APPENDIX E

Stevenage Borough Council

STEVENAGE STATION GATEWAY AREA ACTION PLAN

Modelling Summary Technical Note

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STEVENAGE STATION GATEWAY AREA ACTION PLAN

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STEVENAGE STATION GATEWAY AREA ACTION PLAN

Modelling Summary Technical Note

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APPENDICES

1 INTRODUCTION

1.1 FOREWORD

1.1.1. This report has been prepared on behalf of Stevenage Borough Council to describe the transport modelling of the various proposals associated with the Stevenage Station Gateway Area Action Plan. The impacts of the AAP proposals that may affect traffic capacity or routing have been tested using the Stevenage Town Centre S-Paramics model and the results are summarised in this report.

1.1.2. Unless specified otherwise, references to "Lytton Way" this report are describing the section of road between A1155 Fairlands Way and A1070 Six Hills Way only, including the roundabout junctions at either end of that section.

1.1.3. This report represents a shortened version of the final modelling report which has been prepared as an interim reporting stage to provide results for discussion between officers at SBC and HCC.

1.2 STEVENAGE STATION GATEWAY AAP

1.2.1. The first paragraph of the Stevenage Connection Area Action Plan (AAP) Issues and Options Report (July 2021), hereafter referred to as "the AAP", describes the purpose of the AAP as follows:

"Stevenage's town centre is undergoing a process of renewal and regeneration. As part of this, the area around the Railway Station bounded by the railway tracks and Lytton Way has been identified as a key site for new development and change. This key gateway for the town has the potential for significant transformation, based on its well-connected position only 20 minutes from Kings Cross. Such development could form a key part of the regeneration of the town centre."

1.2.2. The initial stage of the project seeks to identify the options available in the vicinity of Stevenage railway station, to deliver the following objectives:

- A new gateway and arrival experience
- Enhanced movement and access for all modes
- Green infrastructure integrated throughout
- Creating a low-carbon urban village
- Sustainability in mobility, built form and landscaping
- Celebrating the heritage of the town
- Making the most of digital connectivity and high-speed broadband

1.2.3. In addition, the relocation of the main town centre bus interchange from Town Square to the site located to the south of the Stevenage Arts and Leisure Centre offers an opportunity to rethink the interchange between different modes in Stevenage town centre due to the much closer proximity of railway and bus stations and offers an opportunity to redesign and repurpose Lytton Way to help meet the objectives of the AAP.

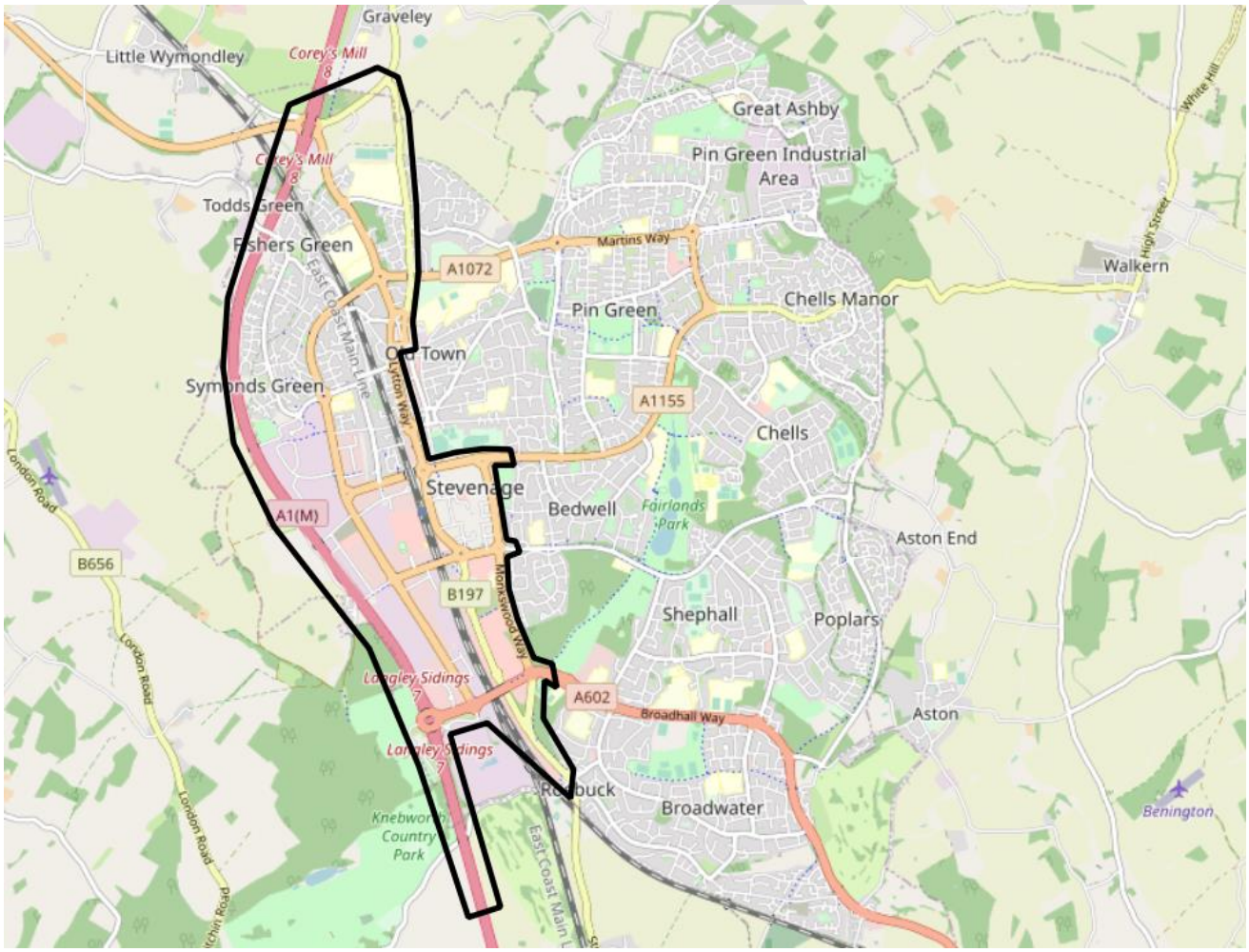
1.2.4. The AAP identifies Lytton Way as a key barrier to the council's commitment to sustainable transport in Stevenage because it severs the station from the town centre and provides an unpleasant environment and public realm for active travel modes. The council's Town Centre Regeneration Framework identifies a potential downgrade or removal of Lytton Way as a key part of the placemaking and regeneration strategy for the town centre.

