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Street adaptations in residential areas: a survey of local authorities in England and Wales

by Liz Beth, BA, MSc, Senior Planning Assistant, Barnsley Borough Council and Tim Pharoah, MSc, MRTPI, MCIT, Senior Lecturer Department of Town Planning, South Bank Polytechnic

Purpose of survey. Traditional street layouts are often inconvenient and dangerous for residents and pedestrians because of the presence of parked vehicles and traffic moving legally at up to 30 mile/h, and illegally faster than that. Children, who spend a larger proportion of their time in residential streets, suffer particularly from the domination of motor traffic. In recent years there has been a growing interest amongst local authorities in possibilities for adapting the layout of residential streets to achieve greater safety and a better environment.

A postal survey of local authorities was undertaken in 1986 in order to find out which authorities had undertaken adaptations to traditional residential roads, and what form these adaptations had taken. Questions asked included whether or not a safety problem on residential streets was perceived to exist, whether any traffic management schemes had been initiated with a view to making residential roads safer, and whether speed control humps had been installed. Details of schemes requested included the reasons(s) for schemes being implemented, consultation procedures and whether any other schemes had influenced the design of the scheme.

A 'Woonerf'-style treatment in Lynton Street, Derby: shared surface, no kerbs and alternate planting to create chicanes for slowing traffic.



Organisation of the postal questionnaire

The questionnaire was sent to every District and Borough Council in England and Wales, to the chief executive in the first instance for forwarding to the relevant department, unless the council had an overall Technical Services Department in which case the questionnaire was sent directly to the Head of Technical Services. Despite the fact that the County is normally the highway authority, every scheme known beforehand had been initiated by a lower-tier authority. Some Districts considered the subject outside their area of responsibility, and 34 referred enquiries to the County as the highway authority. The blurred responsibility for this type of work was revealed by replies from Counties where questionnaires had been forwarded, for more than once the County referred us back to the District for details of schemes. A second survey of Counties could have been undertaken, but the replies from Counties as a result of forwarded questionnaires only confirmed that no adaptations had been undertaken, or provided less information on schemes than had been received from other Districts in the County. These replies have been included under the District(s) they were replying on behalf of.

From the 380 questionnaires posted 182 replies were received, so there was a response rate of nearly 45 per cent. The option of conducting the survey on a sample of local authorities was considered, but rejected due firstly to the expected low response rate on account of the difficulty of targetting the questionnaire. Not only was there an unclear responsibility between County and District, there was also variation in the department handling such matters. The great majority of responses came from either Engineering Departments (42 per cent) or joint departments such as 'Technical Services' or 'Development' (43 per cent). However, 13 per cent were returned from Planning Departments and 2 per cent from other Departments. The individual officers completing the questionnaire overwhelmingly were engineers (73 per cent), while planners completed 17 per cent and other officers completed 10 per cent.

Secondly, the varied and sometimes unique nature of these schemes made a total survey the best method of gathering information on the range of schemes undertaken as far as the response rate allowed. In the event there were usable responses from 61 local authorities which described a total of 212 adaptation schemes undertaken, a reasonable number for analysis.

Results

A simple count of local authorities undertaking any form of residential road adaptations showed that 71 out of the 182 respondents had done so. This means that authorities with adaptations is a minimum of 17 per cent (assuming that all those with adaptations did reply) and a maximum of 39 per cent (assuming that the response is representative). This revealed a greater interest in adaptations than was originally anticipated. Although the questionnaire was more complex for authorities that had undertaken adaptations to residential roads, the response rate appears to be slightly better from authority types having a greater incidence of adaptations. There are exceptions, however: while London authorities had one of the lowest response rates, they are known to have one of the highest rates of adaptations undertaken.

A major hypothesis of this survey was that most authorities undertaking adaptations would be responsible for large urban areas with greater traffic problems and therefore more accidents on residential roads. This was tested by grading authorities into three groups dependent on the size of the largest urban area they included or were part of. The definition of urban areas was taken from the 1981 Census, and the population size groups were taken firstly as those urban areas with a population of more than 200 000 people present; secondly, those areas with populations greater than 70 000 but less than 200 000; and thirdly, the mainly rural areas with no one urban area having a population of 70 000 or over. The last group included approximately one-half of the replies (87), so that the authorities dealing with larger urban areas have effectively been subdivided to double-check any correlation of variables with the size of urban areas. Table I compares variables according to this urban size classification.

Although less than one-third of local authorities (LAs) were in the 200 000+ category, this group accounted for 59 per cent of all schemes. Nearly one-half of LAs were in the less than 70 000 population group, but these LAs accounted for only 19 per cent of the schemes. Eighty-four per cent of LAs in this group had no schemes at all. This group accounted for over 60 per cent of LAs with no schemes.

