# INVOLVING THE PUBLIC IN REDESIGNING URBAN STREET LAYOUTS IN THE UK

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## ABSTRACT

There has been growing interest in the UK in redesigning main urban streets, in order to meet new policy objectives relating to efficiency and sustainability. Traditionally, engineers design their preferred scheme, and then seek public approval through a 'consultation' exercise. In areas of intense street activity this can result in strong local opposition, sometimes resulting in proposals being abandoned.

The paper describes an interactive street design exercise which was developed to deal with these more contentious situations by directly involving local stakeholders in developing design options. The exercise involves a combination of physical and computer-based design aids and has three stages.

First, participants are given a briefing about the area, the current conditions, and any minimum design requirements (e.g. associated with local policy objectives), and discuss how they would like to see the area improved. Next participants divide into smaller groups, where they are provided with a large scale plan of the street, at 1:250, and a series of acetates and blocks depicting different features (e.g. parking bays, bus lanes, seating) to scale. Each group is asked to develop street layouts that they feel meet both the minimum requirements and their aspirations for the area.

Finally, each design option is entered into a GIS-based computer program that displays the street layouts, and is presented on a large screen for collective discussion. The outcome is either a preferred option, or a small number of options, that can be further developed by the engineers and then put forward for formal public consultation.

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By Peter Jones and Roselle Thoreau

## INTRODUCTION

Highway authorities in the UK often experience difficulties in introducing new street layouts and traffic regulations on busy high streets, due to opposition from local traders and residents. Traditionally, traffic engineers develop one or more street schemes solution(s) and then consult local residents and businesses, seeking approval for their proposals. In this approach local people have very little input into the design process, so their concerns and ideas are not incorporated, they have little understanding of the limitations faced by traffic engineers and they have little sense of ownership of the final scheme. As a consequence, there is often strong local opposition to the resulting road scheme, which is seen as having been 'imposed' on local people, and in some cases the proposals have to be abandoned.

The paper describes a public involvement exercise that has been developed to deal with these more contentious types of situation and which directly involves public stakeholders (local residents, business groups, etc.) in developing street design options, with support from the traffic engineers and transport planners, in advance of going out to formal public consultation.

There is an extensive international literature on methods for consulting and engaging public stakeholders in project planning, design, assessment and implementation. Much of this derives from planning, housing and environmental justice literatures, but there are some examples that focus specifically on transportation planning and schemes. In the USA, a wide range of public involvement exercises are carried out, using a variety of techniques, at different scales and with different target groups in mind *(1)*. In the UK, general advice on public involvement is provided in IHT *(2)*, while a recent European Commission funded project looked more broadly at stakeholder engagement procedures, and case study applications, across a range of European countries *(3)*.

What all these documents stress are the benefits of citizen involvement throughout the planning, design and implementation process, but in particular as part of the process of identifying problems or developing a local vision, and generating outline solutions. They also stress the need to engage with a broad range of people, and GUIDEMAPS *(3)* gives specific advice on how to engage with hard-to-reach groups.

Street design has historically been regarded as an activity that needed to be carried out by trained traffic engineers, due to the knowledge required to understand the rules and constraints that shape the opportunities for marking out the use of street space. Designers need to know what types of designated use are permitted on the highway, along with the details of a wide range of regulations affecting sizes and location; for example, the required sizes of parking bays, the minimum width of bus lanes, how close parking and loading bays may be provided to junctions or pedestrian crossings, or the minimum width of a pedestrian footway. One of the aims in developing the procedures described in this paper is to provide members of the public with tools that enable them to understand many of these constraints on street space design, so that they are aware of what can and cannot be incorporated into a design.

Another aim is to encourage more innovative and creative thinking about design options, both in terms of the kinds of facilities that are provided, and the ways they might be combined into street layouts. The procedures were developed as part of the UK 'DISTILLATE' project, funded by the EPSRC (Engineering and Physical Sciences Research Council), under a work

stream dealing with improved methods for option generation. As part of this project, Jones and Lucas *(4)* reviewed a wide range of option generation methods, covering both 'inside' and 'outside the box' approaches. The methods described in this paper come under the general heading of 'constrained option solutions', which represent a special case of 'morphological box analysis'.

