Cheltenham UDF

Transport Strategy - Traffic Impact Assessment

Cheltenham Borough Council and

South West of England Regional Development Agency

April 2007

Cheltenham UDF

Transport Strategy - Traffic Impact Assessment

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1. Introduction

1.1 Introduction

1.1.1 Colin Buchanan have been commissioned as part of a multi-disciplinary team to provide advice on transportation and highway issues related to the preparation of an Urban Design Framework for Cheltenham within the context of the Civic Pride Initiative. This work involves amongst other tasks the preparation of a Transport Strategy to accompany the UDF proposals.

1.1.2 A Draft Transport Strategy Report was produced and issued by Colin Buchanan in October 2006. This report identified a number of possible options with regards to changes to the town's transport network. These proposals responded to a number of objectives set in the UDF project brief, including:

- Road safety improvements, reduced congestion, minimised traffic impact in key areas of the town centre through traffic management changes and restrictions to vehicular access;
- Rerouting of through traffic away from Boots Corner/Royal Well on the Inner Ring Road and onto an outer orbital route;
- Improved accessibility and priority to pedestrians, cyclists and public transport delivered through a combination of traffic management changes, improvements to built environment and creation of routes that are convenient, attractive and safe;
- Improved servicing arrangements to meet current and future business requirements;
- Bus routes and bus stop locations that maximise public transport accessibility across a wider area of the town centre and recognise the importance of service viability and high quality streetscapes. Future requirements are to be allowed for;
- A high quality and alternative accessible location for national coach services and rural services which presently use the bus station in Royal Well. This to include options for integrating this facility into the redevelopment of a town centre site or other locations on the strategic town centre network;
- Review current on-street bus arrangements and their effectiveness assessing nodal interchange points and integration with other transport types;
- High quality, secure and well-located off-street public parking of a quantity and type that supports the parking strategy and accommodates dependency on parking income;
- An approach to the delivery and maintenance of transport infrastructure which sympathises with urban design, planning, heritage and contextual issues; and
- Other transport linked infrastructure measures required, including signing for all transport modes to improve visitor orientation and accessibility.

1.2 Options identified

1.2.1 The options considered in the Draft Transport Strategy were the topic of an extensive consultation exercise. The outcome of this consultation identified two main options to take further as part of the UDF process. These two options are as follows.

"Do minimum" option

1.2.2 The "Do Minimum" option addresses key issues as set out in the project brief with the minimum of alteration to the town's traffic network. It focuses on the closure of Boots Corner to general traffic and the potential benefits that this would bring to other modes of transport accessibility to the town centre.

1.2.3 This option identifies the opportunity to create a north-south bus route through the heart of the town centre along Royal Well Road, Clarence Street and North Place. The redevelopment of the Royal Well Road site could include a new bus station for the town accommodating local services as well as long distance coach services allowing full interchange between all services.

1.2.4 The delivery of this bus corridor would also allow the re-routing of bus services away from Pittville Street therefore providing the opportunity for important streetscape improvements along sections of High Street and The Promenade, tying in possible improvements at Boots Corner.

1.2.5 The closure of Boots Corner is likely to significantly reduce traffic along Albion Street and allow regeneration of this area along a new two way street providing bus priority and access to local facilities rather than accommodating through traffic.

1.2.6 The scheme derived from the "Do minimum" option and taken into account in this technical work is illustrated in details in Figure 1.1.

"Option 2"

1.2.7 The "Option 2" proposals identify a much larger programme of changes to Cheltenham town centre transport network. It builds on the opportunities identified as part of the "Do minimum" option but add to it a proposed new 2-way boulevard route around the town centre catering for traffic accessing the town centre.

1.2.8 The proposed boulevard is intended as an access route to, from and around the town centre. The design of this route would focus on delivering relatively high levels of road capacity but at the same time a permeable and save environment for pedestrians and cyclists. It is proposed to achieve this by delivering where possible a low kerbed central reservation encouraging reduced traffic speed and at the same time, providing increased crossing opportunities for other road users. Other measures could include the provision of on-street parking to keep the boulevard active and keep traffic speed down.

1.2.9 The route identified as part of "Option 2" for the boulevard would include:

- Bayshill Road as an alternative to Montpellier Walk/The Promenade, allowing streetscape improvements to the active Montpellier area and allowing better connection between the northern section of The Promenade around the Municipal Offices and the southern section of The Promenade next to Imperial Gardens.
- St George's Road,
- Honeybourne Way,
- Gloucester Road,
- High Street,
- Poole Way and the existing northern ring road,
- Berkeley Street and Hewlett Road as an alternative to St James Street, allowing significant traffic reduction at the eastern end of High Street, delivering regeneration potential and opportunity for better streetscape in this area,

- College Road, as a natural route between the eastern and southern sections of the town, and
- Montpellier Terrace.

1.2.10 "Option 2" would finally offer the opportunity to introduce traffic management measures to reduce the impact of traffic within the limits of this boulevard. This would be achieved by creating access cells to and from specific areas of the town, limiting opportunities for rat running routes.

1.2.11 A detailed illustration of the "Option 2" scheme taken into consideration in this work is provided in Figure 1.2.

1.3 Purpose of this report

1.3.1 The purpose of this report is to consider the traffic implications of both proposed strategies on the basis of available traffic modelling information. The two strategies identified would lead to significant changes to the town's road network. Therefore their impact on traffic flows in the town ought to be verified and tested. In addition, the two strategies aim at delivering certain changes in traffic pattern in the town. The work detailed in this report identifies whether the strategies would achieve these aims.

1.3.2 Therefore, this report summarises a traffic impact assessment undertaken on the basis of the two proposed strategies. It considers changes in traffic flows on key links around the town centre and identifies potential traffic related issues and possible solutions required to deliver a workable strategy for the town centre. Therefore, this report also presents a set of recommendations towards the identification of a preferred transport strategy for the town.

1.4 Technical context

CSV SATURN model

1.4.2 The assessment presented in this report has been undertaken on the basis of the Central Severn Vale SATURN model (CSV model). This model covers a large area including Gloucester and Cheltenham. It is based on the SATURN strategic traffic assignment modelling facility and provides a detailed description of Cheltenham town centre road network. On this basis, it is considered that the CSV model provides an appropriate framework for undertaking the testing of the proposed transport strategy options for Cheltenham town centre.

1.4.3 The CSV model has been calibrated and validated against observed 2003 traffic flows and other traffic information. It is therefore considered that the 2003 CSV model provides an accurate reflection of traffic patterns in Cheltenham town centre in 2003.

1.4.4 The CSV model is also available for forecast years such as 2011 and 2016. These forecast years include further assumptions on developments committed and to be implemented by 2011 and 2016.

1.4.5 It is important to keep in mind that the work detailed in this report has been undertaken within the context of the Civic Pride project. The aim here is to test the impact of the proposed two strategy options on traffic patterns in the town. It has been considered more appropriate to undertake these tests on the basis of a robust set of observed traffic conditions, i.e. on the basis of the 2003 CSV model. In doing so, it is guaranteed that the assessment undertaken would highlight the impact of the proposed strategy options only and would not be marked by the effects of other possible proposals likely to be implemented by 2011 or 2016.

Approach to modelling

1.4.6 The assessment process has been limited to incorporating to the CSV model the proposed changes to the town centre road network and rerunning the model's traffic assignment on this basis. This process provides therefore a true picture of the potential impact of the proposals, not only at the level of Cheltenham town centre but on the wider road network as well.

Impact assessment criteria

1.4.7 The 2003 base CVS model assignment has been taken as the base case against which to assess the impact of the "Do minimum" and "Option 2" strategies. The impact on a selected number of links around the town has been noted in net terms and in percentage terms. The GEH statistic value has also been used as a measure of the significance of the difference between the base case set of flows and the proposed sets of flows. Typically, the GEH value is used in model validation to compared observed and modelled flows. However, here it is used as an indication of the level of significance of the changes introduced by the proposed strategies.

1.4.8 It has been considered that:

- A GEH value of less than 5 indicates a non significant difference in flows.
- A GEH value of more than 10 indicates a significant difference in flows.
- A GEH value of between 5 and 10 has been considered as indicating a link on which the difference in flows would be relatively significant.

1.4.9 Some comments on capacity at some key junctions have also been made on the basis of mainly manual estimates and CB's experience in traffic engineering. These are based on turning flows output from the model.

2. Base case

2.1 Introduction

2.1.1 The 2003 CSV model has been used as the basis against which to assess the impact of the "Do minimum" and "Option 2" transport strategy proposals. The rationale for using this model is detailed in paragraph 1.4.5. This section details the key traffic patterns illustrated by the 2003 CSV model.

2.1.2 For convenience this section considers different areas of the town in turn after an overview of the key traffic movements across the town centre.

2.2 Key traffic movements

2.2.1 The 2003 CSV model provides an insight on current traffic patterns in the town centre as it is understood Cheltenham town centre road network has not radically changed since 2003. Not only it provides base traffic flows on all road links within the town centre, but it also allows to identify key routes through the town.

2.2.2 The inner ring road and in particular its Royal Well Road – Clarence Street – North Street – Albion Street section is of interest in this study as both Transport Strategy options focus on closing this section of road to general traffic. Other key road links which have been considered are the five main corridors into the town centre i.e:

- A40 Lansdown Road,
- A4019 Tewkesbury Road,
- A435 Evesham Road,
- A40 London Road, and
- A46 Bath Road.

2.2.3 In order to provide an overview of key movements from/to these 6 road links in the town centre, the AM peak model has been interrogated and "select link" analyses undertaken for each of these links, considering the inbound direction of traffic. Similar analyses on the PM peak model would be likely to highlight similar key movement patterns, and therefore have not been undertaken. The full impact assessment of the two strategies is however detailed for both peak periods in chapters 3 and 4 of this report.

2.2.4 The select link analyses undertaken focus on light vehicles. Therefore all numbers stated in the following paragraphs are light vehicles only. It is understood that about 10% of traffic in Cheltenham town centre is HGV traffic. It must also be borne in mind that traffic levels mentioned in these paragraphs will not necessarily include all destinations accessed by traffic in the town centre as traffic along a given route typically "peels" off to destinations along the route. The following paragraph will focus on key movements observed.

Inner ring road

2.2.5 A select link analysis has been undertaken on North Street (northbound) on the basis of the 2003 AM base model, to illustrate the main origins and destinations of traffic currently routed along the inner ring road. The following can be noted:

- The northbound section of the inner ring road channels traffic from the southern end of the town centre wishing to reach destinations on the northern end of the town.

- It also provides a key route for accessing destinations along Albion Street (mainly car parks) but also the A40 London Road to the east. The model shows that about 1/8th of the traffic modelled on the North Street link would travel east to the A40 London Road. (about 100 veh/h)
- Traffic coming from the west, and the A4019 Tewkesbury Road also contributes to a large proportion of traffic modelled on North Street. About 150 veh/h are routed from Tewkesbury Road through the High Street, Ambrose Street, Clarence Street and then North Street to reach destinations on the northern side of the town centre.
- Traffic coming from the south of the town is slowly channelled onto the northbound inner ring road via Montpellier Walk, coming from Park Place (about 80 veh/h) and the A40 Lansdown (only 15 veh/h) or via Bath Road and oriel Road (about 20 veh/h).
- A non negligible proportion of traffic accesses the northbound inner ring road from the west down St George's Road coming from Alstone Lane (about 80 veh/h) and Gloucester Road south (about 75 veh/h).
- Traffic flows on these routes increase on the approach to the town as more local traffic is picked up.
- Past North Street, traffic splits down Albion Street (about 450 veh/h) to access destinations along Albion Street or on route to the east and down North Place about (220 veh/h) to access destination north of St Margaret's Road. Only about 100 veh/h would be routed towards further destinations north of the town down Evesham Road or Prestbury Road.

