

Reading's traffic plan and what it achieved

At a cost of about £300 000, Reading CB between 1968 and 1970 introduced a traffic management scheme, which combined with the opening last year of the Inner Distribution Road (*SURVEYOR*, 5 February 1971), has had a dramatic effect on conditions in Reading's central area and even enabled the authority's public transport service to show an increase in passengers carried for the first time since 1964. Robin Wiseman reports.

THERE CAN BE LITTLE DOUBT that the Reading scheme has been a great success, as the DOE's annual report *Roads in England*, just published, points out. Journey times have decreased and there has been a reduction of about 30 per cent in personal injury accidents, besides the increase in bus passengers carried. The opening of the M4 at the end of last year should also have a marked effect on the town's traffic, but it is as yet too early to quantify this.

The story of the scheme is notable both for the extent of co-operation achieved, albeit with initial misgivings, and the adaptation of the plan to absorb

temporary measures which turned out to be unexpected successes, especially in the provision of bus lanes.

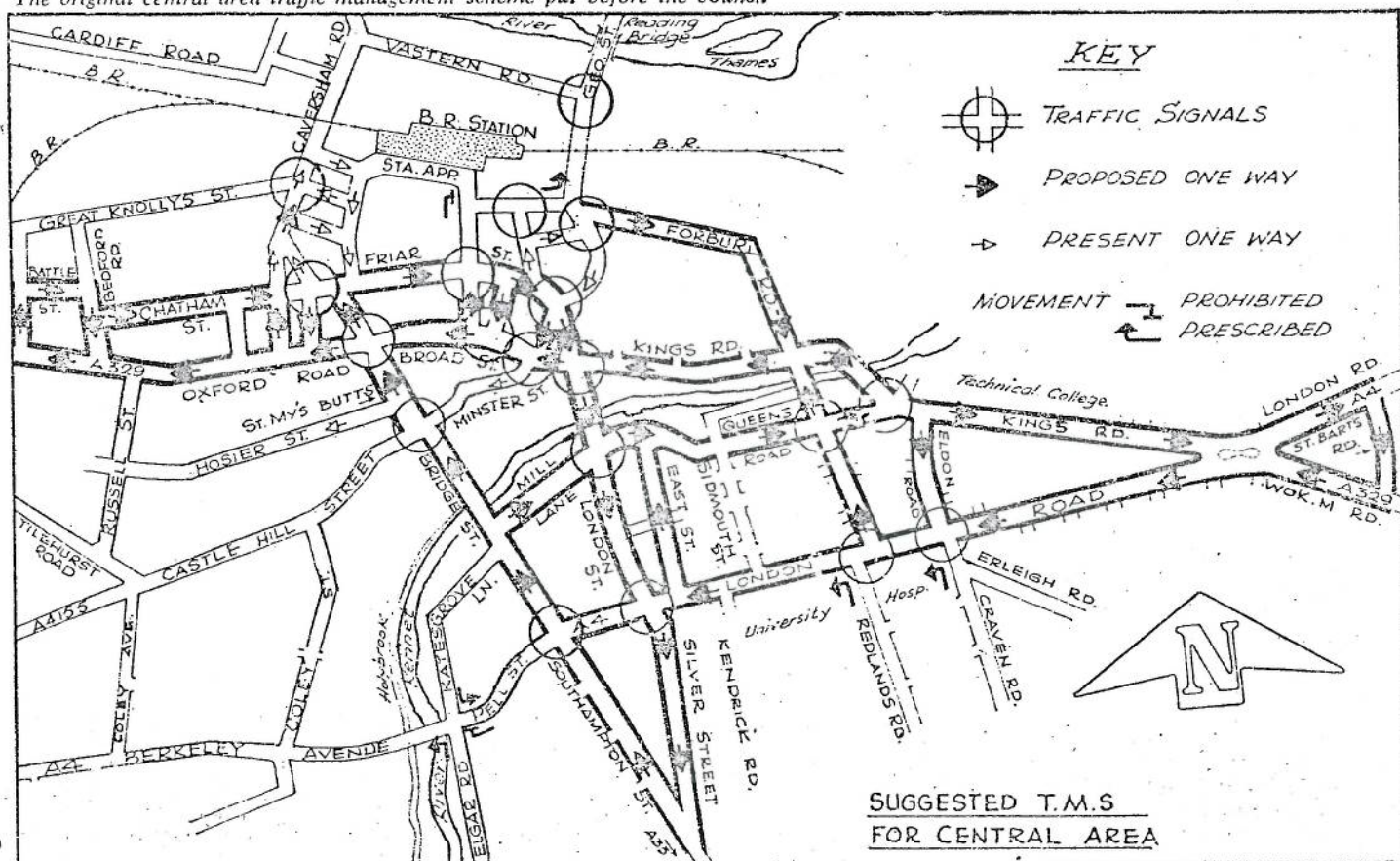
Prior to the start of the Central Area Traffic Management Scheme in 1966, Reading's traffic problems had been dealt with as they occurred in isolation and the town had been used for a number of experiments including seven X-way crossings. This sort of piecemeal solution was merely moving dangerous and congested spots from one part of the road network to another, and the Ministry of Transport's Traffic Advisory Unit, when it came to look at Reading in 1965, saw a comprehensive scheme

