# APPENDIX F YORKSHIRE FORWARD REPORT

Yorkshire Forward

# PLANNING FOR EMPLOYMENT LAND
## TRANSLATING JOBS INTO LAND

ROGER TYM & PARTNERS
Planners and Development Economists

Final Report

April 2010

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# 1 INTRODUCTION

1.1 This report was commissioned by Yorkshire Forward in 2009 to inform the preparation of guidance to planning authorities on the assessment of future need for employment land. The report is intended to feed into a wider guidance note on employment land reviews, the evidence base documents that support employment land policies in local development plans. It relates to one particular technical question: how should authorities translate future employment change into future employment land requirements, as they are required to do by the Regional Spatial Strategy, the Yorkshire and Humber Plan?

1.2 As required by Yorkshire Forward's study brief, the technical discussion in the report focuses on 'employment land uses' as traditionally defined by planners, which are broadly equivalent to Classes B1 to B8 of the Use Classes Order. These are the land uses covered by employment land reviews. In Chapter 2 below, we discuss how employment land reviews should fit into wider evidence base studies that inform planning for the whole economy, including non-B economic land uses such as employment and leisure

1.3 A further limitation of the report is that it deals only with quantitative provision targets – how much land should be provided for employment uses. It does not deal with quantitative aspects of provision – what kinds of sites should be provided to match future demand and policy objectives.

1.4 As part of its policies for the growth and restructuring of the regional economy, the Yorkshire and Humber Plan requires local authorities to take account of 'potential job growth' forecasts by local authority area, which are shown in the Plan at Table 11.1, 'along with more detailed sub regional or local forecasts or more up-to-date information' (The figures in this table are forecasts produced by Yorkshire Forward's Regional Econometric Model in 2007 and are regularly updated by YF). The RSS suggests that local employment land reviews should translate the job forecasts into employment land requirements, which in turn should be translated into allocations in local development plans. The Plan at Tables 11.2 and 11.3 provides a partial version of this translation, though again it notes that its figures are indicative and may be updated, modified by more detailed work at local or sub-regional level, or both. In practice, as YF's study brief notes, local authorities have found it difficult to produce robust assessments of land requirements on this basis. In this report we aim to resolve these difficulties, recommending a clear and consistent calculation method that authorities can follow.

1.5 The starting point of the calculation is an employment growth target or scenario for the local authority area, which may be derived from an updated version of Table 11.1 of the RSS or from other sources. Regardless of its source, the employment growth scenario needs to break down future jobs into activity sectors (industries and services), as per the Standard Industrial Classification (SIC). To derive land provision targets, the calculation comprises three main stages, as follows:

*i) Sector to land use*

Translate the above jobs by sector into jobs by land use, identifying those future jobs that will occupy 'employment' (B-class) space - that is, offices, industrial space and warehousing.

*ii) Jobs to land*

Translate the above employment change into change in land use, based on assumptions about employment densities (floorspace per worker) and plot ratios (ratio of floorspace to site area).

*iii) Margins*

To translate the net change above into a gross provision target, showing how much land should be allocated for B-class development, add to the net change above:

- An allowance to compensate for any existing employment sites that may be lost in future;
- Further allowances for land in the planning and development pipeline and for choice, competition and uncertainty.

1.6 Below, we discuss these stages in turn. Chapter 3 advises on employment densities (floorspace per head), based on a review of earlier research and our own investigation, including a large survey of businesses in the region. Using the same survey, Chapter 4 considers plot ratios and Chapter 5 the sector-to-land-use translation. Chapter 6 discusses 'margins' and finally Chapter 7 summarises our recommendations. But first, in the next chapter, we set out the strategic policies that planning authorities in Yorkshire and the Humber must take account of in setting employment land targets.

1.7 At the same time as the present report, we have been working on a report for the North West Regional Planning Body, 4NW, which addresses some of the same questions[1]. The two reports share some of the same content.

[1] Roger Tym & Partners for 4NW, Setting Employment Land Targets for North West England, 2010, forthcoming.

# 2 POLICY CONTEXT

## The Yorkshire and Humber Plan

### *Policies*

2.1 Local employment land policies, like all local planning policies, must have regard to the requirements of the Yorkshire and Humber Plan, published in 2008 These requirements are the starting point for our report. They are set out in Policies E1, E3, E4 and E5 of the Plan.

2.2 Policy E1, Creating a Competitive and Successful Regional Economy, sets out general principles. Those most relevant to our subject include:

*'In order to create a more successful and competitive regional economy, plans, strategies, investment decisions and programmes should help to deliver:*

A '*Economic growth, restructuring and diversification, taking account of the potential job growth indicated by Tables 11.1 and 11.2 and more detailed sub regional or local forecasts and updates as they become available*

*B Investment in locations where it will have maximum benefit and secure competitive advantage, recognising the role of the Regional Cities and Sub Regional Cities and Towns as key drivers of productivity*

*…*

*E A knowledge-driven economy, by supporting… knowledge-intensive industries*

*F A more entrepreneurial region, with the aim of achieving higher rates of business start-ups and survival, and a larger number of small businesses'.*

*G Development related to important sectors or clusters…'*

2.3 Policy E3 is headed Land and Premises for Economic Development and reads in part:

*A 'Plans, strategies, investment decisions and programmes should… ensure the availability of sufficient land and premises in sustainable locations to meet the needs of a modern economy and in particular take account of:*

1. *The need for additional floorspace for office, retail and leisure uses as indicated by the potential job growth in Table 11.2….*
2. *The ongoing restructuring and modernisation of the manufacturing sector and the guidance on land for industrial uses set out in Table 11.3.*

*…*

*B Local employment land reviews to inform LDFs should take account of the potential job growth set out in Tables 11.1 and 11.2 and the guidance on employment land in Table 11.3 along with more detailed sub regional or local forecasts or more up-to-date information about land needs. Joint working should be undertaken where commercial property markets cross administrative boundaries. Land in use or*

*allocated for economic development should be reviewed during the preparation of LDFs. Sites no longer needed or those that would undermine the delivery of the Core Approach should be considered for alternative uses.*

C *Local Authorities…. should monitor the availability and suitability of employment sites on a 3- year rolling basis so as to ensure that they continue to meet current or longer term needs for economic development. A portfolio of the best sites, representing at least a five-year supply of market-ready sites, should be identified and protected for those purposes.'*

2.4 Table 1.11 shows annual employment change by local authority area to 2016 and beyond, Table 11.2 breaks down these local authority totals by land use, and Table 11.3 translates employment change into land requirements and compares them with estimated supply, though only for industrial and warehousing land uses. Supporting text explains that 'the potential job growth figures [in the tables] are derived from Yorkshire Future's Regional Economic Model and assume that the regional economy will perform well, supported by economic development and regeneration interventions … in line with the core approach and policies in this section of the Plan.' We note that this economic model, provided by Experian, is operated by Yorkshire Forward to provide regularly updated forecasts of employment change by local authority area and activity sector. So authorities always have access to recent employment forecasts that update Table 11.1 of the RSS and provide additional detail, in that they are broken down by sector. But the RSS's figures on employment by land use (Table 11.2) and industrial land requirements (Table 2.3) are the product of a one-off calculation, produced as part of the RSS evidence base, and are not being updated.

2.5 Supporting text also notes:

'[The tables] suggest that the region has more land allocated for industrial and storage/distribution uses than is likely to be required in the future. This is not discounting the importance of providing the market with choice and flexibility in their site selection, and also to allow for a certain amount of 'churn' as sites necessarily stay vacant for a period of time. In addition, it is also acknowledged that at a Local Authority level, where an oversupply of land is expected, this does not mean that further employment land does not need to be provided; it will always be necessary to ensure that new developments come forward with new requirements to avoid stagnation in the market.'

…

'The Plan establishes a strategic context and methodology to assist Local Authorities and other bodies update employment land portfolios. Seeking to align the supply of employment land with the Plan's strategy and addressing the current over-provision of sites is a key sustainability challenge for the Plan. However, it is recognised that the strategic role of employment land is only one issue in an important local debate. The strategic evaluation does not give a maximum amount of employment land to be planned for, as the need to maintain a flexible land bank will result in a large portfolio than simple need-assessments would suggest. On this basis, LPAs will need to develop, from this picture of net need, a gross requirement for their areas.'

2.6 A separate paper from the Regional Planning Body[2] enlarges on the thinking behind Policy E3:

*'The suite of RSS Economic Policies aim to support the restructuring of historic patterns of development so as to support a modern, sustainable economy. It specifically seeks to establish a robust framework for reviewing employment land and the need to fundamentally reappraise employment land portfolios, which was a key recommendation of the EiP Panel (ref. Recommendation 4.9 & para. 4.99). Excessive land portfolios in some parts of the region run the risk undermining core approach of RSS. There needs to be emphasis on the need to re-assess the long-standing and significant stock of extant legacy employment allocations in the region.'*

2.7 *In light of the evidence presented to the EiP about over supply/unsustainable location, the Panel noted that there was "…an undeniable need to reallocate or even de-allocate land which does not meet the core strategy expressed in YH1-YH8 or the needs outlines in polices E1-E3".*

2.8 *It is recognised that an aggressive approach to the review of employment land is justified in this region primarily because of the need to assist the re-engineering of the spatial patterns of the economy. Presently, in many parts of the Region these remain a spatial reflection of patterns of the former heavy/primary industrial base. However, it is also recognised that if this policy approach is applied with vigour, there could be adverse short term impacts on economic performance as a result of an overly restricted land supply.*

2.9 *Accordingly, [as a safeguard,] the RSS proposes… the five-year supply rule (Policy E3.c), [which] is intended to address the issue of market response so as not to stifle economic growth. This is because, inter alia, of the inherent difficulties in predicting long term changes in the economy. This means that the use of forecast-based approaches needs to be carefully plan-monitor-managed over the longer time period.'*

2.10 To return to the text of RSS policies, Policy E4 shows how planning should particularly support regional priority sectors and clusters, which comprise financial and business services; tourism; logistics; and construction, and regional priority clusters including advanced engineering and metals; chemicals; bio-science; digital; food and drink; healthcare technologies; and environmental technologies. Policy E5 is about safeguarding employment land and provides, among other things, that

*'LDFs should define criteria or areas where it is considered necessary to offer special protection to designated employment sites. This approach should be applied when it can be shown that: a review of employment land has been carried out in accordance with Policies E1-E4 or the sites are part of an area subject to an agreed masterplan.*

[2] Yorkshire and Humber Assembly, The RSS Approach to the Review of Employment Land, undated, http://www.yhassembly.gov.uk/library/unknown/RPB_Statement_-_approach_to_supply1.doc accessed 26 March 2010

### *Key Points*

2.11 What are the key implications of these policies for local planning authorities setting employment land targets? Three central objectives or principles stand out.

2.12 The first principle is that planning must support the growth of the regional economy. To fulfil this objective, *planning should ensure that economic growth is not stifled or constrained by lack of suitable land*. In other words; it should aim fully to meet the demand for land. This is the thinking behind the Plan's advice that assessments of the need for employment land should be based on employment forecasts. Assuming that the demand for employment land is driven by employment growth, forecast employment growth is a measure of future demand for land, so planning authorities should provide enough land to accommodate the forecast employment growth.

2.13 But the location of employment sites is not to be determined by market demand alone. A second core principle in the Plan is that *employment growth should be concentrated in the main regional and sub-regional centres*, both for the sake of economic efficiency and more sustainable travel.

2.14 So far, the Yorkshire Plan is similar to many other RSSs. but it also sets out a third core principle which is more specific to Yorkshire and the Humber: the way to faster economic growth is through *a major transformation, restructuring or modernisation of the economy*, which replaces declining traditional sectors with growing and knowledge-driven ones and creates a dynamic entrepreneurial culture.

2.15 Based on these three objectives, the Yorkshire and Humber Plan set outs *quantitative employment growth targets* which form part of its policies, but can be overridden by more up-to-date or more local figures. It also sets qualitative policies which provide that *planning should particularly support certain economic sectors and clusters*, and that it should *encourage the replacement of old sites with new*. With regard to this replacement process, the Plan advises that in quantitative terms there is an oversupply of employment land across the region, which planning needs to reduce. But, while they de-allocate or re-allocate to other uses old employment sites that are not longer commercially attractive or environmentally sustainable, planning authorities should also provide new employment sites to meet modern requirements and accommodate growing sectors. This is why the technical guidance provided in this report will pay particular attention to the loss and replacement of employment sites.

2.16 The RSS touches on another of our technical issues at Policy E3, where it says that, to ensure that the need for land is always met, planning authorities should identify at least a *five-year supply of 'best' market-ready sites*. This is a possible answer to part of the 'margin' question – how much land should be provided to allow for choice, competition and uncertainty? We will discuss this in Chapter 5 below.

2.17 A final point is that the RSS at policy E3 encourages *joint working between local authorities* where property markets cut across administrative boundaries. For the sake of simplicity, this report is written as advice to a single authority, but all this advice is equally applicable to a sub-regional grouping of authorities planning jointly for employment land.

