LDF Sensitivity Assessment

July 2013
Rother District Council

Mott MacDonald

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	June 2013	P Shears	I Johnston	I Johnston	
B	June 2013	P Shears	I Johnston	I Johnston	
C	July 2013	P Shears	I Johnston	I Johnston	
D	July 2013	P Shears	I Johnston	I Johnston	Final version

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1. Introduction

Mott MacDonald has been commissioned by Rother District Council (RDC) to carry out an assessment of traffic conditions in Bexhill and Hastings for 2028. The assessment is being undertaken to inform the Local Plan for Rother District Council and specifically to provide an assessment of the levels and broad distribution of development in the Rother Core Strategy.

This report follows on from the March 2012 LDF Sensitivity Report which assessed the impact of additional traffic in 2028 for varying levels of development and new infrastructure. Since then the Core Strategy has been submitted to the Secretary of State for Communities and Local Government for Examination. This has led to further development scenarios which have now been tested to determine their impact on the traffic network in the area. The Bexhill Hastings Link Road (BHLR) has now been given funding approval from the DfT, so is included in the network assumptions for this assessment.

The proposed development and highway network inputs into the modelling process have been provided by ESCC, HBC and RDC. This report sets out the results of the assessments focusing on impacts on junction operation in Bexhill and Hastings in 2028, for three development scenarios. The modelling undertaken highlights the locations where the congestion is likely to occur across the network.

The assessments were carried out using the traffic model of Bexhill and Hastings developed previously by Mott MacDonald for ESCC and updated most recently in August 2011 for the Bexhill Hastings Link Road (BHLR) Best and Final Funding Bid (BAFFB) submitted to the Department for Transport by ESCC. Full details of the modelling undertaken to support the BAFFB case for the BHLR can be found here: http://www.eastsussex.gov.uk/roadsandtransport/bexhillhastingslinkroad/default.htm

The BHLR traffic model consists of a highway model and a public transport model. The model used for the assessments described in this report is the highway assignment component only of the BHLR multi-modal model. It has been used as a highway only model, and does not use variable demand modelling. Trip re-distribution and mode choice are therefore not considered.

2. Model Development

2.1 Model Background

The existing Bexhill Hastings Link Road traffic model was created in 2004 and validated to 2004 traffic flows. The model was then updated in line with variable demand modelling guidance issued in September 2005. In August 2011, to support ESCC's BAFFB to the DfT, the model was revalidated to May 2011 data. It is this version of the highway assignment model only that has been used for these assessments.

The highway assignment model was built using the SATURN suite of programs and covers the two peak periods and the interpeak. The analyses in this report were carried out only for the peak periods. The AM peak is represented by the hour between 0800 and 0900 and the PM peak model represents an average hour between 1600 and 1800.

Five distinct user classes are represented in the highway models. These are:

- Car commuting
- Car on employers business
- Car other
- LGV and
- HGV.

These distinctions were retained for the analyses carried out.

2.2 Future Year Networks

The following network changes are included in all three scenarios tested for the forecast year 2028:

- Junction improvements due to the planned development in North East Bexhill
- Bexhill Hastings Link Road
- Complementary measures associated with BHLR..

2.2.1 Junction improvements due to North East Bexhill development

The planned junction improvements associated with the development at North East Bexhill are included in the forecast network. The signalised junctions of B2182 Holliers Hill/A2036 Wrestwood Road and B2182 Holliers Hill/A269 London Road and the traffic calming measures along Woodsgate Park Road in Bexhill are assumed to be provided as part of this development. Signal timings for these junctions have been taken from the appropriate 2028 networks created for the BAFFB work, which were based on LinSig assessments undertaken with forecast levels of flow.

2.2.2 Bexhill Hastings Link Road

The BHLR will start on the A259 trunk road at the Belle Hill junction with a new traffic signal controlled junction. A further traffic signal controlled junction just north of the A259 will facilitate access to and from

the A269 London Road to North Bexhill. A further junction is included north east of Bexhill to allow access to the proposed North East Bexhill developments. Finally the BHLR meets the B2092 Queensway in Hastings at another signal junction. The signal timings at all future signalised junctions are consistent with those used in the 2028 BAFFB networks.

The proposed Link Road will be 5.58km long in total. The first 1.4km section of the road (the Bexhill Connection) will be located along the bed of an abandoned railway line cutting to pass through the built up area of Bexhill and constructed to a standard single two lane carriageway standard. The remainder of the road will be constructed to wide two lane single carriageway standard. Crowhurst Road is signalised at the railway bridge just west of the junction with Queensway, this makes traffic cross the bridge in one direction at a time to allow space for non motorised traffic to safely use the bridge.

2.2.3 Complementary Measures associated with BHLR

The network also includes a number of complementary measures designed to ensure traffic reductions resulting from the Link Road remain in future years and ameliorate any adverse impacts. The complementary measures included in the network are:

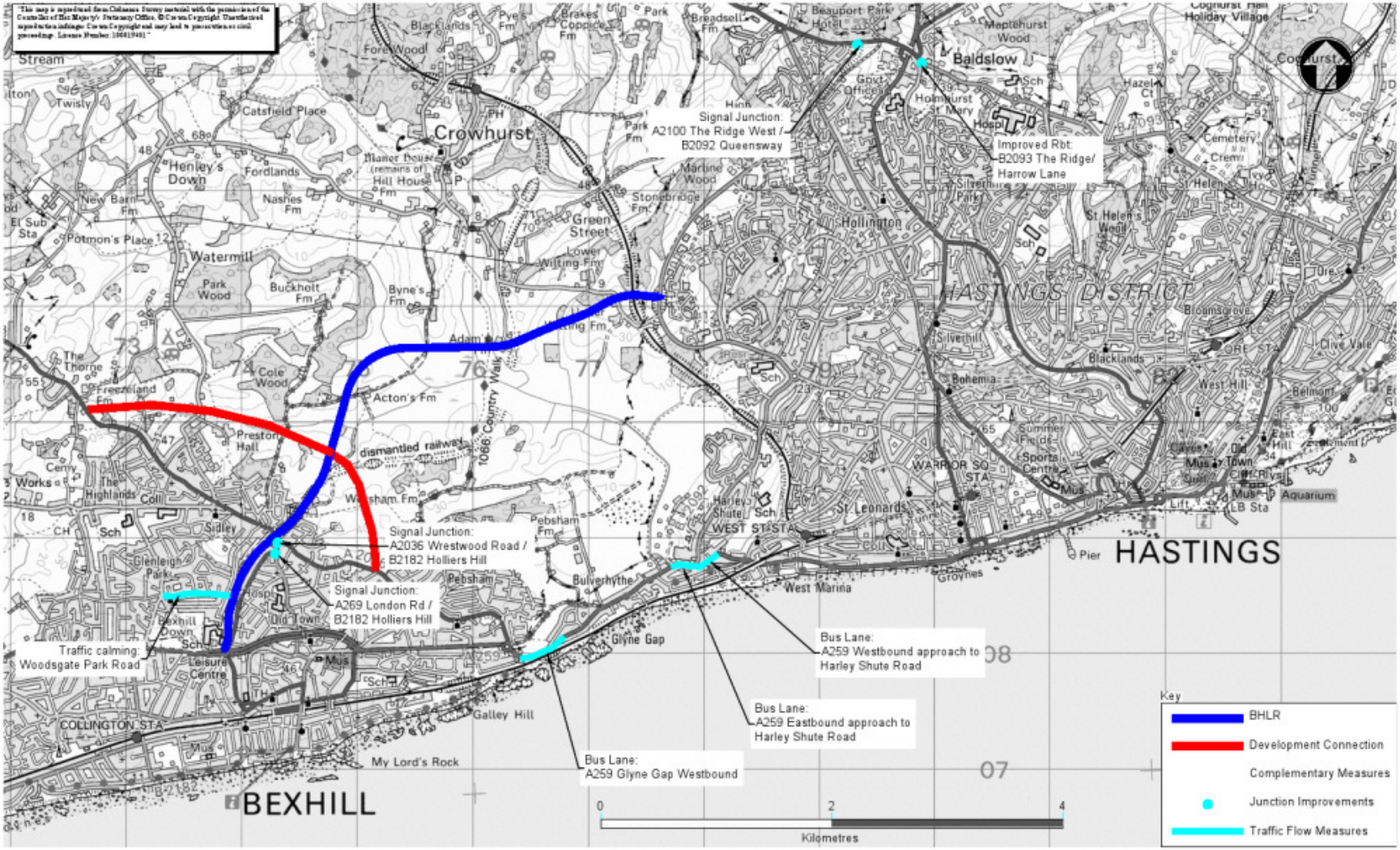
- Improved roundabout junction of B2093 The Ridge/B2092 Queensway, Hastings
- A259 westbound bus lane on approach to Glyne Gap roundabout
- A259 eastbound bus lane on approach to Harleyshute Road
- A259 westbound bus lane between Filsham Road and Harleyshute Road
- An improved roundabout will be provided at the junction of Harrow Lane with The Ridge

In addition to the Link Road, the network also includes a connection from the development access junction south to a new signal junction on Wrestwood Road. This connection is associated with the North East Bexhill development and will be provided by the developers. In 2028 there is also a connection north from the development access junction to a roundabout at Watermill Road and then on to another roundabout at Ninfield Road associated with the North Bexhill development.

