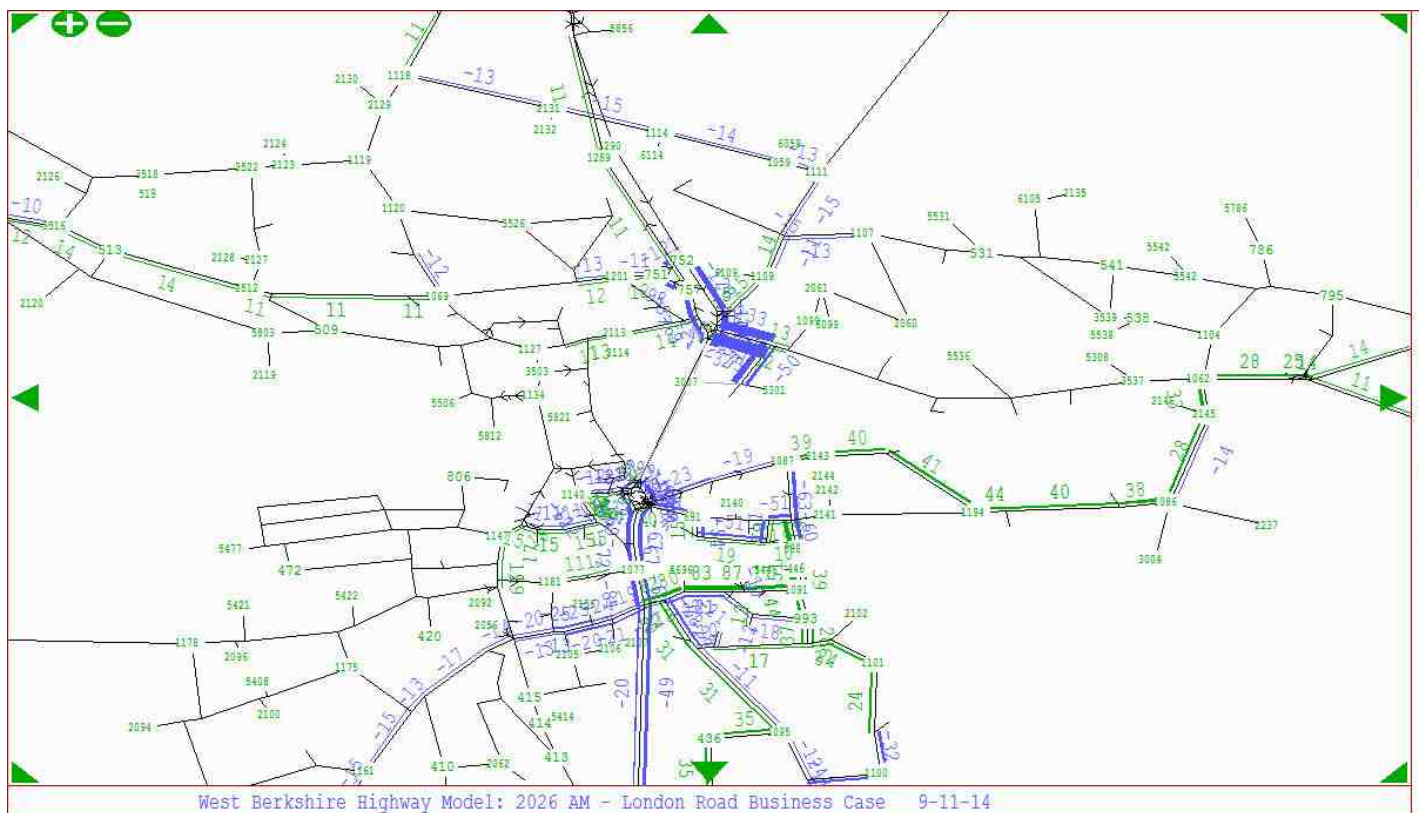


Figure 3.1: 2026 AM peak flow difference – with and without scheme

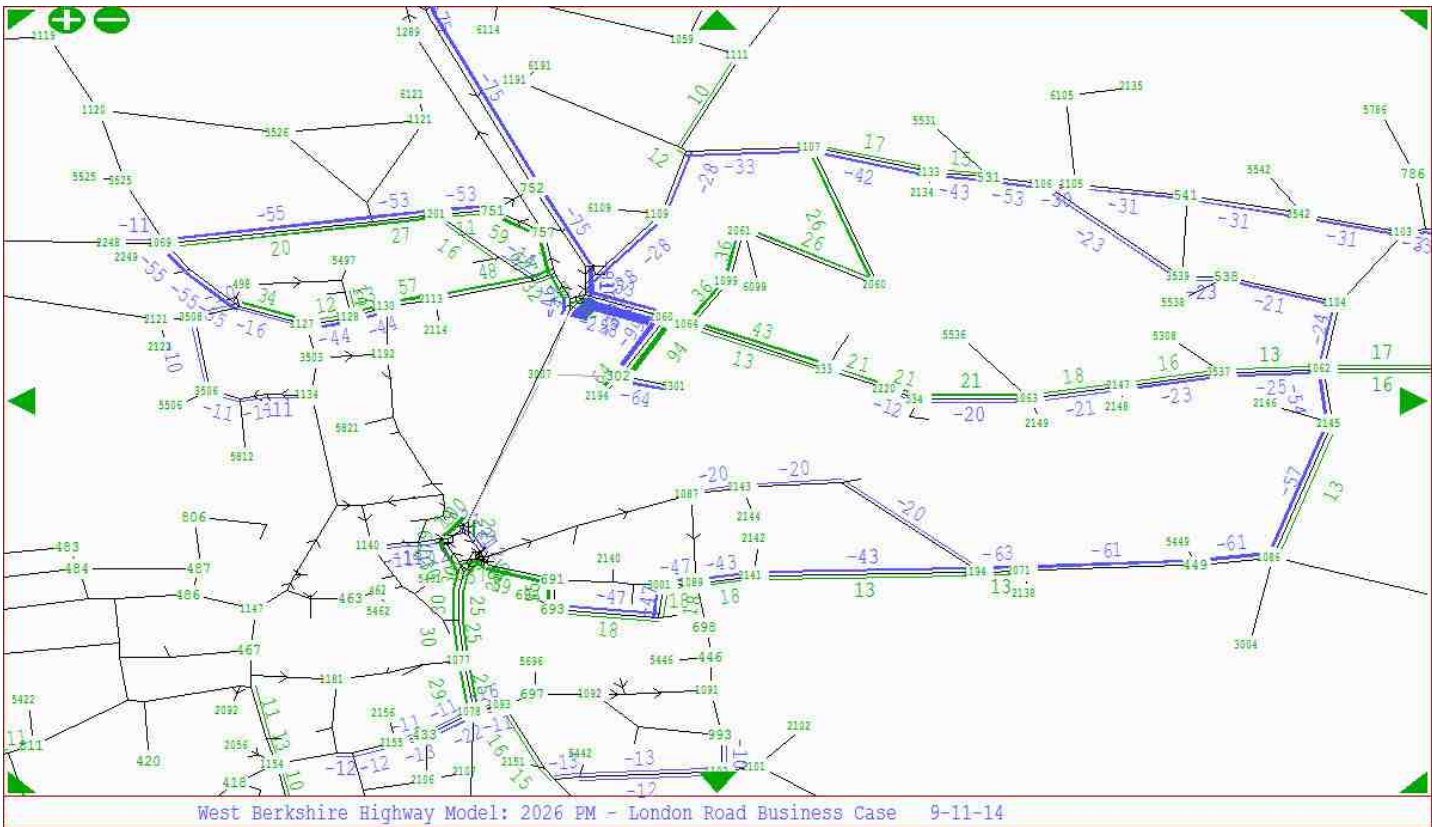


Figure 3.2: 2026 PM peak flow difference – with and without scheme (local area)

3.1.6 Figure 1.7 and figure 1.8 show the impact in the 2026 forecast year for the AM peak and PM peak in terms of actual flow differences with anything less than a 10 pcu flow excluded when the LRIE access scheme is included on the wider road network.

