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Mapping for health: cycling and walking maps of the city

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Abstract

This paper introduces a new project in the city of Manchester that aims to create alternative community-based maps for walkers and cyclists. It focuses on the methods employed and the advantages of engaging map users in the design and construction of specialist maps that can encourage more healthy lifestyles. Early results from the project are described.

Keywords

Community mapping, cycling maps, walking maps, healthy lifestyles.

1. Alternative maps of the city

Do maps only serve the powerful people in society? Who maps the city and to what purpose? To what extent do maps only cater for 'markets'? How might a map be produced to meet needs rather than satisfying consumer demand? How might maps be part of a move to change lifestyles? What role might a designer play in relation to users and potential users? How can we use technologies to empower? These questions should matter to cartographers. And they should matter most for people who map cities.

Most published urban maps reflect the interests of people with power, people who drive, or people who administer these places. For local people, mapping is often strangely silent: what people want tends to be left off the map. Our research seeks to redress this balance, by producing new maps, designed in a collaborative process from below, rather than employed from above. The Community Mapping Project will produce urban walking and cycling maps and investigate the best ways of involving communities in the design and maintenance of the mapping process.

This paper:

- evaluates possible source material
- justifies how the mapping process might be employed to change lifestyles
- describes the methodologies of the initial phases of our case study in Manchester
- focuses on community cycle mapping and
- comments upon initial results of this research.

2. The conventionally mapped city

A nation's official maps depict cities in unprecedented detail and offer an important framework for others wishing to

map the urban area. These large scale plans offer significant cost advantages as a base for new mapping. Their specifications, however, may be inappropriate for specific community needs. In the UK for example the National Mapping Agency, Ordnance Survey, maintains a large scale database, originally sourced from mapping published at a scale of 1:1250. These structured data represent tangible objects in the built environment in great detail. Community feelings about an area are irrelevant to this specification. Whether a route is well-lit, congested with traffic or available as a pleasant walk lies outside the remit. Denis Wood argues that maps like this tend to naturalize the cultural processes involved in their creation (Wood, 1993). A structured database like this is sold as a 'business product': that is, after all, the major market for the mapping; or the data are licenced for use by other publishers. The map becomes a commodity, and people think it is the only way to depict (a) place. Of course other alternatives *do* exist, but they have to be added to the framework data or else created from scratch.

Other more specialist urban mapping may also be inappropriate for community needs. In 1996 it was recognised that modern urban street-finding aids, or A-Z style street maps were 'probably the most commonly used kind of printed cartographic display in the UK' (Perkins and Parry, 1996: 301). This genre of map became increasingly popular during the 1950s when disposable incomes rose and people started to find their way around cities they did not know. By the mid 1990s a very wide variety of different designs in this genre were being commercially printed and published, mapping almost every significant urban area in the world (Parry and Perkins, 2000). These designs are characterized by their ephemerality, by their apparent simplicity, and by their indexical qualities linking

alphabetized lists of street names to a simplified street map, and sometimes to other buildings in the built-up area. These simple designs present an invaluable resource for the private car owner, but hardly ever show public transport, cycle networks, footpaths, and community recreation facilities. Community interests are 'left off the map'. Electronic versions of these maps are no more community-oriented – route planning software maps the navigational needs of car drivers, but rarely caters for walkers or cyclists. There has also been very little published analysis of these kinds of maps; like official surveys they are mostly simply accepted as a part of the urban culture. It is recognised that they are largely purchased by people going to new places or employed by people visiting new parts of the city, but generally not used by people who know the area (Wood, 1993).

Some community mapping does exist. Ten years ago there were very few maps designed for the needs of cyclists in the U.K (Perkins and Parry, 1996). Those published were predominantly small scale and emphasised leisure cycling in rural areas. Today there are more cycling maps, but the majority continue to focus on cycle touring for pleasure, rather than urban commuting (Oliver, 2001). Notable exceptions in the UK include the Cycle City Guides from Dome Publishing, the web-served output from Lovell-Johns and Pinder, and the London Cycle Guide from the London Cycling Campaign. These urban cycling maps are larger scale representations that map the urban road network for the cycling community and are either available as web-served pdf files or published in hard copy. They emphasize cycling facilities, hazards, and a classified system of routes, most of which follow the very roads depicted on the A-Z. However many of these cycling maps also focus on other modes of urban transport such as bus services, and they often emphasize infrastructure rather than community views.