Signal timings for unchanged junctions in the forecast networks have been retained at the same values as those in the validation networks. Signal timings for the complementary measures have been taken from the appropriate BAFFB assignments.

Figure 2.1 shows the locations of the forecast network changes.

Figure 2.1: Forecast network changes



2.3 Matrix Building

This section describes the development of trip matrices for each of the three Scenarios for 2028, based on the planning information supplied by ESCC, Hastings Borough Council and Rother District Council and the information available in TEMPRO 6.2. Tables 2.1 and 2.2 below show the numbers of households and the employment information to 2028. The new Base scenario has increased housing in Bexhill by 25% compared to the March 2012 Scenario 2 forecasts.

Table 2.1: Housing Forecasts

Ward	2011-2028 Base	2011-2028 1B	2011-2028 2A
Ashdown	41	41	41
Baird	457	457	457
Braybrooke	164	164	164
Castle	236	236	236
Central St. Leonards	227	227	227
Conquest	230	230	230
Gensing	239	239	239
Hollington	181	181	181
Maze Hill	402	402	402
Old Hastings	61	61	61
Ore	106	106	106
Silverhill	70	70	70
St. Helens	71	71	71
Tressell	364	364	364
West St. Leonards	458	458	458
Wishing Tree	87	87	87
Hastings total	**3394**	**3394**	**3394**
Battle Town (rest of Rother)	306	306	306
Crowhurst	23	23	23
Bexhill Central	165	165	165
Bexhill Collington	52	52	52
Bexhill Kewhurst	24	24	24
Bexhill Old Town	1204	1347	1347
Bexhill Sackville	177	177	177
Bexhill St Marks	417	417	692
Bexhill St Michaels	41	41	41
Bexhill St Stephens	121	121	121
Bexhill Sidley	616	776	776
Bexhill total	**2820**	**3123**	**3398**
Remainder of Rother SCTS			
Marsham	86	86	86
Rye	322	322	322
Eastern Rother	145	145	145

Ward	2011-2028 Base	2011-2028 1B	2011-2028 2A
Sum Rother SCTS	**3702**	**4005**	**4280**

Table 2.2: Employment Development

Ward	Site Location	Scenarios Base, 1B & 2A GFA (sqm) 2011-2028
Bexhill Old Town	NE Bexhill: West of proposed Link Road 100% B1 (20% office 80% light Ind)	28,000
Bexhill Sidley	NE Bexhill: East of proposed Link Road 70%-B1, 10%-B2, 20%-B8	23,500
Bexhill Sidley	Off A269 Ninfield Road 70%-B1, 10%-B2, 20%-B8	
Bexhill St Marks	West Bexhill - B1	5,000
Bexhill Central	Central Bexhill - B1	3,000
Marsham	Ivyhouse Lane 50%-B2, 50%-B8	3,000
Hastings Hollington	northwest of Queensway - north - 70%-B1, 30%-B2	10,000
Hastings Hollington	northwest of Queensway - south - 70%-B1, 30%-B2	7,050
Hastings Broomgrove	Ivyhouse Lane, north of The Ridge 50%-B2, 50%-B8	11,400
Hastings Baldslow	Baldslow 50%-B1, 30%-B2, 20%-B8	
Hastings Castle	University Centre Phase I	
Hastings Castle	Gap Site - B1	4,770
Hastings Castle	Gap Site - Retail	275
Hastings Castle	Priory Quarter - B1	26,900
Hastings Castle	Priory Quarter - University Centre Phase II	
Hastings Castle	Priory Quarter - retail	4,500
Hastings Castle	Priory Quarter - cinema	1,700
Hastings Castle	Hastings Town Centre - retail	30,000
Hastings Castle	Pelham - B1	3,800
Hastings Castle	Pelham - retail	2,300
Hastings Castle	Pelham - leisure	1,000
Hastings Ashdown	Whitworth Road - B1, B2 and B8 mix	8,100

The three potential housing development areas in Bexhill, namely North East Bexhill, North Bexhill and West Bexhill, were considered separately for matrix building from all other housing developments. Likewise, trips generated by NE Bexhill, W Bexhill and Central Bexhill employment developments were considered separately from all other employment trips for matrix building. The distribution of trips from these developments came from the work done for the Public Inquiry and is consistent with the distributions used for that work. The forecast employment in the area has not increased above the levels used in the March 2011 assessment, however the forecast numbers of houses in Bexhill have increased. Therefore

commuting trips from increases in forecast houses in Bexhill have been assumed to be to/from Eastbourne and London.

All forecast matrices were based on the validated 2011 AM and PM peak matrices, with the background growth from TEMPRO 6.2 applied to bring them to the forecast year 2028.

2.3.1 Background Growth

The Department for Transport maintain the TEMPRO database, which estimates traffic growth rates for each local authority district in the UK. The current TEMPRO Version 6.2 (dataset version 6.2) has been used to calculate growth in car background traffic between 2011 and 2028. Separate growth factors have been calculated by time period, user class and location, excluding any traffic growth due to increases in households or employment in the areas where these have been specifically defined in Tables 2.1 and 2.2. For the zones within East Sussex districts, the appropriate growth rate for that district has been used. For those zones outside of East Sussex, an East Sussex growth rate has been used as most trips from these zones have either an origin or a destination within East Sussex. Appendix A contains tables of the TEMPRO growth factors used.

2.3.2 LGV and HGV traffic growth

Growth for LGV and HGV traffic was based on NTM 2009 forecasts for the South East region. These are shown in Table 2.3 below. The split of articulated and rigid HGVs has been taken from the classified count at Glyne Gap roundabout and used to calculate an overall HGV growth factor.

Table 2.3: LGV and HGV traffic growth

	LGV	HGV	
Growth	AM and PM	AM	PM
2011-2028	1.456	1.144	1.136

2.3.3 Car Matrix Development

After applying the background growth, additional trip generation due to the specific developments specified in Tables 2.1 and 2.2 is added to the matrices using matrix furnessing to produce matrices with development. Trip rates used to calculate trip generation from these developments are presented in Appendix B. The split between the different car user classes was taken from the user class split in the 2011 AM and PM validated matrices and was applied to all newly generated trips by time period. As furnessing was used to add in the additional development trips, the existing trip distributions in the matrix were applied to the newly generated development trips.

The one exception to this was the housing and employment developments at North, North East and West Bexhill where the distribution of trips was taken from the earlier Public Inquiry work, defined separately by user class for AM and PM peak periods. The trips from these developments were therefore dealt with separately and were added to the AM and PM 2028 matrices with developments.

Finally, an income and fuel adjustment factor was applied to account for the changes in incomes and fuel prices between the base year 2011 and forecast year 2028. The factors are based on data in Table 1 of WebTAG Unit 3.15.2 and have been calculated as 1.053 for income and 1.023 for fuel, giving a combined income and fuel adjustment factor of 1.077.

2.4 Total Matrix Growth

Table 2.4 below summarises the total trip numbers in the 2011 base matrices and 2028 matrices for each scenario. The 2028 matrices take account of the TEMPRO growth factors shown in Appendix A, fuel and income adjustment factors, and the relevant development scenarios. The forecast growth equates to approximately 30% growth from 2011 Base to 2028 Base Scenario increasing to 31% growth for scenario 2A.

Table 2.4: Matrix Totals (vehs)

Vehicle Type	2011 Base		2028 Base Scenario		2028 Scenarios 1B		2028 Scenarios 2A	
	AM	PM	AM	PM	AM	PM	AM	PM
Cars	26,713	26,309	34,068	34,345	34,248	34,514	34,413	34,676
LGVs	3,863	4,998	5,625	7,277	5,625	7,277	5,625	7,277
HGVs	2,195	1,518	2,511	1,724	2,511	1,724	2,511	1,724
Total	**32,771**	**32,825**	**42,204**	**43,346**	**42,384**	**43,515**	**42,549**	**43,677**

The new trips related to the proposed housing increases are shown in Table 2.5. The 2028 Base housing in Bexhill contributes to 21% of the additional car trips in the AM 2028 matrices and 14% of the additional car trips in the PM 2028 matrices compared to the 2011 matrices. This is equivalent to 4% (AM) and 3% (PM) of the total 2028 trip matrices for all vehicles. The additional housing proposed in scenario 1B and 2A increase the total 2028 trips by less than 1%.