Conventional morphological box analysis was first proposed by Zwicky *(5)*. It starts with a fixed set of design features (e.g. the main components of a vehicle, such as the engine, suspension, gearbox, etc.) and itemises the various forms that each feature might take (e.g. diesel engine, petrol engine, hybrid engine). It then systematically generates the full set of design permutations representing all the different combinations of forms of each feature. Constrained option solutions similarly start with a set of features and possible forms that each feature might take, but the generation of permutations of options is explicitly constrained, in some way. This may be through an explicit financial constraints, as in the Priority Evaluator *(6)*, or a set of temporal constraints, as in the Household Activity Travel Simulator *(7)*, or – as in this paper – spatial constraints.

In the application described in this paper, the features are street design elements (e.g. traffic lanes, parking/ loading bays), and the forms represent alternative uses for that type of space (e.g. bus, cycle or general traffic lanes; general parking, disabled parking, or loading bays). While these design features can be introduced to varying degrees and in different forms, there are strong spatial constraints limiting the total amount of provision, and some aspects of the precise location of that provision.

These procedures build on two previous research studies. The first started to develop physical design aids to assist in urban arterial street design *(8)*, and the second *(9)* developed computer-based techniques for designing urban street layouts. The work described here advances both kinds of techniques and uses them in combination, to maximum effect.

They have been developed to encourage more inclusive and interactive stakeholder engagement, and stimulate more innovative thinking about how street space might be allocated, taking into account various street user needs. They can be used by public stakeholders with no prior technical knowledge in design groups, with a certain amount of facilitation and assistance from local authority professionals, and may also be usefully applied as part of a training package for newly qualified professional engineers and planners.

**Case study area**

The design exercise described in this paper took place in the centre of Bloxwich, a town to the north of Birmingham, in the English West Midlands, with a population of roughly 40,000. Bloxwich has a shopping high street that is approximately 700 metres in length. It is a busy high street which contains 89 shops and businesses, 5 public houses, 2 large supermarkets, 1 school, 2 churches and a prosperous open air market. The high street is a major arterial route for traffic in the West Midlands, with approximately 20,000 vehicles passing along it in both directions in a 12 hour period on a weekday; 20 bus routes also pass through the area. As a result the road is very busy, there is considerable pressure on parking/and loading spaces on the high street and a concentration of traffic accidents at junctions and pedestrian crossing points. One section of Bloxwich High Street is shown in Figure 1.

The West Midland authorities are currently introducing a phased programme of 'Red Routes' across the whole conurbation. These were originally introduced in London, and consist of a new series of traffic signs and road markings that are intended to improve traffic and

parking controls, in a way that is more understandable to motorists. The main objectives of Red Route schemes are to reduce traffic congestion, improve conditions for buses, cycles and pedestrians, and reduce traffic accidents. This is achieved by reassessing the use of road space and preventing stopping in areas where it would cause delays or represent an accident risk, backed up with strong enforcement.


**Figure 1: Section of Bloxwich High Street**

The local council had previously consulted on a possible Red Route scheme for Bloxwich High Street in 2003. The previous scheme had been based on a design developed by an external consultant, but this had not been well received at a public meeting and had been rejected by local politicians. The council wanted to develop a new scheme which recognised the range of interest groups and objectives, including those of retail/commercial businesses, local residents, through traffic and road safety, public transport, pedestrians and the need to support the local economy and enhance the local environment. They decided to adopt a more innovative approach, and to work with University College London (UCL) and Buchanan Computing Ltd., in developing a new methodology that used a combination of physical and computer-based design tools.

The exercise had three main objectives, namely to:

- Gain an understanding of what local stakeholders (residents and businesses) would like to see included in the designs;
- Discuss the demands of different High Street user groups, and how they might be traded off or reconciled; and, as the output of the design exercises, to
- Generate a design – or designs – to be published for general public consultation.

## METHODOLOGY

The exercise involves three stages and two sequential workshops: (i) project briefing, (ii) the initial option generation design exercise, and (iii) refinement and selection of the preferred

option(s). Stages (i) and (ii) are covered in the first design workshop, and stage (iii) in the second. Both workshops last for around two-and-a-half hours. Each stage is described in more detail below.