In other nations such as the Netherlands, where cycling infrastructure is of much greater importance provision of mapping is more geared to cycling interests. Van Leeuwen, Van Elzakker and Massop (2001) investigated how Dutch cycling maps were used but, ironically, they too focused on recreational cycling in their comparative cartographic evaluation. Once again the city has been overlooked. However, their participatory approach incorporates user opinion into the design process, and offers a refreshing alternative to most traditional cartographic practice. Why might such a participatory approach be useful and how might community maps be employed to change lifestyles?

3. Putting people back into 'counter-mapping'

By involving people in map design, the mapping process can become a subversive bottom up activity (Pinder, 1996). As Harley (1989) directs us, we must focus on the *mapping*, not just the map – this suggests an emphasis on context rather than outcome, and implies that the map can, and should, be read as a cultural text. By including people we can perhaps create a 'new' city from the perspective of those who live in, rather than those who preside over it. Cartographic visualization can have an increasingly democratizing potential (Ryd *et al* 2001) and may even be utopian (Warren 2004).

'Counter-mapping' has been used as an oppositional political tool in many third world contexts, and Nietschmann goes so far as to suggest that the map has defended more indigenous territories than the gun (1995). Less dramatically perhaps, 'bottom-up' mapping also takes place in western cultures. The Parish Maps project initiated by Sue Clifford and Angela King for Common Ground in 1983, and documented by Crouch and Matless in 1996, along with Greenmap, founded in 1995 – aim to strengthen a community's awareness of its 'place' through participation. This 'refiguring of the local' allows a 'pride of place' to develop, linking politics and aesthetics and, in some instances providing a voice for the voice-less. Locally produced maps, with a 'participatory' element, don't just chart the road lay-out of an area, they also depict the natural and cultural environment and begin to 'find a valued beauty in humdrum everyday diversity' (Crouch and Matless, 1996: 237). Numerous participatory GIS initiatives in North America reveal another strand of the ways in which mapping technologies may be used to empower community wishes – the map can be a tool for incorporating community views into government (Ghose and Huxhold, 2001), or for improving health by disseminating knowledge of environmental correlates of disease (Kwan, 2002). It can also be used to persuade people into action, as part of the discourse of advertising (e.g. Goss, 1995). Maps are 'discursively embedded within broader contexts of social action and power' (Pickles, 1992: 193), they cannot be read as a neutral artefact, but instead work as 'value-laden images' (Harley 2001: 53). Through participatory mapping, the process of map making becomes as important as the final outcome, and can develop the capacity to change the society from which it came.

4. Participatory design matters

A participatory approach to urban mapping needs to incorporate people's views. This might include different kinds of potential users, decision makers, designers and researchers. Our methodology in Manchester involves the use of multiple qualitative approaches, so as to give these different voices as much access as possible to the design process (Suchan and Brewer, 2000). It is a stepped and iterative practice, involving as much real-world evaluation of product and process as is possible (see Perkins 2001 for a comparable set of approaches). In our Community Mapping project we have:

- analysed existing designs,
- incorporated user reactions to these products,
- collected community views about what should be mapped,
- produced test maps of different designs,
- produced test maps with different content,
- produced test material with different degrees of interactivity, served from the web and as hard copy.

Analysing designs

According to De Lucia, design is 'the most fundamental, challenging, and creative aspect of the cartographic process' (1974: 83). Interestingly, Blumrich suggests that it is 'the designer [who] should be the central figure' in the creation of 'something new' (1970: 1552); but this notion of a singular 'designer' is becoming increasingly problematic in an era when web sites offer interactive mapping possibilities to the user, and when cartographic communication is increasingly replaced by representation as an analytical framework (Crampton, 2001; MacEachren, 1995). Through the analysis of existing maps and the inclusion of a *plural*, rather than *singular* design team, maps are being created for the people, and by the people.

There has been very little real world research into the analysis of cartographic design (see Perkins and Gardiner (2003) for some examples), and hardly any investigation of how cycling and walking maps might work. In order to understand more fully the way in which such maps 'work', it is important to collect and analyse a wide range of artefacts so as to construct some specific 'design principles'. Using the work of Zeigler (1998) and Farrell (1987), we constructed a 'map evaluation matrix' in the form of a spreadsheet which incorporates a range of factors that may influence how a map is, or perhaps, if badly designed, is *not* used. Such factors include; 'who is map aimed at?', 'adequate scale or size for purpose?', 'easy use of legend?',

'map on two sides of sheet?', 'readability of symbols?', 'appropriate use of colour?' and 'overall comments'.

