Accessibility & Urban Design – Knowledge Matters

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1. Introduction

The shift to an evidence-based policy (EBP) regime borrowing from medical (laboratory) research (EBM) has started to impinge on urban design and related environmental research, with the growth in toolkits and models as predictors and interpreters of how human and built environments interact, and various quality judgements are made, including how urban design, quality of life/liveability and sustainability are assessed. This is matched by how data on who we are, where and how we behave and 'perform' is centrally produced and used to determine areas of 'need'/deprivation and regeneration programmes as well as city and housing growth.

Over the past decade this has manifested in bespoke tools such as agent based modelling and practical toolkits such as CABE's *Design Quality Indicator* and *Space Shaper* and a wealth of design guidance focused on building and space design, including 'streets (Evans 2009). These have been underpinned by philosophical - some would say fundamentalist - concepts of urban design and place-making, notably New Urbanism, the Compact City/High Density development, Crime Prevention through Environmental Design (CPTED) and Space ('is the Machine') Syntax (Hillier, 2007). In their way, they present a prosaic attempt to capture earlier utopian ideals through benchmarking urban design quality and what makes urban living 'sustainable' in social, environmental and economic terms. They are also largely predicated on new build, e.g. urban villages, masterplans, housing growth, and a certain type of retrofitting (i.e. brownfield), understating the fact that c.75% of the built environment that will be in use in 2050 already exists today.

The paper presents a critique of this evidence-based research movement in the urban design field, with examples of policy implementation and practical application and the key proponents in each case. Detailed evidence will draw on empirical research based on Sustainable Urban Environment (SUE) projects funded under the EPSRC Sustainable Urban Envitonment (SUE) programme on urban design and transport (www.aunt-sue.info, www.vivacity2020.org) focusing on accessibility, mixed-use/density and urban design. These challenge some of the principles and imperatives that drive the evidence base and some of the technocratic urban research approaches and methods that have emerged in response. Research findings presented will entail the triangulation of, and contrast between urban design analysis, official data sets and the lived experience of residents and other occupants of urban space.

2. Knowledge Transfer

Research based evidence that has directly informed and reflected government policy is increasingly identified with particular academics/HEIs, to the extent that their ongoing involvement in policy initiatives and programmes has made it difficult to separate the 'man

from the mantra'. This phenomenon can also be seen in the growth in 'think tanks', 'gurus' academic and other (Gibson and Klocker, 2004) - and internationally reknown experts in related fields[i]. In many senses this association and convergence of research evidence into instrumental policy and evaluation mirrors underlying concepts and models in urban design and related fields. These also have 'personalities' of their own, either through key advocates and organisations - notably the Congress for New Urbanism, the Prince (of Wales) Foundation for the Built Environment, Space Syntax Ltd., Living Streets etc., which can also be seen to represent contemporary incarnations of earlier, but more seminal movements such as CIAM ('Athens Charter' 1933, Giedon 1963), Garden City and New Towns (Howard) and Utopian City 'master' planners (Lloyd Wright, Corbusier). An observation of course between these early and late eras in urban planning is the turn away from modernist, zoning/separation of activity and green field development ("sprawl", new towns - e.g. Milton Keynes): 'if in an industrial age the various functions of daily life cannot be clearly separated, that fact alone spells the death sentence of the great city' (Giedon, 1963); and back towards higher density and mixed use form and function, and the reversal of car based transport and access in favour of public transport and pedestrian access within the compact city, where: 'the long argued distinctions between activity and movement, between land use and transport, between production and consumption have begun to dissolve' (Solesbury, 1998).

Both movements however lacked a sound evidence base, preferring instead to place emphasis on utopian visions, masterplans and blueprints, and claims of causality between urban design intervention and form, and behaviour (and by implication, better quality of life) as well as a 'one size fits all' approach to design and planning standards. They also exhibit an absence of participatory planning and attention to governance and diversity (Healey 1997, Wilson 1991). Today, the panaceas of mixed use, high density and the compact city are promoted and taken up in commercial development and public policy praxis without the evidence base or fine grained guidance required to inform practice or justify planning and design models. Obvious examples include the lack of a planning use class for mixed use design (Evans, 2005), or design guidance for live-work premises (Holliss, 2008), and conflicting evidence, measurement and standards around space and densities and appropriate scales for compact city and mixed-use - everywhere of course is 'mixed use' as the area widens out, and also becomes 'mono-use' at the unit level (Evans, Foord & Aiesha, 2009).

