ITS Strategy: Appendix A

Policy for the Provision of Pedestrian Crossings and Pedestrian/Cycle Facilities at Traffic Signal Junctions

1. Introduction

This policy explains how requests for new pedestrian crossings will be considered. This document must be read in conjunction with the Technical Procedure.

The demand for new crossings far exceeds the County Council's ability to provide funding. For this reason we will compare the need at requested sites, so that decisions can be made in a consistent way and best value obtained from the available resources

2. Safety

We will consider safety first, so we will only assess the need for crossings at locations where the appropriate design standards for safety can be met. In exceptional cases where these cannot be met, the Head of Transport for Warwickshire may agree to a departure from standard if a case can be made to demonstrate that safety would not be compromised.

3. How we will assess the need for a pedestrian crossing

We will assess the level of need for a crossing by:-

3.1 Measuring the degree of conflict between pedestrians crossing the road and the two-way traffic flow and

3.2 We will also take into account the following factors

- the age and ability of pedestrians;
- the suppressed demand;
- the different types of vehicles in the flow of traffic;
- the length of time pedestrians have to wait to cross;
- the width of the road;
- the speed of traffic;
- the pedestrian injury accident record at the site.

However, all this depends upon having the necessary resources initially to implement the scheme and then to maintain the installation.

4. The survey

If the safety requirements for a crossing can be satisfied then we will measure the degree of conflict between the traffic and pedestrians by carrying out a 12-hour survey which will count:-

- the number of pedestrians crossing in an hour (P)
- the flow of vehicles in both directions in an hour (V)

Our assessment will be based on the average of the four busiest hours in the day (between 7am and 7pm). When the survey is carried out, the pedestrians will be classified by their age and ability. Vehicles will be classified by vehicle type so that we can take into account the differences between cars, heavy goods vehicles, buses, motorcycles and pedal cycles.

Where it is evident that a significant increase in pedestrian access to services will result from the provision of a crossing, we will seek to establish suppressed pedestrian demand at the location and add these estimated figures to the actual measured pedestrian figures obtained by the survey.

We define "suppressed pedestrian demand" as the estimated additional number of pedestrian journeys likely to be generated as a consequence of a crossing being provided. We will estimate this through an appraisal of local circumstances and the potential increased access to services.

5. The appropriate type of crossing

We will use the information gathered in the survey and the various factors listed in 3.2 to determine whether a crossing should be provided and which type of crossing (if any) is appropriate at the site.

There are three main types of crossing - refuges, Zebra crossings and signal-controlled crossings (Puffin, Toucan and Pegasus). The type of crossing to be provided will also be subject to engineering considerations (e.g. there must be sufficient road width to install a refuge).

To justify a signal-controlled crossing it will be necessary to demonstrate a much higher level of need than a refuge. We will consider a Zebra crossing at the intermediate level of need.

6. Upgrading a zebra crossing to a signal-controlled crossing

Generally the pedestrian accident rates at Zebra and signal-controlled crossings are low. However, a Zebra crossing may be considered for conversion to a signal-controlled crossing at certain locations where it can be justified that a poor pedestrian injury record is likely to be improved.

We may also consider upgrading a Zebra crossing to a signal-controlled crossing as part of a wider traffic management scheme linked to the County Council's Urban Traffic Control System in appropriate circumstances.

7. Provision of pedestrian/cycle facilities at traffic signal junction

We will investigate the need for pedestrian/cycle facilities at an existing traffic signal junction in a similar way to a stand-alone pedestrian crossing. However, providing a pedestrian/cycle facility will have the effect of reducing the capacity of the traffic signal junction and at busy junction this can result in long queues of vehicles. For this reason each junction will be considered individually.

8. The priority list

We will include any justified crossings on a list, ranked by the level of need for future funding. The list will be used annually to inform the selection of schemes to be included in the County Council's Integrated Transport capital programme.

