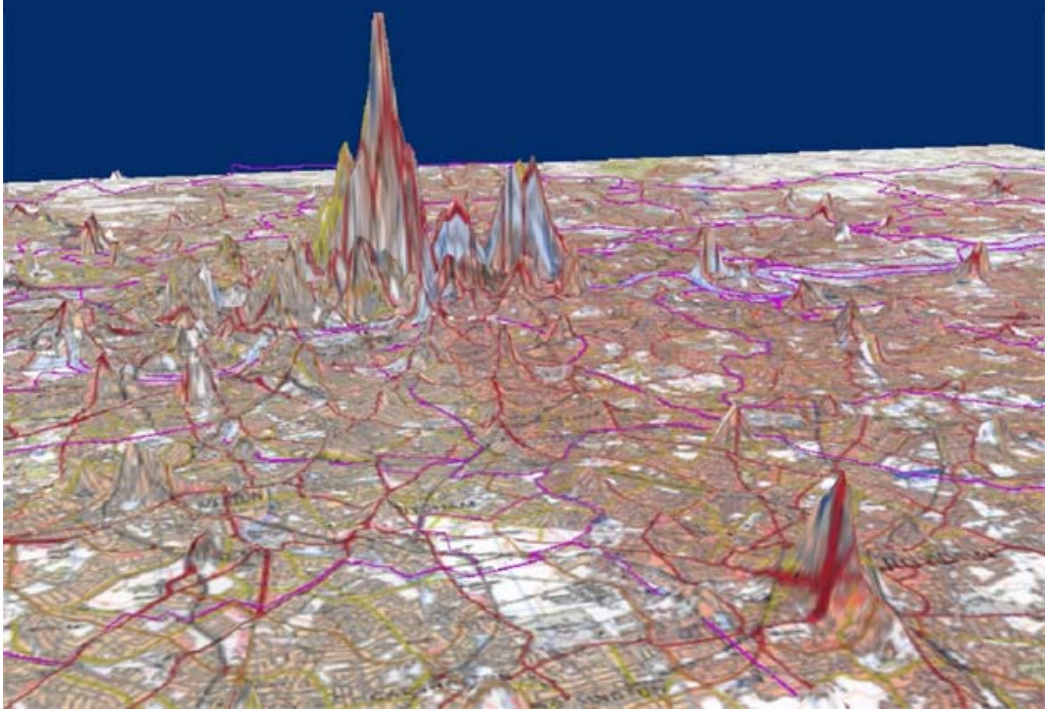
Producing Boundaries and Statistics for Town Centres

London Pilot Study Technical Report

Office of the Deputy Prime Minister
Centre for Advanced Spatial Analysis, UCL



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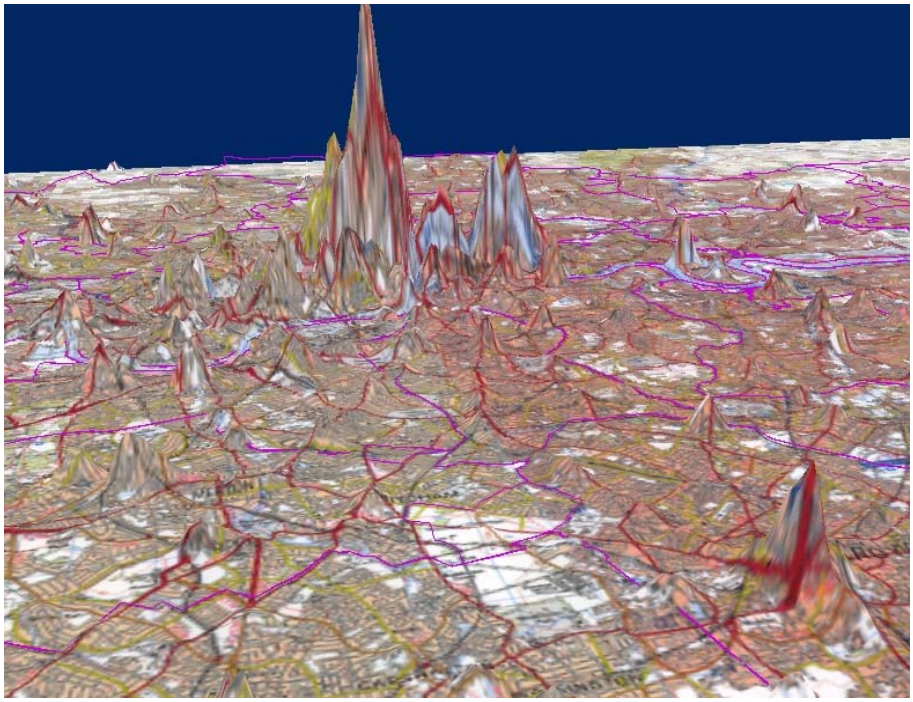
SUMMARY

The London Pilot Study is part of a larger project to develop a model of town centres with boundaries and statistics for planning and monitoring. The overall aim is to develop a nationally consistent method of defining boundaries around concentrations of town centre activities to allow statistical comparisons, then to produce relevant information about all these defined areas.

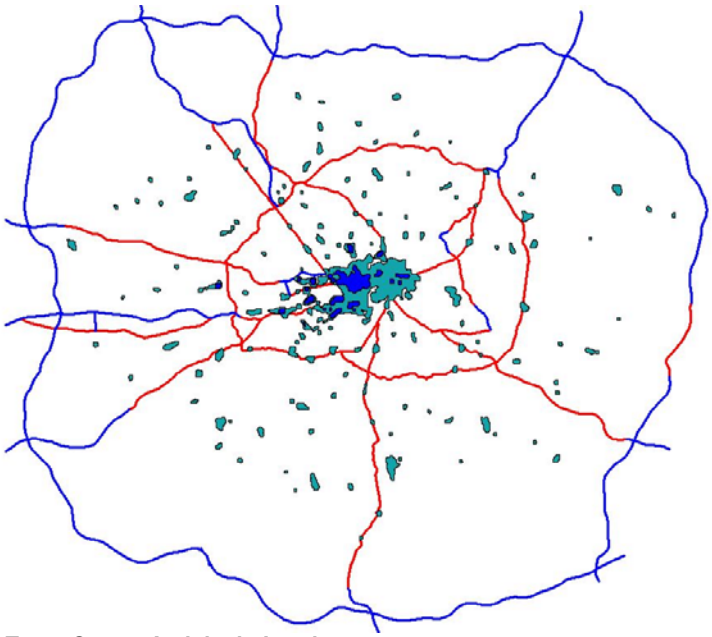
This project was carried out following a Feasibility Study. London was chosen the earlier research had shown that London was probably the most difficult part of the country for which to produce boundaries. The Pilot Study undertook the task of delimiting boundaries for Areas of Town Centre Activity within London and producing employment, turnover and floorspace statistics for these areas. At the same time it aimed to develop a methodology that could be used across the country.

An innovative mapping approach was used, the first stage of which was to combine several indicators each measuring a characteristic associated with town centre activities. These values were then used to produce a surface showing levels of town centre activity. The diagram below shows how this data surface looks for London, with the Central London concentrations of town centre activity being shown by the large peaks.



The Index of Town Centre Activity mapped looking north towards central London

Local knowledge was then used to find a single best-fit "height" threshold on the surface that closely matched perceptions of town centre boundaries. A map with the Areas of Town Centre Activity in London given in blue is shown in the picture below. Some areas came out above the threshold because they shared many of the characteristics of town centres (e.g. concentrations of retail along with some leisure activity) but were in out of town locations and would not be considered town centres. As there was interest in the statistics for these areas it was desirable to leave them in the report, but their inclusion does not imply that they are town centres.



Areas of Town Centre Activity in London

Aggregate statistics for turnover, employee jobs and floorspace have been produced for these Areas of Town Centre Activity. The Office for National Statistics and the Valuation Office Agency have been key suppliers to this project. A major work programme was needed to develop the data sources and the estimation techniques that underpin the results contained in this report.

The work that has been undertaken during this project to develop the boundary model and to improve the data sources has not only allowed the production of the boundaries and statistics for London, but will form the foundation for producing boundaries and statistics for England and Wales. Following this publication work on generating and providing these will begin, with the first national publication planned for Spring 2003. The eventual goal is to provide a national publication that is updated regularly, allowing a time series of statistics to be built up.

The benefits of this innovative work goes beyond the town centres project. The real power of this approach is that it provides unique insights by joining existing datasets on a geographical basis. This has wide relevance across different government policy areas, for example mapping the incidence of different types of crime to identify hotspots.

1 The need for town centre statistics

1.1 The changing town centre

Town centres have many roles. They are concentrations of economic activity and places where people come to work; they are also a focus of social and cultural life and are centres of entertainment. Yet it is their role as centres of retailing which is generally considered to be defining. This is unsurprising since many town centres are the sites of ancient market locations.

Changing patterns in consumer behaviour since the Second World War, the most significant of which was the increased use of the motor car for shopping trips, have gradually undermined the primacy of the town centre as a shopping destination. As more people could afford to run cars, town centres inevitably became more congested, less accessible, and less attractive. High land values and the lack of suitable sites for larger format stores with self-contained car parking further limited new retail development in traditional central locations. Off-centre locations were simply more convenient for the car-borne shopper. The competition from these new and attractive retail formats, situated in more spacious, custom-built locations was intense. As trade and investment was diverted to these new locations, many town centres were left behind.

The negative impact of these new retail formats on town centres has been seen elsewhere in the world, but nowhere more so than in the United States. The town centres or 'downtowns' of many of the country's largest cities suffered substantial decline as consumers increasingly shopped in suburban locations which were more readily accessible by car. The suburban lifestyle, which was pioneered first in Los Angeles, spread throughout North America, and then in turn the rest of the western world: a culture characterised by an ever more mobile population, dominated by the car. Other economic functions were to follow the retailers to peripheral locations which would consolidate into so-called 'Edge Cities' (Garreau, 1991).

A similar process of sub-urbanisation has been recognised in the UK for some time (Hall, 1973). The continuing movement of population away from town centres (a trend that was not to reverse, and then only slightly, until the late 1990s) and the simultaneous trend of employment opportunities moving to peripheral locations meant that town centres in the UK also faced a similar spiral of decline to those experienced by the US downtown (Department of the Environment & URBED, 1994). With population, economic activity and retailing moving to off-centre locations, the draw of the town centre was inevitably compromised.

With this decline, the other functions traditionally associated with the town centre were also affected. Shoppers still desired a 'town centre' type experience: a place to shop, certainly, but also a place to eat and drink and to engage in other leisure activities. The shopping mall was offered as a potential solution – a fully controlled retail environment that emulated the town centre.

The first of these shopping centres in the UK was the MetroCentre in Gateshead. Opened in 1986 on Enterprise Zone land, it offered 1.56 million square feet of retail space in 325 outlets, and provided 12,000 car parking spaces for its customers. This building was in the vanguard of the "Third Wave" of retail development and was followed by other developments such as Meadowhall in Sheffield, and Merry Hill in the West Midlands. These centres threatened the existence of many town centres already beleaguered by the earlier waves of off-centre development (Schiller, 1986).

1.2 The Government response

1.2.1 PPG6

The likelihood of town centres in the UK emulating many depressed downtowns in the US was not lost on 1990s policy makers. It was widely acknowledged that the economic, social, and cultural infrastructure of the United Kingdom depended on the contribution of vibrant, sustainable town centres and that many were in need of protection. If the town centre was to survive, then the continued development of off-centre retailing had to be restrained (Department of the Environment & URBED, 1994).

By the early 1990s the growing concern about the impact of large-scale, out-of-town retail developments on town centres was reflected in widespread pressure for a change in planning policy. After consultation, a new planning policy guidance note - 'PPG6: Town Centres and Retail Development' - was published in 1993 (Department of the Environment, 1993). The PPG established new policy objectives which sought to redress the balance in favour of town centres and set clearer tests for assessing proposals for out-of-centre retail developments.

In 1993 and 1994, the House of Commons Environment Committee reviewed the state of retailing in the UK and the Government's response to the evolving retail environment. The Committee's report strongly advocated the approach adopted by Government although it argued that the changed emphasis of policy did not go far enough.

The Government responded by issuing new guidance, after consultation, in 1996. The new policy made town centres the first choice of location for new retail development thorough the application of the sequential test. The onus was now on developers, who had to demonstrate that they had not (after being flexible about scale, format, design and car parking) managed to find a more central site that was suitable and could be available for development within a reasonable time. (The sequential test has now been extended and applies to leisure development and other key town centre uses). This put the emphasis on putting new developments involving town centre uses in existing centres and put a brake on out-of-centre developments (Department of the Environment, 1996).

1.2.2 The need for better retail information

A further recommendation of the House of Commons Environment Committee was to improve the quality and availability of retail information in order to support the planning process. The provision of such information would enable planners to better understand the distribution of retail activity (in terms of employment, turnover and floorspace) in order to assess the need for new development. Changes in the retail environment through time could also be tracked, as could be the impact of new developments. Better information would ultimately lead to better policy, at both the national and local levels.

Retail information is not only needed in the public sector. During the Environment Committee's deliberations, many commercial organisations commented on the importance of, and need for, more up-to-date and reliable retail statistics, not least to assess the impact of PPG6. For example, *Gateway* wrote that: "planning decisions are taken on the basis of myths" and *Healey & Baker* submitted evidence that there were inadequate statistics for retail planning. In essence, the waves of out-of-centre development, and the related decline in town centres had occurred in an **information vacuum**. The true extent of the changes in the UK's retail economy could simply not be assessed.

The *Oxford Retail Group*, a group of multiple retailers and others with interests in development and investment, was formed with the principal aim of improving access to retail information. The Group campaigned throughout the 1980s and 1990s to reinstate the Census of Distribution (last undertaken in 1971) so that a quantitative picture of the situation could be derived.

The view of the *DoE* (Department of the Environment) at this time was that there was already a great deal of retail information which was gathered, processed and digested in the commercial world. It was necessary to balance the key concern of improving retail statistics and the need to minimise the cost of doing so. For this reason, *DoE* argued against the idea of a retail census as it would place too great a burden on small shopkeepers, although it recognised an essential need for information about the retail

industry. As a result of hearing all the evidence the Environment Committee recommended that: ".. the *DoE*….develop a nationally consistent system of retail data collection to be published at regular intervals" (House of Commons Environment Committee, 1994, paragraph 109).

1.2.3 The *ODPM* response

The Government's response to the Environment Committee's 4th report accepted that more could and should be done to establish a nationally consistent system of retail data published at regular intervals. Thus the *DoE* (now the Office of the Deputy Prime Minister or *ODPM*) instigated a programme of work to improve the availability and quality of retail statistics.

To create meaningful statistics for the country's town centres, their spatial extent needed to be clearly defined within a discrete boundary. Unfortunately, the definitions of town centres used in local plans could not be used since they were not consistently defined, reflecting the different requirements of local authorities and their plans for the next ten years. Those definitions found in commercially available datasets were not consistently defined and were not sufficiently comprehensive in coverage to be viable as a national source. It was also clear that aggregations of the standard geographic units, such as census enumeration districts or postcode sectors, could not be matched to town centres (see section 2.4.1 for a more detailed explanation). So in order for the private and public sectors to be assured of the quality of town centre information provided by central government, an alternative method of defining these areas had to be found.

In order to collate these statistics, the *ODPM* recognised the need to make the fullest use of existing sources of data and limit new data collection to those areas not already covered. Government was an obvious source for these data as it was the source of definitive information at the national level. The Office for National Statistics (*ONS*) had recently compiled the Inter-Departmental Business Register (IDBR), which holds information on employment and turnover for individual businesses, and the Valuation Office Agency (*VOA*) had an extensive commercial and industrial property floorspace database which was used to support the rating process. The *ODPM* proposed to aggregate a range of statistics, on employment, turnover and floorspace, for Areas of Town Centre Activity.

BOX 1.1: Policy implications of Areas of Town Centre Activity

*The purpose of this study has been purely to define areas containing town centre activity for statistical monitoring and comparisons (**Areas of Town Centre Activity**). The areas chosen are ones that contain concentrations of town centre activity but they are loose-fit boundaries – they sometimes extend into residential streets for example[1].*

*It should be noted that these areas have **no** policy status and are not town centres for policy purposes – such centres will be designated in development plans.*

Additionally the areas chosen by the method are ones where there is a concentration of town centre activities which are not necessarily town centre areas. Although most of these will be designated town centres, some may not be and their appearance in the list does not imply that these are recognised as town centres. Similarly the exclusion of a town centre from the list does not imply that it should not be recognised as a town centre, and some smaller town centres are not included.

This approach was supported by a Retail Statistics Working Group (RSWG), containing representatives from Government Departments and agencies, local authorities, retailers and property consultants. The main information requirements identified by the *RSWG* were for data on floorspace, employment and turnover of retail outlets for town and other shopping centres. Fortunately Government data which could be used to generate these statistics were becoming increasingly available at this time.

In 1996, the *ODPM* commissioned the Centre for Advanced Spatial Analysis (*CASA*) at University College London, and the Urban and Economic Development Group

[1] The extension of the areas into residential locations does not affect the statistics produced since commercial activity in these locations is minimal.

(*URBED*) to undertake a Feasibility Study which would investigate the generation of statistically consistent Areas of Town Centre Activity. The method had to be capable of national implementation at a reasonable cost. Once defined, these Areas of Town Centre Activity could be used to aggregate basic statistics such as employment, floorspace and retail sales turnover on a consistent basis for all town centres in England and Wales.

1.3 The Feasibility Study

The aim of the Feasibility Study, conducted between 1996 and 1997, was to develop a prototype model to define "..the extent of town centres geographically, on a consistent basis for statistical purposes" (Town Centres: Defining Boundaries for Statistical Monitoring Feasibility Study (DETR, 1998). In order to achieve this aim, it was necessary to devise a method for drawing a boundary around these areas which was objective, consistent, practical, reliable and robust, and which had the confidence of those in both the public and private sectors who needed to use the statistics. A model was developed after a review of previous work on defining and classifying town centres, as well as an extensive survey of the current views of academics and practitioners. A number of characteristics of town centres were identified, which if quantified and mapped using a Geographic Information System (GIS), could potentially be used to delimit town centres. (For a detailed account of the Feasibility Study, see the 1998 report as above.)

The model was then tested on twelve case study towns which had been selected to be representative of the country's urban hierarchy. These were Abertillery in South Wales; Bristol and Tewkesbury in the South West; Andover and Gravesend in the South East; Wandsworth, Putney and Clapham Junction in London; Wolverhampton in the West Midlands; Warrington in the North West; and Skipton and York in Yorkshire and the Humber.

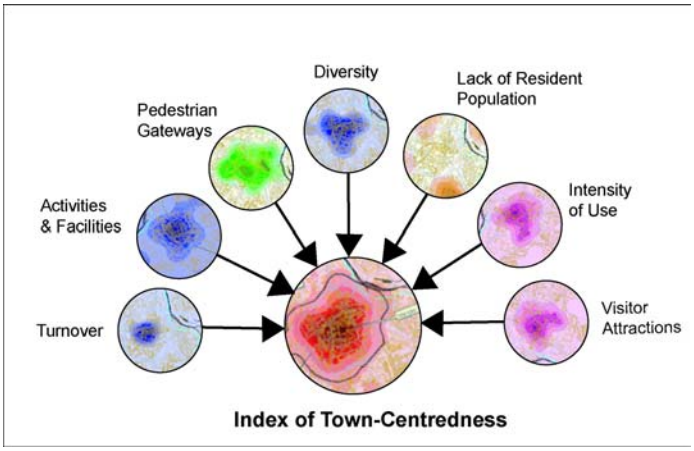


Figure 1.1: The seven components of town centre activity

For each of the twelve cases study towns a study area was defined to cover the full extent of the urban area. Within this area, each of the seven characteristics was modelled by mapping and manipulating data from the core datasets within a GIS, giving every 20-metre grid square within the area a relative value for the characteristic. These values could then be used to generate a data surface, for which contours could be drawn, representing the graduation of the characteristic throughout the study area. Each surface (called a module in the Feasibility Study) represented a discrete component of the model.

In all twelve case studies it proved possible to produce a graduated surface of 'town centre activity', purely by combining the data in the seven component surfaces (Figure 1.1). This final composite surface – the Index of Town Centre Activity (ITCA) – could also be represented as a series of contours. In a topographic map, the contour represents a height threshold, whereas in the ITCA surface, each contour represents a line of equal levels of town centre activity. Each contour could therefore be considered as a potential town centre boundary, and if the correct threshold could be identified, this threshold contour could be used as the definition of the town centre boundary (Figure 1.2). Local planners were able to select a threshold contour for each of the twelve case study areas which they agreed modelled their town centres well.

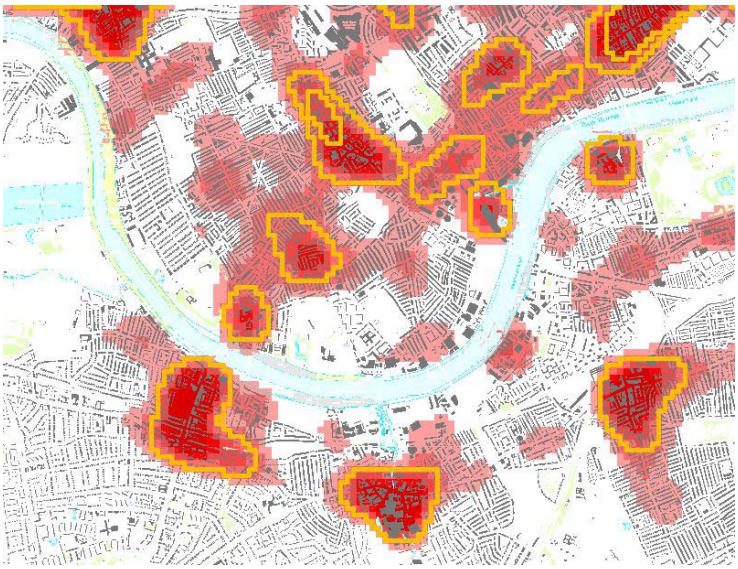


Figure 1.2: Areas of Town Centre Activity in South West London

1.4 Aims and objectives of the Pilot Study

The prototype model developed during the Feasibility Study seemed to work, albeit for limited geographical areas. Yet it was unwieldy, and it was clear that the model would have to be modified if it was to be used to define Areas of Town Centre Activity across England and Wales, not least because of the lack of coverage of certain datasets (Department of the Environment, 1998 p 44).

Towards the end of 1998, the *ODPM* commissioned *CASA* and *URBED* to undertake a further phase of the research – a Pilot Study. Four clear objectives were set for the research:

►The prototype model developed during the Feasibility Study was to be evolved to one capable of generating statistics for England and Wales.

►The revised model needed to be tested on over a much larger area than before. The Pilot area should contain a large number of different town centres so the model could be tested across all of the urban hierarchy.

►A variety of statistics for all the Areas of Town Centre Activity in the study area should be published as the first phase of creating a national compendium.

►An IT infrastructure had to be created that would be able to support the creation of statistics for England and Wales.

1.4.1 A London Pilot Study

Following the success of the Feasibility Study it was decided to carry out a pilot study to look at one large area containing a range of different town centres. The purpose was to develop the boundaries and statistics for Areas of Town Centre Activity within the study area, with a view to using the methodology developed for the rest of England and Wales afterwards. London was chosen to be the study area due to its complexity and variety of town centre types, highlighted by the fact that South West London had been the most challenging area in the Feasibility Study.

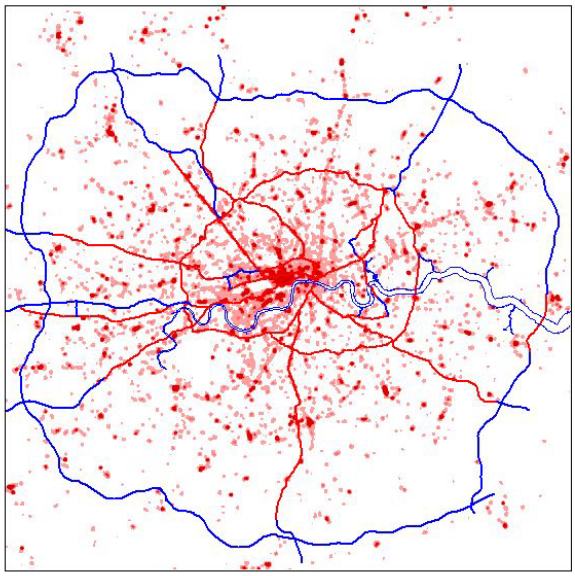


Figure 1.3: Retail Employment Density in London

The study area of the Pilot Study was broadly delimited by the M25 (Figure 1.3). The study area, defined by the rectangle, extends beyond the orbital motorway and well beyond the outer edge of the London Boroughs so that potential edge effects[2] could be discounted. It also enabled the study team to see if some town centres outside London (such as Hemel Hempstead and St Albans) could be accurately defined using the London model. They could be and the implications of this are discussed in section 6.2.1.

1.4.2 Key technical issues

Key technical considerations that had to be accounted for if the Pilot Study were to be a precursor to a statistical compendium for England and Wales comprised:

►The boundaries generated by the model should produce **consistent** statistics so that any difference between the statistics for town centres reflected real differences, rather than any arbitrariness in their spatial definition. This consistency would not only enable the meaningful comparison of different town centres and other retail concentrations across the country, but also that individual town centres could be tracked through time.

►The statistics produced would have to be **accurate**. This accuracy would come from both the improvement of the model itself and from improvements in the quality of the data used to generate the model and aggregate the statistics.

►The collation of these statistics would not be a one-off exercise, but would need to be generated on an annual basis. The compendium would have be **regularly updated**.

►The vitality and viability of town centres is widely recognised to depend on retaining and developing a wide range of attractions and amenities beyond retail alone. The town centre statistics would therefore have to support a much **broader vision** of the role of town centres.

►The retail aspect of town centres was nevertheless considered to be important. It was recognised that a broader definition of town centres would mean that the information on the much smaller retail pitches could be lost. It would be important therefore to see if smaller areal definitions of **Retail Cores** would need to be identified.

[2] When modelling geographic areas, it is sometimes necessary to restrict the extent of the analysis. The outer boundary of the analysis is often arbitrary, often bearing little resemblance to the underlying geography. Edge effects occur because data describing the phenomena exist beyond the boundary, and yet are not taken into account when modelling the areas close to those boundaries. It makes sense therefore, to make the study area larger than the real area of interest in order to minimise any potential edge effect.

1.5 Research approach

In order to produce a new model which improved on the quality of the old model, and met the requirements outlined in section 1.4, a work programme was developed which included independent review of the overall approach, a thorough analysis of the model itself, and consultation with various user groups.

1.5.1 Independent review of the model

The need to quality assure and improve the model led to a wholesale review of the model developed in the Feasibility Study being undertaken by a panel of independent experts:

►Professor Clifford Guy of Cardiff University assessed the overall approach to modelling town centres developed during the Feasibility Study. Well respected in the retail industry, Guy undertook a extensive survey of his colleagues across the industry and made a number of suggestions on how the model could be improved.

►David Unwin, Professor of Geography at Birkbeck College, University of London examined the statistical and modelling techniques used to run the model and offered much advice on how it could be enhanced.

►Leading leisure industry analyst Jayne Cox of Brook Lyndhurst concentrated on evaluating the *Visitor Attractions* component of the model, looking to see if it should be included within the model, and if so, how it could be quantified. This component was arguably the most under-developed of the Feasibility Study model, although was consistently identified as being important by town centre experts.

1.5.2 Review of the data used

As the independent reviewers assessed the model, the study team undertook a thorough review of all potential data sources, including those from both the public and private sectors. The conclusions of this review are found in chapter four of the report.

1.5.3 Continuous improvement of data sources

The model is data driven and the old adage 'garbage in – garbage out' is particularly apt. Throughout the project, there has been a drive to improve the quality of the datasets used. Both the internal and external evaluation of the data have been unstinting, leading to delays as datasets were revised and improved. The fact that statistics have finally been released for London (two years later than originally hoped) is due to the determination of the *ODPM* and the Project Team to assure quality in the outputs of the model. The data are still not perfect, but they represent the best currently available without substantial further work being required.

1.5.4 Testing the model revisions

Once the independent reviews were completed, their recommendations were thoroughly tested. A number of different model configurations were tested during the Pilot Study in order to establish the fine balance between having as detailed a model as possible which could capture all the subtle nuances of town centres, and one which was easy to operationalise at a national level.

1.5.5 User consultation

The evaluation of the various model configurations was not just left to the study team and the independent reviewers. In the Feasibility Study, a large number of town centre experts were consulted throughout the project and were key to the success of the research. A similar consultation structure was put in place for the London Pilot:

►A project **Steering Group**, chaired by the *ODPM*, guided the research team throughout the project. It comprised a large number of individuals, including representatives from central government departments and agencies, local authorities, retail and planning consultants, retailers, chartered surveyors, and academia.

►Representatives of London's 33 Boroughs, which comprised the **Local User Panel**, were also consulted throughout the project. They were not only to assess the quality of the areas and statistics produced during the various iterations of the model, but were also to comment on the quality of the data driving the model. The London Planning Advisory Committee (LPAC) and later on, the Greater London Authority (GLA), were also to play a major role in this advisory process.

►A series of **Expert User Panels**, made up of experts in the field, were convened from time to time to discuss potentially contentious aspects of the research including the visualisation of the statistical boundaries, and how these boundaries might relate to policy (see Box 1.1).

►As the project neared completion, two **independent reviews of the statistics** produced by the model were commissioned. These detailed reviews, conducted by Colliers CRE and TW Associates, identified some shortcomings in the statistics which had to be addressed by the project's data providers. In addition to these formal reviews, a number of individuals, from a variety of organisations, helped assess the quality of the statistics throughout the project.

1.6 Structure of Report

The London Pilot Project has been a long one. A number of issues not even anticipated at the start of the research have emerged to increase the challenges involved. This report augments the Summary Report and gives more detail on how the statistics were created. Some readers will want to delve a little deeper into some of the issues, such as how error affects the model, or how the London Borough planners were able to interact with the model over the Internet. With this in mind, there are pointers to a series of *CASA* Working Papers, available through the project web-site, which offer the interested reader a deeper insight into particular aspects of the project.

In **Chapter 2** the basic problems of defining town centres are outlined. What exactly is a town centre, and is it really possible to create a meaningful statistical definition of one? After a brief review of the approaches previously taken to define the central areas of town and cities, the chapter moves on to identify how the various characteristics of town centres can be mapped, integrated and modelled within a GIS prior to the boundaries themselves being defined.

Key to the success or failure of the project would be the selection of the indicators which would be used to model town centre activity in London. **Chapter 3** gives an explanation of how the components of the model developed in the Feasibility Study were taken apart, assessed and reassembled to create the definitive model for town centres in London, and ultimately, for the UK as a whole. The role of the local user panels in assessing the outputs of the model is also discussed in this chapter.

The three main datasets that were selected to drive the model – the *ONS*'s Annual Business Inquiry, the *VOA*'s commercial and industrial floorspace data, and the postcode data used to geographically locate them, are explained in **Chapter 4**. The chapter also gives an insight to the many types of error that have to be contended with when modelling town centres. As well as demonstrating how these errors could affect the model and its output statistics, the various ways in which they were dealt with are shown.

Statistics for the one hundred and forty-seven Areas of Town Centre Activity and twenty-one Retail Cores in Greater London are found in **Chapter 5**. The statistics are presented on a Borough by Borough basis with some comment on them. General guidance is also offered on how the statistics might be interpreted, as well as a few caveats on their best use.

Chapter 6 is the concluding chapter. Recommendations for the national implementation of the project are discussed here including how the model might need to be changed, how a time series of statistics can be best developed, and how the perennial problem of the accuracy of the data can be addressed. The report also contains annexes including a list of the classifications used in the model and a detailed explanation of the ABI prepared by James Partington of the *ONS*, and the bibliography.

The research has taken considerably longer than originally planned for a variety of reasons which will be touched on throughout this report. The *ODPM* aims to be completely transparent and open about the issues involved in defining Areas of Town Centre Activity that this project has raised. It is fitting, perhaps, that the reports starts by acknowledging that there is no general agreement on what a town centre actually is.

2 Defining town centres

2.1 What is a town centre?

So what exactly is a town centre? The answer to this question is that it depends on who is being asked. A retailer may argue that the town centre is the part of the town where the prime retail pitch is found, easily identified by the highest zone A rents, and largest pedestrian footfall. A taxi driver may argue that the town centre is focused on the pubs and clubs, or defined by a pedestrianised area. A town planner will have yet another view, usually involving not only an appreciation of the wide variety of town centre uses, but also a view on how the town centre will evolve. While everyone has an instinctive response to the question, producing an objective definition that adequately encompasses these responses is less straightforward.