1.2.5. The traffic modelling that is described in this report has been undertaken to look at the impacts of various options for the downgrade or removal of Lytton Way on both traffic in Stevenage town centre and on the operation of local bus services. Further details of the schemes that have been assessed in the transport model are provided later in the report.

1.3 STEVENAGE TOWN CENTRE S-PARAMICS MODEL

1.3.1. The Stevenage Town Centre S-Paramics model is a traffic micro-simulation model of the western side of Stevenage, bordered by the A1M to the west and the A602 (Monkswood Way and St Georges Way to the east). The model study area contains both Junctions 7 and 8 of the A1(M) along with key routes through the town – the study area of the model is shown in Figure @ below.

Figure 1-1 - Town Centre Model Study Area



1.3.2. While traffic microsimulation models are very detailed, they are sometimes the only tool that can be used to understand the interactions between junctions, particularly in congested networks where queues may extend back to or past the next junction upstream with knock-on impacts on the operation of adjacent junctions.

1.3.3. The model includes various driving behaviours (including headway, gap acceptance and driver aggression) that can be calibrated to match observed traffic conditions. This means that the model is

calibrated to match the existing behaviours of drivers in Stevenage and is representative of how people travel through the network.

2 AREA ACTION PLAN MEASURES

2.1 POTENTIAL DEVELOPMENT

2.1.1. The modelling includes for a development representing the following land uses

Table 2-1 – Modelled Land Uses

	Total
Residential	Up to 1000
Commercial (A1/ A3)	Up to 5,000
Hotel	Up to 140
Office (B1)	Up to 3000
MSCP	Approx. 750

2.2 AAP PROPOSALS FOR LYTTON WAY

2.2.1. The AAP contains a set of “core enhancements” for Lytton Way, which focus on the northern (Fairlands Way to Swingate) and southern (Danesgate to Six Hills Way) sections, which will apply in all options:

- Reduction in the width of Lytton Way, with the northern and southern section’s remaining open to all vehicles.
- Conversion of the Lytton Way/ Danesgate and Lytton Way/ Swingate junctions to small roundabouts.
- Improved vehicle access/ egress to/ from the police station, with the option of being able to provide a limited movement right turn egress from the police station if traffic volumes and speeds allow.
- Provision of a new segregated cycleway adjacent to Lytton Way
- Provision of a large public square outside the station
- Facilitation of an east-west pedestrian boulevard running from west of the railway line, through the railway station, to the existing town centre.
- Provision of a cycle hub

2.2.2. The AAP then considers three options for the central section of Lytton Way, between Swingate and Danesgate, as follows:

- Option 1: single carriageway open to all traffic
- Option 2: single carriageway open to buses and taxis only.
- Option 3: closure to all vehicles (except emergency vehicles) to create a pedestrianised plaza between the railway station and leisure centre.

2.2.3. These schemes are described in more detail in the main modelling report.

2.3 INDICATIVE AAP DEVELOPMENT TRIP GENERATION

2.3.1. The AAP land use trip generation has been calculated using data sources such as TRICS or using similar trip rates to those agreed for other developments in Stevenage town centre. Further details of the calculations for these trips can be found in the detailed modelling report.