9. Other circumstances where crossings will be provided or upgraded

This policy describes the way in which we will consider requests for new crossings based on surveys of existing pedestrian and vehicle flows. The following approaches to the provision of crossings in the County Council's Local Transport Plan will coexist with the method of justifying schemes in this policy.

- Safer Routes to School – where the aim is to encourage more children to walk and/or cycle to school with less dependence on the use of the car.
- Casualty Reduction schemes – where the rate of return from likely casualty savings is sufficient to justify the expenditure on a crossing.

- Developer funded schemes – where crossing facilities are required to mitigate anticipated traffic impact of developments and/or anticipated increases in pedestrian flows.
- Facilities installed on key pedestrian or cycle corridors – where crossing facilities may be considered as part of a package of measures on a strategic walking and/or cycling corridor.
- Facilities funded by Area Committee delegated budget or other budget intended to address local priorities – this is to address local priorities as opposed to strategic ones i.e. where a scheme does not satisfy the criteria for funding from the Integrated Transport capital programme, but notwithstanding this, there are very special local circumstances where it would be appropriate to provide a crossing. In this case the decision to fund a crossing must be informed by a consideration of the whole-life costs of the crossing including the likely annual revenue costs of maintenance and energy.

10. Removal of pedestrian crossings

It is possible that in the future traffic volumes and/or pedestrian flows may reduce or other factors may change which may require the removal of a crossing. In this case, a risk assessment and public consultation will be carried out to inform the action to be taken. However, when the crossing is due for an upgrade the evaluation for its need will always be carried out.

The technical procedure

A procedure covering the technical details of the operation of this policy is maintained by the County Council's Head of Transport for Warwickshire.

The content of this procedure may be reviewed and updated by the Head of Transport for Warwickshire, but it is to be expected that the same technical process will be used to assess all schemes during an annual funding cycle.

This procedure covers the technical details of operation of the County Council's Policy for the Provision of Pedestrian Crossings and Pedestrian Facility at Traffic Signal Junctions.

Survey

The survey for obtaining values of P and V as described in the Policy shall take place along the stretch of road approximately 50 metres either side of the requested location. Should the weather deteriorate during the survey period, than arrangements will be made to repeat the survey on another day.

When pedestrian surveys are carried out, the pedestrians will be classified by their age and an indication of their ability.

Determining the level of need for a pedestrian crossing

The level of need will be determined by calculating the degree of conflict between pedestrians crossing the road and the two-way traffic flow as described in the paragraphs below.

The degree of conflict used will be **the adjusted PV^2 value** calculated as follows.

$\mathbf{P_{mod}}$ = the number of pedestrians crossing in an hour (P) weighted by age and ability in accordance with the table below

type of pedestrian	multiplying factor
Child <16	1.25
Adult	1
Elderly	2
Disabled	3

The multiplying factor for cyclist is 1 and for equestrian is 3.

$\mathbf{V_{mod}}$ = the flow of traffic in passenger car units (PCUs) in an hour calculated from the survey data using the weightings in the table below

type of vehicle	multiplying factor
Cars	1
Light goods vehicles	2
Bus	2
Heavy goods vehicles	2.5
Motorcycles	1*
Pedal cycles	1*

* Since this impacts on pedestrians in the same way as cars, the PCUs are up-rated to reflect this.

For each hour between 7am and 7pm the weighted $\mathbf{P_{mod}\ V_{mod}^2}$ value is calculated by multiplying the weighted number of pedestrians by the weighted number of vehicles squared, i.e. $P_{mod} \times V_{mod} \times V_{mod}$.

The $\mathbf{P_{mod}\ V_{mod}^2}$ figures are ranked in order and the top four figures are divided by four to obtain the **average** $\mathbf{P_{mod}\ V_{mod}^2}$ value (representing the four busiest hours of the day).

The **adjusted** $\mathbf{PV^2}$ value is obtained by multiplying the **average** $\mathbf{P_{mod}\ V_{mod}^2}$ value by the pedestrian waiting time factor (T), width of road factor (W), speed limit factor (S) and accident record factor (A). Hence the **adjusted** $\mathbf{PV^2}$ **value** is calculated as follows:

adjusted $\mathbf{PV^2}$ = average $P_{mod}\ V_{mod}^2$ value x T x W x S x A using the factors T, W, S & A from the paragraphs below.