as the only solution capable of coping with future internal and through movement.

Limited by railways and two rivers, Reading's traditional radial route pattern inevitably focused all forms of traffic—local, regional and long-distance—into the central area, with the result that the preliminary collection of data at central area intersections showed that nearly all the area was being used close to capacity with overload conditions at most of the major junctions.

A one-way system was the obvious answer, but what form it was to take had to be decided with an assignment program using morning and evening peak hour matrices prepared from origin and destination figures resulting from a 1962 land-use transportation study. The program distributed traffic by assessing the shortest journey time from point to point and allocating traffic to routes on an all-or-nothing basis.

The original central area traffic management scheme put before the council



The aim of the network was to provide for:

- (a) The maintenance of traffic routes bypassing the town centre;
- (b) The maintenance of alternative traffic routes to avoid overloading individual routes and for emergency purposes;
- (c) The need to avoid essential major road works;
- (d) The maintenance of accessibility;
- (e) Minimal changes to the pattern of public service routine and access to main points of passenger attraction; and
- (f) The maintenance and improvement of the environment in residential areas.

A scheme based on pairs of natural complementary routes north/south and east/west was eventually chosen from the four tested.

The through traffic on the A4 was the cause of much of Reading's trouble, and this was magnified at the notorious 'Cemetery Junction' on the east side of Reading where the A329 Wokingham Road meets the A4. Here, for example, checks on the A4 west-bound approach (limited to single lane working) during a normal weekday morning peak hour indicated a total capacity flow of about 650 vehicles per hour against a total demand of nearly 920 vehicles per hour, representing an overall suppressed demand of some 40 per cent. This was limited only by the departure of half the suppressed demand from the queue using the nearest convenient alternative route via residential side streets.

The use of St Bartholemew's Road linking A4 and A329 to the east of the junction and the diversions of eastbound A4 traffic from London Road to Kings Road was proposed to remove all but local conflicting movements at the junction.

The St Bartholomew's Road proposal, however, met with opposition on environmental grounds when the plan went before the council. These doubts were resolved by terminating the one-way proposals at the main junction and re-casting it to provide a channellised layout.

Implementation of the one-way system over the rest of the town necessitated the introduction of ten new sets of traffic signals and modifications to eight existing sets, with a channellised layout at most junctions aimed at improving vehicular movement and giving help to pedestrians where it had before been impractical. Controlled pedestrian facilities were also provided at three additional sites.

A comprehensive system of street parking restrictions was already being introduced, coupled with a phased development of multi-storey car parks and this was generally found to be compatible with the traffic scheme.

At this stage, buses, which were destined to become a highlight of the finished product, had received little special

attention, and indeed, contra-flow techniques were considered impractical in view of the restrictions on street width and junction capacity.

Pedestrianisation, on the other hand, was being considered, and it was felt that the completion of the first two phases of the Inner Distribution Road, encircling the town centre, would be necessary before a start could be made.

The proposals were put before the council in January 1966, where they lay for a year while a number of problems were resolved.