2.4 COMMITTED AND PLANNED DEVELOPMENT SCHEMES

2.4.1. The following committed or planned developments located in the town centre area have been included in the modelling:

- SG1 Masterplan.
- Redevelopment of Matalan site.
- Redevelopment of BHS site; and
- Redevelopment of the Icon site.

Trip generation information for these sites have been taken from their respective Transport Assessments and have been added to the model in appropriate zones. It has been assumed that the development traffic will be added in addition to any existing demands, unless otherwise described in the Transport assessments. Further details of this process can be found in the detailed modelling report.

2.5 COMMITTED AND PLANNED HIGHWAY SCHEMES

2.5.1. In addition to the committed developments, the modelling also includes several committed highway schemes, including:

- the proposed throughabout at the A602/ Gunnels Wood Road/ GSK junction; and
- the A1(M) Junctions 6 to 8 "smart motorway" proposals.

2.5.2. The A602/ Gunnels Wood Road scheme involves replacing the existing roundabout with a signal-controlled throughabout. This scheme is in both the baseline and forecast year models.

2.5.3. The A1(M) "Smart Motorway" is a scheme that seeks to use the existing hard-shoulder on the A1(M) as a traffic lane during peak times. The Smart Motorway will also include variable speed limits on gantries above the carriageway. At present, there is some doubt about the Smart Motorway programme in England, with the A1(M) scheme paused while the Government undertakes a review of existing Smart Motorways. The traffic modelling includes versions of the model with and without the Smart Motorway scheme to understand the importance of the Smart Motorway to the AAP proposals.

3 MODEL

3.1 INTRODUCTION

This section summarises the main modelling points associated with the AAP project. Further detail can be found in the detailed modelling report.

3.2 ASSESSMENT YEARS

3.2.1. The model will be run for three assessment years, namely:

- 2021
- 2025; and
- 2031

3.2.2. Details of how these traffic flows were derived are contained in the main modelling report.

3.3 MODEL SCENARIOS

3.3.1. The model will test the following four scenarios for the 2025 and 2031 assessment years:

- Baseline
- Baseline with Lytton Way Option 1
- Baseline with Lytton Way Option 2
- Baseline with Lytton Way Option 3

3.3.2. Full details of how the traffic flows have been predicted for these scenarios are contained in the main modelling report.

3.4 BASELINE MODEL CHANGES

3.4.1. A key source of model lock-ups, particularly with the scheme, was observed to be A1(M) Junction 7 which repeatedly locked up due to poor lane discipline on the A602 approach, the roundabout circulatory and on the two merges. The changes at this junction include:

- Amendments to roundabout lanes to better reflect on-street driver behaviour
- Amendments to signal times in the “with development” scenarios due to the impact of the additional right turning vehicles to the GSK site.
- Additional circulatory lane just before southbound diverge (this better reflects the on-street junction arrangement)
- Minor node distance tweaks to allow two lane use to continue further around the junction before merging on slip-roads

3.4.2. There were also several locations in the model where vehicles were u-turning in locations where they would not normally be able to (i.e. at locations where two links split from a single link). This behaviour was prevented to stop vehicles unrealistically turning left at a junction then u-turning at the first available point.

3.4.3. The Signal timings at the A602/ Martins Way junction have been amended to provide a better flow throughput from north to south on the A602 to prevent the roundabout from locking up frequently (as it did with the previous signal timings).

3.5 SENSITIVITY TESTS

3.5.1. When reviewing the modelling, it became apparent that one of the causes of the model locking up was that the validation had used a set of very high gap acceptance parameters and that the lane discipline at some junctions was poor, restricting the traffic throughput. While these assumptions were acceptable for the less congested conditions to which the model was validated, the level of congestion being predicted in some scenarios means that those parameters may not be appropriate in a much more congested network.

3.5.2. While drivers have the luxury of accepting a larger gap during uncongested conditions, behaviour generally changes the longer a driver waits for a gap until such time as a driver accepts any gap they can safely pull into – even if this causes a vehicle behind to brake. As such, the majority of gaps have been reduced from a default of 4 seconds to 2.5 seconds, unless the arm is very congested where vehicles are permitted to find a zero second gap (in practice the vehicle still pulls out safely, just in a manner to cause the vehicle behind to partly give-way. It is also noted that the model cannot account for the typical let out behaviour that drivers often observe when in a queue (i.e. letting one vehicle exit a side road into the queue in front of the other.

3.5.3. A sensitivity test has therefore been undertaken to identify the impact of modelling a more aggressive set of driver behaviour rules.

3.5.4. A further sensitivity test looking at potential mitigation options at the most congested junctions has also been prepared.

3.6 ASSUMED MODE SHIFTS

3.6.1. Due to the predicted levels of congestion in the model it has been necessary to apply a mode shift away from car to all model zones. This is effectively the reduction in the traffic demand that would be required to achieve the results shown in the model results. The mode shift is applied by using a reduced flow percentage when starting the model simulation, and applies to all zones across the model equally.