There have been many attempts at defining the spatial extent of town centres over the last half a century. In 'The Heart of the City', Sert argues that the town centre is 'a focus for both community and for public transport' (Sert, 1952). Murphy and Vance classically defined the Central Business Districts of US cities by mapping land zones that contained the highest concentration of retail and office premises; the highest land values, the tallest buildings, and those which were the focus of pedestrian and vehicular activity (Murphy and Vance, 1954). Since the 1950s there have been numerous further attempts to define town centres (see for example, Alonso, 1964; Murphy, 1972; Comedia, 1991; URBED, 1994) but none sought to define them across a region or country (For a more detailed review of the literature, see *CASA* Working Paper 51).

All these experts consider different aspects of the town centre to be important for definitional purposes, reflecting their different perspectives. This difference of opinion is not limited to the academic community. When various stakeholders were asked to define the extent of Wolverhampton's town centre as part of the Feasibility Study, a number of different definitions were identified (Figure 2.1).

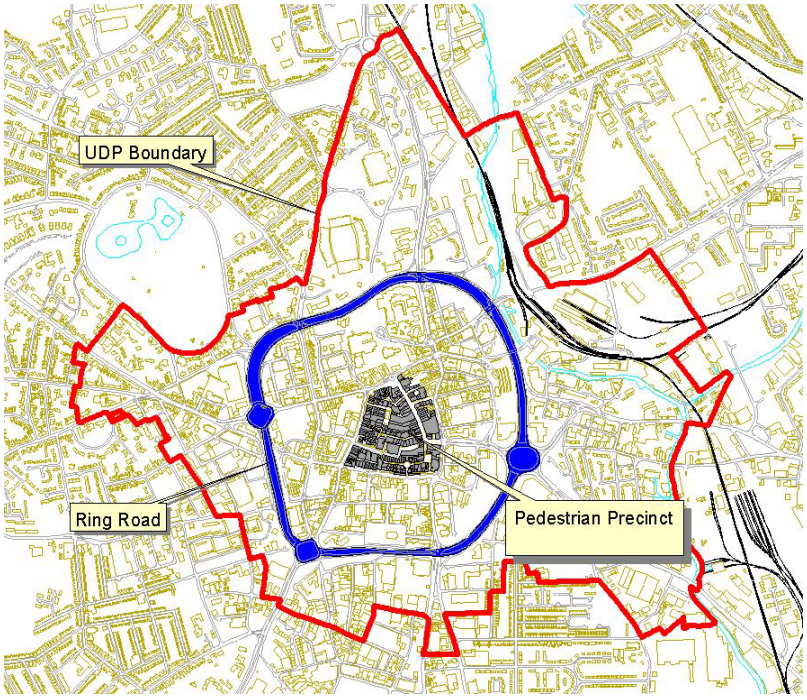


Figure 2.1: Three different views of Wolverhampton's town centre

Wolverhampton's ring road is an obvious contender for delimiting the town centre, and some stakeholder groups, such as the emergency services, use it as a boundary for their operations. The local authority, meanwhile, defines a much more extensive area in its UDP boundary (show in red) which reflects a longer-term strategic vision of how the town centre should evolve.

Local mini-cab drivers are much more selective, defining the town centre as being the pedestrianised area where most of the major retailers are concentrated.

Which is the correct definition? The answer is, of course, that they all are, since they reflect the particular perspectives of the each of the stakeholder groups mentioned. The issue is that the wide range of variety of definitions suggests that there can be no single definition of a town centre which will satisfy everybody. A boundary defined for planning policy purposes by the local authority is unlikely to be useful to a retailer trying to assess market penetration in the prime pitch; a boundary used for police operations is unlikely to be useful to the tourist board.

2.2 Possible town centre indicators

Despite the problems inherent in trying to define a town centre boundary objectively, this is precisely the aim of the research. As the *ODPM* wants the statistics that are aggregated from these boundaries to be useful, then the boundaries would have to make sense to the widest possible range of town centre stakeholders. Any methodology created to define town centres would therefore have to encapsulate as many different perceptions of the town centre as possible. A survey of previous work on defining and classifying towns, and an extensive consultation exercise to draw together the current views of academics, researchers and practitioners was undertaken during the Feasibility Study. This led to the identification of seven key factors that characterise town centres:

► There are a number of specific **activities and facilities** that are traditionally associated with town centre locations. These include obvious functions such as retailing, leisure and public administration. Similarly, there are a number of activities such as manufacturing and warehousing which are rarely found in town centres. If these characteristics could be mapped, then concentrations of certain types of activity may be indicative of the town centre.

► The **diversity of use** was also identified as a key indicator of the town centre. Town centres are cosmopolitan places and incorporate many different functions. Activities tend to become considerably more homogenous and segregated away from the central area.

► The **intensity of use** of development has traditionally been greater in the centre of town (and suburban centres) than elsewhere. This is reflected in both high property values and building plot densities in central locations where development land is often at a premium.

► The town centre must not only be accessible to the population it serves (in terms of both public and private transport) but also be internally accessible to the pedestrian. It proved possible to crudely define catchment areas of **pedestrian gateways** (such as public transport termini and car parks) which when combined give an overall impression of the extent of the central area from a pedestrian's perspective.

► **Resident population**, or rather the **lack** of it, was a fundamental characteristic of most town centres in the UK when the Feasibility Study was started in 1996. The development of retail, commercial and leisure activities in the centre of towns precluded residential land use so that central areas were generally perceived to have relatively low population densities.

► **Turnover** for retail and entertainment uses is likely to be greater in the town centre than elsewhere in the town.

► Finally, **visitor attractions** are important magnets in town centres, bringing in additional revenue and people over and above the quantities which might be predicted for the town. As well as tourist attractions, such as cathedrals and museums, local markets are considered important.

During the consultation process there was little agreement as to what components were the most important in terms of defining a town centre, and sometimes the discussions became heated as different interest groups argued for their particular perspective. It was generally agreed that none of the seven components alone were sufficient to capture the breadth of activity within a town centre, and so it was necessary to find a means of combining some, or all, of the indicators into a single composite measure - an '*Index of Town Centre Activity*' – which could be used to define town centre boundaries. These boundaries would not be based on definitive policy statements of what constitutes a town centre but would rather be the best attempt at quantifying the unquantifiable.

2.3 The limitations of statistical definitions

The problem of defining town centres or central business districts goes beyond that of finding indicators that represent the different perceptions of town centres and combining them appropriately. There are three further issues that make defining town centres difficult:

- they are 'fuzzy' and therefore can never be accurately spatially delimited;
- they change over time; and
- any measurement needs to be performed at an extremely detailed level.

Town centres can be considered to be *fuzzy* objects in so far as their characteristics do not generally begin and end at definite points. As you walk away from the main shopping area on your local high street you are not conscious of a discrete point where you leave the town centre – there is no line on the road. Rather, the town centre is experienced as a continuum that eventually fades away only to be replaced by another land use, whether it be residential, commercial or industrial.

In contrast, statistical boundaries give the impression of being sharply defined. It is therefore extremely difficult to describe a fuzzy area within a town by a precise boundary and yet this is what is needed. In order to collate town centre statistics, a definite boundary has to be selected to encompass those areas containing town centre type activity and then populated with data than fall within that boundary (see Box 2.1).

BOX 2.1: Aggregating statistics into zones – the principles

Statistics are often aggregated by the use of zonal systems. The most obvious example are Census statistics which are aggregated using Enumeration Districts (EDs). In order to collate Census data, the enumerators will identify all the residential properties that lie within a particular zone, and collect the census forms from those homes. By referring to a map, it is easy to see if a property lies within, or outside the zone. To calculate statistical totals for a particular ED, data are aggregated from the Census returns.

This type of spatial aggregation is easily done within a GIS and lies at the heart of the town centre statistics, where the data points that fall within an Area of Town Centre Activity are readily identified. Each individual data point, whether it be information on a firm or building, can be located in geographical space by means of attaching a national grid co-ordinate, or geo-reference, to it. This means that employment and turnover data for Company X can be attached to a map on, or close to, the building where the business is located. The accuracy of the geo-reference is vital and is addressed in more detail in Chapter 4.

This process is precise, and even if a data point lies one metre outside of the boundary, it will not be represented within the statistics of the defined area. The fact that statistical boundaries are discrete while town centre boundaries are fuzzy was to prove one of the major challenges of the research.

Occasionally, of course, town centres are delimited by sharp boundaries, whether natural or man-made. Rivers, parks and even breaks of slope (see, for example, the Abertillery case study in the Feasibility Study report, p. 26) can present a *de facto* boundary to a town centre. For example, many of the town centres which had been severely bombed in the Second World War were redeveloped within a new ring road, the role of which was not only to improve vehicular access, but also to define the town centre (Ministry of Town and Country Planning, 1947).

The fact that some of these ring roads have been seen as a constraint on the evolution of town centres and are now being dismantled (as is the case in Birmingham) add a further dimension to the definitional problem – the spatial extent of a town centre changes through **time**. This can be seen again when looking at the town centre boundary selected for Wolverhampton during the Feasibility Study (Figure 2.2).

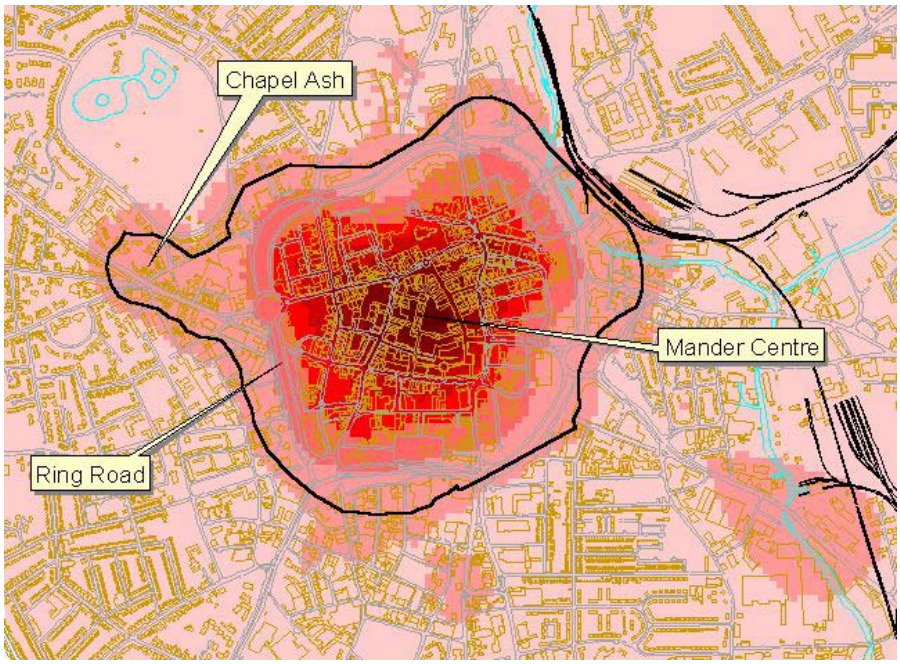


Figure 2.2: An early definition of Wolverhampton's town centre

The statistical boundary selected for Wolverhampton town centre in the Feasibility Study broadly followed its ring road. Part of the boundary extends beyond the ring road along the main arterial route to the north west of the centre – an area called Chapel Ash. An explanation offered for this is that Chapel Ash is a vestigial of the original, more linear town centre that evolved along the road connecting the sheep farms of Shropshire with the growing cities of the West Midlands conurbation. The shape and form of Wolverhampton's town centre was therefore radically altered with the construction of the ring road and the development of the Mander Centre as the primary shopping focus. Town centres are dynamic spatial entities, and while few have undergone the radical change experienced by many town centres in the West Midlands, their spatial extent will change through time.

The third issue that needs to be taken into account is the **scale** at which town centres have to be mapped in order to be defined. The distance over which a town centre land use starts to fade only to be replaced by another is often relatively short – sometimes merely a matter of twenty metres or so. In order for this project to be a success the data used to generate the model and from which statistics would be aggregated would have to be of sufficient granularity to detect quite subtle changes in the underlying urban geography.

2.4 Mapping the indicators

2.4.1 Choosing the correct statistical geography

Early on in the research, a number of existing statistical geographies were examined to see if some aggregation of them could be used to define Areas of Town Centre Activity. One approach was to look at creating aggregations of postcode sector boundaries (see section 4.3 for a full definition of what a postcode sector is). The benefit of this approach is that many of the statistics which would be compiled for Areas of Town Centre Activity can be attributed to postcode sectors. The collation of the statistics would be straight-forward, merely involving the identification of the postcode sectors that fall within a town centre and aggregating totals for them. It was soon to become clear that postcode sector geography is simply too coarse – in some cases more than one town centre could be included within a single postcode sector. Furthermore, since postcode sectors were designed to help deliver the post, they rarely bear any resemblance to the underlying urban geography. Postcodes – at sector level – were judged to create an insufficiently fine statistical geography.

Traditionally, the finest scale of urban analysis has been the Enumeration District. However, as can be seen in Figure 2.3, which shows Wolverhampton's town centre, the resolution of the 1991 Census Enumeration District (ED) is also relatively coarse. The shaded ED, in which the town's main retail area falls, extends far beyond the ring road, meandering first eastwards, then south, before moving back in towards the town centre. Encapsulating just over half a square kilometre, this ED covers a diverse range of land uses and does not form a readily discernible, or coherent, area of economic activity.

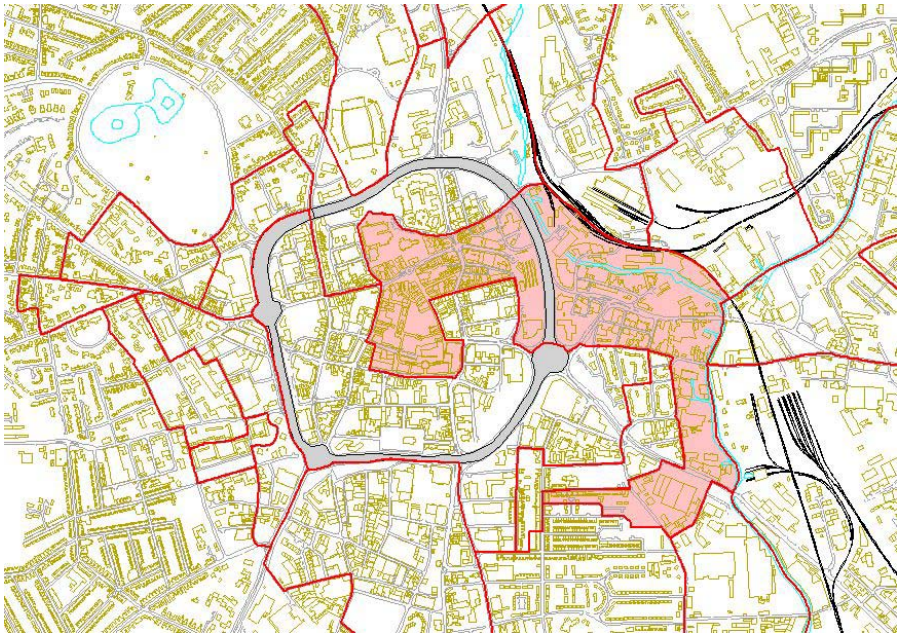


Figure 2.3: 1991 Census Enumeration Districts in Central Wolverhampton

Having been designed to make the collection of the Census of Population as easy as possible, it is hardly surprising that the design of the EDs bears little relationship to the underlying urban geography. If the three EDs that fall within Wolverhampton's ring road were used as the basis of a statistical aggregation for its town centre, they would clearly include too much extraneous data which would render the aggregation meaningless[1].

The land uses and employment activities which make the town centre so distinctive vary at scales below that of the enumeration district and in order to capture this spatial variation, an alternative geo-referencing system had to be used (Thurstain-Goodwin and Unwin, 2000).

Ideally, in order to capture the fine-scale spatial variation of employment, land use and other related phenomena in town centres, then the individual buildings that fall within the town centre would need to be identified. In the longer term, this will be possible (the fledgling National Land and Property Gazetteer, which will geo-reference every building in the UK, can be used to achieve this) but since this is currently unavailable, another approach would have to be adopted.

And so the postcode geography was revisited, but this time looking at the unit postcode (UPC) as a means of geo-referencing. The UPC is the finest level of spatial referencing in the postal zone hierarchy. It represents, on average, between 14 and 17 mail delivery points. However, this average masks considerable variation as a UPC can represent a single delivery point (for example a large company) or sometimes hundreds (Raper, Rhind et al., 1992).

[1] This issue lies at the heart of the Modifiable Areal Unit Problem which bedevils any analysis performed on areal data (Openshaw 1984).

Unlike many geo-referencing methods (such as Postcode Sector ED) the unit postcode is not prescribed by a definite boundary, but rather describes a 'postman's walk' servicing a group of mail delivery points in a particular location. As a result geographical referencing is provided by means of a central point or centroid of the postcode which is the average of the national grid co-ordinates of all delivery points within the postcode; fine nuances in the local urban geography can therefore be mapped (Figure 2.4). Notice how, for example, the area of parkland to the north west of the town centre does not contain any postcodes; similarly, in the town centre, where building densities increase significantly, there is a larger concentration of postcodes.

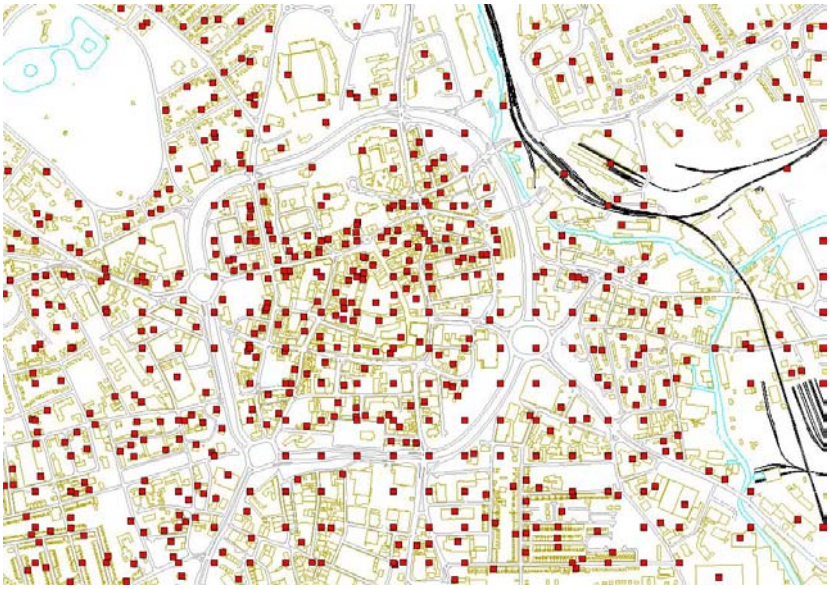


Figure 2.4: Unit postcode centroids in central Wolverhampton

It is important that any dataset used in this project can be geo-referenced to this spatial scale. Nevertheless, geo-referencing unit postcodes is not straightforward, particularly when data need to be mapped to a high precision. There is, at present, no definitive unit postcode catalogue although a consortium including the Royal Mail, *ONS* and Ordnance Survey (OS) are working to remedy this. Instead it was necessary to create a hybrid postcode directory for this project which combined the OS's Code-Point product and the Central Postcode Directory which is maintained by *ONS* (see chapter 4 for more information).

2.4.2 Data mapped as points

Once a means of geo-referencing the data was established, then indicator data could be mapped. In order to do this, the national grid coordinates associated with a particular UPC were linked to data in the databases which shared that postcode. In the example shown in Figure 2.5, convenience retail employment (aggregated according to the UPC) is mapped for part of North London.

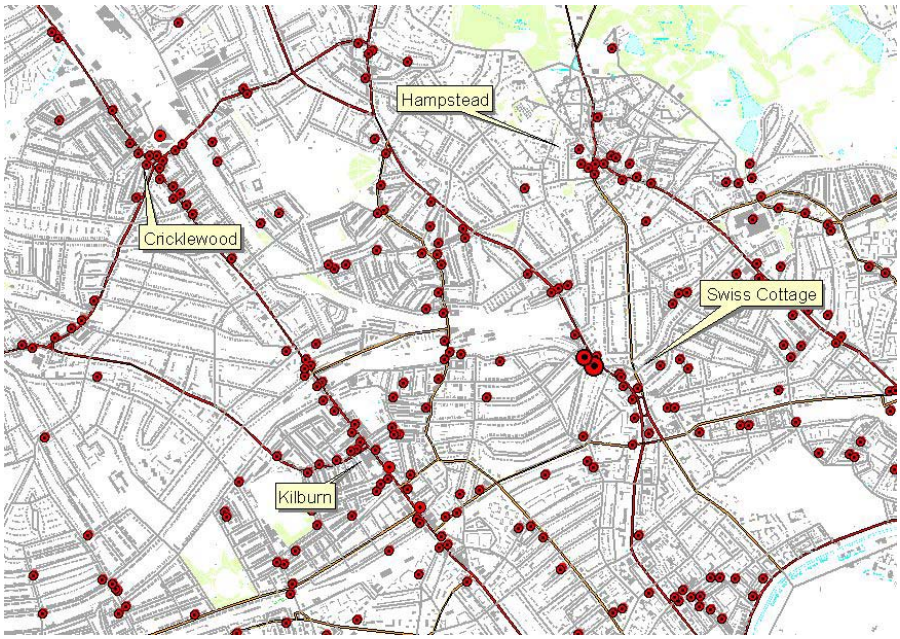


Figure 2.5: Convenience retail employment in North London

The red circles show the locations of unit postcodes where people are employed in convenience retailing at one or more of the delivery points comprising that postcode. (See Annex 1 for a full descriptions of the types of shops normally described as convenience retailers.) The larger the circle, the more people are employed at that location. The largest circles on the map, found in the south east of the map, correspond to the locations of the main supermarkets in the area.

This procedure can be replicated for any data point which can be identified by its unit postcode although the distribution for different activities would vary. While maps of this type offer an excellent means of visualising the location of particular indicators, it can be hard to identify the extent of the main concentrations of retailing. Swiss Cottage, for example, is a major location for convenience retailing in this part of North London. It is difficult to see from Figure 2.5 where the retailing starts and finishes since the data are represented as points on maps.

2.4.3 Data mapped as surfaces

The solution to this problem was to process the point information shown in Figure 2.5 so that the concentrations of data would become more evident. Using a technique called Kernel Density Estimation the point data were converted into density surfaces (Figure 2.6).

The employment density surface for the point data showing convenience retail employment is shown in Figure 2.6. A fine grid of 50 metres has been placed over this part of London and the employment density for each cell is assessed. Areas of high employment density are shown in pink, becoming a more intense red as the density increases. The darkest red are those areas of particularly high density – in excess of 10 people employed per hectare.

Note how some areas which appeared to have a large number of retail locations (such as around West Hampstead which is found in the centre of the map) are not particularly dense in overall employment terms. In this way, the map is a powerful means of summarising considerable amounts of data into an easily digestible format.

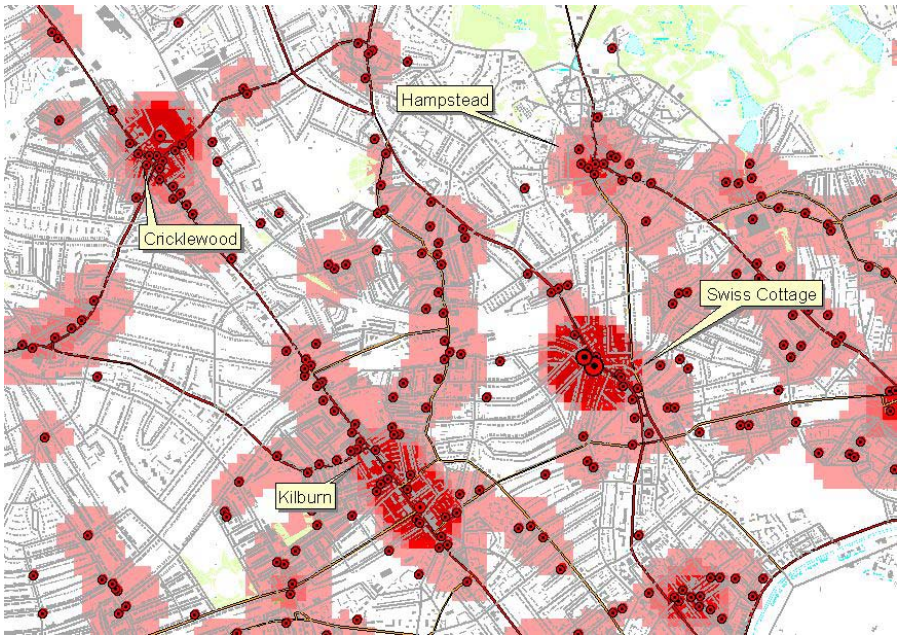


Figure 2.6: Convenience retail employment density in North London

BOX 2.2 :Converting points to surfaces – Kernel Density Estimation

The method is known as Kernel Density Estimation (KDE) because around each location where the density of a particular indicator is being estimated, a circular area (the kernel) of a defined radius, or bandwidth, is created. The density of the indicator at the location is estimated by summing the values of any instance of the indicator that fall within the kernel, their value defined according to some appropriate function (such as a distance decay function). By summing throughout the study area, including those at which no incidences of the indicator variable were recorded, gives the surface of density estimates. It is possible to query any point of the surface to return a notional density value of the indicator.

The greater the bandwidth of the kernel, the larger the number of data points that can contribute to the density value at a particular point on the surface. The resulting surfaces become smoother as the bandwidth is increased. The degree of smoothness of the ITCA surface increases in proportion to the bandwidth which in turn affects the determination and quality of the boundary.

The choice of the kernel bandwidth is always, to some degree, arbitrary. There are several ways to select a bandwidth including use of the discrepancies between the estimated and 'true' probability densities (Fotheringham, Brunsdon et al., 2000), page 148-149) making the bandwidth adapt to the data density (Brunsdon, 1995) or by the application of rules of thumb (Bailey and Gatrell, 1995). Often the choice of bandwidth for the algorithm is less formalised, the result of visualisation together with some a priori ideas on what might be appropriate. After a series of experiments in the review phase of this research, it was decided that a 300m kernel bandwidth was most appropriate to capture the underlying distribution of the various point datasets.

A further benefit of this approach is that it captures the way that town centre areas gradually fade towards their edges. As you walk away from a main shopping street there is no discrete point where you leave the town centre, but the land use gradually changes until another land use becomes dominant. The density of convenience retail employment in Swiss Cottage steadily increases towards its centre, indicated by a gradual intensification of colour.

In Figure 2.7, convenience retail employment is represented as a contour map and in two and a half D (the term used in the GI Science literature to describe the representation of three dimensional figures on a page).

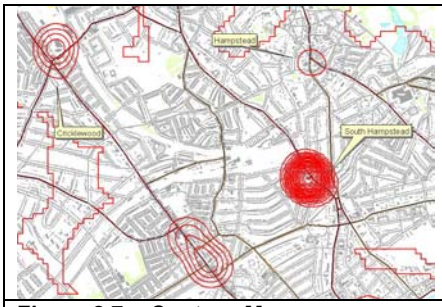


Figure 2.7a: Contour Map

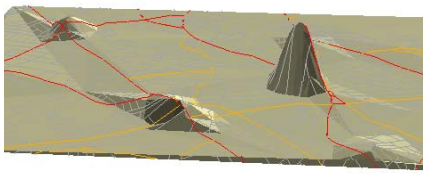


Figure 2.7b: 2.5D surface

2.5 Integrating the indicators

As the other town centre activity indicators are mapped in this way – point data transformed into data surfaces – it became clear that the spatial patterns revealed through the data surfaces are all different. As would be expected given the multiple perspectives expressed by different users of the town centre, none of the indicators alone were sufficient to describe the town centre. They all express a different facet of the town centre. To capture its essence in total, it would be necessary to find a means of integrating the indicators.

One of the benefits of converting all the indicators into data surfaces is that they can be brought together using an technique called overlay analysis. This technique was pioneered by Ian McHarg, in his classic book 'Design with Nature' and is now an established technique in GI Science (McHarg, 1969). Each of the indicator surfaces can be represented as a grid or mesh. If the dimensions of each of the indicator grids are the same, then it is possible to determine the values of each indicator at the same location (Figure 2.8) .

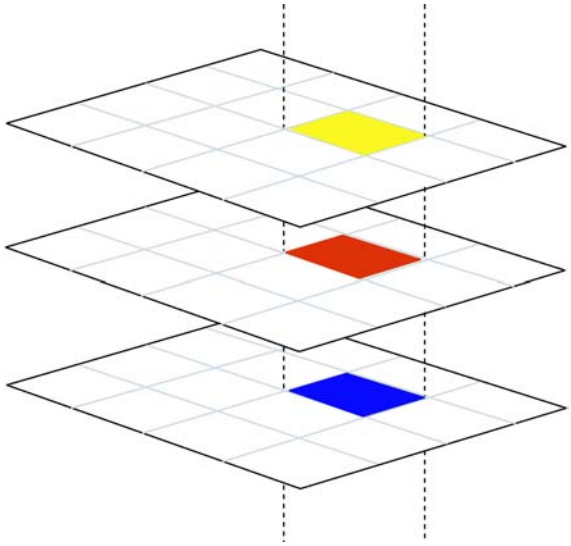


Figure 2.8: Using grids locate indicator values at a particular location.

As the values of all indicators at all locations in the grids can be assessed in this way, it is possible to combine all indicators into a single measure, using the grid as a framework to do so. The most simple way to integrate the grids is by simply adding up the values of different indicators for the same cell to create a composite indicator.

Figure 2.9 shows the distribution of the a number of different employment indicator surfaces which can be combined to give a better indication of where a town centre might be. At the heart of the approach is the notion that Areas of Town Centre Activity are more likely to be found in locations which score highly on all the separate indicators. Even though each of the indicators is capturing a different facet of the town centre, and all have a slightly different spatial pattern, it is clear that most potential town centre locations (such as Hampstead and Cricklewood) score highly on all the indicators; the indicators are said to be highly *auto-correlated*.

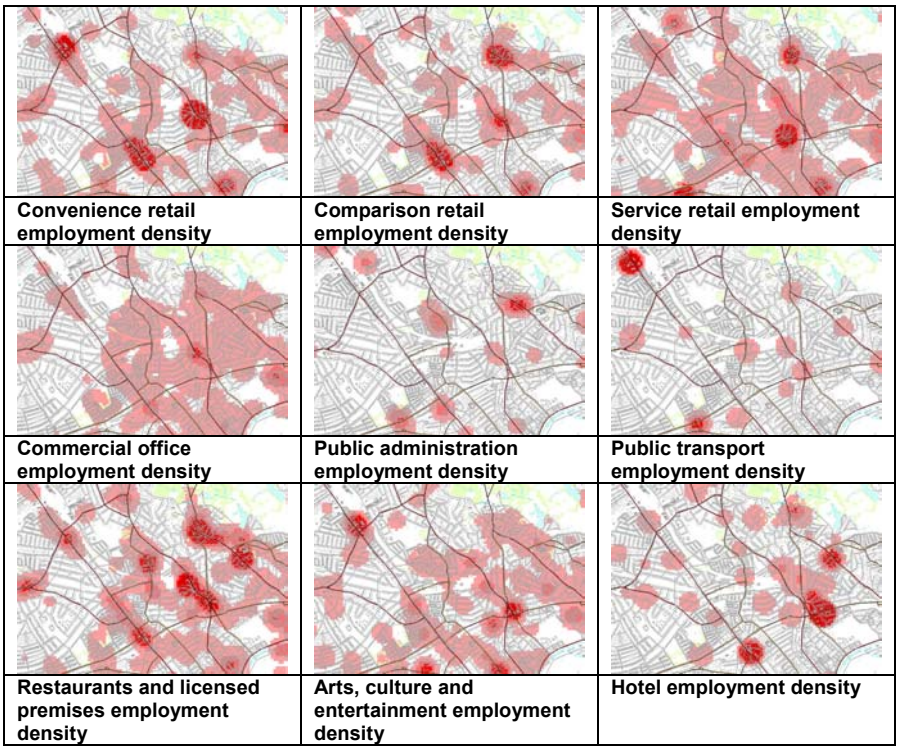


Figure 2.9: Town centre employment indicators in North London

The next stage is to combine all the separate indicators into a single measure. Combining the town centre employment data surfaces listed in the figure above was straightforward. In each of them, the employment density for that particular category is expressed as the number of people employed per hectare. To draw all the surfaces together it was simply a question of adding the values of all the indicator surfaces together for each cell, and creating an aggregate surface. Figure 2.10 shows that aggregate surface for the same part of North London. The darker red areas are those where employment types associated with the town centre are particularly concentrated, and thus are locations which are more likely to be town centres. This combined surface forms the Economy component of the model (see section 3.3.5).