Waiting Time Factor (T)

The average waiting time will be derived by the engineer attempting to cross the road at five random times during the known peak traffic period.

The waiting time factor (T) will then be taken from the table below.

Average Waiting Time	Waiting Time Factor (W)
Less than or equal to 20 seconds	1
21 seconds to 30 seconds	1.2
31 seconds to 40 seconds	1.25
More than 40 seconds	1.3

Width of Road Factor (W)

This factor considers the standard road width to be 7.3 metres. The Road Width Factor is obtained by dividing the road width by 7.3m i.e. ($\frac{\text{road width}}{7.3}$).

Speed Limit Factor (S)

The Speed Limit Factor (S) is based on the speed limit and will be taken from the table below.

Speed limit of the road	Speed Limit Factor (S)
20 mph speed limit	0.8
30 mph speed limit	1
40 mph speed limit	1.2
50 mph speed limit	1.3

Accident Record Factor (A)

The pedestrian injury accident record at a site is taken into account in the following formula:

$A = 1 + \frac{N}{10}$

where N is the number of pedestrian injury accidents in the previous three years.

Estimating suppressed pedestrian demand

Suppressed pedestrian demand will be estimated taking into account the potential for generating new pedestrian journeys of 20 minutes or less.

Criteria for justifying pedestrian crossings

To justify a **refuge**, the adjusted PV^2 value should be greater than 0.4×10^8, but the width of road needs to be at least 7.8m.

To justify a **zebra crossing**, the adjusted PV^2 value should be greater than 0.6×10^8, but a zebra crossing should not be installed on roads with an 85 percentile speed of 35 mph or above and the two-way traffic flow should be less than 500 vehicles/hour.

To justify a **signalled-controlled** crossing (Puffin, Toucan or Pegasus), the adjusted PV^2 value should be greater than 0.9×10^8. Current national guidelines indicate that it is not advisable to install a signalled controlled crossing where the 85th percentile speed is greater than 50 mph. At such locations serious consideration should be given to speed reduction measures before installing a signalled-controlled crossing.

ITS Strategy: Appendix B

Policy for the provision of a traffic signal junction

1. Introduction

This policy explains how proposals for new traffic signal junctions will be considered.

The demand for new traffic signal junctions far exceeds the County Council's ability to provide funding. For this reason we will compare the need for traffic signal control at requested sites so that decisions can be made in a consistent way and best value can be obtained from the available resources.

2. Safety

We will consider safety first, so we will only assess the need for traffic signal junctions at locations where the appropriate design standards for safety can be met.

3. Objective of traffic signal control

The primary objective in providing traffic signal control at a junction is to reduce the conflict between opposing traffic streams, as these conflicts can result in traffic delay and accidents. Traffic signal installations are designed to minimise the occurrence of both of these.

4. Design standards and capacity

Any traffic signals scheme which is to be installed on the highway needs to meet all of the current relevant design standards. In exceptional cases where these cannot be met, the Head of Transport for Warwickshire may agree to a departure from standard if a case can be made to demonstrate that safety would not be compromised.

In order for traffic signals to operate safely and efficiently, it is essential that they can cope with the demands presented to them such as the volume of traffic, the requirements of pedestrians and the physical constraints of the junction layout.

It is therefore necessary to carry out a technical assessment of the proposed layout and to take into account any changes in demand that may occur as a result of installing the traffic signals junction. The proposed scheme will also need to ensure that the installation can operate with a practical reserve capacity to allow for a reasonable degree of future traffic growth.

5. Criteria and strategies for the justification of traffic signals

There are four main factors to take into account when assessing the need for the justification of traffic signal control :- traffic delays, accident record, traffic management and the provision of a pedestrian/cycling crossing facility.

However, all these depend upon having the necessary resources initially to implement the scheme and then to maintain the installation.