2.2.6 The proposed closure of the northbound inner ring road is likely to have a beneficial impact on traffic flows at the heart of the town centre as traffic is likely to re-route around the centre. In particular, traffic flows on Albion Street are likely to reduce significantly. Traffic flows on High Street and Ambrose Street would also reduce as traffic currently using this through route through the town would be deterred by the closure of Boots Corner.

A40 Lansdown Road

2.2.7 The route through the town centre followed by traffic entering the town from the A40 Lansdown Road has been analysed. The following has been noted:

- About 1,440 veh/h approach the town centre from the A40 Lansdown Road, west of Andover Road.
- The A40 splits between Andover Road and Lansdown Road as it approaches the town centre. This is reflected in traffic flows from the west with about 600 veh/h turning off Lansdown Road onto Andover Road - Suffolk Road and about 530 veh/h carrying on down Lansdown Road. About 140 veh/h are routed south down St Stephen's Road accessing developments to the south of the town.
- Traffic routed down Andover Road and Suffolk Road mainly accesses developments along this corridor. Only about 60 veh/h travel across the town to access the A40 London Road to the east.
- Traffic carrying on to Lansdown Road mainly access developments around Montpellier and Bayshill, and only a very small proportion is routed along the northbound inner ring road (about 15 veh/h).

2.2.8 The model identifies a through route from west to north-east along Lansdown Road, Montpellier Terrace, Montpellier Parade, Montpellier Drive, St Luke's Road, College Road en route to Whaddon. This represents about 50 veh/h through the town.

2.2.9 Figure 2.1 illustrates this analysis.

A4019 Tewkesbury Road

2.2.10 A "select link" analysis has been undertaken on Tewkesbury Road just to the west of Gloucester Road on the eastbound direction. The analysis undertaken shows:

- About 1200 veh/h approach the town from this direction. They split between Gloucester Road (about 320 veh/h), High Street (about 450 veh/h) and Poole Way (about 300 veh/h).
- Traffic routed down Gloucester Road serves destinations to the south and west of the town. About 75 veh/h are modelled to access Honeybourne Way and developments in this area. About 200 veh/h carry on down Gloucester Road and about half of these are then routed to destinations south of Andover Road and Suffolk Road via Malvern Road.
- Traffic routed down High Street mainly accesses developments in the St James Square area. However, about 150 veh/h are routed through North Street and down Albion Street. About 120 of these travel through the heart of the town to access destinations on the eastern side of the town. About 130 veh/h from High Street carry on south down St George's Place to access the Montpellier area.
- Traffic routed along the northern section of the outer ring road access destinations along this corridor. However, of these, about 30 veh/h travel further east to reach London Road.

2.2.11 Here again, the model illustrates the importance of High Street and Ambrose Street as a route through the heart of the town centre. The model also shows that the inner ring road and Albion Street would form an attractive alternative west-east route through the town to the outer ring road. The proposed closure of Boots Corner as advocated by both strategies is expected to force traffic out of the heart of the town onto the outer ring road, bringing significant reductions in flows through High Street, Ambrose Street, as well as North Street and Albion Street amongst others. In addition it must be noted that only a small proportion of traffic approaching the town from the west travels through the town, with most traffic accessing destinations within the town.

2.2.12 Figure 2.2 illustrates this analysis.

A435 Evesham Road

2.2.13 The analysis undertaken for the southbound link on Evesham Road just north of Clarence Street shows the following:

- Traffic accessing the town centre from Evesham Road (about 670 veh/h) would choose between two key routes into the heart of the town centre: Henrietta Street (about 120 veh/h) to reach destinations on the south and west side of the centre, such as St James Square and Bayshill, and Winchcombe Street to reach destinations along Albion Street (about 50 veh/h)
- About 170 veh/h would be routed along Fairview Road and St John's Avenue to access the south eastern parts of the town. The model shows that of these about 40 veh/h would travel further east along London Road and about 60 veh/h would travel to the Imperial Square area.
- About 130 veh/h are modelled to turn right out of Evesham Road down St Paul's Road travelling west.

2.2.14 Most of the traffic approaching the town from the north accesses destinations within the town centre. Through traffic is limited to about 40 veh/h routed east and 130 veh/h going west.

2.2.15 Figure 2.3 illustrates this analysis.

A40 London Road

2.2.16 The model shows that about 950 veh/h approach the town centre from the A40 London Road at a point immediately west of Sandford Mill Road. This traffic then travels to/through the town centre as follows:

- About 400 veh/h turn left down Sandford Mill Road accessing destinations to the south of the town centre or travelling through to the A40 west. About 80 veh/h are routed along Sandford Road and then Montpellier Terrace accessing developments along this corridor. About 17 of these travel further west to the Overton Park area.
- About 200 veh/h travel along the Thirlestaine Road – Suffolk Road corridor accessing developments along this route. However, the model shows that about 100 veh/h use this route as a east-west through route on their way to the A40 Lansdown Road.
- About 150 veh/h turn right onto Hale's Road and about 100 of these travel further north to the Whaddon area.
- About 400 veh/h travel straight into the town centre along London Road. About 110 veh/h travel north via Hewlett Road and All Saints Road to Evesham Road avoiding the ring road. About 100 veh/h are routed around the northern section of the ring road to access developments along this corridor. About 70 of these travel further west along Swindon Road.
- About 200 veh/h are routed along the northern section of Bath Road to access developments along Oriel Road, Imperial Square and the St James Square area.

2.2.17 The model illustrates the importance of Suffolk Road and Thirlestaine Road as a east-west through route across the southern end of the town centre. It also highlights a couple of alternative routes to the north via Hale's Road and Hewlett Road. It must be pointed out however, that most of the traffic on this approach access the town centre itself and the proportion of through traffic is relatively low.

2.2.18 Figure 2.4 illustrates this analysis.

A46 Bath Road

2.2.19 A "select link" analysis has been undertaken for the A46 Bath Road northbound link immediately south of Suffolk Road. The model shows the following:

- About 660 veh/h are modelled on this approach to the town centre.
- About 210 veh/h are modelled to turn left into Suffolk Road to access developments along this corridor, with only about 80 of these carrying on through to the west along the A40 Lansdown Road.
- About 220 veh/h turn right into Thirlestaine Road of which about 160 are routed north to reach College Road. It seems that the model limits the amount of traffic turning right at the Bath Road/Sandford Road junction, which would form a more logical route to College Road. This might be due to delays on this right turning movement at this junction. Of these 160 veh/h, about 40 access developments along College Road but about 100 carry on northbound to access areas such as Whaddon or Prestbury Road.
- About 200 veh/h access developments along Bath Road and of these, about 130 travel to Imperial Square and Rodney Road.

2.2.20 A key conclusion of this analysis is that the model identifies College Road as a route to destinations to the north of the town centre from the south eastern parts of Cheltenham. It also shows that potential delays at the Bath Road/Sandford Road junction could cause traffic reassignment on Thirlestaine Road. No major

through town centre movements are highlighted by the model coming from this approach.

2.2.21 Figure 2.5 illustrates this analysis.

Conclusions

2.2.22 These analyses identify some key routes around the town centre including:

- High Street – Ambrose Street – Clarence Street – North Street as an access route to the north and east from the west,
- Suffolk Road – Thirlestaine Road as a key east-west route across the southern end of the town,
- Montpellier Drive – St Luke's Road – College Road as a cut through from south west to north east.

2.2.23 The model also shows that there is no significant through town centre movement in Cheltenham and the large majority of traffic approaching the town accesses destinations within the town centre.

2.3 Base case link flows

2.3.1 The following paragraphs and tables detail the base case link flows extracted from the model and used as a basis for the impact analysis. These are two way traffic flows on the links described taken from the 2003 base CSV model.

Honeybourne Way area

2.3.2 Table 2.1 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the Honeybourne Way area.

Table 2.1: Honeybourne Way area – 2003 base flows

ID	Link	To	From	AM	PM
1	Honeybourne Way	St George's Road	Store Access	443	744
2	Honeybourne Way	Store Access	Gloucester Road	351	594
3	Gloucester Road	Market Street	Tewkesbury Road	1214	1235
4	High Street	Gloucester Road	Park Street	1605	1641
5	Poole Way	High Street	Swindon Road	1071	990
6	Tewkesbury Road	Gloucester Road	Sun Street	2011	2099
7	Gloucester Road	Honeybourne Way	Arle Road	1048	1117
8	St George's Road	Honeybourne Way	Gloucester Road	461	620
9	High Street	Poole Way	Devonshire Street	769	763

(Note: two way flows in veh/h)

St James Square area

2.3.3 Table 2.2 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the St James Square area.

Table 2.2: St James Square area – 2003 base flows

ID	Link	To	From	AM	PM
10	St George's Place	St George's Road	Royal Well Road	1058	858
11	St George's Place	St James Square	Clarence Street	418	551
12	St James Square	Jessop Avenue	Clarence Street	376	282
13	Clarence Street	Ambrose Street	St George's Place	679	649
14	Ambrose Street	Clarence Street	New Street	984	682

(Note: two way flows in veh/h)

Town centre heart

2.3.4 Table 2.3 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the town centre heart are.

Table 2.3: Town centre heart – 2003 base flows

ID	Link	To	From	AM	PM
15	Royal Well Road	St George's Road	Crescent Terrace	940	970
16	Clarence Parade	Crescent Terrace	Clarence Street	756	811
17	North Street	High Street	Albion Street	884	1087
18	North Place	Albion Street	St Margaret's Rd.	417	626
19	Albion Street	North Place	Portland Street	602	678
20	Albion Street	Winchcombe St.	Gloucester Place	501	517
21	Portland Street	Albion Street	Fairview Road	321	306
22	Winchcombe St.	High Street	Albion Street	43	103
23	Winchcombe St.	Albion Street	Fairview Road	91	151
24	Rodney Road	Regent Street	High Street	105	119
25	Rodney Road	Oriel Road	Regent Street	373	497
26	The Promenade	Crescent Terrace	St George's Road	310	464

(Note: two way flows in veh/h)

Montpellier/Bayshill area

2.3.5 Table 2.4 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the Montpellier/Bayshill area.

Table 2.4: Montpellier/Bayshill area – 2003 base flows

ID	Link	To	From	AM	PM
27	Bayshill Road	Parabola Road	Fauconberg Road	683	754
28	St George's Road	Bayshill Road	Parabola Lane	816	944
29	Imperial Square	Rodney Road	The Promenade	651	807
30	The Promenade	Queen's Circus	St George's Road	601	832
31	St George's Road	The Promenade	Royal Well Road	1115	1260
32	St George's Road	Royal Well Road	Bayshill Road	328	455
33	Montpellier Walk	Montpellier Ter.	Montpellier Spa Rd	771	1166
34	Montpellier Ter.	Montpellier Walk	Suffolk Road	984	963
35	Lansdown Road	Lansdown Walk	Lansdown Cres.	1308	1656

(Note: two way flows in veh/h)

Bath Road area

2.3.6 Table 2.5 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the Bath Road area.

Table 2.5: Bath Road area – 2003 base flows

ID	Link	To	From	AM	PM
36	Bath Road	Montpellier Ter.	Montpellier Drive	571	478
37	Bath Road	St Luke's Road	Oriel Road	796	669
38	Oriel Road	Bath Road	Rodney Road	1347	1150
39	Montpellier Ter.	Montpelllier Pde	Bath Road	445	430
40	Suffolk Road	Suffolk Parade	Bath Road	1164	1032
41	Bath Road	Suffolk Road	Sandford Road	511	546
42	Bath Road	Upper Bath Street	Suffolk Road	1220	1296
43	Vittoria Walk	Montpellier Drive	Oriel Road	163	126
44	Montpellier Parade	Montpellier Ter.	Montpellier Spa Rd	516	597