Table 2.5: Additional car trips due to housing

	AM	PM
Additional Car trips (2028 Base – 2011)	7,355	8,036
Car trips due to all housing (2028 Base)	3,974	3,903
Car trips due to Bexhill Housing (2028 Base)	1,579	1,119
Additional car trips due to Scenario 1B Housing (compared to Base)	170	167
Additional car trips due to Scenario 2A Housing (compared to Base)	324	318

2.5 Option Assignment Methodology

To ensure the full impact of additional trips from the new developments is captured, use was made of the BHLR highway model only without variable demand responses, i.e. in fixed trip matrix mode. Although this did not allow trips to re-distribute or change mode in response to forecast levels of congestion, it provided a direct comparison of the parts of the network under pressure for each scenario tested.

3. Results

3.1 Introduction

SATURN assignments were undertaken for the AM and PM peaks in 2028 for the three scenarios. For these assessments, variable demand modelling was not undertaken and redistribution and mode choice have not been considered. The modelling undertaken highlights where the congestion is likely to occur across the network. The potential solutions identified for congested locations are based on the modelling output alone and no feasibility or design work has been undertaken. Where signal timing changes are proposed, this may not be achievable on-street due to site constraints.

3.2 Network Wide Impacts

Table 3.1 below summarises how many junctions are within each capacity category for each option. It also gives network-wide summary statistics in terms of total pcu-hrs and pcu-km travelled and total network speeds. The table also includes the 2028 Scenario 2 reported in March 2012 (referred to as Old Sc2), which assumed that BHLR was built, but had a lower level of housing in Bexhill (2254 houses) than is now being tested.

The number of junctions increase between 2011 and the 2028 scenarios due to the differing highway network assumptions assessed. The 30% increase in trip numbers from the 2011 base to 2028 base Scenario equates to a 44% to 54% increase in travel time across the network. With Scenario 1B travel times increase by 48% to 55% compared to 2011 and with scenario 2A travel times increase by 49% to 57%. Compared to the Old Sc2 total travel time in 2028 increases by 2.3% in the AM and 1.3% in the PM for the updated Base. Total travel times for Scenario 1B increase by 4.3% (AM) and 2.3% (PM) compared to Old Sc2, for Scenario 2A total travel times increase by 5.2% (AM) and 3.2% (PM) compared to Old Sc2.

Table 3.1: Summary Statistics

	AM					PM				
		Old	Updated 2028				Old	Updated 2028		
	2011	Sc2	Base	1B	2A	2011	Sc2	Base	1B	2A
No and % of junctions with max V/C < 80%	267 (89%)	218 (71%)	220 (72%)	217 (71%)	217 (71%)	268 (89%)	227 (74%)	227 (74%)	223 (73%)	222 (73%)
No and % of junctions with max V/C > 80% but < 100%	21 (7%)	44 (15%)	44 (14%)	40 (13%)	42 (14%)	17 (6%)	33 (11%)	33 (11%)	34 (11%)	35 (11%)
No and % of junctions with max V/C > 100% but < 120%	12 (4%)	42 (14%)	41 (13%)	48 (16%)	46 (15%)	12 (4%)	41 (13%)	41 (13%)	44 (14%)	44 (14%)
No and % of junctions with max V/C > 120%	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (1%)	4 (1%)	4 (1%)	4 (1%)	4 (1%)
Total travel time (pcuhrs)	4311	6106	6243	6366	6422	4623	7018	7111	7184	7244
Total travel distance (pcukm)	169531	217271	219452	220541	221440	162291	212234	214456	215838	216631
Network speed (kph)	39.3	35.6	35.2	34.6	34.5	35.1	30.2	30.2	30.0	29.9

Tables 3.2 and 3.3 show the flows in each time period and scenario across a screenline between Bexhill and Hastings. Between the 2011 base and 2028 Scenarios total traffic across the screenline increases by around 36% with traffic increasing significantly on A271and Telham Lane. Due to the construction of BHLR traffic reduces between 2011 and 2028 on A259 and Henley's Down.

Table 3.2: AM Peak Screenline Flows

	Eastbound (vehs)					Westbound (vehs)				
		2028					2028			
Route	2011	Old Sc2	Base	1B	2A	2011	Old Sc2	Base	1B	2A
A271	467	535	558	568	573	554	587	540	524	510
B2095	436	390	394	387	391	383	373	377	372	368
Telham Lane	20	25	25	25	25	29	36	36	38	40
Henley's Down	320	122	127	134	134	174	61	59	59	59
BHLR	-	1020	1021	1022	1015	-	1229	1230	1230	1230
A259 Glyne Gap	1097	1000	1014	1022	1019	1197	822	825	834	838
TOTAL	**2340**	**3092**	**3140**	**3159**	**3156**	**2337**	**3107**	**3065**	**3057**	**3045**

Table 3.3: PM Peak Screenline Flows

	Eastbound (vehs)					Westbound (vehs)				
		2028					2028			
Route	2011	Old Sc2	Base	1B	2A	2011	Old Sc2	Base	1B	2A
A271	475	542	551	548	561	444	569	569	555	568
B2095	411	372	387	387	386	415	353	357	362	355
Telham Lane	16	17	17	17	30	17	13	22	22	22
Henley's Down	88	65	64	76	62	158	89	79	80	80
BHLR	-	932	895	893	867	-	111	1111	1111	1111
A259 Glyne Gap	1119	1102	1103	1109	1124	1161	777	832	847	852
TOTAL	**2109**	**3030**	**3017**	**3031**	**3032**	**2195**	**2912**	**2971**	**2978**	**2988**

3.3 Urban Area AM Peak Analysis

This section discusses the junctions which are overcapacity in each assessment option. Figures 3.1 to 3.3 show the results of the AM Peak Scenarios Base, 1B and 2A respectively. The coloured dots indicate the highest volume over capacity (V/C) ratio across all turning movements at each junction. All green dots indicate V/C ratios below 80%. At these junctions no capacity problems are expected in the forecast year. Blue dots represent V/C ratios between 80% and 100%, yellow dots indicate V/C ratios between 100% and 120% and red dots indicate V/C's above 120%. Delays and congestion may occur for any junctions where V/C ratios at or above 100% are forecast. Comparisons of the maximum V/C at each junction are in Appendix C.

3.3.1 Scenario 2028 Base

3.3.1.1 Glyne Gap

Traffic flows on Glyne Gap increase slightly compared to the Old Scenario 2 flows (less than 1%). Glyne Gap Roundabout operates at below 50% of capacity and the A259 approaches to Harley Shute Rd are operating at 96% V/C due to the introduction of bus lanes on the junction approaches.

3.3.1.2 Bexhill

In Bexhill, the Peartree Lane approach to Little Common roundabout is only just overcapacity at 102%. Broadoak Lane approach to the A259 is just over capacity at 101% and W Down Rd approach to the A259 is at capacity (100%). The A2036 westbound and Penland Road approaches to this signal junction are over capacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms of this junction. In addition, the B2098 Terminus Road eastbound approach to the junction with Buckhurst Place and Sackville Road is overcapacity as are sections of the A269 Buckhurst Place one-way system (up to 101%).

The junction of the A259 London Road with BHLR is shown to be at or overcapacity on all four approaches. The westbound approach is the most over capacity at 102%.

The development connections on to the Link Road are shown to be over capacity, however the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms.

Finally, the B2095 approach to the junction with A259 Barnhorn Road is overcapacity (105%), the A271 westbound approach to the junction with the A269 is overcapacity (110%) and the B2204 approach to the A269 is overcapacity (102%).

3.3.1.3 Hastings

The effects in Hastings are similar to Old Scenario 2 reported in March 2012. However the BHLR junction with Queensway is over capacity (101%).

The junction of the A259/Filsham Road is over capacity on all approaches to the junction (up to 105%).

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge and the right turn from The Ridge into Junction Road are over capacity (103%) as is the Maplehurst Road approach to The Ridge (103%), although this appears to be due to capacity issues at The Ridge/Harrow Lane roundabout which is causing queues back to the Maplehurst junction. Two lanes for the A2100 Ridge eastbound and the Junction Road approaches would be required to reduce V/C ratios to less than 100%.