The purpose of this exercise was not merely to praise or criticise existing maps, but rather to learn from previous experience. To recognise 'best' and 'worst' design practices and to build on them, learn from them and apply findings to our own map designs. Here the words of Blumrich do ring true '... analysis is not and should not be done for its own sake. Analysis as such is worthless unless conclusions are drawn from its results and used constructively' (1970: 1551). The process of map analysis meant we were immediately acquainted with relevant design practices and principles. Having a wider knowledge of such techniques and whether or not they are successful, allows the researcher to use past experience to benefit future design.

The analysis of existing maps was not restricted to the perhaps subjective 'evaluation matrix'. Instead, we again went from the singular to the plural, and opened up designs to critique from users. By presenting a range of existing maps to various focus groups and asking for unprompted opinions, we were able to gauge which maps 'worked' and which did not.

By involving cyclists in researching cycling maps we directed specific questions to relevant and informed people. Asking those who would ultimately benefit from a *good* map, or indeed be frustrated at a *bad* one, meant gaining 'hands on experience' about positive and negative mapping practices, and how they relate to 'real world' use. Opinions such as, 'no gradients', 'confusing colours', 'too big to use on bike' and 'no cycle parking sites', can raise issues that may not have even been thought about prior to focus group sessions. Suggestions such as 'why not indicate rush-hour black-spot areas' can offer an invaluable source of new ideas.

Community involvement

Analysing and gaining insight from existing maps was one form of data collection, but our ultimate objective was to create a suite of new 'participatory' walking and cycling maps. Hence there has been an emphasis on plotting *actual* commuter and/or leisure routes.

Initially contact was made with cycling and walking officers within Manchester City Council. Letters and emails were sent out to ward co-ordinators, tenants and residents groups, local transport co-ordinators, park wardens, walk leaders, walkers and cyclists. We used links from more formal groups, within the local authority, to connect with the people who actually *did* the activities, rather than targeting those who just talked about or co-ordinated them.

We were also very aware that although walking and cycling maps of Manchester existed, they were not, according to the focus groups, widely appreciated or useful. We needed to escape the top down notion of 'this is the route ... use it', and investigate instead, the bottom up, more plural idea that 'these are the routes we *actually* use ... why not try one out'.

We contacted local cycling groups, in order to collect route-based information. We then disseminated two base maps per participant – a 1:50,000 excerpt of an Ordnance Survey map of Greater Manchester and a 1:25,000 scale enlarged version of central Manchester and the University area, as most routes ended in and around the universities. The 'base map exercise' allowed individual cyclists to plot their daily routes to and from work, along with an indication of some leisure routes. Interestingly, most of these 'real' routes varied greatly from those prescribed by existing cycling infrastructure maps. Not only did the exercise yield linear, route-based data, but it also acted as a means of communication and description; with many participants annotating their routes and pointing out factors such as 'dangerous crossing', 'difficult junction' and the occasional positive comment! The *way* in which people drew on their maps also offered insights into map design, as some developed their own symbols and even included a key. These maps were assembled onto a composite and alternative cyclists' route map of the city.



Figure 1: Excerpt from London Cycle Guide.

By combining map analysis, route plots, focus group consultation and interviews, the task of map creation becomes more feasible and useful. We took advice from our users about including photographic imagery, and photographed landmarks along certain routes. We acknowledged that cyclists want to know where to park their bikes, and in a pilot study, have audited campus facilities. People have been included throughout the process.

In undertaking a project such as this, scale is vitally important and it was apparent from early on that a variety of scales would have to be incorporated in order for the maps to be clear and easy to use. The *London Cycle Guide* (by the London Cycling Campaign), was well liked by focus groups and offered a good design precedent in terms of combining a two-scale cycle map of the Central and Greater London areas (See Figure 1).

After discussion it was obvious that Manchester too would benefit from a multi-scale approach – obviously in some web-served format scale is less of an issue. However the web is not accessible to everyone, so it is important to plan hard copy maps in just as much, if not more, detail.