**Project Briefing**

The participants in Bloxwich were first given a presentation explaining the objectives behind introducing the Red Routes network in the West Midlands, and the regulations under which they operate. They were then introduced to the exercise, with a description of existing conditions along Bloxwich High Street (e.g. traffic delays, accident rates at key junctions), and reminded of the existing traffic regulations (marked on small scale plans). Any necessary minimum design requirements (e.g. provision of X parking spaces for disabled drivers) were also specified. Participants were then invited to discuss any other general issues that the design exercise should address when allocating street space, such as providing better pedestrian crossing facilities or stimulating Bloxwich as a shopping area. This was followed by a briefing about how the design section of the workshop was being run.

**The Option Generation Design Exercise**

For this exercise the participants were divided into two smaller design groups, with seven participants in each group. The design exercise involved the following steps:

1. Each group was provided with a street plan of the high street at a scale of 1:250, showing the road layout, building line and individual premises. The plan labelled every building, showing the shop/business name and marking any area to the rear of the premises that was available for loading or private parking. To help participants in orienting themselves on the plan, some photographs were provided and they were invited to identify on the plan their premises or the shops/businesses they usually visited.

   The plan marked out a minimum set of requirements that constrained the design exercise, namely:

   - The fixed building line, and a minimum clear footway width in front of the buildings on either side of the carriageway of 2.0 metres (2.5 metres in all, to allow for street lighting, etc);
   - The minimum amounts of kerbside ‘no stopping’ (double red) markings were shown on the plan around side road corners and at major junctions, that were required for traffic safety or congestion reasons; and the plan also showed
   - Areas that could be allocated for additional parking and loading spaces on the side roads adjoining the high street, and the availability of private loading/parking spaces behind the buildings.

2. The groups were then invited to decide on how the space along the high street should be allocated, both in terms of the traffic running lanes (e.g. by adding a cycle or bus lane) and the use of the kerbside (e.g. for parking, loading or for footway widening). Each group had at least one facilitator and one engineer available to them.

   This part of the exercise was subject to two further design constraints:

   - There should be one continuous traffic lane in each direction along the full length of the high street, in recognition of Bloxwich High Street being a major traffic artery in

the West Midlands. However, the lanes could be varied in their position within the highway, as illustrated in Figure 2 below:

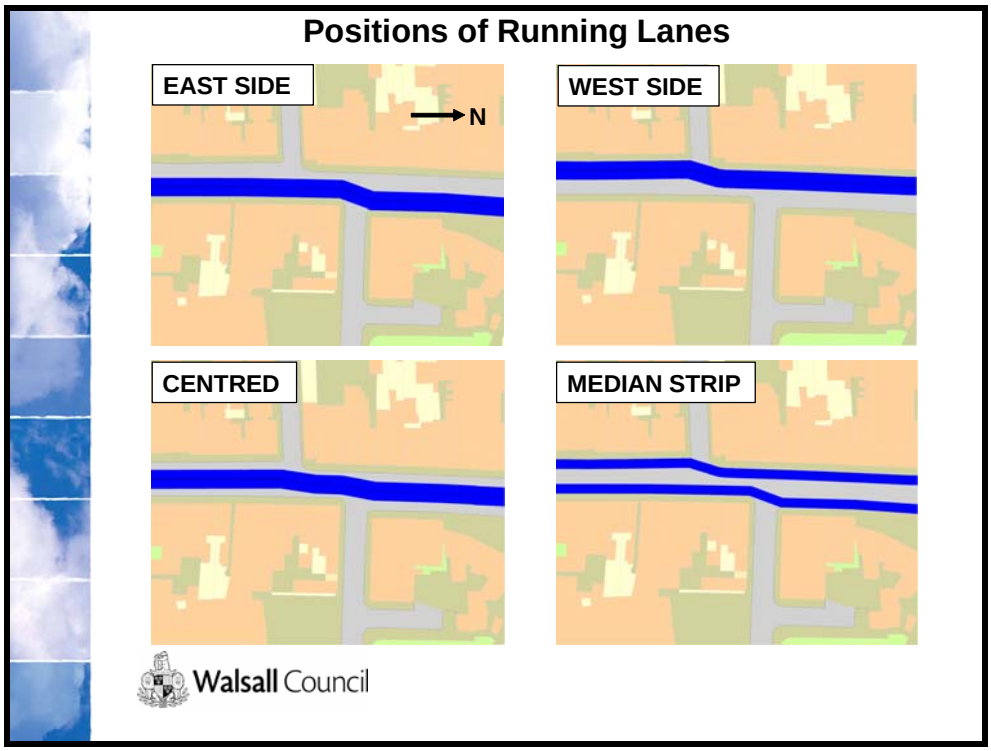


**Figure 2: Workshop presentation slide showing possible running lane positions**

- A minimum number of parking/loading bays, bus stops and pedestrian crossings should be provided along the high street (or adjacent to it), for particular user groups. Participants were shown both the current provision and the minimum requirements for their new designs.