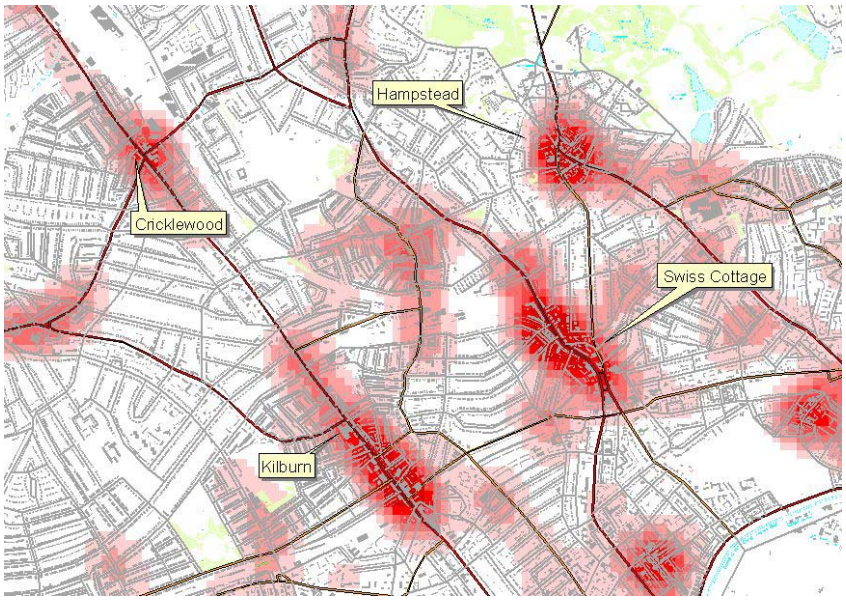


Figure 2.10: Combining town centre employment indicators in North London

There are two potential draw-backs of the simple addition of the employment data surfaces. The first is that some commentators may argue that some employment characteristics should be **weighted** more than others. The second is that this simple approach could not be applied when combining data surfaces of different types because of the danger of one indicator swamping the other as they are combined. For example, floorspace densities (which are expressed in this research as metres squared per hectare) can be more than ten times higher than employment densities (expressed as people per hectare). If the two surfaces where combined without any **normalisation** the resultant surface would be heavily skewed towards the floorspace data and the importance of employment data would be seriously undermined.

2.5.1 Normalising the surfaces

Normalisation is necessary to integrate the data surfaces when they are measured to different scales. It is not possible, for example, to integrate surfaces generated from employment data directly with those generated from floorspace data since they describe different phenomena. Furthermore, the range of their values will be quite different.

For example, the range of values for the density surface of retail employment goes up to a maximum of 530 per hectare in London; the density surface for shop floorspace goes up to just under 5000 square metres per hectare. If the two surfaces were simply added together without any attempt to normalise their values, then an erroneous weighting factor would be introduced.

It should be noted, however, that double counting is *not* introduced by combining employment and floorspace statistics of the same location. While a high degree of auto-correlation would be expected to be found between retail employment and retail floorspace, it does not necessarily follow that all large retail units will employ many people, or that businesses which occupy small retail units employ few people. Similarly, people are not employed in vacant units which nevertheless are an important indicator of where the town centre may be.

2.5.1.1 The early approach

During the Feasibility Study, in order to avoid this, the range of density estimates for each indicator is normalised using the transformation:

Combined Densities = (areal density - minimum density / range of densities) * 100

Clearly, with this simplistic normalisation, if the study area covered by the surfaces includes large values, then the normalised surface will be calibrated according to this value. If the original surface was of building heights in London, for example, then the highest value on the normalised surface would be located at Canary Wharf. Since this building is so much taller than the vast majority of buildings in London, then the output surface would be massively skewed, with a majority of building heights being compressed into a much smaller range than if Canary Wharf did not fall within the study area.

By adopting this normalisation technique, the extent of the study area, and the choice of locations that fall within it, has a considerable impact on the outputs of the model. This in turn meant that it would be wrong to assume the model would work anywhere in the UK, because the exact distribution of the data points which may skew the model were not known. Therefore a different approach to normalisation, which would be less sensitive to outliers in the underlying data, needed to be found.

2.5.1.2 A new approach

A number of other techniques were tested to lessen the impact of extreme values during normalisation as part of the Pilot Study; these included taking the square root of the surfaces, or their logarithms. The technique that was to prove most successful was taking a *z-score* normalisation. In this technique, parameters that describe the overall distribution of values in the pre-normalised surface are taken into account. After a number of experiments, standard *z-score* transformation proved to be more applicable

since it produces a normalised surface which is better defined and less sensitive to extremes than the maximum and minimum used[2].

2.5.2 Weighting the surfaces

The model created during the Feasibility Study was created without recourse to weighting any of the component surfaces. During the Review phase of this project, there was some surprise expressed by respondents of Professor Guy's survey that there was no weighting applied when combining surfaces: intuitively it seemed obvious that it would be needed to account for the varying nature of town centre indicators in each location.

From the outset, it was expected that some components (or indeed sub-components) of the model would be of greater importance in determining the Areas of Town Centre Activity and when the original model was designed a facility for weighting individual surfaces was provided. The process of adding weights to components is called an indexed overlay and can be formalised as the evaluation for every point on the plane of:

$$C = \sum a_i s_I$$

In which C is the combined indicators, s_i is a density score for a given indicator, and a_i is a weight for the *i*th indicator.

As documented in the Feasibility Study report, the prototype method assumes that a=1 for all but a few indicators (i.e. that equal weights were used). With experimentation during the review phase of this research, it was discovered that a large weighting had to be prescribed to an individual component for it to impact on the shape of the final output combined surface. Typically a factor of fifty had to be applied, which would mean that that particular indicator would be ascribed an importance fifty times greater than the others – a factor which would be hard to justify.

The reason for the relative robustness of the model with respect to weighting is explained by the distribution of values of the individual component surfaces. The kernel bandwidth of 300m was selected since it tended to draw out the underlying distribution of the data points, geo-referenced at unit postcode level, most effectively. The resultant surfaces were very spiky, characterised by extremely steep gradients and relatively tall peaks (as can be seen in Figure 2.7b). This meant that even when normalised, the relative values of the peaks remain much higher than the areas in their immediate vicinity.

When combining the various indicator surfaces, all of which were very spiky, in order for a particular component to outweigh the combination of other components, the weighting would have to be extreme.

It soon became apparent that weighting in the model was generally implicit and depended on the structure of the components themselves. As a result, the danger that the model could be double counting certain characteristics of the town centre – i.e. that it was correlated – had to be considered. This issue was considered to be extremely important by both the independent reviewers. One obvious example is the double counting introduced by integrating publicly accessible floorspace in the Activities and Facilities component, as well as mapping total floorspace in the Intensity of Use component. This is issue is addressed in the following chapter.

Despite this, the simple additive approach seemed to work, producing combination surfaces that made sense when visualised on a map[3]. The issues of implicit weighting in the model are addressed in more detail in section 3.2.

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[2] However, the use of this technique assumes a most unlikely second-order stationarity in the surface (i.e. equal variance everywhere and no local variation in spatial auto-correlation). Despite this, it was concluded that this was a best normalisation technique to apply.

[3] The approach follows the principle proposed by William of Ockham in the fourteenth century: ``Pluralitas non est ponenda sine neccesitate'', which translates as "entities should not be multiplied unnecessarily". It is more commonly known Ockham's Razor and is often quoted in the scientific literature as the approach of adopting the most simple approach wherever possible.

2.6 An Index of Town Centre Activity

The conversion of the various town centre indicators from points to data surfaces, their normalisation and ultimate integration led to the creation of a single index measure which was named the Index of Town Centredness in the Feasibility Study, but renamed the Index of Town Centre Activity (ITCA) in the Pilot Study. Figure 2.11 show the Index surface for the area of north London around Kilburn and Swiss Cottage.

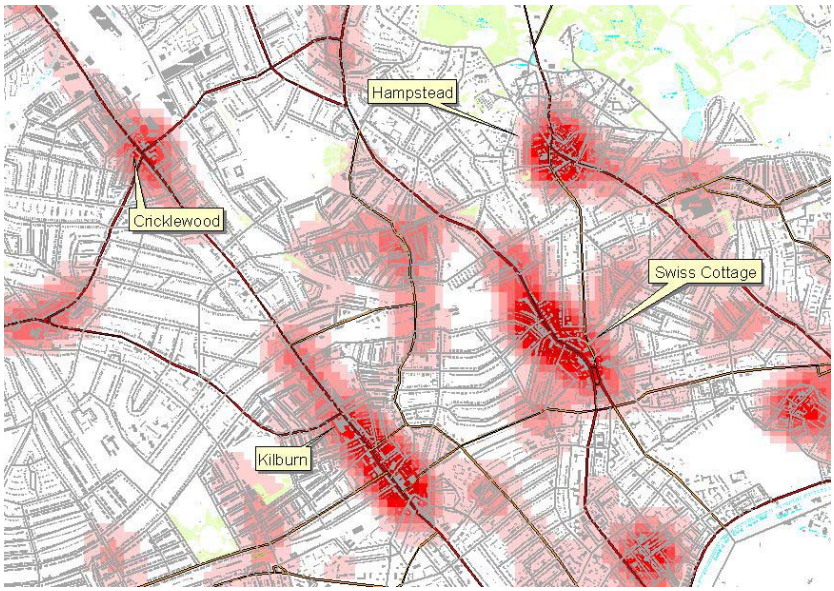


Figure 2.11: ITCA surface in North London

In essence, the greater the value of the Index at a particular point (i.e. the darker the red) the greater the probability that that location lies within a town centre. In order to define an Area of Town Centre Activity, a critical threshold had to be determined – those grid cells which had the same or higher value than the threshold were in a town centre, those that do not were not.

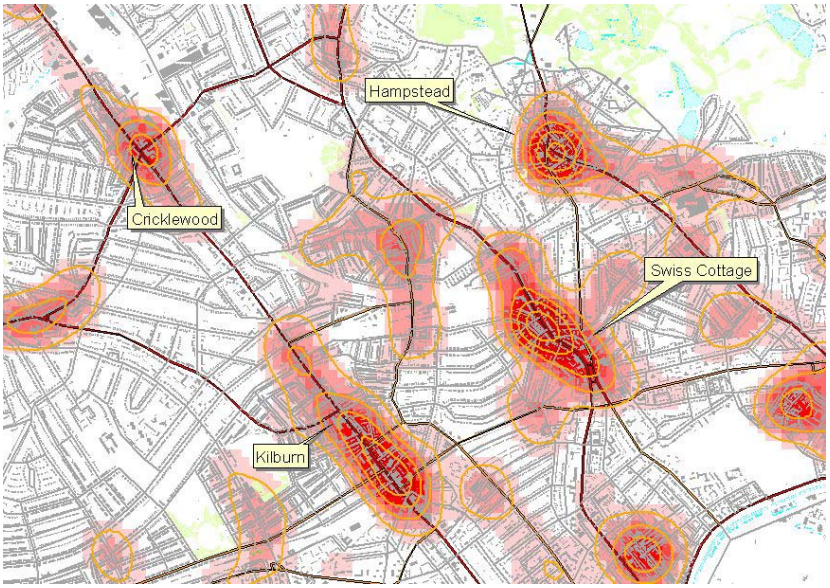


Figure 2.12: Potential Areas of Town Centre Activity in North London

In common with all its individual components, the Index can be represented as a series of contours. In a topographic map, the contour represents a height threshold whereas in the

ITCA surface, each contour represents a line of equal level of town centre activity (Figure 2.12). Furthermore, each contour can be considered as a potential town centre boundary, and if the appropriate contour can be identified this contour (the threshold contour) can be used to define the boundary of the Area of Town Centre Activity.

During the Feasibility Study, local planners were able to select an appropriate contour for each of the ten study areas which accurately delimited the spatial extent of the town centres. In the Wandsworth case study, we found that it was possible to define all three town centres using the same value of threshold contour (Department of the Environment, 1998). Although this method of delimiting the spatial extent of town centres appeared to work, some respondents to Prof Guy's review felt that the method was too arbitrary and that a less subjective method might be established.

The most promising approach of those suggested was to analyse the ITCA surface in more detail, looking at the gradients (slopes) on the ITCA surface. It was suggested that changes in the gradient of the ITCA surface are a more reliable indicator of the change from suburban to town centre than are single values on the surface. The reaction of any surveyor confronted with a similar problem on a real topographic surface would be to search for breaks of slope where there are rapid changes in the gradient field. However, when this technique was investigated, it was found not to be suitable.

Later in the project, it became apparent that it was possible to use a single value of the ITCA to select threshold contours delimiting nearly all the town centres within London (with the exception of those that lie within Central London) and that the method was robust. However, this value was changed during the course of the research, not least because the model itself would undergo a number of iterations.

The quality of the town centre boundaries ultimately depends on the quality of the underlying index surface. The next chapter will explain how the index surface was evolved to the point where it was possible to select a threshold contour for the whole of London, and how that contour was eventually selected.

3 A new model for London

3.1 The new model

A prototype model which defined consistent zones of town centre activity across the whole of the UK was successfully developed during the Feasibility Study. The model was tested on a small number of towns and although these had been selected to be representative of the country's urban hierarchy, there could be no guarantee that the model would be applicable everywhere in the country (Department of the Environment, 1998). In order to assess whether or not the model was robust enough to be applied nationally, it would need to be applied on a much larger, more complex area.

London was chosen as the location for the Pilot Study because of its obvious complexity. Out of all the areas modelled during the Feasibility Study, South West London (which included the town centres of Wandsworth, Putney and Clapham Junction) proved to be the most challenging. In addition it contains a diversity of types of shopping areas from small parades of shops to internationally renowned centres – all of which the model would be required to handle successfully.

When the South West London case studies where undertaken during the Feasibility Study, it became evident that some components of the model needed to be reassessed and, if necessary, revised; the Intensity of Use, Pedestrian Gateways, Visitor Attractions and Financial Turnover components would all require deeper investigation (Department of the Environment, 1998, p 44).

In this chapter, the way in which the prototype model was modified and enhanced is explained. The new model was to be much more streamlined, evolving from the seven-component model of the Feasibility Study, into the much leaner, three component model shown in Figure 3.1[1]. The chapter begins by considering the reasoning behind the modification of the model, before moving on to offer an assessment of each of the seven components of the Feasibility Study model in turn. The process by which the town centre boundaries was selected is presented in section 3.4.1. The chapter concludes with offering an assessment of the model and considers whether or not it will be applicable in the country as a whole.

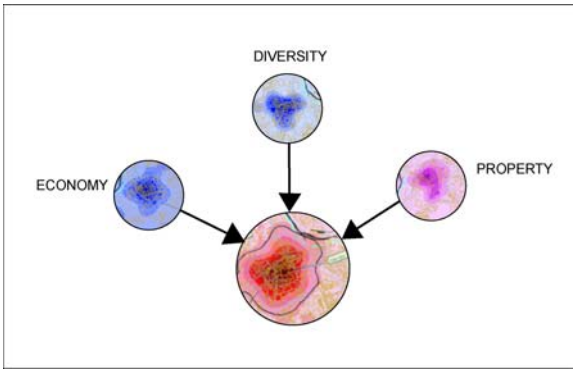


Figure 3.1: The New Model

3.2 The need for a simplified model

At the very beginning of this research, two independent reviews of the model were commissioned in order to give it a thorough and considered evaluation. The first was undertaken by Clifford Guy, Professor of Planning at the University of Wales. Drawing on his own experience, as well as conducting a survey of expert opinion, Cliff Guy investigated the more general theoretical issues associated with the methodology in order to assess its overall efficacy and acceptability. David Unwin, Professor of

[1] As part of this process, the Activities and Facilities component was re-named as 'Economy' and the Intensity of Use component was renamed 'Property'.

Geography at Birkbeck College, University of London, undertook the second review and explored the statistical quality of the model. As well as considering whether or not more traditional spatial analytical methodologies could have been used to derive town centre boundaries, he investigated the various techniques used in the model to see if they could be improved upon.

Both independent reviewers concurred that the model developed during the Feasibility Study should be simplified. Their comments included:

> *"The method used in the Feasibility Study seems **too complex** to be readily acceptable to the practitioner community. It is vital that the final method is readily comprehensible, in principle at least, by the intended users."*
>
> *"Some of the seven components developed in the Feasibility Study are not seen as fully appropriate or necessary....., a reduction to 3 or 4 components would make the method more straightforward and transparent."*
>
> *"The Lack of Residential Population component was disliked, and its omission should be supported grounds of policy conflict. The `Pedestrian Gateways' component was not clearly understood, and could be very difficult to operationalise."*
>
> *"Overall, the method is very data intensive and it is by no means clear that all the data used are strictly necessary. There is a trade off here between the evident robustness.....of the solutions and the volume of data incorporated into the Index of Town Centre Activity."*
>
> *"...my major recommendation would be that in as structured way as is possible variables are eliminated from the procedure to arrive at a basic set that could be applied to all towns and that do not present difficult data collection problems."*

These observations were not unexpected and they concurred with many of the recommendations made by the research team at the end of the Feasibility Study. From the beginning, it was recognised that the model would have to undergo further development as it was tested more widely.

Fortunately, the model was designed in such a way that modification would be possible. The component approach adopted meant that each facet of the model could be examined individually and be assessed on its own merits. It was therefore possible to look at each component in terms of its relationship to the overall model and ascertain whether or not it made an important enough contribution to the definition of town centre boundaries. Each component was to be assessed against a number of criteria:

3.2.1 Pragmatism

It was essential that at the end of the research project, the model created could be used to create boundaries for Areas of Town Centre Activity across the whole country. Furthermore, demand for the data made it desirable to do this in a relatively short time span. If it was not possible to implement a particular component across the whole country (perhaps the data simply were not available) then it would have to be rejected.

3.2.2 Theoretical relevance

In order for a component to be included, it had to be considered meaningful to the user community. Cliff Guy's review in particular identified some issues with certain facets of the model – most notably the Turnover, Pedestrian Gateways and Lack of Residential Population components. Additionally, the visitor attractions component was not considered to be properly formulated and would be investigated in more detail by Jayne Cox of Brook Lyndhurst.

3.2.3 Statistical support

While much effort was put into adjusting the parameters of the Kernel Density Estimator and also of the integration of indicators (explained in the previous chapter) it was also important that the components of the model were statistically robust. One of the key considerations was to ensure that there was no auto-correlation in the model. This means that a particular indicator was not represented more than once. (See section 2.5 for a brief explanation of auto-correlation).

3.2.4 Essential for model?

Any alteration to the components of the model would ultimately be reflected in the final outputs of the model. These changes would be most obviously expressed in terms of the quality of the final boundaries. The quality of these outputs was assessed in two ways – by an initial sensitivity testing (see below) and later on, once the model was approaching its final form, by evaluation by planning officers from the 33 London Boroughs.

3.2.4.1 Sensitivity testing

A means of assessing the impact of changing the model configuration in terms of its output boundaries was developed early in the research. It involved the comparison of the boundaries defined for the 12 town centres studied in the Feasibility Study with those generated by different model configurations tested in this phase of the research.

The procedure relied on the fact that the removal of a component would alter the topography of the final ITCA surface and therefore alter any boundaries selected from that surface. Changes to the ITCA surface were sometimes limited to only a small area of the town centres, sometimes the removal of a component would radically alter the structure of the surface.

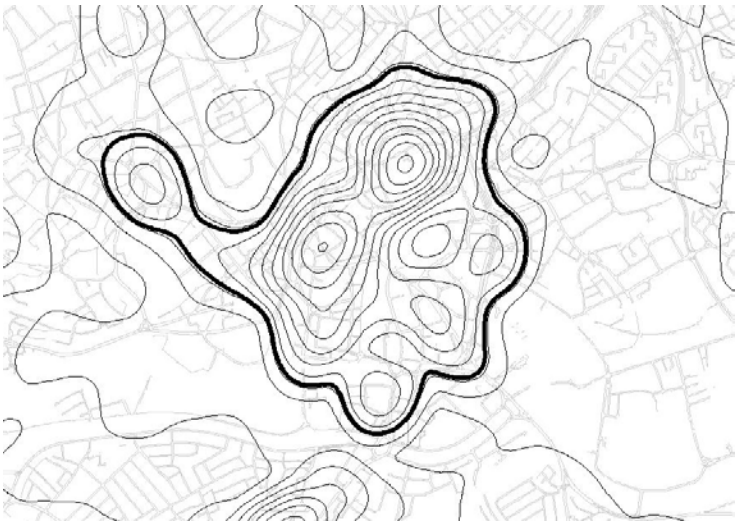


Figure 3.2: The set of possible town centre contours and the town centre boundary for Bristol

For example, Figure 3.2 shows the ITCA surface for Bristol generated during the Feasibility Study. The contours of the surface are shown in the light grey with the contour which was chosen as the boundary for the town centre shown in black. When a component was removed from the Feasibility Study model, a new ITCA surface was created. As would be expected, as more components were removed from the model, the resultant ITCA surface bore less resemblance to the original ITCA surface from which a delimitation of Bristol's town centre, judged successful by the local User Panel, had previously been drawn.

Figure 3.3 shows a contour map of an ITCA surface where a number of different components have been removed. It is clear that the pattern of these contours are different from those shown in the previous figure. The statistical boundary is drawn from the set of contours on the ITCA surface, and so if none of the contours are similar to the contour picked to define the town centre in the Feasibility Study, then the surface is not a good measure of town centre activity – it is simply a bad fit.

Figure 3.3: The set of possible town centre contours in a different model configuration for Bristol

The quality of fit of the surface was measured by comparing statistics aggregated from these new contours with those from the original boundary. (The accuracy of these surfaces and boundaries had, of course, already been verified by the local user panels consulted during the earlier study, and so could be used as controls). By using this method it was possible to establish which components were likely to be most important in terms of defining Areas of Town Centre Activity.

3.2.4.2 Boundary assessment by local authorities

As well as testing the differences using the sensitivity test outlined above, different model configurations needed to be evaluated by the people who knew the town centres best – the planning officers of the London Boroughs.

An internet hosted GIS was developed to allow the representatives of the London Boroughs (as well as officials from LPAC) to examine the different boundaries that could be generated from different model configurations. The CSA Assessment Tool (CAT) enables representatives of the London Boroughs to examine and interrogate the various ITCA surfaces produced by a number of model configurations developed at the conclusion of the review phase of the Pilot Study (Figure 3.4).

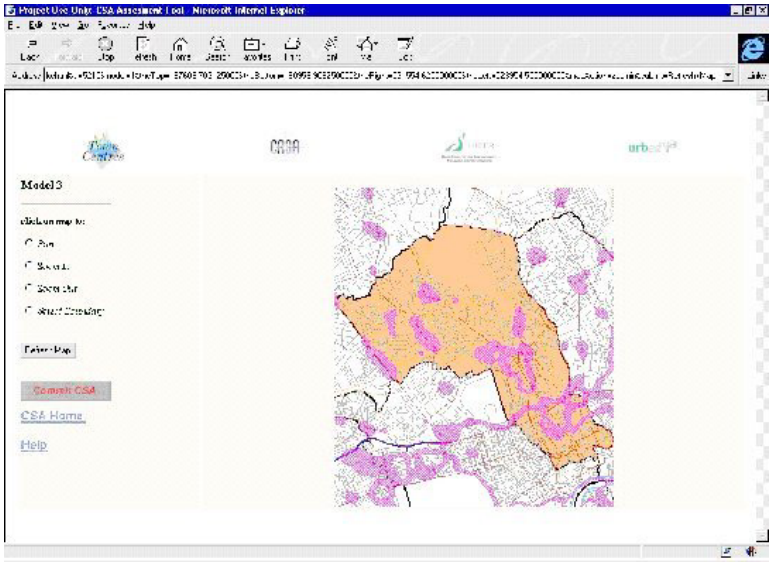


Figure 3.4: The CSA Assessment Tool

Accessed through a standard web browser, via a password protected area of the project's web site, the tool enabled the local authorities to define their own preferred town centre boundaries (by identifying the best fitting contour) within a number of predefined zones for each of the models being tested. The configuration of the models was not revealed to the local authorities at this point, so they had to assess the quality of the model only on the merit of the boundaries it could produce.

Each selected boundary was logged into the database, not only to aid the assessment of which model was the best and why, but also to help determine the average critical threshold whereby the boundaries could best be selected (see *CASA* Working Paper 52, on Internet Technologies, for more information).

3.3 Evaluating the components

Each of the seven components of the original model developed during the Feasibility Study would be rigorously assessed against the four criteria outlined above – that it would be pragmatic to implement them on a national scale, that the logic behind their inclusion would not be disputed, that they didn't compromise the statistical quality of the model, and that finally, and perhaps most importantly, that they could be combined to create a model whose outputs made sense.

In this section, the evaluation of each component is given. Of the seven original components only three would survive, and none of those would be the same as before.

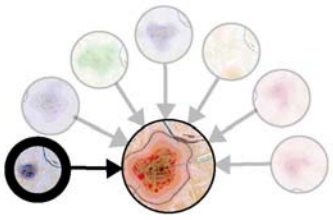
3.3.1 Turnover

The Turnover component was the last to be introduced to the model and was the first to be dropped. Originally introduced to give an indication of economic activity within town centres, it relied on the provision of reliable turnover data by the *ONS*. As will be shown in the next chapter, this was not available until the latter part of 2001, and so for a purely pragmatic reason, the component had to be dropped.

Some of the respondents in Cliff Guy's survey also questioned the validity of the component within the model, and because the turnover data were initially highly correlated with the employment data (in many instances having been directly inferred from employment data) they would effectively duplicate information already in the model.

The absence of this component also failed to have any significant impact on the ITCA surface and so it was rejected from the model. Even though turnover data are excluded from the model, they are important for monitoring Areas of Town Centre Activity and are included in the statistics provided in Chapter 5.

Pragmatism	X
Theoretical Relevance	X
Statistical Support	X
Essential for Model	X



3.3.2 Pedestrian Gateways

Of all the components of the original model, the Pedestrian Gateways proved to be the most contentious and difficult to understand. The aim of the component was to integrate into the model some measure of pedestrian accessibility within the town centre. This was achieved by mapping, and then overlaying, a number of pedestrian catchment areas from key gateway points in the town centre such as car parks and bus termini. Five key problems associated were identified with this measure:

- **User confusion**: Cliff Guy noted that respondents to his questionnaire survey found the Pedestrian Gateways component difficult to conceptualise. Although there have been many attempts to measure and model pedestrian accessibility in urban areas in the past, none have proved successful (Haklay, O'Sullivan et al., 2001).

- **Absence of pedestrian network data**: The network which was used to calculate the pedestrian catchment areas was OSCAR Asset Manager - the most detailed OS product of its type. However, this product is based on road data and does not include information that would be pertinent to calculation of pedestrian catchment such as pavement width, the location of crossings etc.

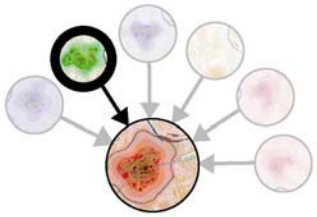
- **Lack of information on gateway usage**: The location of gateways themselves is insufficient, since there needs to be a way of weighting gateways according to their actual usage. Unfortunately, there are no consistent datasets for car park or bus stop usage for the whole country.

- **Impact of selective inclusion**: Clearly, the final catchment area depends on the distribution of gateway points. Not only is it difficult to include all potential gateway points (how, for example, would on-street parking be treated within this component?) but if a gateway was erroneously excluded (deliberately or by accident) then this could have an impact on the final ITCA surface.

- **Burden on local authorities**: Since local authorities would be required to input the gateways data on to the central system, this would necessitate a new data collection exercise by them (conforming to centrally imposed standards) which could potentially demand considerable resources. It is unlikely that this would be well received.

These issues were largely intractable. Although with some considerable effort, a suitable measure of pedestrian accessibility in town centres could be calculated, it would take much time and effort and there would be no guarantee that all users would agree with its formulation. The component would also be reliant on data of unknown coverage and quality which could easily undermine its effectiveness. It was not tenable within the resource constraints of the project and so the Pedestrian Gateways component was removed from the model structure.

Pragmatism	✗
Theoretical Relevance	✗
Statistical Support	✗
Essential for Model	✗



3.3.3 Lack of Residential Population

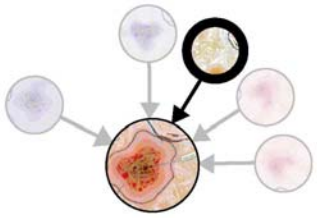
This component of the model reflected fact when it was originally developed, few people tended to live in town centres in the UK. (For example, according to Wolverhampton's town centre manager, only twenty-nine people were living within the ring road in 1997). When population density was mapped as a surface, town centres tended to appear in areas of low density.

During the Feasibility Study, the population surface was generated from the geographically weighted centroids of the 1991 Census of Population. Not only were these data somewhat out of date by the time of the Pilot Study, they were also mapped at a resolution that made their integration into the model problematic. This problem was neatly circumvented by following Higgs and Martin who demonstrated that information on the number of domestic delivery points at each unit postcode, held in the postcode database used to geo-reference the model's data, could be successfully modelled as a proxy of population density (Higgs & Martin, 1997).

Again, a number of questions were raised about whether or not the component should be included within the model. As population density could be proxied from the postcode data, any statistical objections to the component could be put aside. More fundamentally, the reasoning behind the inclusion of this component was undermined by the repopulation of the UK's town centres in the years since the Feasibility Study was completed. In a very short space of time, town centres had once again become fashionable places to live. Furthermore, planning policy suggested that the repopulation of town centres was desirable and thus any indicator of a town centre that depended on the exclusion of population would be seen as being extremely confusing.

Nevertheless, some users of the data felt that it might be a suitable indicator and so model configurations that included this component were tested using the CSA Assessment Tool. The boundaries that these configurations produced were generally not felt to be accurate, and so the component was dropped.

Pragmatism	✓
Theoretical Relevance	✗
Statistical Support	✓
Essential for Model	✗



3.3.4 Visitor attractions

The Visitor Attractions (VAs) component was the perhaps the most difficult component to map and it made only a small contribution to the town centre definitions during the Feasibility Study owing to the difficulties of modelling it. Jayne Cox, of Brook Lyndhurst, was commissioned to explore how the component could be best developed during the Pilot Study.

There was a lot of support for the inclusion of this component, many arguing that visitor attractions are important magnets in town centres, drawing in additional people and revenue over and above that which might be predicted for the town. A key difficulty in dealing with 'Visitor Attractions' is, however, a lack of a commonly-held definition of what they are, either in the different industries that embrace 'attractions', or within the planning use classes or, most importantly, amongst town centre visitors. At its broadest, the definition of VAs might be considered to cover any non-work/non-shopping activity in town centres; at its narrowest it might simply be tourist attractions.

The principal reasoning for including them as a separate component is, therefore, that VAs add more than their mere presence suggests: the implication is that, other things being equal, retail custom (in particular) will be higher in a town with VAs than in one without. The argument that there is a functional 'synergy' between VAs and other uses is much talked about by planners, developers and property agents. Yet there is actually little empirical evidence of it. Evidence on the synergy between leisure activities and shopping – defined as additional visiting or spending - remains mainly anecdotal and theoretical.

One of the reasons for this is that very little (and certainly no consistent) statistical data exist on leisure activities in town centres. This was perhaps reason enough alone to reject the inclusion of the component in the model. However, the importance of the VAs in town centres was argued by many people and so if it could prove to be important, then the data would have to be found.

The 1996 UK Leisure Day Visits Survey by the Countryside Commission and others is one of the few national sources of information on town visiting that is available in the public domain. (Other data is available on an *ad hoc* basis from local authorities' own visitor surveys; potentially useful data in consultants reports (e.g. for property investors) are inaccessible: neither have consistent national coverage). Whilst the survey provides some clues, it covers towns generally, not town centres specifically (Countryside Commission, 1996).

The UK Leisure Day Visits Survey asked people about where they went on trips made from home during their 'leisure time' and how much they spent on different items during that trip. Its key finding was that only 2% of trips to towns (and therefore by extension town centres) were generated by leisure attractions. The implication of this was that a VA component in the model would give undue weight to the tourist attractions included in it, given the importance attached by visitors to other town centre activities such as shopping.

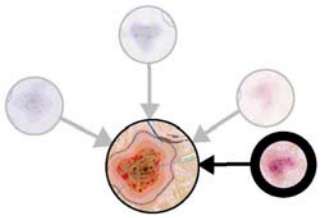
So was there any evidence for the synergy between VAs and other town centre activities? Research by the Oxford Institute for Retail Management in the late 1980s indicated that the presence of leisure facilities at MetroCentre in Gateshead served to

increase dwell times (though a specific link to spending was not made). Mintel's Leisure Shopping report showed that 41% of people like to have lunch or a coffee whilst out shopping; 27% on 'a day out' also liked to look in the shops; while only 12% of shoppers liked to visit other facilities, such as the cinema, on the same trip (Mintel, 1996).

Apart from these examples, the hard evidence on synergy is scant; it either does not exist, or is not in the public domain. Whilst leisure is clearly an important component of economic activity – and of visits to town centres – to elevate it above activities such as retailing, or office employment, would be misleading. Indeed, it would be possible, for the sake of argument, to produce the same 'synergy' case for an office employment component, given that workers can be an important component of retail demand in some towns.