In order to gain feedback, a range of pilot paper maps and cartograms were designed, each with a different emphasis. At present we have focused on three distinct scales:

- the **general overview**, which explores a variety of routes in and out of Manchester city centre to the surrounding areas, at a scale of around 1:100,000 (see Figure 2)
- the more focused **route-based** maps, which take a detailed look at what a cyclist may encounter on his or her journey, at a scale of around 1:25,000 (see Figure 3) and
- the **campus map**, which particularly focuses on cycling facilities available in and around the Hospital and University sites to the south of the city centre at around 1:10 000 (see Figure 4).

There are interesting analogies here to the notion of different scale views that might be appropriate for different kinds of mountain recreation (Maling, 1988). Single scales of cycling information are clearly inadequate for cyclists.

Content and design of test maps

The London Cycle Guide gave us some indication of how to plot different scales onto one paper map. 'The intention was to put all the advantages of the existing maps into one new map' (Van Leeuwen, Van Elzakker and Massop, 2001:42). The 'overview' of the city incorporates the routes that cyclists

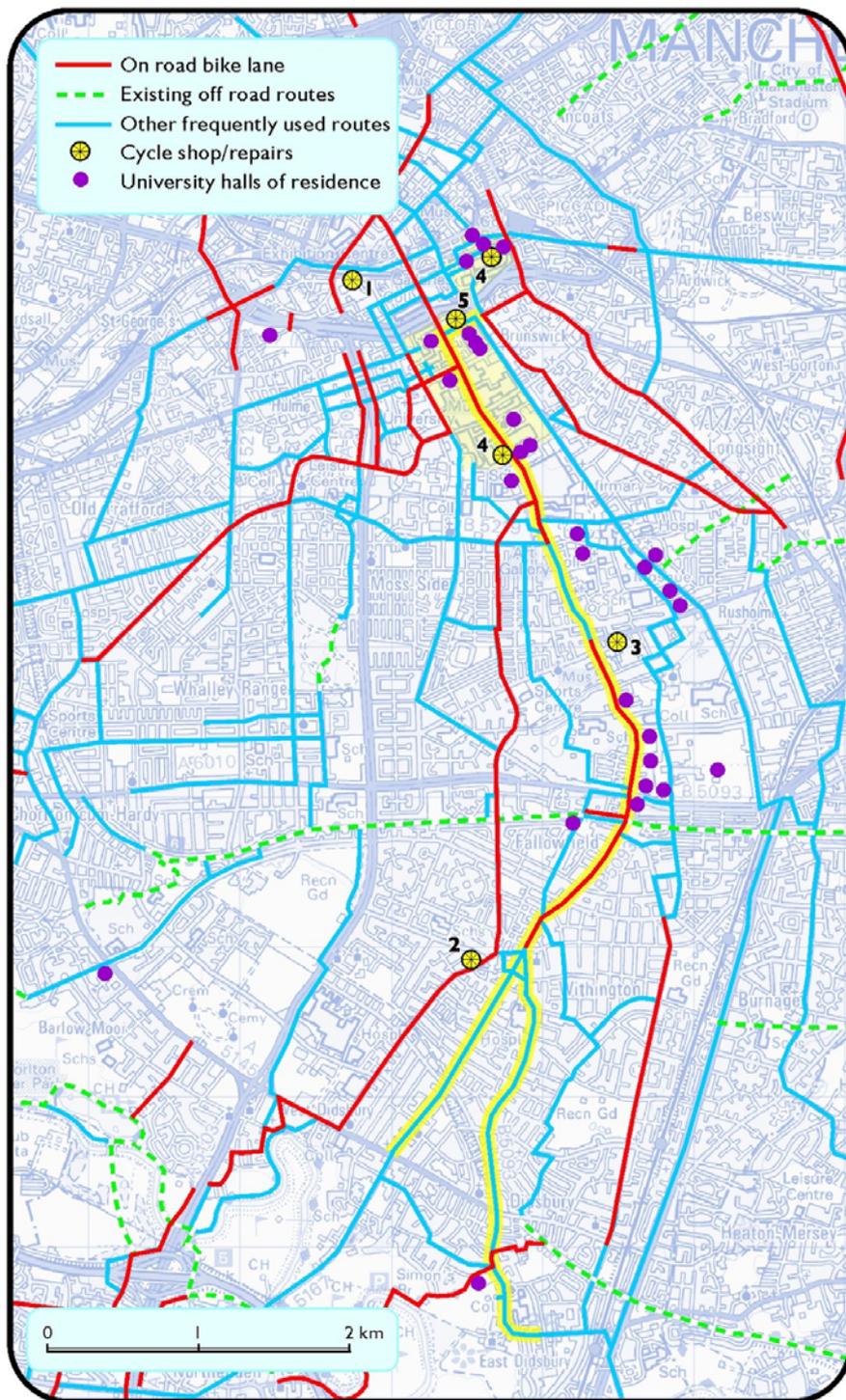


Figure 2: Manchester cycle routes overview.