Looking at the types of scheme, 77 per cent of the LAs with urban populations over 200 000 had Traffic Management (TM) schemes (44 per cent of all TM schemes reported) compared to only one-third of the LAs with a population less than 70 000.

This pattern is even stronger when physical adaptations are looked at. Fifty-two per cent of LAs with adaptations had urban areas over 200 000. Again, 77 per cent of these had adaptations compared to one-third in LAs with under 70 000 (both these relationships were statistically significant on the Chi-square test at the 1 per cent probability level).

There is a close relationship between population size and an LA's concern about pedestrian safety. Forty per cent of LAs expressing concern were from areas with urban populations of 200 000 plus, while over one-half of LAs with under 70 000 said they had no concern (probably meaning that this was not a perceived problem). When concern about pedestrian safety was directly related to LAs with physical adaptations it was found that 56 per cent of LAs expressing concern had carried out adaptations. Read another way, nearly one-half had not! On the other hand, 20 per cent of LAs expressing no concern had made physical adaptations (This relationship was significant at the 1 per cent probability level on the Chi-square test.)

This relationship between the size of urban areas and the likelihood of adaptations and TM schemes was perhaps to be expected. So was the correlation between

Table I. Effect of urban population size on selected variables

	Population size			Total
	200 000+	70 000-200 000	<70 000	
Number of responses	58 (32%)	37 (20%)	87 (48%)	182 (100%)
LAs who expressed concern	39 (40%)	22 (23%)	36 (37%)	97 (100%)
% of size group answering Yes	68%	60%	41%	
LAs with traffic management schemes	44 (44%)	24 (24%)	33 (33%)	101 (100%)
% of size group answering Yes	77%	65%	38%	
LAs with physical adaptations	37 (52%)	18 (25%)	16 (23%)	71 (100%)
% of size group answering Yes	65%	49%	18%	
Total number of schemes	125 (59%)	47 (22%)	40 (19%)	212 (100%)

the perception of an accident problem on residential roads and the size of the urban area.

The greater use of TM schemes to improve the safety of residential roads (101 authorities had done this) shows that the 'Buchanan approach' is still the more usual method used to improve the safety of residential roads.

Local authorities were also classified by type, adapting the classification of Craig¹ for the Office of Population Censuses and Surveys (OPCS). A good relationship was found to exist between District Type (DT) and LAs which have made physical adaptations. Table II describes the DTs and shows (a) the response rate for each DT; (b) the percentage of LAs in each DT in England and Wales; (c) the total number of adaptation schemes in each DT; (d) the frequency of replies from each DT; and (e) the number of authorities which have physical adaptation schemes in each DT. Percentages are given in brackets. Percentages for (c) and (d) are percentages of all schemes and LAs responding respectively. Percentages in (e) are of LAs in each DT with schemes.

The object of grouping LAs in this way was to test for any other variables on the incidence of residential road adaptation. A further correlation of rural areas with few schemes can be seen, and the near-

universal incidence of adaptations undertaken in the traditional manufacturing areas perhaps reflects the concentrations of older terraced housing in these areas. This is probably due to the larger number of General Improvement Areas (GIAs) and Housing Action Areas (HAAs) in areas of terraced housing for, as will be shown, these schemes financed almost one-half of all adaptations.

It can be seen that the greatest concentration of schemes (i.e. DTs which have the greatest percentage of LAs having schemes) is in DTs 8 and 11 with 82 per cent and 83 per cent respectively of LAs having implemented schemes. Together they account for one-third of all schemes. Other areas with large numbers of schemes are DTs 6, 7 and 9 which had 10, 12 and 20 per cent respectively of all schemes. However, in these three areas the schemes appear to be concentrated within particular authorities (some individual councils having nine or more schemes). The percentage of LAs in these three areas with schemes is 35, 30 and 60 per cent respectively.

The DTs having the least number of schemes are DTs 1, 3 and 4, each with only nine schemes, and with at least two-thirds of LAs having no schemes. DT2 had no schemes at all. The relationship between DTs and number of schemes is statistically significant at the 1 per cent probability level on the Chi-square test.