3. Evidence Based Policy

Governments now refer to the need for 'evidence-based policy'-making (EBP) and evaluation (PMSU 2004), which can be interpreted on the one hand as rejection of, or at least disquiet with these simplistic ideological principles and more grand theories and, on the other, as a recognition that public policy interventions require robust testing and greater assessment of their 'fitness for purpose' and operational effectiveness in meeting policy objectives. This is seen as a necessity as competing needs and aspirations, opportunity costs and a more heterogeneous populace (Worpole and Greenhalgh, 1999: 38) demand more transparent 'evidence' of what works and where public intervention is good 'value for money', or not. This also reflects the perhaps naive response that solutions to 'wicked' urban problems (Rittel and Webber, 1973) require empirically tested, but simple, transferable models. The political imperative for evidence is therefore all-pervading, generating guidance and systems for the measurement of performance and impacts, and a range of quantitative indicators against which regeneration and other programmes can be compared and evaluated. Examples of policy goals which have been informed and evaluated by evidence based analysis and measurement 'tools' are summarized in Table 1. These include several of the prime policy platforms of the New Labour government, notably social exclusion, growth (economic,

housing) and quality of life/'liveability'. In several cases however these build on previous (Conservative) government policy and interventions - a sign of their longevity and traction despite a questionable evidence-base - such as area based regeneration, compact city and mixed use which: 'should increasingly become the norm rather than the exception…We will be expecting developers to think imaginatively in future as to how proposals can incorporate mixed land uses, to produce lively and successful developments, and provide a positive contribution to the quality of our towns and cities' (Gummer, 1995).

Table 1. Policy and Evidence

Policy Goals	Measure / Tool	Problems of 'Evidence'
Housing growth targets	Brownfield development; high density (dph)	Backland/infill development, amenity loss (light, noise, air, bio-diversity), ambient vs. area density
Social Inclusion	IMD rankings - New Deal for Communities, SureStart, Housing	Income, Employment factor bias vs. 'Environment', use of proxies - propensity not actuality, ring-fencing
Regeneration	Area programme - BIDs, SRB, UDC/Zoning)	Displacement, churn, ghetto-donut effects, gentrification
Compact City	Mixed-Use, Urban Village, walkability	Scale, planning-use, finance, no land-use use class, social/ tenure mix; economic mix; temporal mix
Crime Prevention & Safety	CCTV, CPTED/DAC/Secured by Design	CCTV detection vs. prevention/safety, fear of crime vs. recorded crime, poor aesthetic and design quality
Liveability	Design Quality Indicator (DQI) / Design Codes, Living Places	Aesthetics, standardisation, new-build versus retro-fitting, 'hanging baskets' and 'doorstep' priority
Accessibility	Distance to transport/services (PTAL, PERS - see Table 2)	Journey times vs. Environment, safety & mixed abilities ; disabled vs. wider socially excluded
Sustainable Development	Quality of Life (QoL) and Best Value Indicators (BVPI)	Proxy indicators, satisfaction not actual use/impacts, economic/housing growth vs. environment/quality
Open Space	Access, Quality (*Space Shaper*)	Green vs brownfield, public realm vs. Parks, safety
Planning amenity standards/norms	Play/Open Space, Sports, Libraries (population/per capita)	Diversity, choice, scale (hierarchies), lifestyle, barriers to access. No standards for arts facilities

These policy goals are manifested in high level regeneration and quality of life domains, such as crime, social inclusion, 'access' (to services, jobs) and environmental quality - in pursuit of 'Sustainable Communities' (ODPM, 2003), and 'Best Value' in local services - with performance and change measured by sets of indicators (PIs) at local, regional, and at national scales (DETR, 1998). A feature of these evidence-based policies and programmes is often conflicting and weak evidence and questionable measurements used (Evans, 2006, 2009, Evans, Foord & Aiesha, 2009). In some cases this directly reflects bias in the standard metrics used, such as in Indices of Multiple Deprivation (IMD 2007) weighted towards economic and employment and against environment and housing factors, and in others the crude nature of the measure applied, notably density per hectare (dph) in housing, and thermal comfort measurement in national housing condition surveys. Brownfield and infill development is perhaps the prime example of planning policy devised to encourage (private) development at higher densities (and lower space standards) in sites of 'previous developed land'. However this has produced loss of amenity and overcrowding particularly in backland developments, with consequent reduction in resident views and daylight, and in loss of garden/green areas (and ecology/bio-diversity), as well as increased car parking and traffic as population densities and movement intensifies. From our research into accessibility and urban design in London and Sheffield for example, incumbent residents suffer the effects of overcrowding, loss of privacy and reduced pedestrian access as routes are closed and 'public' realm is privatized as a result of new infill housing. The extent to which these are 'unintended consequences', or a failure of the planning system to fully measure impacts and consider resident views, is debatable, but the governance systems and importantly the evidence base used to justify such instrumental planning policy are seriously flawed. Resolution is left to