Firstly, there was public transport

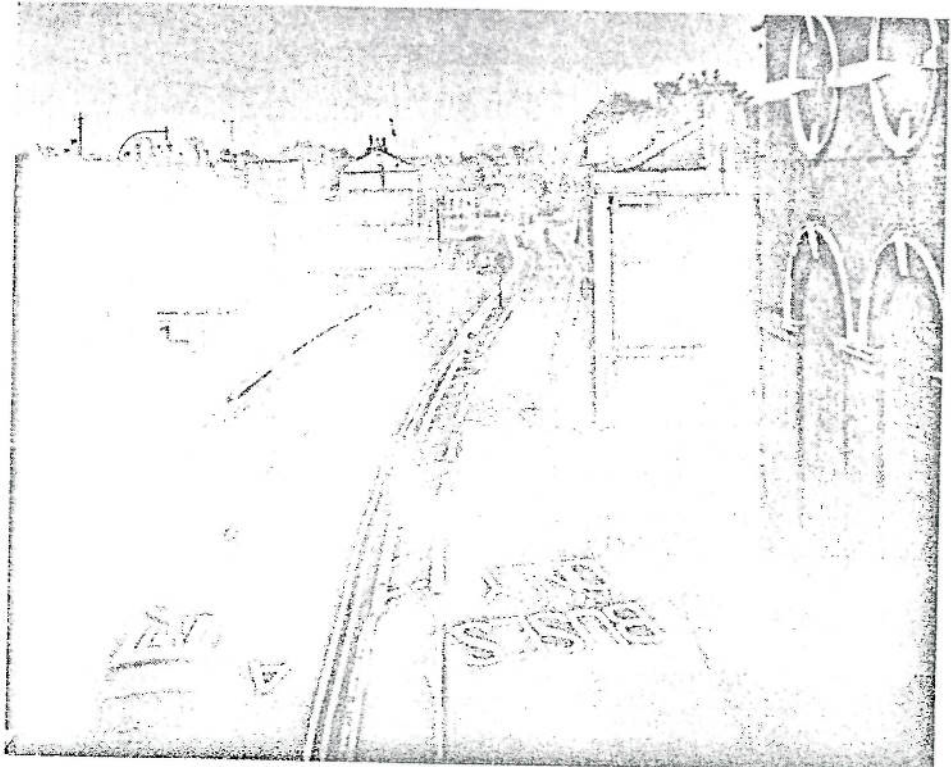
operation.

The diversion of eastbound A4 traffic into Kings Road had necessitated the use of Mill Lane, a hitherto little used road whose main function was to serve the Corporation Transport Depot which extends along much of its northern frontage. The use of the depot would have been seriously impaired by the influx of main through traffic because of physical limitations in its layout. The problem was solved by providing a partially segregated bus lane along the frontage of the depot which allowed buses entering or leaving service to short-circuit the



Above: This aerial view of Reading shows the present length of Inner Distribution Road, seen from the west

Below: Mill Lane, Reading, showing the bus lane introduced to help vehicles using the Transport Depot on the right



one-way system and, together with an internal circulatory system, permitted unimpeded movement within the building.

In addition, some routes in Reading were at that time still being operated with trolley buses, though these were gradually being replaced.

Rather than hold up the scheme or attempt to resite the overhead equipment, it was decided to use contra-flow facilities on the relevant part of the one-way network, purely as a temporary measure. This, as it turned out, was a significant decision which had a marked effect later.

Other problems which had to be resolved were: the effect of the scheme on frontagers; the design, delivery and installation of traffic signals in difficult conditions; and the involvement of staff in other concurrent schemes in the borough.

When considering the phasing for implementation of the scheme, it became apparent that the opening of the Severn Bridge in September 1966 could have a marked effect on A4 traffic and it was therefore decided to make the improvement of conditions on the trunk route the subject of the first phase. The measures to aid public transport and major junction works at 'Cemetery Junction' and Mill Lane/London Street, however, would delay this phase, so it was decided to divide it into two sub-phases (1A and 1B).

Phase 1A eventually came into operation on 16 June 1968 and the bus took its first nudge at the car as the Corporation vehicles (about 18 per hour) were allowed to use the contra-flow lane in

King's Road between 'Cemetery Junction' and Watlington Street. The Thames Valley buses (30 per hour), meanwhile, were confined to the one-way system.