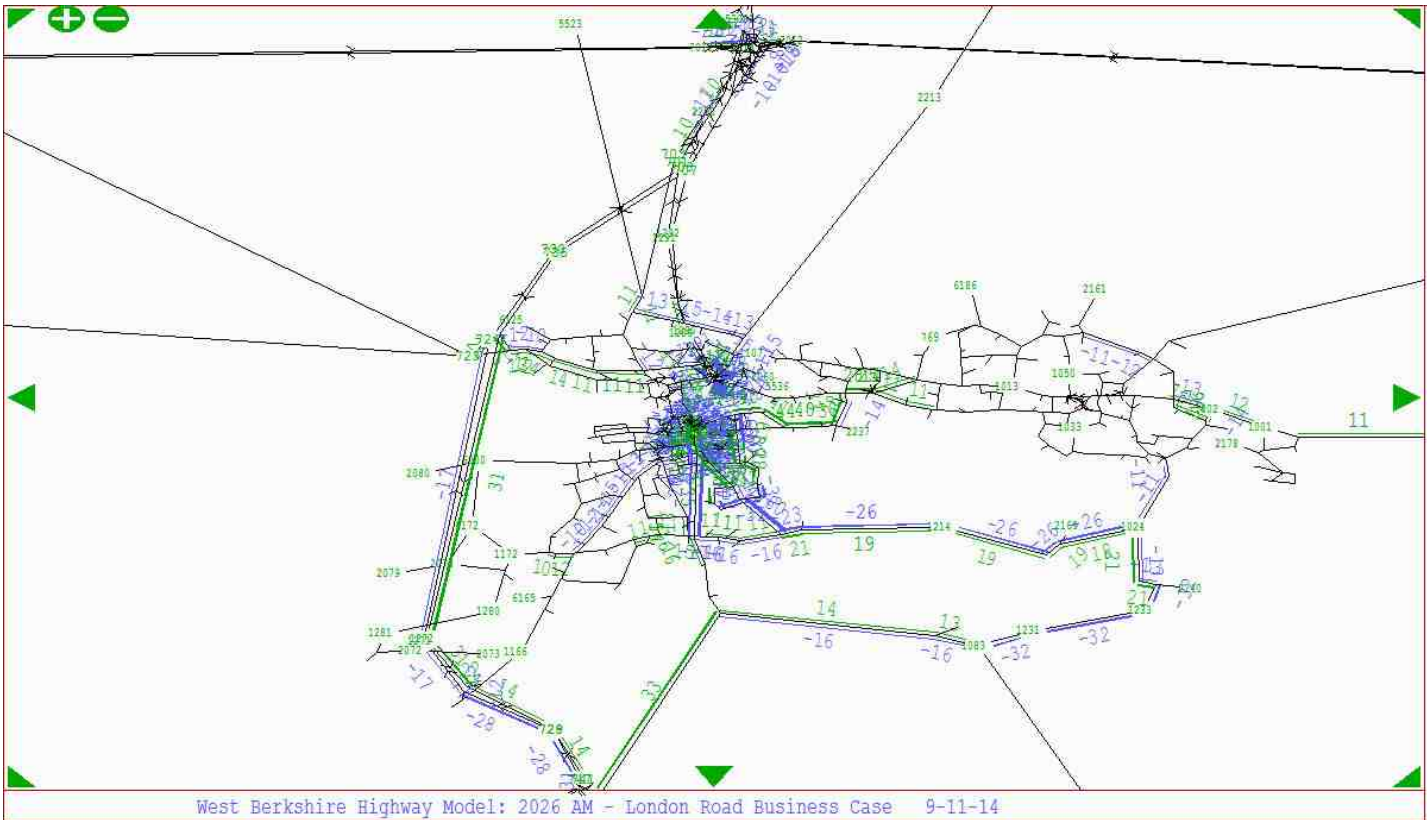


Figure 3.3: 2026 AM peak flow difference – with and without scheme (wider area)