Since each high street plan was several metres in length, it was suggested that participants first decide where they wanted to locate three pedestrian crossings, followed by the sets of bus bays along the high street, before then dealing in more detail with each of the four intervening sections, in turn.

To carry out the design task, each group was provided with a box containing a series of design aids, in the form of a tool kit. This is shown in Figure 3 below, and consisted of:

- A set of blocks depicting general street features including; parking bays, disabled parking bays, loading bays, bus stop bays, bus shelters, refuges, bike stands and benches.
- A set of acetates showing running lanes for general road traffic, bus lanes cycle lanes, and different kinds of pedestrian crossings
- A set of stickers depicting all the above features
- A set of coloured pens.
- A book of "Post-it" notes


**Figure 3: Set of tools given to each group**

For ease of identification, the blocks and acetates used symbols and were coded in a colour similar to those that applied to the relevant UK signs and markings for each type of facility. For example, a blue badge disabled parking bay was coloured blue and included a wheelchair symbol.

The acetates and perspex blocks were also made to 1:250 scale, to exactly match the street plan of the area, so that each block and acetate represented the size of surface area needed for that particular feature. For example, for one general parking space an area of two metres by 6 metres is required. This method enabled participants to readily see how much space would be required on the street to accommodate a particular design suggestion, and to consider what might have to be foregone to provide sufficient space.

3. Once a consensus had been reached regarding the allocation of space to different features along the high street, the perspex blocks and acetates were replaced with stickers identical in size and colour that were permanently stuck onto the plan. This avoided the problem of the chosen design shifting or being lost when the maps were moved. Any kerblines that need to be widened or modified were drawn on at this point.

*Results of the Design Exercise*

Once they understood the task, the participants carried out the design exercise with considerable enthusiasm and concentration (see Figure 4). They generally worked well together in their groups, but they did occasionally ask for assistance from the facilitator or an engineer, with a question regarding specific traffic design rules or local knowledge. However, as much as possible the task was left to the participants to carry out.

**Figure 4: Participants designing their high street**

Initially the individual participants focused on the area surrounding their own businesses, or areas where they had a personal interest. However, with a little prompting most participants were willing to contribute to discussions about the design of the whole of the area; as the session continued, their confidence in running the exercise grew. All participants played an active role, both in discussing problems and options and in placing blocks and acetates on the plan of the high street.

Towards the end of the session, each group reviewed the proposals they had been developing, and was able to agree on one design that met the needs of that particular group (although this was not set as a requirement at the start of the exercise). They then converted this from the format of the moveable blocks and acetates to the set of permanent stickers and additional markings showing kerb alignments, etc. In some cases, this translation from blocks/acetates to stickers prompted further debate, as the proposals became finalised and definitive.

There were certain similarities and differences between the proposals produced by the two groups. Both groups had made similar types of additions/changes to the current scheme, in terms of the overall balance of provision of features, but they had chosen to locate these features in different places along, or adjacent to, the high street.

Neither group limited themselves to providing for the minimum levels of loading/parking spaces that had been set out as a constraint at the start of the design exercise, nor did they maintain the existing layout of these features along the high street. Both groups increased the number of general and disabled parking spaces considerably. They were reluctant to provide for as many bus stops as were required, because part of this space was needed for services terminating along the high street, which they did not regard as a priority space use for such a prime site.

In their designs, both groups kept the footways at the minimum width of 2.5 metres that had been marked out on the plans. They were told at the beginning that this was considerably less footway space than they currently have in most places along the high street. However, both groups stated that they preferred the narrower footways so that they could provide more parking and loading bays. Participants said that they felt that the footway was currently too wide for the needs of local shoppers and residents.

One of the plans contained a large number of loading bays on the high street, whereas the other group provided mainly parking bays. To compensate, the former group allowed room for parking bays off the high street, whereas the latter group placed the majority of their loading bays off the high street.