The Reading police were very worried about this innovation and especially about the form that the lane would take. It had been agreed that a double white line would be specially approved, but the police considered that a physical barrier was essential. Eventually a compromise was reached and it was agreed to try the lane with advance warning signs, initial segregating 'Keep Left' bollard on islands and reflective studs between the lines.

It should also be pointed out that King's Road averages little more than 32ft wide, so with a bus lane of 10ft (plus double white lines), the combined A4 and A329 eastbound traffic would be restricted to two 10ft lanes, which at peaks would be used well up to capacity.

In the end, the experiment was a resounding success and many of the expected difficulties failed to materialise. Westbound buses were able to halve journey times to six minutes per mile over the half mile length, even at peak times. Even the Thames Valley buses confined to the one-way route showed a significant improvement in peak journey times, while vehicles permitted to use the bus lane to service frontage properties in off-peak periods created no particular problems.

One small difficulty arose from the lengthy headways between buses on the special lane—they created temptations

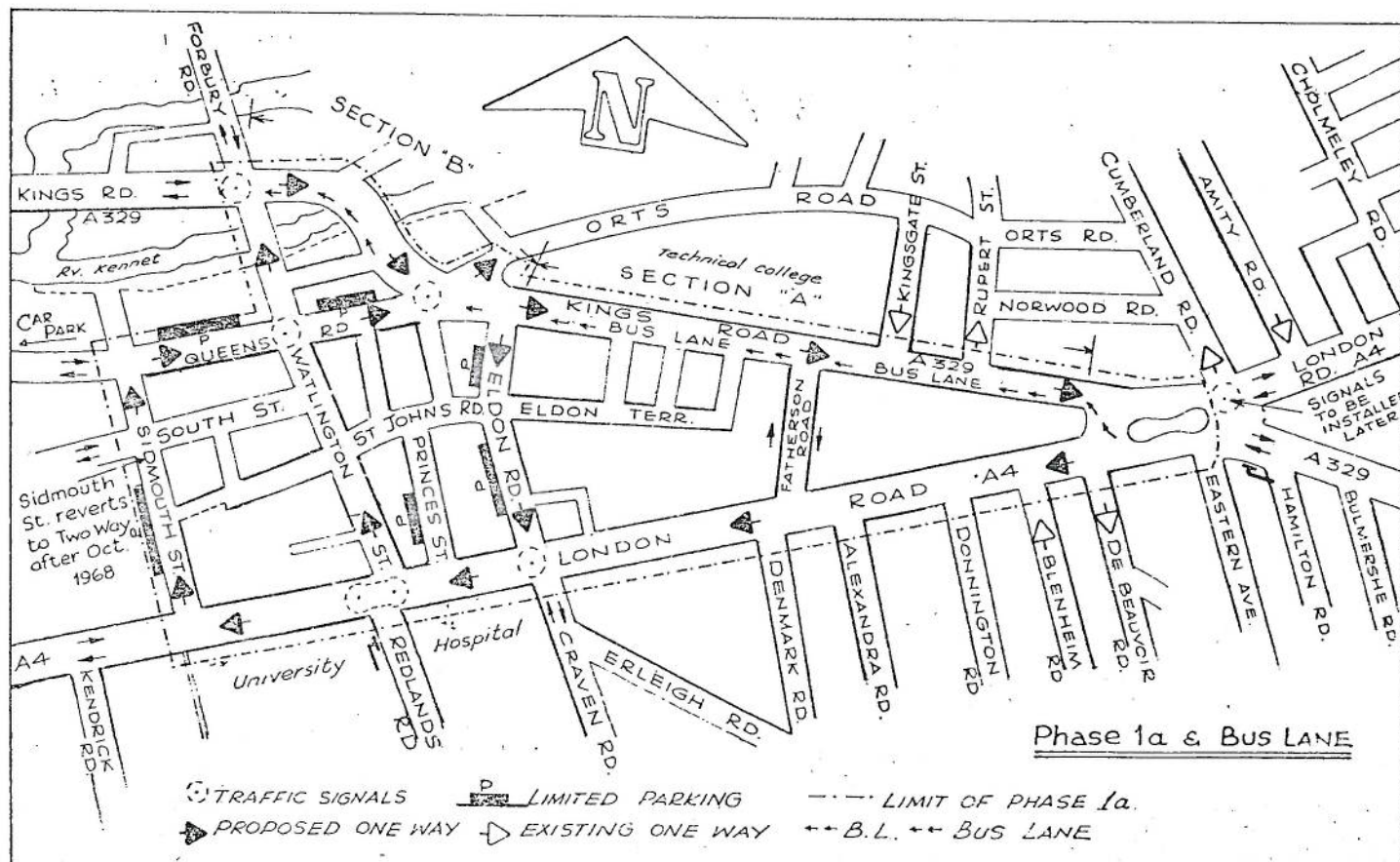
for other road users to stray into the bus lane, especially while road works at 'Cemetery Junction' were in progress, and this was one reason why it was decided to open the lane to Thames Valley buses as well from April 1969.