## PPS4

### *Policies*

2.18 As well as the Regional Spatial Strategy, local development plans and planning decisions of course must have regard to national policy. In regard to planning for the economy, this national policy is found in the new Planning Policy Statement (PPS)4, published in December 2009. PPS4 marks a new departure in national policy in that it brings together all economic land uses, covering retail, leisure and public services as well as the traditional employment uses. With regard to employment uses, it lends retrospective support to the main messages of the Yorkshire and Humber Plan.

2.19 At the level of general objectives, the first and main point in the Statement is that planning should positively encourage sustainable economic growth, by providing land in response to market requirements. For example, Policy EC2 advises:

'*[Development plans should] set out a clear economic vision for their area which positively and proactively encourages sustainable economic growth… [and] reflects the different location requirements of businesses, such as the size of site required, site quality, access and proximity to markets, as well as the locally available workforce.'*

2.20 Turning to more specific policies, PPS4 (at Policy EC2.1g) advises that Regional Spatial Strategies should set minimum job targets by local authority; as we have seen the Yorkshire and Humber Plan already does set job targets, although they are not minimums and they are not binding on local authorities. Policy EC1.2b advises that in assessing the need for office development *'authorities should take account of 'forecast employment levels'*, which presumably refers to these same employment targets. Although there is no similar provision for the other employment uses (industry and warehousing), the apparent implication is that for these sectors also local authorities in setting land requirements should have taken account of future jobs. But the PPS does not specify in detail how this should be done, and so far there is no supporting evidence to fill in this detail (so far the only supporting guidance published is about retail and town centre uses).

2.21 PPS4's advice on setting targets marks a departure from the Government's previous position, which was not stated in policy, but in a guidance document, the 2004 Guidance Note on Employment Land Reviews. This note explained that there were three alternative ways of assessing future need for employment land: it could be derived from employment ('labour demand') forecasts, from workforce ('labour supply') forecasts, or by projecting forward the past take-up of land. The note did not express a preference between these three methods, but rather suggested that all were potentially useful. This position seems to be superseded by the PPS 4's support for the first method, given that the 2004 Guidance Note is not mentioned in the PPS (but neither has it been withdrawn, so it is not clear whether it is still relevant). However the new PPS leaves us without clear-cut advice on how exactly land provision targets should be set. Such advice may emerge in future guidance.

2.22 As we have seen, an important principle of the Yorkshire and Humber plan is that planning should support economic restructuring by prioritising the land requirements of

priority sectors and clusters. PPS4 provides some support for this approach, in prioritising the land requirements of knowledge-based and high-tech sectors – which comprise some, but not all, of the priority sectors named by the Yorkshire and Humber Plan. Policy E.2.1c reads in part:

*'[Development plans should] positively plan for the location, promotion and expansion of clusters or networks of knowledge-driven or high-technology industries'.*

2.23 The PPS (at Policy E2.1e) also prioritises a sector which is not mentioned in the RSS, strategic distribution:

*"[Development plans should] identify, protect and promote key distribution networks, and locates or co-locates developments which generate substantial transport movements in locations that are accessible (including by rail and water transport where possible).'*

2.24 PPS4 agrees with the RSS in the view that sites no longer suitable or deliverable for economic uses should not be retained for employment: *'if there is no reasonable prospect of the site being used for its allocated economic use… the allocation should not be retained, and wider economic uses or alternative uses should be considered'* (Policy EC2h). It is also similar to the RSS in the advice that 'local planning authorities should allocate sufficient sites in development plan documents to meet at least the first five years' identified need'. However, unlike in the RSS, this advice does not specify that the allocated five-year land supply should be market-ready, and it only applies to town centre uses – which includes offices[3] but not industry and warehousing.

### *The Whole-Economy Evidence Base*

2.25 The new PPS does not use the words 'employment land review', or indeed 'employment land'. Rather, it implies that the B-class uses will be subsumed into wider planning evidence bases that cover the whole economy. So far there is no guidance on how these wider evidence bases should be structured. However, we expect that they will still need to set land provision targets for the B class – industry, warehousing and offices – separately from other economic land uses, because different methods fit different uses: while demand for B-class land is traditionally derived from employment, the demand for retail space for example is derived from consumer expenditure, and for local services such as schools from housing and population. Therefore the technical guidance in this report will still be needed, even if employment land reviews are superseded by wider evidence base documents, covering the whole economy.

2.26 In the absence of national guidance, we have developed a suggested approach to an evidence base that informs planning policy for the whole economy. This approach has not

[3] Offices are classed as both and employment (B-class) use and a main town centre use.

been fully tested in practice, though we have applied some of it in earlier studies, for example in Mid Bedfordshire and Bath and North East Somerset (BANES)[4].

2.27 In our suggested approach, the study has three main stages as shown below.

### *Stage 1 The Local Economy*

2.28 The first stage of the study will deal with the whole economy, including both the B-class sectors – those that occupy industrial space, warehousing and offices – and the non-B sectors such as retail, leisure and public services. It will review the economy of the study area and the main policies that impact on that economy, to assess:

i) Expected changes over the plan period, which planning should respond to;
ii) Problems and disadvantages which planning policy should help correct;
iii) Opportunities which planning policy should help seize.

2.29 This analysis will inform the evidence base throughout. One of its outputs will be first-draft employment growth targets by sector, which will be based on the latest economic forecasts from the Regional Economic Model, but may amend the forecasts in the light of additional information and/or policy objectives. For example, in an area which will benefit from new infrastructure, which the forecast does not 'know' about, the local authority might expect more growth than the forecast predicts. In an area designated for growth or regeneration the authority might aim for more job growth than the forecast.

2.30 Amendments to the forecast should not be based on just wishful thinking. Thus, if the authority aims to attract more growth to a regeneration area, the study at some stage needs to provide a convincing account of how this additional growth will come about, perhaps through active policy interventions. It also needs to consider how this additional growth might impact on other areas, for example to see if jobs will be displaced from neighbouring authorities.

### *Stage 2A The B Uses*

2.31 In its second stage, the study will split into separate sections that deal with the main economic land uses separately.

2.32 The section that deals with B-class uses will be in effect an employment land review. Among other things, this will translate the employment targets at Stage 1 into employment land requirements. One of the conclusions of the employment land review may be that the employment targets should be amended. For example, the analysis might suggest that there is not enough land or labour in the local authority area to support the proposed job growth, so some of this growth should be steered to neighbouring areas. Conversely, it might suggest that the area should aim for growth above the targets, for example because

[4] Roger Tym & Partners for Mid Bedfordshire District Council, Employment Growth in non-B Use Classes, 2007; Roger Tym & Partners for Bath & North East Somerset District Council, BANES Business Growth and Employment Land Study, 2009

the area can offer a major strategic site that is likely to attract national or international investment.

### *Stage 2B Retail and Town Centre Leisure*

2.33 The section that deals with retail and town centre leisure uses will be in effect a retail/leisure study. To assess land requirements it will start from retail/leisure 'need', which is measured by consumer expenditure rather than employment in the sector. The findings of the study might imply very different job growth in retail and leisure than forecast by the Regional Economic Model, because the study will incorporate factors which the model does not 'know' about. For example, there may be proposals for major new shopping centre, which would attract expenditure from other places and so create additional jobs in the local authority area.

2.34 RTP's 2007 study of non-B employment in Mid Bedfordshire, referenced earlier in this section, provides an example of how potential expenditure growth and retail development can be translated into retail jobs. This kind of analysis needs robust assumptions on employment densities in retail. We make a start in updating these assumptions in Appendix 3 to this report, which estimates floorspace per head in food stores.

### *Stage 2 C Other Services*

2.35 In general it should be relatively straightforward to accommodate routine local services such as primary schools and GP surgeries. No special study should be required to assess the land needed for such services, because that land is normally provided as part of housing developments, in accordance with established standards. A more difficult question, which the evidence base study will need to focus on, relates to the land requirements of strategic or one-off proposals relating to universities, major hospitals, cultural and tourist attractions and so forth.

2.36 For example, changes in education budgets may adjust school staffing levels, while land requirements may remain the same. Health is a difficult sector, because health trusts tend to have large and flexible estates which they are constantly reorganising. The same may apply to universities.

2.37 For ports, airports and other major infrastructure, economic modelling in our opinion cannot provide a robust picture of future land requirements. The amount and nature of development will depend on operators' commercial strategies and the nature of their estates. Again, in our experience the only way to assess likely future land needs is to talk to operators and look at documents they produce.

2.38 Authorities should also assess potential land requirements relating to non-town centre leisure, tourism, culture and sport. For this, they should refer to the leisure, culture and tourism strategies that exist in many areas, talk to promoters and operators of proposed projects and investigate the employment and land use impacts of any existing facilities that are similar to those being proposed in their areas. In Mid Bedfordshire, for example, one of the main tasks for the non-B employment study was to assess the potential implications of two tourism/leisure/culture proposal, the first for a holiday village and the

second for a freshwater sanctuary combining conservation, education and scientific research. In BANES, a major issue was how the very limited land available in Bath city centre should be divided between offices, retail, tourism, the university and cultural activities.

### *Stage 2D Revisiting Employment Targets*

2.39 As well as a picture of future land requirements, the Stage 2 research discussed above should produce a picture of future employment, which may differ significantly from the first-stage employment targets at Stage 1. For example, if the local university is planning major expansion (or contraction); this may imply large employment changes in the future which the Regional Economic Model does not 'know' about, this may have major implications for future employment, which should feed back into the authority's overall employment targets.

### *Stage 3 Conclusions and Recommendations*

2.40 Stage 3 will bring together these different strands to make final recommendations across all economic land uses. Often the land requirements of different economic uses will conflict; for example, retail, offices and culture may compete for limited space in the town centre. Stage 3 needs to find a balance between the different claims on land, based on two broad factors: analytical evidence on the consequences of alternative policy stances and value judgments reflecting the authority's wider objectives and priorities. The whole-economy evidence base should bring these strategic decisions out into the open, which individual studies on separate land uses cannot do.

2.41 As well as a picture of future land requirements, as mentioned earlier an output of the study may be proposed employment targets which differ from the first-draft targets in Stage 1 above. These proposed targets may have implications beyond spatial planning.

## *Key Points*

2.42 The new PPS4 retrospectively supports key principles and policies of the Regional Spatial Strategy, indicating that:

- Planning should positively encourage sustainable economic growth, through pro-active policies which provide land to meet market requirements.
- Regional Spatial Strategies should set employment growth targets for local authorities, of which authorities should take account in setting land provision targets.
- Development plans should prioritise the land requirements of knowledge-based and high-technology industries (they should also provide land in the most accessible locations for strategic distribution, which is not a requirement of the RSS).
- Employment sites that are no longer in demand for their allocated use should be re-allocated or de-allocated.
- For offices, local development plans should allocate at least enough land to meet the first five years' identified need.

2.43 PPS4 does not require local and regional authorities to produce employment land reviews. Rather, it suggests that what is now called an employment land review in future should be subsumed into a wider evidence base that covers the whole economy. There is no national guidance as yet about how this evidence base should be approached. Above, we make a suggestion to that effect.

2.44 Future evidence bases will need to answer the same questions that are now answered by employment land reviews. Therefore the technical guidance provided in this report will still be needed.

# 3 FLOORSPACE PER WORKER

## Introduction

3.1 As part of the present study, we conducted a large business survey of floorspace per worker (employment densities) in Yorkshire and the Humber. Previous surveys of this kind are few in number, out of date and only cover London and the South East (the latest were in 2004 for the South East and 2006 for London offices). Until now, this evidence has not been updated or extended to other regions, probably because the available methods were expensive and not necessarily reliable. In this study, we pioneer a new method which is cheaper and more robust.

3.2 To calculate floorspace-to-worker ratios for the different employment uses, we need to know floorspace, activity sector (industrial classification) and numbers employed for large samples of business units (establishments, sites). Floorspace was previously hard to determine, but in the last few years has become available online through the Valuation Office Agency (VoA) database. However, the other two variables remain a problem, partly because each unit's classification and employment number needs to be the same as recorded in the official source of employment statistics, the Annual Business Inquiry (ABI), - since the employment numbers used in the jobs-to-land calculation are nearly always based on the ABI. This official information about individual units is confidential, so to ascertain industrial activity and numbers employed previous studies have used either telephone interviews or (occasionally) commercial databases. These sources have disadvantages: telephone interviews are expensive, commercial databases in our experience are often inaccurate, and neither source is necessarily consistent with the ABI.

3.3 In this study, we have tried to overcome these difficulties by using a newly available data source, the Industrial and Commercial Property Register (IDBR). The IDBR is an official list of all business units, which forms the basis of several National Statistics data series, including the ABI. The Register shows each unit's name, address, employment and Standard Industrial Classification (SIC) as recorded in official statistics; as in the ABI, the SIC reflects the activity of the individual unit rather than any wider firm of which it may be part. Confidential IDBR data are now available to local authorities and certain other public bodies on application. For our survey, the Regional Planning Body requested a comprehensive schedule of business units in the Yorkshire and Humber region. From this schedule we drew a sample of units which according to RTP's definition of B-class sectors were expected to occupy industrial, warehouse and office space[5]. We then matched these property units (hereditaments) to the VoA database, which shows the kind of space that the unit occupies and its floorspace. Where the matching was successful, we used it to calculate the floorspace per head ratio, which we call F/L and measure in square metres per worker.