3.6.2. WSP believes that the application of these mode shifts is justified because of the various Sustainable Travel Town and Active Travel Fund schemes that are being considered across Stevenage will help encourage travel by non-car modes. At present the modelling applies a maximum mode shift of 15%, however WSP understands that officers believe even larger mode shifts may be possible given the right conditions.

3.6.3. The percentage mode shift that has been applied in each model scenario is summarised in Table 3-1.

Table 3-1 – Required % Traffic Demand Reduction (or mode shift)

Scenario	No Smart MW		With Smart MW	
	AM	PM	AM	PM
2021 baseline	100	100	-	-
2025 Baseline	100	100	100	100
2025 Option 1	100	100	100	100
2025 Option 2	100	100	100	100
2025 Option 3	95	95	95	95
2031 Baseline	90	90	90	90
2031 Option 1	90	90	90	90
2031 Option 2	90	90	90	90
2031 Option 3	85	85	85	85

3.6.4. A secondary test, applying a 25% mode shift in the 2031 Option 3 has also been tested.

4 MODELLING RESULTS

4.1 INTRODUCTION

4.1.1. This section summarises the model results from the main model scenarios. Section 5 summarises the results of the sensitivity tests

4.1.2. This report has been prepared on behalf of Stevenage Borough Council to describe the transport modelling of the various proposals associated with the Stevenage Station Gateway Area Action Plan. The impacts of the AAP proposals that may affect traffic capacity or routing have been tested using the Stevenage Town Centre S-Paramics model and the results are summarised in this report.

4.1.3. The modelling described in this

4.1.4. Unless specified otherwise, references to “Lytton Way” this report are describing the section of road between A1155 Fairlands Way and A1070 Six Hills Way only, including the roundabout junctions at either end of that section.

4.2 NETWORK PERFORMANCE

4.2.1. The network performance statistics that have been calculated from the Paramics model are as follows:

- Average journey time in seconds across all vehicles.
- Total number of vehicles completing a journey

4.2.2. The total number of vehicle statistic is important when comparing different journey times across scenarios because it can help to identify where a model is suffering greater congestion (i.e. a scenario with a significantly lower travel time may also have a lower number of vehicles, suggesting that the model is very congested and more of the shorter, faster journeys are being completed)

4.2.3. Table 4-1 summarises the network performance statistics for the scenarios without the A1(M) smart motorway.

Table 4-1 – Network Performance Results (Without Smart Motorway)

Scenario	Average JT (s)		Total Vehicles	
	AM	PM	AM	PM
2021 baseline	300	316	24191	27302
2025 Baseline	466	421	23540	28625
2025 Option 1	603	421	24555	28847
2025 Option 2	793	397	21637	4248

2025 Option 3	646	451	23262	11721
2031 Baseline	562	484	17829	21372
2031 Option 1	402	282	24402	27189
2031 Option 2	513	468	24421	16082
2031 Option 3	448	510	23092	20068

4.2.4. Table 4-2 summarises the network performance statistics for the scenarios with the proposed smart motorway in place on the A1(M).

Table 4-2 – Network Performance Results (Without Smart Motorway)

Scenario	Average JT (s)		Total Vehicles	
	AM	PM	AM	PM
2021 baseline	300	316	24191	27302
2025 Baseline	291	460	25216	27712
2025 Option 1	621	421	26864	28943
2025 Option 2	641	551	25509	10657
2025 Option 3	544	578	23996	14069
2031 Baseline	388	476	26512	17231
2031 Option 1	400	284	24429	27177
2031 Option 2	416	523	24358	16022
2031 Option 3	359	553	23085	21042

4.2.5. The network performance results show that overall, Option 1 provides the best performance of the three options, although (particularly in the AM Peak) this can be worse than the performance of the

baseline conditions. The model shows that the Option2 and 3 schemes serve siginifcantly less traffic than the Option 1 network. On the basis of the network performance statistics, Option 1 appears to be the best option overall.

4.3 JOURNEY TIMES

4.3.1. The model contains several journey time routes representing the main traffic corridors within the model. The modelled journey times are measured along key journey time routes, as shown in Table 4-3

Table 4-3 – Journey Time Routes in Stevenage Paramics model

Route	Description
1E	A602 (A1(M) to Valley Way)
1W	A602 (Valley Way to A1(M))
2E	Six Hills Way (Gunnels Wood Road to Rockingham Way)
2W	Six Hills Way (Rockingham Way to Gunnels Wood Road)
3E	Fairlands Way (Gunnels Wood Road to Siam Road)
3W	Fairlands Way (Siam Road to Gunnels Wood Road)
4E	Gunnels Wood Road and Martins Way (A602 to Grace Way)
4W	Gunnels Wood Road and Martins Way (Grace Way to A602)
5N	Monkswood Way and St Georges Way (London Road to Fairlands Way)
5S	Monkswood Way and St Georges Way (Fairlands Way to London Road)
6N	North Road (Gyratory to Gresley Way)
6S	North Road (Gresley Way to Gyratory)

4.3.2. Table 4-4 summarises the AM peak hour vehicle journey times in the scenarios that do not include the Smart motorway scheme on the A1(M).