3.3.2 Scenario 1B

3.3.2.1 Glyne Gap

Traffic flows on Glyne Gap increase slightly compared to the Old Scenario 2 flows (2% eastbound and westbound). Glyne Gap Roundabout operates at below 50% of capacity and the A259 approaches to Harley Shute Rd are operating at 96% V/C due to the introduction of bus lanes on the junction approaches.

3.3.2.2 Bexhill

In Bexhill, the Peartree Lane approach to Little Common roundabout is overcapacity at 102%. Broadoak Lane approach to the A259 is over capacity at 102% and W Down Rd approach to the A259 is over capacity at 101%. The A2036 westbound and Penland Road approaches to this signal junction are over capacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms of this junction. The Woodsgate Park approach to the junction with London Road is overcapacity (101%). The westbound Westwood Rd approach to London road is over capacity, however the model suggests that changes to the signal timings would reduce the V/C to less than 100% for all arms. In addition, the B2098 Terminus Road eastbound approach to the junction with Buckhurst Place and Sackville Road is overcapacity as are sections of the A269 Buckhurst Place one-way system (up to 101%).

The junction of the A259 London Road with BHLR is shown to be at or overcapacity on all four approaches. The westbound approaches are the most over capacity at 103%

The development connections on to the Link Road are shown to be over capacity, however the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms.

Finally, the B2095 approach to the junction with A259 Barnhorn Road is overcapacity (107%), the A271 westbound approach to the junction with the A269 is overcapacity (113%) and the B2204 approach to the A269 is overcapacity (104%).

3.3.2.3 Hastings

The effects in Hastings are similar to the Base. However the BHLR junction with Queensway is over capacity (102%).

3.3.3 Scenario 2A

3.3.3.1 Glyne Gap

Traffic flows on Glyne Gap increase slightly compared to the Old Scenario 2 flows (2% eastbound and westbound). Glyne Gap Roundabout operates at below 50% of capacity and the A259 approaches to Harley Shute Rd are operating at 96% V/C due to the introduction of bus lanes on the junction approaches.

3.3.3.2 Bexhill

In Bexhill, the Peartree Lane approach to Little Common roundabout is only just overcapacity at 103%. Broadoak Lane approach to the A259 is just over capacity at 102% and W Down Rd approach to the A259

is over capacity at 101%. The A2036 westbound and Penland Road approaches to this signal junction are over capacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms of this junction. In addition, the B2098 Terminus Road eastbound approach to the junction with Buckhurst Place and Sackville Road is overcapacity as are sections of the A269 Buckhurst Place one-way system (up to 101%). The Woodsgate Park approach to the junction with London Road is overcapacity (101%). The junction of the A259 London Road with BHLR is shown to be at or overcapacity on all four approaches. The westbound approaches are the most over capacity at 104%

The development connections on to the Link Road are shown to be over capacity, however the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms.

Finally, the B2095 approach to the junction with A259 Barnhorn Road is overcapacity (107%), The A271 westbound approach to the junction with the A269 is overcapacity (115%) and the B2204 approach to the A269 is overcapacity (104%).

3.3.3.3 Hastings

The effects in Hastings are similar to the Base. However the BHLR junction with Queensway is over capacity (102%).

3.3.4 Comparison of Scenarios

Table 3.4 shows the maximum RFC at over capacity key junctions, as the number of proposed housing increases these junctions are increasingly operating over capacity.

Table 3.4: AM peak Maximum RFCs

Max RFC	Old Sc2	Base	1B	2A
A259/B2095	102%	105%	107%	107%
Little Common Roundabout	101%	102%	102%	103%
A259/Broadoak Lane	96%	101%	102%	102%
A259/Westdown Rd	97%	100%	101%	101%
BHLR/Belle Hill	100%	103%	103%	104%
BHLR/Queensway	100%	101%	102%	102%

Table 3.5 shows the additional impact of scenarios 1B and 2A compared to the Base for a variety of measures. In all cases the greater housing levels have a detrimental effect on the network.

Table 3.5: AM impact summary

Impact compared to Base	1B	2A
Total travel time (pcuhrs)	2.0%	2.9%
Total travel distance (pcukm)	0.5%	0.9%
Network speed (kph)	-1.7%	-2.0%
average rfc	0.6%	0.8%

3.4 Urban Area PM Peak Analysis

Figures 3.4 to 3.6 show the results of the PM Peak Scenarios 1, 2 and 3 respectively. Comparisons of the maximum V/C at each junction are in Appendix C.

3.4.1 2028 Base

3.4.1.1 Glyne Gap

Traffic flows on Glyne Gap increase slightly compared to the Old Scenario 2 flows. The highest increase is in the PM peak westbound where an additional 55 veh/hr are forecast with the new base development assumptions, this is equivalent to a 7% increase compared to Old Scenario 2. Glyne Gap Roundabout operates 51% of capacity and the A259 approaches to Harley Shute Rd are operating at 89% V/C due to the introduction of bus lanes on the junction approaches.

3.4.1.2 Bexhill

The right turn from Sutherland Avenue onto the A259 is just at capacity (100%) with BHLR as is the A259 eastbound (102%) at Little Common roundabout. The A2036 westbound approach to the signal junction with Penland Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. Sections of the A269 Buckhurst Place one-way system are over capacity (up to 102%). The A2036 westbound approach to the signal junction with the A269 London Road is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The A259 London Road /BHLR junction is shown to be overcapacity with three arms having movements operating at 101% of capacity. The development connections onto the Link Road and onto A2036 Wrestwood Road are over capacity but the model suggests that changes to signal timings would reduce the V/C to less than 100% on all arms at these junctions.

The A271 westbound approach to the junction with A269 is at capacity (100%).

3.4.1.3 Hastings

The effects in Hastings are similar to Old Scenario 2 reported in March 2012. However the BHLR junction with Queensway is over capacity (101%).

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge and the right turn from The Ridge into Junction Road is overcapacity (>120%) as is the Maplehurst Road approach. Two lanes for the A2100 Ridge eastbound and the Junction Road approaches would be required to reduce V/C ratios to less than 100%. The Junction Road approach to the A21 is overcapacity as are The Ridge approaches to the junction with Harrow Lane. Signalisation and upgrade of the A21/Junction Road junction may be able to reduce V/C ratios but this would need to be investigated further. Additionally the A28 approach to its junction with the A21 is just overcapacity.

3.4.2 Scenario 1B

3.4.2.1 Glyne Gap

Traffic flows on Glyne Gap increase slightly compared to the Old Scenario 2 flows. The highest increase is in the PM peak westbound where an additional 70 veh/hr are forecast with the new base development assumptions, this is equivalent to a 9% increase compared to Old Scenario 2. Glyne Gap Roundabout operates 52% of capacity and the A259 approaches to Harley Shute Rd are operating at 90% V/C due to the introduction of bus lanes on the junction approaches

3.4.2.2 Bexhill

The right turn from Sutherland Avenue onto the A259 is just at capacity (100%) with BHLR as is the A259 eastbound (102%) at Little Common roundabout and sections of the A269 Buckhurst Place one-way system (up to 104%). The A2036 westbound approach to the signal junction with Penland Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The A259 London Road /BHLR junction is shown to be overcapacity with three arms having movements operating at up to 101% of capacity. The development connections onto the Link Road and onto A2036 Wrestwood Road are over capacity but the model suggests that changes to signal timings would reduce the V/C to less than 100% on all arms at these junctions.

The A271 westbound approach to the junction with A269 is at capacity (101%).

3.4.2.3 Hastings

The effects in Hastings are similar to the Base. However the BHLR junction with Queensway is over capacity (101%).

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge and the right turn from The Ridge into Junction Road is overcapacity (>120%) as is the Maplehurst Road approach. Two lanes for the A2100 Ridge eastbound and the Junction Road approaches would be required to reduce V/C ratios to less than 100%. The Junction Road approach to the A21 is overcapacity as are The Ridge approaches to the junction with Harrow Lane. Signalisation and upgrade of the A21/Junction Road junction may be able to reduce V/C ratios but this would need to be investigated further. Additionally the A28 approach to its junction with the A21 is just overcapacity.

3.4.3 Scenario 2A

3.4.3.1 Glyne Gap

Traffic flows on Glyne Gap increase slightly compared to the Old Scenario 2 flows. The highest increase is in the PM peak westbound where an additional 75 veh/hr are forecast with the new base development assumptions, this is equivalent to a 10% increase compared to Old Scenario 2. Glyne Gap Roundabout operates 52% of capacity and the A259 approaches to Harley Shute Rd are operating at 91% V/C due to the introduction of bus lanes on the junction approaches

3.4.3.2 Bexhill

The right turn from Sutherland Avenue onto the A259 is just at capacity (100%) with BHLR as is the A259 eastbound (103%) at Little Common roundabout and sections of the A269 Buckhurst Place one-way system (up to 102%). The A2036 westbound approach to the signal junction with Penland Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The A259 London Road /BHLR junction is shown to be overcapacity with all four arms having movements operating at up to 103% of capacity. The development connections onto the Link Road and onto A2036 Wrestwood Road are over capacity but the model suggests that changes to signal timings would reduce the V/C to less than 100% on all arms at these junctions.

