COMBER ONE-WAY SYSTEM

BRIDGE STREET/CASTLE STREET/MILL STREET/BRIDGE STREET LINK

AUGUST 2009

1.0 Introduction

DaTA Section was commissioned by Southern Division to produce a feasibility report into a one-way traffic system on Castle Street, Comber with a possible extension to Mill Street.

Castle Street is a particularly narrow stretch of road and is frequently used by heavy vehicles. The street is frequently congested as delivery vehicles have to park in the street, blocking traffic and creating a hazard to pedestrians. This restricted road width has been linked to two road traffic accidents involving pedestrians. As a result of the accidents it is intended to raise the level of the kerb in Mill Street to prevent vehicles mounting the footway.
With any of the proposals considered traffic will be diverted onto Bridge Street Link which currently services the car parks to the rear of Castle Street and Bridge Street and Comber Leisure Centre. This link will need to be realigned as the increased flow of traffic will cause an increased hazard to pedestrians and other road users.

A previous study of a one way system in Comber considered a number of proposals including closing Castle Street to traffic. This proposal was not considered to be feasible and has not been included as part of this study

2.0 Traffic Surveys

Turning Movement surveys were conducted during the AM peak hour on the 10th March 2005 as part of an earlier study of this area. Four surveys were conducted in total focusing on the following junctions:

- Killinchy Street and The Square
- Bridge Street and The Square
- Bridge Street and Bridge Street Link
- Castle Street and Car Parks

The figures from these surveys were factored to take into account growth between the time of the survey and the present. The percentage increase was calculated using the figures supplied by the National Traffic Forecasts (See COBA Manual, Volume 13, Section 1, Part 4). The forecast traffic figures for the existing layout are listed in Appendix 1.

3.0 Bridge Street Link

- Primary access to Leisure Centre and Car Parks.
- Used as a rat-run to avoid traffic signals at The Square.
- Currently not suitable for the volume of traffic requiring diversion.

Bridge Street Link is primarily a car park service road which is also used as a rat-run to avoid the traffic lights at the end of Castle Street. It has a number of tight turns and there are several entrances into each car park and very few road markings. Because of the high incidence of people parking directly on the road, rather than in the car parks, and the high numbers of pedestrians in the area, Bridge Street Link would require significant realignment and widening of the carriageway to ensure safety and sight lines are sufficient.

The entrances to the car parks should be reduced to one entrance/exit per area. Some of the existing accesses do not provide adequate sightlines to ensure safety with the proposed increased volume of traffic. The most work would be required at the priority junction behind Supervalu. Traffic coming from Castle Street has to give way at the junction at the bottom of the hill with Bridge Street Link. Priority should be given to the through traffic to allow a free flowing situation. This corner will also need to be smoothed out as it currently has a very tight turning radius and is not suitable for the proposed increased frequency of heavy vehicles.

4.0 One-way System Proposals

Three possible one-way systems were considered:

- Option 4.1 Castle Street one-way from Mill Street towards The Square
- Option 4.2 Castle Street one-way from The Square towards Mill Street
- Option 4.3 Extension of Option 4.2 to include Mill Street

The impact of each of these proposals on the affected links and junctions was assessed:

4.1 Castle Street One-way from Mill Street (Figure 4)

4.1.1 Description

- One-way traffic on Castle Street, from Bridge Street Link towards The Square
- Bridge Street Link remains two-way
- Mill Street remains two-way
- Junction of Bridge Street and Bridge Street Link signalised
- Car park entrances reduced in number

This proposal entails making Castle St one-way from Bridge Street Link to The Square. Traffic from Mill Street to The Square will pass along Castle Street as at present, traffic from The Square to Mill Street will go via Bridge Street Link. Bridge Street Link will remain two way and traffic from it to Castle Street can turn in either direction. Traffic from Mill Street can either turn left along Bridge Street Link or continue straight along the one-way section to the Square.

Projected traffic figures are included in Appendix 2.

4.1.2 Impact on Junctions

Castle St / Bridge St Link	This proposal will result in a high proportion of people turning right from Bridge Street Link onto Mill Street. A Picady model shows that this junction will operate close to capacity
Bridge St / Bridge St Link	The junction of Bridge Street and Bridge Street Link would need to be signalised to cater for the increased right turners into Bridge Street Link. The signals will include a pedestrian phase and so the pelican crossing on Bridge Street can be removed.
Castle Street/ High Street/ Killinchy Street / Bridge Street	The Junction of Bridge Street/ High Street/ Killinchy Street and Castle Street would not show a significant improvement as the one way system will remove only one conflicting turning movement from this junction.

4.1.3 Impact on Links

Castle St	One-way traffic in a single lane will allow the footways to be widened and so solve the existing problem on Castle Street.
Bridge Street Link	The junction of Bridge Street and Bridge Street Link would need to be signalised to cater for the increased right turners into Bridge Street Link. The signals will include a pedestrian phase and so the pelican crossing on Bridge Street can be removed.
Impact on Castle Street/ High Street/ Killinchy Street / Bridge Street Junction	The Junction of Bridge Street/ High Street/ Killinchy Street and Castle Street would not show a significant improvement as the one way system will remove only one conflicting turning movement from this junction.