Table 4-4 – Vehicle Journey Times (AM Peak, without Smart Motorway)

AM Peak	Baseline			2025			2031		
	2021	2025	2031	Opt.1	Opt.2	Opt.3	Opt.1	Opt.2	Opt.3
1E	81	84	81	77	91	87	77	87	84
1W	155	226	293	282	500	149	158	288	135
2E	91	100	95	127	153	98	128	99	95
2W	521	674	699	1279	895	485	1200	736	380
3E	90	94	96	96	178	242	96	124	101
3W	257	414	475	443	653	1143	275	463	776
4E	275	276	280	276	362	281	274	322	281
4W	321	382	429	417	723	682	371	528	464
5N	216	286	380	361	973	218	352	759	204
5S	160	167	177	188	186	368	202	168	359
6N	138	280	302	229	221	143	186	183	136
6S	174	1323	1646	1271	908	161	378	419	147

4.3.3. Table 4-5 summarises the AM peak hour vehicle journey times in the scenarios that do not include the Smart motorway scheme on the A1(M).

Table 4-5 - Vehicle Journey Times (PM Peak, without Smart Motorway)

PM Peak	Baseline			2025			2031		
	2021	2025	2031	Opt.1	Opt,2	Opt.3	Opt.1	Opt.2	Opt.3
1E	105	127	202	107	0	267	93	201	190
1W	145	149	160	143	0	0	139	179	198
2E	178	242	417	169	0	1614	124	0	1001
2W	98	119	184	235	0	240	117	323	258
3E	99	107	195	108	0	0	100	1090	978
3W	113	123	213	127	0	375	112	454	469
4E	376	505	552	430	0	600	353	973	590
4W	302	340	392	386	0	821	296	1299	625
5N	325	467	563	502	0	672	268	644	495
5S	290	390	555	487	0	246	284	203	250
6N	144	155	163	166	125	154	141	143	137
6S	132	136	141	144	0	316	134	239	166

4.3.4. Table 4-6 summarises the vehicle journey times from the AM peak with smart motorway scenario models.

Table 4-6 – Vehicle Journey Times (AM Peak, with Smart Motorway)

AM Peak	Baseline			2025			2031		
	2021	2025	2031	Opt.1	Opt.2	Opt.3	Opt.1	Opt.2	Opt.3
1E	81	84	81	77	91	87	77	87	84
1W	155	226	293	282	500	149	158	288	135
2E	91	100	95	127	153	98	128	99	95
2W	521	674	699	1279	895	485	1200	736	380
3E	90	94	96	96	178	242	96	124	101
3W	257	414	475	443	653	1143	275	463	776
4E	275	276	280	276	362	281	274	322	281
4W	321	382	429	417	723	682	371	528	464
5N	216	286	380	361	973	218	352	759	204
5S	160	167	177	188	186	368	202	168	359
6N	138	280	302	229	221	143	186	183	136
6S	174	1323	1646	1271	908	161	378	419	147

4.3.5. Table 4-7 summarises the vehicle journey times from the AM peak with smart motorway scenario models.

Table 4-7 - Vehicle Journey Times (PM Peak, with Smart Motorway)

PM Peak	Baseline			2025			2031		
	2021	2025	2031	Opt.1	Opt,2	Opt.3	Opt.1	Opt.2	Opt.3
1E	105	127	202	107	0	267	93	201	190
1W	145	149	160	143	0	0	139	179	198
2E	178	242	417	169	0	1614	124	0	1001
2W	98	119	184	235	0	240	117	323	258
3E	99	107	195	108	0	0	100	1090	978
3W	113	123	213	127	0	375	112	454	469
4E	376	505	552	430	0	600	353	973	590
4W	302	340	392	386	0	821	296	1299	625
5N	325	467	563	502	0	672	268	644	495
5S	290	390	555	487	0	246	284	203	250
6N	144	155	163	166	125	154	141	143	137
6S	132	136	141	144	0	316	134	239	166

4.4 QUEUING

4.4.1. The model contains a large number of queue measurement routes which report the length of queues in metres from the give-way line at a junction. What these routes do not provide is details of queues which block back through upstream junctions or information

In general, the majority of the queueing is focussed on the following six junctions:

- Fairlands Way/ Gunnels Wood Road
- Fairlands Way/ Lytton Way
- Fairlands Way/ St Georges Way
- Six Hills Way/ Gunnels Wood Road
- Six Hills Way/ Lytton Way
- Six Hills Way/ Monkswood Way/ St Georges Way.