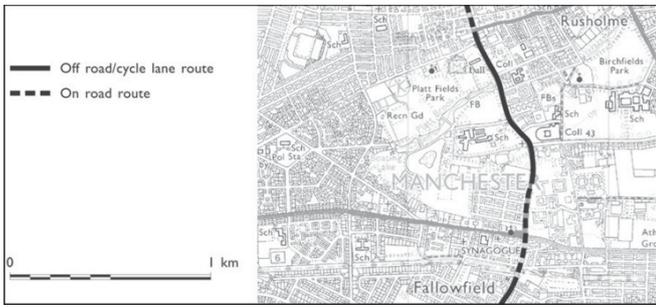
themselves use, while the map on the verso shows a more detailed view of a particular area, and the routes, cycling facilities, hazards and landmarks within it. Similarly to the Dutch example, 'decisions on the contents of the map prototype and their method of representation were based as much as possible on the results of the evaluation of the existing maps' (Van Leeuwen, Van Elzakker and Massop, 2001:42). At focus groups we discussed which elements needed to be present on our map: if *all* of these elements were to be included, the map would become too cluttered, difficult to

discern and ultimately fairly useless. In the Dutch example the elements are prioritized, with only the highest priorities mapped. Our own research also revealed that the 'wish list' of map elements was much longer than the available space on the map, especially in an urban area. There was a disjunction between amount of information and ease of map use; we had to prioritise in some way.

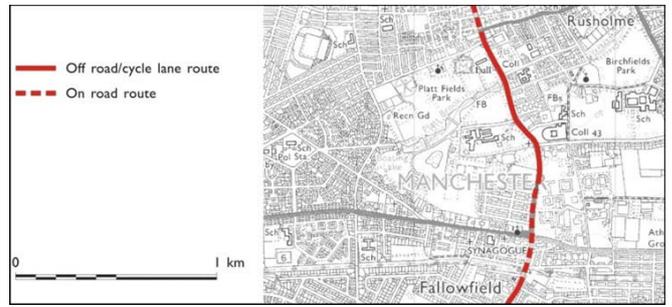
In order to prioritise, it was initially important to hear the full 'wish list' of map elements – we could then discuss which factors were most vital, and which were surplus to the requirements of cyclists. Popular elements included cycle lanes, cycle shops and secure parking facilities. Other features were suggested but we were unclear at that stage how they should be depicted. We needed to test different kinds of symbols, for elements such as traffic lights or accident black-spots. We also needed to decide whether or not iconic images of certain landmarks should be included. Landmarks are often important features that 'help users to orient themselves' (Van Leeuwen, Van Elzakker and Massop, 2001:43), so they obviously had to be explored further. There was also some discussion in the focus groups as to whether the maps should include a written description of the route. In order to discover which of these combinations would 'work' best we experimented and discussed test designs and outcomes in our focus groups (see Figure 3).

These maps were designed to incorporate evidence from the analysis and the focus group work. They are seen as the first step in a series of iterations. As yet there is no 'final' design. We feel it is extremely

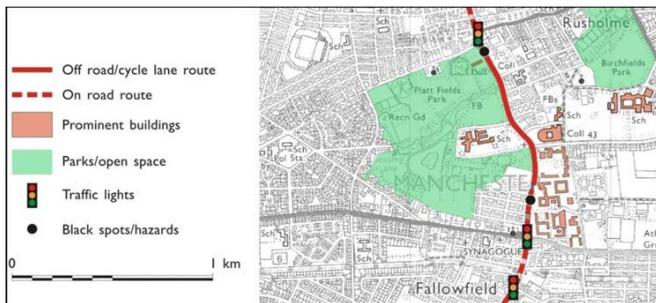
important to gain as much feedback as possible before committing to any particular map or set of maps. The purpose of such a breadth in design practice is to gain reactions from the people who will eventually use the final maps. The various designs were presented for discussion at a focus group meeting, to encourage people to comment on, dispute, alter and reject the maps – allowing a more active community involvement in the mapping process. Figure 3 summarizes some of these reactions.