individual planning authorities to interpret government policy and balance costs and benefits, but in practice a 'Pareto loss' is the norm - with housing growth the overriding goal - unless strong resistance and political support combine to resist a particular scheme. Even then, fear of subsequent planning appeals, i.e. cost, time delays, 'blight', shortage of resources and 'skills deficit', places pressure on the development control process to compromise on planning permissions, particularly on change of land use (e.g. light industrial to residential) and higher densities, with negative consequences for environmental and social impacts. What EBP and their underlying instrumental advocacy research tend to ignore, is the contested nature of the principles and practice they employ, which is evident from the literature[ii] and increasingly from the empirical evidence emerging from urban design and related research.

3.1 Toolkits

An outcome of the EBP approach and policy implementation has been the growth of toolkits and guidance in a range of urban design and other spheres, particularly addressing design and space quality, crime and safety, and accessibility. These range of from government ministry and agency guidance, for example on design codes, codes for sustainable homes and pedestrian accessibility, as well as bespoke models promoted by commercial or research spin-out enterprises such as Space Syntax Ltd (pedestrian flow, crime), *Secured by Design* (crime prevention), Transport Research Laboratory, Intelligent Space/Atkins (pedestrian modelling) and the Building Research Establishment (building performance and sustainability). Several of these directly target urban design and are underpinned by evidence-based research. Such research often provides case study models and exemplars to support the transferability to new situations and scenarios - and clients. In public policy terms the promotion of these toolkits and guidance seeks to ensure standardization and the successful roll-out of EBP in order to achieve maximum policy take-up and outcomes.

For example, only recently has the "street" as a pedestrian environment attracted transport, design and safety attention, as a stimulus to increased walking and pedestrian activity. This has been driven by the twin goals of sustainability through more compact cities (Cooper & Evans., 2009; Jenks, 1999) resulting in reduced car use, crime and pollution, and the health benefits from increased physical activity countering 'obesogenic environments' (Lake and Townsend, 2006). Recent efforts to fill this knowledge gap include design guidance and toolkits to measure accessibility at the street level (Table 2) and guides to facility design, particularly to meet disability access and related building and planning regulations. The recent *Manual for Streets* (DfT, 2007) signalled government's acceptance that the pedestrian needed to be at the top of the 'hierarchy of need' in the public realm, drawing on growing 'good practice' in street design and layout schemes. Design guidance referenced in this manual is also generally predicated on new-build or major works, however the vast majority of development is incremental, retro-fitting and infill of existing built environments.

Despite inclusive design and community consultation imperatives, user involvement in these professional guidelines is however weak, with an overemphasis on physical environmental and street features leading to prescriptive design standards, but less consideration of safety and other perceptual barriers and the needs of particular excluded groups (including hard to reach, non and infrequent users). Comprehensive community profiling and mapping is not a feature of these approaches, with the exception of the *Accession* model promoted by the Transport Ministry. This relies on limited national Census and other (e.g. deprivation, IMD) data, but which again does not target perceptual, fear of crime and local knowledge factors that, as we have found (Evans, 2009), determines accessibility within the urban environment, and to transport. Pedestrian evaluation systems have also been found to be inadequate in assessing design against crime within the transport system, whilst agent-based modelling

techniques such as Space Syntax 'are largely inconclusive and the complexity of the approach hinders detailed scrutiny and critical inspection' (Cozens and Love, 2009: 329).