[55] Chapter 5 provides further detail of this definition.

3.4 Below, we discuss the F/L ratio first for offices and then for industry and warehousing. For each of these land uses, before presenting the results of our survey we briefly review the evidence available prior to the survey, in two parts: firstly we consider the research literature and secondly we set out additional, qualitative evidence drawn from our own experience and informal interviews conducted for the present study. These interviews covered:

- IPD Occupiers, a service that provides performance benchmarks to corporate real estate and facilities management;
- One office consultant;
- Two logistics consultants;
- One consultant on industrial and warehouse property;
- One property developer with office and industrial developments in the region;
- Four warehouse occupiers with facilities in the region.

3.5 Our analysis does not break down the B-class land uses as finely as the Use Classes Order. We do not distinguish between light industry (B1c) and general industry (B2), because none of our information sources – neither earlier research, nor our interviewees, nor the VoA database – make this distinction; B1c and B2 do not exist outside the world of planning. Nor do we identify research and development (B1b) as a separate category. As a type of floorspace, research and development also exists in planning only. There is of course an economic activity sector called Research and Development (SIC 72), but our experience shows that it is not associated with a single type of accommodation: some R&D activities (possibly most) operate in offices, others in industrial premises and others in labs. This is not a large problem in setting quantitative targets for employment land provision, because R&D is a tiny sector, accounting for 0.4% of all jobs in the UK and 0.1% in Yorkshire and the Humber.

## Offices

### *Previous Evidence*

#### *The Research Literature*

3.6 The main standard reference source on employment densities remains the 'Full Guide'[6] produced by Arup for English Partnerships in 2001. In our experience, this much-quoted document is the main source used by property developers and their advisors. The Guide does not report original research, but is a review of earlier empirical studies. These studies are few in number and their geographical coverage is uneven. Thus the Guide cites 13 reference documents, of which just six relate to office densities; of these six studies four are about London and/or the South East. Most of the studies that the Guide

[6] Arup Economics and Planning, Employment Densities: A Full Guide, Report English Partnerships and the Regional Development Agencies, July 2001

references date from the 1990s and some from the 1980s, so the evidence in the Guide is even more out of date than its publication date suggests.

The EP Guide recommends the following density assumptions 'for use in the appraisal of potential employment at land and property projects':

**Table 3.1 Office Floorspace per Workspace in the EP Guide**

| Gross Internal Area per Workspace sq m | |
|---|---|
| General (purpose-built) offices | 19.0 |
| Headquarters | 22.0 |
| Serviced business centre | 20.0 |
| City of London | 20.0 |
| Business park | 16.0 |
| Call centres | 12.8 |

Source: Arup

3.7 There are three main ways to measure commercial floorspace:

- The *net internal area (NIA)* in the usable area of a building, excluding common areas such as stairways, corridors, lifts and toilets, as well as boiler rooms, plant rooms and the like.
- The *gross internal area (GIA)* is the entire enclosed area of a building, including these common parts.
- The *gross external area (GEA)* is the gross external area plus the thickness of the external walls[7].

3.8 As a rough guide, the GIA and GEA are approximately equal. For an office building, the NIA is typically around 15% smaller than the GIA, although the ratio of course depends on the design and layout of buildings.

3.9 The EP Guide is unusual in dealing with gross internal area. In the discussion below, we focus on net internal area, which is the measure used in all or most studies and discussions of employment densities. Assuming a ratio of net to gross area of 85%, EP's headline figure of 19 sq m of gross floorspace would convert to 16.2 sq m of net space.

3.10 The EP Guide says that the above ratios 'reflect the median figure[8] across a range of sources' that they have reviewed. It also says that the ratios show space per workspace

[7] See VoA, A Summary of Valuation Office Agency Code of Measuring Practice Definitions for Rating Purposes, http://www.voa.gov.uk/business_rates/comp/index.htm

[8] The EP F/L ratios are sometimes understood as median ratios across business units, which would mean that half the units have ratios above the figure given and half have lower ratios. This is wrong. Careful reading of the Guide shows clearly that its ratios are *weighted means* calculated across business units, but *medians* calculated across the studies reviewed. This is an obscure mathematical point but it is important, because a median value calculated across business units could not be used to translate jobs into space.

rather than per worker – an important distinction, because at any one time one would expect that a significant proportion of workspaces would be unoccupied. We have no information on the proportion of workspaces which is occupied. But, if we assume for the sake of illustration that the proportion is 85%, then EP's headline figure of 19 sq m gross per workspace, which as shown earlier equates to 16.2 sq m net per workspace, when translated into net space per worker reverts to 19 sq m.

3.11 However we are not certain that the EP numbers really do relate to workspaces: certainly RTP's 1997 survey for SERPLAN, which is one of EP's main sources, measured floorspace per worker.

3.12 A slightly more recent reference source on employment densities is the Employment Land Review Guidance Note published in 2004 by the ODPM (now CLG)[9]. This document has traditionally had authority as official planning guidance issued by the Government for local authorities. But at present its status is uncertain, because the latest Government policy statement on planning for economic development, PPS4, published at the end of 2009, does not refer to it. The Guidance Note advises:

'There is no one correct figure and ratios vary due to a number of factors such as employment sector, function, location, age of building and point of the economic cycle. There are a limited number of large-scale surveys that have been undertaken. The study carried out for SERPLAN by Roger Tym & Partners (RTP) in 1997[10] remains one of the most comprehensive data sources for London and the South East. This surveyed over 1,200 firms. More recent work done only in the South East (DTZ, 2004)[11] surveyed over 1,000 firms.'

3.13 The Guidance Note goes on to quote the density figures from these two surveys, which in the case of offices are around 18 sq m per worker (net internal area) both in RTP (1997) and DTZ (2004)[12]. It also reproduces the ratios from the EP Guide which we have shown at Table 3.1 above - which are based in part on RTP's 1997 study – but labels them as floorspace per worker, contrary to the original Guide, which as we have seen refers to floorspace per work*space*.

3.14 In practice, most planning documents, including employment land reviews and other evidence bases, tend to follow this guidance. Most such documents use the headline ratio of 18 sq m for offices and interpret it as floorspace per worker.

3.15 Since the 2004 DTZ study there has been just one large-scale regional survey of floorspace per worker, produced by RTP with King Sturge and Ramidus Consulting in

[9] Office of the Deputy Prime Minister, Employment Land Reviews – Guidance Note, A Report to ODPM from Environmental Resources Management, December 2004

[10] Roger Tym & Partners for SERPLAN, The Use of Business Space: Employment Densities and Working Practices in London and South East England, 1997

[11] DTZ for SEERA, The Use of Business Space and Changing Working Practices in the South East, 2004

[12] This is a rounded figure. More precisely, averaged F/L ratios were 17.9 in the RTP study and 18.3 in the DTZ study. The former figure related to the former Rest of the South East (RoSE) region and the latter to the South East region as currently defined.

2006 for the London Development Agency and covering London only[13]. Based on net internal area, this found a London-wide F/L ratio of 16.2 sq m per worker (net internal). It also found geographical variations across the capital, with ratios of 14.4 in the Central Activities Zone, 14.7 elsewhere in Inner London and 20.5 in Outer London. In the particular case of London this suggests that space in more expensive areas is used more intensively, but as we shall see this is not a general feature of office densities.

3.16 The 2006 London study also considered whether floorspace per worker in offices might be changing over time. The study investigated this through a review of earlier research, case studies and its own business survey. It concluded that many office occupiers, had been working to reduce floorspace per worker, driven by increasing cost pressures and enabled by improving technology and design. The report identified two main kinds of space-saving practices: firstly flexible working methods such as hotdesking, which mean fewer workstations (workspaces) in relation to number of workers, and secondly reducing floorspace per workstation, for example through shifting from cellular to open-plan layouts or reducing support space such as catering. In an extreme scenario, these space-saving practices could potentially reduce floorspace per head by up to 75%.

3.17 But the London study found no evidence that space-saving practices had made a measurable impression on *average* office densities to date. One reason for this was that only a minority of firms were making large reductions in space. Another factor is that not all offices are correctly occupied in line with bet practice norms: many are under-occupied, sometimes dramatically so. Moreover one would expect under-occupation to be more common than over-occupation, because an occupier who needs to expand has the option of taking up additional space without moving out of existing premises, while in order to reduce their space the occupier normally has to relocate to smaller premises. In the UK, it is especially difficult to relocate, because offices are typically let on fixed-term leases.

3.18 Other than the RTP and DTZ studies, there has been no large-scale, statistically robust research on office densities. But there have been a number of smaller-scale publications, some of them based on empirical surveys. Several such publications were reviewed in the 2006 London report and contributed to its conclusions.

3.19 More recently, a further study of office densities was produced by the British Council for Offices (BCO) in 2009[14]. The BCO is a membership body whose members are organisations involved in creating, acquiring or occupying office space. Its purpose is 'to advance the collective understanding of its members, enabling them to work together to create more effective office space'. This study is based on a survey of 88 BCO members, occupying 249 properties. Details of the sample are not provided, so we cannot tell if it is a representative sample, and if so for what geographical area and type of occupier. But, since the sample is formed of BCO members, it seems likely that it was biased towards

[13] Roger Tym & Partners, Ramidus Consulting Limited, King Sturge, for London Development Agency, The Use of Business Space in London, May 2006

[14] British Council of Offices, Occupier Density Study Summary Report June 2009

the larger and more professional occupiers and those which are especially interested in using space efficiently.

3.20 The BCO study finds an average of 11.8 sq m per workspace. Assuming that the average office operates at 85% of capacity, this would translate to 13.9 sq m per worker. The BCO's previous good practice guidance (2005), which suggested 12-17.5 sq m per workspace, has been revised to take account of the 2009 findings.

3.21 As well as surveys which assess what actual office densities are, we have looked at targets, or norms, which indicate what office densities ought to be. One source of such norms is central Government, which is the country's largest office occupier. The Office for Government Commerce (OGC), in its report on The State of the Estate in 2008[15], says that the Government in April 2008 set standards for office space per worker (net internal area) of 10 sq m per full-time equivalent (FTE) in new buildings or major refurbishments and 10-12 sq m in other 'workspace improvement opportunities' such as flexible working. Translated into space per worker as opposed to FTE[16], this would produce a range of roughly 9-11 sq m – much less than the survey-based figures mentioned earlier. But this is as one would expect, because good practice norms measure what should ideally be achieved in a new office or an initiative to improve an existing office, and this by definition is more efficient than the actual average of all offices. The OGC report confirms this, mentioning that the average space per FTE across Government departments is 14.5 per FTE - which is well above target and would equate to around 13 sq m per worker.

### *Additional Evidence*

3.22 Our informal interviews identified a rule of thumb of around 10 sq m per workstation or per worker, with lower figures, such as 7 sq m, used for call centres. Yet again, this probably reflects the views of the larger, more professional and more efficiency-minded companies, rather than all office occupiers. Moreover, our discussions showed that the rule of thumb is applied very loosely; often occupiers allow further space for expansion. In any case, in choosing a new office density is only one of many considerations; other factors, such as location and building features, may be more important. Even though occupiers when taking up space may intend to occupy it as efficiently as possible, practical considerations may mean that the space is never optimally used, or only for a short time.

[15] OGC, The State of The Estate in 2008, A report on the efficiency and sustainability of the Government estate, undated

[16] To provide a rough translation of FTE jobs into total jobs, we assume that 23% of workers are part-time (based on Annual Business Inquiry (ABI) 2008) and these part-time workers on average work 50% of full-time hours (based on the Annual Survey of Hours and Earnings 2009). (Both sets of figures relate to the UK and to Financial and Business Services, which is the main occupier of office space.). If follows that the ratio of total jobs to FTE jobs is approximately 112%.

### *Conclusion*

3.23 Thus, in summary, large-scale surveys form the 1990s and early noughties suggested that average F/L ratio for offices was in the region of 16-18 sq m (net internal) per worker. This evidence was based largely on London and the South East.

3.24 Qualitative evidence suggests that office floorspace per worker may be falling over time, driven by increasing pressures to improve efficiency and enabled by new technology and design, but there are no rigorous statistics to confirm this. The norms or targets used by the more sophisticated occupiers in planning new or redesigned offices show much lower space per head. Over time, actual ratios may fall towards these 'ideal' figures. But we expect that actual averages will always be lower than the ideal, because inevitably some office space will be used less than optimally, and due to fixed-term leases offices are more likely to be under-occupied than over-occupied.

## *The Yorkshire and Humber Survey*

### *Survey Method*

3.25 Our survey sample comprises nearly 1,200 business units employing 24,000 people across Yorkshire and the Humber. This sample was drawn from 11 randomly selected local authorities covering a mix of local authority types. Seven of the local authorities are classified by the ONS as 'predominantly urban', three as 'predominantly rural' and one as 'significant rural' which means mixed urban/rural[17]. Together these authorities account for around half of the region's total employment. The sample was drawn at random from those business units classified in the IDBR to the sectors previously identified by RTP as likely to occupy employment space, or 'B-class sectors' (see Chapter 5 below).