Interestingly, both groups kept the two traffic lanes in the centre of the available carriageway space along the high street, where they are currently located, and neither considered adopting one of the other lane layouts shown in Figure 2. Both groups also talked about changing the existing traffic circulation patterns in the residential streets off the high street. In particular, by making some streets one-way and reversing existing traffic flows in others.

In preparation for the second design workshop, the option developed by each design group was entered by the traffic engineers into the LineMap GIS-based computer program, and checked for feasibility. To their surprise, the engineers found that both of the schemes were largely practical and technically feasible, and required very little adjustment. The use of the scale blocks and acetates had ensured that space allocations met design requirements, and it was only in a small number of cases where adjustments had to be made to allow enough space for the swept paths of large turning vehicles at junctions.

**Selection of Preferred Option Exercise**

For the exercise carried out in this second workshop, the designs that had previously been developed in the first workshop were made available to participants in both a printed format and as a computer-generated projection. In each case, the two designs were shown in both ‘block’ format (similar to how they looked at the end of the previous workshop) and in road marking format (i.e. how they would look on the street in practice).

About half the participants attending this workshop had attended the previous workshop, and there were a number of new participants. Maps of both the schemes designed at the first workshop were placed on the walls at the venue, so that participants could look at them in advance of the session starting. Each of the schemes was labelled to show the group who had designed it, and had a colour key to remind participants what the different coloured blocks represented (see Figure 5). This made it easier for participants to remember what their designs looked like in detail, and it showed the willingness of the Council to build on the designs that had been developed by the local stakeholders in the previous session.

This second exercise consisted of the following steps:

1. The participants were first given a brief presentation, explaining the events that had taken place during the first design workshop and outlining the purpose and format of the current exercise. It was explained that the decisions made during the evening would form the basis of what later went out to formal public consultation, subject to further feasibility checks, covering things such as traffic capacity at key junctions and the costs associated with moving utilities located beneath the street (e.g. gas or water pipes).

**Figure 5: One option displayed in 'block' and 'line marking' format**

2. The group then reviewed the two designs that had been generated during the previous workshop. The schemes were presented side by side on screen, looking at short sections of the high street, in turn (see Figure 6).