Table II. Profile of District Types (DT)

DT Description	(a) Response rate (%)	(b) % in England and Wales	(c) No. of schemes	(d) No. of LAs who replied	(e) No. of LAs with schemes
1 Established high status	44.8	14.6	9 (4)	26 (14)	5 (19)
2 Higher-status growth areas — mainly rural	56.5	5.8	0 (0)	13 (7)	0 (0)
3 Higher-status growth areas — mainly urban	34.8	5.8	9 (4)	9 (5)	3 (33)
4 More rural areas	35.8	19.9	9 (4)	29 (16)	5 (17)
5 Resort and retirement areas	55.2	7.3	12 (6)	17 (9)	5 (29)
6 Mixed town and country (mainly rural)	53.8	9.8	22 (10)	20 (11)	7 (35)
7 Mixed town and country (mainly urban)	40.6	16.9	25 (12)	27 (14)	7 (30)
8 Traditional manufacturing	47.6	5.3	44 (21)	11 (6)	9 (82)
9 Service centres and freestanding cities	64.5	7.8	42 (20)	20 (11)	12 (60)
10 Areas with much LA housing	40.0	2.5	11 (5)	4 (2)	2 (50)
11 Parts of inner London	35.3	4.3	29 (14)	6 (3)	3 (83)
Total (average)	46.3	99.9	212 (100)	182 (100)	61

Table III. Details of the schemes

		Physical adaptation schemes described		Responding LAs with such schemes	
		Number (Max. 212)	%	Number (Max. 61)	%
Age of adjacent housing	Pre-1919	129	61	52	85
	Inter-War	34	16	23	38
	Post-1945	27	13	16	26
	Mixed	14	7	12	20
	Not stated	40	19	11	18
Other authority(ies) involved	County	62	32	24	34
	Central Government Agency	5	4	5	9
	Other	13	6	5	8
	Not stated	142	67	46	75
Reasons for implementing	Improved safety	112	53	54	89
	Improved environment	143	66	54	89
	Residents' demand	113	53	44	72
	Other	24	11	10	16
	Not stated	22	10	7	12
Method(s) of funding	GIA/HAA	90	43	28	46
	Traffic and road safety budget	7	3	5	8
	Inner urban/area programme (IAP)	6	3	2	3
	Housing (HIP)	13	6	10	16
	Other sources	21	10	16	27
	Mixture of 2 or more	6	3	5	8
	Not stated	74	35	21	34
Techniques employed in adaptations	Pinch-points	86	41	40	66
	Pavement widening	83	39	38	62
	Junction narrowing	71	34	31	51
	Road closure	54	26	24	37
	Carriageway twist	36	17	21	34
	Speed humps	29	14	15	25
	Pedestrianisation	17	8	7	12
	Refuges/bollards	17	8	6	10
	One-way working	13	6	8	13
	Changed surface	9	4	7	12
	Shared surface	7	3	3	5
	Other	74	35	28	46
Mixture of 3 or more	71	34	34	56	



Above: Junction narrowing coupled with footway build-out in Broomhall, Sheffield; and below: another footway extension, outside a school in Camden, London.



Further analysis of adaptation schemes undertaken

Of the 71 authorities who had reportedly undertaken residential road adaptations only 61 gave details of any schemes. Some of these included schemes to increase parking provision only, while one authority mentioned carriageway widening schemes in order that motor vehicles could pass each other easily. While such measures may improve safety for some groups of road-users, they are not likely to satisfy environmental or pedestrian priority objectives. Most authorities, however, described schemes which were 'pedestrian-friendly'. The questions were somewhat ambiguous, but the authors were keen not to exclude schemes by being too specific. Another difficulty is that there is a variety of terminology applying to such schemes which is in itself often ambiguous. Although it has not been possible to separate out the few schemes which were designed for other objectives, it is the responses that described schemes aiming to improve pedestrian environment and safety that are of the most interest. The following results are based on the total of 212 schemes mentioned by the 61 LAs.

Of these 61 LAs, 37 had undertaken speed-reduction measures on residential roads (58 per cent). Only six LAs specified that these measures were speed humps, although several authorities wished to install speed humps but were deterred from doing so by the siting requirements of the Department of Transport (DTP). Even so, the majority of speed-reduction measures described as implemented or proposed were not speed humps.

Table III provides a summary of how the 212 schemes and 61 LAs varied on a number of key factors such as age of adjacent housing, other authorities involved, funding, reasons for implementation and what techniques were used.

Almost one-half of these schemes (43 per cent) were done as part of the environmental improvements within the GIAs and HAAs, and this may explain why the most mentioned reason for doing them was given as environmental improvement. To verify this a cross-tabulation was done between the number of schemes receiving GIA/HAA funding and LAs reporting 'improved environment' as a reason for implementation. Ninety schemes (43 per cent) stated improved environment as a reason and had GIA/HAA funding which would appear to confirm the relationship. It should be noted that most schemes were done for more than one reason, and many authorities (quite rightly, in the authors' view) did not want to specify a main reason for some or even all of their schemes.

The majority of the schemes (142 or 67 per cent) were done by the responding authority unaided and the level of involvement of the County (in 32 per cent of the schemes) was mostly as the authorising highway authority, their financial involvement was much more limited. Several of the sources of funding used are available only to a limited number of

authorities. The widespread use of area improvement grants and, to a lesser extent, Urban Programme grants for this work may suggest that authorities without access to these funds will be less able to implement adaptations to residential roads. These authorities will tend to be those covering the smaller urban areas and mainly rural districts. Indeed several authorities pointed out that they would like to make adaptations to residential roads, but could not afford to.