Jayne Cox, of Brook Lyndhurst Ltd, concluded that while Visitor Attractions, in the broadest sense, are important town centre uses, the intellectual arguments for having a separate VA component in the definitional model were weak. Therefore, it would not make sense to undertake any data collection exercise. The Feasibility Study model, which contained a unique data set for tourist attractions, gave undue weight to these particular leisure activities which, in reality, are much less important town centre attractions than facilities such as pubs and restaurants. Even if the VA component were strengthened by including other leisure activities, it would continue to give undue weight to leisure over other, and perhaps more important, town centre activities such as shopping or office employment. The importance of town centres as leisure destinations was already best captured in the Activities and Facilities component. (For a more detailed review of the VA component, see *CASA* Working Paper 53).

Pragmatism	X
Theoretical Relevance	X
Statistical Support	X
Essential for Model	X



3.3.5 Economy (*Activities and Facilities*)

The original Activities and Facilities component was perhaps the most involved of all the components in terms of its structure, and drew on data provided by both the *ONS* and the *VOA*. Made up of two main strands, the employment activities associated with the town centre, and publicly accessible floorspace within the town centre, it aims to encapsulate the key reasons why people come to town centres (Figure 3.5).

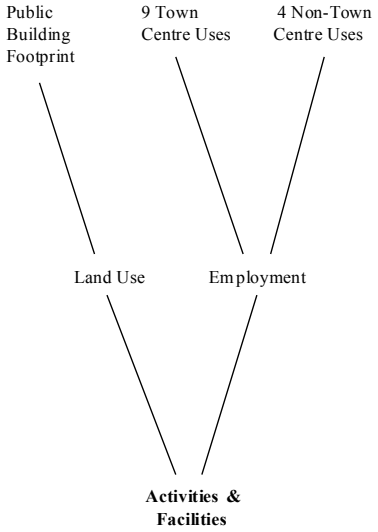


Figure 3.5: The Activities and Facilities component from the Feasibility Study

Employment data is a good indicator of the types of economic activities that occur in town centres. The purpose of the employment strands was to simultaneously define those employment types which are associated with the town centre, and those which are not. Thus, while it might be expected to find retail and office employers in the town centre, it is rare to find primary or manufacturing industries there. By mapping both (and by using the non-town centre activities as negative indicators) an employment surface was generated where the peaks were likely to be Areas of Town Centre Activity, and the troughs, areas of decidedly non-town centre activity.

The second strand of the component was to map the extent of publicly accessible floorspace, namely floorspace (generally on the ground floor of buildings) which people were able to enter. This branch comprised retail floorspace but also included floorspace data attributable to civic administration. There is a strong substantive argument to support the inclusion of this element of the component. Buildings in town centres do tend to be relatively accessible.

Unfortunately the data which was used to drive this part of the model was not available after the 1995 Rating Assessment conducted by the *VOA*, data from which was used to create the first model. This meant that the component had to be reduced to the employment activities strand. A further reason to trim this particular component was the argument that the publicly accessible floorspace was highly correlated with the Intensity of Use component. Since floorspace was no longer involved, the component was renamed *Economy* (Figure 3.6).

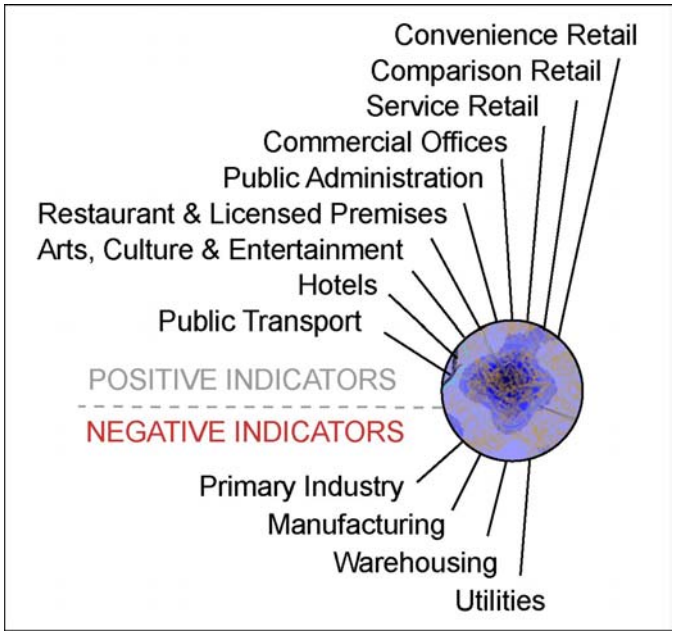
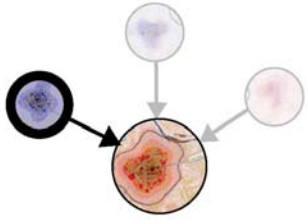


Figure 3.6: The Economy component of the Pilot Study

The model was then tested for its sensitivity to the exclusion of the economy model. From this, it was clear that this component was core to the model and should be included.

Pragmatism	✓
Theoretical Relevance	✓
Statistical Support	✓
Essential for Model	✓



3.3.6 Property (Intensity of Use)

Property is an important facet of town centres, and has always figured highly in any attempt of defining them (see, for example, Murphy and Vance, 1954). Like the previous component, Intensity of Use comprises two main strands – the density of town centre floorspace and property rental values. Data from the Valuation Office was used to build this component (Figure 3.7)

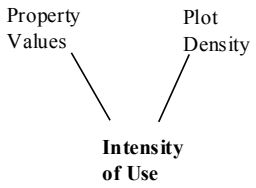


Figure 3.7: The Intensity of Use component from the Feasibility Study

Mapping the density of floorspace in a particular postcode gives a sense of the intensity of development in the built environment. Land values tend to be higher in town centres which means that buildings have to be taller and to have higher densities in order to be economical. It takes time to construct buildings, and they generally stand for many years before being demolished. Plot densities, therefore, tend to increase and decrease slowly through time and are indicative of longer term market trends; they rarely capture the short term market changes which can nevertheless be important in understanding town centres.

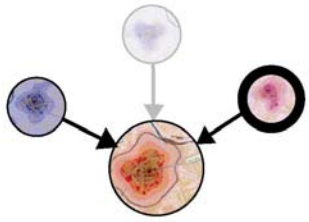
In order to gauge more short term property market patterns, the intensity of use component contained a component mapping rental values. Proxy rental value could be created by matching the information on floorspace for rateable units, with the rateable value ascribed to them by the Valuation Office. Divide floorspace by the total rateable value and you create a notional rent – rateable value per square metre.

The mapping of these notional rents was problematic. During the Feasibility Study it simply was not possible, since the two *VOA* datasets could not be matched using the information available to the research team. In this Pilot Study, however, it was possible for the first time to match these two datasets and generate a measure of rateable value per square metre. Before assessing whether or not this was a suitable measure, the means of generating a surface from these data needed to be considered.

The kernel density approach to generating a data surface could not be applied in this instance because of the assumptions that underpin the algorithm. Instead, the rental surface would have to be generating using an interpolation algorithm, such as Inverse Distance Weighting or Kriging. These algorithms depend on the notion that property values can be described predominantly by location. While the adage "location, location, location" is often used to describe property values, other factors, such as the age and structure of the property, its assigned land use and so on all affect the value of a property (Wyatt, 1999). Therefore, any attempt to generate meaningful town centre rental maps would have to account for these variables in order gain an accurate picture. Furthermore, property rents are extremely dynamic and since the *VOA* rateable value data are only produced every five years, shorter terms trends in the markets could not be detected by this dataset.

These issues meant that creating a generally acceptable rental model for the office and retail property markets would be difficult in the time available. As a result, it was decided to remove the rental values strand of the Intensity of Use component and concentrate on the plot density measure which nevertheless captured market trends, albeit long term, by the very nature of the built environment. This component, renamed *Property*, was found to be as central to the definition of town centre areas as the Economy component discussed in the previous section.

Pragmatism	✓
Theoretical Relevance	✓
Statistical Support	✓
Essential for Model	✓



3.3.7 Diversity

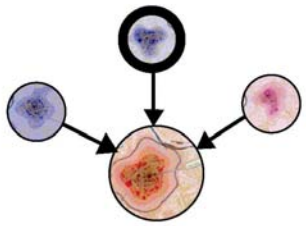
The final component to be considered was diversity. Urban land use becomes more heterogeneous towards the town centre and this component aimed to incorporate this into the model. This occurs because the town centre has traditionally been the most dynamic part of the town.

Unfortunately, there was no dataset available that could be used to map land use when the project started (although the National Land Use Database created by the *ODPM* is starting to fill that void). As a result, employment data from the *ONS* were used as a proxy in order to try and capture difference in the diversity of land use. For each unit postcode, the total number of different economic activities was counted (each economic activity defined according to its 5 digit unit Standard Industrial Classification code). From this count, a surface of activity could be calculated.

The diversity measure was widely considered to be an important component during the Feasibility Study since, in a sense, it captured the vitality of the town centre (URBED, 1994). Some people, however, found its inclusion contentious, particularly since no distinction was made between town centre type activities and non-town centre type activities. This meant that areas of a town encapsulating many types of activity, such as a large industrial estate, could return a high diversity value.

In the Pilot Study the measure was modified to take into account only town centre type activities (listed in the Annex as those that comprise the Economy component). Again the component was found to be central to the accurate measurement of town centres, since its exclusion led to the creation of less meaningful boundaries. The diversity component was also to prove to be useful in the definition of the boundary itself, as will be seen later in the chapter.

Pragmatism	✓
Theoretical Relevance	✓
Statistical Support	✓
Essential for Model	✓



3.4 Selecting the correct boundary

Once the optimum index surface was created, it would be necessary to identify the threshold contour on that surface which would be used to define the town centres in London.

The procedure of selecting the boundaries was a two step process. The first step was to select the threshold contour that would define the spatial extent of the areas. The second step was sorting through the set of potential Areas of Town Centre Activity, devising criteria to remove areas which were clearly not concentrations of town centre activities and evaluating how large an area needed to be for the statistics to be sufficiently accurate for publication.

3.4.1 The threshold contour

The threshold contour was identified by selecting a series of potential thresholds on the

town centre surface and selecting the one which appeared to best define the widest range of town centres. The boundaries selected by the Wandsworth planners in the Feasibility Study offered a good control to start with. Later, with the input of other London Boroughs (in particular from the analysis of the boundaries made by various local authorities through the CSA Assessment Tool) further controls were created against which the threshold contours generated from new models were assessed.

It was discovered early on that a threshold contour could be selected which not only defined the edge of Central London, but that could also define quite small town centres close to its edge (such as Caledonian Road). This was particularly encouraging since one of the great concerns of the research was whether or not Central London would dominate the choice of the threshold contour to such a degree that it would not be possible to identify the other town centres using an identical contour.

One way of understanding the concept of the threshold contour is to imagine the flooding of the index surface to the threshold height, with the islands created by the areas with a high index value becoming the Areas of Town Centre Activity (figure 3.8).

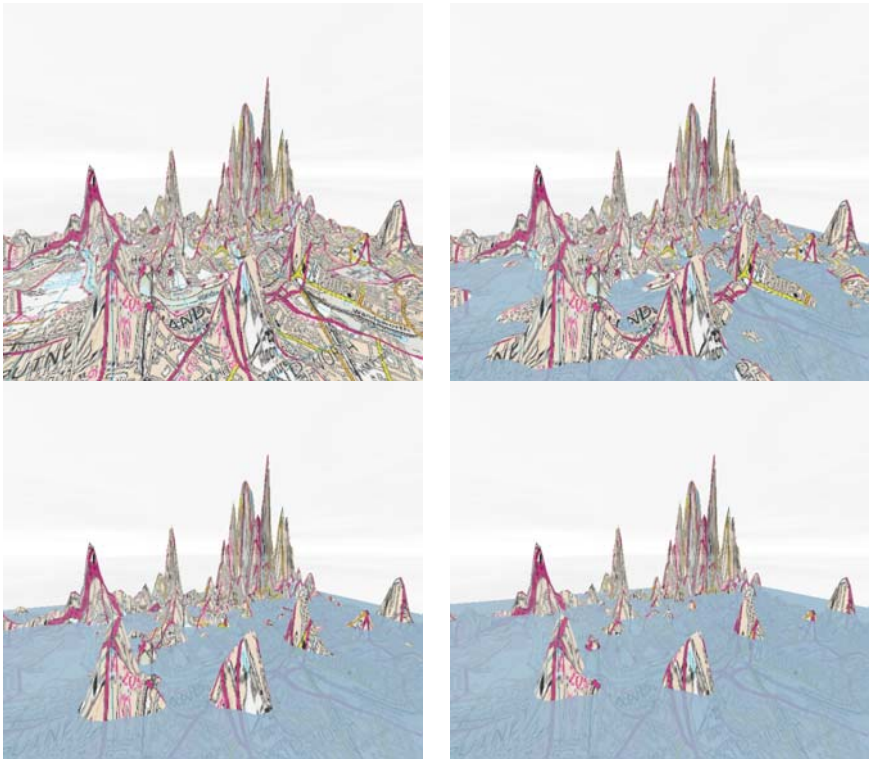


Figure 3.8: Flooding the index surface - looking from Putney towards Central London

However, as threshold contours were selected from various index surfaces (reflecting changes in both the model structure and changes in the data underpinning it) it became clear that some centres appeared in some models, and not others. Bethnal Green, for example, was to appear in several iterations but would not make it through to the final cut presented here. In contrast, some town centres would appear in all iterations without any discernible changes to their boundaries at all. The three Feasibility Study town centres – Putney, Wandsworth and Clapham Junction – were all examples of this.

At this stage it is difficult to establish why certain centres prove more sensitive than others. One conjecture would be that it may reflect their essential vitality and viability. It could equally be a question of data – the employment and floorspace datasets driving the model are not concurrent. Until the datasets are homogenised in the next phase of the research, the national roll out, it is impossible to be certain.

3.4.2 Sifting through the boundaries

The threshold contour selected from the Index surface would not only identify Areas of Town Centre Activity. Local concentrations of employment activity and floorspace often led to the creation of significant local peaks. The large shopping centres, such as Brent Cross, Bluewater, and Lakeside all broke through the threshold. Similarly, a number of large business parks, many located around Heathrow Airport, also appeared as potential 'town centres'. Perhaps the most interesting 'phantom town centre' was found just north of Shepherd Bush based on BBC Television Centre (Figure 3.9).

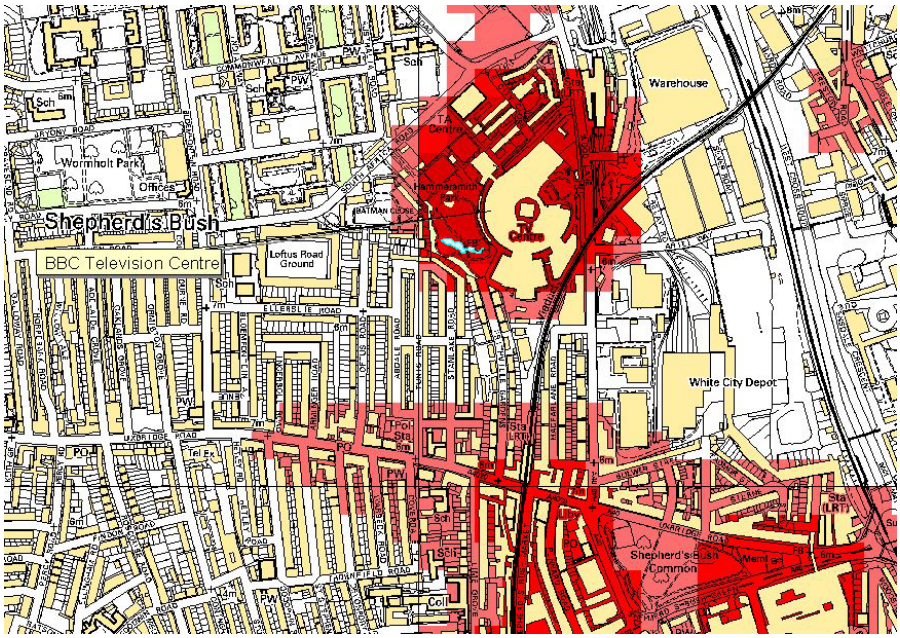


Figure 3.9: A phantom Area of Town Centre Activity north of Shepherd's Bush.

These phantom Areas of Town Centre Activity would be removed in two easy stages. The first was to specify a lower limit on the size of the boundaries. Any boundaries which occupied less than four hectares were deleted. This not only removed the smaller peaks that emerged through data error (see section 4.6) but also ensured that the statistics aggregated within these zones would be less prone to error.

The next stage was to establish if they truly were Areas of Town Centre Activity or not. Since high employment and floorspace levels underpinned the local peaks, the diversity measure was used. In order to qualify as being an Area of Town Centre Activity, the employment diversity within that boundary had to exceed a threshold. The threshold was determined by trial and error, but at the end of the project, it was possible to select a diversity value that precluded the inclusion of business parks and other phantom areas.

Large out-of-town shopping centres were still included using this method as these do tend to have a diversity of employment within them. It would have been possible to try to come up with some statistical method to discriminate between town centres and shopping centres, but as the turnover, employment and floorspace data for these areas are also of interest for retail planning, they were simply retained in the model.

3.4.3 Defining London's Areas of Town Centre Activity

The process of defining the Areas of Town Centre Activity in London from the index surface can be summarised as follows:

►First select the minimum contour (selected at an ITCA >= 27) which define the spatial extent of each Area of Town Centre Activity.

►Then delete all boundaries with an area less than four hectares (this meant that smaller

town centres such as the Roman Road and Caledonian Road were deleted).

►Delete all centres without a sufficiently high diversity level (3.5). This left a total of one hundred and forty-seven Areas of Town Centre Activity.

►Add a buffer of twenty-five metres around the defined boundaries in order to try and account for potential geo-referencing errors in postcodes on the periphery of the statistical areas.

The Retail Core model (so called because it is only used to define the Retail Cores of much larger Areas of Town Centre Activity) follows the structure of the main model, but only retail employment, retail floorspace, and retail diversity are incorporated.

Retail Cores were defined using this composite retail surface. To qualify as cores they had to fall within an existing Area of Town Centre Activity, and must themselves be over 4 hectares in area. The cut off was an index value of 13 on a composite retail surface. A further 20 Retail Cores were added to the series in this way.

The Retail Core model is not suited to mapping town centres since it attempts to capture only a certain aspect of them. Care should be taken, therefore, when comparing statistics generated from the Retail Core model with those generated from the main model.

3.5 A national method

The model produced during this study has been found to work well for London and preliminary checks of the models on the areas included outside the M25 indicates that the model is also performing well there. The components included in the model have proven value and are also applicable across England and Wales. This means that while some further modelling work may be needed to develop a set of national boundaries for Areas of Town Centre Activity, the model development work in the Pilot Study has provided a strong grounding for this future work and gives confidence in its likely success.

The final question to be asked in the appraisal of the model is whether or not it can be applied to all town centres across the whole country. Can the same ITCA value be used to generate comparable town centre statistics for every type of town centre in the country? When the model is run for this much larger area, it will become clear.

4 Data Sources

Data drives the model discussed in the previous chapters, and is also used to create the statistical aggregations for Areas of Town Centre Activity. It is vital, therefore, that the data are of the highest possible quality. This chapter starts by presenting the criteria against which potential data sources for the project were evaluated, before moving on to introduce the datasets in more detail.

Despite all efforts, there are errors in the datasets. The different types of error in the databases are outlined and their impact on the both the model and output statistics discussed. The chapter ends with a brief overview of the Data Verification Tool, a prototype internet tool which enabled local authority officers to examine the raw data and suggest amendments.

4.1 A broad data review

At the start of the research, a review of all the potential data sources that could be used to drive the model was undertaken. A number of potential sources for the data, from both public and private sectors, were evaluated against a number of criteria.

The primary consideration was whether or not the data were **suitable** for the model – could they easily be mapped and converted into the component data surfaces? The **quality** of the data was also important. The model is data driven and poor quality inputs will invariably lead to poor quality outputs - a principle more commonly known as "garbage in, garbage out". Assessing the quality of datasets is often difficult, particularly since the provenance of data can be considered commercially sensitive. Therefore, the **transparency** of the data, in terms of the methods of its collection, storage and any techniques used to modify or enhance the data was essential. It would not be possible to countenance the use of data if information concerning their derivation was not available or was kept confidential.

The model and system developed during this Pilot Study are to be rolled out nationally and the statistics are to form an annual compendium which is likely to be maintained into the foreseeable future. Any datasets being used in the process need to be of a guaranteed **longevity**, with an assurance of consistent data series and methods of collection. Furthermore, the datasets used would have be **nationally comprehensive** so that all Areas of Town Centre Activity could be modelled. Due to the high level of disaggregation necessary to define Areas of Town Centre Activity (as explained in section 2.4.1) it is important that issues of data **confidentiality** do not preclude the use of data in a highly disaggregated format. Finally, various **technical issues** (such as the ease of mounting the data into a large database) were taken into account.

In the event, the evaluation process showed that the *ONS*'s employment and turnover data and the *VOA*'s floorspace data were the most suitable data sources. Despite this, the exceptionally high demands placed on the data sources meant further investigative work was still needed on them before they could be used to produce boundaries and statistics suitable for publication.

4.2 Employment and turnover data

Employment data are used to define two of the three component of the models (economy and diversity) and are key to the success of the project. The employment data used throughout the Feasibility and Pilot Studies, provided by the *ONS*, are extremely detailed, enabling business activities to be mapped at unit postcode level. During the research, the *ONS* refined its employment data which meant that three separate versions of the employment databases were used – the Inter-Departmental Business Register (IDBR), the Annual Employment Survey (AES), and the Annual Business Inquiry (ABI).

4.2.1 IDBR

The IDBR was used as the source for employment and turnover data (categorised by five digit SIC, at the unit postcode level) in the Feasibility Study and was the first of the three employment databases to be used during the London Pilot Study. The register, maintained by the Office for National Statistics (*ONS*), was established between 1993 and 1995 and combines the former Central Statistical Office (CSO) VAT-based business register and the former Employment Department (ED) employment statistics system.

The IDBR is compiled from two main sources. Details of businesses registered for VAT (approximately 1.6 million firms) are supplied to *ONS* weekly from HM Customs & Excise. The second source, available quarterly, is the Inland Revenue's database containing the details of employers with employees in Pay As You Earn (PAYE) employer schemes (approximately 0.9 million employers). By combining these sources and others (such as other *ONS* databases and surveys) *ONS* is able to hold employment information for each individual site of work place, covering more than ninety-eight per cent of UK economic activity.

As well as being classified according to SIC, data are also grouped according to the way in which companies are organised – in broad terms at the *enterprise* and *local unit* level. An enterprise represents the whole company while a local unit represents a branch, or an individual site, of a particular company. (Although strictly speaking, an enterprise could be a sub-unit of an enterprise group which represents a group of companies – for example the Virgin Group). Data on employment and turnover are returned by the company at the reporting unit which is a grouping of the business's local units for which the business provides a return. For the vast majority of businesses, this will be the same as the enterprise, but about ten per cent of businesses prefer to divide the enterprise into a number of reporting units, each of which provide a separate statistical return for a group of local units. In general terms, employment data are available to the local unit level while turnover data are returned at the Enterprise level.

Although data from the IDBR seemed to produce good quality data surfaces and ultimately a good model, the *ONS* raised some doubts about the quality of the statistics that it produced because the database included a large number of **unproven** units – data which had been received form the PAYE and VAT sources but had yet to be verified. Additionally, the IDBR does not contain up to date information on the creation and closures of businesses (often referred to as births and deaths of data records) and so any statistics generated directly from the IDBR could not be supported. The *ONS* recommended that the *ODPM* instead use the Annual Employment Survey (AES), which was based upon the IDBR.

4.2.2 AES

The Annual Employment Survey (AES) was the source of employment statistics used by the *ONS* between 1995 and 1998. Employment data in the AES were based on those held on the IDBR, although were modified through a postal survey of a sample of local units in order to account for those unproven units held on the IDBR.

However, when data from the AES were used to generate the model, a number of potential errors where identified. It appeared that the survey approach used within the AES was not sensitive enough to generate statistics at the spatial scale required to generate the town centres model and it was agreed that the dataset was not a suitable source for the project. Fortunately, the *ONS* was moving to replace the AES with a better dataset – the ABI – which was to be used much more successfully later in the project.

4.2.3 ABI

The Annual Business Inquiry (ABI) is the successor to the AES and is the source of both the employment and turnover data in the model. The ABI comprises two distinct elements the ABI/1 which holds employment data, and the ABI/2 which holds turnover data. These are presented in this section of the report. For a more detailed and through overview of the ABI, please refer to Annex 2.

4.2.3.1 Employment data – ABI/1

Like its predecessor, the ABI uses the IDBR as its foundation and does not include unproven records which have come onto the IDBR from PAYE and VAT sources. A different approach to the one adopted by the AES is taken to account for the unproven data within the IDBR.

When enumerated, an enterprise furnishes the *ONS* with information about the total number of people employed at **all** of its local units. This figure is then divided between all the local units of that enterprise using the employment information held on the IDBR under the assumption that the enterprise's local unit totals remain constant. (Sometimes, the division of the enterprise total is modified to take account of prevailing economic conditions based on industry type and geographical locations.)

The employment figures for the enterprises which are not enumerated are modelled according to their employment sizes held on the IDBR, local geographic and industrial economic trends, and the responses received from the survey for other similar sized and located enterprises.

This survey is carried out at the same time each year, returns specified to the Friday following the second Thursday in December. By keeping this date fixed each year it becomes easier for the *ONS* to make temporal comparisons with a greater degree of accuracy. One notable effect of this, however, is that employment figures have increased in comparison to the earlier *Annual Employment Survey* (which was surveyed in September) due to seasonal increases in employment occurring in the build up to Christmas.

Although there have been criticisms levelled against the database, particularly in its early days, as far as can be established, the quality and detail of the employment data in the ABI is unrivalled. Furthermore, the *ONS* is committed to maintaining the database and to continually improve its quality.

In this project, detailed data for each local unit from the ABI/1 are mapped and modelled and are used to create the component indicators of the Economy and Diversity components. The information used are:

- the postcode of the local unit (which is used for geo-referencing;
- the local unit's standard industrial code (SIC): and
- the total number of people employed at the unit.

4.2.3.2 Turnover data – ABI/2

At the start of the project, The *ONS*'s Inter-Departmental Business Register (IDBR) was the main source of employment and turnover information. However in the IDBR, turnover for multiple retailers is held for the enterprise, or group of stores, unlike employment which is held for each site or work place. Whilst employment information could therefore be produced for town and shopping areas, turnover information could not and had to be estimated.

Originally, turnover estimates were made by imputing turnover at the local unit according to the proportion of employment at that local unit. These statistics produced in this way were not too reliable and it was felt that more accurate estimates could be derived from local unit information. A survey was conducted early in 1999 of 70 large and 10 medium sized retailers, which returned turnover information for all (or in some cases most) of their local units for the annual years 1997 and 1998, or the date closest to that year. These returns covered over half the turnover of all the multiple retailers in the country.

Information about turnover per head could be derived from these returns, and it was deemed appropriate to apply this to the employment in the local units belonging to the remaining multiple retailers (which were not surveyed) to provide an estimate of turnover for each of the non-sampled local units. Turnover estimates were first produced in Summer 1999, but further to a meeting between the *ODPM*, *ONS* and the Turnover Subgroup of the *RSWG*, it was agreed that the methodology should be changed so that various concerns could be taken into consideration, namely that the total turnover produced would be consistent with the total ABI turnover published by *ONS* and that the real local unit data obtained from the Retail Turnover Inquiry would be preserved (the ABI was not in existence when the Inquiry started).

Unfortunately, this exercise was still unable to produce statistics of sufficient quality to be released, and acting on the recommendations of the independent reviewers of the statistics, the imputed turnover statistics were not released.

Fortunately, *ONS* had been developing estimates of turnover data at the local unit level as part of the roll-out of the ABI. In existence from 1998 (although sub-national estimates from it were not available until 2002) the ABI/2 was to become the source of turnover data for the project. Like the employment data, it is necessary to produce estimates for local units in order to compile the estimates for the Areas of Town Centre Activity and a similar process is used to that of the ABI/1.

Local unit data are calculated from the ABI by taking the return reported to the ABI then allocating this to its sites. The allocation uses a regression formula based on NUTS2 region (a European system for classifying units of geography) two-digit SIC code and employment size while ensuring that the apportioned data for all local units within a reporting unit still equals the returned data. The data for these sites are then grossed up to cover the businesses not covered in the ABI to produce sub-national estimates, with the overall total being scaled to ensure consistency with the national dataset. To produce the local unit estimates needed for the town centres work, these sub-national estimates are then apportioned out to the local units preserving the estimated local unit returns for the businesses covered by the ABI.

Turnover data are not used to create the town centre model, although they are a primary statistical output in this research. It is possible to create turnover statistics for a whole range of activities in town centres and to be confident that they can be compared and analysed with the employment data. The only category for which this has not proved possible is the commercial office category since the ABI/2 does not currently produce turnover data for the companies with a financial services SIC code (65).

4.3 Valuation Office floorspace data

Floorspace data were used in the property component of the model as well as in the statistical tables. The figures are the result of a major collaboration between the Office of the Deputy Prime Minister (*ODPM*), the Valuation Office Agency (*VOA*) and University College London (*UCL*) to improve the quality of floorspace statistics which were last published in 1995.

The information comes from administrative databases used by the *VOA* in the process of assessing the value of non-domestic property in England and Wales. Data are held for individual units of occupation or hereditaments, which include groups of buildings, individual buildings, and parts of buildings (for example, an office building let in floors). Most of these hereditaments are classified as one of four bulk classes (shops, offices, factories, and warehouses), with the remainder (including hotels, public houses, libraries and leisure premises) in a non-bulk class.

The *VOA* collects floorspace data where needed to assess the rateable value of a hereditament. This is done for the majority of the hereditaments in the bulk classes but is not collected for the non-bulk classes. Therefore, while it would be desirable to include floorspace for leisure activities, this information is currently not available. Accordingly the floorspace data used in this project are for the office and retail hereditaments (see Annex 1 for more information on the office and retail classes). The floorspace for these is measured by taking the net internal area, which excludes common areas such as stairwells and shared foyers. Structural walls, lift shafts and columns are also excluded. This definition is not the same as the sales space for shops as sales space further excludes areas such as storage. Crown properties, including central government offices, were added to the *VOA*'s databases in April 2000 and are included in the floorspace data set.

4.3.1 Developing the floorspace dataset

Whilst most of the hereditaments in the four bulk classes have their floorspace collected and stored on a central database, this is not true for all as some are valued with reference to specialist markets or are valued based upon replacement cost or commercial turnover. Omissions tend to be unusual types of properties including specialised heavy industrial properties and also some large retail premises such as major department stores.

Upon analysing the 1995 data it was found that the omissions include (but are not confined to) between twenty and twenty-five percent of superstores and hypermarkets. The fact that the omissions contained a significant number of hereditaments with very large floorspace areas meant accurate floorspace could not easily be estimated for the areas containing these stores. However, even though the floorspace data for these 'unusual' hereditaments were not on the central database, it was generally still measured and kept on paper records in the process of calculating the rateable value. Thus *ODPM* sponsored the *VOA* to undertake an extensive manual exercise to transfer the 2000 floorspace for these unusual hereditaments from paper records stored in local offices onto the central database. This restored nearly all the missing floorspace data, and where the data remained unavailable they were estimated from the rateable value of the hereditament and the rateable value per square metre for the other hereditaments in the area.

The *VOA* central database generally also records the Bulk Class (retail, office, factory or warehouse) of a hereditament along with several other codes describing the building use. Where this bulk class was missing it was inferred from other existing information. The shops use classes (A1, A2, A3 and 'Other') are not contained on the central database and have been produced by using all of the activity classifications in the data. Annex 1 contains more information on the hereditaments included within each class.

4.3.2 Classification Problems

There are enormous difficulties involved with consistently describing and classifying non-domestic buildings, which have implications for the derivation of accurate statistics on non-domestic floorspace. The non-domestic stock is extremely diverse in size, form and construction. The range of activities is equally diverse, from shops to car repair and showrooms, from office work to bingo, from crèches to scientific research. Many hereditaments contain mixtures of activities that would usually be considered distinct. Common examples here are composites of banks with their own offices above, or warehouses containing shops. Petrol stations are commonly found combined with small grocery shops, or attached to supermarkets.

One consequence of this diversity is that different organisations may classify the same premise differently. A mixed premise may be a shop to one person, an office to another. Even with a single data supplier (such as the *VOA*) classification practice tends to vary among its local offices which can lead to discrepancies in the statistics where different bulk classes have been used in different areas. One of the more extreme examples of the problems associated with mixed premises is Heathrow Airport, where the shops and offices within the airport have not been classified as such, resulting in much of this floorspace being excluded from the compiled statistics.