3.26 For each of the business units in the sample, we matched an IDBR record, showing the unit's activity (SIC classification) and employment, to a VoA record showing its type of space and net internal area. Many units were discarded from the analysis because this matching process failed: when presented with their IDBR addresses, the VoA online database responded with an error message. Much of the time, this means that the website is refusing queries due to overloading, so a later attempt to match the same address could be successful. The VoA error message does not distinguish between such overloading and 'real' failure – where an address does not exist in the database. The most likely reason for real failure is inaccurate addressing.

3.27 But a further reason why some IDBR addresses could not be matched to the VoA is that some business units operate from residential addresses, and therefore do not appear on the business rates register. To identify how often this might apply, we compared IDBR addresses to the Royal Mail Postcode Address File, a database which records the number of residential and commercial addresses ('drop points') in each postcode. Around a third of business units, accounting for some 10% of the sample's total employment, are

[17] Urban: Barnsley, Bradford, Kingston upon Hull, Kirklees, Leeds, NE Lincs. Rural: Craven, Richmond, Ryedale. Mixed: Calderdale.

registered by the IDBR postcodes where the Royal Mail only record residential addresses (this proportion does not vary with geographical location or any other factor visible to us). On the face of it, this suggests that 10% of B-class jobs are based in domestic rather than commercial premises. But we cannot be sure that this figure is accurate, because addressing in both the IDBR and the VoA database is imperfect, so some of the businesses registered to all-residential postcodes could be wrongly addressed.

3.28 In our opinion, authorities in setting employment land targets should not make any allowance for people working from domestic addresses, because any such assumptions would be very uncertain. If 10% of B-class workers overall are indeed based at domestic addresses, then ignoring these people would result in the planning system providing marginally too much land. But the over-provision would not be significant, and because planning should not constrain economic growth it is better to slightly over-provide than slightly under-provide land.

*Findings*

3.29 286 units in our sample occupy space which is defined by the VoA as 'offices'. These units employ nearly 8,000 people. These totals exclude units classified to SIC 78, Employment Activities (formerly known as Labour Recruitment), which consists mostly of employment agencies. We have excluded this industry from the analysis of floorspace per worker because the great majority of the people it employs do not work in their employer's office, but on clients' premises.

3.30 The average F/L ratio for offices, based on net internal floorspace, is 15.7 square metres per worker, with a confidence interval of 12.5-18.8 sq m per worker[18]. This is virtually equal to earlier findings from the 2001 EP Guide and the 2006 London study, and some 2 sq m below estimates for London and the South East from the RTP (1997) and DTZ (2004) studies.

3.31 The table below shows average ratios for different types of local authority. For this analysis we use a slightly amended version the National Statistics (ONS) rural-urban typology. We call the ONS's 'predominantly urban' authorities 'urban' and its 'predominantly rural' authorities 'rural'. We also call the ONS's 'significant rural' authorities 'mixed', because these authorities cover a mixture of rural and urban areas, in which neither type predominates. We also separate Leeds from the other urban authorities..

[18] All the averages in our analysis equal total floorspace divided by total employment. Technically, the resulting figure is the mean of individual units' F/L, weighted by their employment.

Table 3.2 Average Office F/L Ratios by LPA type

| Local Authority Type | F/L Sq m | Sample | Av Size Sq m |
|---|---|---|---|
| Leeds | 14.1 | 67 | 610 |
| Other Urban | 17.2 | 176 | 345 |
| Mixed | 13.4 | 19 | 120 |
| Rural | 15.9 | 24 | 196 |
| **Total** | **15.7** | **286** | **381** |

Source: RTP

3.32 Leeds has slightly lower F/L than the rest of the region, though the difference is not statistically significant. One possible reason for this difference is that many of the office occupiers in Leeds are large call centres and back-office data processing centres. Outside our formal survey sample, we looked at very large units, listed in the IDBR as employing 500 people or more, and found anecdotally that many seem to be call centres or back offices and tend to have low floorspace per worker, sometimes as low as 6 sq m. This kind of variation does not lend itself to formal analysis, because there is no way to formally identify call centres and back offices from the IDBR, and across the board there is no statistical relationship between the size of office units and their floorspace per head.

3.33 In rural and mixed local authority areas, the F/L ratio is also slightly below the regional average, though again the difference is not statistically significant. The sample size is small, indicating that the great majority of the region's office units are in urban local authority areas.

3.34 We also tried a finer-grained analysis of urban-rural differences in office densities, using Middle-Layer Super-Output Areas[19] rather than whole local authority areas. This analysis was not productive, because there are too few office units in rural Super-Output Areas: nearly all office units are within built-up boundaries, so even in predominantly rural authorities nearly all offices are in Super-Output areas classed as urban.

3.35 An alternative way of comparing urban and rural employment floorspace-to-worker ratios is the national analysis at Appendix 2 below. This, like the analysis above, suggests that office space per head may be slightly lower in rural than urban areas, but the difference is small and we have no explanation for it.

3.36 Our analysis above has only considered those properties that the VoA classifies as offices. As we discuss in Chapter 5 below, there is no exact correspondence between the VoA's categories and planning use classes. From detailed examination of the VoA schedules it is clear that the VoA's 'offices' category, as well as B1a offices, also includes space which planners would classify to other uses, especially A2, financial and professional services – which covers offices visited by the public, such as bank branches

[19] Middle-Layer Super-Output Areas are statistical building blocks much smaller than local authorities, with an average resident population of about 7,000.

and estate agents. To complicate things even further, some A2 space is classified to 'shops'.

3.37 So in general A2 space in the VoA database is merged into wider categories, mostly offices, and the average densities we have calculated include most A2 as well as B1a offices. But there is one VoA category, called 'bank', which seems to consist wholly of A2 space, and specifically bank branches – though it does not cover all bank branches, let alone all A2 space. There are 22 such units in our sample and they have an average F/L ratio of 30 sq m per worker, well above the average for VoA 'offices'. This is not surprising, since A2 space needs to accommodate customers as well as workers. However, given the small sample size, the figure of 30 sq m per worker is not reliable.

3.38 Other than the factors discussed above, our analysis has not found any meaningful patterns in office F/L ratios. The variation in the ratios is no doubt due to many factors; for example, the RTP studies quoted earlier show that these factors include over-and under-occupation (not all offices are optimally occupied at any one time) and the use of space-saving practices. But these and other explanatory factors are not captured in our data set. Nor would an analysis that includes them necessarily help inform land provision targets, because planning authorities do not know and cannot control these factors and how they change in the future.

## Industry and Warehousing

### *Previous Evidence*

#### *The Research Literature*

3.39 For industry and warehousing, as for offices, a standard reference source on floorspace per worker is the 2001 EP Guide referred to earlier. The Guide uses the same method for industry/warehousing as for offices. Its findings are shown in the table below.

**Table 3.3 Industrial/Warehouse Floorspace per Worker in the EP Guide**

| Gross Internal Area per Workspace sq m | |
|---|---|
| General industrial buildings | 34 |
| Small business units | 32 |
| High-tech/R&D (not science park) | 29 |
| Science park | 32 |
| General warehousing | 50 |
| Large-scale and high-bay warehousing | 80 |

Source: Arup, 2001

3.40 For industrial/warehouse space, the difference between net and gross area is typically 5% or less, so comparisons between EP and other sources are more straightforward than for

offices. As for offices, the sources cited in the EP Guide suggests that its findings on industry and warehousing are largely based on London and the South East.

3.41 The 2004 ODPM Guidance Note, also mentioned earlier, highlights the findings of the RTP and DTZ surveys of London and the South East, in sq m per worker, as follows:

*RTP (1997)*

- Manufacturing 29.7
- Warehousing (general) 40.1

*DTZ (2004)*

- Warehousing (with loading bays e.g. DIY) 78.2

3.42 These figures only relate to London and the South East, and the DTZ figures appears to relate to retail warehousing, which of course is not an employment (B-class) use. Nevertheless, these figures are the assumptions most often used in planning documents relating to employment uses throughout England, probably because there are no comparable studies for other regions.

3.43 In recent years there has been growing demand for large-scale strategic warehouses, often resisted by planning authorities, on the assumption that these kinds of warehouses deliver few and poor-quality jobs. A number of studies have tried to test this assumption, though none have been based on rigorous large-scale surveys comparable to the ones mentioned above. By contrast, on industrial uses there has been very little research.

3.44 The table at Appendix 1 summarises the findings of recent studies, both on warehousing and industrial space. It is difficult to assess the accuracy of these studies, because most are based on small samples and do not provide details of their research method. However, they are broadly consistent in suggesting the following broad ranges:

- 'Standard sheds', both manufacturing and warehousing: 40-50 sq m
- Large warehouses, probably over 10,000 sq m: 80-100 sq m.

3.45 The evidence, both from the RTP and DTZ studies and the smaller studies reviewed at Appendix 1, is that floorspace per worker is far more variable for industry and warehousing than for offices. But one finding that is consistent across all data sources is that the larger the warehouse, the higher its floorspace per worker. For the largest warehouses, of 10,000 sq m and over, average ratios are almost certainly around 90 sq m, though individual units vary widely around this figure.

3.46 A closer look at the surveys we have reviewed suggests that there are some finer-grained differences in density between types of activity and unit sizes:

- Light industrial units generally have lower F/L ratios than either B2 or B8 uses.

- Historically B2 uses had significantly lower F/L ratios than B8 uses, but this has now changed. The recent research suggests that the differential has narrowed and one source even argues that it has been reversed[20].
- Small industrial and warehouse buildings typically have lower F/L ratios than larger buildings in the same use class. In particular, the evidence suggests that large warehouse buildings have higher ratios than smaller ones.

3.47 The lower F/L ratios in light industrial units are likely to reflect the predominantly manual nature of operations in these units, which are typically at the small end of the industrial/warehouse size range. In addition, light industrial units typically incorporate a 10% office content as standard, which in percentage terms may be twice that of a large warehouse or more. As office floorspace typically has much lower floorspace per worker than industrial/warehouse space, this will reduce the overall ratio, and some light industrial units will have more than 10% offices.

3.48 Historically industrial uses may have used less floorspace per worker than warehousing. This is because factories manufactured most of their components on site. But this is likely to have changed due to the off-shoring of labour intensive manufacturing jobs to low labour cost countries, in Asia Pacific and elsewhere. Many factories now perform only limited assembly or finishing tasks. Components and parts are imported and stored onsite so more of the space is devoted to warehousing these components[21].

3.49 In addition, increasing automation within industry is likely to increase floorspace per worker over time. Moreover, floorspace per worker in warehousing may have fallen in some cases as the function of warehouses has changed over time. In particular, many warehouses incorporate a range of value adding activities including in some cases final assembly of goods, leading to a 'blurring of manufacturing and distribution boundaries'[21].

### *Additional Evidence*

3.50 The qualitative discussion below is based both on King Sturge's market experience and on the informal interviews conducted as part of the present study.

3.51 For occupiers of industrial and warehouse premises employment is not generally a significant driver of demand and, therefore, not usually a significant space planning consideration. Instead, occupier requirements are usually much more related to sales growth, the throughput of product that this generates, and customer requirements, such as the customer's order lead time[22].

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[20] GVA Grimley/Cranfield School of Management *Making and Moving The Future Prospects for British Industry*, Spring 2007 suggests the differential has narrowed. AtisReal *Challenging Perceptions of B8 Part 2 – dispelling the myths,* January 2007 suggests it has reversed. However, the B2 evidence in this study was not produced by a new survey but was based on one undertaken for the Black Country Consortium in 2005.

[21] GVA Grimley/Cranfield School of Management *Making and Moving The Future Prospects for British Industry*, Spring 2007

[22] The customer order lead time is the time between when a customer places an order for replenishment and the time when it expects to take delivery of the product.

3.52 As with office accommodation, occupiers of industrial and warehouse premises vary in the way they plan their facilities. In some cases the approach is quite ad hoc (e.g. being based on their existing space and their predicted rate of growth as a business), but in cases involving significant investment the planning process is typically much more rigorous and 'scientific'. For general industrial premises, requirements are largely driven by expected demand for the unit's products. General industrial buildings are often developed bespoke for occupiers to reflect their specific production requirements such as the need to install specialist machinery or the need for special 'clean' rooms.

3.53 For the warehouse planning process typically involves a number of stages.

3.54 First, the function of the warehouse is identified. This is important because the warehouse function will affect the size, design and density of the warehouse. For example, a warehouse whose main purpose is to provide a bulk storage facility will have different property attributes and generate different economic activities compared with another whose purpose is to facilitate the rapid throughput of fast moving product lines.

3.55 Second, having identified the function of the warehouse, the occupier will undertake a location analysis to select an optimum (or least cost) location. This process is normally based on transport modelling, which takes account of inbound deliveries to the warehouse and outbound deliveries to customers. This modelling identifies an 'area of search' for the warehouse and is followed by a detailed analysis of the sites/properties within this area in terms of their comparative road accessibility, labour availability and costs, and property availability and costs.