(Note: two way flows in veh/h)

St John's Avenue area

2.3.7 Table 2.6 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the St John's Avenue area.

Table 2.6: St John's Avenue area – 2003 base flows

ID	Link	To	From	AM	PM
45	Fairview Road	Gloucester Place	Sherborne Place	1304	1239
46	St John's Avenue	Fairview Road	Albion Street	1133	1009
47	Albion Street	St John's Avenue	St James Street	1577	1720
48	Berkeley Street	Albion Street	High Street	1430	1434
49	St James Street	Albion Street	High Street	283	328
50	High Street	St James Street	Berkeley Street	1607	1355
51	Bath Road	Bath Street	High Street	1325	1082
52	Hewlett Road	London Road	Albion Street	1073	1003
53	Hewlett Road	Carlton Street	All Saints Road	1554	1516

(Note: two way flows in veh/h)

College Road area

2.3.8 Table 2.7 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the College Road area.

Table 2.7: College Road area – 2003 base flows

ID	Link	To	From	AM	PM
54	College Road	London Road	Bath Parade	959	1105
55	College Road	St Luke's Road	Sandford Road	632	688
56	London Road	College Road	Keynsham Road	1260	1032
57	Old Bath Road	College Bath Road	Sandford Road	1658	1377
58	Sandford Mill Road	Old Bath Road	London Road	412	355
59	London Road	Old Bath Road	Sandford Mill Road	1474	1628
60	Sandford Road	College Road	Keynsham Road	899	935
61	Sandford Road	Bath Road	College Road	571	702
62	Thirlestaine Road	Bath Road	College Lawn Rd	1224	1075
63	Old Bath Road	Thirlestaine Road	Sandford Road	1676	1420
64	London Road	Sandford Mill Road	Cirencester Road	1873	1935
65	Hale's Road	London Road	Sydenham Road	972	1023

(Note: two way flows in veh/h)

Portland Street area

2.3.9 Table 2.8 identifies the links considered in this assessment and the base two way traffic flows provided by the 2003 base CSV model for the Portland Street area.

Table 2.8: Portland Street area – 2003 base flows

ID	Link	To	From	AM	PM
66	Swindon Road	St George's Street	Henrietta Street	1320	1378
67	St Margaret's Rd	Dunalley Street	North Place	995	1042
68	St Margaret's Rd	Portland Street	Winchcombe St.	1117	1290
69	Portland Street	St Margaret's Rd	Clarence Street	532	786
70	Winchcombe St.	Fairview Road	Belmont Road	803	559
71	Evesham Road	Clarence Road	Welllington Road	1045	948
72	Prestbury Road	Clarence Road	Wellington Road	964	835

(Note: two way flows in veh/h)

3. "Do minimum" – Impact Assessment

3.1 Introduction

3.1.1 The following chapter provides the detailed results of the traffic impact assessment of the "Do minimum" transport strategy option proposed for Cheltenham town centre as part of the UDF project.

3.1.2 Figure 1.1 illustrates the "Do minimum" transport strategy option considered in this assessment. Section 1.2 of this report provides an overview of the features of this option. In addition, the reader is encouraged to refer to the Draft Transport Strategy Report (October 2006) for further details on this option.

3.1.3 Figures 3.1 and 3.2 illustrates the impact assessment results for the morning and evening peak periods.

3.2 Key traffic movements

3.2.1 "Select link" analyses have been undertaken for each approach road to the town centre in the case of the "Do minimum" strategy in the AM peak as a means of comparison with patterns of traffic highlighted in chapter 2 of this report. The following key conclusions can be drawn from this exercise.

A40 Lansdown Road

3.2.2 The analysis undertaken shows that the implementation of the "Do minimum" option would not impact significantly on the routing of traffic approaching the town from the A40 Lansdown Road:

- About 1,400 veh/h would approach the town centre from the A40 Lansdown Road.
- About 140 veh/h would turn south along St Stephen's Road to access developments to the south of Suffolk Road.
- About 580 veh/h would travel along Suffolk Road accessing developments along this corridor. About 290 veh/h would reach the junction with Bath Road. About 60 of these would then turn south down Bath Road while about 180 would carry on east on Thirlestaine Road accessing developments along this road. About 70 veh/h would reach London Road on the eastern side of the town.
- About 520 veh/h would approach the town centre along Lansdown Road past Westal Green. Of these, about 60 would access destination in the Bayshill area, and about 70 would travel up Montpellier Walk to access destinations on Imperial Square. About 270 veh/h would travel along Montpellier Terrace. Only 15 of these would reach Bath Road and Sandford Road to access developments around this junction. About 230 veh/h would turn left into Montpellier Parade, 60 of which would travel along Vittoria Walk to their destinations. About 110 veh/h would travel along Montpellier Drive, some to access destinations along the northern parts of Bath Road (about 50 veh/h) but for most of them to travel further east and north along College Road (about 60 veh/h).

3.2.3 This analysis is illustrated by Figure 3.3

A4019 Tewkesbury Road

3.2.4 The routing through the town of traffic approaching from the north west has been reviewed in the case of the "Do minimum" option in the morning peak. The following points have been observed:

- About 1,100 veh/h would approach the town centre from Tewkesbury Road, slightly less than in the base case. This traffic would split between Gloucester Road (about 290 veh/h), High Street (about 300 veh/h) and Poole Way (about 380 veh/h). It can be seen that in the case of the "Do minimum" strategy, traffic would be deterred away from High Street and redirected around the town centre via Poole Way.
- Traffic assigned down Gloucester Road would follow patterns similar to what is observed in the base case with about 80 veh/h accessing Honeybourne Way and about 200 veh/h carrying on south down Gloucester Road before being split between Gloucester Road south (about 40 veh/h) and Malvern Road en route to destinations around Andover Road.
- Traffic routed down High Street would mainly access developments in the St James Square area, and about 125 veh/h would travel further to access the Imperial Square area via Bayshill Road. This is similar to what is observed in the base case situation.
- Traffic rerouted around the north of the town would still serve destinations within the town centre, and about 70 veh/h would travel through the town to London Road in the east.

3.2.5 This analysis illustrates the effect of the closure of Boots Corner to through traffic and in particular how east-west through traffic which would be reassigned to the northern section of the outer ring road. This would lead to reductions in traffic flows through the heart of the town centre.

3.2.6 Figure 3.4 illustrates this analysis

A435 Evesham Road

3.2.7 The analysis undertaken in the case of inbound traffic on Evesham Road shows very similar results to the analysis undertaken in the base case:

- Traffic accessing the town centre from Evesham Road (about 670 veh/h) would split between the same two routes into the heart of the town centre identified in the base case i.e. Henrietta Street (about 120 veh/h), Winchcombe Street to access Albion Street (about 60 veh/h).
- About the same level of traffic would be routed around the town along Fairview Road and Berkeley Street to reach destination to the south of the town (about 100 veh/h) or travelling to the east along London Road (about 30 ve/h).
- About 160 veh/h (compared to 130 veh/h in the base case) would be routed along St Paul's Road to destinations to the west of the town.

3.2.8 This analysis shows that the proposed "Do minimum" strategy would have a minimal impact on traffic accessing the town centre from the north.

3.2.9 This analysis is detailed in Figure 3.5

A40 London Road

3.2.10 The "select link" analysis undertaken on the inbound link on London Road in the morning peak, in the case of the "Do minimum" option shows that these proposals would not impact the pattern of traffic accessing the town centre from the east:

- About 930 veh/h would approach the town from this direction.
- About 400 veh/h would turn left down Sandford Mill Road. About 100 of these would travel to destinations along Sandford Road, Montpellier Terrace and further to the south west towards the Overton Park area. About 200 veh/h would travel along Thirlestaine Road, with about 50 veh/h turning left down Bath Road, and the rest accessing destinations along Suffolk Road. About 100 veh/h would travel further to the west along Lansdown Road.
- About 150 veh/h would turn right from London Road into Hale's Road to reach destinations to the north of the town (about 100 veh/h to the Whaddon area)
- About 380 veh/h would travel straight down London Road into the centre of the town, with about 120 of these turning into Hewlett Road to travel north with up to 100 veh/h reaching Evesham Road and Albert Road. About 140 veh/h would be routed around the northern section of the ring road, with about 70 veh/h carrying on west along Swindon Road. About 110 veh/h would enter the southern section of the inner ring road (Bath Road north, Oriel Road) to access developments around the Imperial Square area.

3.2.11 Figure 3.6 illustrates this analysis.

A46 Bath Road

3.2.12 The modelling of the "Do minimum" strategy suggests that the way traffic approaching the town from the A46 Bath Road is distributed within the town centre would not be significantly modified by the implementation of the proposed strategy:

- About 670 veh/h would approach the town centre from the A46 Bath Road.
- About 210 veh/h would turn left into Suffolk Road to serve destinations along this route. About 80 of these would carry through to the west and Lansdown Road.
- About 250 veh/h would turn right into Thirlestaine Road, About 180 veh/h would then be routed to access College Road, the same restriction to the right turn at the Bath Road/Sandford Road junction applying in the model. About 100 veh/h would carry on north along College Road and Hewlett Road to reach destinations to the north of the town (about 40 veh/h being routed along Hewlett Road further north and about 30 along All Saints Road to Evesham Road).
- From Thirlestaine Road about 70 veh/h carry on along Old Bath Road and then about 40 of these are routed further north along Hale's Road.
- About 200 veh/h access the centre along Bath Road with about 100 veh/h assigned to Oriel Road serving destinations around Imperial Square.

3.2.13 This analysis is detailed in Figure 3.7.

Conclusions

3.2.14 The implementation of the "Do minimum" strategy would not have a significant impact on patterns of traffic around the town centre. Traffic approaching the town centre from most gateway routes would not have to be significantly rerouted to reach their destination. However, the proposed strategy would deter some through town centre movements, especially from the west and Tewkesbury Road where traffic accessing destinations on Albion Street would not be able to use High Street, Clarence Street and North Street and would therefore have to reroute along the northern section of the ring road.

3.3 Honeybourne Way area

3.3.1 Tables 3.1 and 3.2 summarises the traffic impact assessment undertaken for a selection of road links in the area around the northern end of Gloucester Road and Honeybourne Way.

Table 3.1: Honeybourne Way area – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
1	Honeybourne Way	443	482	39	9%	D/NS
2	Honeybourne Way	351	391	40	11%	D/NS
3	Gloucester Road	1214	1260	46	4%	D/NS
4	High Street	1605	1511	-94	-6%	B
5	Poole Way	1071	1134	63	6%	D/NS
6	Tewkesbury Road	2011	1987	-24	-1%	B
7	Gloucester Road	1048	1035	-13	-1%	B
8	St George's Road	461	363	-98	-21%	B
9	High Street	769	603	-166	-22%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.2: Honeybourne Way area – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
1	Honeybourne Way	744	809	65	9%	D/NS
2	Honeybourne Way	594	685	91	15%	D/NS
3	Gloucester Road	1235	1307	72	6%	D/NS
4	High Street	1641	1719	78	5%	D/NS
5	Poole Way	990	1000	10	1%	D/NS
6	Tewkesbury Road	2099	2160	61	3%	D/NS
7	Gloucester Road	1117	1134	17	2%	D/NS
8	St George's Road	620	639	19	3%	D/NS
9	High Street	763	836	73	10%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.3.2 The assessment undertaken shows that the proposed "Do minimum" strategy would have overall a small impact on traffic flows in this section of the town centre network in both the AM and PM peak periods. It appears that the proposed closure of Boots Corner would deter some traffic from accessing the town centre from High Street in the morning peak (-166 veh/h), this traffic being redirected in part around the town along the northern section of the ring road.