The A271 westbound approach to the junction with A269 is overcapacity (102%).

3.4.3.3 Hastings

The effects in Hastings are similar to the Base. However the BHLR junction with Queensway is over capacity (102%).

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge and the right turn from The Ridge into Junction Road is overcapacity (>120%) as is the Maplehurst Road approach. Two lanes for the A2100 Ridge eastbound and the Junction Road approaches would be required to reduce V/C ratios to less than 100%. The Junction Road approach to the A21 is overcapacity as are The Ridge approaches to the junction with Harrow Lane. Signalisation and upgrade of the A21/Junction Road junction may be able to reduce V/C ratios but this would need to be investigated further. Additionally the A28 approach to its junction with the A21 is just overcapacity.

3.4.4 Comparison of Scenarios

Table 3.6 shows the maximum RFC at over capacity key junctions. As the proposed housing increases the effects at these key junctions

Table 3.6: PM peak Maximum RFCs

Max RFC	Old Sc2	Base	1B	2A
A259/B2095	101%	102%	102%	103%
Little Common Roundabout	100%	100%	100%	100%
A259/Sutherland Ave	100%	101%	101%	103%
BHLR/Belle Hill	100%	101%	101%	102%
BHLR/Queensway	101%	102%	102%	103%

Table 3.7 shows the additional impact of scenarios 1B and 2A compared to the Base for a variety of measures. In all cases the greater housing levels have a detrimental effect on the network.

Table 3.7: PM impact summary

	1B	2A
Total travel time (pcuhrs)	1.0%	1.9%
Total travel distance (pcukm)	0.6%	1.0%
Network speed (kph)	-0.7%	-1.0%
average rfc	0.8%	1.1%

3.5 Potential Impact of Smarter Choices

The potential impact of Smarter Choices has been assessed previously for the BHLR Public Inquiry in November 2009. In order to estimate whether the introduction of Smarter Choice measures could reduce traffic on the A259 to a level that would allow development to take place in North-east Bexhill without BHLR, the assumptions shown in Table 3.8 below were adopted. These were based on local targets, and a high intensity of effectiveness.

Table 3.8: Smarter Choice Measures assumptions summary

	High Intensity
Hastings and Battle Quality Bus Partnership	42% increase in bus passengers with 30% transfer from car
Bexhill Bus Improvements	42% increase in bus passengers with 30% transfer from car
School Travel Plans	15% reduction in school trips by car
Workplace Travel Plans	30% reduction in car commuter trips for LDF developments and other employment areas
Rail Schemes	44% of total new rail trips removed from car matrices past station locations

Source: BHLR BAFFB Forecasting Report, Table 11-2

The trip matrices for 2028 with BHLR were adjusted to take account of each measure. The workplace travel plans were assumed to be implemented at existing major employment sites and all new employment sites. All other initiatives were assumed to be implemented throughout Bexhill and Hastings. This reduced car trips by 4.1% in the AM peak and 3.0% in the PM peak. These levels of reductions in trip generation at the new housing might not fully mitigate local pressure points due to the 25% increase in new housing in Bexhill compared to the Old Scenario 2 reported in March 2012.

3.6 Other interventions

Further modelling is required to identify the most appropriate interventions to resolve those junctions at or around capacity on the A259. That work will need to be undertaken with the Highways Agency, who are responsible for the A259 through Bexhill.