3.56 Third, the actual design of the warehouse is usually based around an analysis of its operational requirements which will vary according to the function of the warehouse. For example, if the warehouse is a bulk storage facility then the factors considered will include: the forecast sales of each product line; the characteristics of the products including their size and weight and their storage characteristics; an assessment of how much stock needs to be held, having regard to demand, the customers' order lead time and the suppliers' lead time; and storage and handling systems. However, if the warehouse is a cross docking facility where goods are processed through the warehouse without being put into storage, then the factors influencing the design are different and the type of warehouse will be different, typically having less height than a storage warehouse, with a more generous number of doors and more yard space.

3.57 This overview of the warehouse planning process highlights, that whilst for occupiers labour may be part of the cost equation, it is not a factor that usually influences the warehouse design in terms of size of the building or the density of the development.

### *Conclusions*

3.58 The evidence we have reviewed suggests that typical floorspace per worker ratios for industry and warehousing nationally are:

- 'Standard sheds', both manufacturing and warehousing: 40-50 sq m
- Large warehouses, probably over 10,000 sq m: 80-100 sq m.

3.59 The former figure is higher than the ratios generally used in planning, which are derived from surveys that only covered London and the South East.

3.60 The evidence reviewed above suggests that floorspace per head varies with size of unit, so the larger the unit the greater is the F/L ratio. But it does not indicate if there are thresholds or discontinuities in this relationship. Nor does it show if, for units of equal size, there is a real difference in average densities between industry and warehousing.

3.61 Floorspace per head varies greatly between individual units, much more so for industry and warehousing than offices. This is because, unlike for offices, in the industrial/warehouse sector there is no direct link between numbers of workers and amounts of space. In simple physical terms, the purpose of office space is to house people, together with some documents and a little machinery and equipment. In contrast, the purpose of industrial and warehouse space is to store and produce goods, using large amounts of machinery and equipment. So in industry and warehousing the number of workers is a minor consideration in planning for space.

### *The Yorkshire and Humber Survey*

3.62 Our survey method has already been described in the section on office densities, earlier. Below, we report the survey findings for industrial and warehouse space.

3.63 Of our survey sample, around half occupy properties classified by the VoA as factories, workshops or warehouses. The following table shows employment densities in these types of space.

**Table 3.4 F/L Ratios for Factories, Warehouses and Workshops**

| VoA Property Type | F/L Sq m | Count | Av Size Sq m |
|---|---|---|---|
| Factory | 72 | 99 | 4,556 |
| Warehouse | 76 | 150 | 1,315 |
| Workshop | 52 | 312 | 583 |
| **Total** | **67** | **561** | **1,482** |

Source: RTP

3.64 As we have already mentioned, the VoA classification does not quite match planning use classes. Planners make a distinction between warehouses (B8) and industrial properties (B2 and B1c) whereas the Valuation Office classes properties as warehouses, factories or workshops. The workshop category contains most of the smaller properties, seemingly regardless of whether they are used for production or storage/distribution. Large units are generally categorised into either factories or warehouses and these two categories have virtually the same floorspace per worker – some 50% above the ratio for workshops.

3.65 In general, from detailed examination of the VoA records, together with the sector-to-land-use analysis in Chapter 5 below, it seems clear that in classifying properties the VoA does

not pay close attention to whether they are used for production, storage/distribution or a mixture of the two. This seems reasonable, because in our experience these activities often occupy identical buildings (except for large specialist units, such as purpose-build strategic warehousing) and the mix of industrial and warehousing activity in any given building is often difficult to determine. Because industry and storage/distribution generally occupy the same kinds of building, they generally produce the same rental values. Since the purpose of the VoA is to assess rateable values, which are a function of rental values, it seems understandable that they are not especially interested in differentiating between industry and warehousing. For these reasons, in our analysis of floorspace per head we have merged workshops, factories and warehouses into a single category.

3.66 Across all industrial/warehouse space, our survey shows average F/L ratio of 67 sq m per worker, with a 95% confidence interval of 56-79 sq m. The ratio is considerably above those estimated in earlier surveys. This is likely to reflect true regional differences.

3.67 The analysis below shows average densities for different types of local authority. As we did for offices, we keep Leeds separate from the other ONS urban authorities.

**Table 3.5 Industrial/Warehouse F/L Ratios by Type of Authority**

| Local Authority Type | F/L Sq m | Count | Av Size Sq m |
|---|---|---|---|
| Leeds | 61 | 76 | 1,996 |
| Other Urban | 70 | 376 | 1,451 |
| Mixed | 68 | 53 | 1,355 |
| Rural | 60 | 56 | 1,146 |
| **Total** | **67** | **561** | **1,482** |

Source: RTP

3.68 The analysis shows very little difference by local authority. Leeds reports a slightly lower floorspace to labour ratio but the difference is only 10% and not statistically significant.

3.69 The table below shows average densities by type of ONS Super Output Area; which is a noted earlier provide a much finer-grained geography than local authority areas.

**Table 3.6 Industrial/Warehouse F/L Ratios by Type of Super-Output Area**

| SOA Type | F/L Sq m | Count | Av Size Sq m |
|---|---|---|---|
| Urban | 68 | 486 | 1,481 |
| Town & Fringe | 65 | 54 | 1,804 |
| Rural | 48 | 21 | 674 |
| **All** | **67** | **561** | **1,482** |

Source: RTP

3.70 This data would suggest a slightly lower ratio for rural areas; but the sample is very small. This is because even in rural local authorities industrial/warehouse properties are mostly located in built-up areas. If the ratio is indeed lower in rural areas, this could be because

units in these areas tend to be smaller, and as discussed in the next paragraph smaller units on average have less floorspace per worker. Our sample size does not allow us to test this supposition.

3.71 The table below shows how F/L ratios vary by unit size. The ratio goes up steadily with unit size: on average, the larger the unit the more space each worker requires.

**Table 3.7 F/L Industrial/Warehouse F/L Ratios by Unit Size**

| Unit Size, sq m | Sq m per worker |
|---|---|
| <500 | 36 |
| 500-999 | 45 |
| 1,000-2,499 | 67 |
| 2,500-4,999 | 72 |
| = >5,000 | 87 |
| All | 67 |

Source: RTP

3.72 These averages conceal considerable variation. Within each size range, some users use space more intensively, some less. One warehouse could employ lots of workers, packing and handling goods 365 days a year; the next door unit doing the same but with automated plant and another unit only employing only a skeleton staff whose purpose is to secure seasonal goods.

3.73 Shift working is one obvious reason why F/L ratios will vary between units. A three-shift occupier will use its space more intensively than a single-shift occupier.

3.74 The analysis above only considers those properties the VoA classify as warehouses, factories or workshops. But our sample also includes large numbers of more specialist properties, described by the VoA as garages, depots, haulage yards and so forth. These often share similar characteristics to industrial and warehouse space and are also found on industrial estates. Floorspace per worker in these specialist properties are even more variable than in more standard spaces. Many of their workers work off-site. For example our random sample includes a large Council depot that employs around 300 people in just over 2,000 sq m - 7 square meters per worker. Our sample also includes a number of Post Office delivery offices, which report large numbers of employees but little space. We assume this is because most postal workers are not provided with working space in their delivery offices.

3.75 In summary, the business survey shows that industrial/warehouse density ratios vary widely around an average of 67 sq m per worker. There is a direct relationship between unit size and the F/L ratio: the ratio increases steadily with size, from 36 sq m for units below 500 sq m to 87 sq m for those above 5,000 sq m. But there are no visible differences between urban and rural areas. If there are differences between industry and

warehousing they cannot be discerned from our dataset, because the VoA seems not to distinguish clearly between these uses.

## Conclusions

3.76 Based on earlier research and practical experience as well as our business survey, we recommend the following default assumptions regarding floorspace per head in Yorkshire and the Humber:

- Offices 16 square metres (net internal area) per worker
- Industrial and warehouse 67 square metres (gross internal area) per worker.

3.77 The regional employment land study that informed the Yorkshire and Humber RSS[23] used F/L ratios of 19 sq m for offices, 34 sq m for general industry and 50 sq m for warehousing, based on the EP Guide, ODPM Guidance Note and earlier RTP studies. In our opinion the ratios we recommend are preferable because they are based on more evidence, more recent evidence and evidence that is specific to Yorkshire and the Humber.

3.78 We recommend that industry and warehousing be merged because these uses seem to operate at similar densities and mostly from similar buildings (except for large specialist units) and they are often difficult to distinguish in practice, both in formal datasets and on the ground. We recommend that no allowances be made for people working from domestic addresses, because we cannot be sure of the impact of this factor, and if planning is not to restrict economic growth it is better to err on the side of generosity.

3.79 It is often argued that cost pressures, new technologies and new working methods are producing steadily falling floorspace per head in offices. This is certainly true of the more sophisticated office occupiers and of certain sectors and geographical areas, but we cannot be certain that it is true of offices in general, including in the Yorkshire and Humber region. Therefore we recommend that, for the moment, planning in the region should assume no future change in standard office densities. If the ratio does fall in future, we may find that our calculations have over-provided land for offices, but over the five or 10 years until the calculations are reviewed the error will not be large; and if planning is not to stifle economic growth, land provision should err if anything on the generous side.

3.80 Our recommended density ratios are broad standards, which are likely to be correct on average for large areas, but may be misleading for particular places, especially if these places are small. To provide more detailed standard assumptions would require disproportionate effort and may not be useful in setting land provision, because the factors that drive variations in density, such as the future mix of unit sizes and the future extent of space-saving practices, are not known to local authorities or controlled by them.

3.81 Therefore our recommended floorspace ratios should be used as a starting point in employment land reviews setting provision targets for offices, factories and warehouses.

[23] Arup for Yorkshire and Humber Regional Assembly, Regional Employment Land Study Modelling Work, 2005

These ratios are suitable tools for relatively coarse-grained planning, at the level of the region, sub-regions and some individual districts. But they will not necessarily be valid for some other districts and for individual developments or small areas, because employment densities vary hugely between individual units, especially in industrial/warehouse space.

3.82 Therefore, planners will wish to adjust the default densities in the light of local information, especially when planning for small areas or individual developments. For example, if a site is to be occupied by call centres we may assume very low floorspace per worker, in the region of 7-10 sq m. For a site accommodating large sheds of 10,000 sq m or more, whether warehousing or industrial, one would expect high floorspace per worker, around 90 sq m. In contrast, on a site providing small to medium units one would expect a ratio around 40 sq m per worker.

3.83 Where employment space is being lost, for example in the redevelopment of old industrial areas, planners will need to estimate the numbers of jobs that may be lost. Here again, our default density assumptions may be altered in the light of local knowledge. Where old industrial areas are very under-occupied, as is often the case, using standard densities may seriously overstate the employment implications of releasing them for other uses. In such cases, rather than making blanket assumptions about such areas, authorities might wish to find out actual employment numbers.

3.84 To help customise the standard assumptions, authorities should consider researching their areas though local versions of our business survey, matching the IDBR to VoA floorspace data. This should provide a low-cost way of researching local densities and other questions on the use of business space, including questions about particular businesses or sectors and particular parts of the local authority area. For example, authorities could use this method to investigate the requirements of specific priority sectors, or the numbers employed in employment areas being considered for release to other uses.

# 4 PLOT RATIOS

## Evidence to Date

4.1 To help inform development plans, employment land reviews and other evidence base documents must estimate the capacity of land to accommodate new employment floorspace. Most plan-makers first estimate the number of jobs; then the amount of floorspace required to accommodate them; then the amount of land required to accommodate the floorspace.

4.2 The capacity of land to accommodate floorspace is known as the plot ratio and is expressed as the floorspace capacity of a hectare of land. For example a plot ratio of 1:4,000 indicates that each hectare can accommodate 4,000 square metres of floorspace. This is sometimes expressed as a percentage, in this case 40%.

4.3 But there is little empirical evidence to support any assumptions planners make about plot ratios. Most evidence base studies still rely on the 1997 RTP study mentioned earlier, which is quoted the ODPM's Employment Land Review Guidance Note. The 2005 Yorkshire and Humber employment land study assumes 4,000 sq m per hectare, referring to the Guidance Note and RTP studies in the East Midlands and London.

4.4 Alternatively inconsistent and un-evidenced rules of thumb are used. The most common rule of thumb estimate is that each hectare of new greenfield land can accommodate between 3,500 and 4,000 sq metres of employment floorspace; either offices, warehouses of general industrial units (a plot ratio of 35%-40%). Separate ratios for brownfield redevelopment are rarely quoted.

## The Yorkshire and Humber Survey

4.5 To help provide evidence to support employment land planning in Yorkshire and Humber we collected data from around half of the local authorities in the region[24]. We asked each local authority to supply us details of all B-class developments over 1,500 sq m completed over the past five years. We asked for the information needed to estimate plot ratios by geography and land type.

4.6 The data provided classify developments into use classes B1 (business), B2 (general industry) and B8 (storage and distribution) but they do not subdivide the B1 into its component parts of B1a (offices), B1b (research and development) and B1c (light industry). In our analysis we equate the B1 class with offices. We make no reference to class B1b, research and development, because we have no information about it and, as explained in Chapter 3 above, it is a very small category.