3.3.3 In terms of junctions, the Gloucester Road/Tewkesbury Road junction form a key gateway to the town's road network. It is understood that it currently operates close to its capacity. In particular, the capacity available on the eastern approach to the junction (High Street) is limited by the close proximity of the railway bridge but still has to cope with large volumes of traffic exiting the town centre. It is understood that major improvements at this junction are programmed for the near future which would remove this constraint and greatly improve the capacity of the junction.

3.3.4 The model runs undertaken suggest that the implementation of the proposed "Do minimum" strategy would have only a minimal impact on traffic flows through the junction and therefore only a minimal impact on the performance of the junction. In the PM peak, traffic on all approaches to the junction would slightly increase but it is expected that the predicted small increase in flows could be accommodated irrespective of the proposed improvements at the junction.

3.3.5 The "Do minimum" option would have only a marginal impact on the operation of the junctions at both ends of Honeybourne Way (junction with Gloucester Road and St George's Road), in both the AM and PM peaks.

3.4 St James Square area

3.4.1 Tables 3.3 and 3.4 summarise the results of the impact analyses undertaken on key links in the St James Square/St George's Place area.

Table 3.3: St James Square area – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
10	St George's Place	1058	1128	70	7%	D/NS
11	St George's Place	418	444	26	6%	D/NS
12	St James Square	376	558	182	48%	D/RS
13	Clarence Street	679	519	-160	-24%	B
14	Ambrose Street	984	999	15	2%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.4: St James Square area – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
10	St George's Place	858	1061	203	24%	D/RS
11	St George's Place	551	443	-108	-20%	B
12	St James Square	282	566	284	101%	D/S
13	Clarence Street	649	552	-97	-15%	B
14	Ambrose Street	682	712	30	4%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.4.2 In the morning peak, the analysis undertaken shows a relatively significant impact on St James Square with a significant reduction in flows on Clarence Street, between St James Square and St George's Place. In the evening peak, the analysis shows some reassignment of traffic between St George's Place and St James Square. This can be explained as follows: the network described in the 2003 CSV model allows turning movement in and out of St George's Place to/from High Street. However, currently, these movements are not allowed as a cycle priority measure has been installed at the northern end of St George's Place. The "Do minimum" network would include the current restriction on St George's Place. Therefore a comparison between the two networks is bound to show reassignment of traffic in this area.

3.4.3 Taking this difference between the two models into account, the assessment shows that overall the introduction of the proposed "Do minimum" strategy would not lead to significant changes in traffic flows in the area. The only noticeable impact would be on the southern section of St George's Place where traffic which previously used Royal Well Place to access/travel through the area would be reassigned as a result of the closure of Royal Well Road. This is particularly the case in the PM peak.

3.5 Town centre heart

3.5.1 Tables 3.5 and 3.6 summarise the impact assessment results for road links located at the heart of the town centre.

Table 3.5: Town centre heart – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
15	Royal Well Road	940	123	-817	-87%	B
16	Clarence Parade	756	42	-714	-94%	B
17	North Street	884	93	-791	-89%	B
18	North Place	417	51	-366	-88%	B
19	Albion Street	602	42	-560	-93%	B
20	Albion Street	501	326	-175	-35%	B
21	Portland Street	321	179	-142	-44%	B
22	Winchcombe Street	43	4	-39	-91%	B
23	Winchcombe Street	91	131	40	44%	D/NS
24	Rodney Road	105	0	-150	-100%	B
25	Rodney Road	373	304	-69	-18%	B
26	The Promenade	310	318	8	3%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.6: Town centre heart – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
15	Royal Well Road	970	108	-862	-89%	B
16	Clarence Parade	811	87	-724	-89%	B
17	North Street	1087	108	-979	-90%	B
18	North Place	626	54	-572	-91%	B
19	Albion Street	678	277	-401	-59%	B
20	Albion Street	517	211	-306	-59%	B
21	Portland Street	306	138	-168	-55%	B
22	Winchcombe Street	103	25	-78	-75%	B
23	Winchcombe Street	151	176	24	16%	D/NS
24	Rodney Road	119	0	-119	-100%	B
25	Rodney Road	497	457	-40	-8%	B
26	The Promenade	464	556	92	20%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.5.2 The analysis undertaken shows the dramatic change that the "Do minimum" strategy would lead to in the heart of the town centre. Traffic flows on Royal Well Road, Clarence Street and North Street would fall significantly and be limited to bus movements of the order of up to 60 per hour per direction. It must be stressed that the modelling work undertaken focuses on representing the changes in road traffic patterns resulting from the implementation of the proposed strategies. It does not include changes to bus routing and zone loading points, which have been left unchanged. This must be borne in mind when considering the results of the assessment in this area.

3.5.3 Traffic flows on Albion Street are predicted to reduce as through traffic is diverted from this location. It is considered that traffic modelled on Albion Street relates to traffic accessing model zones in this area.

3.5.4 The reduction in traffic flows around the Albion Street area and in particular in and out of North Place and Portland Street would have a beneficial impact on the operation of the junctions along St Margaret's Road and the northern section of the town ring road. The "Do minimum" strategy would also lead to reduced flows exiting Albion Street at the junction with St John's Avenue.

3.6 Montpellier/Bayshill area

3.6.1 Tables 3.7 and 3.8 summarise the impact assessment results in the AM and PM peak periods for road links located in the Montpellier/ Bayshill area.

Table 3.7: Montpellier/Bayshill area – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
27	Bayshill Road	683	696	13	2%	D/NS
28	St George's Road	816	556	-260	-32%	B
29	Imperial Square	651	382	-269	-41%	B
30	The Promenade	601	288	-313	-52%	B
31	St George's Road	1115	539	-576	-52%	B
32	St George's Road	328	450	122	37%	D/RS
33	Montpellier Walk	771	590	-181	-23%	B
34	Montpellier Terrace	984	1051	67	7%	D/NS
35	Lansdown Road	1308	1295	-13	-1%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.8: Montpellier/Bayshill area – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
27	Bayshill Road	754	922	168	22%	D/RS
28	St George's Road	944	922	-22	-2%	B
29	Imperial Square	807	683	-124	-15%	B
30	The Promenade	832	590	-242	-29%	B
31	St George's Road	1260	740	-520	-41%	B
32	St George's Road	455	899	444	98%	D/S
33	Montpellier Walk	1166	825	-341	-29%	B
34	Montpellier Terrace	963	891	-72	-7%	B
35	Lansdown Road	1656	1468	-188	-11%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.6.2 The closure of Boots Corner would lead generally to a reduction in traffic along Montpellier Walk, The Promenade (southern section) and the eastern end of St George's Road, the approach route to the existing inner ring road.

3.6.3 In the AM peak period, the predicted increase in traffic on Bayshill Road and on Montpellier Terrace (western end) would be minimal at 2% and 7% respectively. However, in the PM peak, although the predicted impact on traffic on Montpellier Terrace would be beneficial (reduction in traffic by 7%), the model work undertaken suggests that traffic would increase on Bayshill Road (+168 veh/h, a 22% increase). This confirms the expectations formulated in the Draft Transport Strategy Report, that Bayshill Road would play a more important role within the town road network as a result of the closure of Boots Corner to general traffic.

3.6.4 In both peaks, the model predicts an increase in traffic on St George's Road between Royal Well Road and Bayshill Road. This can be explained by traffic reassigning from Royal Well Road to St George's Road on their way west and north (+122 veh/h, +37% in the morning peak)(+444 veh/h, +98% in the evening peak).

3.6.5 These predicted increases in traffic on Bayshill Road and St George's Road would put additional pressure on the junction of Bayshill Road and St George's Road. This junction would play a more strategic role within the town centre road network as a result of the proposed "Do minimum" strategy. An initial capacity review at this junction would however suggest that this junction can be operated so that the predicted changes in flow patterns can be satisfactorily accommodated in both peak periods.

3.7 Bath Road area

3.7.1 Tables 3.9 and 3.10 summarise the outcome of the analyses undertaken in the morning and evening peak periods for road links located around the Bath Road area.

Table 3.9: Bath Road area – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
36	Bath Road	571	493	-78	-14%	B
37	Bath Road	796	710	-86	-11%	B
38	Oriel Road	1347	1070	-277	-21%	B
39	Montpellier Terrace	445	475	30	7%	D/NS
40	Suffolk Road	1164	1167	3	0%	D/NS
41	Bath Road	511	470	-41	-8%	B
42	Bath Road	1220	1202	-18	-1%	B
43	Vittoria Walk	163	147	-16	-10%	B
44	Montpellier Parade	516	575	59	11%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.10: Bath Road area – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
36	Bath Road	478	476	-2	0%	B
37	Bath Road	669	620	-49	-7%	B
38	Oriel Road	1150	927	-223	-19%	B
39	Montpellier Terrace	430	452	22	5%	D/NS
40	Suffolk Road	1032	1202	170	16%	D/RS
41	Bath Road	546	446	-100	-18%	B
42	Bath Road	1296	1264	-32	-2%	B
43	Vittoria Walk	126	116	-10	-8%	B
44	Montpellier Parade	597	504	-93	-16%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.7.2 The impact of the proposed “Do minimum” option on these road links would be mainly beneficial or non-significantly detrimental. Traffic flows in the area would overall remain within the base case traffic flow levels.

3.7.3 It must be noted that a relatively large reduction in traffic is predicted on Oriel Road. It is believed that this would be due to traffic coming from the east currently using the inner ring road to access the town centre via Oriel Road, reassigning to an alternative route around the town centre.

3.7.4 The Bath Road/Montpellier Terrace/Sandford Road junction is considered as an important junction on the town road network. It is a four arm staggered cross road controlled by traffic signals. It is understood that this junction currently operates close to capacity. The SATURN modelling suggests that this junction would not be put under additional pressure as a result of the implementation of the “Do minimum” strategy.

3.7.5 In the PM peak, the modelling work undertaken suggests a relatively significant increase in traffic on Suffolk Road as a result of the introduction of the proposed “Do minimum” strategy. This emphasises the important strategic role that the A40 Suffolk Road ought to play as a key east-west route through the southern parts of the town.

3.7.6 The predicted increase in traffic on Suffolk Road would increase traffic pressure at the Suffolk Road/Bath Road junction. An initial capacity review at this junction, however, suggests that the predicted increase in traffic on the western

approach to this junction could be accommodated without detrimental effects to the operation of the junction.

3.8 St John's Avenue area

3.8.1 Tables 3.11 and 3.12 summarise the outcome of the analyses undertaken in the morning and evening peak periods for road links located in the area around St James Street at the eastern end of the High Street.