Figure 3.1: 2028 AM Peak Base Scenario

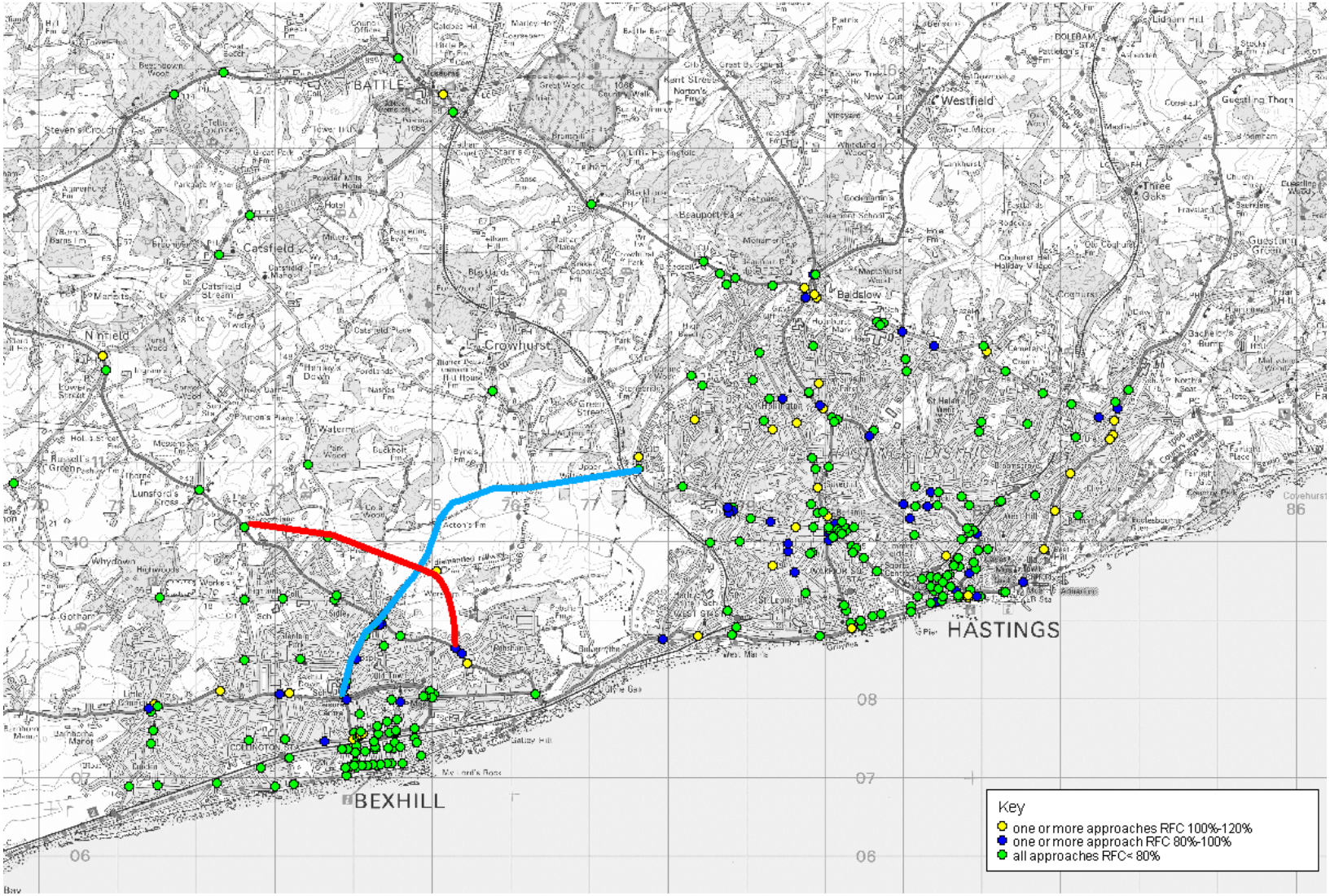


Figure 3.2: 2028 AM Peak Scenario 1B

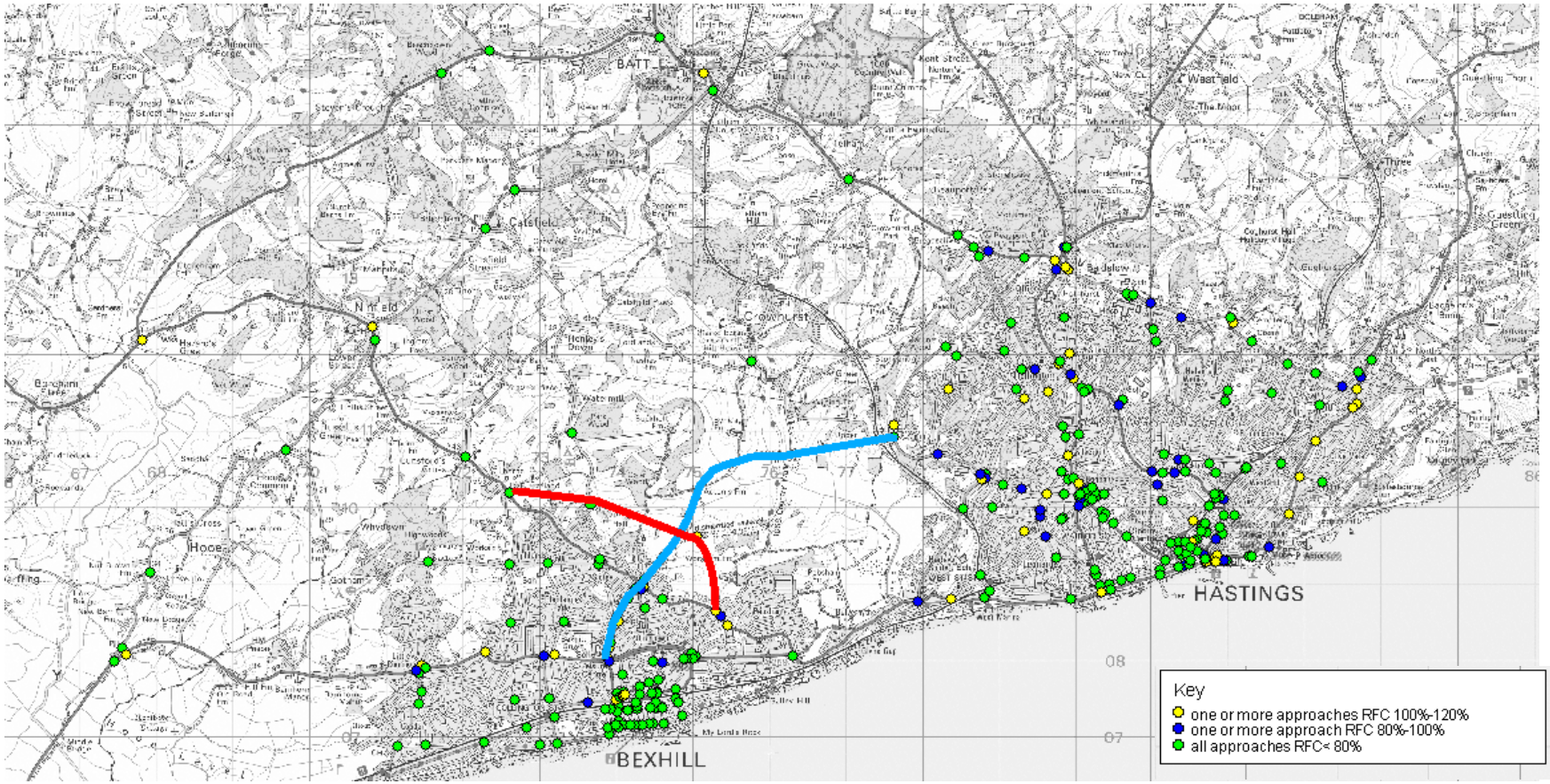


Figure 3.3: 2028 AM Peak Scenario 2A

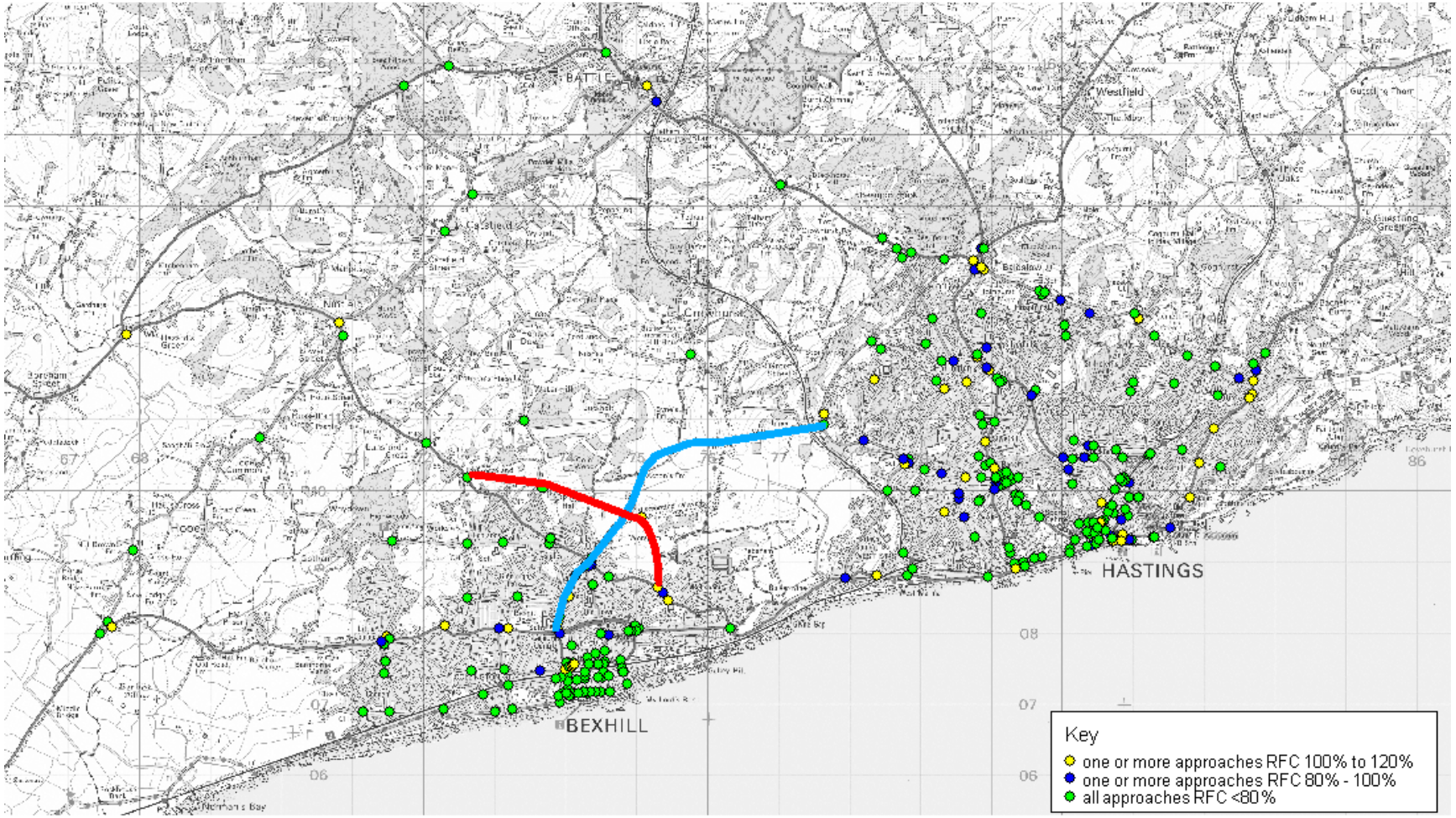