Turning to the techniques themselves, alterations to the horizontal alignment of carriageways and kerbs are the most popular techniques. Shared surfaces are legally difficult to implement on existing streets. There is a rather low incidence of surface changes to carriageways, but unlike the more popular techniques this measure had to be detailed by the respondent and was not a suggested response in the body of the questionnaire. The number of such schemes may therefore be under-represented.

Table IV shows the nature of the residents' consultation procedures which were undertaken by the LAs.

Table IV. Nature of residents' consultation

Nature of consultation*	Number of LAs using it	%
Residents' Group liaison	16	31
Public meetings	24	46
Survey	1	2
Leaflets	3	6
Letter to residents	5	10
Other	3	6
Total	52	100%

Only 15 per cent of the 212 schemes included in the survey response had been evaluated.

Few LAs were influenced by the Dutch or German schemes (5 per cent). Design Bulletin 32² had considerably more influence (23 per cent), especially among the engineers (28 per cent). Conversely, more planners than engineers were familiar with the overseas schemes (13 per cent). In many authorities a combination of influences is apparent, with 25 per cent reporting being influenced by two or more 'external' factors. However, nearly one-half considered their schemes 'unique' to local circumstances and based on local initiative.

Summary

The survey found evidence of street adaptations by 71 of the 182 authorities responding to the questionnaire (39 per cent of respondents). There were wide variations in objectives, techniques, implementation and awareness of European practice. The 'Buchanan approach' to road safety in residential areas using environmental traffic management is more common than physical redesign of streets (101 as compared to 71 respondents).

The hypothesis that adaptations are more likely to be carried out by authorities in larger urban areas was supported by the survey results. It is clear that the incidence of adaptations owed much to the various

techniques for the renewal of older housing areas, with almost half the reported adaptations being financed from GIA or HAA budgets. Almost all traditional manufacturing towns reported schemes in this context. Indeed, access to special funds of this sort has a large influence on whether a local authority is likely to implement schemes. It also has a bearing on the type of scheme, with those forming part of an urban renewal project being concerned with environmental as well as road safety objectives. Most schemes (67 per cent) were undertaken solely by the responding authority, and the level of County involvement was small. Nevertheless, the responsibility for such schemes is not always clear, as shown by the fact that 32 Districts referred the questionnaire to the County for reply, and some Counties referred them back again!

Of respondents giving details of schemes, 58 per cent claimed to have carried out adaptations designed to reduce traffic speed. Only 16 per cent of these, however, specified that speed humps had been used. Some authorities expressed a wish to use humps, but had been deterred

by DTp regulations (a situation that should have changed since more flexible siting requirements were issued by the DTp.)

The type of scheme most commonly used involved a change in the horizontal alignment of carriageways and kerbs. Changes in vertical alignment (including humps) and the use of shared space were rare. Few schemes used a combination of different measures to reinforce the effect, or to satisfy a number of objectives, and fewer still (if any) could be described as part of an area-wide programme to achieve wider transport objectives. In this respect in particular, practice in the U.K. lags far behind that in neighbouring European countries.

Consultation with residents was widely undertaken, with 77 per cent of respondents using 'face-to-face' techniques,

either liaison groups or public meetings. The popularity or effectiveness of schemes is largely unknown, however, since only 15 per cent of them had been the subject of evaluation. Despite the large amount of experience of this kind of work in other European countries, few local authorities were aware of it, or even admitted to being influenced by external sources. Even Design Bulletin 32 was cited by only 23 per cent of respondents.

Conclusion

In conclusion, the survey of local authorities found that by no means all perceived the safety and environment of residents as a particular problem, especially those representing smaller populations. Amongst authorities who have implemented physical measures there are wide variations in enthusiasm and approach, often depending on urban renewal policies rather than the benefits to be gained from street design *per se*. In other European countries reconstruction of residential streets to achieve a variety of objectives has been standard practice since the early 1980s, or even earlier, and a considerable amount of work has been undertaken to evaluate the consequences of the various techniques. It is unfortunate that local authorities in England and Wales are largely unaware of this work, and also have themselves undertaken little evaluation of the rather limited range of techniques employed. If there is to be a major expansion of street adaptation activity, and such an expansion is long overdue, then there is much to be gained by learning from the experience of other European countries. The collation of such experience, and translation into a form useful to British authorities, is therefore an urgent task.

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Mr Pharoah's address: Department of Town Planning, South Bank Polytechnic, Wandsworth Road, London SW8 2JZ.

A raised carriageway provides a continuous footway across this T-junction at Millbank in Westminster, London.