Table 2. Selected Toolkits for Street Design and Accessibility

Toolkit (Source)	Summary of Method
Link and Place (Jones, P. et al.)	Aims to encourage stakeholder involvement in the design process. Planning and Design of street as a *Link* - a place that users should pass through as quickly and conveniently as possible; and *Place* - as a destination. Aims to meet varying needs of street users and encourage stakeholder engagement. Does not focus on in particular on safety, but rather on design and the purpose (local, national, tourist etc.) for which the street will be used
Space Shaper (CABE)	A toolkit for public engagement for use by anyone from community groups to professionals. Aims to measure the quality of a public space before investing in improvements on that space. The focus is on urban design and safety does not form a specific part of the assessment process, although there are questions related to how a space makes a user feel
Pedestrian Evaluation Review System (PERS - TRL)	A systematic process to assess the pedestrian environment. Establishes the relative quality of different routes, provides an opportunity to review opportunities for improving individual links and crossings. Promotes objective rather than subjective review, conducting an audit of the links, crossing, routes and public transport spaces. Safety not specifically mentioned as part of the audit process - tool appears designed specifically for use by transport planners. Expert judgement based
Public Transport Access Levels (PTALs – TfL)	Formula (algorithm) which measures the accessibility of the public transport network by calculating an average waiting time and walking time for services. No allowance for variation in walking abilities, social or environmental barriers
Community and Street Audit (Living Streets)	Evaluates the quality of public space from the viewpoint of participating users and determines what needs to be done to improve areas and routes. These can be carried out by members of the public, local stakeholders or by consultants. It is possible that the approach will allow safety issues to be raised, as conversation and observation are key parts of this methodology. No community or non-user ('excluded') profiling
Space Syntax (Space Syntax Ltd. - UCL)	Aims to understand relationships between places, by looking at how their configuration (routes, morphology) influences pedestrian and vehicular movement. Has also been used to relate space syntax to crime (burglary) patterns. Prior knowledge and social factors not reflected in agent based model
ACCESSION Within Reach Modelling Software (DfT)	GIS-based, used to map accessibility, both current and that to be achieved by future improvements. No focus on safety or consult5tion, although can be used to measure physical accessibility as part social exclusion calculation (limited to Census profiles). Provides an accessibility overlay on any background map.
Place Check	Questionnaire-based assessment of the qualities of a place, designed to capture opinions of a wide range of take holders. No specific focus on fear, although the general nature of some of the questions would allow fear to be mentioned as an issue
Crime Prevention Through Environmental Design (CPTED)	Relies on the ability to influence offender decisions that precede crimes - and research that indicates that the probability of being caught will form part of this process. Reduction of fear of crime forms part of CPTED strategies, which seek to prevent crime by manipulating the built environment to improve natural surveillance, improve territorial reinforcement and clear demarcation of ownership of space

Accessibility as a feature of Sustainable Development and 'Communities' (ODPM, 2003) is also expressed in terms of quality of life, measured through a basket of over 30 indicators applied at a local level (DETR, 1998). These include access to services indicators represented by journey (walking) times to a predetermined destination such as local GP or park, but from our user consultations these do not reconcile with the everyday destinations undertaken or most desired (Table 3). What is also common between these physical design audit and planning standards is not only the absence of user involvement in their specification, but also a failure to recognise that travel and mobility needs and behaviour varies according to demographic make-up and local environmental quality and safety. As Ekblom observes in the case of Crime Prevention Through Environmental Design (CPTED): 'the efficacy of CPTED can be reduced by demographic factors and socio-economic factors. Social conditions may

nurture fear, reduce the inclination to intervene and result in the withdrawal of people into the home' (2006: 3). What emerges is that the inter-action between local residents, other users (workers, visitors) and the local environment requires a fine grain level of analysis which might also inform higher scale urban design and planning of the street and transport system.

4. Case study - accessibility and urban design

As the first step in specifying accessible design from a user perspective, several focus group sessions were held with groups with specific mobility needs and those experiencing potential transport exclusion, e.g. young people, mothers with toddlers/single parents, registered disabled, ethnic minorities - including elders and youth (SEU, 2003). These sought to evaluate the travel activity, aspirations and barriers to access, which could then be compared with transport planning standards and quality of life indicators. Focus groups were held in contrasting locations and communities in northern and southern England (Rotherham, Liverpool, Camden/London, and Hertfordshire). A key finding for example from the older groups consulted, was an assessment of their regular travel needs, and these were consistent across the locations and groups involved - Table 3.