4.2 Castle Street One-way from The Square (Figure 5)

- Castle Street one-way from The Square to Bridge Street Link
- Traffic from Mill Street routed down to Bridge Street Link with priority
- Traffic turning right from Castle Street gives way to Mill Street traffic
- Traffic from Castle Street can continue down Mill Street
- Bridge Street Link one-way from Castle Street to car park entrances
- Bridge Street Link two-way up to car park entrances
- Signalise junction of Bridge Street and Bridge Street Link
- Right turn from Bridge Street into Bridge Street Link banned

This proposal entails making Castle Street one-way from The Square to Bridge Street and channelling all traffic from Mill Street along Bridge Street Link. Bridge Street Link will be made one way from Castle Street to a point near the car park entrances. Traffic will be two-way from Bridge Street to allow entry and exit from the car parks. Traffic from Bridge Street can only go to the car parks, there is no way to gain direct access to Castle Street or Mill Street from the car parks.

Projected traffic figures are in Appendix 3.

Impact on Castle St / Bridge St Link Junction	The junction of Castle Street/ Mill Street will allow traffic from Mill Street to flow freely into Bridge Street Link with priority over right turning traffic from Castle Street.
Impact on Bridge St / Bridge St Link Junction	The junction of Bridge Street/ Bright Street Link will need to be signalised to allow the increased volume of traffic joining Bridge Street from Bridge Street Link to exit safely. This set of signals would include a pedestrian phase and so would replace the existing pelican crossing. Right turns from Bridge Street into Bridge Street Link will be banned, so traffic wanting to access the car parks will need to travel via Castle Street. This would not significantly increase the journey time.
Impact on Castle Street/ High Street/ Killinchy Street / Bridge Street Junction	The junction of High Street/ Killinchy Street/ Castle Street and Bridge Street will be more efficient as one entry arm has been removed

4.3 Mill Street Extension of One-way System

This has been considered in conjunction with proposal 4.2 above with Mill Street one–way out of town. This would benefit the town in a number of ways:

- Free flow of traffic along Mill Street from The Square to the west of the town,
- Greatly improved pedestrian safety along Mill Street/ Castle Street,
- Decreased noise and pollution levels along residential section of Mill Street,
- Increased number of vehicles using the bypass.

This extension along Mill Street will allow residents to park on-street and should allow delivery vehicles to unload without causing a serious blockage to through traffic.
Traffic which previously approached the town centre along Mill Street will have a choice of alternative routes

1. Railway Street - Ballygowan Road - High St. – This will add approximately 0.75km to the journey and will take traffic along Railway Street which is traffic calmed. There are also implications for increased traffic movements at the Ballygowan Road / Railway St junction.

2. Comber Bypass - Killinchy Street – This will add approximately 1.3km to the journey but may be more attractive to drivers as the route is higher speed and free flowing.

3. High Street is currently a very well used route into Comber and is frequently used by LGVs and HGVs. The gradient of the hill approaching the town centre is quite steep and increasing the volume of traffic along this route may have safety implications if people start to take chances at the traffic lights.

Impact on Castle St / Bridge St Link Junction	Increased volume due to loss of straight on movement from Mill Street.
Impact on Bridge St / Bridge St Link Junction	Increased volume, particularly right turning movement, due to loss of exit from Castle Street.
Impact on Castle Street/ High Street/ Killinchy Street / Bridge Street Junction	The junction of High Street/ Killinchy Street/ Castle Street and Bridge Street will be more efficient as one entry arm has been removed. Additional traffic on High Street and Killinchy Street approaches will require adjustments to the timings on the signals

An outdated traffic survey of the Mill Street/ Glen Road junctions suggests that 300 to 350 vehicles would make the movement straight through the roundabout during the AM peak hour. The vehicles from the town centre along Mill Street have been accounted for in the previous models, but the 350 vehicles from the Glen Road direction will have to divert onto the bypass or High Street.

Conclusions

The following table shows the performance of the model for each of the affected junctions. A lower RFC (Ratio of Flow to Capacity) and a higher PRC (Practical Reserve Capacity) is desirable. The full reports generated by the modelling programmes for Proposal 4.1 are in Appendix 4-6, and those for Proposal 4.2 are in Appendix 7-9.