5.1 Traffic delays

It is inevitable that, on arterial roads, delays will occur on the side roads at priority junctions during peak hours. However at the majority of these locations, queues will quickly disperse after the peak period.

The assessment will consider the traffic conditions over the four busiest hours of the day. If the delay experienced by drivers is more than eight minutes at the junction during each of the four busiest hours, then consideration will be given to installing traffic signal control at the junction.

5.2 Accident record

The average accident rate at existing traffic signal junctions in Warwickshire is 0.56 injury accidents per year. This implies that at any set of traffic signals installed this level of accidents could be expected.

As a responsible authority, WCC would not want to introduce any facility onto the highway that would increase the risk of accidents at a particular location. Therefore if the existing accident record at a location being considered for traffic signal control is less than 0.59 injury accidents per year, there is a potential risk of making the accident record worse.

The provision of traffic signals mainly for casualty reduction purposes will only be considered if the accident rate at a particular junction is six or more injury accidents (average) per year for three years, to ensure a reduction in accidents to the average rate of 0.59 per year or less.

It must also be realised that the provision of traffic signals at a junction which has an established accident record may not be the most appropriate remedial measure and other measures may be required.

5.3 Traffic management

A junction may be signalised to provide better traffic management control within a certain region of the road network. This may allow the junction to be linked and co-ordinated with other adjacent traffic signalled junctions to influence the pattern and speed of traffic progression.

5.4 Pedestrian and/or cycling facility

If a controlled pedestrian crossing is justified within close proximity to a junction, it may not be feasible to implement due to relevant design standards. In this case, consideration should be given to signalising the junction to provide the pedestrian and/or cycling facility.

5.5 Developer funded schemes

A junction may be signalised to mitigate anticipated traffic impact of a development and/or anticipated increases in pedestrian flows.

5.6 Safer Routes to School

A junction may be signalised where the aim is to encourage more children to walk and/or cycle to school with less dependence on the use of the car.

6. Advantages and disadvantages of traffic signals

The following will be taken into account when appraising the proposal for new traffic signal junction.

6.1 Advantages

(a) Pedestrians can cross at traffic signal junctions by taking advantage of breaks in traffic caused by the intergreen periods (one approach losing right of way and the other approach gaining right of way). Where pedestrian movements are high or there are few gaps within the traffic flow, a separate full or partial pedestrian facility could be incorporated into the installation.

(b) They are usually more economical in their use of road space, particularly at constrained sites where physical restrictions could make other types of control more costly and difficult to provide.

(c) Their flexibility to assist specifically one particular approach (e.g. signalling right-turners separately) or category of road user, and their ability to respond to different traffic conditions.

(d) Their ability to link and co-ordinate with other adjacent signalled junctions to influence the pattern and speed of traffic progression.

6.2 Disadvantages

(a) They can produce increased delay during off peak times.

(b) They may increase the risk of certain types of traffic accident.

(c) They incur regular maintenance costs which are essential to the safe and efficient control of the junction together with the additional requirement to regularly monitor their operation.

(d) They do not cater for "U"-turning movements.

(e) To ensure the safe and efficient operation of the junction, no waiting “at any time” restrictions may have to be introduced. This may lead to loss of on street parking for residents and/or traders.

(f) They are not recommended on high speed roads (where the 85th percentile approach speed exceeds 65 mph).

6.3 Capital and revenue expenditure

The typical installation cost to provide traffic signal control at a simple T Junction is approximately £90,000 (2010 prices). In addition, the annual cost associated with their operation and maintenance requirements is approximately £2,850. Also, traffic signal equipment has a limited life cycle, ranging between approximately 6 to 15 years, therefore additional funds are required to upgrade this equipment after this period.

7. Removal of traffic signal junctions

It is possible that in the future traffic volumes may reduce or other factors may change which may require a junction not to be signalised. In this case, a risk assessment and public consultation will be carried out to inform the action to be taken. However, when the junction is due for an upgrade the evaluation for its need will always be carried out.