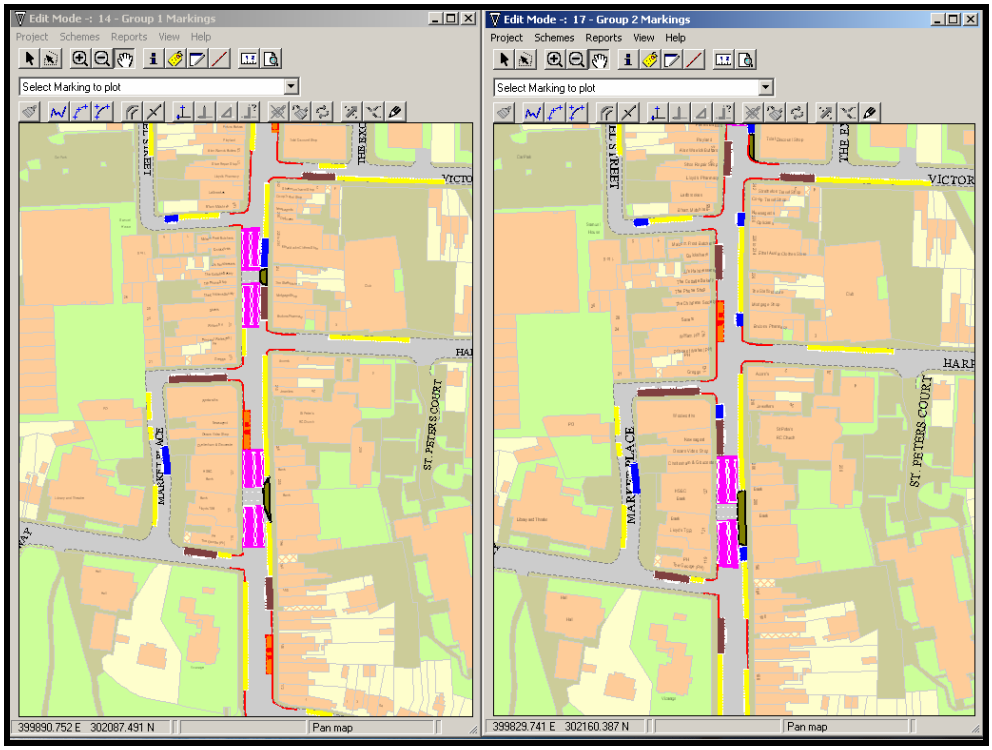


**Figure 6: An example of the two schemes side by side in LineMap format**

For each of these sections of the high street, a representative from each of the original design groups was asked to briefly explain their thinking behind their chosen allocation of space. All the participants then discussed different viewpoints and reached an agreement on how to proceed. There were three options: (i) select one scheme or the other, (ii) agree some hybrid scheme drawing on elements from both schemes, or (iii) agree that both schemes should be put out to public consultation. Where some modification was required, this could be edited live on screen, so that people could see the new design emerge during the evening, as a result of their discussions.

3. Once participants had agreed on a scheme (or schemes), the engineers ran through the scheme(s) on screen, to check for any detailed problem areas (e.g. whether the running lanes were too narrow at a pinch point), and then moved on to discuss any junction turning bans, or one-way circulation patterns in the surrounding side roads that should be included as part of the design.

*Results of the Preferred Option Exercise*

When the two different schemes were compared section by section, there was never an immediate consensus among the participants in favour of adopting one scheme over the other. Rather, there was considerable debate, and in some cases new ideas were proposed. However, in the end, one of the original scheme designs for the high street was adopted unanimously by the participants, with only minor modifications.

In addition, there was considerable discussion as to whether it would be feasible to reduce the speed limit on the high street from 30 miles per hour to 20 miles per hour, and in the process significantly reduce the length of guard railing that currently restricted where people could cross the road at present. This generated further debate regarding the current average speeds on the high street, the feasibility of speed enforcement and the causes underlying the high street's accident record. The participants were divided as to whether a lower speed limit would be beneficial overall, and so it was eventually decided that the issue would be put to wider public consultation.

There was also much debate about whether the provision of parking spaces reserved for disabled drivers should be located on the high street or on the adjoining side streets. Here the two schemes from the first workshop had adopted different strategies, with one providing these dedicated spaces predominately on the high street and the other on the side streets. The debate centred on whether priority should be given to locating these spaces where there would be safer parking (i.e. on the side streets) or where they would be closer to desired destinations (i.e. on the high street). It was eventually agreed that a there should be some disabled parking spaces on both the side streets and the high street, to meet both objectives.

Finally, considerable changes to traffic circulation patterns in the adjoining residential side roads were discussed and agreed, as well as some modifications to allowed traffic turning movements on and off the high street – building on debates that took place in the first design workshop.

Figure 7 shows one section of the final scheme design, in both 'block' and equivalent 'road marking' formats.