Figure 3.4: 2028 PM Peak Base Scenario

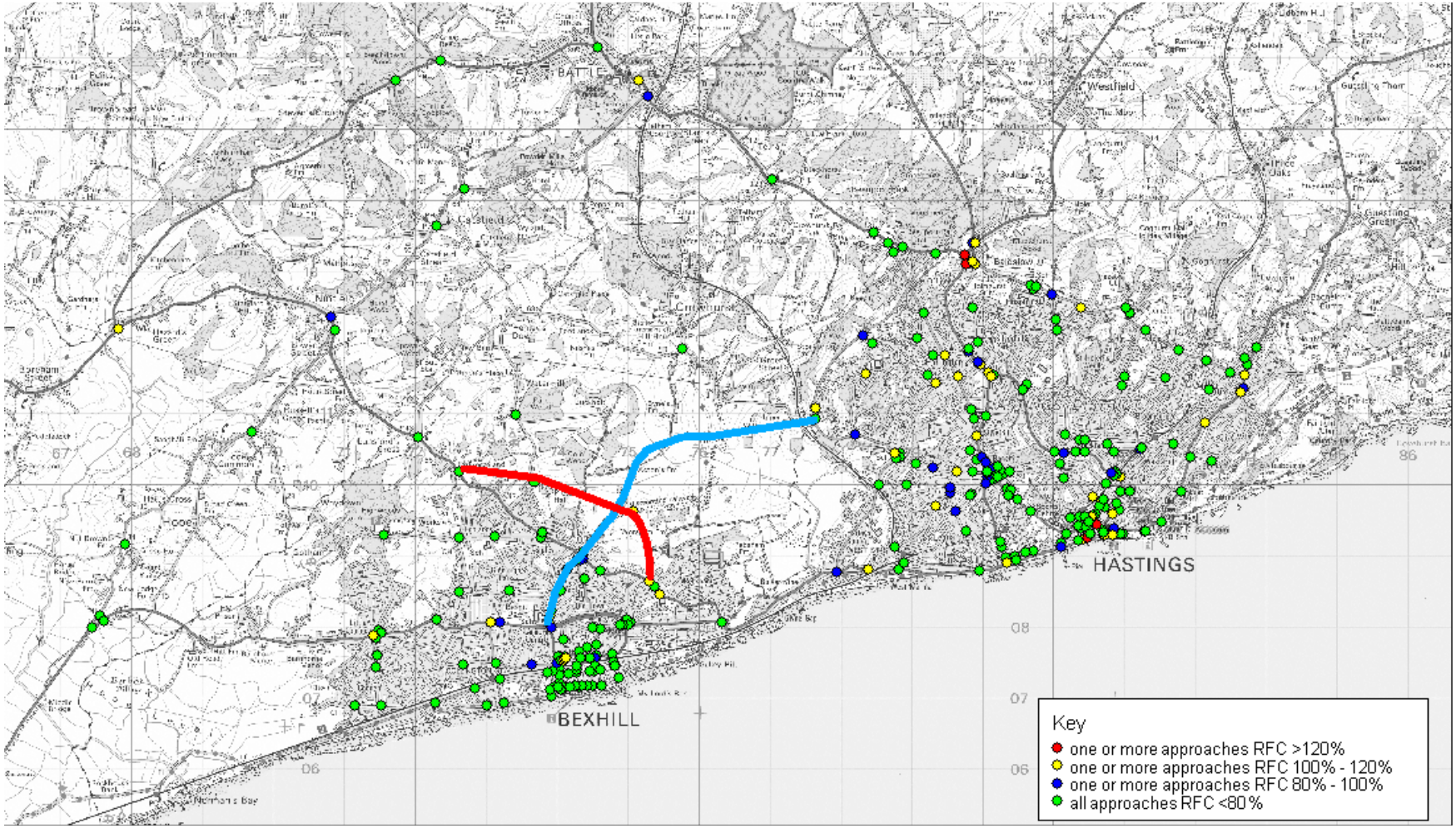


Figure 3.5: 2028 PM Peak Scenario 1B

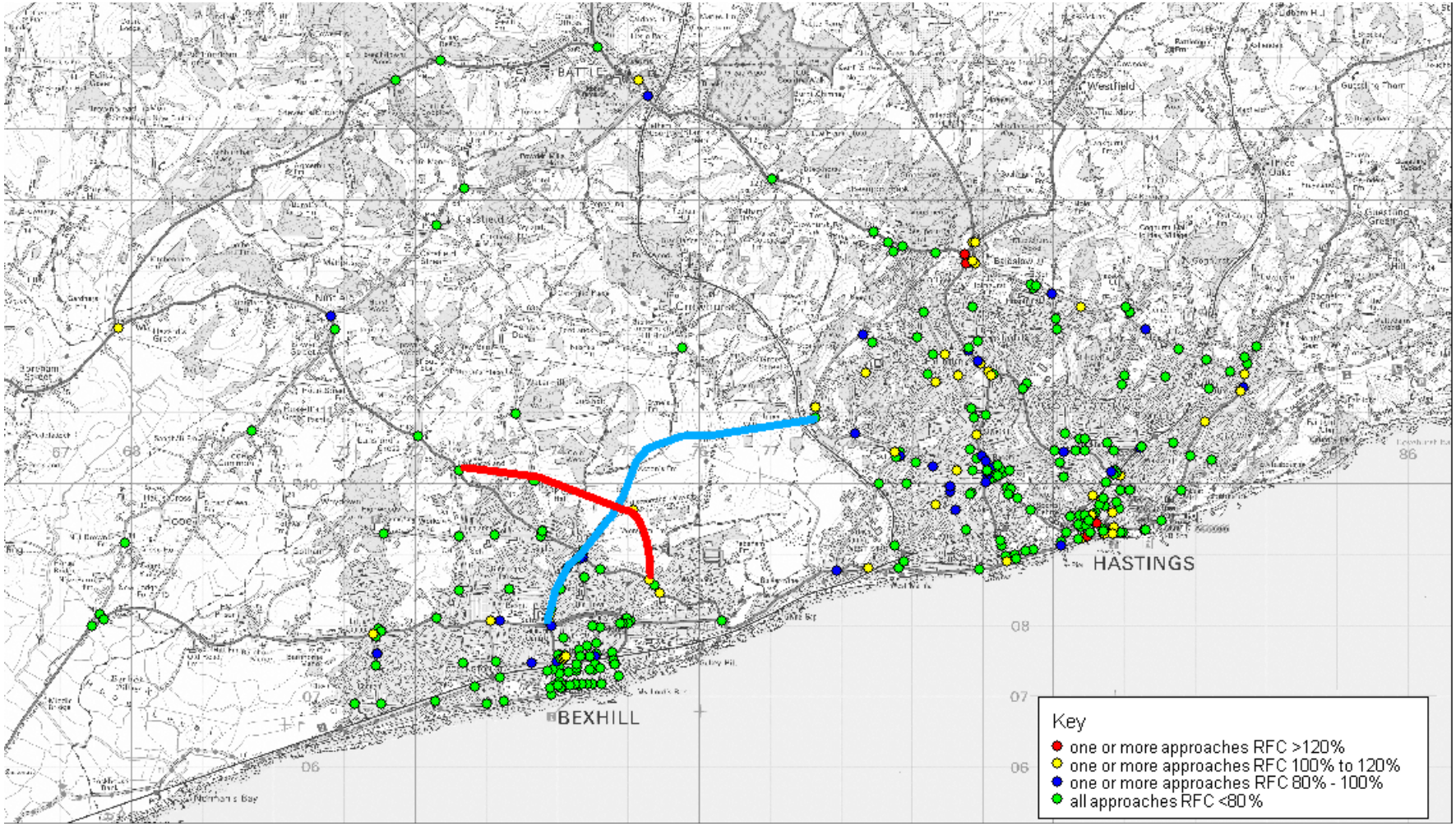
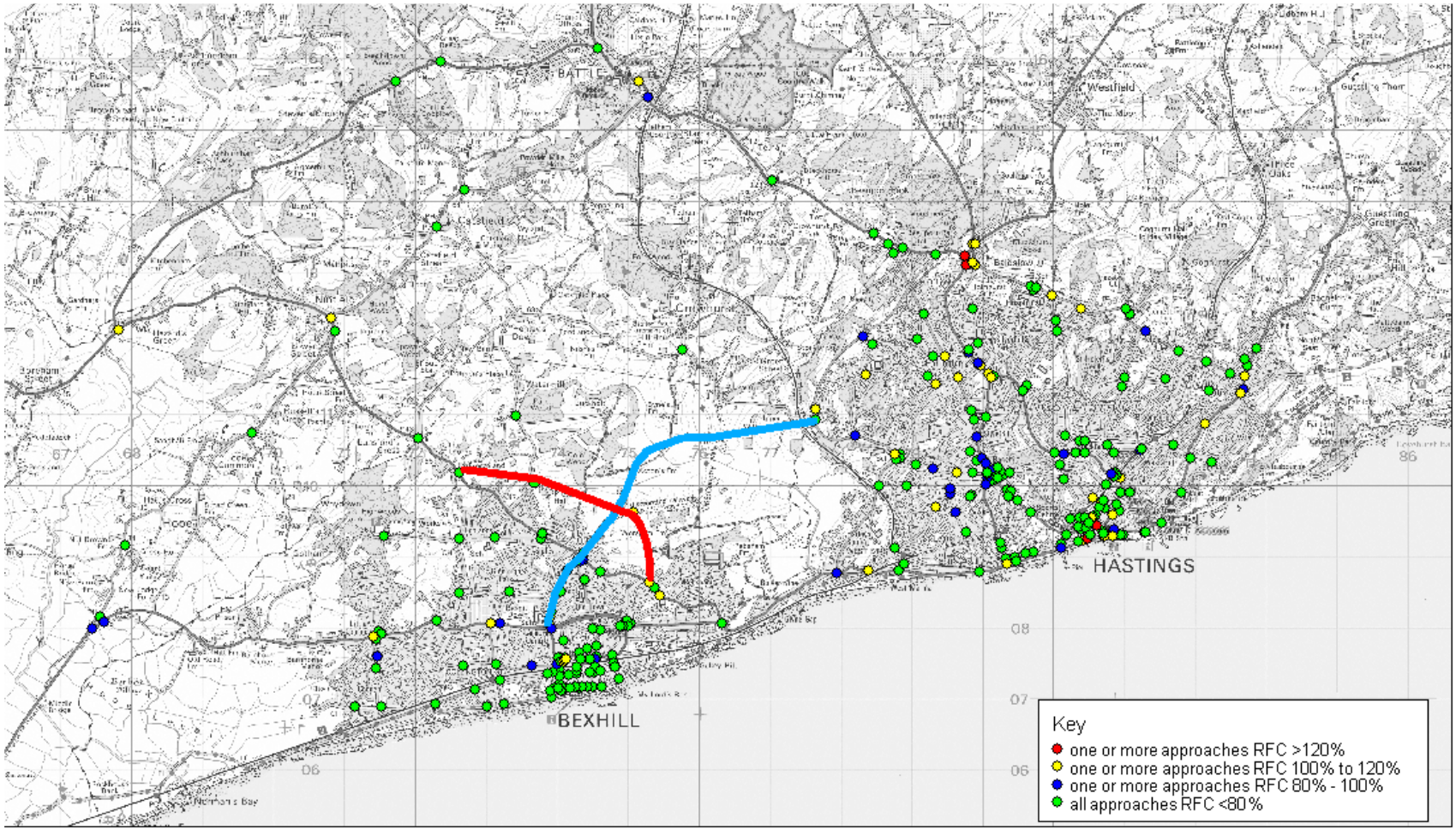