Table 3.11: St John's Avenue area – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
45	Fairview Road	1304	1510	206	16%	D/RS
46	St John's Avenue	1133	1375	242	21%	D/RS
47	Albion Street	1577	1561	-16	-1%	B
48	Berkeley Street	1430	1231	-199	-14%	B
49	St James Street	283	512	229	81%	D/S
50	High Street	1607	1635	28	2%	D/NS
51	Bath Road	1325	1124	-201	-15%	B
52	Hewlett Road	1073	1166	93	9%	D/NS
53	Hewlett Road	1554	1578	24	2%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.12: St John's Avenue area – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
45	Fairview Road	1239	1286	47	4%	D/NS
46	St John's Avenue	1009	1052	43	4%	D/NS
47	Albion Street	1720	1472	-248	-14%	B
48	Berkeley Street	1434	1203	-231	-16%	B
49	St James Street	328	475	147	45%	D/RS
50	High Street	1355	1334	-21	-2%	B
51	Bath Road	1082	912	-170	-16%	B
52	Hewlett Road	1003	1192	189	19%	D/RS
53	Hewlett Road	1516	1554	38	3%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.8.2 The results of the analysis in this area reveals the main impact of the "Do minimum" strategy on traffic patterns in the town centre The model runs undertaken show that traffic would increase by about 200-250 veh/h along Fairview Road, St John's Avenue and St James Street in the morning peak, the predicted increase on the same links being more modest in the evening peak. At the same time, traffic reduction by about 200 veh/h would be observed on the northern end of Bath Road in the morning peak and 170 veh/h in the evening peak.

3.8.3 The closure of Boots Corner to general traffic will force traffic to reroute around the town centre and will make the inner ring road clockwise circuit around the town, of which the northern section of Bath Road forms an important part, less attractive, leading to the traffic reductions in this area predicted by the model. The predicted increase in traffic along the northern section of the existing ring road could also be explained by this reassignment of traffic around the town.

3.8.4 The strategy proposes a change of layout at the junction of Albion Street and St John's Avenue to allow traffic to access Albion Street from the east. Traffic pattern through the junction would change as a result of the proposed new transport strategy including a decrease in demand out of Albion Street, but an increase in traffic along the ring road plus the introduction of right turn traffic.

However, a simple capacity analysis suggests that a junction arrangement could be identified to accommodate the predicted changes in traffic flows at this point on the network as the weight of traffic turning out of Albion Street would be significantly reduced while the model does not predict a high level of right turning movements into Albion Street.

3.8.5 In the evening peak, a relatively significant increase in traffic is predicted on Hewlett Road, north of London Road. This increase is due mainly to increased northbound traffic coming from College Road. The proposed strategy would lead to a reassignment of traffic travelling from the south western parts of the town to the north east, which currently uses the inner ring road and that would be moved to College Road and Hewlett Road northbound.

3.9 College Road area

3.9.1 Tables 3.13 and 3.14 summarise the results of the impact analyses in the morning and evening peak periods for road links in the College Road – Old Bath Road area.

Table 3.13: College Road area – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
54	College Road	959	1165	206	21%	D/RS
55	College Road	632	634	2	0%	D/NS
56	London Road	1260	1320	60	5%	D/NS
57	Old Bath Road	1658	1770	112	7%	D/NS
58	Sandford Mill Road	412	417	5	1%	D/NS
59	London Road	1474	1432	-42	-3%	B
60	Sandford Road	899	898	-1	0%	B
61	Sandford Road	571	514	-57	-10%	B
62	Thirlestaine Road	1224	1238	14	1%	D/NS
63	Old Bath Road	1676	1677	1	0%	D/NS
64	London Road	1873	1835	-38	-2%	B
65	Hale's Road	972	1044	72	7%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.14: College Road area – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
54	College Road	1105	1284	179	16%	D/RS
55	College Road	688	703	15	2%	D/NS
56	London Road	1032	1046	14	1%	D/NS
57	Old Bath Road	1377	1639	262	19%	D/RS
58	Sandford Mill Road	355	303	-52	-15%	B
59	London Road	1628	1595	-33	-2%	B
60	Sandford Road	935	948	13	1%	D/NS
61	Sandford Road	702	614	-88	-13%	B
62	Thirlestaine Road	1075	1336	261	24%	D/RS
63	Old Bath Road	1420	1459	39	3%	D/NS
64	London Road	1935	1867	-68	-4%	B
65	Hale's Road	1023	11154	131	13%	D/NS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.9.2 The model runs undertaken suggest that the introduction of the proposed "Do minimum" strategy would have the following impact on traffic flows in this area:

- In the morning peak, the impact would be relatively negligible, with traffic flows reducing or remaining similar to base traffic flows on most road links considered.
- The implementation of the "Do minimum" strategy would lead to a relatively significant increase in traffic on the northern section of College Road in both peak periods. Further analysis reveals that this increase in traffic would be due to reassigned traffic originating mainly from the Montpellier area and travelling north. This traffic which currently uses Royal Well Road and the inner ring road would be diverted along an existing "rat run" route through the south-east quarter of the town along Montpellier Drive, a short section of Bath Road, St Luke's Road and the northern section of College Road.
- This traffic reassignment would result in added pressure on the College Road/London Road junction. This four arm traffic signal junction currently operates within capacity although on a long cycle time, leading to long queues on approaches in peak conditions. A simple capacity analysis suggests that this junction would still operate within capacity in the case of the proposed "Do minimum" strategy being implemented and therefore would have the ability to handle the predicted addition of traffic on the College Road approach.
- In the evening peak, the increase in traffic predicted on Sufffolk Road would be mirrored along Thirlestaine Road and Old Bath Road, as this section of the A40 across the town would play a more important role.

3.10 Portland Street area

3.10.1 Tables 3.15 and 3.16 summarise the results of the impact analyses undertaken for the morning and evening peak periods on road links in the Portland Street – Evesham Road area.

Table 3.15: Portland Street area – Do minimum AM

ID	Link	Base	Do Min	Impact	%	Comment
66	Swindon Road	1320	1584	264	20%	D/RS
67	St Margaret's Road	995	1102	107	11%	D/NS
68	St Margaret's Road	1117	1776	659	59%	D/S
69	Portland Street	532	422	-110	-21%	B
70	Winchcombe Street	803	844	41	5%	D/NS
71	Evesham Road	1045	981	-64	-6%	B
72	Prestbury Road	964	923	-41	-4%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 3.16: Portland Street area – Do minimum PM

ID	Link	Base	Do Min	Impact	%	Comment
66	Swindon Road	1378	1445	67	5%	D/NS
67	St Margaret's Road	1042	1093	51	5%	D/NS
68	St Margaret's Road	1290	1629	339	26%	D/RS
69	Portland Street	786	470	-316	-40%	B
70	Winchcombe Street	559	572	13	2%	D/NS
71	Evesham Road	948	728	-220	-23%	B
72	Prestbury Road	835	740	-95	-11%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

3.10.2 The analysis undertaken shows that the introduction of the proposed "Do minimum" transport strategy would have generally a beneficial or a non-significant impact on traffic flows on roads north of the existing ring road. Traffic

levels on the northern approaches to the town would remain generally unchanged while traffic flows on Portland Street would reduce.

3.10.3 However, the modelling work undertaken suggests that traffic flows would increase on the northern section of the ring road as a result of the introduction of the "Do minimum" strategy. This can be explained by the closure of Boots Corner leading to reassignment of traffic around the town centre rather than through its heart.

3.10.4 The model suggests a large increase in traffic on the section of St Margaret's Road between Portland Street and Winchcombe Street (+659 veh/h in the morning peak and +339 veh/h in the evening peak). A closer analysis of the modelling results shows that a large proportion of this traffic (145 veh/h in the morning peak and 271 veh/h in the evening peak) comes from a model zone loading traffic at the junction of Albion Street and Portland Street, travelling north along Portland Street in the base model. As a result of the proposed closure of the section of Albion Street between North Place and Portland Street and the closure of Portland Street northbound to general traffic except buses, this traffic is reassigned in the model to the nearest route around this road closure, and therefore appears on St Margaret's Road westbound in both peak periods.

3.10.5 It is considered that the zone modelled, loading traffic on Albion Street by Portland Street is artificial and does not reflect a real traffic assignment in this part of the town centre. Therefore, part of the predicted increase on St Margaret's Road is considered artificial. On this basis, it is expected that the increase in traffic on St Margaret's Road would be in the region of +388 veh/h (+35%) in the morning peak, and +194 veh/h (+15%) in the evening peak

3.10.6 It remains that the proposed strategy would generally lead to increased traffic flows on the northern section of the existing ring road, putting additional pressure on junctions which are currently believed to operate with difficulties. However, the following two points can be made:

- A detailed study undertaken by CB in parallel to this assessment has identified traffic management solutions allowing to increase significantly traffic capacity along the northern section of the ring road. This study identified that the existing junction could be operated more efficiently providing increased green time and therefore capacity to through traffic on the ring road. Details of this analysis are appended to this report in Appendix 2.
- The "Do minimum" strategy would limit traffic in and out of North Place and Portland Street south to bus traffic only therefore simplifying traffic movements through the two junctions with St Margaret's Road. This would provide added capacity to through traffic on the ring road.

3.10.7 On this basis, it is considered that the proposed "Do minimum" strategy would not unduly impact on traffic conditions on this section of the ring road.

3.11 Overall conclusions – Do minimum

3.11.1 The impact assessment undertaken suggests that the proposed "Do minimum" strategy as illustrated in Figure 1.1 would not have a significant impact on traffic flows in Cheltenham town centre:

- The closure of Boots Corner to general traffic would lead to a reassignment of traffic on numerous routes around the town centre, therefore spreading the impact of the proposals.
- The northern section of the ring road would be the most affected section of the network. However, it is considered that the traffic management

improvements identified by CB and presented in the report in Appendix 2 as well as the reduction in traffic demand on key side roads out of the town centre as a result of the proposed strategy would mitigate this impact and benefit traffic conditions along this section of the ring road.

- The northern section of College Road would see a relatively significant increase in traffic as a result of the proposal. This is due to a reassignment of traffic along an existing "rat run" route through the south east quarter of the town centre. Traffic mainly originating from the Montpellier area, which is currently routed north through Boots Corner, would be reassigned to Montpellier Drive, St Luke's Road and the northern section of College Road on their way north and east. An initial capacity analysis at the College Road/London Road junction suggests that this junction would be able to cope with the change in traffic patterns predicted.
- The closure of the inner ring road including Royal Well Road, Clarence Street and North Street would lead to traffic reassignment in the St James Square area. Traffic accessing this area would be reassigned to St George's Place as a key route in from the south. At the northern end of this area, the model shows that High Street and Ambrose Street form another key route into the area. However, it also shows that this route is used as a through route into the town centre through Boots Corner to Albion Street. The "Do minimum" strategy would in effect close this through route.
- The proposed "Do minimum" strategy would lead to significant reductions in traffic in the heart of the town centre. Royal Well Road, Clarence Street and North Street would see traffic volumes reduce significantly as these streets would be converted to bus only routes. The closure of the inner ring road would also deter some south-north through movements, leading to reduction in flows on the southern section of The Promenade and Montpellier Walk. In the evening peak period, these reductions would be mirrored by increases in traffic along Bayshill Road as traffic reassigns to this route.
- The traffic reductions predicted in the town centre would be partly due to traffic reassigning to more strategic routes further out of the centre. This is illustrated by the predicted increases in traffic in the PM peak along the A40 Suffolk Road and Thirlestaine Road corridor.
- The predicted traffic reductions would create the opportunity to deliver public realm improvements on key routes at the heart of the town centre. The closure of the inner ring road would also allow the delivery of the bus spine route through the heart of the town centre and the creation of a new bus interchange on the redeveloped Royal Well Road site, benefiting greatly bus accessibility to the town with associated potential modal shift away from the private car and therefore further reduction in traffic in the town.

4. "Option 2" – Impact Assessment

4.1 Introduction

4.1.1 This section details the results of the impact assessment undertaken for the proposed "Option 2" transport strategy. Figure 1.2 illustrates the proposals considered in this assessment. Section 1.2 of this report provides an overview of the features of this option. In addition, the reader is encouraged to refer to the Draft Transport Strategy Report (October 2006) for further details on this option.