4.4.2. In the Option 2 and Option 3 scenario models, the model visualisation shows significant congestion surrounding the town centre, with queues nearly forming a circle around Six Hills Way, Fairlands Way, Gunnels Wood Road and St Georges Way. The model also shows queueing southbound into the Fairlands Way/ Lytton Way junction which extends back up the A602 to (and sometimes beyond) the gyratory located to the north of Old Stevenage town centre.

4.4.3. Overall, it is considered that the level of queue congestion shown in the Option 2 and Option 3 models is likely to result in severe delays to bus services serving the town centre.

4.5 IMPACTS ON BUS SERVICES

Introduction

4.5.1. The new Stevenage Bus Station is located to the east of Lytton Way and will be directly affected by any highway proposals associated with the AAP scheme. At a high level, Option 1 provides the opportunity to reduce the length of some bus-station bound bus services, either by providing a right turn directly to the bus station access or by buses being able to U-turn sooner on entry to the bus station

Stevenage Bus Services

4.5.2. The bus services in Stevenage can broadly be split into two types, namely:

- Town services, providing connections between areas located within Stevenage; and
- Intra-urban services, providing connections from Stevenage to destinations such as Hitchin, Watford and Luton.

4.5.3. Ideally the AAP proposals would not affect either type of bus service, but the intra-urban services cannot as easily be replaced by a mode shift to local walking/ cycling schemes. This means that it is more important to ensure that the intra-urban services can continue to operate successfully.

4.5.4. WSP has divided the bus services into the two groups above and has then looked at the impact on those bus services. Detailed tables showing the modelled journey times on about 57 separate bus route sections within the model (one section is a route from the edge of the model to another edge of the model or the bus station) are contained in Appendix @.

4.6 CONCLUSION/ RECOMMENDATION

4.6.1. When considering a recommendation based on the models with unamended model parameters (i.e. the non-Sensitivity Test models) there are several factors to consider. Based on “near-full” traffic demands, Option 1 is the best performing overall, because it allows the most traffic through the network while resulting in the least congestion, particularly in the PM Peak. On this basis of traffic capacity alone, Option 1 would be the recommended option. It is also noted that the roadworks associated with the construction of the new Stevenage Bus Station have effectively trialled the reduction in traffic capacity associated with Option 1 with little apparent impact.

4.6.2. However, traffic capacity is not the only consideration in terms of the AAP schemes, with placemaking and sustainable travel being key priorities, particularly associated with the Stevenage Sustainable Travel Town goals. This means that if residents and businesses of Stevenage are willing to accept potentially large mode shifts away from travel by private car towards more sustainable modes such as public transport, walking and cycling, the level of congestion predicted to be associated with options 2 and 3 could be reduced. The level of mode shift associated with these two Options operating successfully could be more than 25%, which would represent a significant behavioural change for the local community which may require further consultation with the community.

4.7 POTENTIAL OPTION 2/ 3 TRIAL

4.7.1. As described earlier in the report, the temporary lane closures that were in place during construction of the bus station have effectively demonstrated that the Option 1 road layout is likely to operate

successfully. If possible, it therefore suggested that a short term trial of closing Lytton Way outside the railway station could be tested, maintaining emergency vehicle, bus and taxi access.

4.7.2. For example, a temporary road closure could be installed on Lytton Way using traffic

4.7.3. WSP is uncertain if such measures could be trialled “on street”, but is something that could be considered to demonstrate to local residents that the scheme operates successfully.

5 SENSITIVITY TESTS

5.1 INTRODUCTION

5.1.1. As described earlier in this report, the forecast year models for Options 2 and 3 (in particular) highlighted that there were many locations in the model where gap parameters at junctions were unduly pessimistic (i.e. vehicles were looking for a very large gap) which meant that when the network became congested, the driver behaviour was not aggressive enough for vehicles to use the smaller, rarer gaps that were available in the model.

5.1.2. Additionally, there were several roundabouts where the roundabout lane discipline was not properly refined, which was leading to vehicles crossing on entry to the roundabout, and reducing capacity, because vehicles were simply using the wrong lane for their manoeuvre.

5.1.3. More details of the changes made during the sensitivity test are provided in the full modelling report. The remainder of this section reports the model results for the sensitivity test scenarios, where the sensitivity test scenarios are described as follows:

- Sensitivity 1 = 2031 Option 3 model with amended parameters
- Sensitivity 2 = 2031 Option 3 model with amended parameters and highway improvements

5.1.4. These scenarios all assume that the A1(M) smart motorway has been constructed.

5.2 HIGHWAY IMPROVEMENTS

5.2.1. Sensitivity test 2 includes the following highway improvements

- Removal of the bypass lane from Danestrete to Six Hills Way
- Additional Right Turn Lane from Fairlands Way to St Georges Way
- Amendments to eastbound carriageway on Fairlands Way at St Georges Way roundabout
- Signalisation of NB Gunnels Wood Road approach to Fairlands Way roundabout
- Minor tweaks to lane destinations at Six Hills Way/ St Georges Way roundabout.