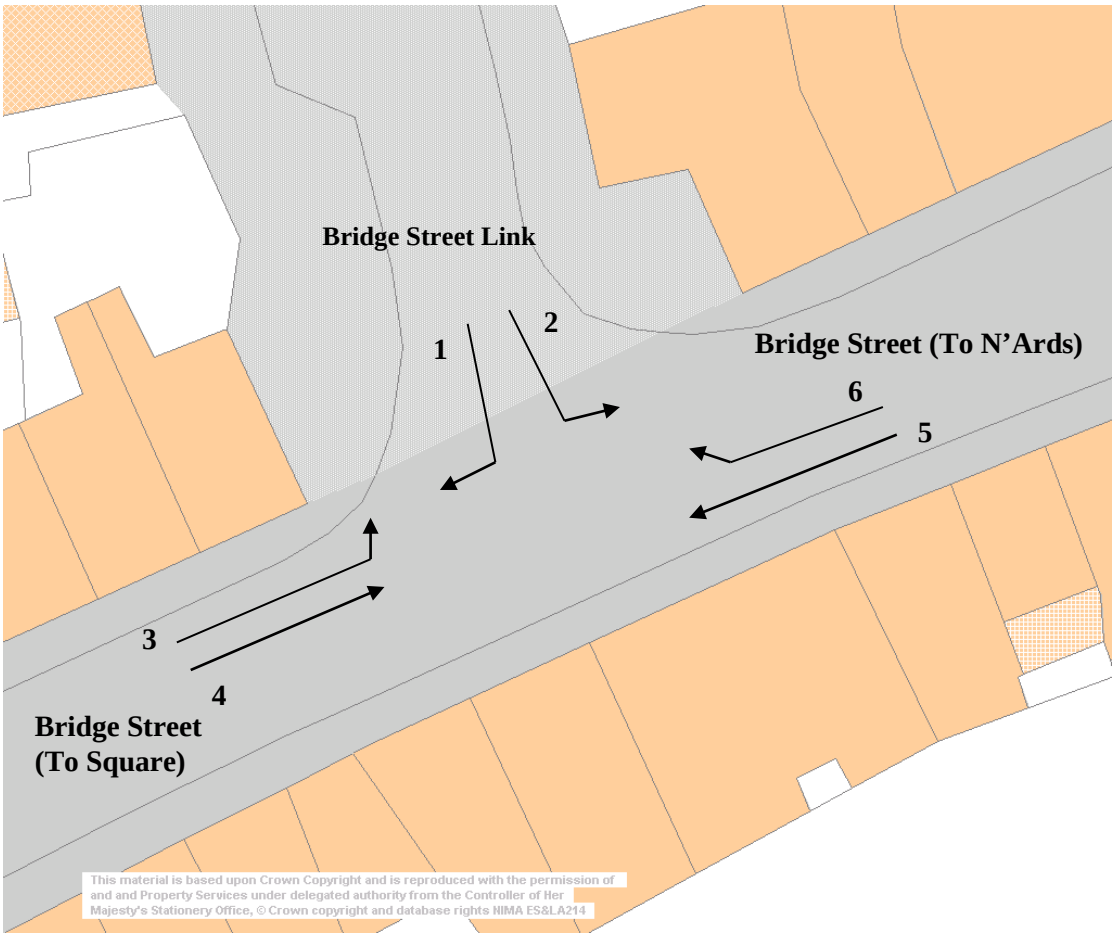
Junction	Proposal 4.1	Proposal 4.2
Castle/Mill/Bridge St Link	0.84 (Peak RFC)	0.289 (Peak RFC)
Bridge/ Bridge St Link	28.7 (PRC, 120s cycle)	39.7 (PRC, 120s cycle)
Castle/High/Killinchy/Bridge	18.7 (PRC, 150s cycle)	29.6 (PRC, 120s cycle)

The results of the models suggest that Proposal 4.2 is the more efficient system. It results in shorter queues and by removing a conflicting movement at the High Street/ Bridge Street Junction allows more traffic to flow during a cycle.

Both proposals will require some alteration of corner geometries on Bridge Street Link to smooth out corners and improve visibility. This will also require some trees and vegetation to be removed. Both proposals will also require the installation of traffic signals at the junction of Bridge Street and Bridge Street Link. Proposal 4.2 may cause more disruption during the initial change-over period as the construction of a traffic island at the junction of Bridge Street Link and Castle Street is likely to require all traffic to be temporarily diverted away from this route (If the one-way system is extended along Mill Street, this traffic island will not be necessary).