4.1.2 Figures 4.1 and 4.2 illustrate the impact assessment results for the morning and evening peak periods.

4.2 Key traffic movements

4.2.1 Detail "select link" analyses have been carried out to provide an overview of the key traffic movements predicted by the model in the case of the "Option 2" strategy being implemented. These analyses have been undertaken in a similar fashion to the base case analyses (AM peak only, light vehicles only) and therefore provides a good starting point for comparing the proposed option with the current traffic situation.

A40 Lansdown Road

4.2.2 The predicted routing of traffic approaching the town centre from the A40 Lansdown Road following the implementation of the "Option 2" strategy can be summarised as follows:

- About 1,450 veh/h would approach the town centre from the A40 Lansdown Road.
- About 170 veh/h would turn south down St Stephen's Road to access destination to the south of Andover Road (about 140 veh/h in the base case).
- About 680 veh/h would travel along Andover Road with about 340 veh/h reaching Bath Road. This shows an increase in traffic travelling from the south west to the south east of the town along Andover Road and Suffolk Road (about +80 veh/h) when compared with the base case situation.
- About 60 veh/h would turn south down Bath Road to access developments along this route, while about 230 veh/h would carry on east along Thirlestaine Road mainly to access destinations on this road. Only about 70 veh/h would travel further east to London Road.
- About 430 veh/h would approach the town centre along Lansdown Road past Westal Green. The model shows that about 70 veh/h accessing developments on the western side of Imperial Square would be rerouted from Montpellier Walk to Montpellier Street as a result of the "Option 2" proposals. About 230 veh/h would be routed along Montpellier Terrace with about 210 of these turning into Montpellier Drive to access destinations around the eastern side of Imperial Square. The model does not show any traffic travelling further north along Montpellier Drive and College Road like in the base case scenario.

4.2.3 Figure 4.3 illustrates this analysis.

A4019 Tewkesbury Road

4.2.4 The implementation of the "Option 2" proposals would lead to significant reassignment of traffic around the town centre. These area particularly well

illustrated in the case of the routing of traffic approaching the town from the A4019 Tewkesbury Road:

- About 1,200 veh/h would approach the town from the A4019 Tewkesbury Road. This traffic would split between Gloucester Road (about 530 veh/h, an increase of about 210 veh/h when compared to the base case) and 460 veh/h on Poole Way (compared to about 300 veh/h in the base case). Only about 40 veh/h would be routed along High Street past Poole Way. This is due to the proposed closure of an existing through route along High Street and Ambrose Street as proposed in the "Option 2" strategy.
- About 200 veh/h from Tewkesbury Road would travel around the north west parts of the town centre along Honeybourne Way (about 75 veh/h in the base case) to access the St Jame's Square area and the Bayshill area. About 100 veh/h would be routed through Fauconberg Road to access developments on the western side of Imperial Square.
- About 230 veh/h would carry on south along Gloucester Road before splitting between Gloucester Road south of Malvern Road (about 40 veh/h) and Malvern Road (about 160 veh/h). About 100 veh/h would travel further along Montpellier Terrace to access the eastern side of Imperial Square from Montpellier Parade.
- Traffic from Tewkesbury Road routed around the northern section of the ring road would mainly serve destinations on this side of the town centre with only about 50 veh/h travelling through the town to London Road (about 100 veh/h in the base case).

4.2.5 This analysis is illustrated in Figure 4.4.

A435 Evesham Road

4.2.6 The analysis undertaken for the Evesham Road approach to the town suggests that the proposals forming part of the "Option 2" strategy would deter some through town centre movements from this approach to the town. This is particularly the case for traffic which is currently routed to the St James Square area through Ambrose Street, and traffic routed to Oriel Road and Imperial Square through the southern section of the inner ring road. These traffic flows would not appear in the case of the "Option 2":

- About 580 veh/h would approach the town centre from Evesham Road. These would be split between St Paul's Road travelling west (about 150 ve/h as compared to 130 veh/h in the base case) and about 270 veh/h travelling along Winchcombe Street to the east (compared to 290 veh/h in the base case).
- About 60 veh/h would travel down Dunalley Street to reach local destinations and about 90 veh/h would access Albion Street.
- About 80 veh/h would travel down Hewlett Road about 50 of which would access destination around College Road and Keynsham Road, whereas about 30 veh/h would travel further east to London Road.

4.2.7 This analysis is illustrated in Figure 4.5.

A40 London Road

4.2.8 The proposed closure to traffic of the southern section of the inner ring road would have an impact on the routing of traffic accessing the town from the east. Traffic which currently access destinations around Imperial Square and on the western side of the town would be rerouted mainly to Sandford Road and Thirslestaine Road/Suffolk Road. The proposed changes on Hewlett Road and Berkeley Street would also lead to a reassignment of traffic from the east travelling north to Evesham Road. The following can be added:

- About 950 veh/h would approach the town centre from the A40 London Road.
- About 500 veh/h would turn south down Sandford Mill Road (400 veh/h in the base case). Of these, about 170 would be routed along Sandford Road travelling towards destinations on the eastern side of Imperial Square (about 60 veh/h) or carrying on further west along Montpellier Terrace (about 100 veh/h) to reach destinations in Overton Park, Bayshill and St James Square.
- About 220 veh/h would be routed along Thirlestaine Road with about 50 veh/h turning south down Bath Road and about 170 veh/h carrying on along Suffolk Road. Some of this traffic would access destinations along the Suffolk Road corridor with about 100 veh/h carrying on through to Lansdown Road to the west.
- About 320 veh/h would turn into Hale's Road to reach destinations to the north of the town (about 150 veh/h in the base case). About 180 of these would travel towards Whaddon, whereas about 120 would travel down Sydenham Road to reach Hewlett Road and about 90 veh/h would reach Evesham Road.
- About 110 veh/h would travel around the town along the northern section of the ring road accessing destinations on this side of the town with about 60 of these travelling further on west on Swindon Road.

4.2.9 This analysis is illustrated in Figure 4.6.

A46 Bath Road

4.2.10 The analysis undertaken in the case of the "Option 2" strategy suggests that traffic would be deterred from travelling across the town from south east to north east, especially along College Road. A summary of the analysis undertaken can be detailed as follows:

- About 670 veh/h are predicted to approach the town centre from the A46 Bath Road.
- About 240 veh/h would turn west into Suffolk Road. About 80 of these are routed by the model through the "Suffolks" area to reach Montpellier Terrace and Montpellier Drive to access the Imperial Square area. About 100 veh/h would travel further along Andover Road to access development along this corridor, with about 80 of these travelling further west to Lansdown Road.
- About 230 veh/h would be routed along Thirlestaine Road. Only about 50 of these would access College Road and travel further north to Fairview Road and the northern section of the ring road (compared to 160 veh/h in the base case). About 160 veh/h would travel along Old Bath Road, with about 110 of these carrying on further north along Hale's Road (only 30 veh/h in the base case).

4.2.11 This analysis is illustrated in Figure 4.7.

Conclusions

4.2.12 The implementation of the proposed "Option 2" strategy would deter through movements through the town centre, especially in areas such as St James Square, the eastern end of High Street, but also College Road. As a result traffic would reassign to more strategic routes and in particular Suffolk Road and Thirlestaine Road (the A40) and the northern section of the ring road.

4.3 Honeybourne Way area

4.3.1 Tables 4.1 and 4.2 summarise the traffic flows predicted by the model on a selection of road links in the area around the northern end of Gloucester Road and Honeybourne Way.

Table 4.1: Honeybourne Way area – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
1	Honeybourne Way	443	881	438	99%	D/S
2	Honeybourne Way	351	807	456	130%	D/S
3	Gloucester Road	1214	1921	707	58%	D/S
4	High Street	1605	1598	-7	0%	B
5	Poole Way	1071	1402	331	31%	D/RS
6	Tewkesbury Road	2011	2097	86	4%	D/NS
7	Gloucester Road	1048	1304	256	24%	D/RS
8	St George's Road	461	561	100	22%	D/RS
9	High Street	769	226	-543	-71%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.2: Honeybourne Way area – Option 2 PM

ID	Link	Base	Option2	Impact	%	Comment
1	Honeybourne Way	744	1252	508	68%	D/S
2	Honeybourne Way	594	1134	540	91%	D/S
3	Gloucester Road	1235	1926	691	56%	D/S
4	High Street	1641	1753	112	7%	D/NS
5	Poole Way	990	1276	286	29%	D/RS
6	Tewkesbury Road	2099	1938	-161	-8%	B
7	Gloucester Road	1117	1289	172	15%	D/NS
8	St George's Road	620	610	-10	-2%	B
9	High Street	763	424	-339	-44%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.3.2 The assessment undertaken for the purpose of testing the proposed "Option 2" strategy highlights the impact of the traffic management measures introduced as part of this strategy. Traffic management measures aimed at reducing through routes within the boundaries of the proposed town boulevard would reassign a significant amount of traffic away from the centre of the town onto the proposed boulevard.

4.3.3 The assessment predicts a significant increase in flows on Honeybourne Way and the northern section of Gloucester Road. Although significant capacity is available along the Honeybourne Way corridor, which would accommodate the predicted increase in traffic, the implementation of the proposed strategy would put the Gloucester Road/Tewkesbury Road junction under additional pressure. However, it is understood that major capacity improvements are planned at this junction which would remove the constraint of the existing railway bridge on the eastern approach to the junction. This improvement would guarantee that the junction can accommodate satisfactorily the predicted changes in traffic patterns as a result of the proposed strategy.

4.3.4 The proposed traffic management measures introduced within the St James Square area i.e. the proposed ban of north-south movements at the St James Square/Ambrose Street junction would lead to an important reduction in flows on the High Street, east of Poole Way. This traffic would most likely reassign to Poole Way and along the northern section of the ring road as the assessment suggest (traffic increase on Poole Way).

4.4 St James Square area

4.4.1 Tables 4.3 and 4.4 summarise the results of the impact analyses undertaken on key links in the St James Square – St George's Place area.

Table 4.3: St James Square area – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
10	St George's Place	1058	793	-265	-25%	B
11	St George's Place	418	267	-151	-36%	B
12	St James Square	376	267	-109	-29%	B
13	Clarence Street	679	45	-634	-93%	B
14	Ambrose Street	984	86	-898	-91%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.4: St James Square area – Option 2 PM

ID	Link	Base	Option2	Impact	%	Comment
10	St George's Place	858	512	-346	-40%	B
11	St George's Place	551	402	-149	-27%	B
12	St James Square	282	25	-257	-91%	B
13	Clarence Street	649	122	-527	-81%	B
14	Ambrose Street	682	81	-601	-88%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.4.2 The results of these tests illustrate the effect of the traffic management measures in the St James Square area forming part of the proposed Option 2 strategy, leading to a general reduction in traffic levels around St James Square. This is due to through traffic through the area being deter by the closure of the north-south link between St James Square and Ambrose Street.

4.4.3 It must however be noted that there is still a significant amount of traffic accessing this area as the traffic flows on St George's Place suggest.

4.4.4 These tests also shows the impact of the strategy on Clarence Road and how traffic on this route would be reduced mainly to bus traffic and traffic accessing the private car park in the Crescent, and also the public car park on The Promenade by the Municipal Offices.

4.5 Town centre heart

4.5.1 Tables 4.5 and 4.6 summarise the impact assessment results in the AM and PM peak periods, for road links located at the heart of the town centre.