Table 3: Benchmarking of older people's (minimum) travel needs

Activity	Frequency	No. of journeys	National accessibility indicator
Food shopping	Weekly	2	% households & households without access to a car within 15 and 30 minutes of a major centre by public transport
Comparison shopping	Monthly	2	
Social or recreational activity	Weekly	2	% of the population within 20 minutes travel time (walking) of different sports facility types
Structured day time activity appropriate to need	Weekly	2-10	n/a
Post Office	Weekly	2	n/a
Medical trip or visit	Monthly	2	% households & households without access to a car within 15 and 30 minutes of a GP by public transport (30 and 60 minutes of a hospital)

Solomon and Titheridge (2006)

Whilst national benchmarks focus on GP/hospital and town centre access, as well as sports facilities, the most frequent trips by older people were to local amenities such as post office and green grocer. This is confirmed in studies of older people (King et al., 2003), where park, restaurant and church also ranked as frequent destinations. However, government accessibility indicators do not include food shopping. Busy (traffic, pedestrians, shops, signage etc) centres may also be a turn-off to some older people (and adults with young children), particularly the frail, dementia sufferers and those lacking confidence and mobility. Cunningham and Michael's review of studies in this field (2004) also found that the most consistently significant factors were safety and aesthetics, and to a lesser extent, micro-scale urban design (e.g. pavements, lighting). The recommended approach from this evidence is the use of objective measures in combination with user evidence to 'provide a richer more accurate picture of environmental influences on physical activity' (ibid: 442), and one that that therefore should involve the community in order to ensure that their perspectives are considered. In our case study, contextual data was also collected for several urban testbed areas in collaboration with local authorities (L.B.Camden and Herts), and visualised in 2D and 3D formats, including land-use, building heights, recorded crime (property, street/vehicle crime), 'points of interest' (e.g. amenities, retail, transport), as well as socio-economic and demographic profiles drawn from Census (2001), deprivation (IMD) and Experian

demographic, lifestyle data. By using a wide range of available data, this baseline mapping can be undertaken for other areas at various scales of geography, and in a comparative framework. This spatial data has also provided the baseline for street audit and resident surveys, and as a reference for the findings arising from user surveys, where variations between primary and secondary data often arise around local perceptions and experience regarding safety, social and amenity factors. This community mapping revealed low car ownership and pockets of poverty surrounded by better off neighbourhoods, a mixed morphology of housing/building types, a high child and youth (primary and secondary schools, churches), as well as older person presence, and from census analysis, high economic inactivity and poor health. The travel horizons of those seeking work (a key government target group) were very small - the immediate neighbourhood and adjoining localities. Transport provision (bus, tube, rail) has however in close proximity (if not "accessible" to many residents), but located outside of the area itself. Whilst schools and some community facilities existed within the neighbourhood, most food and other shopping (e.g. supermarkets) and higher level activities (e.g. employment, leisure) were also located outside of the area. Street crime (robbery and snatch theft) and road safety also worsened at the edge of the area, but which served as the main pedestrian access to bus and other transport. Recorded street crime peaked at rush hour times (not at night), highlighting the disadvantage of residential areas close to major transport and commuter flows. This has been exacerbated by construction and heightened security in and around station areas (anti-terrorism, new station and adjoining development, closure/removal of litter bins, public WCs and seating), which has effectively displaced crime and anti-social activity (drug dealing, prostitution) and environmental problems (litter, parking, street urination) and transferred this to adjoining neighbourhoods. This creates for some older and vulnerable groups (e.g. ethnic minorities) an enclave or "ghetto" effect, limiting travel outside of the residential neighbourhood. Vehicle/bicycle (theft, damage) was concentrated within the residential area itself, but again on the perimeter of the neighbourhood where most cars were parked and in proximity to shops and institutional buildings with poor natural surveillance.