The diversity of the stock also means that, even with the hundreds of categories available in the various *VOA* classifications, there are still numerous premises which do not fit well into any particular category or which fall within several different categories. It appears that such premises are frequently described by assigning apparently contradictory codes in the various classifications available, a phenomenon that occurs for ten to twenty percent of all hereditaments. For example, hereditaments with primary description 'post office' and bulk class 'factory' frequently turn out to be postal sorting offices. This creates uncertainty about building use when inferring the bulk classes where they are missing and the shop use classes, which potentially impacts the accuracy of the statistics for the classes.

Additional detail on the compilation of the floorspace data is provided in the ODPM publication 'Floorspace and Rateable Value for Commercial and Industrial Properties 2000'. See http://www.planning.odpm.gov.uk/frvcip/index.htm

For this research project, the following data were used:
- postcode;
- floorspace area;
- *VOA*'s bulk class (i.e. shops or office); and
- use class (an inferred use class for A1, A2 and A3 properties only).

4.4 Postcode Data

The use of unit postcodes (UPC) has been crucial in geo-referencing the employment, turnover and floorspace data. The postcode is made up of four levels, which are outlined below using the example of University College London's postcode:

- Postal Area: **WC**
- Postal District: **WC1E**
- Postal Sector: **WC1E 6**
- Unit Postcode: **WC1E 6BT**

As the postcode gets progressively longer, the location to which it refers becomes consistently narrower and more precise. The postal area in this case refers to just the west-central area of London, whilst the district and sectors are smaller areas inside this postal area. Finally, the UPC section pinpoints the exact road or cluster of buildings the mail should be delivered to. In this particular example, the UPC is even more precise than this. Any building that receives on average more than 25 pieces of mail per day receives its own unique UPC – in this example, University College London will receive far in excess of this, so its UPC will refer to the exact central delivery point of the college.

a) London Postal Areas

b) Postal Districts in WC

c) Postal Sectors around UCL

Figure 4.1: Postcode hierarchy for WC1E 6BT

Figure 4.1a shows the postal areas of London, with **WC** being located in the centre. Figure 4.1b shows that **WC** is made up of a number of postal districts – 14 in this case while Figure 4.1c displays some of the postal sectors in **WC1E/H** as well as the single UPC designated for University College London at **WC1E 6BT**[1].

The data used in this project are all geo-referenced to unit postcode level. This means that each unit postcode is attributed national grid coordinates which can used to plot the data accurately on a map. In cases where the UPC contains a single building, the grid reference given for it would usually be located in the geographical centre of the building. In those situations where a UPC represents a number of buildings, a slightly different methodology has been used where the geo-reference is located to the centre point of the building which is closest to spatial average of the centre points of all the buildings that fall within the UPC.

The UPC is frequently used to geo-reference data by a wide variety of different organisations with different applications. Yet while the UPC is often used to geo-reference data its primary function is to co-ordinate the delivery of post (Shepherd and Ming, 1998); (Longley and Harris, 1999). As a result, the Royal Mail frequently changes postcodes in a particular area as they continue to optimise the postal delivery network. These changes take time to filter through to the various datasets which use the UPC as the method of mapping data. As a result, it is difficult to get a 100% match between unit postcodes in a geo-referencing database.

A further problem encountered was that postcodes reported in the Central Postcode Directory (CPD) and in other *ONS* datasets are given national grid co-ordinates to a

[1] Note that this postcode, although attributed to **WC1E 6**, is actually located outside of the sector boundary. The most likely cause of this is the fact that UCL buildings cover a relatively large area across a number of postal sectors although the main gate of the front entrance to the central area of the college is in **WC1E 6**.

precision of 100 metres. This is of insufficient resolution to capture the intrinsic *granularity* of town centre geography (see section 2..4.1). There is, however, a postcode database which provides UPC geo-referencing, in general, at a precision of one metre. The Ordnance Surveys Code-Point™ product, derived from Address-Point™ was used as the main geo-referencing dataset in this research. (During the Feasibility Study, its predecessor, Data-Point™ was used).

However, as might be expected, it was not possible to match all the UPC records in the ABI with those found Code-Point™. As a result, a hybrid UPC geo-referencing dataset was compiled. This procedure is often used when trying to map extensive datasets (Martin and Higgs, 1997).

Code-Point™ comprises the largest part of the hybrid directory, accounting for 91.9% of all the records. The CPD (the version used is dated Quarter 2, 1998) is maintained by the *ONS* and forms the next layer, accounting for only 6.5% of unit postcodes within the hybrid, and primarily picking up those UPCs which had been terminated by the Royal Mail. The remaining postcodes in the hybrid directory came from geo-referencing information held in the IDBR.

It is hoped that recent work between *ONS*, Royal Mail and Ordnance Survey will preclude the need for hybrid directories in the future. The *Gridlink* project has been developed to produce a definitive ongoing postcode database, aiming to update all UPCs on a regular basis whilst assuring that they are reported to a consistent one metre resolution, and to give an indication of the quality of geo-referencing. When completed, it should contain each single UPC, omitting none, thus taking away the need to combine different directories to produce one complete one.

There are initiatives underway which aim to record and geo-reference each parcel of land in the country. This will mean that it will be possible to link socio-economic datasets, such as the ABI and *VOA* floorspace database, directly to land parcels. The use of such fine scale geo-referencing would enable the granularity of the town centre to be better captured, and for the modelled boundaries to be of a tighter fit.

4.5 Data Error

Despite all the efforts of the data providers, and the research team, there are errors in the data which will ultimately affect the model and the statistics derived from it. It is impossible to completely remove error from databases, particularly ones of these size. In this section, a brief review of data error is presented. For a full overview of the data errors and its impact on the project is presented in *CASA* Working Paper 54.

The errors associated with the project can be neatly categorised into two broad headings – errors associated with the geographical location of data, and errors associated with the data that are being mapped.

4.5.1 Geographical error

As was suggested in section 4.4, the geo-referencing of unit postcodes (UPCs) is not always entirely accurate. This can be attributed to a number of reasons, not least that there is no single definitive source of postcode information which all the data providers can use in order to accurately geo-reference their data. Furthermore, addresses and postcodes are in a constant state of flux, which means that it is impossible to maintain accurate, up to date postcode information in either the ABI or the *VOA* floorspace data.

There are three key issues though that can significantly effect the quality of geo-referencing and therefore the accuracy of the model and statistics:

- the presence of false postcodes;
- the quality of the geo-referencing; and
- PO Boxes.

4.5.1.1 'False' postcodes

Sometimes, data held on the ABI and Floorspace database are associated with postcodes which cannot be traced. Often these are postcodes which have been terminated by the Post Office for operational reasons and have yet to filter through to either the *ONS* or *VOA* databases.

Many of these are picked up eventually in the Central Postcode Directory – a key postcode catalogue in that it contains birth and death information on individual postcodes. Sometimes though, postcodes cannot be traced using any of the postcode directories that comprise the hybrid directory and are perhaps explained as typographic errors.

In the Pilot Study, the proportion of employment attributed to non-existent postcodes was a mere 0.116% of the total employment. The *VOA* database was less accurate, with 2.33% of the total floorspace being attributed to non-existent postcodes (although the vast majority of these are associated with industrial and/or warehouse hereditament which are not used in either the model or the statistics).

At present, there is no means of addressing this issues although the creation of the Gridlink product (see section 4.4) should go some way to solving this problem.

4.5.1.2 Lower quality geo-referenced postcodes

As mentioned in section 4.4, the a hybrid postcode directory was created for this project integrating Code-Point™ (with 1 metre precision), the Central Postcode Directory (rounded to the nearest 100 metres) and some from IDBR grid-references. This means that not every postcode can be accepted as being totally accurate: those derived from the CPD and the IDBR can be sited up to 100 metres from their true location; PO Box references are often more than half a kilometre away from their 'real' location.

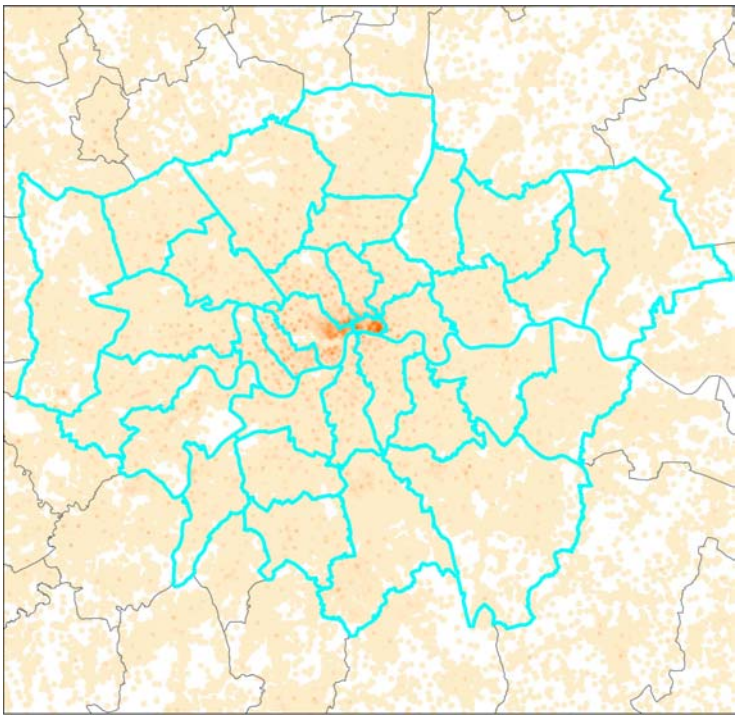


Figure 4.2 The distribution of poor quality postcodes in London

There are 320,516 UPCs in the Pilot Study area. 214,977 (67 %) are geo-referenced to a precision of 1 metre[2]; 12,390 (4 %) are precise to 10 metres, and 93,149 (29 %) to a precision of 100 metres. Figure 4.2 gives an indication of the distribution of poorer quality postcodes. The intensity of the colour is an indication of how precise the postcodes are in that area. Central London shows up as having a large number of imprecise postcodes, but that is due to the overall density of postcodes there.

4.5.1.3 PO Boxes

A PO Box is a special postcode that, although identified to a single organisation or firm, is not identified to a particular building. The maintenance of geographical anonymity is very important to some organisations, such a women's refuge; it is also useful to large organisations, such as banks, which may service a series of offices from a single post-room; it does, however, make the mapping of economic and building data problematic.

To get around this lack of location, Royal Mail and Ordnance Survey have located each PO Box in the geographic centre of its postcode sector. This can sometimes be a considerable distance from the location of the organisation where the mail is delivered.

A good example of this can be found in Figure 4.3 which shows the difference between the real location of Sainsbury's HQ (in 1999) and that suggested by the geo-reference returned for the PO Box. Rather than the postcode being located on Stamford Street, it is about 500 metres away to the east in the centre of the postal sector **SE19**.

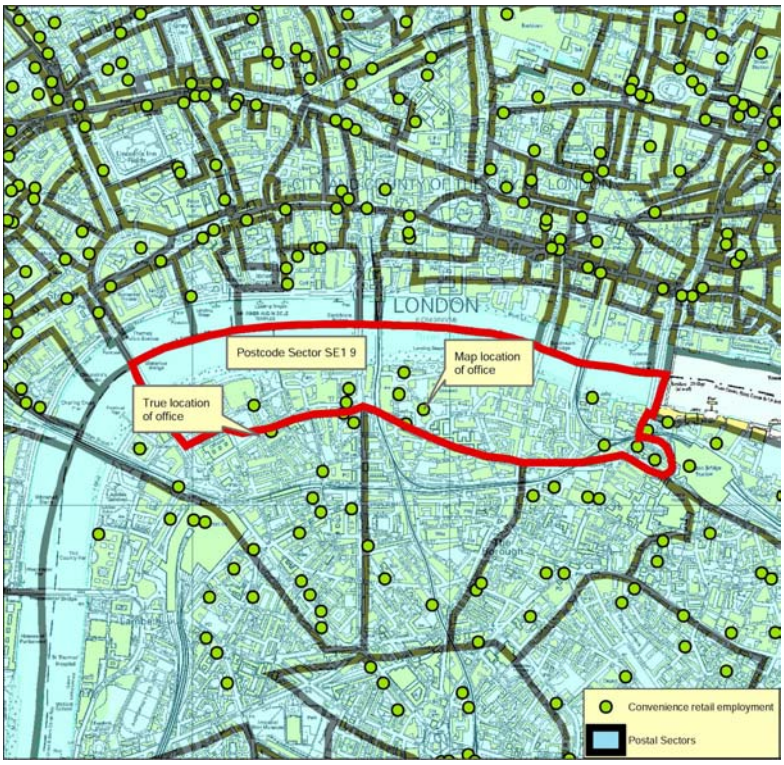


Figure 4.3 : Geographical displacement of Sainsbury's HQ due to its PO Box geo-reference

Since Sainsbury's is a major employer, the displacement of its geographical location could have an impact on the town centre model. In this instance, because both locations fall within the same Area of Town Centre Activity – Central London – there is no impact on the output statistics. It is clear to see that such a displacement could affect the output statistics. The problem is multiplied in those postcode sectors which contain a large number of PO Boxes. Figure 4.4 shows the amount of PO Boxes present in a Postcode

[2] Errors may have occurred in geo-referencing the higher quality postcodes. Although ascribed a *precision* of 1 metre, this does not necessarily mean that they are *accurate* to 1 metre.

District as a proportion of the total UPCs. Interestingly, Postcode Districts on the eastern part of London seem to have a larger proportion of postcodes that elsewhere. Whether or not this distribution is reflected in the quality of the boundaries of town centres in this part of London has yet to be determined.

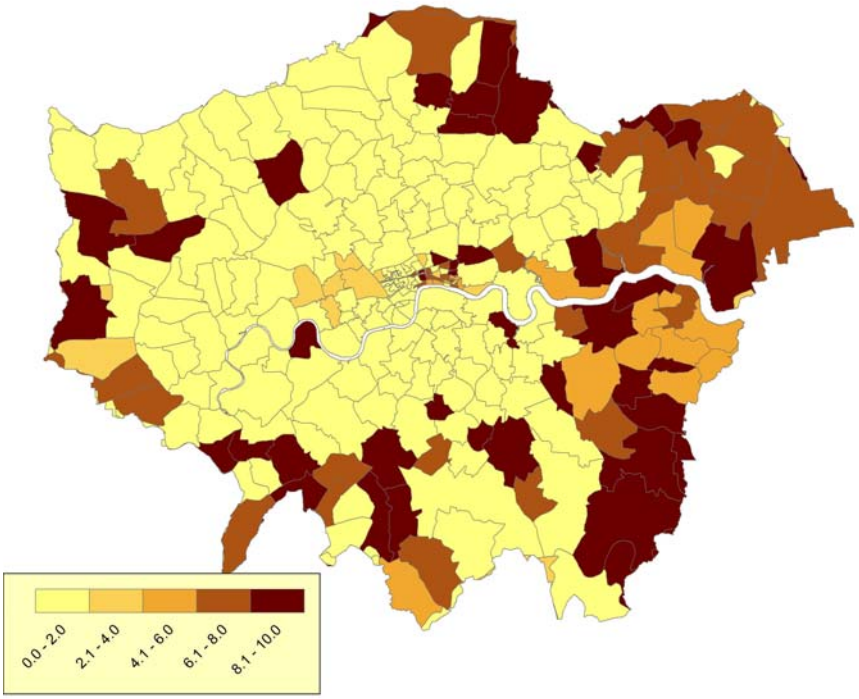


Figure 4.4: Number of PO Boxes as percentage of total unit postcodes

4.5.2 Attribute error

The second type of error that needs to be considered occurs when the data attached to the postcodes are incorrect. There are three broad areas of attribute error:

- ►classification
- ►incorrectly recorded attributes
- ►missing data

4.5.2.1 Classification of data

The classification of data is never straightforward, and the assignment of a classification to a particular piece of data, whether it be the Standard Industrial Classification (SIC) used in the employment and turnover data, or the Use Class use in the floorspace data, is, to a degree, inherently subjective.

As mentioned in section 4.3.2 above, the classification of data in the *VOA* floorspace data has been problematic for the *VOA* and other organisations using the data. Different valuers will classify a hereditament in different ways, reflecting their own experience or the accepted approach of the particular regional office. Differences of opinion will always occur.

Data held on the ABI is potentially subject to greater classification error or discrepancy because of the wide variety of potential classifications. The ABI is produced for economic purposes and the classification of the local units within the database are determined by an enterprises' overall industrial classification rather than the activity that occurs at a particular local unit. This becomes an issue when mapping the head office of a company. The primary activity at a head office is office work in an office building, although the SIC classification returned from that location could well be something completely different.

One of the best examples of this is again Sainsbury's former head office in Stamford Street, Southwark (it has now moved to Holborn). This office employed a large number of people, few of whom would have a direct retail function – they are predominately office workers - yet the SIC allocated to this office in the ABI was 52119 – *'Retail sale in non-specialised stores with food, beverages or tobacco predominating'*. This issue is likely to be compounded at Sainsbury's new HQ on Holborn which includes a small supermarket on its ground floor with offices on the floors above[3].

The *VOA*, on the other hand, will record the building in terms of its physical use, in this case an office that does not deal with the public, so assign it a bulk class of 2 (offices), which translates into a use class of B1. The difference categorisation between the two further complicates the matching and can start to create discrepancies in the statistics.

Classification can also be an issue with certain types of economic activity. For example, employment agencies tend to return employment totals for all the people employed through that office, in a wide variety of different activities. Thus, an employment agency on the high street, which in reality only employs 4 or 5 people at that particular office, may return an employment figure of hundreds – reflecting the number of people held on their books.

4.5.2.2 Incorrectly recorded attributes

As would be expected with databases the size and complexity of the ABI and *VOA* floorspace, there will be some random effects that make some of the entries in the database simply incorrect. Typographic errors in databases that have more than a million records are perhaps to be expected. Fortunately, there appears to be only a few of them.

4.5.2.3 Missing data/dataset disagreement

Sometimes, the three datasets do not concur on the presence or absence of data. The employment and turnover data tend to agree more, not surprising since both are derived in broadly the same way. There tends to be more differences between the *ONS* and *VOA* datasets. For example, in the postcode area in which UCL falls - WC1E, the ABI suggests that there are 442 firms present, the ABI/2 is slightly different with 443 firms; the *VOA* floorspace data suggests that there are only 271 hereditaments within that area.

At first glance, this may appear to be a huge difference, but could be explained by a number of different reasons:

►The most likely explanation for the discrepancies is that the *VOA* floorspace data does not provide a full census of non-domestic buildings. There are a large number of different categories that are excluded from the database (see section 4.3 for more information). It is unreasonable therefore to expect there to be a complete match between the two data sources.

►There is no one-to-one matching between a firm and a hereditament. A hereditament is a unit of ownership of property. It is possible for more than one company to share the same hereditament, and so we would expect the number of hereditaments to be smaller than the number of firms present in a particular area.

►The databases are not temporally concurrent – the AB1 Datasets is dated 1999, while the *VOA* floorspace data are dated 2000. Some differences between the two databases would therefore be expected although this is unlikely to be significant.

Sometimes, postcodes contain floorspace data but not employment or turnover data. In Figure 4.2, the presence or absence of data is recorded for Stoke Newington's Area of Town Centre Activity. Within the town centre boundary, there are just ten UPCs which contain data from both the ABI and the floorspace databases; a further three contain only employment and turnover without any floorspace data. Just outside of the town centre boundary to the north east and south east, there are two postcodes which contain floorspace data but no employment or turnover data. It is highly likely that these are vacant units.

[3] It should be stressed that this does not affect the model, since the data would be aggregated into the Economy component. On the other hand, the statistical totals can be easily skewed by this problem.

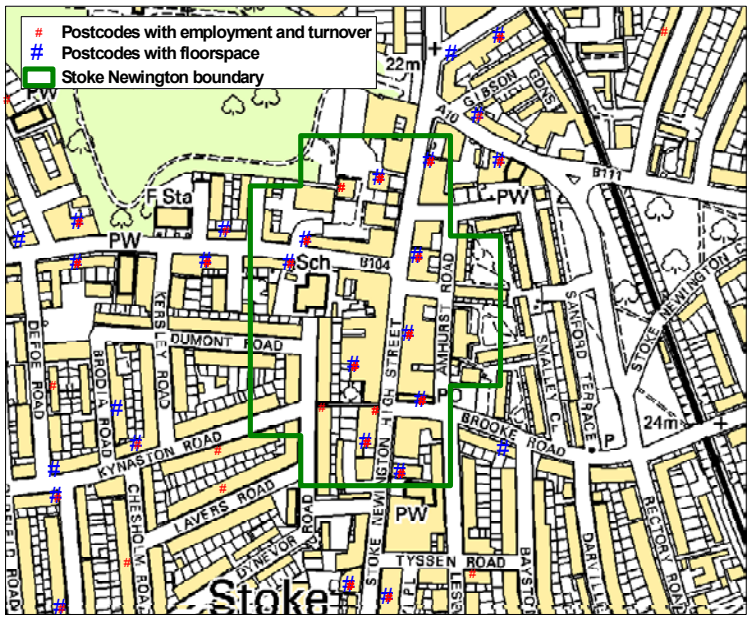


Figure 4.5: Stoke Newington and surrounding area

Overall though, it appears that there is a good match between the dataset. The quality of both datasets could be improved, especially if they were used together in the verification exercise. This issue is addressed later in section 4.8.

4.6 Impact on the model

It should be stressed that the errors outlined in the sections above are relatively rare and tend to have little impact in overall terms, on the boundaries from the model. There are many reasons why this is the case – the data are of high quality, and errors in one dataset are often offset by the accurate recording of information in the other.

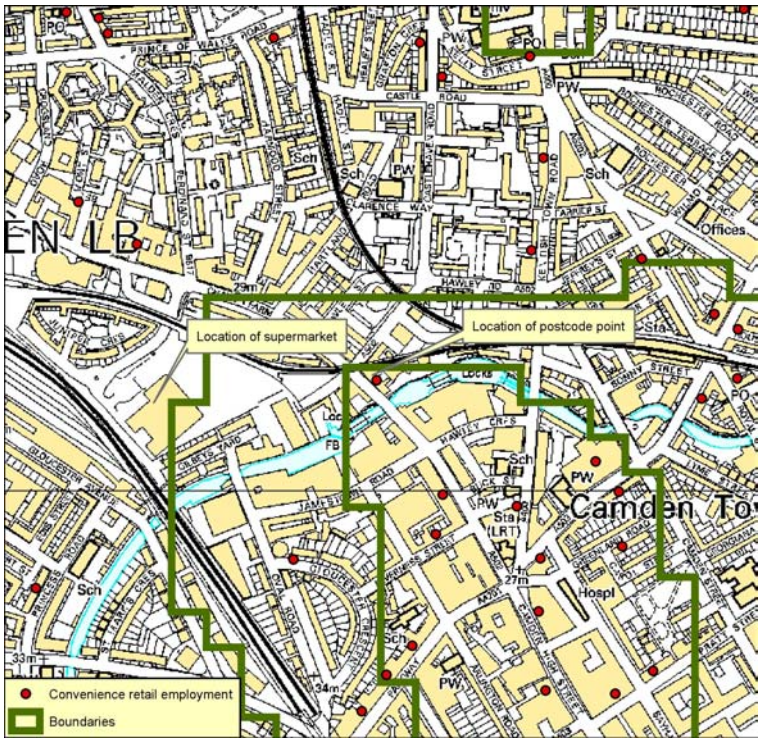


Figure 4.6: The north of Camden's Area of Town Centre Activity and Retail Core

The minimal impact on the model can be asserted because the data used have been able to create a composite ITCA surface that accords with a general perception of where town centres are. The only time when this has not been the case, which occurred when data from the AES (see section 4.2.2) were used to drive the model, it was quickly realised that the dataset itself was at fault. In effect, the model has become an excellent way of assessing the overall quality of the data.

While assessing the ITCA surface can give an overall sense of data error, local problems can be harder to detect. Figure 4.6 shows the convenience retail employment postcodes in the northern half of Camden Town and their relationship to the Area of Town Centre Activity for Camden, and the Retail Core of Camden High Street. To the north west of the town centre is a large Safeway supermarket for which there appears to be no postcode suggesting that the employment, turnover and floorspace data for it are missing.

Due to its proximity to the statistical boundaries (note how the town centre boundary bisects the building) it would be fair to assume that were the data for it present, they would exert enough influence to pull the boundary a little further to the north west. When the database was interrogated though, the data were tracked down to a UPC in the far north west of the Retail Core. The location of the Safeway postcode (which it shares with other shops) is some distance from the 'real' location of the building itself. The relationship between the misplacement of postcodes, and the impact on both the model and statistical outputs is discussed more in *CASA* Working Paper 54.

4.7 Impact on the statistics

Data errors appear to have had a greater impact on the output statistics because they are aggregated by the boundaries produced by the model. The aggregation is precise – there is no fuzziness present as there is when converting the data into surfaces for example. The geographical errors can therefore have a major impact on the accuracy of the data aggregation.

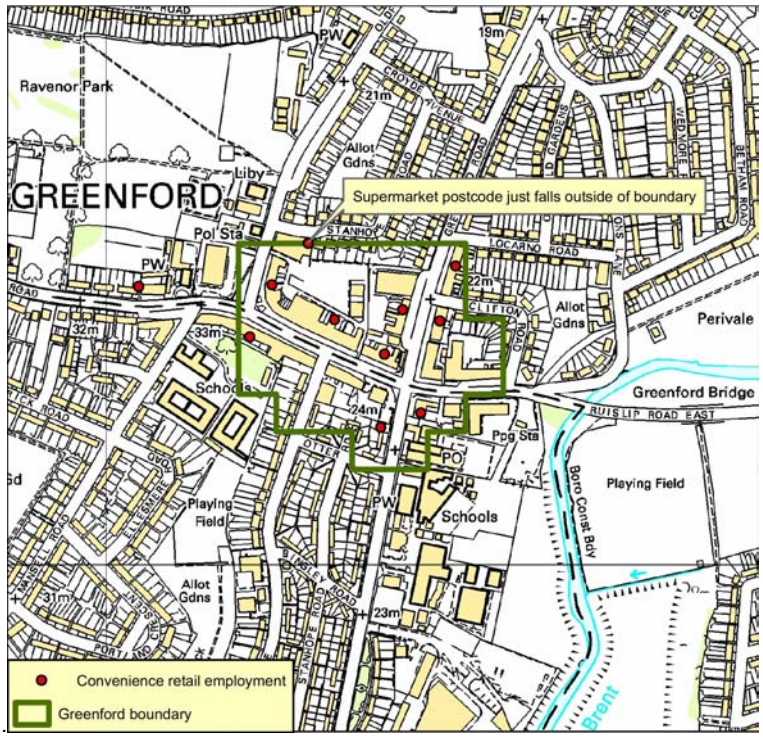


Figure 4.7: Greenford town centre boundary showing nearby supermarket .

Even small errors in geo-referencing can have a large impact on the output statistics, either by including data from buildings that are not truly in the boundary, or by omitting data from buildings that are in the boundary, but their postcode is not. Thus if a

postcode is only geo-referenced to an accuracy of 100 metres, it is possible for the data associated with it not to be included within the statistical aggregation even though if were geo-referenced accurately, it would fall within the boundary.

For example, Figure 4.7 shows Greenford, with a supermarket in the north of the town. As can be seen from the building outline and the boundary, the supermarket partly falls inside the boundary. However, careful study of the building's postcode will show that it does not quite fall inside – it is outside by a matter of one metre. This has implications as it means that the statistics from that particular store are not counted in the town centre statistics, even though they contributed to the model and influenced the position of the boundary.

The inverse is also possible of course, the UPC in which the Safeway supermarket falls in Figure 4.6 is actually just within the Camden Town Retail Core, when in reality, the building is firmly outside the Retail Core, and arguably, outside of the town centre.

The impact of attribute errors – typographic or classification errors – can easily lead to particular statistics being under or over counted. One way of identifying attribute errors by comparing the data from different sources – for example seeing if the floorspace to employment ratio for offices is in line with the expected average. This type of comparison is fraught with problems (and explained in more detail in section 5.2.4) not least because the data used in the Pilot Study are not concurrent (the employment and turnover data are dated 1999, while the floorspace data are dated 2000).

Ultimately, the detection of errors in the statistics by manipulating the data in various ways is fruitless, the best way is to address the problem directly in the raw data themselves.

4.8 Spotting Errors in the raw data

In spite of the overall high quality of the principal data sets, there are many potential sources of inaccuracy in the data used to drive the model (see above). In order to resolve this problem a Data Verification Tool (DVT) was developed to allow the underlying information (disaggregated to unit postcode level) to be checked by local experts[4]. Although there was no evidence that using unchecked data would lead to any significant errors in the output, a user-friendly Data Verification Tool was developed as part of the Pilot Study (Figure 4.8).

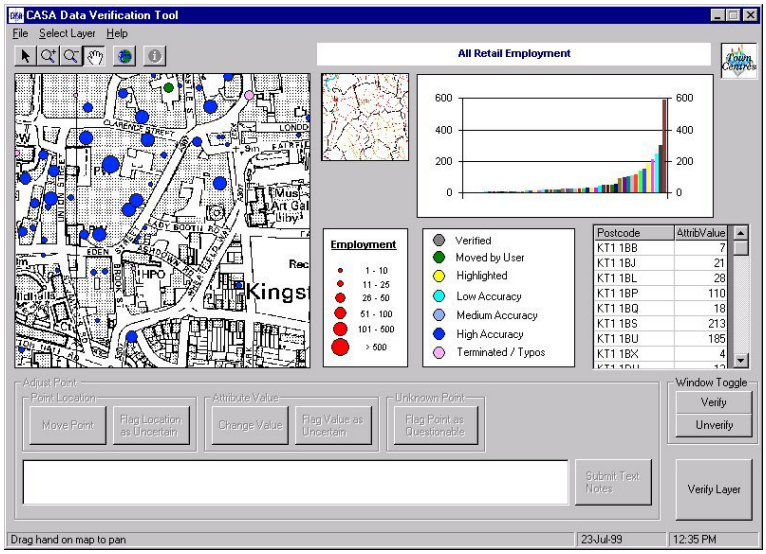


Figure 4.8 : The Data Verification Tool

[4] The data examined in the DVT came only from the IDBR, although all the data used in this study could be explored using the tool. All local authority officers signed a confidentiality agreement before examining the data.

The purpose of the DVT was to display each 'layer' of information individually in a format that made it comparatively easy for someone who is familiar with the pattern of activities in and around a centre to identify major errors (e.g. a missing supermarket or a misplaced industrial estate). Once identified the errors could be either corrected or have information provided about them, or both. Previous research has shown that it is easier for people to judge what is right or potentially wrong if the information is shown on a map rather than on a printed list. The purpose of the DVT was to help identify, and if possible correct, substantial errors in the data. (Small errors were unlikely to effect the model or the statistics too much).

Using Internet technology the DVT enabled a selected local expert in a Borough to examine and verify the data one 'layer' at a time on their local computer. The tool was designed to be highly visual and, with a little instruction, it was relatively simple to use. A map of the local authority was displayed and the values for the attribute that has been selected are indicated by the size of the dots that appear at each postcode centroid. For example, the number of people employed in office occupations for the Commercial Office element of the Economy component.

By zooming in or out, it proved easy to get an overall impression of where the values are clustered (retail employment would be expected to be concentrated in the shopping areas) and to examine individual postcode points to see if they show reasonable values in approximately the right locations. If the user highlighted an individual postcode point, the DVT displayed corresponding information from the central database in a table format. This enabled the user to see the exact value for the attribute for that point.

The user was able to make corrections to the data, either by moving the location of a postcode point on the map, or by noting probable errors in the position or value of the attribute in a "Comments" box. At the end of each interaction the DVT feeds back all the new information to the central database, thus keeping the systems database fully up to date.

The DVT was a success. It was in the main, easy to use and helpful in identifying anomalous and inaccurate data. Furthermore, four of the local authorities said they would be prepared to participate in regular data verification for the *ODPM*, Office for National Statistics and the Valuation Office. One Borough stated that they would be prepared to help again 'subject to approval that this is an appropriate use of time and providing more detailed, site specific information is made available'. However, because of time constraints and technical difficulties caused by local security measures, many of the Boroughs who wanted to test the system were unable to do so by the end of the research.

Nevertheless, the DVT proved that an Internet Mapping Tool could be used to enable local authority officers to help the major data providers clean and improve their data in a cost effective way. For a more detailed overview of the DVT, see *CASA* Working Paper 52.

5 Retail Planning Statistics

In this chapter, the statistics for the one hundred and forty-seven Areas of Town Centre Activity and twenty-one Retail Cores in Greater London are presented (Figure 5.1). The statistics are first presented at the Borough level, with aggregated data presented for the key employment, turnover and floorspace categories. Then detailed statistics on the town centres and Retail Cores (shown in the light and dark blue respectively in the Figure below) will be represented for all three categories on a centre by centre basis.