Surprisingly, this move only produced a marginal decrease in the county operator's journey times, while those of the Corporation buses increased slightly—a change attributed to the inability of the two sets of buses to overtake each other in the bus lane.

All phases of the Reading scheme were introduced by the council as Experimental Traffic Orders. Objections were invited and considered before the introduction of each phase, but the Highways Committee decided to proceed with the implementation and to reconsider objections in the light of experience after the initial experimental period.

Of the 40 objections received to Phase 1A, half related to waiting restrictions and, more worryingly, another third concerned noise from traffic in roads like Queen's Road, which had previously 'benefited' from lack of traffic due to the impossibility of getting into and out of the road at busy congested periods. The authority was both concerned and sympathetic over this nuisance and some relief was obtained by linking traffic signals to avoid noise from large vehicles stopping and starting, and, subsequently, by resurfacing the carriageway.

But, mostly, these objections only underlined the inadequacy of the Phase 1A proposals on their own and the necessity for speeding up the succeeding stages,



though it served to prove that piecemeal solutions would not have been the right answer.

Phase 1B was introduced in May 1969. It included the Transport Depot modifications, the remodelling of 'Cemetery Junction' and the straightening out of the staggered junction of London Street, Mill Lane and Queen's Road. An interesting part of the latter scheme was the inclusion in the traffic signal installation of the exit from the nearby Yield Hall multi-storey car park.

This was Reading's first multi-storey park and, up to this point, the two accesses were both two-way, causing long delays at the busiest times with queues creating chaos in the adjacent streets. The car park operators agreed to co-operate in reorganising their internal system to one-way, though with initial reservations. The simplified system, however, combined with the signal-assisted exit, has since met with the approval of all concerned.

The implementation of Phase 1B did throw an extra load on the town centre, causing over-saturation, requiring considerable police control and raising considerable doubts, but the council and the public generally accepted the need for the earliest possible introduction of the second phase. The opening of the first section of the Inner Distribution Road in November 1969 gave some relief, particularly to northbound traffic.

At this stage, a revised plan for the second stage was submitted to the council, recommending modifications in the light of the experience gained so far and

the progress in redevelopment elsewhere in Reading, notably increased parking facilities.

Among these modifications was the removal of through traffic from Broad Street, the main shopping street, and Queen Victoria Street, and the provision of contra-flow bus lanes in another four one-way streets. In November 1969, the council decided to adopt the report's proposals except those relating to Broad Street and the bus lanes in Oxford Road east of Bedford Road and an extension of the King's Road scheme.

Phase 2A was introduced in June 1970 and following this a working party of council members, their officers and representatives of the DOE was set up to sort out the remaining problems. One result of this was the acceptance by the council of the partial pedestrianisation of Broad Street which was implemented in November 1970 as Phase 2B.

The opening of the Inner Distribution Road's second stage in January last year created a much healthier situation by diverting local through traffic from the town centre and particularly from Friar Street, one of the few trouble spots remaining after Phase 2 was completed. The whole scheme has now been made permanent and work will start soon on the widening of footways in Broad Street to relieve pedestrian congestion.