Figure 1. Problematic routes to local transport and amenities

Primary data collected from this testbed area was geo-coded into a GIS database and mapped. In order to be able to analyse the quality of the public realm for the inclusive journey environment, attributes of each elements were ranked with negative and positive values. For example areas/routes that have a low level of natural surveillance were drawn based on the combination of six variables (Evans, 2009; Azmin-Fouladi, 2007): No window; No ground

floor window; Blank walls; High fences; Boundary wall/plantation >1.50; Set backs of >10.00m (Fig. 1). By using the GIS modelling technique combined with photos, spatial and observational data were layered to determine key routes and areas with potential personal security/fear of crime problems.This approach has been applied to the quality of urban design within the area, where elements that contribute to a negative environment can include a lack of 'enclosure' (inadequate relation between building height and street width), abnormal setbacks and 'dead frontage' (Evans, 2009). By overlaying negative features, a new layer is created. These and other aspects can be further analysed by examining micro-elements where specific problems are identified, and where barriers are expressed by participants in user (resident and first-time visitor) surveys.

Following the comprehensive street audits and digital data analysis, leading to the creation of a Street Design Index (SDI), small group meetings and postal questionnaire surveys were also conducted with residents, and accompanied map-walks organized with participants as an experiential exercise to consult on their predetermined journeys. Limitations to pedestrian access and more frequent journeys included 'fear of crime' and 'road safety' as prime barriers, as well as problems with walking surfaces, with specific problem features and areas annotated on maps. These participant comments were overlaid with problematic streets, routes and features delineated from the prior street audit which showed both close correlation, but also divergence (Fig 3). Focus groups were also held with the use of large scale maps, through the GIS-Participation technique (Cinderby, 2006). Here participants - young children and parents, residents, workers and older people - were able to annotate these using text and colour-coded stickers on the local area map, to mark their home and journey routes, problem areas and amenities, and intermediate features such as bus stops and facilities, e.g. public toilets, benches. The next figures show the combination of street design audit and comments arising from the GIS-Participation focus group with older residents in Elm Village, Camden (Fig 2), and from a survey questionnaire of all residents. These highlighted both routes and features/sites with which participants had negative associations or experiences, and useful details of journeys undertaken (e.g. supermarket, cinema), their frequency and problems in the journey chain. These included the relocating bus stops separating bus services (where once they shared a single stop), inadequate crossings (islands too narrow for safety, controlled pedestrian crossing times too short), treacherous 'designer (dutch) paving' (sculpted, with weeds/grass growing through) and anti-social behaviour and areas with poor surveillance.

This urban village with mixed tenure - owner occupied, shared ownership and rented - was originally built on new urbanist principles by a social housing developer in the mid-1980s. The estate was the subject of crime prevention interventions in the late-1990s by the local police. Responding to a rise in burglaries and residents' expressed fear of crime, typical crime prevention measures included alley-gating - the closing off of alleyways and installing gates around/behind houses and other properties to reduce burglary access, and setback/doorway closure in order to remove their use for rough-sleepers, drug-dealers and general 'hanging-out' etc - again, based on 'Best Practice' (*Secured by Design*, CPTED). Both however restrict pedestrian access, close off regular routes and reduce quality of space and function between internal and external spaces, as well as generally having poor aesthetic quality. As Gamman and Pascoe observe: 'some gates were not high enough to be entirely efficient. Other gates either do not complement the housing they were are supporting or they seem to have a criminal appearance. Ugly gates may reduce actual recorded crime, but for some residents they may also increase fear of crime' (2004: 11). This has been the case here with displacement of crime from burglary to street crime and drug dealing, and a consequent rise in fear of crime by residents. Fear was also the barrier that was ranked by far the highest by residents, followed by road safety, pavements and distance to amenities (Fig 2).
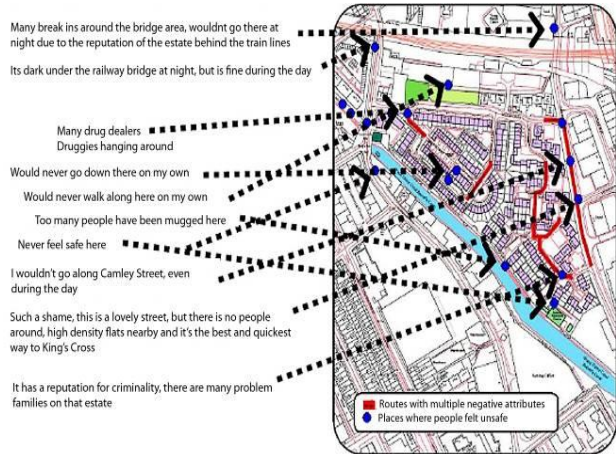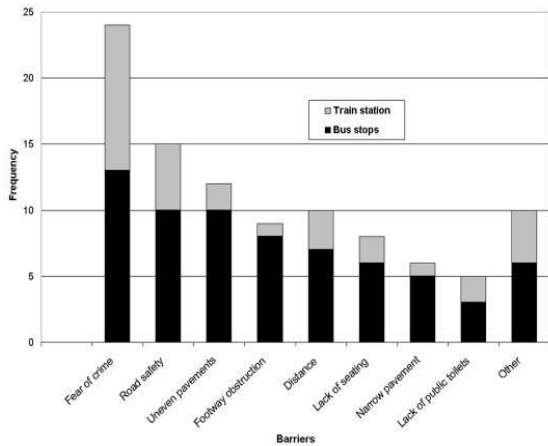
Figure 2. Barriers to accessing local bus stops and station (household and GIS-P surveys)