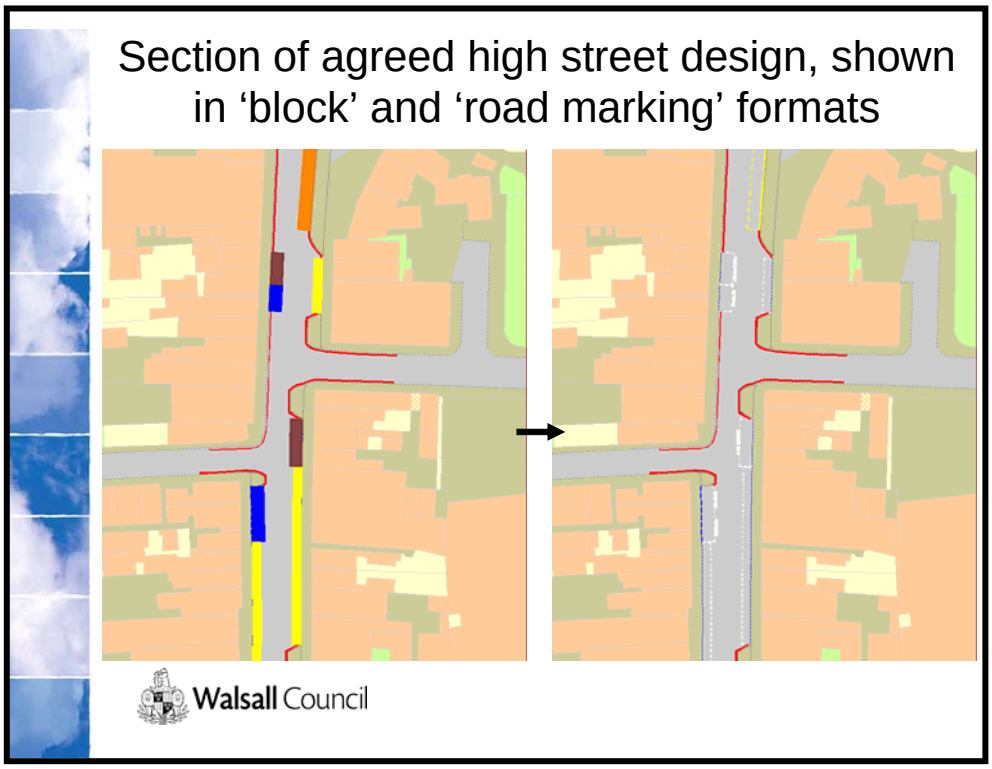


**Figure 7: Conversion of ‘block’ scheme to regulation roads markings**

## PUBLIC CONSULTATION

The design workshops involved a relatively small number of local businesses and community stakeholders. The follow-up conventional public consultation exercise provided the opportunity for a wider range of members of the public to comment on the proposed scheme – and enabled the traffic engineers and planners to see whether this inclusive approach to design had resulted in a scheme that was much more acceptable than the one that had been prepared by a professional consultant, a few years previously.

The days and venue was advertised in local papers and on local radio, and the scheme was exhibited in a purpose built bus manned by local traffic engineers, and parked just off Bloxwich High Street. On each of the three days of the exhibition, between 35 and 40 people visited the bus. There was a mix of local residents, local shoppers and local business owners among those who attended.

The exhibition bus contained a large scale plan of the overall proposed scheme for the high street (based on the outcome of Workshop Two), with several smaller maps highlighting some of the suggested proposals and options in more detail. Pamphlets were also provided describing the Red Route Network being developed in the West Midlands conurbation, including details of their objectives and the associated traffic signs and road markings. A continuous PowerPoint slide presentation was displayed on a large monitor screen. This described how the proposed scheme had been developed, and provided details of further possible changes, such as the 20 mph speed limit on Bloxwich High Street. Questionnaires asking for feedback on the scheme were given out to the members of the public who attended.

In general, the feedback from the public consultation exercise was very positive – in stark contrast to the negative responses to a previous effort to consult on remodelling the High Street that had been based on proposals put forward by consultants. Before they attended the exhibition, many local residents had come to believe that parking was to be completely banned along the high street, and the cars forced to park in local residential streets. Once they discovered the proposed scheme would in fact increase high street parking provisions, they were generally happy with the proposals.

Over half those who responded to the questionnaire were happy with the proposed plan (57%), the remainder were either not sure (21%) or against it (21%). The aspect considered most important was improving safety for vehicles, with 59% of respondents saying that this was very important; most respondents (68%) felt that the proposed scheme would be 'effective' or 'very effective' in achieving this. The aspect that respondents thought the scheme would be best at improving was the provision of pedestrian facilities, with 71% saying that the proposals would be 'effective' or 'very effective' in achieving this.

## DISCUSSION

The feedback from participants in all the groups and both design exercises was generally very positive. The participants liked the methods that were used and found them easy to work with and comprehend; they generally approached the exercises in an enthusiastic and constructive manner. As a result, they felt that the outputs represented 'their scheme', not the Council's scheme, and that their concerns were being taken much more seriously then when they had been raised by them in the past.

They also gained a greater understanding of the kinds of problems and constraints that engineers face when generating street designs, and why some outcomes were possible and others were not. They also recognised the kinds of trade-offs and compromises that have to be made, given the finite amount of space available to accommodate a diverse range of needs.

The participants liked the combined use of the physical design tool, followed by the computer-based tool. The former provided a simple way of initially identifying potential street design features and exploring on the plans a range of options which varied in their composition and layouts. Once selected design options had been agreed, their translation into computer-based formats gave participants a sense that their designs were being taken seriously. It was also possible to work in larger groups with the designs projected on a screen, than was possible with the physical design versions. They also liked the ability to work in colour block format on the screen, and then see this immediately transformed into a set of professional road markings.