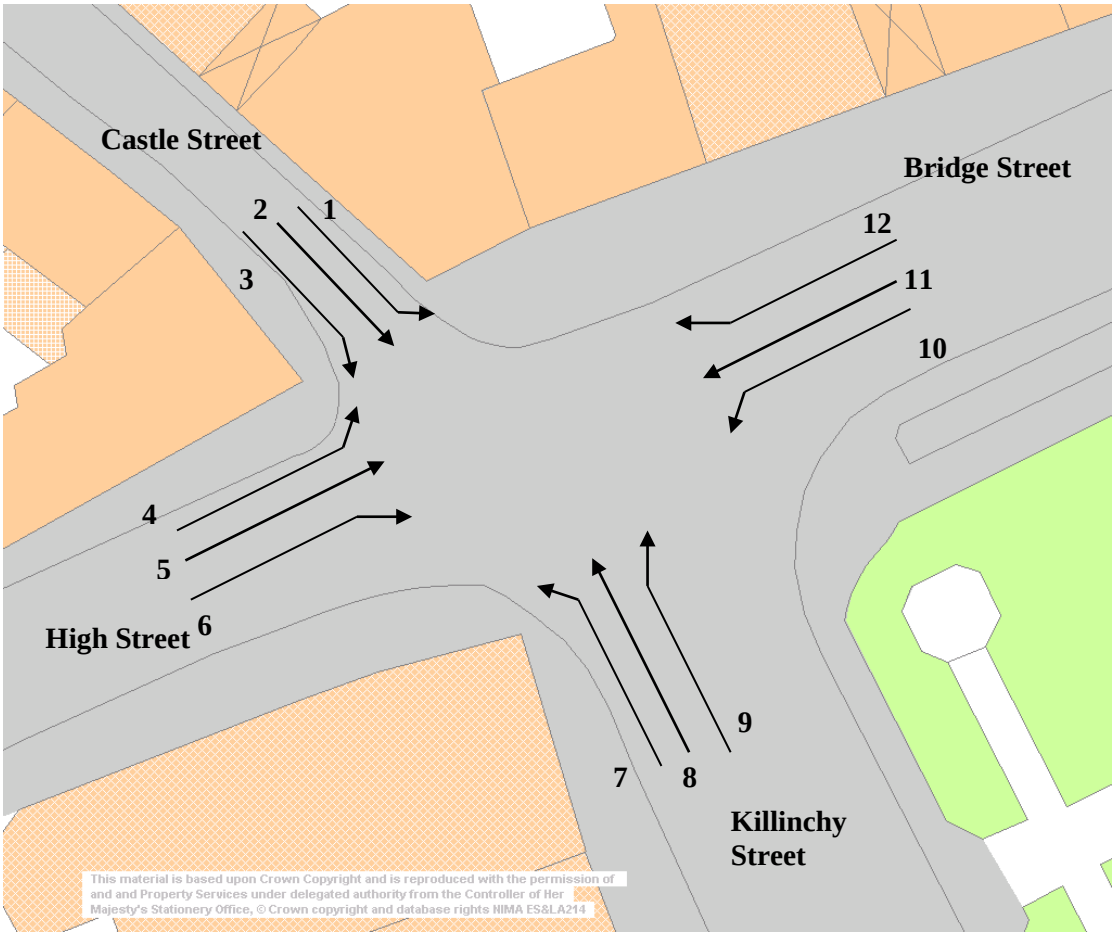
If required, the best route for the continuation of the one way system should run westwards from Castle Street to the Belfast Road mini-roundabout. This will allow vehicles to enter the town via either High Street or use the bypass to enter from Killinchy Street. It would work in tandem with the proposed circulatory system with Bridge Street Link, improve traffic flow along Mill Street, increase pedestrian safety and reduce noise levels and pollution for the local residents.

Figure 1. Turning Movement diagram for the Bridge Street/ Bridge Street Link Junction



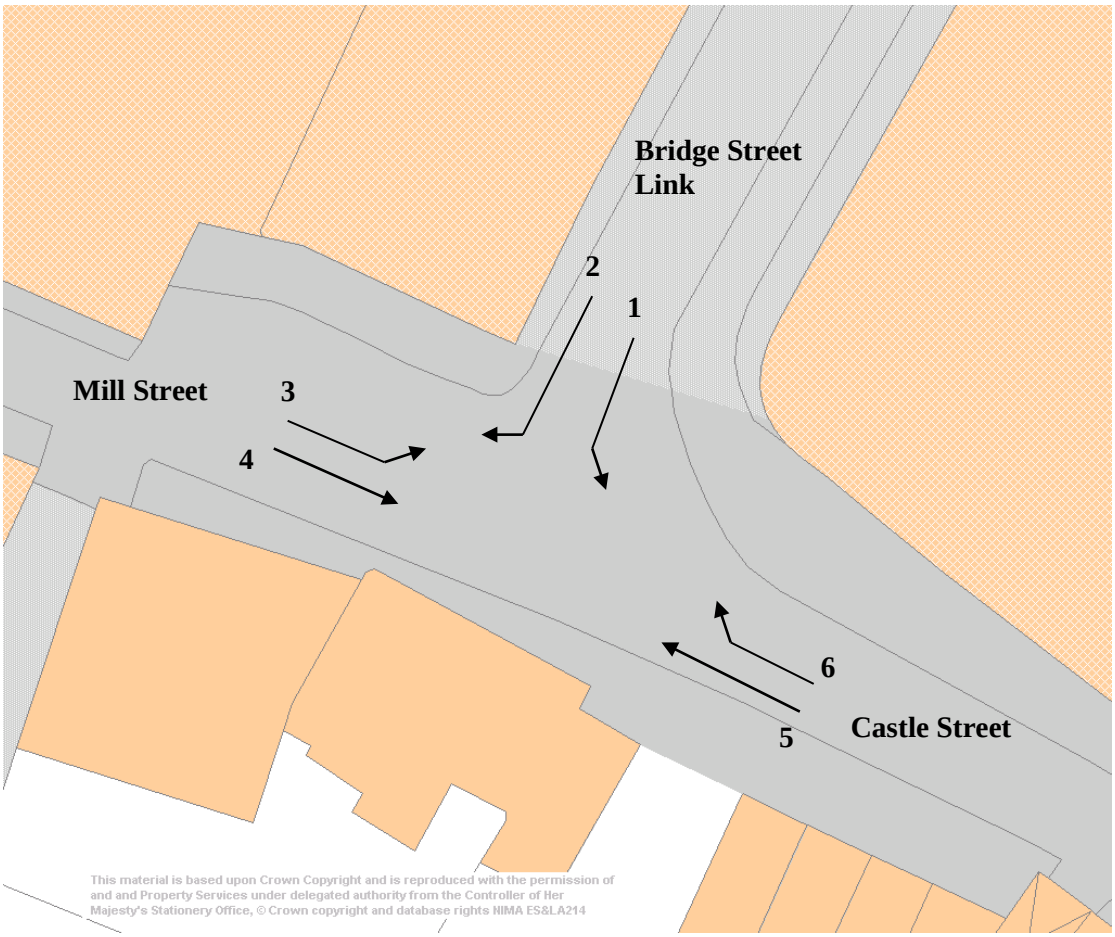
Movement	1	2	3	4	5	6
2009 Figures	91	7	15	561	559	111
Proposal 4.1	91	7	173	561	559	180
Proposal 4.2	180	185	15	561	670	0