The walk to the bus was the most problematic. A growing concern was the effect of new housing development on adjoining infill sites which reduced pedestrian access (routes closed or made longer/unsafe) and also reduced views and sight lines. Major alterations to the streetscape present particular problems to older and dementia sufferers for whom familiarity and landmarks are important for confidence in undertaking regular journeys (Mitchell, 2007).
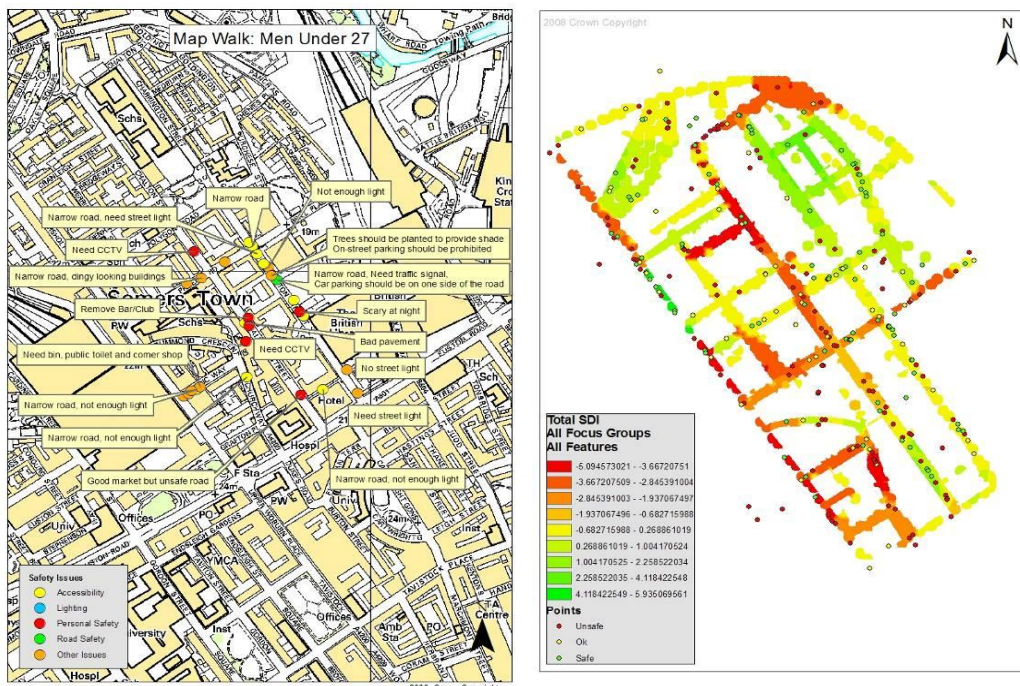

Figure 3. Map walk (Men Under-27); Synthesis of Street Audit with participant focus groups and map walks

Participant consultation conducted with focus groups and individuals - using both face-to-face and self-completed questionnaires and annotated maps completed after guided map walks (Fig 3) - included older people, as well as young (Bangladeshi) men, women, single parents/mothers with toddlers.The street audit and mapping model and testbed example has also been adopted by the regional transport authority in their *Guidance to local authorities for Submission of Local Accessibility Schemes* (TfL, 2007). Prior to our analysis and consultation however, the local authority had already embarked on traffic calming and legibility re-design of the street area in response to access and safety problems, and conflicts subsequently

emerged between wheelchair users (preferring step-free kerbs) and the visually impaired who require the kerb to differentiate pavement from road (by guide dog and stick). This has required the retro-fitted legibility interventions - based on so-called 'Good Practice' guidance (CABE, DfT, et al.) - to be reversed by the local authority at additional cost [iii].