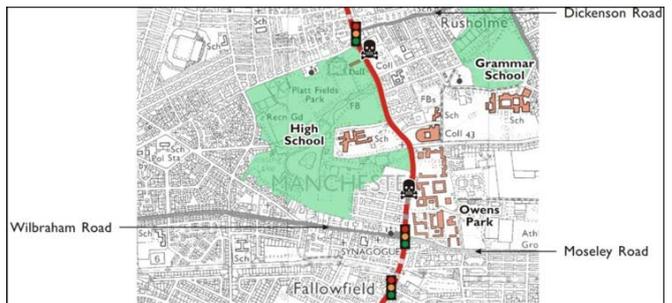
(a) A black and white single line map. Criticised for its lack of detail and definition – people thought this was far too simplistic. Distinguishes on and off-road cycle routes.



(b) Red introduced instead of black – more visible but still lacks vital information.



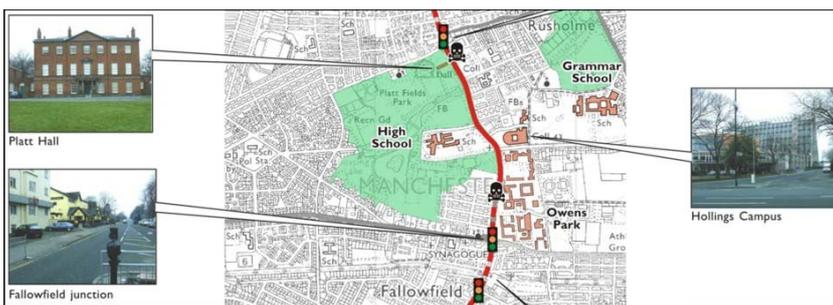
(c) Key is expanded, colours used for routes, buildings, parks and open spaces, while point symbols are introduced for traffic lights and black-spot areas. Generally the focus group felt this map worked well, and offered useful information for new cyclists or those familiar with the area.



(d) Colour use is the same as (c) but a more iconic symbol for 'hazard' has been introduced, the skull and cross-bones. Road names are also added with arrows from outside the map. Focus groups liked the iconicity of the image but felt it would put people off, rather than encourage them to get on their bikes.



(e) Same map as (d) but written route descriptions have been added. The focus group felt the written information along with the already detailed map was overcomplicated and unnecessary.

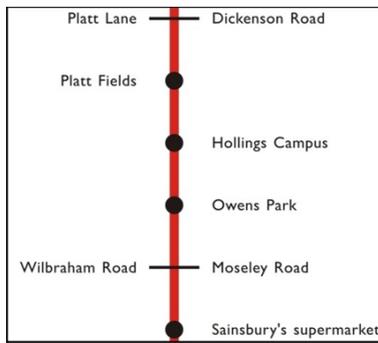


(f) Same map as (d) but photographs of iconic landmarks have been introduced. There was a suggestion that images of pubs be included as 'most people know where they are, and they're good for a drink!' There was also a call for more road names to be specified.



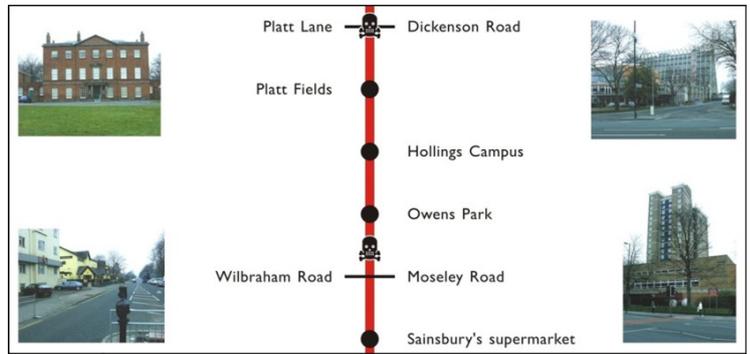
(g) An over-cluttered image. Line, point, colour, written description and photographic imagery. This map was criticised for being far too busy and distracting.

Figure 3: The design and content of cycle test maps (continued over page).



(h) An extremely simplistic cartogram noting junctions and landmarks along the route, with no imagery. People did not generally like this design at all. They felt the route needed to be embedded in the context of its surroundings.

Figure 3: (continued).