[24] Leeds, Doncaster, Wakefield, Bradford, Kirklees, Hull, East Riding, Rotherham, Scarborough

4.7 The table below shows the average plot ratio for greenfield developments. Our sample size was 106 developments over 169 hectares of land.

**Table 4.1 Greenfield Plot Ratios**

| | Sq m per hectare | Hectares | Count |
|---|---|---|---|
| B1 | 3,500 | 54 | 55 |
| B2 | 3,200 | 30 | 23 |
| B8 | 3,500 | 34 | 18 |
| Mixed B2/B8 | 3,100 | 11 | 5 |
| Mixed B1/2/8 | 3,900 | 15 | 5 |
| All | 3,500 | 169 | 106 |

Source: RTP

4.8 The table below shows the average plot ratio for brownfield developments. Our sample comprised 222 developments over 247 hectares of land.

**Table 4.2 Brownfield Plot Ratios**

| | Sq m per hectare | Hectares | Count |
|---|---|---|---|
| B1 | 6,000 | 50 | 94 |
| B2 | 3,300 | 68 | 65 |
| B8 | 4,000 | 45 | 49 |
| Mixed B2/B8 | 4,900 | 5 | 4 |
| Mixed B1/2/8 | 5,000 | 9 | 10 |
| All | 4,100 | 247 | 222 |

Source: RTP

4.9 The analysis shows that the brownfield average plot ratio was very similar to the 4,000 sq m per hectare 'rule of thumb' that is generally in use. Across all developments, greenfield and brownfield, the plot ratio was 3,850 square metres of floorspace per hectare of land. On average brownfield sites had a slightly higher plot ratio of 4,100 square metres per hectare as opposed to 3,500 square metres per hectare for greenfield sites. However this is because of a small number of very high-density B1 office schemes in town centres, which are by nature brownfield.

### *Warehouse (B8) and General Industrial (B2) Plot Ratios*

4.10 Looking at warehouse development, brownfield sites are developed slightly more intensively than greenfield ones. Our analysis shows that on average 4,000 sq m of warehouse floorspace was accommodated on each hectare of brownfield land compared to 3,500 sq metres in greenfield sites.

4.11 But this difference is not significant and could be attributable to other factors. The average size of brownfield sites is only half than our greenfield site sample.

4.12 The plot ratio for general industrial (B2) development shows very little variation by type of land. Both greenfield and brownfield development is around 3,250 square metres per hectare. In each case the average size of development is similar.

4.13 Our analysis of mixed B2/B8 development (where the local authority could not differentiate between B2 or B8 space) shows a slightly higher density of development on brownfield land of nearly 5,000 sq metres a hectare. But the sample is too small for this figure to be meaningful.

4.14 In summary plot ratios of both B8 warehousing and B2 general industrial development are similar at around 3,500 square metres per hectare (35%). There does not appear to be any strong evidence to suggest that planners should use different estimates by land type (greenfield/brownfield).

4.15 This is probably because the key characteristics controlling how dense a site can be developed do not vary significantly by geography. Most B2/B8 units are predominantly single story and the need for circulation space, car parking and other land take does not vary by location very much.

### *Offices*

4.16 For offices, our analysis above shows a large difference in plot ratios between greenfield and brownfield development. Average plot densities for brownfield sites are nearly double that of greenfield; 6,000 square metres per hectare as opposed to 3,500.

4.17 However closer examination of the data shows that the averages are heavily influenced by a small number of very dense town centre schemes.

4.18 We asked the local authorities to tell us the sequential location of each office development. The authorities were able to identify 29 sites as town centre sites, but for most of the sites they were unsure of sequential location. On average, the 29 town centre sties had a plot ratio of 14,600 sq m per hectare. All the town centre sites are brownfield, which heavily influences the overall brownfield average.

4.19 Town centre office densities are very site specific and are largely determined by site constraints and market demand for the specific site; as opposed to any direct relationship to site size. So it is impossible to draw any simple conclusions for town centre sites. However the data do allow us to draw broad conclusions for greenfield sites and large, non town centre brownfield sites.

4.20 For offices, typical plot ratios are in the range of 3,500–4,000 sq metres per hectare; with the exception of town centre office development. For town centre offices each local authority needs to either estimate capacity site by site or estimate averages which take into account their local circumstances. We understand from developers and agents that 6,000 square metres per hectare is often considered a reasonable assumption. At this density developers can offer three or four storey office with limited car parking on most town centre sites. The obvious exception is the centre of major cities and high-density town centres where the height of buildings can exceed 4 or 5 storeys and plot ratios can almost be infinite.

## Conclusions

4.21 For most industrial and warehousing development and for out-of-centre offices, our analysis suggests that plot ratios are between 3,500-4,000 sq m per hectare. This ratio is quite stable across geographies because most development is largely single-storey. Providing space at this density is generally cost-effective for developers because it delivers the space the market wants as efficiently as possible. There is room for car parking and landscaping and office buildings may not require lifts (which can be a considerable expense). In setting land provision targets, we suggest that planners use a standard assumption of 3,500 sq m per hectare. We think that this is slightly preferable to the 4,000 sq m used in the regional employment land study, because it is at the bottom of the range of actual densities, so it implies that, if anything, land provision errs on the side of generosity.

4.22 In town centre office development, however, there is scope for increasing the development capacity of the land by reducing (or removing) car parking, minimising (or removing) landscaping and building upwards. So very high plot ratios, far above 100%, are theoretically possible, and it is very difficult to set a standard. If planners must use a standard ratio, based on our consultations 6,000 square metres per hectare could be a reasonable minimum, achievable on most town centre sites.

4.23 However, in our view it is preferable to avoid blanket assumptions about plot ratios, because such assumptions in some cases will be unreliable. Therefore we suggest that floorspace should be the main yardstick used in planning documents, as is already done in many places. For maximum accuracy, land requirements should be expressed in square metres of floorspace and supply should be measured in square metres of development capacity. In assessing supply, local authorities if possible should use site-specific estimates of development capacity for town centre office sites. For other sites, they should use 3,500 sq m per hectare as a default assumption, which should be overridden where there is specific information to the contrary, for example from planning applications.

# 5 SECTOR TO LAND USE

## Evidence to Date

5.1 To translate jobs into space, it is important to understand that not all employment units occupy what is called employment space. Many jobs (in most places more than half of all jobs) are based in other kinds of space, such as health and educational establishments, shops and leisure premises. These jobs are normally planned for differently to B space. A new hospital or university is likely to have a bespoke land requirement; schools are planned according to the expected numbers of children. From the sectors (industries and services) that make up the whole economy, the employment land review needs to extract the 'B-space sectors' – those that occupy factories, offices and warehouses.

5.2 Traditionally, this mapping of sectors into land uses has often been done on the basis of broad sector categories, assuming that factories are occupied by Manufacturing, warehouses by Wholesaling and offices by Finance and Business Services (FBS). Everyday observation shows that this considerably understates the range of activities that use 'employment space'. For example, many industrial/warehouse units are occupied by construction-related activities such as plumbers and electricians or services such as motor repairs; many warehouses are occupied by activities outside the wholesaling sector, such as postal and courier services; and many offices are occupied by activities outside the FBS sector, including public administration.

5.3 If planning takes no account of these 'additional' B-space activities, it risks seriously under-providing employment land in places where these activities are growing, and over-providing it in places where they are contracting. Typically in our experience, the danger of under-provision applies to industrial/warehouse space, because B-space construction and services have been growing while manufacturing has been declining. Conversely, in some areas there is a danger of over-providing offices, because the public sector has bee losing office jobs and freeing office space.

5.4 Accordingly, Roger Tym & Partners from the early 2000s onwards developed a finer-grained definition of the B-class sectors, based on the 2003 Standard Industrial Classification (SIC), which has been increasingly used in employment land reviews. In its most recent version, this definition broadly assumes that:

- Industrial space is occupied by Manufacturing, plus certain parts of the Construction, Motor Repairs/Maintenance and Sewage/Refuse Disposal.
- Warehousing is occupied by a variety of transport and distribution activities which are widely spread across the Standard Industrial Classification.
- Office sectors are as defined by the ODPM in 2004 in research on town centres[25], plus selected parts of Public Administration and Defence.

[25] ODPM, Producing Boundaries and Statistics for Town Centres England and Wales 2000, Interim Report, April 2004

- Jobs classified to SIC 74.5, Labour Recruitment – which covers people employed through agencies – are distributed across land uses in proportion to the share of each sector in total employment. This recognises that agency workers are employed in the whole economy, not just the B space sectors.

5.5 The regional employment land study that informed the current Yorkshire and Humber RSS, quoted earlier, used a definition of industrial sectors very similar to the above, taken from a 2004 RTP study for the GLA. For offices, the regional employment study used an earlier and coarser-grained version RTP definition, taken from a 2002 study for the GLA, which covered all financial and business services, including all of Labour Recruitment, but excluded all of Public Administration and Defence.

5.6 Some planning evidence bases take a different approach. Rather than assigning whole activity sectors to single types of space, they assume a distribution of each sector's employment across different types of space. For example, it might be assumed that of the jobs in Financial and Business Services 85% are in offices, 5% in factories and warehouses and 10% in other kinds of properties.

5.7 Although assumptions on sector-to-land-use relationships are fundamental to employment land reviews, until now they have not been tested rigorously in practice. This is because researchers have not been able to access detailed SIC data for individual occupiers; which we now have from the IDBR.

## The Yorkshire and Humber Survey

5.8 In this study, we updated the RTP sector-to-land-use assumptions to fit the new Standard Industrial classification (SIC 2007) and used the Yorkshire and Humber business survey to test these assumptions. For each unit in the survey sample, we first recorded the type of space the unit was expected to occupy according to the RTP definition of B-class uses and then compared this with the actual type of space occupied, as shown in the VoA database.

5.9 Appendix 4 shows the detailed results of this research, including the percentage split of each SIC category according to the type of space we found the business units to occupy. Table 5.1 below presents our recommended sector-to-space matrix.

5.10 The matrix is very similar to the original RTP assumptions, but we have made some adjustments in the light of the business survey. For example, we have removed SIC 94, Activities of Membership Organisations, from the B-space definition. Our survey found more than 20 firms in this sector, employing over 270 people. The original RTP definition assumed that these jobs would be based in offices space but we found that around 90% of them were in clubs and social halls. We have also removed SIC 82.99, Business Support Services Not Elsewhere Classified. Our survey shows that jobs in this SIC are distributed across a variety of types of space, with no type predominant. We used to class all these jobs as office jobs but in the survey only one third of them were found in offices.

5.11 Although the matrix presents a simplified version of reality, it does allocate nearly all jobs to the correct type of space.

### *Office Jobs*

5.12 Using the office definition presented in the matrix, our survey finds that 82% the jobs classed by RTP as office jobs are in space defined by the VoA as offices. The remaining 18% of RTP-defined office jobs are in different types of VoA space, most in non-B space (shops and 'other').

5.13 This is probably as a good fit as we can get for office jobs. However, it is important to understand the limitations of our research. Through the business survey we have tested the definition of offices (and indeed industrial/warehouse space) as a whole, not at the level of individual activities. The survey confirms that our definition of offices is broadly right, but it cannot guarantee that it will allocate any individual activity, let alone any individual business unit, to the right type of space. A survey that provides such guarantees would involve a huge sample and disproportionate effort and cost.

5.14 To take an extreme example of a 'difficult' sector, SIC 72, Research and Development, is classed in the matrix as an office sector. In practice, as discussed earlier, based on our experience we believe that R&D takes place in a variety of spaces, which in physical terms are sometimes labs, sometimes offices and sometimes industrial premises, though in planning terms they may be placed in a separate class. On balance, we think that more R&D jobs are in offices than other types of space, but this remains an opinion. It is not an opinion which our survey can test, because there is only one R&D unit in our sample – a reflection of the tiny size of the sector, which as mentioned earlier accounts for one in a thousand of the region's jobs.

5.15 The assumption that R&D activities are based in offices will not be correct in all cases, but on average any resulting error in the calculations will be far too small to affect a district's land provision targets. However, in some places R&D may be a large sector, and it may be known to operate in space other than offices. In such places, the planning authority should adjust our default assumptions in the light of this local knowledge. To improve this local knowledge, it could apply to National Statistics for its IDBR data – which lists all business units, as we have seen – and use our survey method to match IDBR units that show activity sector and employment to VoA records that show types of space.

5.16 In translating SIC sectors into land uses we separate Employment Activities (SIC 78), which mainly consists of employment agencies. Our survey finds that businesses in this sector operate from either VoA offices or VoA shops but we know that the vast majority of the people they employ work elsewhere, on customers' premises. So we recommend that these jobs be split between office, industrial, warehouse and non-B space in proportion to the shares of each type of space in the whole economy.

5.17 Ideally we would like to split B1 office space from A2 space but the data show that this cannot be done, either on the basis of SIC codes or VoA descriptions. For example, in our survey half of bank jobs (SIC 64.191) occupy space described by the VoA as offices and the other half are in space described by the VoA as banks. But the near-neighbour of banks in the SIC, the building societies (SIC64.192), almost all occupy space labelled by the VoA as offices.