The results have been used to refine the whole journey design assessment and GIS-based street visualisations in an iterative design process, and practical design recommendations made. The feature attributes in particular were validated with end-users (residents groups, visitors), and with professionals with responsibility for the urban, street and transport environments. This validation and weighting can be re-applied in each testbed and user group situation to reflect local conditions, subjectivities and preferences (Evans, 2009). This is more flexible than fixed design metrics and standards, where "one size does not fit all". The annotated maps were then analysed, together with focus group and questionnaire surveys, and mapped data digitised in GIS. These were then integrated with spatial data on demographic, land-use, amenity (e.g. bus stops, WCs), as well as recorded crime data for the area, producing a synthesis between the primary, qualitative information and spatial data. For instance, areas of high street crime density were overlaid with participant's own experience and perspective of safer and unsafe areas (Fig 3). These revealed both convergence, but also divergence between where recorded crime was concentrated, where street audits revealed problematic routes -and other areas where particular groups felt safe, unsafe or 'feared' crime. Some factors were functional and physical such as narrow streets, dangerous crossings - islands too small for wheel/pushchair chairs - lighting and poor surveillance, while others were social such as noise, pubs/alcohol (muslim young men). Fear of crime also depended on prior incidents (including those reported in the local media), reputation (e.g. gangs) and other local community knowledge.

5. Conclusion

This experience highlights the importance of not relying solely on street/environmental design and crime analysis without participant input and observation. In this sense, space is socially produced (not the 'Machine'), with local knowledge and practice influencing movement behaviour and choice which may vary across different user groups at different times of the day. This concurs with a call made in a review of the evaluation of regeneration programmes which recommended a shift of focus away from evidence-based policy and practice, to building knowledge over time, drawing together local experience, research findings and, critically, a better understanding of trade-offs and political imperatives (Coote et al. 2004). These latter aspects have been little considered and understood in the evaluation of urban design interventions to date and, therefore, the nature of 'evidence' - its perspicacity, and the need for a more grounded theory - emerges from this critical review. The importance of 'context' therefore needs to be stressed when considering EBP toolkit and 'best practice' interventions, since: 'every city, and every district or neighbourhood is different..[so] can there ever be useful evidence-based urban design?' (Stonor and Stutz 2004: 3). The triangulation of comprehensively mapped digital data, with observational - human and urban environmental – analysis, combined with user consultation, moves beyond, but also draws upon, the physical access audit, street and place design toolkits that are currently promoted in quality of life assessments and benchmarks. In so doing, this has also sought to bridge the divide between the socio-medical ('evidence-based') and environmental-technological ('deterministic') approaches to access and urban design.

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[i] Notable examples include: Gehl (Copenhagen) *Public Realm*; Florida (Toronto) *Creative Class*; Landry (Comedia) *Creative City*; Sassen (LSE/Columbia) *Global Cities* and the *Urban Age* roadshow (with Sennett, Burdett - LSE). In the UK, prime policy examples (and advocates) include *Core Cities* (Parkinson, Liverpool JM), *Urban Task Force* (Rogers, GLA/Mayor's Urbanism Unit; and Rouse, CABE); *Design Quality* and *Codes* (Carmona, UCL), *New Deal for Communities* (Lawless, Sheffield Hallam), *High Density* (Burdett, LSE and GLA/Olympic Village Design) and *Design Against Crime* (Davey, Cooper et al., Salford).

[ii] See Cooper & Evans (2009) on *Mixed-Use* and *Housing Density*; Cozens (2009) on *CPTED*; Simmie on *Clusters*: 'the cluster idea … has taken many academics and policy-makers by storm. It has become the accepted wisdom more quickly than any other major idea in the field in recent years…at the expense of previous explanations and lacking in relevant empirical evidence (2006: 184); Jenks (1999) and Dempsey et al. (*Built Environment* forthcoming, 2010) on the *Compact City*; and Rudge (2005) on *Housing Thermal Conditions*.

[iii] This scenario has also occurred in the award winning (and 'best practice exemplar') 'legible', 'shared surface' re-design of Exhibition Road, Kensington west London, with the local authority now facing legal challenge by the Guide Dog and 30 other disability organisations.