5.3 NETWORK PERFORMANCE

5.3.1. Table 5-1 summarises the network performance statistics for the sensitivity test scenarios

Table 5-1 – Network Performance Statistics (Sensitivity Tests,

Scenario	Journey Time (s)		Total Vehicles	
	AM	PM	AM	PM
2031 Option 3	359	553	23085	21042
2031 Sensitivity 1	391	491	22216	19758
2031 Sensitivity 2	413	503	22242	24577

5.3.2. The network performance statistics show that the changes to the model and highway improvements are predicted to have a small negative impact in the AM peak, but that the highway improvements offer a significant capacity improvement in the PM peak (approx. 3500 additional vehicles per hour pass through the model.

5.4 JOURNEY TIMES

5.4.1. Table 5-2 summarises the model journey times from the sensitivity test scenarios.

Table 5-2 – Sensitivity Test Journey Times (seconds)

	AM Peak			PM Peak		
Route Names	2031 Option 3	2031 Sensitivity 1	2031 Sensitivity 2	2031 Option 3	2031 Sensitivity 1	2031 Sensitivity 2
1E	87	92	90	201	154	149
1W	136	549	139	203	314	179
2E	96	152	94	1170	877	264
2W	482	1475	776	287	562	391
3E	91	87	-	1175	1127	-
3W	604	230	467	466	397	340
4E	283	275	276	784	602	490
4W	422	331	312	736	567	637
5N	229	1173	171	544	622	408
5S	357	181	155	268	216	191
6N	135	136	136	135	139	135
6S	141	147	149	169	235	168

5.4.2. Table 5-3 below compares the 2031 Sensitivity Test 2 results with the results from the original 2031 Option 3 model, which does not include the model parameter changes nor the highway improvements.

Table 5-3 – Comparison of Sensitivity Test 2 vs 2031 Option 3 with no amendments

Route	AM	PM
1E	3	-52
1W	3	-24
2E	-2	-906
2W	294	104
3E	-	-
3W	-137	-126
4E	-7	-294
4W	-110	-99
5N	-58	-136
5S	-202	-77
6N	1	0
6S	8	-1

5.4.3. It is evident that the majority of journey times within the model are faster in the AM and PM peaks, with the exception of route 2W (Six Hills Way between Rockingham Way and Gunnels Wood Road). It is noted that the opposite direction shows a substantial journey time reduction.

5.5 QUEUES

5.5.1. Table 5-4 summarises the modelled queue lengths at several locations within the model study area. The table also includes a comparison between Sensitivity test 2 and the 2031 Option 3 model results.

Table 5-4 – Average Queue lengths (metres)

	AM Peak				PM Peak			
	Opt 3	ST1	ST2	ST2 vs Opt3	opt 3	ST1	ST2	ST2 vs Opt3
1 Fairlands Way E	336.6	179.8	337.9	1	79.2	91.2	76.8	-2
1 St Georges Way	194.0	386.0	51.6	-142	375.2	376.5	359.8	-15
1 Fairlands Way W	99.4	68.5	43.2	-56	344.2	296.5	395.4	51
2 St Georges Way N	252.4	87.1	40.4	-212	244.0	100.8	101.6	-142
2 Six Hills Way E	343.9	334.0	82.7	-261	58.0	97.4	35.7	-22
2 A602 S	47.6	178.7	50.7	3	303.7	333.4	159.5	-144
2 A602 W	41.3	73.1	23.5	-18	205.2	220.9	183.0	-22
3 Six Hills Way W	25.8	45.2	28.2	2	439.6	352.6	83.2	-356
3 Lytton Way	2.7	10.9	4.7	2	127.7	123.9	41.4	-86
3 Danestrete	0.0	6.9	4.3	4	159.5	168.3	34.4	-125
3 A602 E	18.1	154.1	66.8	49	22.3	23.2	6.5	-16
3 London Road S	6.5	444.8	261.9	255	103.7	134.1	7.3	-96
4 Lytton Way N	44.5	48.0	34.0	-11	280.8	279.9	279.8	-1
4 Fairlands Way E	46.6	65.7	38.7	-8	144.6	227.1	101.6	-43
4 A602 S	82.5	86.9	56.3	-26	211.7	205.1	205.5	-6
4 A1155 W	40.0	31.5	25.1	-15	474.3	476.6	450.4	-24
5 Gunnells Wood Rd N	79.9	146.0	84.4	5	195.2	107.1	100.2	-95
5 Six Hills Way WB	413.7	536.3	540.9	127	202.1	411.2	326.3	124
5 Six Hills Way EB	3.4	6.6	4.2	1	106.9	108.0	109.5	3
5 Gunnells Wood Road NB	57.2	68.3	39.0	-18	216.6	149.0	64.8	-152
6 Monkswood Way	0.0	0.3	0.2	0	0.5	4.9	0.0	-1
6 London Road S	6.0	106.7	3.7	-2	20.4	38.7	8.4	-12
6 London Road N	5.5	172.2	5.8	0	35.9	73.1	34.6	-1
Gunnels Wood Road	46.0	15.3	12.2	-34	576.3	164.9	52.9	-523
GSK	0.0	0.0	0.0	0	33.1	13.2	6.4	-27
A602 EB	145.8	103.6	91.4	-54	227.3	157.6	208.9	-18
A602 WB	8.6	432.2	20.9	12	75.6	225.1	20.0	-56