Figure 2. Turning Movement diagram of Castle Street/ Bridge Street/ High Street/ Killinchy Street Junction



Movement	1	2	3	4	5	6	7	8	9	10	11	12
2009 Figures	89	64	30	34	344	46	126	55	85	11	362	69
Proposal 4.1	89	64	30	0	378	46	126	0	140	11	362	0
Proposal 4.2	0	0	0	34	344	46	126	55	85	11	362	264

Figure 3. Turning Movement diagram for the Mill Street/ Castle Street/ Bridge Street Link Junction



Movement	1	2	3	4	5	6
2009 Figures	9	84	122	202	133	26
Proposal 4.1	9	242	122	202	0	0
Proposal 4.2	0	0	324	0	353	137

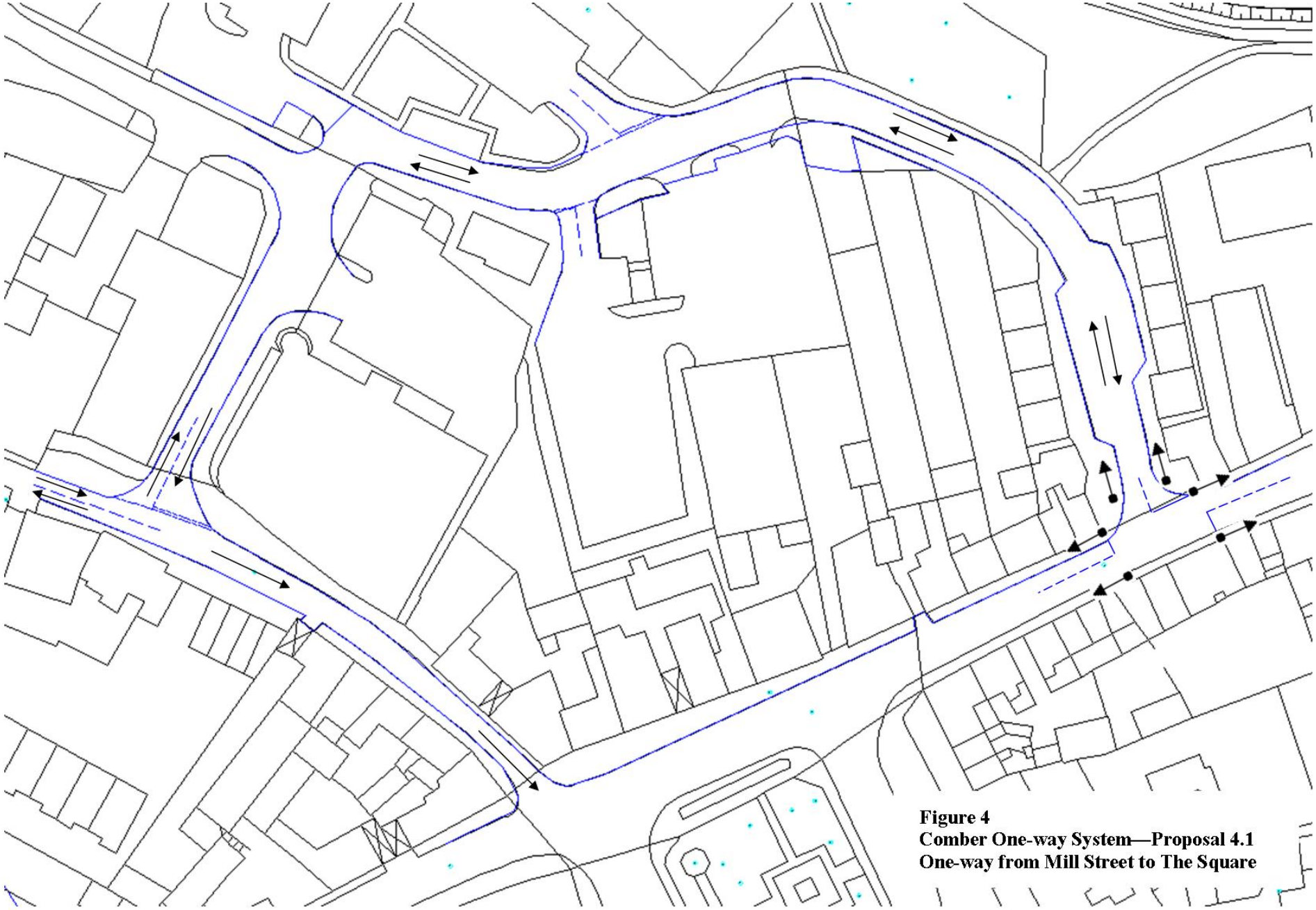


Figure 4
Comber One-way System—Proposal 4.1
One-way from Mill Street to The Square

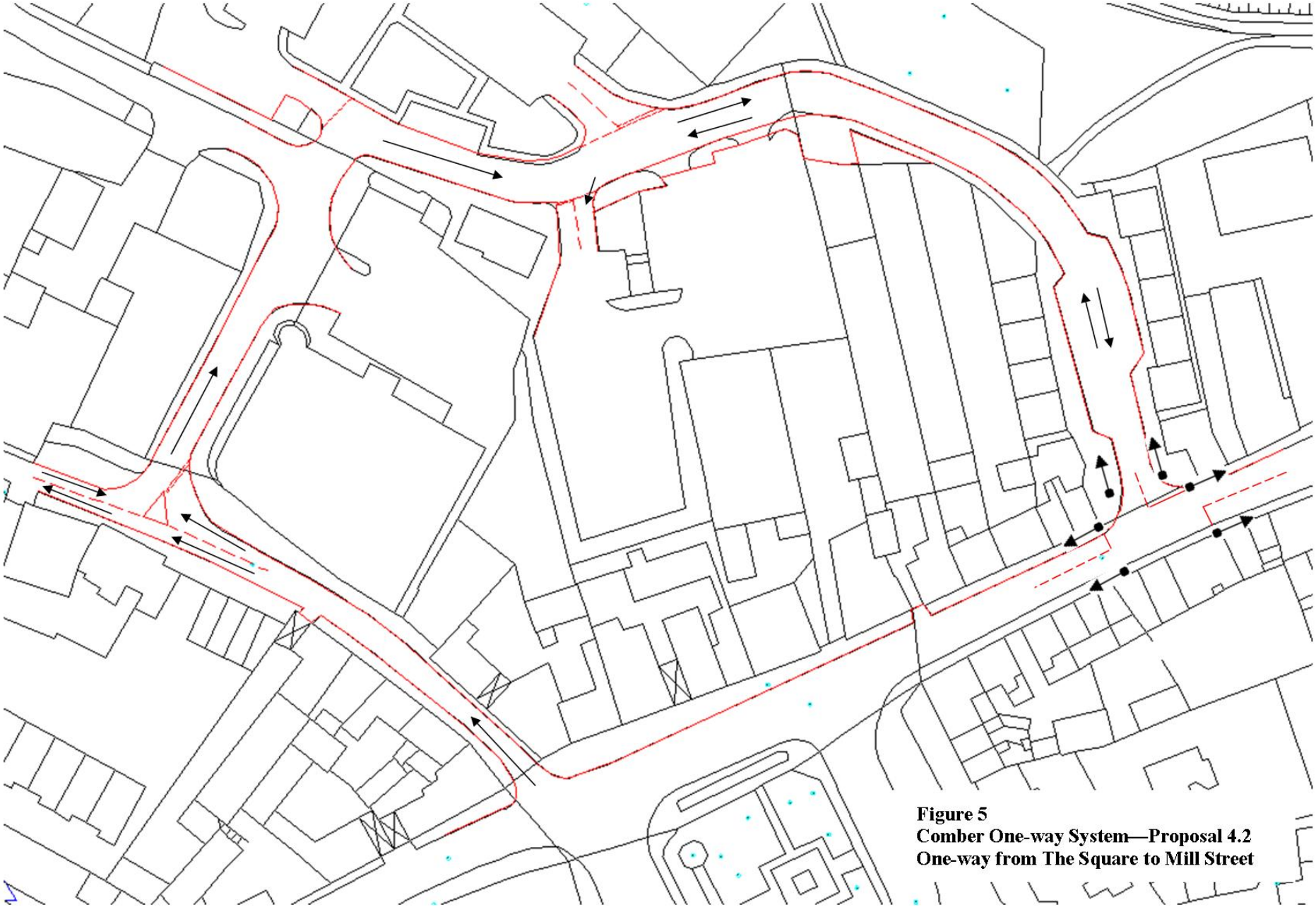


Figure 5
Comber One-way System—Proposal 4.2
One-way from The Square to Mill Street