Before-and-after studies

The implementation of the traffic management scheme, with its techniques evolving as the plan rolled along, is in-

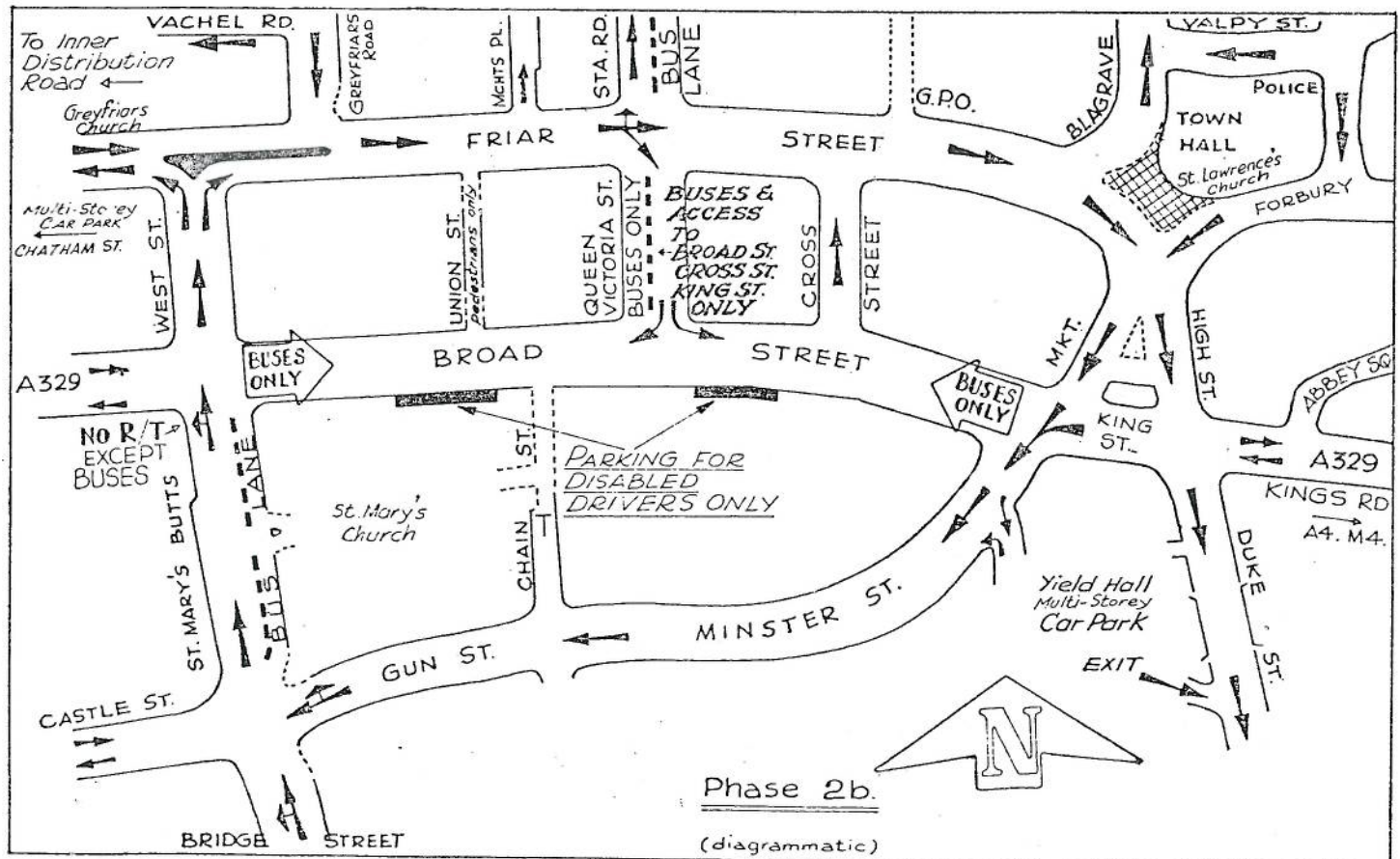
teresting in itself, but the results shown by the before-and-after studies show what can be achieved for an outlay of £300 000 (not counting the Inner Distribution Road costs). The main before-and-after studies were conducted over a period of three weeks covering Monday to Friday and the volume counts were seasonally adjusted because of a variety of circumstances including the extended time scale of phased implementation, with inception and completion dates occurring in different months of the year.