	AM Peak				PM Peak			
	Opt 3	ST1	ST2	ST2 vs Opt3	opt 3	ST1	ST2	ST2 vs Opt3
RM Monkswood Way SB	41.8	51.6	37.4	-4	62.9	121.3	76.6	14
RM Monkswood Way NB	31.2	319.0	31.3	0	102.0	150.3	83.6	-18
RM A602 WB	40.6	115.4	32.8	-8	94.4	124.2	63.3	-31
RM A602 EB	19.6	24.7	17.4	-2	186.9	181.1	42.4	-144

5.5.2. The predicted queue lengths again show that the Sensitivity Test 2 scheme and mode shift generally operates better than the original 2031 Option 3 model without the sensitivity test 2 parameters.

5.6 BUS SERVICE IMPACTS

Tables summarising the bus service impacts of the proposed sensitivity test are contained in Appendix E. The bus data shows a similar pattern to that of the vehicle journey times, with services generally being faster and more reliable under the Sensitivity test 2.

5.7 CONCLUSION

5.7.1. The Sensitivity tests have shown that the Option 3 scheme could operate more successfully than predicted in the original modelling assuming a more aggressive driver behaviour and the implementation of highway capacity improvements. It is noted however, that the highway improvements are not LTP4 compliant as they are led primarily by the need to provide traffic capacity rather than improve sustainable modes such as walking and cycling. The schemes that have been modelled will also need further design development to identify if they could be implemented on-street.

6 SUMMARY AND CONCLUSION

6.1 SUMMARY

6.1.1. This Technical Note has been prepared to summarise the modelling results for the Stevenage Station Gateway AAP scenarios. This report will form part of the final modelling report, which will also contain more details of model development and assumptions

6.1.2. The modelling has tested the following assumptions for 2025 and 2031 assessment years, with and without the proposed smart motorway scheme on the A1(M):

- Baseline
- AAP Option 1: with single carriageway link between Swingate and Danesgate, open to all traffic
- AAP Option 2: as per option 1, but link only open to buses and taxis
- AAP Option 3: with section of Lytton Way

6.1.3. In addition to the above scenarios, sensitivity tests have been prepared that consider a set of more aggressive gap parameters and potential improvement schemes at several junctions in the model study area.

6.1.4. The model indicates that the traffic redistribution caused by traffic causes the highway network around Stevenage town centre to begin to lock up in the models with the existing gap parameters, which means that if driver behaviour did not become any more aggressive, neither Option 2 nor Option 3 shows long term operational resilience, with the 2031 scenarios showing a situation where traffic cannot get through the model causing major delays to bus services. This means that at present, the recommended option in highway capacity terms is Option 1, because it is the only option that is not predicted to cause significant congestion.

6.1.5. A version of the Option3 scenario assuming more aggressive driver behaviour and improvements to several junctions also indicates that there may be some circumstances under which options 2 and 3 may be able to work.

6.1.6. While the model results make it difficult to recommend Options 2 or 3 from a highway capacity viewpoint, there are other considerations that officers may need to use when assessing which scheme is most appropriate. Both Option 2 or 3 could work in highway capacity terms if residents of Stevenage and users of the town centre accepted a much higher level of mode shift than would be required for Option 1. The level of ambition in the Stevenage Sustainable travel Town may make the level of mode shift achievable – however there is a political decision to be made about what happens if the necessary mode shift cannot be achieved.

6.1.7. Effectively, the roadworks associated with the new bus station have already demonstrated that Option 1 is likely to work. This means that one option could be to test the success or otherwise of Options 2 and 3 by temporarily restricting through traffic on Lytton Way to identify if the reality of this situation is the same as predicted in the model. If the resultant congestion is bad, the temporary restriction could be removed and Option 1 confidently selected, whereas if the congestion is not as bad as is being predicted a trial could help to

Appendix A

MODEL RESULTS (WITHOUT SMART MOTORWAY)

Appendix B

MODEL RESULTS (WITH SMART MOTORWAY)

Appendix C

BUS DATA

Appendix D

MODEL RESULTS (SENSITIVITY TEST)

Appendix E

BUS DATA (SENSITIVITY TEST)

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