Appendix 1 – Forecast Traffic Figures (Existing Layout)

Table 1. Bridge Street/ Bridge Street Link Junction

	From	Bridge Street Link	Bridge Street	Bridge Street	Town Centre	Town Centre	Bridge Street Link
Time	**To**	**Bridge Street**	**Bridge Street Link**	**Town Centre**	**Bridge Street**	**Bridge Street Link**	**Town Centre**
08:00	08:15	14	19	142	137	0	0
08:15	08:30	18	25	124	124	3	1
08:30	08:45	28	23	162	161	4	4
08:45	09:00	31	44	131	139	8	2
	Total	91	111	559	561	15	7

Table 2. Castle Street/ Bridge Street/ High Street/ Killinchy Street Junction

Part 1	**From**	**Castle Street**	**Castle Street**	**Castle Street**	**High Street**	**High Street**	**High Street**
Time	**To**	**Bridge Street**	**Killinchy Street**	**High Street**	**Castle Street**	**Bridge Street**	**Killinchy Street**
08:00	08:15	15	22	3	4	101	13
08:15	08:30	21	11	3	2	81	8
08:30	08:45	35	17	11	12	78	14
08:45	09:00	18	14	13	16	84	11
	Total	89	64	30	34	344	46

Part 2	**From**	**Killinchy Street**	**Killinchy Street**	**Killinchy Street**	**Bridge Street**	**Bridge Street**	**Bridge Street**
Time	**To**	**High Street**	**Castle Street**	**Bridge Street**	**Killinchy Street**	**High Street**	**Castle Street**
08:00	08:15	29	8	15	1	96	11
08:15	08:30	19	10	13	2	83	16
08:30	08:45	41	17	23	7	93	19
08:45	09:00	37	20	34	1	90	23
	Total	126	55	85	11	362	69

Table 3. Mill Street/ Castle Street/ Bridge Street Link Junction

	From	Bridge Street Link	Castle Street	Castle Street	Mill Street	Mill Street	Bridge Street Link
Time	**To**	**Castle Street**	**Bridge Street Link**	**Mill Street**	**Castle Street**	**Bridge Street Link**	**Mill Street**
08:00	08:15	1	1	36	47	15	12
08:15	08:30	4	7	29	46	30	17
08:30	08:45	1	10	38	64	50	28
08:45	09:00	3	8	30	45	27	27
	Total	9	26	133	202	122	84

Appendix 2 - Forecast Traffic Figures (One Way to The Square, Proposal 4.1)

Table 1. Bridge Street/ Bridge Street Link Junction

	From	Bridge Street Link	Bridge Street	Town Centre	Town Centre	Bridge Street Link
Time	**To**	**Bridge Street**	**Town Centre**	**Bridge Street**	**Bridge Street Link**	**Town Centre**
08:00	08:15	14	161	137	23	0
08:15	08:30	18	149	124	31	1
08:30	08:45	28	185	161	52	4
08:45	09:00	31	175	139	67	2
	Total	91	670	561	173	7

Table 2. Castle Street/ Bridge Street/ High Street/ Killinchy Street Junction

Part 1	From	Castle Street	Castle Street	Castle Street	High Street
Time	**To**	**Bridge Street**	**Killinchy Street**	**High Street**	**Bridge Street**
08:00	08:15	15	22	3	105
08:15	08:30	21	11	3	83
08:30	08:45	35	17	11	90
08:45	09:00	18	14	13	100
	Total	89	64	30	378

Part 2	FROM	High Street	Killinchy Street	Killinchy Street	Bridge Street	Bridge Street
TIME	**TO**	**Killinchy Street**	**High Street**	**Bridge Street**	**Killinchy Street**	**High Street**
08:00	08:15	13	29	23	1	96
08:15	08:30	8	19	23	2	83
08:30	08:45	14	41	40	7	93
08:45	09:00	11	37	54	1	90
	Total	46	126	140	11	362

Table 3. Mill Street/ Castle Street/ Bridge Street Link Junction

	from	Bridge Street Link	Mill Street	Mill Street	Bridge Street Link
Time	to	Castle Street	Castle Street	Bridge Street Link	Mill Street
08:00	08:15	1	47	15	35
08:15	08:30	4	46	30	45
08:30	08:45	1	64	50	76
08:45	09:00	3	45	27	86
	Total	9	202	122	242

Appendix 3 - Forecast Traffic Figures (One Way from The Square, Proposal 4.2)

Table 1. Bridge Street/ Bridge Street Link Junction

	From	Bridge Street Link	Bridge Street	Town Centre	Town Centre	Bridge Street Link
Time	**To**	**Bridge Street**	**Town Centre**	**Bridge Street**	**Bridge Street Link**	**Town Centre**
08:00	08:15	29	161	137	5	26
08:15	08:30	39	149	124	12	19
08:30	08:45	63	185	161	26	33
08:45	09:00	49	175	139	32	32
	Total	180	670	561	75	110