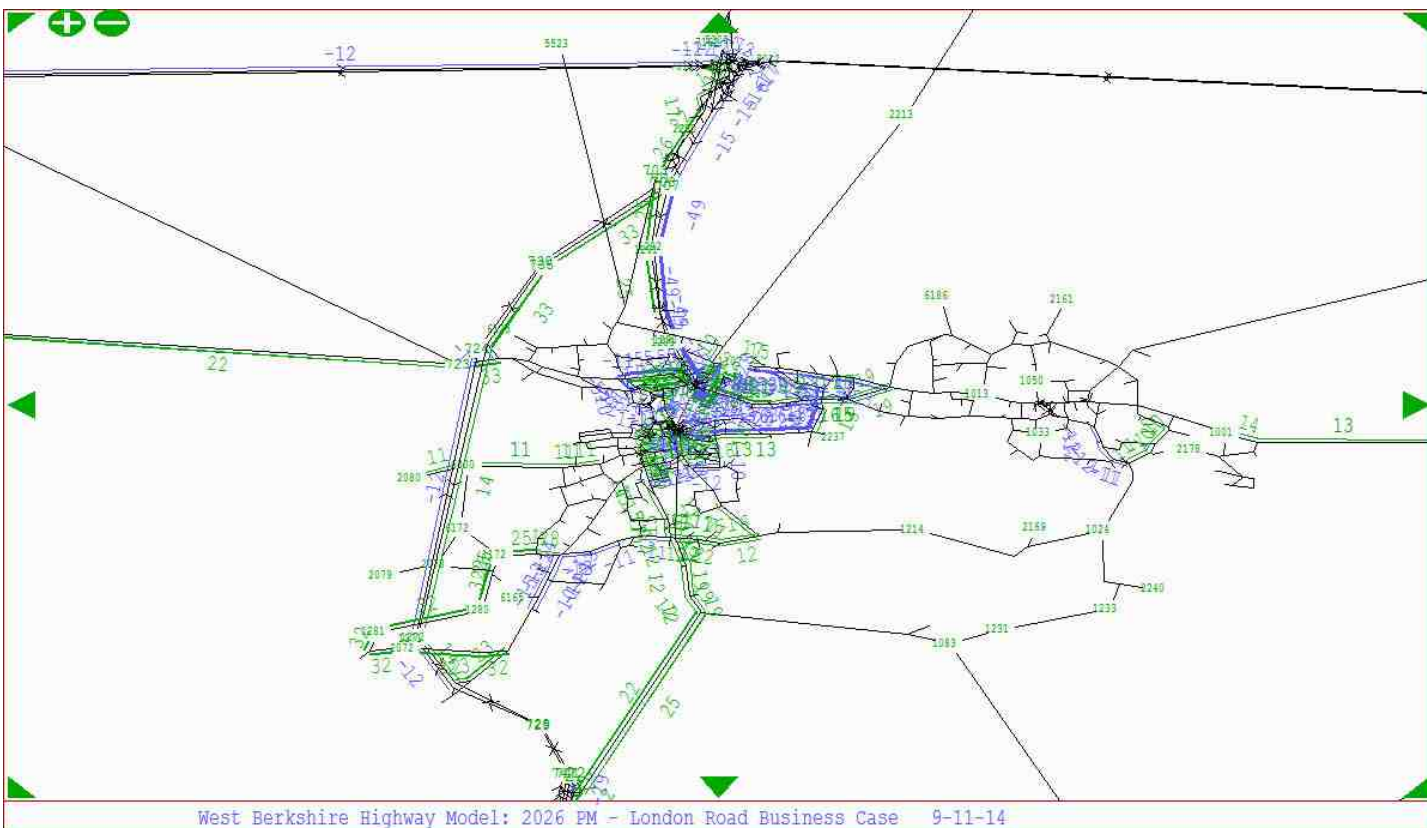


Figure 3.4: 2026 PM peak flow difference – with and without scheme (wider area)

-
- 3.1.7 There are differences in flows on the wider road network (figure 1.7 and figure 1.8) e.g. A34 and M4 which show that the introduction of the LRIE access scheme is having an effect wider than the local area due to it providing access to the industrial estate. A lot of the differences are restricted to the area of interest which would indicate that the traffic model is behaving as you would expect.
- 3.1.8 The required outputs trip matrices, time matrices and distance matrices) have been extracted from the SATURN assignments for input into the TUBA economic assessment.

4 TUBA economic assessment

- 4.1.1 WYG have stated that the annualisation factors that have been used in the business case have not been created in accordance with TUBA guidance. The Highways Agency calculate annualisation factors in order to expand the modelled time periods to represent the full modelled year. These factors are applied to the user benefits calculated during each modelled period to produce the total benefits by the scheme throughout each of the appraisal years.
- 4.1.2 As an example the HA A45/A46 Tollbar End Improvement economic assessment report (March 2013) states that the:
- “Tollbar model comprised three weekday time periods: AM peak hour, average inter-peak hour and PM peak hour. The modelled period benefits calculated by TUBA were converted into an estimate of annual benefits using annualisation factors.”*
- 4.1.3 These annualisation factors were 683 for the AM peak period (07:00-10:00) and 683 for the PM peak period (16:00-19:00) with 2,277 representing the Inter peak (10:00-16:00) and the weekend.
- 4.1.4 Notwithstanding this the TUBA economic assessment for the LRIE access scheme has been re-run using annualisation factors of 253 hours for the AM peak hour, inter-peak hour and the PM peak hour.