### *Industrial and Warehouse Jobs*

5.18 The survey finds that some 80% of jobs classed by RTP as industrial are based in VoA factories, workshops or garages. Approximately 10% are in warehouses and 10% in a mixture of other types of space, including shops and offices.

5.19 Of the jobs allocated by the RTP definition to warehouses, around 50% are in spaces classed by the VoA as warehouses, 15% in VoA workshops, 20% in VoA factories and the remaining 15% in VoA offices.

5.20 These findings confirm that, as we already noted in Chapter 3 above, the VoA does not fully distinguish between space use for production and space used for storage and distribution. This is not surprising; in our practical experience we have found that the distinction is very difficult to make, including for planners, because industry and warehousing largely occupy the same kinds of buildings, many units combine the two activities in proportions that vary over time, and smaller buildings are allowed to shift between the two with no need for planning permission.

5.21 The survey also shows that around one tenth of the jobs which the RTP definition allocates to industry and warehousing are in fact based in offices. Our experience indicates that these jobs are in the administration, sales and marketing functions of industrial, service and distribution firms. A construction or plumbing business, for example, will often have an office that deals with orders, appointments, record-keeping, tax and so forth. In some cases this office will be ancillary to a factory or warehouse and therefore will not count as office space, but in other cases it will be free-standing. If the business is small, the office may be its only premises.

5.22 On average, the fact that a minority of jobs classed as industrial/warehousing are in fact in offices will not significantly distort land provision targets, because the numbers involved are small. But in some areas, probably the most highly urbanised, this may not apply and many business units classified to industry/warehousing sectors may be office units. Where this is the case, planning authorities should adjust the standard assumptions in our matrix in the light of local knowledge. Again, such local knowledge could be enhanced through a local version of our survey, in which the authority obtains the IDBR from National Statistics and matches it to VoA data online.

5.23 As with offices, the assumptions in the matrix are correct on average, but they do not necessarily work for individual sectors or business units. At the level of individual business units, for example, there are many instances of untypical sector-to-land-use relationships, and some of the units involved may be so large that they impact on district-wide land requirements. Thus a transport operator, for example, may employ hundreds of people who according to the matrix are expected to need warehouse space, but in reality work all over the country or region, driving vehicles or maintaining equipment, so they need virtually no workspace at all.

## Conclusions

5.24 The matrix of SIC to space in Table 5.1 provides the correct type of floorspace for almost all B space jobs. Its accuracy increases if the industrial and warehouse categories are merged, because, as we have seen, the VoA records do not draw a clear line between production and storage/distribution. At the level of broad provision targets, merging industry and warehousing should not cause any problems in planning, because as we have seen these uses operate largely in similar buildings and at similar densities – with the exception of large specialist units, which may be specially allowed for in calculations.

5.25 Overall, the matrix very slightly over-provides B-class floorspace because our survey shows that some of the jobs we expect to occupy factories, warehouses or offices are actually in non-B space; including shops and retail properties. But the leakage is only 10% - 5% to shops and 5% to other properties - and moreover it may be offset if some of the sectors assigned to non-B space on occasion use B space, as we believe is likely[26].

5.26 Within the B class, our matrix slightly overstates industrial/warehouse requirements and understates office requirements, because some of the jobs that the matrix allocates to industry and warehouses are in offices, and the leakage in the opposite direction is smaller. Overall, we feel that this distortion is too small to be a problem, but in individual areas it could make a significant difference and calculations should be adjusted accordingly.

5.27 Like the density assumptions discussed in Chapter 3 above, our sector-to-land-use matrix is robust for large areas, but not necessarily for small areas or specific sectors, let alone individual businesses. So the matrix is an effective tool for relatively coarse-grained planning, but its usefulness will diminish as the area being planned for gets smaller. To provide a finer sector-to-land-use mapping in our opinion would involve disproportionate effort and expense. In particular, we do not think it is helpful to create a more complicated matrix, in which jobs in individual sectors are split between different land uses. In our opinion, the sample sizes needed for such analysis would be too large, and the confidence attached to the findings too small, for the analysis to be useful.

5.28 Accordingly, we recommend that the matrix at Table 5.1 be used to provide default assumptions in setting employment land targets, and that in setting broad targets the industrial and warehouse categories be merged. We feel that these assumptions are preferable to those in the 2005 regional employment land study because they are based on evidence that is more recent and specific to the Yorkshire and Humber region.

5.29 Like the density assumptions discussed in Chapter 3, the assumptions in the matrix may be adjusted to take account of local circumstances and to incorporate local knowledge. As we have also discussed in Chapter 3, authorities may choose to increase this local knowledge by conducting a smaller-scale version of our business survey, matching IDBR to VoA data.

[26] This opinion was not tested in the Yorkshire and Humber business survey, because, as explained earlier, the survey only covered units which based on RTP's existing assumptions were expected to occupy B-class space.

Table 5.1 Recommended Sector-to-Space Matrix

| Industrial Sectors | SIC (2007) | Activities |
|---|---|---|
| Manufacturing | 15-33,<br>95 | ▪ All manufacturing<br>▪ Repair of computers and personal and household goods |
| Some Construction | 43.2, 43.3,<br>43.9, | ▪ Electrical, plumbing and other construction installation activities<br>▪ Building completion and finishing<br>▪ Other specialised construction activities |
| Motor Vehicle Activities | 45.2, 45.4 | ▪ Maintenance and repair of motor vehicles<br>▪ Sale, maintenance and repair of motor cycles and related parts and |
| Sewage and Refuse Disposal | 37, 38 | ▪ Sewage<br>▪ Waste collection, treatment and disposal activities |
| Employment Activities (part)[27] | 78 | |
| **Warehousing Sectors** | **SIC (2007)** | **Activities** |
| Wholesale | 46 | |
| Freight Transport by Road | 49.41 | |
| Removal services | 49.42 | |
| Storage and Warehousing | 52.10 | |
| Other Supporting Land Transport Activities | 52.21 | |
| Cargo Handling | 52.24 | |
| Post and Courier Activities | 53 | |
| Packaging Activities | 82.92 | |
| Employment Activities (part) | 78 | |
| **Office Sectors** | **SIC (2007)** | **Activities** |
| Publishing | 58.1 | |
| Motion Picture, Video and TV programme activities | 59.11, 59.12, 59.13, 59.2 | ▪ Motion picture production activities<br>▪ Motion picture programme post production activities<br>▪ Motion picture distribution activities<br>▪ Sound recording and music publishing activities |
| Programming and broadcasting activities | 60 | ▪ Radio broadcasting<br>▪ TV programming and broadcasting activities |

[27] SIC 78 covers all workers employed through agencies. These workers operate in a wide range of activities throughout the economy. Therefore we allocate them across the whole economy, both to B and non-B sectors, in proportion to each sector's share of total employment.

**Office Sectors** continued

| | | |
|---|---|---|
| Computer programming, consultancy and related activities | 62 | ▪ Computer programming activities<br>▪ Computer consultancy<br>▪ Computer facilities management activities<br>▪ Other IT and computer activities |
| Information Services | 63 | ▪ Data processing<br>▪ Web portals<br>▪ Other information service activities |
| Financial & Insurance Activities | 64, 65, 66 | ▪ Financial services, except insurance and pension funding<br>▪ Insurance, reinsurance and pension funding except compulsory social security<br>▪ Activities auxiliary to financial services and insurance activities |
| Real Estate Activities | 68 | |
| Legal and Accounting Activities | 69 | |
| Activities of head offices, management consultancy activities | 70 | |
| Architectural and engineering activities, technical testing and analysis | 71 | |
| Scientific R & D | 72 | |
| Advertising and market research | 73 | |
| Other professional, scientific and technical activities | 74 | ▪ Specialised design activities<br>▪ Photographic activities<br>▪ Translation and interpretation activities<br>▪ Other professional, scientific and technical activities nec |
| Renting and leasing activities | 77.4 | ▪ Leasing of intellectual property and similar products |
| Employment activities (part) | 78 | ▪ Activities of employment placement agencies<br>▪ Temporary employment agencies<br>▪ Other human resource provision |
| Security and investigation activities | 80 | |
| Office admin, office support and other business support activities | 82.1, 82.2, 82.3, 82.91, 82.99 | ▪ Office admin and support activities<br>▪ Activities of call centres<br>▪ Organisations of conventions and trade shows<br>▪ Activities of collection agencies<br>▪ Other business support service activities |
| Administration of the State | 84.1, 84.3 | ▪ Administration of the State & economic & social policy of the community<br>▪ Compulsory social security activities |

Source: RTP

5.30 On a technical note, most employment forecasts split the economy into about 20-30 broad activity sectors. These sectors are not detailed enough to be used in our sector-to-land-use mapping, which in some cases uses finer-grained sectors. For example we count as a B-space activity only part of Construction industry (SIC 43.2, 43.3 and 43.9), whereas the forecasts only show the whole of Construction (SIC code 43). To estimate future employment in those 'sub-sectors' which are not identified separately in the forecasts, we assume the future share of each sub-sector's employment in the larger sector of which it forms part remains constant. If, for example, in the base year SIC codes 43.2, 43.3 and 43.9 accounts for 40% of all construction jobs in the study area, we assume that they will continue to account for 40% of al construction jobs throughout the forecast period.

# 6 'MARGINS'

6.1 In employment land planning, the word 'margin' covers many kinds of adjustments made in calculating land requirements. Here we split these adjustments into two groups, firstly dealing with loss of existing sites and secondly providing for land in the pipeline, competition, choice and uncertainty.

## Losses of Existing Employment Land

6.2 In calculating future land requirement for a given employment use, the starting point is net employment change – the future change in the stock of jobs over the plan period, equal to the jobs to be gained in new and expanding employment units, minus the jobs to be lost in closing and contracting employment units. Therefore the resulting land requirement also represents net change, i.e. the change in the stock of employment land, equal to the land that will be gained through new development and change of use, minus any existing employment land that may be lost to other uses.

6.3 In order to turn this net land requirement into proposed employment land allocations, we need to translate it into a gross requirement, or gross gain – an estimate of the new land that should be identified for employment, regardless of any existing land which will be lost to employment. To arrive at this gross requirement, we need to add to the net requirement already calculated a further quantity of land that equals the expected future loss and will replace that loss. If this adjustment is not made and significant amounts of existing employment land are lost in future, the planned land supply will fall significantly short of what is needed to accommodate the employment target for the area.

6.4 The replacement of existing sites lost to employment by new sites is often described as churn. But the word 'churn' is ambiguous, because it sometimes refers to quite different things, such as the turnover of occupiers within the existing stock of buildings – which is not relevant to our present subject. – or the margin which should be allowed for choice, competition and so forth - which is discussed later in this report. Therefore, for the sake of clarity, in the discussion below we do not use the word 'churn'.

6.5 In existing planning documents, there are four main approaches to the calculation of losses and gross change. The first and simplest, adopted by many planning authorities, is to ignore the issue and confuse net and gross change. This is not helpful, because it produces misleading results which are wide open to challenge, and as noted earlier it risks under-supplying employment land, especially in places where large losses of existing space are occurring – which in practice means most places.

6.6 The second approach is to make a blanket assumption that a given percentage of the existing stock will be replaced each year, and of this replacement a given proportion will need to be on new sites. We consider that this approach is unsatisfactory, for two reasons: there is no empirical evidence on what proportion of the stock is replaced each year, and common sense suggests that this proportion varies widely between places, so blanket assumptions will be inaccurate.

6.7 The third approach to estimating future losses is to project past losses, where known, to the future plan period. This does not seem unreasonable, but it is open to the obvious objection that the future may be very different from the past. If this method is to be used, the authority needs to look carefully at past losses and use local knowledge to make a judgment on how the future might compare with the past.

6.8 The fourth approach to losses is that, as part of its employment review or other evidence base work, the authority conducts a qualitative assessment of its existing employment sites and areas, to identify those which could or should be lost to employment uses, either because they are no longer suitable or viable for employment or because they are needed for a higher-priority use, such as housing. Based on this assessment, the employment land calculation can develop different scenarios to illustrate possible futures, and plan for new sites accordingly.

6.9 The Yorkshire and Humber regional employment land study, which we have already referred to, notes that any employment land lost over the plan period should be replaced, providing a similar explanation to that in paragraphs 6.2-6.3 above. But it does not include any advice on whether or how any future losses should be estimated.

6.10 In our view, the fourth method we have described, in which the planning authority specifically identifies employment sites and areas that may be lost to other uses, is by far the most robust way of dealing with loss of existing employment sites. As well as informing land provision targets, the qualitative assessment of existing employment sites is useful and necessary because it will support policies that safeguard such sites. Without robust site assessments, authorities are at serious risk of losing employment land to other uses which can and should be kept for employment. Conversely, they also risk protecting sites which do not deserve protection, because they are no longer suitable or commercially attractive for employment, and should be replaced by better sites in the interest of sustainable economic growth. In Yorkshire and the Humber it is especially important to avoid this risk, in order to deliver the key strategic objective of economic restructuring.