For calculating traffic volume changes, a cordon was established around the central area and counts made at each major road and some minor roads crossing the cordon. Two Streeter Amet counters were used to obtain directional flows at each cordon point on a continuous basis. All the main links of the network within the cordon were also subject to manual directional volume counts on a pre-determined programme which obtained hourly flows on a sample basis for the 12 hours 7am to 7pm, involving the use of up to 30 enumerators.

The table on page 18 shows how volumes have increased on both ends of the A4, by 21.5 per cent in the east and 17 per cent in the west. The cordon points shown radiate clockwise around Reading from London Road in the east to Reading Bridge in the north.

Journey times were measured during the time that the volumetric counts were taking place, using the floating car method. A series of routes were devised to cover all the links within the cordon

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Reading's traffic plan

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to obtain at least twelve runs during peak and off-peak periods.

Considerable changes can be found in average journey times on the three main routes, most notably in the evening rush hour.

On the London Road-Bath Road A4 route, morning peak times decreased by 12.8 per cent eastbound and 21.6 per cent westbound, and evening peak times by even more — 19.7 per cent eastbound and 36.9 per cent westbound, the latter journey time changing from 23.27 minutes to 14.68 minutes.

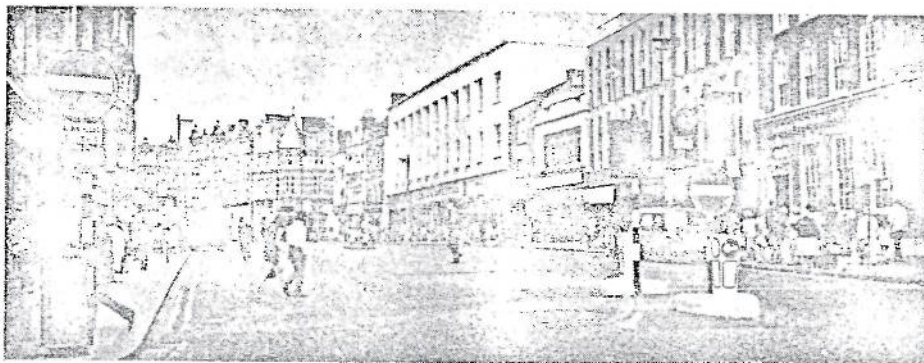
Reading Chamber of Commerce and Trade conducted a survey immediately following the introduction of Phase 2B to gauge the reactions of local traders. However, only 26 of the 188 questionnaires sent out were returned (which may be significant in itself).

These, in the main, accepted the scheme and expressed satisfaction with it. The main objections centred on the lack of purpose-built car parks to compensate for the loss of on-street facilities. Traders are also concerned that the scheme has tended to speed traffic through Reading and away from their shops.

But the CCT admits that faced with the alternative — a town centre choked with traffic — the traffic management scheme was preferable.

Considerable decreases were also recorded on the Oxford Road-Wokingham Road A329 route eastbound (by 15.1 per cent and 33.8 per cent during morning and evening peaks respectively), though decreases in westbound times were not so pronounced.

Only on the Caversham Bridge-Basingstoke Road A4155/A33 route were increases in peak journey times recorded — by 2.2 per cent northbound and 8.5 per cent southbound in the morning. Evening peak journey times on this route decreased by 20.12 per cent northbound and 0.8 per cent southbound.



Broad Street after Phase 2B. Work will start soon on widening the footways to relieve pedestrian congestion

VEHICLES PASSING THROUGH CORDON POINTS PER 12 HOUR DAY (7 am-7 pm)