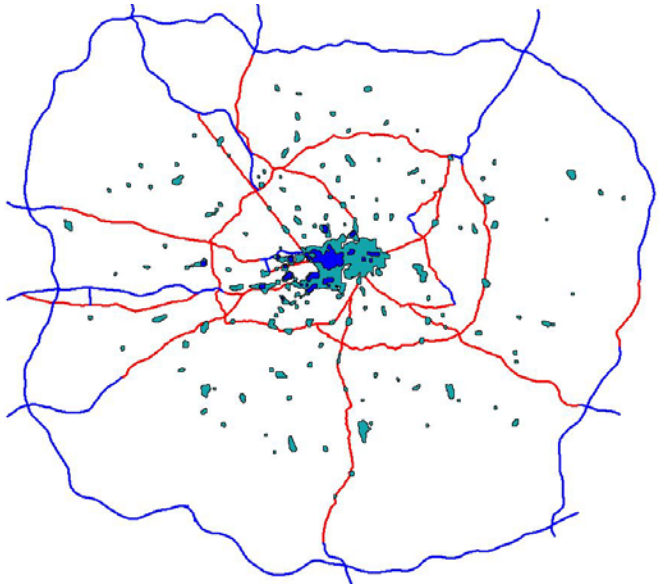


Figure 5.1: London's Areas of Town Centre Activity and Retail Cores

5.1 Caveats

The statistics presented in this chapter should be viewed as being **provisional** and will be revised when the first national statistics become available in 2003. As highlighted in the previous chapter, the floorspace and employment data used to drive the model are not concurrent – the employment and turnover data are for 1999, while the floorspace data are as at 2000. When the model is run across the whole country later this year, it will be done using employment data as at 2000. Additionally, if a new *ODPM* research exercise to produce historic floorspace data is successful, statistics will be come available for 1998 and 1999 (see section 6.3.1).

Notwithstanding the concurrency of the datasets used to build the model, the reader should also be aware of a few additional caveats about these statistics. The *ODPM*'s aim is to be as transparent as possible about the modelling process and about the statistics themselves, the only barrier to this transparency being the need to avoid disclosing specific data about an individual company or building.

5.1.1 Errors in the underlying data

The employment, turnover and floorspace statistics used to create the boundaries and statistics are estimates and will consequently contain some level of error. While various internal and external checks of quality have been undertaken, this is the first time that these estimates have been published and the response to the publication will provide valuable feedback on how good the statistics actually are.

Errors in the estimates may affect the results in two ways. Firstly, the model is data driven and thus any error in the raw data, whether it be associated with the classification of the data, the amount of employment, turnover or floorspace returned for a particular unit postcode, or indeed the geo-referencing of that data, can have an impact on the shape of the final Index of Town Centre Activity (ITCA) surface. In turn this may lead to the boundaries being wrong

in certain places. Nevertheless, as explained in section 4.6, the model appears to be very robust to the presence of data error, and the few instances where it may be inaccurate are generally readily identified.

Secondly, errors in the data may have an impact on the aggregation of the output statistics. The compiled statistics appear to be less robust than the boundaries and where it is believed that the statistics are likely to be unreliable this has been identified with an asterisk in the tables.

5.1.2 Disclosure

A number of the aggregate statistics for certain employment, turnover or floorspace categories will not be shown since they are potentially disclosive (i.e. data for an individual company or building can be identified).

The ABI employment and turnover data are collected from businesses under the terms of the 1947 Statistics of Trade Act. This Act guarantees businesses that *ONS* will not disclose "the particulars of any undertaking". The Act does not stipulate the rules that govern whether a data point is publishable or not. These have been developed over time within *ONS*. The rules are based on both the number of units underpinning a data point and the relative sizes of the units. Standard *ONS* disclosure rules have been adopted for this project.

Generally, the larger the number of units underpinning a data point, the more likely it will be publishable. The converse is that the smaller the area, the more likely it will be that the data are disclosive. For this reason, disclosure is not an issue for the Borough totals or for the larger Areas of Town Centre Activity and Retail Cores since they are populated by a large number of data points in the various statistical categories. As the size of a statistical area gets smaller, the number of potential data points which populate that area also start to fall, and the chance that a particular aggregation might be disclosive increases.

5.1.3 Comparing the statistics

The statistics have been designed in order to facilitate true and valid comparison between town centres for the first time. Notwithstanding errors in the underlying data, as all the statistical boundaries have been created in the same way, it is possible to make direct comparisons between town centres without the concern that any differences in the data are due to inconsistencies between boundaries.

Care should be taken though when comparing statistics from Retail Cores with Areas of Town Centre Activity since the Retail Core boundaries were generated exclusively from retail data and do not take into account other town centre activities. Thus, it would be wrong to compare King Street Retail Core (found in Hammersmith and Fulham) with nearby Greenford (which is an Area of Town Centre Activity) and not be aware that the different approaches to defining the zones may affect the statistical totals.

Some users of the statistics will also want to generate employment, turnover and floorspace densities by dividing categories' totals by the area of land falling within the boundaries. While this is undoubtedly a useful means of comparing different Areas of Town Centre Activity, the approach makes the assumption that the indicator is distributed evenly across the whole of the areas contained by the boundary. This is not the case in reality where there are often 'hot-spots' of activity within the boundaries and thus the true density of a particular activity in a town centre will be higher than centre density totals might suggest. Furthermore, due to the smoothing effect of the algorithm used to create the component data surfaces (see section 2.4.3) some of the Areas of Town Centre Activity will include some residential areas; this has little or no impact on the statistics since there is rarely any commercial activity or buildings within housing areas.

The comparison of employment and turnover ratios is possible for all the Areas of Town Centre Activity and Retail Cores since they have been classified in the same way. Care should be exercised though when generating any ratios between these two sets and the floorspace data. Not only have the datasets been created for different purposes, there is at present no means of linking the two save by the unit postcode. Furthermore, as was explained in section 4.5 above, the classifications of activity in the two datasets do not necessarily have a one to one mapping.

5.1.4 The naming of Areas of Town Centre Activity

In order to produce the statistical tables it has been necessary to allocate a name to each of the Areas of Town Centre Activities and Retail Cores. While some of the choices of names were straightforward, others were more problematic as some areas either had no obvious name or were known by different names by different groups of people. As a result it is advised that the statistics are not looked at without also referring to the maps of the areas on the Internet or the CD-ROM, to ensure that there is no confusion about which area is being referred to.

5.1.5 Missing Areas of Town Centre Activity

As was explained in Chapter 4, inaccuracies in the geo-referencing of data, and the fact that individual buildings or companies are rarely precisely located by their unit postcode means that problems with accuracy increase as areas become smaller. For this reason, the minimum size of a statistical area, whether it be an Area of Town Centre Activity or a Retail Core, was set at four hectares.

This means that some town centres, which have actually been defined by the selection of the threshold contour were not included in the series. In the longer term, as the accuracy of geo-referencing increases, then perhaps even smaller centres will be able to be identified.

Some readers will be disappointed that certain town centres were not included within this statistical series. Bethnal Green, for example, which had appeared in some of the earlier versions of the statistics, does not appear in this one – its Index value was a little too low to be included. Figure 5.2 shows how close it is to being defined, as indeed was the Roman Road, a little to the north east.

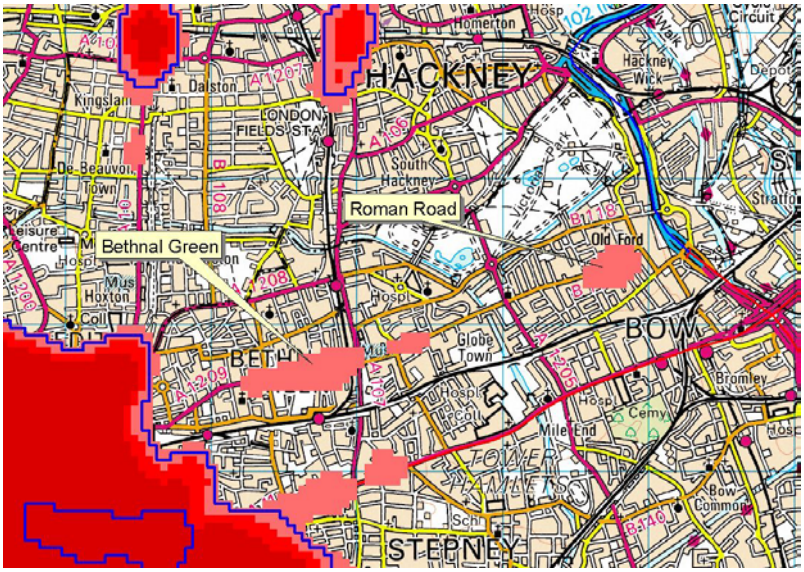


Figure 5.2: The Index surface in East London

It should be stressed though that just because a town centre, district centre or retail core is not included in the series does not mean that it does not exist. Its overall Index value is just not high enough to be included in this **comparative series**. This may not be the case when the national model is produced. Even if it is, the *ODPM* may offer statistics on smaller centres (with the caveat that they are not comparable to the main series) in due course.

5.1.6 Policy issues

An important issue that was raised throughout the research project was how the statistical boundaries would relate to the policy definitions of town centres. A key consideration was what to call them. After much consultation, it was generally agreed to describe the statistical boundaries as **Areas of Town Centre Activity**. These are areas where there is a concentration of town centre activities. Although most of these will be designated town centres, some may not be and their appearance in the list does not imply that these are

recognised as town centres. The extent of these areas on the map also does not imply the area defined as the town centre for planning purposes in the development plan, which may be smaller or larger depending on what the local planning authority is planning for over the next 10 years.

Areas of Town Centre Activity are purely a statistical device to enable:

► areas with concentrations of town centre activity across the country to be defined in a comparable way;
► data on town centre activities to be provided from national sources without breaching confidentiality; and
► changes in the composition of these areas to be monitored on a consistent basis.

It should be noted that these areas have **no** policy status and are not town centres for policy purposes – such centres will be designated in development plans.

5.2 Borough level statistics

In this section, Borough level totals are presented according to the different statistical classifications for employment, turnover and floorspace data. These totals are totals for the entire area of the Borough, not just the sum of the Areas of Town Centre Activity that fall within the Borough.

These tables show that the Southwark has the highest levels of convenience retail employment and turnover, with the City of London having the least. Westminster, which contains most of Oxford Street, Covent Garden and Leicester Square, has highest levels of employment and turnover for comparison retail, service retail, restaurants and licensed premises and for Arts, Culture and Entertainment. It also has the highest level of Public Service Employment. The largest employment in commercial offices is found in the City of London.

The picture shown by the floorspace statistics is consistent with this, with the highest levels of floorspace in offices and all retail use classes being found in Westminster. The City of London has the second highest level of office floorspace.

Only London Borough statistics are presented in this publication. Employment statistics at Local Authorities level for the rest of the UK are available from Nomis®[1] and a wider range of floorspace statistics for Local Authorities in England and Wales have been published in 'Floorspace and Rateable Value for Commercial and Industrial Properties 2000 (DTLR, 2001)'. Turnover statistics are expected to become available for Local Authorities later this year.

5.2.1 Employment statistics

The statistics presented represent the total number of people employed in the various classifications in 1999. The individual employment categories accord to those developed in the model (see Chapter 3). No distinction is made between full time and part time employees; the statistics are *not* full time equivalents. A detailed breakdown of the various SIC codes which make up the various categories can be found in Annex 1.

[1] For further information about Nomis® contact info@nomisweb.co.uk.

EMPLOYMENT (persons)	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
LONDON	**130,613**	**251,009**	**116,323**	**181,293**	**88,700**	**1,108,132**	**254,422**
Inner London	**52,712**	**123,555**	**61,286**	**107,001**	**53,579**	**823,945**	**166,729**
Camden	4,761	12,262	7,604	11,551	6,701	88,692	16,223
City of London	743	3,604	2,724	9,038	2,850	242,040	6,703
Hackney	2,022	2,738	2,272	2,231	1,366	21,094	5,303
Hammersmith and Fulham	3,020	4,285	3,712	4,322	3,207	36,340	6,155
Haringey	3,057	4,665	1,595	2,769	2,570	8,305	5,021
Islington	3,277	3,915	4,500	5,270	2,559	47,641	13,612
Kensington and Chelsea	3,766	17,598	6,030	9,948	5,088	29,997	5,095
Lambeth	4,283	2,937	2,994	4,980	3,240	20,625	8,799
Lewisham	3,837	3,199	1,396	2,351	1,417	6,868	3,363
Newham	3,663	4,573	1,400	2,153	1,356	8,596	6,528
Southwark	6,781	4,169	3,632	4,764	2,465	42,563	12,375
Tower Hamlets	2,972	2,416	2,301	3,475	1,300	48,849	8,545
Wandsworth	4,778	6,426	3,687	5,045	2,179	18,715	8,553
Westminster	5,752	50,768	17,439	39,104	17,281	203,620	60,454
Outer London	**77,901**	**127,454**	**55,037**	**74,292**	**35,121**	**284,187**	**87,693**
Barking and Dagenham	2,868	2,170	1,239	1,900	878	3,520	2,407
Barnet	5,935	12,054	3,489	6,328	2,982	21,809	6,166
Bexley	4,631	3,971	1,409	3,310	1,306	8,240	3,611
Brent	4,008	7,682	2,590	3,354	2,793	13,496	3,835
Bromley	5,981	10,255	5,424	5,363	1,827	22,304	4,221
Croydon	5,699	12,771	3,582	5,610	2,528	29,649	9,167
Ealing	4,081	7,926	3,428	6,070	1,995	19,099	5,425
Enfield	4,640	5,384	2,682	3,711	1,236	12,700	5,534
Greenwich	3,957	3,419	1,453	2,783	2,178	6,632	6,144
Harrow	2,805	5,423	2,076	2,840	1,915	15,480	4,697
Havering	3,748	6,975	2,030	3,511	1,080	9,049	3,422
Hillingdon	6,775	10,410	5,578	5,361	1,754	19,329	6,651
Hounslow	3,868	5,758	6,580	5,391	2,414	26,517	4,301
Kingston upon Thames	2,685	8,732	2,513	3,349	1,055	18,990	4,591
Merton	3,051	4,504	3,422	2,662	2,028	11,881	2,919
Redbridge	3,957	5,714	1,849	3,192	1,444	9,576	4,413
Richmond upon Thames	2,803	4,443	2,380	4,698	2,624	18,482	4,488
Sutton	3,072	6,113	2,124	2,402	1,337	12,155	2,255
Waltham Forest	3,337	3,750	1,189	2,457	1,747	5,279	3,446

5.2.2 Turnover statistics

The statistics here are the gross turnover (in thousands of pounds) of companies within the various categories in 1999. The turnover categories are the same as those for employment to facilitate comparison. The columns do not sum exactly due to rounding.

TURNOVER (£000s)	Convenience Retail	Comparison Retail	Service Retail	Restaurants and Licensed Premises	Arts, Culture & Entertainment
London Total	**14,658,845**	**22,030,402**	**16,665,967**	**5,707,908**	**7,042,541**
Inner London	**5,594,323**	**10,623,066**	**9,622,851**	**3,408,308**	**4,140,069**
Camden	460,798	1,001,279	2,072,590	356,281	423,887
City of London	74,600	252,433	592,382	286,396	123,806
Hackney	229,312	238,236	251,131	69,223	143,329
Hammersmith & Fulham	338,439	356,497	480,332	135,473	255,668
Haringey	322,719	429,424	170,707	81,594	254,449
Islington	343,738	342,981	710,310	163,004	262,622
Kensington & Chelsea	369,298	1,418,688	902,285	324,686	266,207
Lambeth	457,125	242,369	315,759	151,845	199,777
Lewisham	421,625	261,571	146,351	72,158	119,181
Newham	359,590	418,726	136,754	64,097	143,169
Southwark	820,404	357,209	538,193	154,345	192,450
Tower Hamlets	354,534	182,288	303,795	106,910	109,632
Wandsworth	511,852	548,083	357,700	156,931	197,151
Westminster	530,289	4,573,282	2,644,563	1,285,364	1,448,741
Outer London	**9,064,522**	**11,407,336**	**7,043,116**	**2,299,600**	**2,902,472**
Barking and Dagenham	332,873	178,168	113,834	61,506	102,437
Barnet	668,782	1,044,794	400,727	208,213	237,093
Bexley	594,360	335,738	157,887	104,782	104,690
Brent	457,862	839,014	326,353	101,890	321,923
Bromley	680,108	919,517	1,441,563	156,670	160,711
Croydon	684,547	1,202,322	469,506	176,273	211,376
Ealing	461,134	770,734	379,137	170,731	142,813
Enfield	535,243	500,985	299,429	111,037	111,386
Greenwich	449,157	297,754	162,879	83,799	122,322
Harrow	328,121	458,964	266,058	82,749	223,099
Havering	514,431	641,503	204,724	110,071	91,438
Hillingdon	670,673	862,185	575,333	172,985	147,119
Hounslow	489,771	561,164	679,902	154,153	141,182
Kingston upon Thames	260,636	740,431	276,109	106,497	87,535
Merton	381,256	389,167	388,446	87,785	212,944
Redbridge	489,325	463,029	199,013	100,723	116,395
Richmond upon Thames	310,677	354,370	286,023	157,339	207,959
Sutton	384,069	554,977	299,823	76,332	79,347
Waltham Forest	371,498	292,522	116,371	76,067	80,702

5.2.3 Floorspace statistics

The floorspace statistics are generated from data provided by the *VOA* and represent the net internal area[1] in square metres, in 2000. The shop and office categories are the bulk class definitions used by the *VOA* to aid the rating process and are the categories used to create the Property component of the model. Conscious of the need to produce floorspace statistics that accorded to the Town and Country Planning classifications, the *ODPM* commissioned UCL to produce floorspace totals for A1, A2 and A3 floorspace. The *VOA* does not classify its data according to these classifications and therefore the totals modelled by UCL should be seen as best estimates.

FLOORSPACE (000s sq m)	Retail	Offices	A1	A2	A3
LONDON	**15,961**	**26,721**	**12,756**	**951**	**1,552**
Inner London	**7,695**	**19,802**	**5,876**	**483**	**1,035**
Camden	647	2,074	458	47	108
City of London	195	4,758	108	13	70
Hackney	330	486	254	23	37
Hammersmith & Fulham	363	689	281	22	48
Haringey	405	221	330	26	34
Islington	404	1,220	306	24	54
Kensington & Chelsea	738	491	599	36	88
Lambeth	395	667	307	26	43
Lewisham	452	163	354	33	35
Newham	446	221	376	23	23
Southwark	429	1,100	323	29	50
Tower Hamlets	432	1,548	342	21	48
Wandsworth	512	388	389	39	55
Westminster	1,947	5,776	1,449	119	341
Outer London	**8,266**	**6,919**	**6,880**	**468**	**516**
Barking and Dagenham	248	133	210	11	13
Barnet	606	417	500	45	52
Bexley	354	154	275	25	23
Brent	479	309	395	34	34
Bromley	605	378	509	29	32
Croydon	781	817	662	39	41
Ealing	491	498	401	35	38
Enfield	453	243	363	30	31
Greenwich	390	184	331	19	26
Harrow	338	360	276	25	26
Havering	468	197	391	22	19
Hillingdon	398	922	334	25	26
Hounslow	387	660	323	22	25
Kingston upon Thames	423	347	353	24	26
Merton	342	287	274	19	25
Redbridge	457	256	398	14	18
Richmond upon Thames	321	368	245	25	35
Sutton	326	238	292	16	11
Waltham Forest	397	153	349	10	14

[1] The net internal area includes most space useful to an occupant's business, and excludes common areas such as stairwells and foyers. Walls, lift shafts and columns are also excluded. This definition is not the same as the sales space for stores as it includes areas such as storage areas.

5.3 Statistics for Areas of Town Centre Activity and Retail Cores

In this section, employment, turnover and floorspace statistics are presented for each of the one hundred and forty-seven Areas of Town Centre Activity and twenty-one Retail Cores identified within Greater London. The areas have been grouped together by Borough and as some zones straddle Borough boundaries (for example Cricklewood falls within both Barnet and Brent) the statistics are presented in all the Boroughs that they intersect. In some instances, an asterix is used to flag where *ODPM* considers the statistics to be potentially flawed.

5.3.1 London

The tables below contain the total employment, turnover and floorspace for London as a whole and the rounded percentages of this total found in the one hundred and forty-seven Areas of Town Centre Activity. The totals for the Areas of Town Centre Activity are not shown due to disclosure issues.

The Borough level data should not be used to calculate corresponding tables, as where a town centre overlaps one or more boroughs then the total statistics for that town centre are given under both Boroughs. In addition, these proportions are included to give additional information about the Areas of Town Centre Activity and should not be used to represent the proportion of retailing in or outside of town centre locations. As stated in section 5.1.6, not all of the Areas of Town Centre Activity are town centres, smaller town centres may not be included in the tables and these proportions also depend on how gradually town centre activity changes to other types of activity.

EMPLOYMENT (persons)	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
London	130,613	251,009	116,323	181,293	88,700	1,108,132	254,422
Proportion in Areas of Town Centre Activity	40%	61%	47%	59%	44%	70%	62%

TURNOVER (£000s)	Convenience Retail	Comparison Retail	Service Retail	Restaurants and Licensed Premises	Arts, Culture & Entertainment
London	14,658,845	22,030,402	16,665,967	5,707,908	7,042,541
Proportion in Areas of Town Centre Activity	40%	57%	62%	60%	44%

FLOORSPACE (000s sq m)	A1	A2	A3	Retail	Offices
London	12,757	951	1,552	15,961	26,721
Proportion in Areas of Town Centre Activity	54%	64%	64%	55%	74%

The Areas of Town Centre Activity contain between forty and seventy-four percent of the employment, floorspace and turnover in the various categories. A higher proportion of the employment in comparison retail, commercial office, public service and restaurants and licensed premises tends to be contained within the areas than for convenience retail and Arts, Culture and Entertainment. The proportions are similar for these categories for the turnover, with the exception of service retail turnover where a higher proportion than for employment is within the Areas of Town Centre Activity. For the floorspace, a higher proportion of office floorspace is contained within the Areas than for the other floorspace types, with a lower proportion of A1 floorspace.

5.3.2 Central London

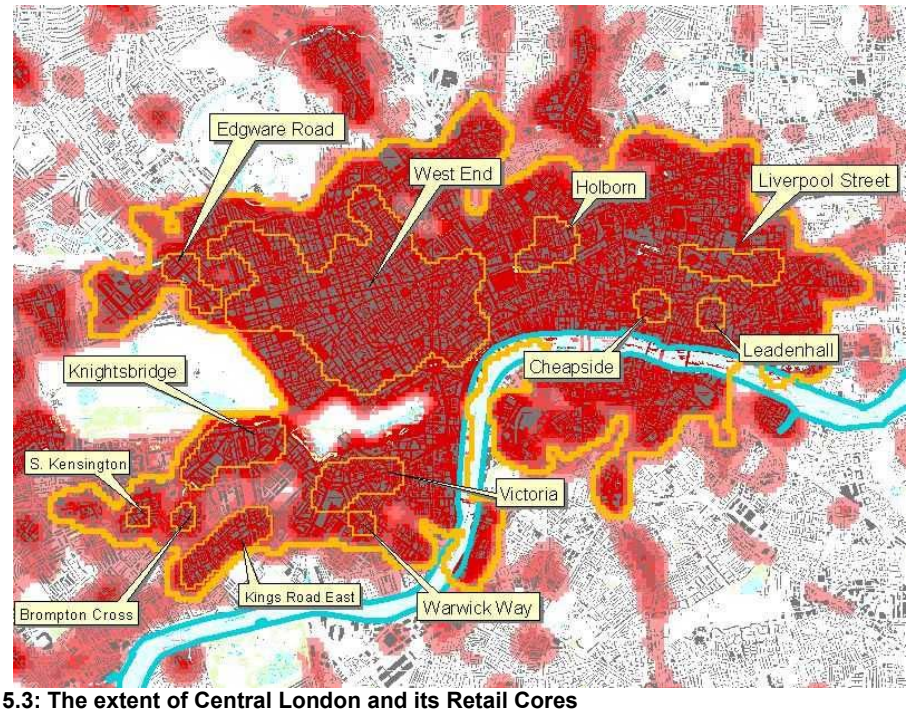


Figure 5.3: The extent of Central London and its Retail Cores

The largest Area of Town Centre Activity identified by the model was Central London. This included the whole of the West End, Holborn, Liverpool Street and Kings Road among other areas. Parts of Camden, the City of London, Hackney, Hammersmith and Fulham, Islington, Kensington and Chelsea, Southwark, Tower Hamlets and Westminster are all included in this area (data for Central London are *not* given in the Borough tables in sections 5.3.3 – 5.3.5). Instead, the tables below gives the statistics for Central London, along with the West End (the largest Retail Core within this area). The other Retail Cores contained within Central London are presented for their respective boroughs.

EMPLOYMENT (persons)	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
Central London	11,083	59,922	29,609	60,239	26,489	593,191	99,212
West End (Retail Core)	2,489	31,501	11,601	29,879	11,652	124,361	7,049

TURNOVER (£000s)	Convenience Retail	Comparison Retail	Service Retail	Restaurants and Licensed Premises	Arts, Culture & Entertainment
Central London	1,237,381	4,966,421	4,724,589	1,953,649	1,743,667
West End (Retail Core)	249,682	2,712,499	1,696,534	996,763	983,455

FLOORSPACE (000s sq m)	Retail	Offices	A1	A2	A3
Central London	2,996	14,555	2,232	169	525
West End (Retail Core)	1,568	3,109	1,207	74	261

5.3.3 Employment (persons)

Inner London

	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
CAMDEN							
Camden High Street (Retail Core)	1,084	833	696	931	136	1,909	79
Camden Town	1,143	1,008	1,750*	1,335	408	5,852	412
Hampstead	83	584	108	416	19	574	Disclosive
Holborn (Retail Core)	87	964	760	453	79	13,311	786
Kentish Town	200	183	50	160	69	339	467
Kilburn	409	713	108	239	42	1,065	174
Primrose Hill	23	148	45	107	55	824	0
Swiss Cottage	982	314	107	570	61	1,571	Disclosive
West End (Retail Core)	2,489	31,501	11,601	29,879	11,652	124,361	7,049
CITY OF LONDON							
Cheapside/ Queen Victoria Street (Retail Core)	140	442	194	741	Disclosive	11,393	0
Holborn (Retail Core)	87	964	760	453	79	13,311	786
Leadenhall (Retail Core)	48	563	172	470	26	8,956	0
Liverpool Street/ Whitechapel (Retail Core)	233	889	469	1,296	37	26,301	97
HACKNEY							
Dalston	498	427	87	129	53	530	Disclosive
Finsbury Park	34	47	Disclosive	43	Disclosive	62	Disclosive
Hackney	33	408	20	96	130	171	919
Stoke Newington	87	73	31	155	19	117	99
HAMMERSMITH AND FULHAM							
Chelsea Harbour	Disclosive	77	28	80	12	454	0
Fulham High Street	23	50	18	55	19	728	0
Fulham/North End Road	357	374	183	498	100	1,314	659
Hammersmith	622	1,080	1,457	913	860	8,008	1,511
Kensington High Street West	41	38	28	64	6	531	Disclosive
King Street (Retail Core)	277	795	617	384	89	2,657	Disclosive
New Kings Road/Lots Road	5	336	113	133	34	635	Disclosive
North End Road (Retail Core)	59	226	47	91	14	195	Disclosive
Parsons Green	29	116	61	149	40	1,698	0
Shepherd's Bush	568	364	202	423	153	898	182
HARINGEY							
Crouch End	141	306**	81	269	62	262	341
Finsbury Park	34	47	Disclosive	43	Disclosive	62	Disclosive
Muswell Hill	217	413	116	194	35	320	Disclosive
Tottenham	38	94	27	178	18	151	Disclosive
Wood Green	710	1,996	111	469	329	744	992

Employment (persons) continued

Inner London

EMPLOYMENT (persons)	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
ISLINGTON							
Angel (Retail Core)	586	716	172	541	64	2,076	Disclosive
Archway	83	74	Disclosive	90	96	361	Disclosive
Caledonian Road	26	9	3	23	Disclosive	54	0
Dalston	498	427	87	129	53	530	Disclosive
Finsbury Park	34	47	Disclosive	43	Disclosive	62	Disclosive
Holborn (Retail Core)	87	964	760	453	79	13,311	786
Holloway	700	695	43	295	31	237	Disclosive
Islington	782	1,029	478	1,379	308	8,039	4382
Liverpool Street/ Whitechapel (Retail Core)	233	889	469	1,296	37	26,301	97
KENSINGTON AND CHELSEA							
Brompton Cross (Retail Core)	17	308	43	511	Disclosive	957	0
Chelsea Harbour	Disclosive	77	28	80	12	454	0
Earls Court	240	125	220	459	32	359	Disclosive
Gloucester Road North	29	70	288	137	6	167	0
Harrow Road/Great Western Road	61	25	64	69	14	84	Disclosive
Holland Park	94	45	90	77	98	506	0
Kensington High Street (Retail Core)	288	2,556	1,390	893	144	5,357	1,025
Kensington High Street West	41	38	28	64	6	531	Disclosive
Kensington High Street/Notting Hill	469	3,220	1,851	1,797	354	7,529	1,401
Kings Road East/Sloane Square (Retail Core)	421	3,601	318	471	119	1,743	134
Kings Road West	31	156	68	254	51	135	Disclosive
Knightsbridge (Retail Core)	138	7,432	1,092	1,791	61	6,446	85
New Kings Road/Lots Road	5	336	113	133	34	635	Disclosive
Notting Hill (Retail Core)	126	331	67	418	74	587	Disclosive
Portobello Road (Retail Core)	179	289	56	168	44	94	0
Portobello Road/Westbourne Grove/Bayswater	662	1,751	521	1,881	806	3,671	147
South Kensington (Retail Core)	67	94	88	269	Disclosive	287	Disclosive
The Beach, Fulham Road	92	155	90	530	199	436	Disclosive
LAMBETH							
Brixton	237	639	50	347	400	468	906
Camberwell	40	102	33	237	29	218	Disclosive
Clapham	126	105	56	371	49	600	Disclosive
Streatham	454	323	113	267	56	1,006	473
Upper Norwood	213	89	69	313	41	389	Disclosive
Vauxhall	Disclosive	Disclosive	271	69	Disclosive	1,774	1,055

Employment (persons) continued

Inner London

	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
LEWISHAM							
Blackheath	136	120	95	198	27	387	Disclosive
Catford	203	302	77	125	66	209	374
Lee Green	Disclosive	63	43	118	Disclosive	191	175
Lewisham	270	1,184	112	379	83	1,922	Disclosive
NEWHAM							
East Ham	315	897	104	274	26	568	721
Stratford	355	906	62	136	100	791	933
Upton Park	144	167	Disclosive	Disclosive	24	56	Disclosive
SOUTHWARK							
Camberwell	40	102	33	237	29	218	Disclosive
Peckham	153	534	60	108	58	379	361
Shad Thames	32	35	198	572	112	3,169	307
Walworth	301	480	69	158	39	255	554
TOWER HAMLETS							
Docklands	542	237	439	391	163	15,320	2,155
Liverpool Street/ Whitechapel (Retail Core)	233	889	469	1,296	37	26,301	97
WANDSWORTH							
Balham	530	214	90	126	34	242	Disclosive
Battersea Riverside	31	141	35	86	62	1,173	Disclosive
Clapham Junction	587	1,086	136	611	76	1,051	332
Putney	601	1,181	432	631	240	2,188	564
Tooting	149	452	33	286	94	182	Disclosive
Vauxhall	Disclosive	Disclosive	271	69	Disclosive	1,774	1,055
Wandsworth	628	466	65	268	74	1,142	2,069
WESTMINSTER							
Bayswater (Retail Core)	336	929	273	926	191	1,514	Disclosive
Edgware Road (Retail Core)	344	624	286	397	149	1,958	65
Harrow Road/Great Western Road	61	25	64	69	14	84	Disclosive
Kilburn	409	713	108	239	42	1,065	174
Kings Road East/ Sloane Square (Retail Core)	421	3,601	318	471	119	1,743	134
Knightsbridge (Retail Core)	138	7,432	1,092	1,791	61	6,446	85
Portobello Road/Westbourne Grove/Bayswater	662	1,751	521	1,881	806	3,671	147
St. Johns Wood	119	218	93	108	29	442	Disclosive
Victoria (Retail Core)	556	3,298	1,661	1,622	309	8,200	18,798
Warwick Way (Retail Core)	156	92	111	254	28	507	Disclosive
West End (Retail Core)	2,489	31,501	11,601	29,879	11,652	124,361	7,049