Zone to sector analysis

- 4.1.5 There are 394 zones in the WBTM and the model zone system is sufficiently detailed so that all major trip movements within West Berkshire can be identified to a level consistent with existing transport models covering the study area, as well as inter-urban movements across the county and wider strategic movements. TUBA is able to output user benefits on a sector to sector basis and the zones have been aggregated in 18 sectors which are shown in figure 1.9 and figure 1.10.

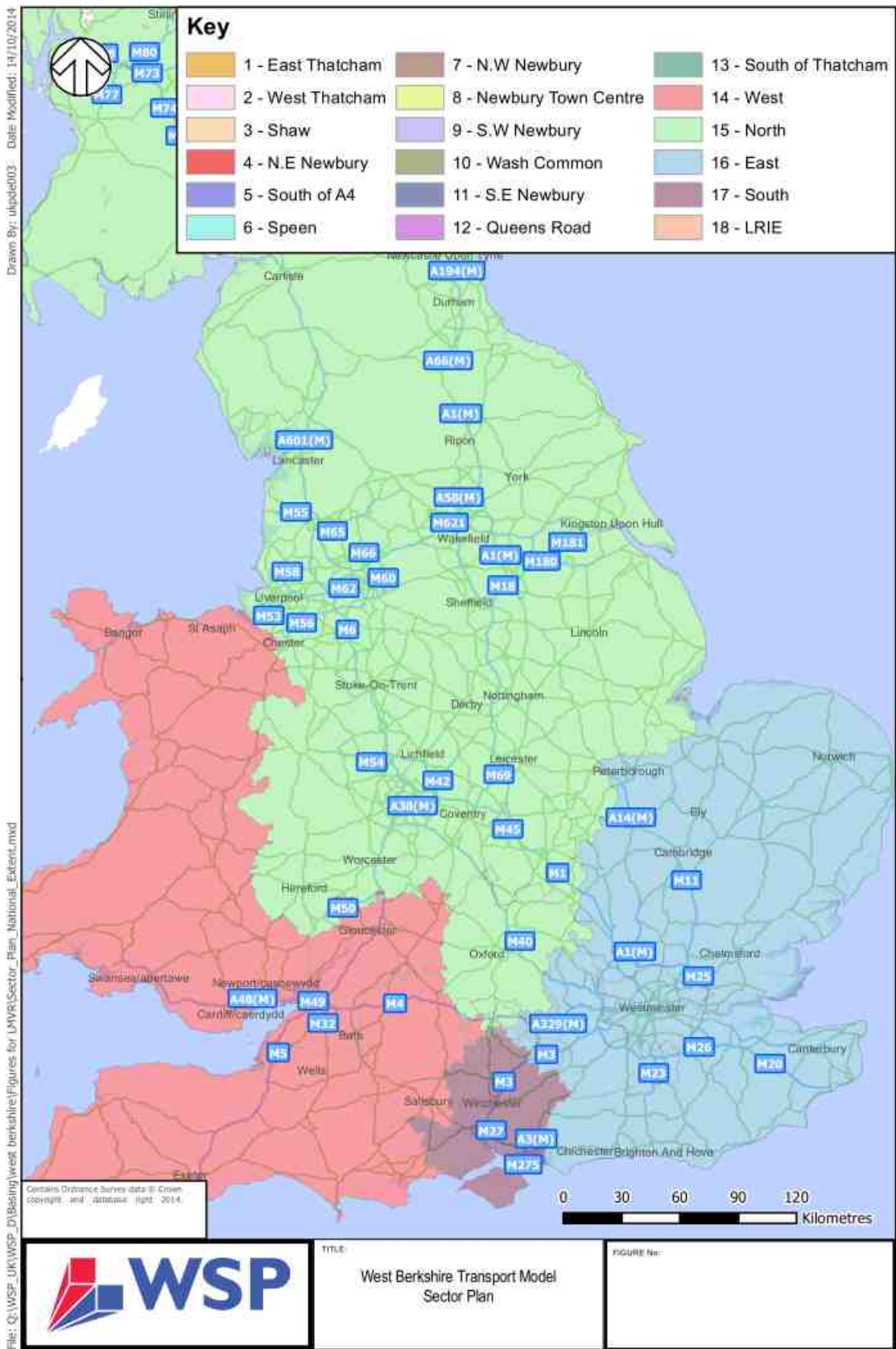


Figure 4.1: WBTM - UK sectors

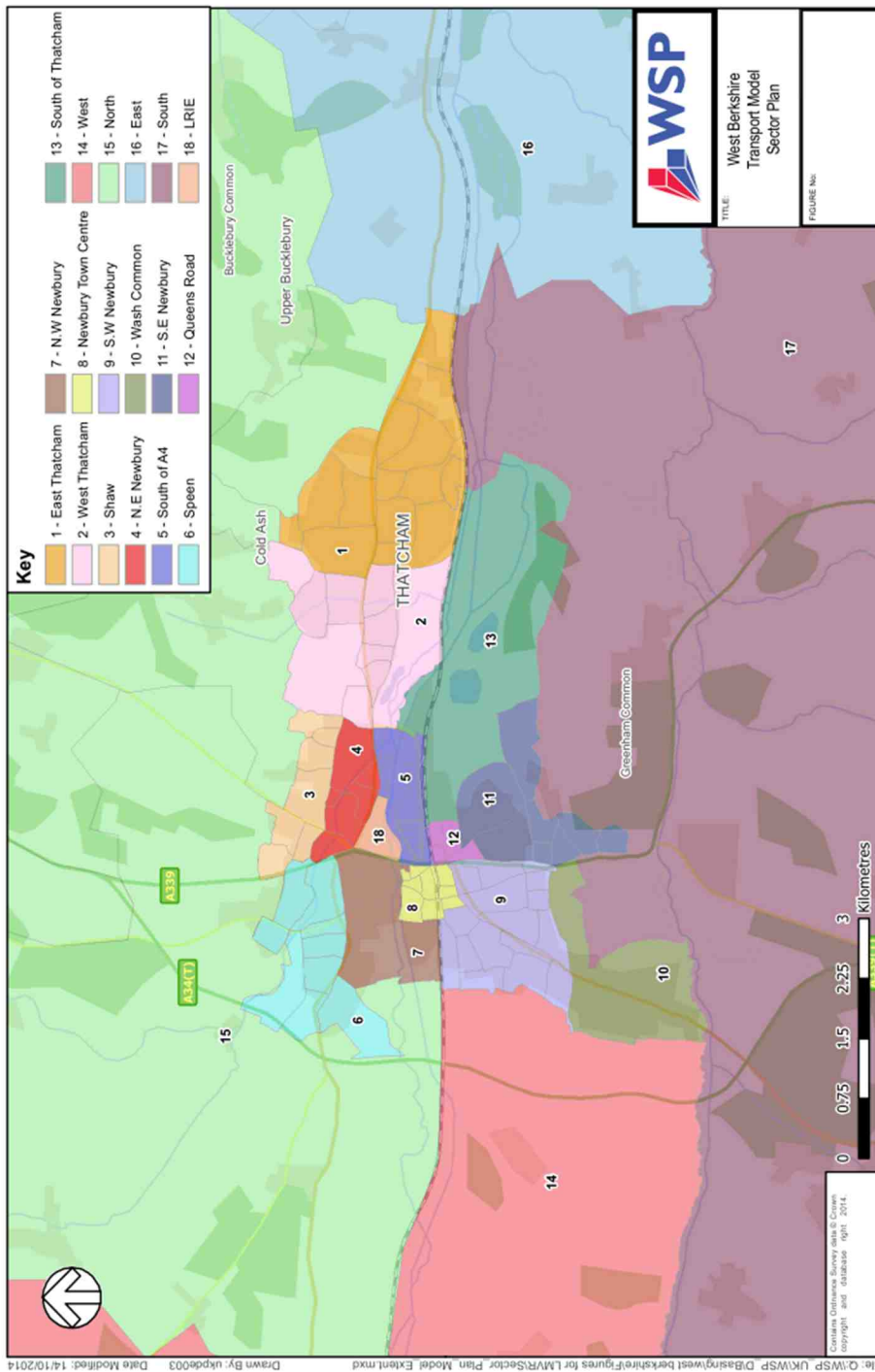


Figure 4.2: WBTM - West Berkshire Council sectors

4.1.6 Table 1.1 shows all benefits aggregated into 18 sectors. As a rule of thumb user benefits as a percentage of network costs should be at least 10 times the %Gap achieved in the without scheme and with scheme scenarios. The TUBA output shows that the total user benefits as a percentage of total DM user costs are 0.29% for the 2019 modelled year and 0.57% for the 2026 modelled year. Given that the %GAP used in the assignment process is 0.03% then the total user benefits are within the range recommended by WebTAG. Table 1.1 shows that £14.408m of the total benefits come from trips to and from sector 18 which is the London Road Industrial Estate.