(i) More detailed cartogram including black-spot symbols and landmark imagery. This cartogram was preferred to the previous one, but was still generally disliked. The more 'traditional' map base (and especially map (c)) was much more attractive both aesthetically and in terms of information for cyclists.

A Community Mapping Website has also been constructed and was evaluated by the focus group. The site allows people to access local information, make comments, leave feedback and generally gain awareness of what the project aims to achieve. It acts as a rich resource allowing another arena for community involvement and participation and, above all else, it delivers web-served versions of the mapping.

4. Conclusions

The Manchester Community Mapping Project is funded until autumn 2006. By then we will have mapped around 160 different cycling routes and audited the provision of existing cycling infrastructure. We will have incorporated community views into the official discourses of those who control funds and have the power to improve provision in the Manchester area. The second walking strand of the

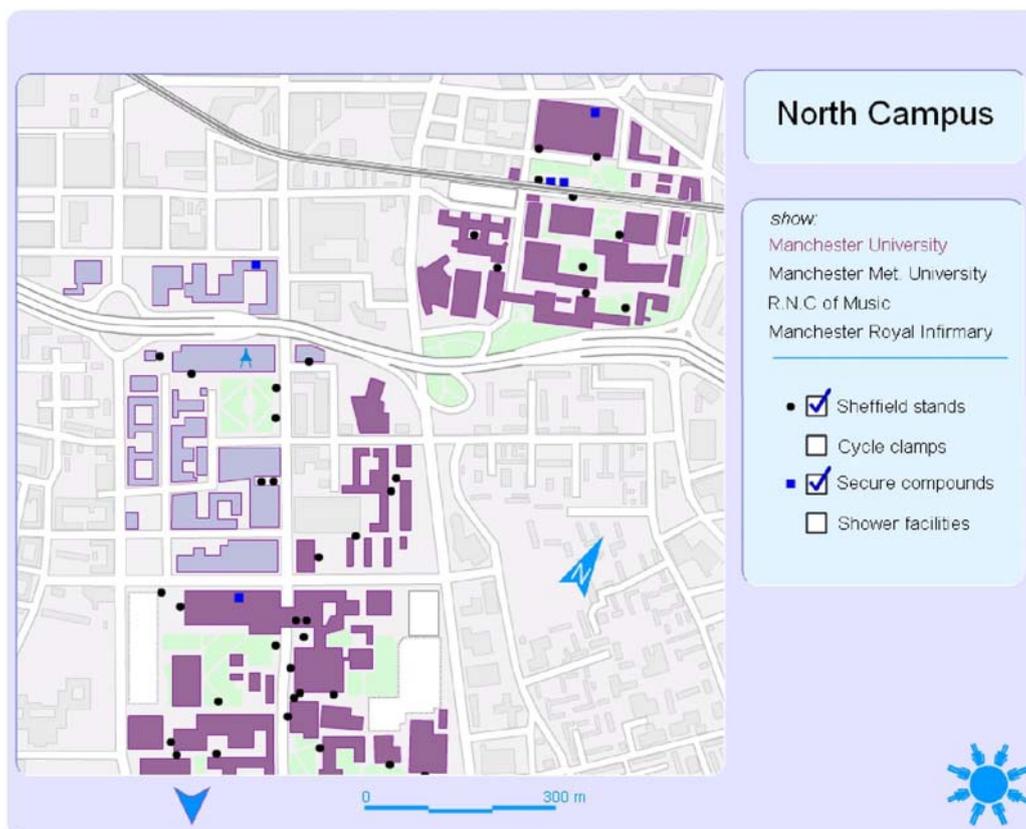


Figure 4: The campus cycle storage facility map on the Community Mapping web site.

project will offer a parallel suite of web-served and hard copy mapping. These will again reflect community desires and offer a single source, facilitating community access to information about our city.

Maps are an essential part of this process. They will be released in multiple scales, offering different themes of information and in different media. The geographical representation appeals to people as a more natural attractive, authoritative, and alternative guide to their place, than words alone, but needs to be linked to other media. Such a resource can be used to encourage healthier lifestyles

and a much more *active* use of the city. But the project is part of a *process* in which the map becomes a catalyst for change. We see the project as ongoing and aim to investigate best practice in this area and encourage others to adopt these practices in ways that are relevant to their own contexts. The questions that start this paper can only be answered by active collaboration between different community groups, informed facilitators with access to cartographic knowledge and resources to deliver an ongoing suite of products. Together with the map we can change the world!

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