5.3.4 Employment (persons)

Outer London

	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
BARKING AND DAGENHAM							
Barking	417	626	122	357	185	1,400	929
Dagenham	288	166	51	39	Disclosive	87	Disclosive
BARNET							
Barnet	329	611	191	199	49	511	27
Brent Cross	Disclosive	4,627	78	Disclosive	0	110	0
Brent Street	92	94	64	93	50	228	Disclosive
Burnt Oak	110	205	31	28	Disclosive	136	Disclosive
Cricklewood	270	70	51	104	59	99	Disclosive
Edgware	494	834	404	338	99	1,343	197
Finchley	257	213	278	311	31	1,527	393
Golders Green	63	305	86	232	19	500	Disclosive
Hendon	18	52	21	93	12	189	0
New Barnet	Disclosive	41	17	154	Disclosive	531	Disclosive
North Finchley	612	510	188	586	104	1,149	297
Southgate	Disclosive	120	120	227	21	1,113	81
Temple Fortune	167	193	51	42	Disclosive	186	0
Whetstone	Disclosive	200	130	705	12	964	945
BEXLEY							
Bexleyheath	810	1,707	134	512	45	2,351	1,001
Erith	82	108	8	46	13	84	Disclosive
Sidcup	122	203	75	128	51	225	0
Sidcup Station	99	33	49	92	Disclosive	614	1,051
Welling	Disclosive	208	49	70	Disclosive	161	0
BRENT							
Burnt Oak	110	205	31	28	Disclosive	136	Disclosive
Cricklewood	270	70	51	104	59	99	Disclosive
Harlesden	149	132	14	233	35	194	Disclosive
Kilburn	409	713	108	239	42	1,065	174
Wembley	167	725	172	404	313	1,560	149
Wembley Park	Disclosive	131	160	26	44	329	Disclosive
BROMLEY							
Beckenham	389	331	146	217	42	1,202	Disclosive
Bromley	780	4,851	1,719	836	273	8,185	861
Homesdale Road	Disclosive	30	759	106	0	369	0
Orpington	295	954	118	337	16	1,136	422
Penge	95	180	12	107	11	110	99
Petts Wood	276	191	84	66	Disclosive	147	0
Upper Norwood	213	89	69	313	41	389	Disclosive
West Wickham	Disclosive	140	42	23	0	131	Disclosive

Employment (persons) continued

Outer London

	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
CROYDON							
Cherry Orchard Road	7	6	215	69	Disclosive	141	0
Coulsdon	52	138	65	93	26	396	0
Croydon	775	3,137	677	1,749	190	6,130	242
Norbury	Disclosive	34	19	120	Disclosive	248	Disclosive
Purley	Disclosive	135	202	142	98	891	Disclosive
Thornton Heath	Disclosive	48	20	21	Disclosive	61	Disclosive
Upper Norwood	213	89	69	313	41	389	Disclosive
EALING							
Acton	73	125	117	134	47	279	Disclosive
Chiswick	803	860	516	2,283	50	2,487	374
Ealing	390	2,063	314	2,193	113	2,588	2,333
Ealing Broadway (Retail Core)	338	1,849	203	534	50	1,018	Disclosive
Greenford	291	202	50	139	25	199	0
Southall	193	353	30	131	Disclosive	224	124
West Ealing	339	655	88	221	31	289	Disclosive
ENFIELD							
Enfield	222	1,443	258	417	61	1,539	502
Lower Edmonton	213	255	30	45	55	64	191
Palmers Green	288	185	39	85	12	443	Disclosive
Southgate	Disclosive	120	120	227	21	1,113	81
GREENWICH							
Blackheath	136	120	95	198	27	387	Disclosive
Eltham	476	1004	120	309	136	451	406
Greenwich	111	78	176	302	19	281	467
Lee Green	Disclosive	63	43	118	Disclosive	191	175
Woolwich	462	845	196	302	278	1,511	2,263
HARROW							
Burnt Oak	110	205	31	28	Disclosive	136	Disclosive
Edgware	494	834	404	338	99	1,343	197
Harrow	80	2,736	367	665	153	5,716	2,423
Pinner	Disclosive	241	136	201	19	382	Disclosive
Rayners Lane	63	111	73	85	723	221	0
Stanmore	19	142	51	159	Disclosive	448	Disclosive
Wealdstone	28	135	29	152	24	209	77
HAVERING							
Hornchurch	51	398	110	144	Disclosive	441	45
Romford	442	3,512	236	932	110	3,665	504
Upminster	68	402	57	102	Disclosive	244	0

Employment (persons) continued

Outer London

	Convenience Retail Employment	Comparison Retail Employment	Service Retail Employment	Restaurants and Licensed Premises	Arts, Culture & Entertainment Employment	Commercial Office Employment	Public Service Employment
HILLINGDON							
Eastcote	Disclosive	180	Disclosive	63	0	314	Disclosive
Hayes	78	162	34	82	Disclosive	161	Disclosive
Heathrow Airport	217*	612*	544*	347*	Disclosive	165*	1,268*
Ruislip	112	361	76	118	Disclosive	367	Disclosive
Uxbridge	585	1,686	247	561	87	2,805	1,590
HOUNSLOW							
Chiswick	803	860	516	2,283	50	2,487	374
Feltham	75	97	Disclosive	137	11	197	243
Hounslow	294	2,008	163	418	70	2,273	870
KINGSTON UPON THAMES							
Kingston Upon Thames	624	6,549	465	1,065	162	3,656	2,730
New Malden	387	457	183	166	159	6,628*	134
Norbiton	0	8	26	22	Disclosive	691	0
Surbiton	366	178	150	289	9	927	Disclosive
Tolworth	74	258	39	146	11	365	Disclosive
MERTON							
Morden	204	98	41	142	31	373	1,122
Wimbledon	225	1,778	395	652	117	3,453	309
Wimbledon Village	45	219	28	195	37	501	0
REDBRIDGE							
Barkingside	281	275	55	283	Disclosive	160	358
Gants Hill	51	95	31	217	Disclosive	468	Disclosive
Ilford	501	2,687	310	609	151	2,076	1,638
South Woodford	358	229	75	138	48	668	Disclosive
RICHMOND UPON THAMES							
East Sheen	431	146	75	58	19	414	0
Kingston Upon Thames	624	6,549	465	1,065	162	3,656	2,730
Richmond	182	1,809	273	990	154	3,528	279
Teddington	175	147	110	142	8	823	Disclosive
Twickenham	247	280	183	436	85	1,559	1,526
SUTTON							
Cheam	32	96	50	49	Disclosive	212	0
North Cheam	Disclosive	52	38	75	0	67	0
Sutton	594	2,632	419	795	248	5,785	1,288
Wallington	266	1,204	86	103	11	519	Disclosive
WALTHAM FOREST							
Chingford Mount	273	219	32	97	Disclosive	95	0
Leyton	256	218	61	101	26	263	Disclosive
Leytonstone	96	108	Disclosive	111	44	299	Disclosive
Walthamstow	535	1,257	87	189	151	453	260

5.3.5 Turnover (£000s)

Inner London

	Convenience Retail Turnover	Comparison Retail Turnover	Service Retail Turnover	Restaurants and Licensed Premises	Arts, Culture & Entertainment Turnover
CAMDEN					
Camden High Street (Retail Core)	125,620	75,199	45,937	28,869	15,014
Camden Town	130,336	89,475	Disclosive	40,015	35,399
Hampstead	6,576	36,250	12,015	12,148	2,574
Holborn (Retail Core)	6,923	75,662	115,610	13,381	11,099
Kentish Town	10,556	12,184	5,198	4,599	6,110
Kilburn	41,208	59,025	14,372	6,671	6,752
Primrose Hill	2,028	15,114	5,131	4,227	19,711
Swiss Cottage	103,336	24,086	13,650	16,870	5,087
West End (Retail Core)	249,682	2,712,499	1,696,534	996,763	983,455
CITY OF LONDON					
Cheapside/ Queen Victoria Street (Retail Core)	Disclosive	26,552	31,981	24,103	25,610*
Holborn (Retail Core)	6,923	75,662	115,610	13,381	11,099
Leadenhall (Retail Core)	4,079	44,211	25,198	14,327	2,062
Liverpool Street/ Whitechapel (Retail Core)	18,770	68,069	80,912	41,733	4,497
HACKNEY					
Dalston	53,192	35,227	7,655	3,995	7,635
Finsbury Park	2,981	3,941	Disclosive	1,542	Disclosive
Hackney	1,959	34,501	2,290	3,052	7,306
Stoke Newington	7,212	5,946	2,425	4,508	2,544
HAMMERSMITH AND FULHAM					
Chelsea Harbour	Disclosive	5,968	3,409	2,492	987
Fulham High Street	3,045	7,741	1,496	1,976	1,595
Fulham/North End Road	39,719	28,705	23,866	16,010	10,928
Hammersmith	93,448	82,901	234,915	27,730	53,728
Kensington High Street West	3,438	3,044	3,693	2,193	531
King Street (Retail Core)	40,565	54,492	113,869	11,876	6,335
New Kings Road/Lots Road	833	26,164	11,604	4,128	3,102
North End Road (Retail Core)	6,133	17,067	6,643	2,187	2,011
Parsons Green	2,683	9,611	5,495	5,000	3,535
Shepherd's Bush	63,352	28,275	15,678	12,832	17,007
HARINGEY					
Crouch End	12,097	41,947*	13,288	7,792	6,236
Finsbury Park	2,981	3,941	Disclosive	1,542	Disclosive
Muswell Hill	24,540	34,097	11,711	6,265	4,714
Tottenham	2,734	6,882	2,400	5,108	Disclosive
Wood Green	79,825	163,847	14,917	13,693	92,134

Turnover (£000s) continued

Inner London

	Convenience Retail Turnover	Comparison Retail Turnover	Service Retail Turnover	Restaurants and Licensed Premises	Arts, Culture & Entertainment Turnover
ISLINGTON					
Angel (Retail Core)	68,950	64,745	18,484	22,613	6,770
Archway	6,814	5,652	Disclosive	3,010	6,649
Caledonian Road	2,180	754	381	745	Disclosive
Dalston	53,192	35,227	7,655	3,995	7,635
Finsbury Park	2,981	3,941	Disclosive	1,542	Disclosive
Holborn (Retail Core)	6,923	75,662	115,610	13,381	11,099
Holloway	69,289	58,129	4,797	7,130	4,865
Islington	87,642	89,850	48,061	47,437	31,883
Liverpool Street/Whitechapel (Retail Core)	18,770	68,069	80,912	41,733	4,497
KENSINGTON AND CHELSEA					
Brompton Cross (Retail Core)	1,172	29,452	3,494	15,948	Disclosive
Chelsea Harbour	Disclosive	5,968	3,409	2,492	987
Earls Court	19,824	10,288	34,581	14,071	4,647
Gloucester Road North	2,594	4,744	38,025	4,592	724
Harrow Road/Great Western Road	5,326	1,660	9,318	2,020	2,295
Holland Park	6,121	3,134	7,452	2,391	7,976
Kensington High Street (Retail Core)	27,296	227,248	333,015	26,687	14,363
Kensington High Street West	3,438	3,044	3,693	2,193	531
Kensington High Street/Notting Hill	42,629	281,410	447,008	59,102	56,544
Kings Road East/Sloane Square (Retail Core)	40,471	281,740	37,449	14,106	5,862
Kings Road West	1,958	11,568	5,516	7,646	3,717
Knightsbridge (Retail Core)	10,912	580,294	110,073	59,987	5,617
New Kings Road/Lots Road	833	26,164	11,604	4,128	3,102
Notting Hill (Retail Core)	9,884	23,662	8,253	15,882	5,217
Portobello Road (Retail Core)	21,038	21,693	5,800	4,822	4,900
Portobello Road/ Westbourne Grove/ Bayswater	59,250	150,091	62,856	58,947	100,297
South Kensington (Retail Core)	5,243	7,179	9,530	8,153	Disclosive
The Beach, Fulham Road	7,152	17,274	9,949	19,537	21,880
LAMBETH					
Brixton	21,142	50,648	4,774	9,930	13,552
Camberwell	2,625	8,267	6,591	7,766	3,646
Clapham	10,311	8,065	5,234	11,406	6,022
Streatham	51,413	22,455	11,128	7,711	5,282
Upper Norwood	24,697	6,690	5,152	9,465	6,072
Vauxhall	Disclosive	Disclosive	27,803	2,200	Disclosive

Turnover (£000s) continued

Inner London

	Convenience Retail Turnover	Comparison Retail Turnover	Service Retail Turnover	Restaurants and Licensed Premises	Arts, Culture & Entertainment Turnover
LEWISHAM					
Blackheath	10,435	9,705	14,895	8,907	2,423
Catford	Disclosive	21,061	9,200	3,475	5,373
Lee Green	Disclosive	3,983	4,552	3,872	Disclosive
Lewisham	28,325	95,652	13,602	10,046	7,202
NEWHAM					
East Ham	33,818	69,568	14,571	7,453	3,974
Stratford	39,056	68,704	9,735	3,944	13,059
Upton Park	22,321	11,523	Disclosive	Disclosive	2,398
SOUTHWARK					
Camberwell	2,625	8,267	6,591	7,766	3,646
Peckham	18,997	40,235	4,608	3,407	5,424
Shad Thames	2,683	2,912	45,471	19,127	5,848
Walworth	28,475	38,522	5,283	4,735	6,554
TOWER HAMLETS					
Docklands	Disclosive	18,629	57,691	14,115	9,790
Liverpool Street/ Whitechapel (Retail Core)	18,770	68,069	80,912	41,733	4,497
WANDSWORTH					
Balham	60,750	17,793	Disclosive	3,651	3,022
Battersea Riverside	3,371	9,090	3,668	4,486	5,013
Clapham Junction	64,812	100,915	18,149	21,036	7,322
Putney	61,117	84,121	59,155	18,479	52,856
Tooting	12,799	38,622	5,835	8,844	14,419
Vauxhall	Disclosive	Disclosive	27,803	2,200	Disclosive
Wandsworth	69,976	35,672	7,228	6,713	6,277
WESTMINSTER					
Bayswater (Retail Core)	27,473	84,453	37,462	27,913	13,512
Edgware Road (Retail Core)	35,471	54,064	54,703	12,083	14,682
Harrow Road/Great Western Road	5,326	1,660	9,318	2,020	2,295
Kilburn	41,208	59,025	14,372	6,671	6,752
Kings Road East/Sloane Square (Retail Core)	40,471	281,740	37,449	14,106	5,862
Knightsbridge (Retail Core)	10,912	580,294	110,073	59,987	5,617
Portobello Road/Westbourne Grove/Bayswater	59,250	150,091	62,856	58,947	100,297
St. Johns Wood	9,674	12,959	9,000	3,600	2,381
Victoria (Retail Core)	54,206	285,107	329,849	52,838	18,269
Warwick Way (Retail Core)	24,035	6,566	12,803	8,245	2,935
West End (Retail Core)	249,682	2,712,499	1,696,534	996,763	983,455

5.3.6 Turnover (£000s)

Outer London

	Convenience Retail Turnover	Comparison Retail Turnover	Service Retail Turnover	Restaurants and Licensed Premises	Arts, Culture & Entertainment Turnover
BARKING AND DAGENHAM					
Barking	54,319	41,367	13,634	10,059	35,315
Dagenham	33,139	11,169	5,980	1,081	Disclosive
BARNET					
Barnet	24,695	45,119	24,329	4,898	2,618
Brent Cross	Disclosive	418,747	2,612	Disclosive	0
Brent Street	9,729	8,081	8,682	2,250	6,116
Burnt Oak	12,752	14,474	2,588	857	Disclosive
Cricklewood	37,280	8,437	5,409	2,652	10,142
Edgware	56,485	61,250	57,185	10,109	10,545
Finchley	44,270	16,777	34,214	10,868	3,464
Golders Green	4,885	21,640	8,937	6,377	2,488
Hendon	1,509	3,570	3,524	2,476	2,335
New Barnet	Disclosive	3,438	2,767	3,678	Disclosive
North Finchley	61,628	35,717	23,525	15,861	8,467
Southgate	Disclosive	8,743	13,915	6,481	2,649
Temple Fortune	11,585	16,497	7,907	1,267	Disclosive
Whetstone	Disclosive	21,545	32,780	26,338	900
BEXLEY					
Bexleyheath	96,285	153,557	22,314	15,810	4,605
Erith	9,973	8,172	760	1,501	2,219
Sidcup	12,311	15,417	11,228	3,543	3,240
Sidcup Station	Disclosive	2,767	3,823	2,910	Disclosive
Welling	Disclosive	15,301	6,987	2,236	Disclosive
BRENT					
Burnt Oak	12,752	14,474	2,588	857	Disclosive
Cricklewood	37,280	8,437	5,409	2,652	10,142
Harlesden	14,368	9,416	815	10,997	5,123
Kilburn	41,208	59,025	14,372	6,671	6,752
Wembley	15,270	62,765	47,438	12,232	21,223
Wembley Park	Disclosive	17,907	22,585	922	2,456
BROMLEY					
Beckenham	42,963	27,525	20,539	9,746	3,401
Bromley	77,933	422,246	Disclosive	30,159	27,438
Homesdale Road	Disclosive	2,515	330,969*	3,290	0
Orpington	32,846	68,951	15,768	9,704	787
Penge	8,058	12,820	Disclosive	3,244	1,491
Petts Wood	32,349	13,886	6,444	2,141	Disclosive
Upper Norwood	24,697	6,690	5,152	9,465	6,072
West Wickham	Disclosive	10,637	7,931	745	0

Turnover (£000s) continued

Outer London

	Convenience Retail Turnover	Comparison Retail Turnover	Service Retail Turnover	Restaurants and Licensed Premises	Arts, Culture & Entertainment Turnover
CROYDON					
Cherry Orchard Road	587	503	52,322	2,090	Disclosive
Coulsdon	6,038	9,620	6,982	3,037	2,005
Croydon	89,437	247,640	130,796	56,912	15,123
Norbury	Disclosive	2,873	1,459	3,494	Disclosive
Purley	Disclosive	9,364	19,854	4,414	7,236
Thornton Heath	Disclosive	3,744	1,279	685	Disclosive
Upper Norwood	24,697	6,690	5,152	9,465	6,072
EALING					
Acton	11,167	9,371	4,837	3,780	6,859
Chiswick	86,481	70,095	69,822	52,586	5,583
Ealing	39,563	152,211	34,383	53,579	11,236
Ealing Broadway (Retail Core)	34,879	136,522	23,100	17,469	4,768
Greenford	36,166	13,933	4,981	4,377	3,098
Southall	18,116	27,194	5,382	3,942	Disclosive
West Ealing	38,676	61,218	9,972	5,578	2,205
ENFIELD					
Enfield	18,845	116,819	73,247	12,584	5,393
Lower Edmonton	31,193	19,100	3,168	1,166	6,126
Palmers Green	32,629	12,040	8,790	2,126	2,116
Southgate	Disclosive	8,743	13,915	6,481	2,649
GREENWICH					
Blackheath	10,435	9,705	14,895	8,907	2,423
Eltham	Disclosive	82,389	15,907	8,479	12,477
Greenwich	9,394	6,400	26,198	9,320	1,302
Lee Green	Disclosive	3,983	4,552	3,872	Disclosive
Woolwich	57,728	63,996	26,930	9,039	16,604
HARROW					
Burnt Oak	12,752	14,474	2,588	857	Disclosive
Edgware	56,485	61,250	57,185	10,109	10,545
Harrow	6,365	206,370	64,874	20,048	10,984
Pinner	Disclosive	21,120	12,997	5,812	2,001
Rayners Lane	5,329	8,302	9,312	2,620	142,368
Stanmore	1,386	9,379	6,206	4,717	Disclosive
Wealdstone	2,348	9,075	3,583	3,699	Disclosive
HAVERING					
Hornchurch	5,530	29,224	13,347	5,127	Disclosive
Romford	49,764	289,847	32,411	31,348	10,025
Upminster	5,409	23,507	8,136	2,884	Disclosive

Turnover (£000s) continued

Outer London

	Convenience Retail Turnover	Comparison Retail Turnover	Service Retail Turnover	Restaurants and Licensed Premises	Arts, Culture & Entertainment Turnover
HILLINGDON					
Eastcote	Disclosive	12,932	Disclosive	1,746	0
Hayes	6,855	11,685	5,366	2,313	Disclosive
Heathrow Airport	6,996*	48,026*	Disclosive	11,922*	Disclosive
Ruislip	11,018	23,367	15,806	3,551	Disclosive
Uxbridge	72,729	135,887	29,284	18,482	8,815
HOUNSLOW					
Chiswick	86,481	70,095	69,822	52,586	5,583
Feltham	8,078	6,648	20,833	3,668	1,491
Hounslow	28,761	167,279	27,183	13,487	9,940
KINGSTON UPON THAMES					
Kingston Upon Thames	59,270	509,798	55,958	36,843	14,348
New Malden	33,600	33,895	24,342	4,864	13,272
Norbiton	0	670	3,280	651	Disclosive
Surbiton	41,641	13,282	15,944	8,319	1,339
Tolworth	8,663	33,031	3,960	4,271	1,029
MERTON					
Morden	22,681	7,295	6,198	3,992	2,506
Wimbledon	22,383	125,288	52,802	20,124	9,469
Wimbledon Village	2,550	17,842	2,711	10,182	3,231
REDBRIDGE					
Barkingside	31,862	20,327	7,590	7,393	800
Gants Hill	4,578	7,834	2,859	6,875	Disclosive
Ilford	55,847	227,013	31,719	17,839	16,636
South Woodford	Disclosive	17,460	10,685	4,206	3,668
RICHMOND UPON THAMES					
East Sheen	37,515	10,552	12,047	1,764	2,158
Kingston Upon Thames	59,270	509,798	55,958	36,843	14,348
Richmond	29,729	135,790	34,714	39,699	12,960
Teddington	29,406	10,987	12,218	4,594	696
Twickenham	32,298	22,223	31,802	13,684	3,971
SUTTON					
Cheam	2,799	6,631	6,920	1,480	Disclosive
North Cheam	Disclosive	3,835	2,059	1,957	0
Sutton	81,310	219,573	40,189	25,230	17,739
Wallington	30,897	106,259	14,235	3,315	Disclosive
WALTHAM FOREST					
Chingford Mount	29,510	14,493	5,638	2,911	Disclosive
Leyton	Disclosive	16,718	5,347	2,889	3,711
Leytonstone	14,239	7,918	Disclosive	3,628	2,118
Walthamstow	60,496	82,251	13,033	5,103	5,877

5.3.7 Floorspace (sq m)

Inner London

	A1	A2	A3	Retail	Office
CAMDEN					
Camden High Street (Retail Core)	40,066	4,827	8,445	54,742	38,827
Camden Town	55,496	6,726	12,967	81,278	147,663
Hampstead	12,023	2,197	4,612	19,043	5,413
Holborn (Retail Core)	29,338	4,052	4,425	38,332	325,743
Kentish Town	15,406	2,918	2,097	20,421	7,666
Kilburn	38,527	5,176	2,472	47,079	13,879
Primrose Hill	3,313	350	1,610	5,561	7,188
Swiss Cottage	28,461	4,057	9,715	42,422	25,524
West End (Retail Core)	1,207,026	74,005	260,998	1,568,256	3,108,618
CITY OF LONDON					
Cheapside/ Queen Victoria Street (Retail Core)	13,653	3,057	5,473	22,734	185,745
Holborn (Retail Core)	29,338	4,052	4,425	38,332	325,743
Leadenhall (Retail Core)	12,036	1,032	5,687	18,797	210,447
Liverpool Street/ Whitechapel (Retail Core)	48,913	2,109	12,257	64,101	603,307
HACKNEY					
Dalston	40,435	5,019	3,815	51,250	7,608
Finsbury Park	4,548	1,486	614	6,648	3,767
Hackney	21,828	1,401	1,485	24,883	14,193
Stoke Newington	13,197	1,944	2,341	17,695	2,644
HAMMERSMITH AND FULHAM					
Chelsea Harbour	3,276	Disclosive	1,854	5,322	18,019
Fulham High Street	1,735	Disclosive	421	2,706	18,125
Fulham/North End Road	37,974	3,805	8,223	50,728	30,547
Hammersmith	71,562	7,632	10,958	90,871	327,502
Kensington High Street West	1,715	Disclosive	699	2,588	47,604
King Street (Retail Core)	44,520	5,401	4,030	54,108	85,388
New Kings Road/Lots Road	11,907	0	1,337	13,244	8,166
North End Road (Retail Core)	17,650	1,822	1,802	21,464	2,521
Parsons Green	9,083	783	2,084	12,340	10,916
Shepherd's Bush	31,904	3,156	6,710	46,301	29,206
HARINGEY					
Crouch End	15,889	2,672	4,219	23,019	19,118
Finsbury Park	4,548	1,486	614	6,648	3,767
Muswell Hill	19,413	2,058	2,746	24,217	5,793
Tottenham	10,338	1,899	1,893	14,130	4,631
Wood Green	99,143	5,245	3,726	109,238	32,429

Floorspace (sq m) continued

Inner London

	A1	A2	A3	Retail	Office
ISLINGTON					
Angel (Retail Core)	44,026	1,585	7,579	54,074	85,576
Archway	10,437	1,866	1,108	13,553	13,261
Caledonian Road	3,291	596	945	5,018	Disclosive
Dalston	40,435	5,019	3,815	51,250	7,608
Finsbury Park	4,548	1,486	614	6,648	3,767
Holborn (Retail Core)	29,338	4,052	4,425	38,332	325,743
Holloway	39,317	3,321	2,362	45,521	6,700
Islington	70,508	4,905	14,608	92,393	175,696
Liverpool Street/ Whitechapel (Retail Core)	48,913	2,109	12,257	64,101	603,307
KENSINGTON AND CHELSEA					
Brompton Cross (Retail Core)	8,483	424	4,952	16,144	2,665
Chelsea Harbour	3,276	Disclosive	1,854	5,322	18,019
Earls Court	10,853	1,899	5,682	18,889	4,643
Gloucester Road North	4,558	301	2,193	7,170	2,881
Harrow Road/Great Western Road	6,238	1,053	876	8,167	1,243
Holland Park	4,715	Disclosive	937	5,853	3,021
Kensington High Street (Retail Core)	90,001	5,987	10,034	107,648	99,336
Kensington High Street West	1,715	Disclosive	699	2,588	47,604
Kensington High Street/Notting Hill	116,724	12,047	17,527	148,869	136,216
Kings Road East/Sloane Square (Retail Core)	79,650	4,113	4,956	91,562	42,565
Kings Road West	7,201	596	5,860	14,031	1,540
Knightsbridge (Retail Core)	218,412	6,709	13,282	239,410	152,818
New Kings Road/Lots Road	11,907	0	1,337	13,244	8,166
Notting Hill (Retail Core)	11,429	3,833	3,738	19,351	13,663
Portobello Road (Retail Core)	15,112	817	1,978	18,354	1,755
Portobello Road/Westbourne Grove/Bayswater	81,556	5,998	20,911	110,525	41,759
South Kensington (Retail Core)	6,233	1,414	2,659	10,306	2,569
The Beach, Fulham Road	8,155	807	3,282	12,318	5,699
LAMBETH					
Brixton	52,188	3,448	5,220	61,802	32,664
Camberwell	9,552	2,482	1,352	13,519	4,774
Clapham	16,627	2,153	4,196	23,359	12,837
Streatham	34,822	5,755	3,946	44,744	8,849
Upper Norwood	17,937	1,513	3,508	23,941	5,882
Vauxhall	449	Disclosive	1,872	2,412	54,237

Floorspace (sq m) continued

Inner London

	A1	A2	A3	Retail	Office
LEWISHAM					
Blackheath	7,952	1,835	3,162	13,339	5,775
Catford	26,945	5,072	2,756	36,093	24,339
Lee Green	13,566	958	787	15,419	5,893
Lewisham	72,921	8,430	3,009	85,375	32,204
NEWHAM					
East Ham	44,578	4,569	2,544	52,392	23,177
Stratford	45,177	3,777	2,473	51,600	43,280
Upton Park	17,621	980	520	19,141	580
SOUTHWARK					
Camberwell	9,552	2,482	1,352	13,519	4,774
Peckham	48,163	3,676	1,653	53,980	12,293
Shad Thames	6,727	812	5,374	12,954	60,535
Walworth	34,978	2,070	2,533	40,449	13,094
TOWER HAMLETS					
Docklands	19,084	1,831	7,991	32,315	715,459
Liverpool Street/ Whitechapel (Retail Core)	48,913	2,109	12,257	64,101	603,307
WANDSWORTH					
Balham	20,526	3,571	1,966	26,439	9,035
Battersea Riverside	1,973	Disclosive	1,736	4,397	17,406
Clapham Junction	57,909	5,192	5,863	70,116	14,619
Putney	43,349	6,783	7,058	57,870	65,511
Tooting	32,293	3,755	2,584	39,821	3,639
Vauxhall	449	Disclosive	1,872	2,412	54,237
Wandsworth	37,797	3,134	2,182	43,562	46,255
WESTMINSTER					
Bayswater (Retail Core)	37,371	3,193	11,370	52,386	18,072
Edgware Road (Retail Core)	37,119	5,262	6,043	48,756	41,366
Harrow Road/Great Western Road	6,238	1,053	876	8,167	1,243
Kilburn	38,527	5,176	2,472	47,079	13,879
Kings Road East/Sloane Square (Retail Core)	79,650	4,113	4,956	91,562	42,565
Knightsbridge	218,412	6,709	13,282	239,410	152,818
Portobello Road/Westbourne Grove/Bayswater	81,556	5,998	20,911	110,525	41,759
St. Johns Wood	9,006	1,839	1,323	12,585	4,852
Victoria (Retail Core)	66,205	7,195	12,785	87,866	383,774
Warwick Way (Retail Core)	12,388	730	3,410	17,155	13,647
West End (Retail Core)	1,207,026	74,005	260,998	1,568,256	3,108,618

5.3.8 Floorspace (sq m)

Outer London

	A1	A2	A3	Retail	Office
BARKING AND DAGENHAM					
Barking	42,899	3,629	2,895	50,188	52,091
Dagenham	17,498	2,054	358	19,935	156
BARNET					
Barnet	20,663	2,803	2,951	26,819	4,887
Brent Cross	82,251	Disclosive	2,354	85,059	Disclosive
Brent Street	8,596	1,152	1,348	11,164	7,095
Burnt Oak	12,362	921	898	14,221	2,345
Cricklewood	16,704	1,629	1,766	20,215	5,140
Edgware	34,936	4,969	3,742	43,647	28,184
Finchley	19,863	3,424	2,951	26,293	36,954
Golders Green	11,917	3,633	4,129	19,755	5,201
Hendon	4,791	3,090	1,163	9,773	437
New Barnet	7,999	Disclosive	1,454	9,635	8,823
North Finchley	29,301	4,884	3,335	38,017	19,594
Southgate	11,347	3,024	3,217	17,637	17,599
Temple Fortune	8,315	1,234	230	9,960	2,169
Whetstone	7,481	1,629	2,477	11,726	25,432
BEXLEY					
Bexleyheath	58,675	5,898	3,456	70,049	34,154
Erith	17,771	1,786	654	20,414	787
Sidcup	11,581	3,388	1,834	18,334	4,249
Sidcup Station	6,814	959	920	8,693	23,676
Welling	20,210	1,410	1,433	23,053	1,023
BRENT					
Burnt Oak	12,362	921	898	14,221	2,345
Cricklewood	16,704	1,629	1,766	20,215	5,140
Harlesden	15,434	1,833	2,510	19,889	1,741
Kilburn	38,527	5,176	2,472	47,079	13,879
Wembley	44,263	4,621	3,555	53,404	60,163
Wembley Park	17,228	Disclosive	353	17,636	27,129
BROMLEY					
Beckenham	21,597	2,811	2,695	27,152	10,652
Bromley	164,424	10,161	8,789	183,374	110,427
Homesdale Road	885	Disclosive	Disclosive	1,072	15,459
Orpington	47,219	3,819	2,769	54,450	26,295
Penge	8,882	996	1,088	10,966	1,347
Petts Wood	13,528	1,131	1,058	16,665	3,582
Upper Norwood	17,937	1,513	3,508	23,941	5,882
West Wickham	10,417	1,074	Disclosive	11,782	1,283

Floorspace (sq m) continued

Outer London

	A1	A2	A3	Retail	Office
CROYDON					
Cherry Orchard Road	3,197	263	564	4,081	22,565
Coulsdon	11,089	1,602	680	14,652	5,348
Croydon	258,414	15,186	16,877	294,536	475,639
Norbury	6,462	831	781	8,158	26,405
Purley	23,066	2,375	1,671	27,125	9,205
Thornton Heath	12,691	614	Disclosive	13,370	6,481
Upper Norwood	17,937	1,513	3,508	23,941	5,882
EALING					
Acton	20,087	2,740	1,331	24,604	5,728
Chiswick	41,918	5,647	4,140	54,381	34,608
Ealing	73,613	8,995	8,795	91,824	100,426
Ealing Broadway (Retail Core)	58,922	7,656	6,382	73,294	27,319
Greenford	11,970	2,340	1,047	15,357	8,442
Southall	25,281	3,764	2,633	32,132	5,712
West Ealing	31,623	1,796	1,927	37,032	8,287
ENFIELD					
Enfield	45,148	5,270	2,789	54,188	38,148
Lower Edmonton	26,121	1,288	850	28,585	6,805
Palmers Green	18,226	2,650	1,216	22,358	8,236
Southgate	11,347	3,024	3,217	17,637	17,599
GREENWICH					
Blackheath	7,952	1,835	3,162	13,339	5,775
Eltham	51,789	3,535	2,737	59,721	6,314
Greenwich	8,586	2,579	3,862	16,527	9,085
Lee Green	13,566	958	787	15,419	5,893
Woolwich	80,127	6,150	4,308	92,956	69,783
HARROW					
Burnt Oak	12,362	921	898	14,221	2,345
Edgware	34,936	4,969	3,742	43,647	28,184
Harrow	83,876	6,404	5,620	103,082	99,361
Pinner	15,457	1,815	2,040	19,369	3,471
Rayners Lane	8,658	1,687	828	11,390	8,771
Stanmore	7,457	2,183	1,743	11,631	16,414
Wealdstone	12,433	1,259	971	14,663	6,921
HAVERING					
Hornchurch	21,361	3,970	1,065	26,495	8,825
Romford	128,293	8,325	5,656	147,627	63,357
Upminster	20,270	2,022	856	23,850	1,620

Floorspace (sq m) continued

Outer London

	A1	A2	A3	Retail	Office
HILLINGDON					
Eastcote	8,466	1,275	819	10,690	529
Hayes	9,554	1,713	873	12,895	1,747
Heathrow Airport	Disclosive	Disclosive	0*	172*	101,320*
Ruislip	13,785	2,687	1,586	18,147	2,991
Uxbridge	57,793	4,326	3,747	67,668	107,232
HOUNSLOW					
Chiswick	41,918	5,647	4,140	54,381	34,608
Feltham	14,799	1,760	512	17,928	12,103
Hounslow	99,966	4,770	3,386	108,403	69,914
KINGSTON UPON THAMES					
Kingston Upon Thames	208,726	9,820	10,551	232,073	131,932
New Malden	26,904	2,700	2,431	32,035	31,070
Norbiton	197	0	562	1,295	12,624
Surbiton	15,640	3,679	2,805	25,518	11,486
Tolworth	13,934	1,669	1,339	16,942	28,026
MERTON					
Morden	15,912	2,183	2,041	20,328	20,696
Wimbledon	67,638	4,787	6,540	80,063	83,375
Wimbledon Village	6,555	1,665	2,429	10,649	8,370
REDBRIDGE					
Barkingside	16,063	841	760	17,664	1,213
Gants Hill	12,429	1,764	1,226	18,766	20,641
Ilford	125,539	6,430	5,555	137,762	65,435
South Woodford	21,147	811	1,914	23,872	13,909
RICHMOND UPON THAMES					
East Sheen	14,422	1,854	1,016	17,537	8,138
Kingston Upon Thames	208,726	9,820	10,551	232,073	131,932
Richmond	53,655	6,402	6,927	67,055	78,307
Teddington	15,104	2,085	1,864	19,259	15,305
Twickenham	21,392	4,704	3,894	30,249	45,954
SUTTON					
Cheam	6,876	695	Disclosive	7,818	6,602
North Cheam	11,039	767	225	12,031	544
Sutton	134,127	6,604	4,544	146,423	89,217
Wallington	20,533	2,224	330	23,652	27,066
WALTHAM FOREST					
Chingford Mount	15,508	780	Disclosive	16,348	2,822
Leyton	24,255	294	406	25,208	3,558
Leytonstone	13,405	629	Disclosive	14,277	6,132
Walthamstow	71,865	2,140	2,019	76,251	5,558

6 Conclusions and next steps

6.1 Conclusions

The London Pilot Study has proved to be a success. A model has been developed that enables Areas of Town Centre Activity to be consistently defined in Greater London – the most complex urban area in the country. The model is not only able to define the spatial extent of London's central area, but also a full range of centres representing the urban hierarchy of the capital.