Sector	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Grand Total
1	8397	2365	42515	-3477	-6731	72474	124285	-2948	17417	57876	-16870	-31036	-11114	118759	241982	-136533	-61960	-22272	393129
2	-3137	-361	39871	3111	-13600	39317	81881	-9268	-25043	-15313	4484	3835	-3592	23638	103679	-49734	-15745	-13313	150710
3	-19199	-12992	10564	2784	-47024	27361	35397	-20826	-20643	-10656	-32003	-16075	-27209	9147	64650	-32177	-15486	-4820	-109207
4	-171229	-83263	-6925	-16637	-50328	13472	61964	-18604	-73312	-110258	-17379	-23973	-26738	549	-64445	-22640	-97883	-10875	-718504
5	268247	86050	94650	72654	295207	38209	65398	18669	77002	31768	80752	78779	96066	213667	570720	85845	64100	269002	2506785
6	17658	13470	31067	41411	-6240	7854	20100	-7318	-16925	-4472	-12203	-17974	-2640	-560	114221	8976	-10490	28409	204344
7	29668	45539	48885	77642	23921	2345	-18373	-19804	-46375	-1126	79291	24944	27156	-61782	138106	209552	-39993	72455	592051
8	27937	19940	98404	51857	10285	15364	5586	1095	10284	7048	-9548	-3132	4392	15229	165894	-3582	-7226	78401	488228
9	85404	15711	38127	89319	-7507	9566	12972	-1944	784	1328	-11727	31278	-12760	-13686	106123	1223	1827	210263	556301
10	62455	14998	20610	75438	15450	4174	18275	4767	2405	1242	855	25775	3613	-56610	63107	-40766	4879	103707	324374
11	78630	168750	257823	212384	266484	51544	123877	39108	156122	129559	1074	49201	46566	260009	327813	220413	274203	182853	2846413
12	126509	255370	341670	213681	485859	114580	242078	57243	96249	57601	7949	100129	165257	134524	551961	158006	153833	93310	3355809
13	96672	165104	306652	110177	196760	42139	82060	11116	65904	53114	3844	27052	40229	81382	210047	52163	89307	28453	1662175
14	119654	14939	65795	68572	-58221	20409	33410	-100075	-60164	-31974	-49957	-37117	-12611	-1034	28689	-83196	-82291	125150	-40022
15	-93377	-22090	80377	30790	-135729	75662	166863	-168485	-153781	-89663	-90422	-50126	-36402	16915	44991	-226913	-194450	40445	-805395
16	-316664	-139423	71869	71554	-108853	20836	41196	-74427	-89958	-21062	-75706	-116113	-67681	-58396	-372243	-365093	109987	97216	-1392961
17	122689	20499	58087	180376	52810	61955	68787	23975	8637	9220	-11904	35509	6474	-40507	169100	-93049	-12648	231639	891649
18	1023257	799776	417109	394415	1377677	362645	1033672	661213	1023232	500383	885528	328857	179470	1037182	1760371	1204329	1419264	0	14408380
Grand Total	1463571	1364382	2017150	1676051	2290220	979906	2199428	393487	971835	564615	736058	409813	368476	1678426	4224766	886824	1579228	1510023	25314259

Table 4.1: LRIE access scheme - Sector to sector benefits

TUBA - warnings

- 4.1.7 TUBA displays warnings when e.g. the ratio of the without scheme (DM) scenario and with scheme (DS) scenario travel time is lower than the limit and there were 5,661 warning messages in total displayed. The data checks that TUBA undertakes are shown in table 1.2.

Table 4.2: TUBA – data checks

Value of r	Action
$r < A$ or $r > D$	Serious warning
$A < r < B$ or $C < r < D$	Warning
$B < r < C$	OK, no warning

- 4.1.8 The values of A, B, C and D are shown in table 1.3.