Table 4.5: Town centre heart – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
15	Royal Well Road	940	102	-838	-89%	B
16	Clarence Parade	756	51	-705	-93%	B
17	North Place	884	120	-764	-86%	B
18	North Place	417	51	-366	-88%	B
19	Albion Street	602	69	-533	-89%	B
20	Albion Street	501	601	100	20%	D/NS
21	Portland Street	321	33	-288	-90%	B
22	Winchcombe Street	43	4	-39	-91%	B
23	Winchcombe Street	91	133	42	46%	D/NS
24	Rodney Road	105	0	-105	-100%	B
25	Rodney Road	373	303	-70	-19%	B
26	The Promenade	310	290	-20	-6%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.6: Town centre heart – Option 2 PM

ID	Link	Base	Option2	Impact	%	Comment
15	Royal Well Road	970	102	-868	-89%	B
16	Clarence Parade	811	81	-730	-90%	B
17	North Place	1087	120	-967	-89%	B
18	North Place	626	54	-572	-91%	B
19	Albion Street	678	66	-612	-90%	B
20	Albion Street	517	235	-282	-55%	B
21	Portland Street	306	39	-267	-87%	B
22	Winchcombe Street	103	25	-78	-76%	B
23	Winchcombe Street	151	152	1	1%	D/NS
24	Rodney Road	119	0	-119	-100%	B
25	Rodney Road	497	456	-41	-8%	B
26	The Promenade	464	729	265	57%	D/S

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.5.2 The analysis undertaken shows the significant reduction in traffic volumes that would result from the implementation of the "Option 2" strategy. Traffic flows on Royal Well Road, Clarence Street and North Place would fall to significantly lower levels that currently and be mainly limited to bus movements of the order of up to 60 vehicles per hour per direction.

4.5.3 Traffic flows on Albion Street are predicted to reduce as through traffic is diverted from this location. It is considered that traffic modelled on Albion Street relates to traffic only accessing model zones in this area.

4.5.4 The reduction in traffic flows around the Albion Street area and in particular in and out of North Place and Portland Street would have a beneficial impact on the operation of the junctions along St Margaret's Road and the northern section of the town ring road. The "Option 2" strategy would also lead to reduced flows exiting Albion Street at the junction with St John's Avenue.

4.5.5 However, in the evening peak, the model runs undertaken suggest that traffic on The Promenade (north of Imperial Square) would increase significantly as a result of the implementation of the proposed strategy. The proposed strategy attempts to limit through routes through the heart of the town centre and builds upon the principle of access cells. In the case of the St James Square area, the proposed application of these principles would lead to a limited number of access and egress opportunities to/from the area. As a result, the model assigns traffic exiting the area to The Promenade.

Possible modifications to address impact on The Promenade

4.5.6 Some modifications to the "Option 2" proposals in this area of the town could be considered to address this impact. It could be considered not to implement the proposed road block between St James Square and Ambrose Street. This would in effect re-open the north-south through route across the area with potential implications on traffic flows on Ambrose Street and High Street. This alternative has been modelled and the outcome of this test shows that less traffic would be routed down The Promenade, exiting the area. However, the reduction achieved would still keep the predicted amount of traffic on this road above the level of traffic identified in the base case (561 veh/h against 464 veh/h in the base case in the PM peak). In addition, traffic volumes around St James Square and on St George's Place would increase back towards/above the levels indicated by the base case (St James's Square, 387 veh/h compared to 282 veh/h in the base case in the PM peak).

4.5.7 Further modifications would therefore be required to achieve traffic reductions on The Promenade. An option could be to modify the junction of The Promenade and St George's Road. The "Option 2" proposal provides for traffic exiting The Promenade (northern section) to travel southbound down the southern section The Promenade and Montpellier Walk. This provides an alternative to St George's Place as a route out of the St James Square area. This arrangement could be modified and traffic exiting the northern section of The Promenade could be forced to turn right into St George's Road through to the St George's Place/St George's Road junction. This alternative has also been modelled and the test undertaken show that this proposal would achieve a significant reduction in traffic down the northern section of The Promenade. Traffic predicted on this road in this case would be 149 veh/h (compared to 464 veh/h in the base case in the PM peak). This reduction would be accompanied by reduction in traffic flows around the Imperial Square area. However, traffic volumes around St James Square would not be significantly reduced when compared with the base case. In addition this solution would push more traffic along Bayshill Road (1017 veh/h predicted against 754 veh/h in the base case in the PM peak).

4.6 Montpellier/Bayshill area

4.6.1 Tables 4.7 and 4.8 summarise the impact assessment results in the AM and PM peak periods for road links located in the Montpellier/Bayshill area.

Table 4.7: Montpellier/Bayshill area – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
27	Bayshill Road	683	819	136	20%	D/NS
28	St George's Road	816	1011	195	24%	D/RS
29	Imperial Square	651	394	-257	-39%	B
30	The Promenade	601	439	-162	-27%	B
31	St George's Road	1115	75	-1040	-93%	B
32	St George's Road	328	44	-284	-87%	B
33	Montpellier Walk	771	331	-440	-57%	B
34	Montpellier Terrace	984	1559	575	58%	D/S
35	Lansdown Road	1308	988	-320	-24%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.8: Montpellier/Bayshill area – Option 2 PM

ID	Link	Base	Option2	Impact	%	Comment
27	Bayshill Road	754	780	26	3%	D/NS
28	St George's Road	944	1198	254	27%	D/RS
29	Imperial Square	807	765	-42	-5%	B
30	The Promenade	832	882	50	6%	D/NS
31	St George's Road	1260	69	-1191	-95%	B
32	St George's Road	455	165	-290	-64%	B
33	Montpellier Walk	1166	379	-787	-67%	B
34	Montpellier Terrace	963	1494	531	55%	D/S
35	Lansdown Road	1656	1083	-573	-35%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.6.2 The implementation of the proposed "Option 2" strategy would lead to significant reductions in traffic along Montpellier Walk, the southern section of The Promenade and more significantly at the western end of St George's Road where traffic would be limited to mainly bus traffic. The tests undertaken therefore suggest that the "Option 2" strategy would deliver the opportunity for significant public realm improvements.

4.6.3 It must however be noted that Montpellier Walk and the southern section of The Promenade would still carry about 300-400 veh/h (2-way) as these two streets would still play an important role as an egress route from businesses and residences in this area.

4.6.4 As a consequence of these traffic flow reductions, traffic on Bayshill Road and St George's Road, west of Bayshill Road would increase. This confirms the view detailed in the Draft Transport Strategy, that to achieve traffic reduction on Montpellier Walk in particular, Bayshill Road would have to take on a more important role within the town centre road network.

4.6.5 These increases in traffic would put additional pressure on the southern and western approaches to the Bayshill Road/St George's Road junction. This would be balanced out to a certain extent by the large reduction in traffic on the eastern approach to the junction and to a lesser extent on the northern approach to the junction. An initial capacity assessment undertaken at this junction suggests that it would be able to accommodate the predicted change in flow patterns in both the AM and PM peaks.

4.6.6 The reduction in traffic on Montpellier Walk and the general closure of routes through the town centre proposed as part of the strategy would lead to a significant increase in traffic along Montpellier Terrace. This confirms the ideas developed in the Draft Transport Strategy that Montpellier Terrace would take a more important role in the town centre road network, forming part of the proposed new boulevard around the town centre.

4.7 Bath Road area

4.7.1 Tables 4.9 and 4.10 summarise the outcome of the analyses undertaken in the morning and evening peak periods for road links located around the Bath Road area.

Table 4.9: Bath Road area – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
36	Bath Road	571	46	-525	-92%	B
37	Bath Road	796	205	-591	-74%	B
38	Oriel Road	1347	707	-640	-48%	B
39	Montpellier Terrace	445	1155	710	160%	D/S
40	Suffolk Road	1164	1299	135	12%	D/NS
41	Bath Road	511	540	29	6%	D/NS
42	Bath Road	1220	1152	-68	-6%	B
43	Vittoria Walk	163	660	497	305%	D/S
44	Montpellier Parade	516	1133	617	120%	D/S

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.10: Bath Road area – Option 2 PM

ID	Link	Base	Option2	Impact	%	Comment
36	Bath Road	478	286	-192	-40%	B
37	Bath Road	669	523	-146	-22%	B
38	Oriel Road	1150	1129	-21	-2%	B
39	Montpellier Terrace	430	1269	839	195%	D/S
40	Suffolk Road	1032	1176	144	14%	D/NS
41	Bath Road	546	707	161	29%	D/RS
42	Bath Road	1296	1208	-88	-7%	B
43	Vittoria Walk	126	635	509	404%	D/S
44	Montpellier Parade	597	781	184	31%	D/RS

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.7.2 The proposed "Option 2" strategy would lead to significant traffic reassignment around the Bath Road area:

- The proposed simplified junction layout at the Montpellier Terrace/Bath Road/Sandford Road junction would turn this junction into a three arm traffic signal junction with traffic from Bath Road north only able to turn left out and a ban on traffic turning into Bath Road north.
- The simplified operation of this junction would increase the capacity of the junction therefore accommodating the predicted increase in traffic circulating around the town centre along Montpellier Terrace in both peak periods.
- In addition, the proposed closure of the road link between Montpellier Spa Road and Montpellier Drive would address issues related to the "rat run" route identified through the south-eastern quarter of the town (Montpellier Drive – St Luke's Road – College Road) and would force traffic onto Montpellier Terrace, a wider, more suitable route for through traffic.

4.7.3 However, when combined together these proposals would lead to a significant increase in traffic on Montpellier Parade and Vittoria Walk. As a result of the implementation of the "Option 2" proposals in the area, these two streets would form the only access route to businesses and residences located around this area.

Possible modifications to address impact on Vittoria Walk

4.7.4 The modelling work undertaken suggests that traffic along Vittoria Walk would be mainly tidal therefore emphasising the impact of the predicted increase in traffic along this street. A number of alternatives to the proposals illustrated in Figure 1.2 could be considered in isolation or in combination.

4.7.5 The Bath Road/Montpellier Terrace/Sandford Road junction could be retain as existing. This would maintain Bath Road (north) as a key route into the area. However, it is likely that the junction would struggle to accommodate the predicted level of traffic at this point.

4.7.6 The road link between Trafalgar Street and Montpellier Parade could remain open. It is likely that this would maintain the identified "rat run" route through to St Luke's Road and College Road, with a detrimental impact on these two roads.

4.7.7 Northbound access along Montpellier Walk could be retained, up to Imperial Square, as an other route into the area. However, this would have implications on the degree of traffic reduction achieved along this street and therefore the degree to which public realm improvements could be delivered at this location.

4.7.8 These three alternative proposals have been modelled together for the PM peak. The outcome of this modelling exercise suggests that the combination of these modifications would achieve reduction in traffic on Montpellier Parade and Vittoria Walk, taking predicted flows below the base case traffic flow levels.

4.7.9 However, the model also suggests that the Bath Road/Montpellier Terrace junction if not modified would form a bottleneck on the network with the eastern approach to the junction (Sandford Road) operating over its capacity. As a result traffic would reassign onto Thirlestaine Road and Suffolk Road even more than in the case of the Option 2 test. Finally, traffic flows on Montpellier Walk would only marginally reduce when compared to the base case if all traffic is allowed northbound, reducing the opportunity for local public realm improvements in this area.

St John's Avenue area

4.7.10 Tables 4.11 and 4.12 summarise the outcome of the analyses undertaken in the morning and evening peak periods for road links located in the area around St James Street at the eastern end of the High Street.