Using these spatial definitions of town centre activity, a range of statistics incorporating employment and turnover data from the *ONS*, and floorspace data from the *VOA*, can be collated. These statistics have been independently checked and verified and should be considered the best available at this current time.

It is therefore recommended that this model be taken forward and adopted by the *ODPM* to create a national set of statistics for Areas of Town Centre Activity.

6.2 Next steps

6.2.1 National implementation

The next phase of this project is to use the model to define Areas of Town Centre Activity and Retail Cores for the whole of England and Wales. A first set of boundaries and statistics will be produced in the summer of 2002 using the existing model and be disseminated to local authorities in England and Wales for comment. It is possible that some minor changes to the model will be required, although preliminary results from the Pilot Study suggests that the it can already define Areas of Town Centre Activity beyond London (Figure 6.1)

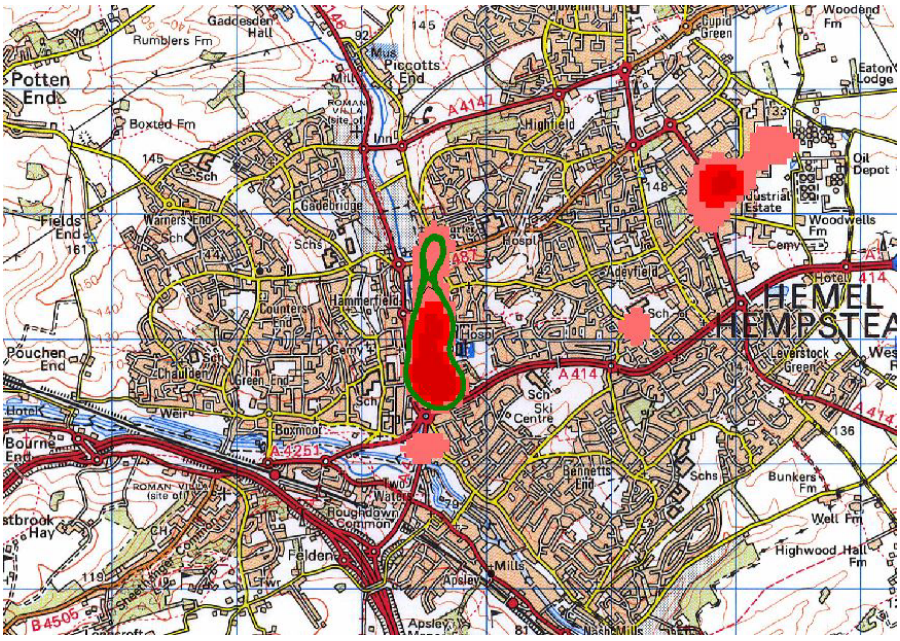


Figure 6.1: Area of Town Centre Activity in Hemel Hempstead.

Should the model indeed prove to be robust enough to create statistics for England and Wales, it is anticipated that a national compendium will be available in Spring 2003.

6.2.2 Data quality

It is the quality of the data that both drives the model and is used to create the statistics that will determine the success of failure of the enterprise. The Office of the Deputy Prime

Minister (*ODPM*) and its partners the Office for National Statistics (*ONS)* and the Valuation Office Agency (*VOA)* are committed to carry on their efforts to improve the quality of the data. *ODPM*, in consultation with the data providers, will investigate the possibility of further developing the Data Verification Tool (discussed in section 4.8).

6.2.3 Additional year's data

As the ABI data for 2000 is to shortly become available this will remove some of the problems with comparing the floorspace with the employment and turnover data sets.

Floorspace data has additionally been published at a local authority level for 2000 by *ODPM* ('Floorspace and Rateable Value for Commercial and Industrial Properties 2000') and has been well received.

Furthermore, the *ODPM* has commissioned further research to create annual commercial and industrial floorspace data extending back into the mid 1990s. As the ABI employment data are already available for 1998 this will enable three years of statistics to be published.

These publications provide a valuable addition to the information currently available on town centres and land use and *ODPM* is committed to updating them annually.

Annex 1 Allocation of SIC Codes

Employment and Turnover Categories

The ABI, which is used for the employment and turnover data, uses the UK Standard Industrial Classification of Economic Activity (SIC) to classify business establishments by the type of economic activity in which they are engaged. The following groupings of SIC codes were used to create the categories of employment and turnover for this study:

Convenience Retail
52110 Retail sale in non-specialised stores with food, beverages or tobacco predominating
52111 Retail sale by confectioners, tobacconist and newsagents
52119 Retail sale in non-specialised stores with food, beverages or tobacco predominating not elsewhere classified
52210 Retail sale of fruit and vegetables
52220 Retail sale of meat and meat products
52230 Retail sale of fish, crustaceans and molluscs
52240 Retail sale of bread, cakes, flour confectionery and sugar confectionery
52250 Retail sale of alcoholic and other beverages
52260 Retail sale of tobacco products
52270 Other retail sale of food, beverages and tobacco in specialised stores

Comparison Retail
52120 Retail sale in non-specialised stores where food, beverages or tobacco does not predominate
52310 Dispensing chemists
52320 Retail sale of medical and orthopaedic goods
52321 Retail sale of hearing aids
52329 Retail sale of medical and orthopaedic goods not elsewhere classified
52330 Retail sale of cosmetic and toilet articles
52410 Retail sale of textiles
52420 Retail sale of clothing
52421 Retail sale of adults' fur and leather clothing
52422 Retail sale of children's and infants' clothing
52423 Retail sale of other women's clothing
52424 Retail sale of other men's clothing
52430 Retail sale of footwear and leather goods
52431 Retail sale of footwear
52432 Retail sale of leather goods
52440 Retail sale of furniture, lighting equipment and household articles not elsewhere classified
52450 Retail sale of electrical household appliances and radio and television goods
52460 Retail sale of hardware, paints and glass
52470 Retail sale of books, newspapers and stationery
52481 Retail sale of floor coverings
52482 Retail sale of photographic, optical and precision equipment, office supplies and equipment (computers etc.)
52483 Other retail sale in specialised stores not elsewhere classified
52484 Retail sale of jewellery, clocks and watches
52485 Retail sale of sports goods, games and toys, stamps and coins
52489 Other retail sale in specialised stores not elsewhere classified (n.e.c)
52500 Retail sale of second-hand goods in stores
52630 Other non-store retail sale

This definition excludes
52610 Retail via mail order houses
52620 Retail sale via stalls and markets
since they were either too large and likely to skew the statistics (as in the case of mail order houses) or that they were not inclusive (many street markets are not included on the ABI).

Service Retail
52700 Repair of personal and household goods
52710 Repair of boots, shoes and other articles of leather
52720 Repair of electrical household goods
52730 Repair of watches, clocks and jewellery
52740 Repair not elsewhere classified

60220 Taxi Operations
63301 Activities of travel agents
63302 Activities of travel organisers
63303 Activities of tour guides
63304 Miscellaneous tourist assistance
63309 Other tourist assistance activities n.e.c.
64120 Courier activities other than national post activities
71401 Renting of sporting or recreational equipment
71402 Renting of other personal and household goods not elsewhere classified
71403 Renting of radios, televisions and video recorders
71404 Renting of video tapes, records and other pre-recorded media
71405 Renting of video tapes
71409 Renting of other personal & household goods n.e.c.
74812 Portrait photographic activities (excluding operation of photo coin-operated machines)
74819 Miscellaneous photographic activities (excluding portrait photography)
93010 Washing and dry cleaning of textile and fur products
93020 Hairdressing and other beauty treatment
93030 Funeral and related activities
93050 Miscellaneous service activities

This category excludes 74811 (Operation of photo coin-operated machines) since while these machines are often found in town centres, the offices that run them may not necessarily be so. This category is instead found in the office employment category.

Offices
22110 Publishing of books
22120 Publishing of newspapers
22130 Publishing of journals and periodicals
22140 Publishing of sound recordings
22150 Other publishing
65110 Central banking
65121 Banks
65122 Building societies
65210 Financial leasing
65221 Credit granting by non-deposit taking finance houses and other specialist consumer credit grantors
65222 Factoring
65223 Activities of mortgage finance companies
65229 Other credit granting not elsewhere classified
65231 Activities of investment trusts
65232 Activities of unit trusts and property unit trusts
65233 Security dealing on own account
65234 Activities of bank holding companies
65235 Activities of venture and development capital companies
65239 Financial intermediation not elsewhere classified
66010 Life insurance
66020 Pension funding
66030 Non-life insurance
67110 Administration of financial markets
67121 Fund management activities
67122 Security broking and related activities
67130 Activities auxiliary to financial intermediation not elsewhere classified
67200 Activities auxiliary to insurance and pension funding
70110 Development and selling of real estate
70120 Buying and selling of real estate
70201 Letting of conference and exhibition centres
70202 Other letting of own property other than conference and exhibition centres
70209 Other letting of own property
70310 Real estate agencies
70320 Management of real estate on a fee or contract basis
72100 Hardware consultancy
72200 Software consultancy and supply
72300 Data processing
72400 Data base activities
72500 Maintenance and repair of office, accounting and computing machinery
72600 Other computer related activities
73100 Research and development on natural sciences and engineering

73200 Research and development on social sciences and humanities
74110 Legal activities
74111 Activities of Patent and Copyright Agents
74119 Other legal services
74121 Accounting and auditing services
74122 Book-keeping activities
74123 Tax consultancy activities
74130 Market research and public opinion polling
74141 Public relations activities
74142 Financial management
74143 General management consultancy activities
74149 Miscellaneous business and management consultancy activities
74150 Management activities of holding companies
74151 Management activities of wholesale holding companies
74152 Management activities of transport holding companies
74153 Management activities of construction holding companies
74154 Management activities of catering holding companies
74155 Management activities of motor trades holding companies
74156 Management activities of service trades holding companies
74157 Management activities of retail holding companies
74158 Management activities of production holding companies
74159 Management activities of non-financial holding companies
74201 Architectural activities
74202 Urban planning and landscape architectural activities
74203 Quantity surveying activities
74204 Engineering consultative and design activities
74205 Engineering design activities for industrial process and production
74206 Engineering related scientific and technical consulting activities
74209 Miscellaneous engineering activities
74300 Technical testing and analysis
74401 Sale or leasing activities of advertising space or time
74402 Planning, creating and placement of advertising activities
74409 Miscellaneous advertising activities
74601 Investigation activities
74811 Operation of photo coin-operated machines
74830 Secretarial and translation activities
74841 Credit reporting and collection agency activities
74842 Speciality design activities
74843 Activities of exhibition and fair organisers
74844 Activities of conference organisers
74849 Miscellaneous business activities
91110 Activities of business and employers organisations
91120 Activities of professional organisations
91200 Activities of trade unions
91320 Activities of political organisations
91330 Activities of other membership organisations not elsewhere classified
92111 Motion picture production in film or video tape
92119 Other motion picture and video production activities
92120 Motion picture distribution
92201 Radio activities
92202 Television activities
92319 Other artistic and literary creation and interpretation
92400 News agency activities

This definition excludes:

74500 Labour recruitment and provision of personnel
74602 Security and related activities
74709 Specialised cleaning activities
74701 Interior cleaning of buildings; window cleaning activities

Most of the people employed according to these classifications do not necessarily work at the office where they are registered. For example, it is not uncommon for hundreds of people to be registered as working at an employment agency office on the high street when in reality, only four or five people may actually work there. This can clearly skew the statistics and so these categories are not included.

Civic and Public Administration
64110 National post activities
75110 General (overall) public service activities
75120 Regulation of the activities that provide health care, education, cultural services and other social services excluding social security
75130 Regulation of and contribution to more efficient operation of business
75140 Supporting service activities for the government as a whole
75210 Foreign affairs
75230 Justice and judicial activities
75240 Public security, law and order activities
75250 Fire service activities
75300 Compulsory social security activities

This excludes 75220 since this relates to defence activities and includes Army, RAF and Royal Navy establishments

Restaurants & Licensed Premises
55301 Licensed restaurants
55302 Unlicensed restaurants and cafes
55303 Take-away food shops
55304 Take-away food mobile stands
55401 Licensed clubs with entertainment
55402 Public houses and bars
55403 Tenanted public houses and bars
55404 Managed public houses and bars

Arts, Culture and Entertainment
91310 Activities of religious organisation
s 92130 Motion picture projection
92311 Live theatrical presentations
92320 Operation of arts facilities
92341 Dance halls, discotheques and dance instructor activities
92349 Miscellaneous entertainment activities
92510 Library and archives activities
92521 Museum activities
92522 Preservation of historical sites and buildings
92611 Operation of ice rink and roller skating rinks
92629 Other sporting activities not elsewhere classified
92710 Gambling and betting activities
92720 Other recreational activities not elsewhere classified
93040 Physical well-being activities

Floorspace Categories

The floorspace data is categorised into retail and offices using the *VOA* bulk classes. These are two of the four bulk classes used by the Valuation Office Agency in their process of assessing the value of non-domestic property in England and Wales (the other two categories are factories and warehouses). The retail bulk class has been further split up into Town and Country Planning use classes. Both the bulk classes and use classes are described below.

VOA bulk classes

Retail

In general the shop bulk class covers premises that serve the public 'off the street'. The class includes (but is not confined to) banks, building society outlets, betting shops, hairdressers and beauty salons, pharmacists, launderettes and dry cleaners, post offices, real estate agents, tax consultants, travel agents, ticket sales, takeaways bars, restaurants, cafes, wine bars, food courts, amusement arcades, showrooms, hyper markets, retail warehouses, superstores and department stores. Also included are markets, car sales showrooms and sales yards, shops selling car parts, farm and factory shops, hobby shops, kiosks, booths, photo booths, craft workshops that display and sell goods and street front repair shops. Some health centres may be valued as shops. The bulk class includes some wholesale premises (others are typically warehouses).

Offices

In the main the office bulk class includes premises being used as offices in purpose built office buildings, offices over shops and offices in converted houses. A considerable number of premises contain a substantial mix of office and retail space and depending on the mix and local circumstances, they may

be valued as offices or shops. Hence those banks, building society outlets, post offices and estate agents with substantial office space are likely to be valued as offices. Non-office activity (e.g. laboratories, instrument manufacture and repair) in an office building or similar circumstances is likely to be valued as an office.

Use classes

A1 - Shops

Use for all or any of the following purposes:
(a) for the retail sale of goods other than hot food
(b) as a post office
(c) for the sale of tickets or as a travel agency
(d) for the sale of sandwiches or other cold food consumption off the premises
(e) for hairdressing
(f) for the direction of funerals
(g) for the display of goods for sale
(h) for the hiring out of domestic or personal goods or articles
(i) for the reception of goods to be washed , cleaned or repaired
where the sale, display or service is to visiting members of the public.

A2 - Financial and professional services

Use for the provision of:
(a) financial services, or
(b) professional services (other than health or medical services), or
(c) any other services (including use as a betting offices) which is appropriate to provide in a shopping area
where the services are provided principally to visiting members of the public.

A3 - Food and Drink

Use for the sale of food and drink for consumption on the premises or of hot food for consumption off the premises.

Annex 2 The Annual Business Inquiry

This Annex describes the sampling and estimation processes that are part of the Annual Business Inquiry (ABI) methodology. Written by James Partington of the *ONS*, it focuses on the employee jobs variables.

Background and Terminology

The Office for National Statistics (*ONS*) uses the terms 'enterprise' and 'local unit' to describe the different structural aspects of a business. 'Local units' are sites or work places. 'Enterprises' are whole businesses under common ownership. A single site business, such as a shop which is not part of a chain is, in *ONS*'s terminology, a 'single site enterprise' or an enterprise with only one local unit. A 'multi-site enterprise', as the name suggests, is the term *ONS* would use for a chain of shops that are under common ownership.

ONS maintains a record of businesses on its Inter-Departmental Business Register (IDBR). The IDBR contains information on the enterprise, and on the local units linked to each enterprise. It is updated regularly from both *ONS*'s own survey information and from administrative sources. It provides a comprehensive business register with well over two million local units.

For the convenience of contributors who are asked to provide statistical returns, *ONS* introduces a third term – 'reporting unit'. The reporting unit is a tool used by *ONS* to assist in the data collection process and represents a grouping of the business's local units. For the vast majority of businesses, the reporting unit is equivalent to the enterprise. In other words, the business supplies aggregate information for the whole of its operation. *ONS* calls these reporting units 'enterprise reporters', because the reporting unit provides information on the whole of the enterprise. But about ten per cent of businesses choose to divide the enterprise into a number of reporting units, each of which provides separate statistical returns for 'clumps' of local units. *ONS* calls these reporting units 'local unit list reporters', because each reporting unit provides information for a specific range of its local units.

Most of *ONS*'s business surveys are conducted at the reporting unit level rather than the local unit level. This means that most of the information that *ONS* collects is for each organisation as a whole rather than each organisation's sites. For many variables, it makes good sense to collect the information for the organisation as a whole. For example, variables such as purchases, taxes, etc. might not be calculated site by site by the business itself. However, there are certain variables, such as employment, for which there is a demand among users for regional data, and this means there needs to be some way of estimating these values for each site. It is for this reason that the updating of the local unit information for each business on the IDBR is very important.

A new survey, the Annual Register Inquiry (ARI), has been introduced to perform this role. This survey replaces the Annual Employment Survey as the primary source of information on site industry codes and site geography codes. The ARI survey is also the mechanism that captures information on new local units and major structural changes such as takeovers and mergers, and this information is also fed onto the IDBR.

The ARI is itself a sample survey which is conducted on a rolling basis throughout the year. Over a twelve month period, the ARI will have refreshed the structural information on the IDBR for all businesses with employment of more than one hundred, and it will also have surveyed one quarter of businesses with employment between twenty and ninety-nine. Additional inclusions in the ARI sample are those businesses whose IDBR employee figures diverge by more than a certain threshold from equivalent data from administrative sources, and a small selection each year of businesses with employment below twenty.

The Design of the ABI Sample

The sample for the ABI is drawn from the IDBR The sample is drawn at the reporting unit level. Approximately 80,000 reporting units are selected for each year's survey. The sample is drawn following a stratified random design with three stratification dimensions. These are:

- Employment size band (1 to 9, 10 to 19, 20 to 49, 50 to 99, 100 to 249 and 250 +);
- Region (England and Wales combined, Scotland, and Northern Ireland); and
- Industry.

Within England and Wales, industry stratification is at the 4-digit SIC level. Within Northern Ireland it is at the 2-digit SIC level. Within Scotland the sample is drawn at a hybrid 2/3/4 digit level. Special arrangements have been made with the Scottish Executive, the National Assembly for Wales and the Department of Enterprise, Trade and Investment in Northern Ireland to boost the samples for those regions.

All businesses in the largest (250 +) employment size band are surveyed every year. Within the smaller size bands, where businesses are sampled, the sampling fractions vary considerably by industry. The sample is drawn using 'Neymann allocation" which gives a larger share of the sample to the industries that show more diversity in the businesses' returns. Within the middle size bands (businesses with between 10 and 249 people in employment), the sample is rotated each year at a rate of fifty per cent. In other words, half the businesses that are in the survey in year 1 are also included for year 2. The system of rotation is designed to spread the form-filling burden across businesses, while retaining a reasonable degree of consistency within the sample between consecutive years. This helps improve the accuracy of estimates of change between years.

Coverage of businesses in the retail sector (SIC 52) varies by region and by detailed industry. Sampling fractions in the retail sector across the UK for the 2000 ABI survey were as follows:

Size band (based on size of reporting unit)	0-9	10-19	20-49	50-99	100-249	250+
Sampling fraction	3%	11%	23%	50%	62%	100%
Coverage[1] based on jobs	2%	9%	19%	38%	53%	100%
Coverage[2] based on turnover	2%	8%	17%	39%	46%	100%

The number of reporting units in the sample with a retail code in 2000 was 9,700.

Most businesses are asked to supply a breakdown of their employees between male full-time, male part-time, female full-time and female part-time, as well as giving the total. In addition, businesses are asked to give the number of working proprietors and the number of unpaid workers, including family workers. The employment information is sought for a particular date towards the end of the calendar year; the rule is that this date will be the Friday after the second Thursday.

Businesses that are also selected for *ONS*'s monthly Retail Sales Inquiry (RSI) in respect of December will be sent a shorter version of the ABI form, without the

[1] "Coverage" reflects the register employment for the selected units divided by register employment for SIC 52

[2] "Coverage" reflects the register turnover for the selected units divided by total register turnover for SIC 52

four-way breakdown of employees (although still asking for the totals). This is because the four-way split is already requested on the RSI form. The information from the RSI form is fed into the ABI system to decompose the total number of employees collected on the ABI short form into the four categories.

National Estimation

The first stage of the estimation process is to generate national estimates of employee jobs, based on the reporting unit information obtained through the survey. In simple terms, the returned values are multiplied by grossing factors; the resulting values are summed to generate overall totals. This 'grossing up' takes place separately for groups of businesses which have similar characteristics i.e. by industry and size band. The IDBR provides the information from which the grossing factors are calculated.

The grossing procedure used in ABI is known as 'combined ratio estimation'. The term 'combined' indicates that there is some merging of cells to ensure adequate coverage before the estimation process can start. The 'ratio estimation' approach relies on finding a relationship between the returned employee jobs figures and some auxiliary information which, in this case, is the employment value for that business held on the IDBR. Typically the IDBR employment value will be the employment value identified in the previous years' survey.

Each year, the employment, industry and geography coding information on the IDBR is updated using a variety of sources of information, most notably *ONS*'s Annual Register Inquiry. The annual update is towards the middle of the year, prior to the ABI sample being drawn in the Autumn for despatch towards the end of the year in respect of a December survey date.

The estimation system includes a technique for the treatment of outliers. Outliers are identified on the basis of the ratio between the returned employment and the register employment; the return is regarded as an outlier if this ratio is greater than twenty. The value of twenty was chosen after extensive research. If a business is regarded as an outlier, it is moved to a separate stratification cell in the estimation process. This ensures that, although the returns are counted in full in the published datasets, they do not form part of the estimation process for businesses that were not sampled.

Special treatment is needed within the survey processing to deal with businesses that ceased trading between the time the sample was drawn off the register and the survey date. *ONS* has standard procedures for such cases. It is assumed that for smaller businesses, the number of deaths identified through the survey is offset by an equivalent number of unrecorded births. However, for businesses with employment of more than fifty, there is no off-setting adjustment for possible births. Finally, special steps are taken to ensure that the results are not distorted by takeovers or mergers which might otherwise lead to double counting in the results.

Sub-National Estimation

To compile estimates for employee jobs at sub-national levels requires a five-stage process. The five steps are as follows:

- Step 1 - local unit apportionment;
- Step 2 - post-stratification;
- Step 3 - estimation;
- Step 4 - scaling; and
- Step 5 - synthetic estimation.

Each of these five stages is explained below.

Step 1 - Local Unit Apportionment

This involves cascading the data collected at the reporting unit level across the local units which are linked to the reporting unit The IDBR is the source of information on the links between the reporting unit and local unit.

A simplified version of this process would involve sharing the reporting unit total across the known local units, according to the proportions from the IDBR. So, for example, if the IDBR shows that three local units are linked to a particular reporting unit and the IDBR employment for each local unit were 12, 6, and 2, then 60% of the reporting unit total employees would be allocated to the first local unit, 30% to the second and 10% to the third. These same proportions would also be applied to the male full-time, male part-time, female full-time and female part-time variables.

However, the ABI methodology contains a refinement. Imagine that the local unit which would be allocated 10% of the reporting unit's total employees is in an industry which is enjoying nationwide growth. Since the ABI survey collects information on such real world changes, it is desirable to allow this information to feed into the estimation process, adjusting the allocation of the total employees across the local units. Within the ABI there is a modelling process which attempts to adjust the apportionment across local units to take into account such developments.

The first stage in this modelling step is to group the returned ABI data for reporting units with less than 100 employees and less than three local units according to the following criteria:

- Employment size bands; 1 to 2, 3 to 4, 5 to 9, 10 to 19, 20 to 49, 50 to 99;
- 3-digit industries; and
- counties.

Within each of these groupings the returned data are compared with the data held on the register to identify patterns, and these are turned into a set of estimation coefficients that are used to adjust the apportionment process. This modelling process is applied to each of the four-way breakdowns. Any businesses returning zero values are modelled independently, using similar criteria to those above, but with the exception of 2-digit rather than 3-digit industry coding. These, too, feed into the apportionment adjustment processes.

The upshot of this modelling procedure is to yield a value for each variable (male full-time, male part-time, female full-time, female part-time, total employees), for each local unit linked to each reporting unit that sent in an ABI return. The methodology will ensure that the sum of each reporting unit's local unit values will match the value at the reporting unit level for each variable.

The Annual Register Inquiry form asks for a written description of the activity at that site. This drives the industry codes for local units held on the IDBR. Head Offices are likely to have an industry code reflecting the primary activity of the whole organisation. For the retail sector, this means that head offices are likely to be assigned to SIC 52. There is no distinction in the subsequent results between retail jobs at a supermarket or shop, and retail jobs at a head office.

Step 2 - Post Stratification

Once a value has been assigned to each variable in a local unit, the estimation process can begin in earnest. The first stage is to group the local unit data into some estimation cells. The estimation cells are defined as follows:

- Local unit region;
- Reporting unit SIC; and
- Reporting unit size band.

Each of these groupings takes place for both the local unit apportioned data, and the local unit population data which came from the IDBR. A combination of these two datasets enables the estimation process to continue, almost as if the local unit apportioned data were real data.

It should be noted that these estimation cells are not the same as the levels of disaggregation at which results will be published (which will be based on the local

unit's region, SIC and size band details).

Step 3 - Estimation

Once the local unit apportioned data have been grouped into estimation cells, the ratio estimation process itself can start. As already discussed, this involves finding a relationship between the 'returned' data within the cell and the employment data for those units held on the IDBR. In practice, this requires the construction of some grossing factors to be applied to each of the local unit apportioned values. The purpose of the grossing factor is to update the returned data to account for those units that were not included in the survey.

As part of this process, reporting units that are marked in the national datasets as outliers are also regarded as outliers in the sub-national estimation system. In other words, all of the local units linked to a reporting unit which is an outlier are marked as outliers too. They are then treated in exactly the way discussed before, by being moved into separate strata where the grossing factors are one, and the grossing factors are adjusted accordingly for the remaining units. Once the grossing factors have been calculated for each local unit, the local unit dataset can be re-grouped into the groupings used for publication (local unit SIC, region and size bands).

Step 4 - Scaling

Because the national and sub national estimates are obtained using different stratification schemes, they are very likely to differ at the UK level. To overcome this, the local unit dataset is scaled to match the aggregate employee jobs total from the reporting unit dataset. However, the treatment of data for units in Northern Ireland brings an extra complexity to this scaling process. The data published for Northern Ireland from the ABI system are constrained to match the values for Northern Ireland published by the Department of Enterprise, Trade and Investment in Northern Ireland. This means that it is not possible to apply a single scaling factor to the local unit dataset to bring it into line with the reporting unit dataset.

Instead the scaling process requires some extra steps. First, the local unit dataset is scaled to match the reporting unit dataset Then, the Northern Ireland local unit data are constrained to the known totals for Northern Ireland at the 2 digit SIC level. Next, a new UK total is derived by adding the constrained Northern Ireland values to the GB local unit dataset. Finally, a small adjustment is made to the reporting unit dataset to account for any differences between the reporting unit dataset for the UK and the local unit dataset for GB plus the constrained Northern Ireland local unit data.

Step 5 - Synthetic Estimation

In theory, the estimation mechanisms described above can be used to generate estimates for any domain of interest, even those at very fine levels of industrial or geographical detail. In practice, however, the sample size may be stretched too thinly for these very fine disaggregations, and there is a risk that some cells may not be of publishable quality. To overcome this problem, a set of 'minimum domains' have been identified. Minimum domains are cells (combinations of industry and geography) for which the estimation process described above has been shown to give robust results. Typically, minimum domains are 2-digit industry by local authority district or county. However, there are some higher aggregations of minimum domain, in particular, for smaller industries.

Under the minimum domain approach, the first stage is to calculate an estimated value for the minimum domain using the estimation procedures set out above. These minimum domain totals are then spread out across all the local units within the minimum domain according to the IDBR total employment. As ever, there is an extra complexity. The local unit apportioned values are protected within this process. In other words, the amount of employee jobs which is to be distributed across all unsurveyed local units within the minimum domain is equivalent only to that part of the minimum domain which is estimated. In a final step, the local unit apportioned data are added back alongside the apportioned values to give the

final estimates of employee jobs at very fine levels of industry or geography.

For Further Information:

More information about the ABI (including information about the precision of the published estimates of employee jobs at Local Authority District level) can be found on the National Statistics website, www.statistics.gov.uk. Alternatively, you can contact the *ONS* team via annual.employment.figures@ons.gov.uk or by telephoning 01928 792690.

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