Table 4.3: TUBA - limit values

A	B	C	D
0.33	0.67	1.5	3.0

- 4.1.9 The 4.469 warnings are split as follows:

- Ratio of DM to DS travel time lower than the limit: 468 warnings with none serious
- Ratio of DM to DS travel time higher than the limit: 1,852 warnings with 199 serious with 133 of the serious warnings having a ratio of 3.5 or less which is just above the limit of 3.0
- Ratio of DM to DS travel distance lower than the limit: 106 warnings with none serious
- Ratio of DM to DS travel distance higher than the limit: 795 warnings with 20 have a ratio of 3.0 or greater which is higher than the limit

- 4.1.10 Table 1.4 shows the updated economic benefits using the revised convergence criteria and the 253 peak hour annualisation factors. All monetary values are in 2010 prices, discounted to 2010.

Table 4.4: Analysis of Monetised Costs and Benefits (AMCB)

Item	Value (£000s)
Greenhouse gasses	£0.227m
Economic Efficiency: Consumer Users (Commuting)	£6.313m
Economic Efficiency: Consumer Users (Other)	£9.303m
Economic Efficiency: Business Users and Providers	£10.052
Wider Public Finances (Indirect Tax Revenues)	-£0.716
Present Value of Benefits (PVB)	£25.278m
Broad Transport Budget	£2.313m
Present Value of Costs (PVC)	£2.313m
Net Present Value (NPV)	£22.965m
Initial Benefit to Cost Ratio (BCR)	10.929

- 4.1.11 This information shows that the initial BCR of the scheme, based on standard monetised values, is **10.929**. This represents the benefits for the core elements of the scheme and includes all benefits and dis-benefits extracted from the WBTM.
- 4.1.12 Information on the monetised benefits by time saving has been extracted from the TUBA economic assessment output and has been analysed. Table 1.5 shows that £13.329m (55.23%) of the £24.135m time saving benefits are in the greater than five minute range indicating that due to its location as an industrial estate it attracts traffic from longer distances.

Table 4.5: LRIE access scheme – monetised benefits by time saving

	Net journey time changes		
	0 to two minutes	Two to five minutes	> five minutes
Business users	£1.632m	£2.854m	£5.092m
Commuting and other users	£3.202m	£3.115m	£8.237m
Total	£4.837m	£5.969m	£13.329m

- 4.1.13 There are £13.329m of time saving benefits in the greater than five minute range which would indicate that the majority of the time saving benefits are for longer distance traffic due to the LRIE access scheme providing better access to the businesses on the LRIE. This would lead to the conclusion that the traffic model is stable with a limited level of model 'noise' and that the benefits reflect the introduction of the LRIE access scheme.

5 Summary

- 5.1.1 The information contained within this technical note has tried to address the concerns that WYG have raised regarding:
- The base transport model used for the assessment of the scheme (and it is noted that the model is calibrated and validated on link flows only) assigns 717 more trips than observed in the PM peak on the Mill Lane approach at the adjacent A339/Bear Lane junction
 - Specific sector to sector movements have been removed from the TUBA assessment. In turn this has led to large benefits and large disbenefits being omitted from the final benefit calculation, which highlights possible concerns regarding the reliability of the model
 - The annualisation factors used in the TUBA assessment have been derived using peak hour to peak period factor rather than the method set out within TUBA guidance
- 5.1.2 It has provided additional information on the 2013 PM peak base year model which shows that the additional modelled flow on Mill Lane is due to a localised re-routing of traffic to avoid the northbound approach to the B3421 Kings Road/B3421 Hambridge Road/Boundary Road priority junction due to the narrow road crossing the railway line to the south of the junction and the southbound approach to the St John's Road roundabout.
- 5.1.3 The SATURN assignments have been re-run using much stricter convergence criteria so that the traffic model results are as free from error and model 'noise' as possible and the TUBA assessment has used 253 peak hour annualisation factors as suggested by WYG.
- 5.1.4 The re-run TUBA economic assessment shows that the initial BCR of the scheme, based on standard monetised values, is **10.929**. This represents the benefits for the core elements of the scheme and is considered to be very high value for money.
- 5.1.5 The 4,469 TUBA warnings show that 153 have ratios which are above or below the limits allowed within TUBA. There are £13.329m of time saving benefits in the greater than five minute range which would indicate that the majority of the time saving benefits are for longer distance traffic due to the LRIE access scheme providing better access to the businesses on the LRIE. This would lead to the conclusion that the traffic model is stable with a limited level of model 'noise' and that the benefits reflect the introduction of the LRIE access scheme.

Appendices

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