Cordon Point	In	Before Out	Total	In	Out	After Total	% Total change
LONDON ROAD (A4)	8 581	8 599	17 180	10 555	10 324	20 879	+21.5%
WOKINGHAM ROAD (A329)	5 611	8 053	13 664	7 214	7 203	14 417	+5.5%
ERLEIGH ROAD	1 725	2 471	4 196	2 380	2 372	4 752	+13.2%
CRAVEN ROAD	535	599	1 134	1 304	1 198	2 502	+20.6%
REDLANDS ROAD	3 396	2 638	6 034	2 238	873	3 111	-48.4%
CHRISTCHURCH ROAD (A327)	6 581	6 592	13 173	6 018	6 502	12 520	-5.0%
BASINGSTOKE ROAD (A33)	9 287	8 944	18 231	9 498	10 150	19 648	+7.8%
BATH ROAD (A4)	11 440	11 882	23 322	13 272	14 005	27 277	+17.0%
TILEHURST ROAD	5 439	6 042	11 481	5 436	5 364	10 800	-6.0%
OXFORD ROAD (A329)	9 151	9 800	18 951	8 969	9 380	18 349	-3.8%
CAVERSHAM BRIDGE (A4155)	9 660	9 841	19 501	10 457	10 764	21 221	+8.8%
READING BRIDGE (B3345)	8 001	7 199	15 200	6 538	5 332	11 870	-22.0%
TOTALS	81 565	85 914	167 479	85 443	85 123	170 566	+1.8%
SEASONALLY CORRECTED TOTALS	80 757	85 063	165 820	82 954	82 644	165 598	-0.2%

Off-peak times were generally slower than the evening peak, but faster than in the morning.

From these two sets of data other changes in the system as a whole were calculated: The total vehicle hours within the cordon went down from 16 145 to 14 214; the total vehicle miles covered within the cordon fell slightly as did the average mileage covered per vehicle; the average journey speed and the average traffic speed in the system both rose by between 13 and 14 per cent, while the average time spent inside the cordon per vehicle dropped by 14.1 per cent.

Personal injury accidents have decreased considerably, both inside and outside the central area. Comparing the 3-year period 16 June 1965 to 15 June 1968 with that from 16 June 1968 to 15 June 1971, the total number of accidents within the central area fell by 29 per cent (from 1 152 to 817) and in the rest of the borough by 7 per cent (from 1 272 to 1 185), giving an overall decrease of 24 per cent. Two interesting figures were a 50 per cent cut in accidents involving bus passengers in the central area and a 13 per cent rise in accidents involving pedestrians outside the central area, though fatalities here dropped by 17 per cent.

Lastly, and very significant in this public transport-minded year, is the effect on the buses.

R C Jenkins, Reading's transport manager reports that, with the introduction of the majority of bus priority measures on June 14 1970, timekeeping improved immediately, together with the regularity of the services. The average mileage lost because of traffic congestion dropped

from 300 to 40 miles a week, but lost mileage in itself is not as serious as regularity of services and this is where the significant improvement has been achieved.

Over a two-mile distance within the area of the scheme, reductions in running time of 11 per cent off-peak and 13 per cent peak have been recorded in the east-west services. On north-south services, reduction of 22 per cent and 41 per cent respectively have been achieved over three quarters of a mile. While this represents only a saving of between two and five minutes per journey, drivers enjoy considerable benefit during their shifts.

As pointed out in the introduction to this article, this increased reliability has been reflected in passenger demand. Over a five-year period prior to the scheme, Reading CC's buses were experiencing an average passenger decline of about 2 per cent per year.

The financial year ending in April 1971, which included the introduction of Phase 2A in June 1970 and 2B in November resulted in an increase in passengers carried from 27 679 521 to 28 167 359, or 1.76 per cent.

The annual report of the National Bus Company published on 7 July last year recorded a passenger decline of 10 per cent over a similar period in 1970, reflecting similar trends reported by other municipal operators. Reading's bus revenue increased by £58 000 in the last financial year, £21 000 of which was directly due to increased fares and £37 000 to the traffic management measures.

With an estimated saving of some £760 000 attributable to the reduction in vehicle hours and accidents (though some proportion of this total must be ascribed to the Inner Distribution Road), the £300 000 spent on the traffic management scheme begins to look like a very worthwhile investment in the future of the borough.

I would like to express my thanks to K H Thorpe, borough surveyor and planning officer, Reading CBC; Traffic Advisory Unit, DOE; R C Jenkins, transport manager, T M Clarke, principal traffic engineer, and C F Ridler, chief assistant engineer, all of Reading CBC; and Reading Chamber of Commerce and Trade, for their assistance in the preparation of this article.