At the start of both sessions, it was apparent there was some suspicion and bad feeling towards the Council officials, due to the poor image of the Council and the local reaction against the previous Red Route design that had been put out to public consultation. These participants were initially doubtful whether the design exercise would make a real difference and lead to a proposal that addressed local concerns and priorities. However, as the exercises progressed, participants became much more positive towards the process and the Council, and by the end of both sessions participants were very relaxed and open in their discussions with the officials – with the sense of 'us' and 'them' having been replaced by a spirit of partnership working.

The ability of this interactive approach to generate a practical design that would gain broad public approval was demonstrated during the subsequent public consultation exercise. Here opposition to the scheme was only around 20%, compared to the widespread rejection of

an earlier scheme for Bloxwich High Street that had been developed by a consultant without public input. A 20% rejection rate is also much lower than is typical when proposals of this nature are presented to the public.

It was thought by both parties that the success of these design workshops would help in ensuring a more positive and effective relationship between the Council and local stakeholders in the future. Although the number of participants who attended both sessions was small, the participants felt that if more people had known about the different approach to consultation that the Council had taken on this occasion, then more people would have wanted to attend and participate.

## CONCLUSION

The methods of engaging with local citizens and other stakeholders described in this paper represent a much more open, interactive and accessible approach to developing street designs than is conventionally adopted in the UK. Using scale blocks, acetates and scale plans makes the design option generation process as simple as possible for non-professionals to understand – including making explicit many of the constraints that designers face - and encourages engagement and experimentation. The follow-up computer-based editing and refinement, and the conversion from 'blocks' to 'road markings' gives participants confidence that the designs are being taken on board by the professionals.

More generally, it allows Councils to regain the trust among local communities, who regard conventional consultation as just a rubber stamping exercise, and enables officials to tap into local knowledge and so gain a wider understanding of the needs of an area. It allows members of the public to participate actively in development of their community, and gives them some appreciation of the constraints that lie behind street planning.

The local Council officials very much liked this new method of approaching and designing local schemes, and plan to use it in designing many of their future schemes; it is also being recommended for wider application across the West Midland conurbation. Whilst they saw particular value in using this approach in designing large schemes such as for a high street, they are also considering whether it could be used for much smaller – but contentious - schemes, for example where a bus stop needed to be relocated.

## ACKNOWLEDGMENTS

This exercise has been carried out in conjunction with Buchanan Computing Ltd. and Walsall Metropolitan District Council and is linked to the EPSRC (Engineering and Physical Sciences Research Council) DISTILLATE project, part of which is concerned with improved methods of generating scheme options and encouraging stakeholder engagement. The exercise builds on previous European Union (EU) and Department for Transport (DfT) studies.

## REFERENCES

1. TRB. 'Going Public: Involving Communities in Transportation Decisions'. Special issue of *TB News*, 220, May-June 2002.
2. IHT. 'Involving the Public'. Chapter 10 in *Transport in the Urban Environment*, Institution of Highways and Transportation, London, 1997.

3. GUIDEMAPS. 'Successful Transport Decision-making: A Project Management and Stakeholder Engagement Handbook', Volumes 1 (Concepts and tools) and Volume 2 (Fact sheets). The GUIDEMAPS Consortium www.guidemaps.info. 2004.
4. Jones. P. and K. Lucas. DISTILLATE, Project B: Option Generation Literature Review. Working Paper, Centre for Transport Studies, UCL and Transport Studies Group, University of Westminster. 2005.
5. Zwicky, F. 'Morphology and Nomenclature of Jet Engines'. *Aero Engine Review*, June, 1947.
6. Hoinville, G. 'Evaluating Community Preferences.' *Environment and Planning*, Vol 3, 1970, pp. 370-380.
7. Jones, P.M. "HATS: A technique for investigating household decisions" *Environment and Planning A*, Vol 11, No. 1, 1979, pp. 59-70.
8. ARTISTS. "Arterial Streets for People - Guidance for planners and decision makers when reconstructing arterial streets". Lund University, Sweden. Web link: www.tft.lth.se/guide/artistsguide.htm. 2005.
9. Jones, P., Cook, A., Tanner, G., Christodoulou, G., Potter, R. and A. Wadhawan. "Computer-based tools for streetspace design and reallocation". Final Report to the Department for Transport, in conjunction with Buchanan Computing and GDC. March 2006. Transport Studies Group, University of Westminster.