Table 4.11: St John's Avenue area – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
45	Fairview Road	1304	1348	44	3%	D/NS
46	St John's Avenue	1133	1144	11	1%	D/NS
47	Albion Street	1577	1300	-277	-18%	B
48	Berkeley Street	1430	591	-839	-59%	B
49	St James Street	283	4	-279	-99%	B
50	High Street	1607	138	-1469	-91%	B
51	Bath Road	1325	130	-1195	-90%	B
52	Hewlett Road	1073	1109	36	3%	D/NS
53	Hewlett Road	1554	970	-584	-38%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.12: St John's Avenue area – Option 2 PM

ID	Link	Base	Option2	Impact	%	Comment
45	Fairview Road	1239	1257	18	1%	D/NS
46	St John's Avenue	1009	961	-48	-5%	B
47	Albion Street	1720	1250	-470	-27%	B
48	Berkeley Street	1434	714	-720	-50%	B
49	St James Street	328	50	-278	-85%	B
50	High Street	1355	77	-1278	-94%	B
51	Bath Road	1082	31	-1051	-97%	B
52	Hewlett Road	1003	981	-22	-2%	B
53	Hewlett Road	1516	1095	-421	-28%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.7.11 The proposed "Option 2" strategy includes significant changes to the road network in this area. The aim of the proposed changes is to significantly reduce traffic flows to the east of High Street and to provide the opportunity for important public realm improvements including a safer, more attractive pedestrian route from the St James Street car park to the retail area of the town. In order to achieve this aim, the "Option 2 " strategy proposes the closure of St James Street to through traffic as well as significant traffic calming of the eastern section of High Street and the northern section of Bath Road. A proposed road closure on Bath Road immediately to the south of Bath Parade would further deter any through traffic from this area.

4.7.12 As a result Hewlett Road and Berkeley Street would form part of the proposed town boulevard.

4.7.13 The tests undertaken illustrate the reductions in traffic flows that the "Option 2" strategy would achieve on High Street, St James Street and the northern section of Bath Road, allowing public realm improvements.

4.8 College Road area

4.8.1 Tables 4.13 and 4.14 summarise the results of the impact analyses in the morning and evening peak periods for road links in the College Road – Old bath Road area.

Table 4.13: College Road area – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
54	College Road	959	935	-24	-3%	B
55	College Road	632	624	-8	-1%	B
56	London Road	1260	943	-317	-25%	B
57	Old Bath Road	1658	2049	391	24%	D/RS
58	Sandford Mill Road	412	568	156	38%	D/RS
59	London Road	1474	1346	-128	-9%	B
60	Sandford Road	899	906	7	1%	D/NS
61	Sandford Road	571	550	-21	-4%	B
62	Thirlestaine Road	1224	1588	364	30%	D/RS
63	Old Bath Road	1676	1797	121	7%	D/NS
64	London Road	1873	1814	-59	-3%	B
65	Hale's Road	972	1490	518	53%	D/S

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.14: College Road area – Option 2 PM

ID	Link	Base	Option2	Impact	%	Comment
54	College Road	1105	931	-174	-16%	B
55	College Road	688	538	-150	-22%	B
56	London Road	1032	957	-75	-7%	B
57	Old Bath Road	1377	1968	591	43%	D/S
58	Sandford Mill Road	355	323	-32	-9%	B
59	London Road	1628	1588	-40	-2%	B
60	Sandford Road	935	844	-91	-10%	B
61	Sandford Road	702	603	-99	-14%	B
62	Thirlestaine Road	1075	1489	414	39%	D/S
63	Old Bath Road	1420	1637	217	15%	D/RS
64	London Road	1935	1856	-79	-4%	B
65	Hale's Road	1023	1566	543	53%	D/S

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.8.2 The model runs undertaken for the "Option 2" strategy show that the impact of these proposals in the College Road – Old Bath Road area of the town would be mixed. The model suggests that traffic flows on Sandford Road and College Road would reduce as a result of the proposed strategy. In particular the model shows a decrease in flows on the northern section of College Road, where the "Do minimum" tests show an increase in traffic volume. This is likely to be due to the proposed road closure on Montpellier Spa Road deterring traffic from using the identified "rat run" route through Montpellier Drive and St Luke's Road.

4.8.3 However, the model shows that traffic would be reassigned to Thirlestaine Road and Old Bath Road travelling around the south-eastern section of the town centre. The model shows that this traffic would not rejoin the boulevard route around the town to go north but would instead travel along Hale's Road. The tests undertaken predict a significant increase in flows on Hale's Road in both peak periods.

4.8.4 Predicted increases in traffic on Old Bath Road and Hale's Road would put additional pressure on the Hale's Road/Old Bath Road/London Road junction. An initial capacity assessment suggests that a capacity solution at this junction would only be identified if one or more movements were banned. A solution could involve allowing traffic northbound along Sandford Mill Road and ban right turn out of Old Bath Road. Such a solution would increase traffic flows on this road and may conflict with on street parking along this route. These disadvantages should however be considered against the possible beneficial traffic calming effect of operating this street as a two way road rather than a one way road (lower speed).

4.8.5 The implementation of "Option 2" would lead to significant changes at the College Road/London Road junction. Initial capacity tests show that the proposed new junction combined with predicted reduction in flows on two of its approaches could deliver an acceptable solution in capacity terms.

4.9 Portland Street area

4.9.1 Tables 4.15 and 4.16 summarise the results of the impact analyses undertaken for the morning and evening peak periods on road links in the Portland Street – Evesham Road area.

Table 4.15: Portland Street area – Option 2 AM

ID	Link	Base	Option2	Impact	%	Comment
66	Swindon Road	1320	1613	293	22%	D/RS
67	St Margaret's Road	995	1466	471	47%	D/S
68	St Margaret's Road	1117	1918	801	72%	D/S
69	Portland Street	532	488	-44	-8%	B
70	Winchcombe Street	803	632	-171	-21%	B
71	Evesham Road	1045	875	-170	-16%	B
72	Prestbury Road	964	905	-59	-6%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

Table 4.16: Portland Street area – Option 2 PM

ID	Link	Base	Do Min	Impact	%	Comment
66	Swindon Road	1378	1779	401	29%	D/S
67	St Margaret's Road	1042	1457	415	40%	D/S
68	St Margaret's Road	1290	1759	469	36%	D/S
69	Portland Street	786	545	-241	-31%	B
70	Winchcombe Street	559	529	-30	-5%	B
71	Evesham Road	948	700	-248	-26%	B
72	Prestbury Road	835	786	-49	-6%	B

(Note: B: beneficial, D: detrimental, NS: not significant, RS: relatively significant, S: significant) (two way flows)

4.9.2 The model runs undertaken suggest that the "Option 2 " strategy would have overall a beneficial impact on traffic flows on links north of the ring road in both peak periods. However, the analyses undertaken suggests a significant impact on the northern section of the ring road. The model shows an increase in traffic on St Margaret's Road between Portland Street and North Place of 801 veh/h in the AM peak and 469 veh/h in the PM peak (two way flows). Part of this predicted increase would be due to traffic being loaded on the network artificially in CB's view at the junction of Portland Street and Albion Street. This represents 283 veh/h in the AM peak and 157 veh/h in the PM peak. The predicted impact on the northern section of the ring road would remain important though.

4.9.3 This impact would be mitigated to a certain extent by the simplification of the operation of the Portland Street and North Place junctions as a result of the implementation of the bus proposals part of the "Option 2" strategy. In addition, as detailed in appendix to this report, CB believes that capacity on the corridor could be greatly improved by managing the infrastructure available more efficiently.

4.10 Overall conclusions – Option 2

4.10.1 The impact assessment undertaken suggests that the proposed "Option 2" strategy as illustrated in Figure 1.2 would have some impact on traffic flow patterns around the town centre. The modelling work undertaken overall confirms the objectives of traffic reassignment that the strategy aimed at achieving:

- The proposed traffic management measures accompanying the closure of Boots Corner to general traffic and the development of the bus corridor through the town would have the combined effect of deterring through traffic through the central parts of the town while diverting town centre traffic on more strategic circular routes most of them forming parts of the identified boulevard around the town.

- This is particularly noticeable at the north western end of the town where the modelling work undertaken suggests large increases in traffic flows on Honeybourne Way and Gloucester Road with reduction in flows on St James Square, St George's Place, Clarence Street and Ambrose Street. Initial capacity assessments at junctions at both ends of Honeybourne Way suggest that these junctions would be able to accommodate the predicted changes in traffic patterns in the area. The programmed improvements to the Gloucester Road/Tewkesbury Road junction should also provide additional capacity able to accommodate future increases in traffic at this junction.
- In a similar fashion, traffic reductions on Montpellier Walk and the southern section of The Promenade would be mirrored by increases in traffic on Bayshill Road and St George's Road (west). The Bayshill Road/St George's Road junction would play an important part on the proposed town centre road network. Although the model predicts increases in traffic on two of its approaches, these would be balanced by reduction in flows on the other two approaches to the junction. On this basis it is considered that the junction should be able to accommodate the predicted change in flow patterns in the area.
- However, the modelling work undertaken also highlights some issues with the proposed strategy. In particular, attempts to limit through traffic through the Montpellier/Imperial Square area would lead to limited access opportunities to this area focusing traffic on one main route i.e. Montpellier Drive – Vittoria Walk. Each or a combination of the proposed traffic management measures in the area could be modified/removed to maintain a number of routes in and out (northbound traffic on Montpellier Walk, no road blockage at the eastern end of Montpellier Spa Road, no simplification of the Bath Road/Sandford Road/Montpellier Terrace junction). However, not delivering any of these proposed changes would limit the extent to which traffic calming can be achieved on some critical sections of the network (Montpellier Walk, College Road)
- The proposed strategy would redirect a significant amount of traffic along Montpellier Terrace. The proposed simplification of the Bath Road/Montpellier Terrace/Sandford Road junction would allow to accommodate this predicted increase in flows.
- The model also predicts an increase in traffic along the northern section of The Promenade as egress opportunities out of the St James Square area would be reduced as a result of the proposed elimination of through routes through the area. The "Option 2" proposals in this area (limit movements at the St James's Square/Ambrose Street junction, priority regime at the junction of The Promenade and St George's Road) could be removed/modified in order to achieve a beneficial impact on The Promenade.
- The model predicts that traffic would also be reassigned on wider strategic routes around the town centre. It seems to indicate that Thirlestaine Road – Old Bath Road –Hale's Road would form a key west-east and north route around the town. Traffic pressure would increase at the London Road/Hale's Road junction in particular, and is likely to require a modification of this junction, including banning some movements.
- Traffic would also significantly increase on the northern section of the ring road as a result of the introduction of the proposed strategy. Although part of the increase predicted by the model would be due to an artificial reassignment of traffic within the model, the proposed strategy would still impact significantly upon this section of the road network. However, the traffic management improvements identified by CB and detailed in appendix in this report as well as the simplifications introduced by the

proposed scheme at the Portland Street and North Place junctions would mitigate the predicted impact.

- Traffic flows on College Road are predicted to remain unaffected by the proposed strategy, the proposed road closure on Montpellier Spa Road deterring additional “rat running” traffic through to St Luke’s Road and College Road. In addition, new traffic management at Hewlett Road and Berkeley Street would necessitate a new junction design for the College Road/London Road junction. The proposed new design would reflect new traffic patterns at the junction and would therefore be expected to operate within capacity.
- The model highlights the significant reduction in traffic flows on the most central part of the town centre road network delivering the framework for public realm improvements. Therefore, it demonstrates that the proposed strategy would deliver the objectives of reduced traffic impact enabling Civic Pride improvements.

5. Conclusions and recommendations

- Both options achieve the objectives set in Draft Transport Strategy
- Capacity available in network to accommodate impact of “Do minimum” option
- “Option 2” needs refining as potential conflict between capacity and achieving all goals set in Draft Transport Strategy

Appendix

"Click here to enter text for Appendix 2"