Figure 3.6: 2028 PM Peak Scenario 2A



4. Summary and Conclusions

This report assesses the impact of various combinations of developments in the Bexhill Hastings area of East Sussex to assist with the preparation of the Local Plan Core Strategy for Rother District Council.

This report follows on from the March 2012 LDF Sensitivity Report which assessed the impact of additional traffic in 2028 for varying levels of development and new infrastructure. Since then the Core Strategy has been submitted to the Secretary of State for Communities and Local Government for Examination. This has led to further development scenarios which have now been tested to determine their impact on the traffic network in the area. The Bexhill Hastings Link Road (BHLR) has now been given funding approval from the DfT, so is included in the network assumptions for this assessment.

This report used a traffic model of Bexhill and Hastings to estimate the re-routeing of traffic which could occur as a result of increased congestion at Glyne Gap, and hence the traffic impact of new development over a wider area. Three scenarios have been tested, representing a range of network and development assumptions.

Assessments have been produced for three scenarios for the AM and PM peak periods in 2028. Specific levels of congestion at individual junctions may vary in reality from that presented, however the modelling work undertaken does indicate the pressure points across the network. The potential solutions identified for congested locations are based on the modelling output alone and no feasibility or design work has been undertaken.

The assessments were carried out using the traffic model of Bexhill and Hastings developed previously by Mott MacDonald for ESCC and updated most recently in August 2011 for the Bexhill Hastings Link Road Best and Final Funding Bid (BAFFB) submitted to the Department for Transport by ESCC. It has been used as a highway only model, and does not use variable demand modelling. Trip re-distribution and mode choice are therefore not considered. The trip matrices were built using consistent trip rates used for the BHLR modelling and the distributions assumed for the main development sites in Bexhill were retained from the BHLR Public Inquiry, however the model assumes increased commuting traffic to Eastbourne as a result of the increased housing.

Earlier work carried out by Mott MacDonald for ESCC identified that the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. The BHLR is assumed to be built in the three options assessed in this report.

The greater scale of housing in each of the scenarios assessed inevitably generates more traffic on the local network, which will have some detrimental effects leading to some junctions on the A259 operating over capacity by 2028, albeit mostly only a little over 100%.

However it is noted that relative to the previously assessed scenario (for 2,250 new homes in Bexhill), the total travel time, average network speed and number of junctions at or over capacity is only marginally greater (see Tables 3.1 and 3.4-3.7).

For each of the scenarios assessed, congestion is visible (see Figures 3.1-3.6) at junctions along the major routes through the urban areas. Congestion in Bexhill occurs at some arms of junctions, notably along the A259 west of the town centre and also on a section of the A269.

In relation to the A259 Link Road junction, it was demonstrated at the Public Inquiry that when redistribution and mode choice issues are considered, and with more detailed assessments using LINSIG, the Link Road junctions should have capacity for forecast growth.

There are apparent capacity issues with the A259 west of the town centre. Options may include improvements to increase the capacity of junctions and/or links between the A259 and A269 (e.g. the BHLR connection at Belle Hill and Little Common Roundabout). However, further modelling is required to identify the most appropriate interventions to increase capacity at the junctions identified. That work will need to be undertaken with the Highways Agency who are responsible for the A259 through Bexhill. Subject to this, the implications for housing may be to limit the scale of housing served by the A259 west of the town centre. Also, it is noted that the modelling assumes increased commuting traffic to Eastbourne as a result of increased housing. However, this will depend on the amount of employment provision locally.

Given that the degree of over-capacity on any junction in Bexhill is not severe (i.e. less than 120%), then the introduction of Smarter Choices measures also provides a means of mitigating congestion. If smarter choices were implemented then it is likely that the trip generation rates from the new housing would reduce by up to 4%. To be as effective as possible, Smarter Choices should be comprehensively approached.

Congestion in Hastings is centred along the A259, around Baldslow and junctions along the B2159 and A21 through Hollington. As was apparent from the March 2012 work, there is a need to address capacity around The Ridge, which is forecast to have the greatest congestion, particularly in the PM peak. The highway authorities should therefore investigate on-line options as suggested in the report or, if necessary, off-line improvements.

Overall, it should be remembered that the traffic forecast results are only intended to identify the key areas which could be under pressure as a result of forecast traffic. Variable demand re-distribution effects are likely to reduce forecast congestion, and further more detailed capacity assessments are required to determine if the identified areas of congestion can be mitigated by signal timing changes or minor physical improvements.

Appendices

Appendix A. TEMPRO6.2 growth factors

Table A.1: TEMPRO6.2 Growth Factors AM Peak 2011-2028

Area	Commute		Employers Business		Other	
	Origin	Destination	Origin	Destination	Origin	Destination
East Sussex	1.110	1.113	1.110	1.117	1.146	1.144
Eastbourne	1.121	1.080	1.106	1.089	1.159	1.127
Lewes	1.072	1.102	1.079	1.103	1.137	1.143
Hastings[1]	0.998	1.026	1.006	1.044	1.040	1.046
rural (Rother) [1]	0.962	1.024	0.975	1.036	1.021	1.063
Bexhill[1]	0.988	1.026	1.001	1.042	1.080	1.075
Battle[1]	0.974	1.026	0.984	1.035	1.052	1.069
Rye[1]	0.983	1.026	0.990	1.044	1.064	1.076
Wealden	1.054	1.123	1.072	1.132	1.136	1.185

Source: TEMPRO6.2

Notes: 1 TEMPRO growth factors excluding any growth due to increases in households or employment.

Table A.2: TEMPRO6.2 Growth Factors PM Peak 2011-2028

Area	Commute		Employers Business		Other	
	Origin	Destination	Origin	Destination	Origin	Destination
East Sussex	1.107	1.105	1.116	1.115	1.148	1.147
Eastbourne	1.077	1.115	1.088	1.114	1.138	1.147
Lewes	1.097	1.068	1.103	1.082	1.146	1.148
Hastings[1]	1.020	0.992	1.033	1.016	1.050	1.045
rural (Rother) [1]	1.019	0.959	1.027	0.982	1.054	1.044
Bexhill[1]	1.023	0.985	1.034	1.011	1.075	1.082
Battle[1]	1.023	0.972	1.036	1.000	1.068	1.063
Rye[1]	1.020	0.976	1.035	1.020	1.074	1.074
Wealden	1.119	1.051	1.125	1.078	1.174	1.163

Source: TEMPRO6.2

Notes: 1 TEMPRO growth factors excluding any growth due to increases in households or employment.

Appendix B. Trip Rates

Table B.1: TRICS Trip Generation Rates

TRICS Land Use Category	Rate	AM Peak		PM Peak	
		In	Out	In	Out
Mixed Private Housing	per dwelling	0.12	0.44	0.37	0.18
Business Parks (B1)	per 100sqm	1.4	0.11	0.12	1.09
Industrial Estates (B2)	per 100sqm	1.11	0.28	0.25	1.15
Commercial Warehousing (B8)	per 100sqm	0.12	0.06	0.07	0.13
Retail	per 100sqm	1.30	0.67	1.63	2.20
University	per 100sqm	1.31	0.32	0.41	0.80
Cinema	per 100sqm	0.00	0.00	2.19	2.02
Mixed Leisure	per 100sqm	0.00	0.00	0.08	0.39

Source: TRICS (2006a)

Appendix C. Max V/C