Table 2. Castle Street/ Bridge Street/ High Street/ Killinchy Street Junction

Part 1	From	High Street	High Street	High Street	Killinchy Street
Time	**To**	**Castle Street**	**Bridge Street**	**Killinchy Street**	**High Street**
08:00	08:15	4	102	13	29
08:15	08:30	2	88	8	19
08:30	08:45	12	88	14	41
08:45	09:00	16	92	11	37
	Total	34	370	46	126

Part 2	From	Killinchy Street	Killinchy Street	Bridge Street	Bridge Street	Bridge Street
Time	**To**	**Castle Street**	**Bridge Street**	**Killinchy Street**	**High Street**	**Castle Street**
08:00	08:15	8	15	23	96	30
08:15	08:30	10	13	13	83	41
08:30	08:45	17	23	24	93	42
08:45	09:00	20	34	15	90	67
	Total	55	85	75	362	180

Table 3. Mill Street/ Castle Street/ Bridge Street Link Junction

	From	Mill St	Castle Street	Castle Street
Time	**To**	**Bridge St Link**	**Bridge St Link**	**Mill Street**
08:00	08:15	62	20	54
08:15	08:30	76	32	70
08:30	08:45	114	33	99
08:45	09:00	72	52	130
	Total	324	137	353

SUMMARY

1. Introduction

DaTA Section was commissioned by Southern Division to produce a feasibility report into a one-way traffic system on Castle Street, Comber with a possible extension on Mill Street.

Castle Street is a particularly narrow stretch of road and is frequently used by heavy vehicles. The street is frequently congested as delivery vehicles have to park in the street, blocking traffic and creating a hazard to pedestrians. The restricted road width has been linked to two road traffic accidents involving pedestrians. As a result of the accidents it is intended to raise the level of the kerb in Mill Street to prevent vehicles mounting the footway.

A previous study of a one way system in Comber considered a number of proposals including closing Castle Street to traffic. This proposal was not considered to be feasible and has not been included as part of this study

2. One-way System Proposals – Castle Street

Two possible one-way systems were considered:

- Option 4.1 Castle Street one-way from Mill Street towards The Square
- Option 4.2 Castle Street one-way from The Square towards Mill Street

The impact of each of these proposals on the affected links and junctions was assessed. While both Options 4.1 and 4.2 would resolve the problems on Castle St, Option 4.2 was found to be preferable in terms of the operation of the junctions. The key benefits are

- Removal of an entry arm from the High St / Castle St/ Bridge St / Killinchy St junction will increase capacity
- No conflict at the Castle St / Bridge St Link junction

Some work on Bridge St Link will be required to improve the alignment and reduce the number of accesses into the car parks.

The junction of Bridge Street/ Bright Street Link will be signalised to allow the increased volume of traffic joining Bridge Street from Bridge Street Link to exit safely. These signals will include a pedestrian phase and so would replace the existing pelican crossing. Right turns from Bridge Street into Bridge Street Link will be banned, so traffic wanting to access the car parks will need to travel via Castle Street. This will not significantly increase the journey time.

3. Extension of One-way System to Mill Street

A number of injury accidents involving pedestrians in Mill Street have been caused by vehicles mounting the kerb to get round parked vehicles. To prevent this happening it is intended to raise the level of the kerbs in Mill Street. It will still be possible for two way traffic to pass on a give and take basis but delays may increase.
An extension of Option 4.2 to include Mill Street has been considered as a means of resolving the congestion. All of Castle Street and Mill Street will be one-way out of town. This would benefit the town in a number of ways:

- Free flow of traffic along Mill Street from The Square to the west of the town,
- Decreased noise and pollution levels along residential section of Mill Street,
- Increased number of vehicles using the bypass.

Traffic which previously approached the town centre along Mill Street will have a choice of alternative routes

- Railway Street - Ballygowan Road - High St. – Adding approximately 0.75km to the journey and taking traffic along Railway Street which is a traffic calmed residential area.
- Comber Bypass - Killinchy Street – Adding approximately 1.3km to the journey but possibly more attractive to drivers as the route is higher speed and free flowing.

However there are some clear disadvantages which need to be fully considered

- Increased journey time
- Increased traffic in Railway Street
- Increased right turns onto the bypass

4. Recommendations

- Introduce a one-way system as described in Option 4.2 above and detailed below.

  - Castle Street one-way from The Square to Bridge Street Link
  - Traffic from Mill Street routed down to Bridge Street Link with priority over Castle Street traffic.
  - Traffic turning right from Castle St into Bridge St Link gives way to Mill Street traffic
  - Traffic from Castle Street can continue along Mill Street
  - Bridge Street Link one-way from Castle Street to car park entrances
  - Signalise junction of Bridge Street and Bridge Street Link
  - Right turn from Bridge Street into Bridge Street Link banned

- Monitor congestion in Mill Street and introduce an extended one –way system if necessary.