## Choice, Competition etc

### *Methods*

6.11 In an area where the planning system provides exactly enough land each year to meet the calculated requirement, it is almost certain that land supply in practice would fall short of demand, and hence development and employment growth would fall short of the target. One reason for this is that at any one time some development and redevelopment sites will be in the development pipeline – and thus not actually delivering jobs and floorspace. Indeed some sites may remain in the pipeline for a long time or forever, if they are constrained by factors such as bad ground conditions or lack of infrastructure. Moreover, there would be no room for choice or to accommodate the qualitative requirements of different occupiers and developers, and because occupiers and developers have no choice landowners may enjoy monopoly power. Finally, a precise match between requirement and provision would mean that there is no room for error: if the planning

authority were to underestimate demand for any reason, business occupiers and developers would be forced out of the area by lack of sites.

6.12 All this suggests that to meet market demand and policy targets there should be a margin, or allowance, so provision is above the predicted requirement. Existing employment land reviews and other evidence base studies do not provide either a detailed account of what the margin is for – many just say it is needed for smooth operation of the market – or an accepted view on how it should be calculated.

6.13 Many studies allow a margin not supported by any evidence. Often this is set as a percentage of the total requirement over the plan period. This is not helpful, partly because the size of the margin increases with the period being considered, which is logically wrong.

6.14 In some other studies, the margin is set as proportion of the employment land stock which should be vacant at any one time. The Yorkshire and Humber regional employment land study uses this approach and estimates the correct, or natural, vacancy rate as 10% for B2/B8 uses, taken from a 2004 RTP study for the GLA, and 5% for B1, taken from a 2002 Hertfordshire employment land study. These benchmarks are based on judgment rather than empirical evidence. Irrespective of the actual rates used, one disadvantage of the vacancy-based method is that it does not take account of levels of development, whereas in practice one would expect the margin to be higher in places where the expected quantum of development, and hence the land provision target, is higher. To take a hypothetical example, in an area where the stock of office land is 100 hectares and we expect two hectares to be developed each year, if there are 10 hectares (10% of 100) of allocated land undeveloped at any one time this might be considered a satisfactory margin, because it would take five years to use up. But if we expected 10 hectares to be developed each year, the margin of 10 hectares might look tight, because it would run out after just one year.

6.15 In this study and outside this study, we aimed to find a better way of estimating what the margin should be. We first tried an approach that splits the margin into two:

i) Land which at any one time is identified for employment uses, but is still in the planning and development pipeline, so it is not available to deliver jobs.

ii) A further allowance for choice, competition and uncertainty.

6.16 Below, we discuss these two elements in turn.

6.17 With regard to the first element, how much land is in the pipeline will depend on the amount of future development and how long each site spends in the pipeline. Thus, to take a hypothetical example, if development amounts to 10 hectares a year and each site spends one year in the pipeline, then at any one time there will be 10 hectares in the pipeline. If 10 hectares a year are developed annually and each site spends two years in the pipeline, at any one time there will be 20 hectares in the pipeline, and so forth.

6.18 So we tried to estimate how long on average development sites spend in the pipeline, through discussions with local authorities at steering group meetings/workshops convened for this study and informal follow-up discussions. We found that there are no

analysable formal data on how long sites spend in the pipeline. We also found that, in the opinion of all knowledgeable people, even if an average 'gestation period' could be calculated, it would not make sense to use it as a benchmark, because the period varies too widely. Thus a town centre redevelopment, an urban extension or even a single plot affected by major constraints might take 20 years to come to fruition, while a in a more straightforward scheme the time from planning permission to completion might be a year or less. Therefore, we concluded that the margin could not be calculated by estimating the time that sites sped in the pipeline. In our opinion, to take forward this line of investigation would involve grossly disproportionate effort.

6.19 We now turn to the second question set out above – how much of a margin should be allowed for choice, competition and uncertainty? We thought that the property industry might have rules of thumb to determine whether there is too much or too little land identified for employment. But, from discussions with property consultants and agents as part of this study and outside this study, we found that there is no such rule of thumb. The property industry does have views about land supply, but these views tend to be based on qualitative judgment rather than quantitative criteria.

6.20 In summary, therefore, our initial approach to the margin, based on estimating its two components separately, has proved unfruitful. So we turned to an alternative approach, which does not attempt to split out components, but looks at what the margin, considered as a whole, has been in practice.

6.21 To apply this alternative method, one would need to collect data on the size of actual development pipelines (outstanding planned supply) and actual take-up across many areas and/or dates, and calculate the resulting years supply indicator – the ratio of the pipeline to average annual take-up – for each place and date. One would then make an econometric analysis of the years supply ratio against indicators of market pressure, such as vacancy rates and rental change, to see what level of supply in relation to the pipeline seems to result in a balanced market. Alternatively, as a short cut, one might simply calculate an average ratio over time and space and assume that this provides a reasonable norm.

6.22 There is a model for this approach in research on the central London office market, produced as part of evidence bases supporting the London Plan[28]. Based on sophisticated time-series analysis, this research concluded that for a healthy market outstanding permissions should provide just over three years supply of office sites – that is, enough capacity to cover three years worth of land take-up (development). Its definition of supply did not include planning allocations. This is a reasonable approach in central London, where virtually all development is brownfield and there is almost no new land to be allocated for development. But in most other places development sites allocated but not yet permitted will be a significant component of future planned supply.

[28] London Property Research & DTZ Research, London Office Monitoring Project - Stage II (Benchmarks) SDS Technical Report Ten, Greater London Authority, 2001. For an up-to-date analysis see Ramidus Consulting with Roger Tym & Partners for Mayor of London, London Office Policy Review 2009, Greater London Authority, 2009

### *Evidence*

6.23 We have attempted an analysis of land supply against demand in Yorkshire and the Humber, using local authorities' Annual Monitoring Reports (AMRs). In this analysis, we have used the most recent annual take-up as a proxy for future demand and the total employment land 'available' (RSS indicator BD3) as a measure of outstanding land supply. We found that the volume of supply was hugely variable, both in absolute terms and in relation to demand. At the top of the range, North Lincolnshire reports almost 1,000 hectares of employment land 'available' and neighbouring North East Lincolnshire 600 hectares. Across Yorkshire and the Humber, eight authorities report more than 20 years supply against their latest annual take-up. At the other extreme, five authorities have less than 10 hectares 'available'.

6.24 There are possible explanations for these variations. We know that in Lincolnshire, for example, many of the allocated sites are identified for estuary uses; most of these allocations are very old and are likely to be rolled forward into new plans because of their specialist nature. In the authorities with almost little no identified supply, most new space is windfall development; for many smaller, rural authorities this may be an acceptable way of providing the limited amount of new space they require. More generally, our experience across the country leads us to expect that some allocated sites may never come forward in practice, because they are commercially unattractive, unsustainable or physically constrained.

6.25 We also suspect that the amount of land in development plans at least partly reflects the age of plan. A new plan is likely to allocate more land than an older one where choice allocations have already been taken up.

6.26 It is of course possible to calculate average amounts of outstanding supply and average ratios of this supply to annual take-up. But in our view these averages would not provide any kind of useful guideline as to what level of supply is normal or desirable, because the variation – which reflects very large differences in local circumstances - is far too large.

6.27 Whatever the reasons, we conclude that there is no empirical method to determine what margin of land supply should be allowed for a well-functioning market.

6.28 As an alternative approach, therefore, we have looked at existing practice. In the light of common sense and the London research discussed earlier, it seems to us that the best practice is found in the rule of thumb which suggests that planning should provide a five-year reserve of deliverable land. As we have seen, this approach is adopted in the Yorkshire and Humber Plan and broadly speaking in PPS4, although in the latter case it only applies to town centre uses (including offices) and there is no mention of deliverability. It is also used in a number of other plans, including in the West Midlands RSS both in its current version and emerging Phase 2 Revision, and it parallels national policy on housing in PPS3. From informal discussions with the authors of some of these documents, we understand that there is no empirical basis for the five-year land reserve; it has been adopted because it was considered reasonable.

### *Conclusion*

6.29 In our opinion, the most robust way to allow for constraints, competition, choice and uncertainty is similar to the approach already adopted in the Yorkshire and Humber Plan and the West Midlands RSS, and advocated by the new PPS4 for offices: authorities should ensure that at any one time they have enough readily available (unconstrained) land to meet the gross provision target for each employment uses (including the land required to replace future losses) for the next five years.

6.30 The emerging West Midlands RSS (Stage 2 Revision) defines 'readily available' as follows:

*'A site is defined as readily available if ALL the following conditions are met:*

- *The site EITHER has planning permission AND/OR is allocated for economic development in the development plan AND/OR is committed by an appropriate Council resolution*
- *[It has] no major problems of physical condition*
- *[It has] no major infrastructure problems in relation to the scale of development / activity proposed*
- *The site is being actively marketed.'*

6.31 We know from experience that the last criterion is problematic in practice because in depressed markets landowners are reluctant to market sites. Also if the plan proposes regeneration or structural change (which probably requires public intervention) then it is unlikely that the market will be actively marketing sites prior to that intervention.

6.32 So we suggest that the last criterion, regarding sites being actively marketed, should not be used as policy but as advice. Ideally all sites in the five-year supply should be actively marketed but in some cases the authority may justify a site's inclusion because it has evidence that in normal market conditions, a willing buyer and a reasonable landowner, the site would be offered for development.

6.33 Local authorities should also identify a longer-term indicative supply to last for the whole plan period. This longer-term supply does not necessary need to be available today. But authorities must have reason and evidence to show that it will become available over the life of the plan and that the profile and phasing of new land can maintain the five-year rolling reservoir.

6.34 In our opinion, development planning documents should also identify the extent, nature of development and boundary for sites expected to form broadly the next 5-10 years of supply; so easing the process of getting planning permission for the sites and providing developers and funder's certainty. But for the longer term land should only be identified in broad terms.

6.35 In applying these recommendations, it should be borne in mind that they cover only the quantitative aspect of land supply – how much land should be provide for offices and industry/warehousing respectively. Qualitative issues are beyond the scope of this report but will be at least as important in practice. Authorities in identifying land for employment

need to ensure that it is commercially attractive – especially to priority sectors and clusters - and sustainable, and that its locations are in line with the spatial vision for the area. If the development plan focuses on quantitative targets only, at the expense of these qualitative issues, there may be pressure to release easy but unsustainable greenfield sites to meet the target, while policy-preferable urban sites, which may be more difficult to develop, do not come forward.

# 7 CONCLUSIONS

7.1 New government policy in Planning Policy Statement (PPS)4, published in December 2009, endorses the core approach of the Yorkshire and Humber Plan to planning for economic land uses. Based on these strategic policies and the analysis presented earlier, our recommendations are as follows.

*Sector to land use*

- Planning authorities in the region should base their employment land provision on employment growth targets, in line with the Yorkshire and Humber Plan and PPS4.
- To translate these employment targets into land requirements, they should first translate employment change by industrial sector into employment change by land use, using the matrix provided in Chapter 5 above. This will produce future employment numbers for offices and for industry/warehousing.

*Jobs to land*

- To translate these future jobs into floorspace requirements, as a default authorities should assume floorspace per worker of :
  - 16 sq m (net internal) for offices
  - 67 sq m (gross internal) for industry and warehousing.
  - These standard ratios may be replaced by more specific assumptions based on local knowledge.
  - To translate floorspace into site area, default assumptions should be 3,500-4,000 sq m per hectare for industry, warehousing and out-of-town offices.
  - It is very difficult to set a standard plot ratio for town centre offices. Consultations suggest around 6,000 sq m per hectare but our survey, in which town centre offices are mostly in Leeds, shows a ratio of some 14,000 sq m per hectare.
  - Wherever possible authorities should avoid blanket assumptions about plot ratios, certainly for town centre offices, because such assumptions are likely to unreliable.
  - Therefore we suggest that floorspace should be the main yardstick used in planning documents, as is already done in many places.
    - Land requirements (demand, targets) should be expressed in square metres of floorspace.
    - Supply should be measured in square metres of development capacity, which should be estimated individually for large sites and collectively, based on geographical areas, for smaller sites.
    - The plot ratios we have estimated should be used as defaults where no specific estimates are available.
    - For present purposes we suggest merging industry and warehousing into a single land use, because they operate mostly from similar buildings and at similar employment densities and are often difficult to distinguish in practice.

### *Losses*

- To convert net into gross land requirements, planning authorities will need to estimate the existing employment space that may be lost in future and provide additional land to replace these losses.
- For this, authorities as part of their evidence bases should conducts a qualitative assessment of its existing employment sites and areas, to identify those which could or should be lost to employment uses, either because they are no longer suitable or viable for employment or because they are needed for a higher-priority use, such as housing.
- Based on this assessment, employment land calculations should develop different scenarios to illustrate possible futures, and plan for new sites accordingly.
- As well as policies and decisions regarding new development sites, this qualitative site assessment should inform policies on the safeguarding or release of existing employment sites.
- Such policies are especially important in Yorkshire and the Humber, in order to deliver the key strategic objective of economic restructuring.

### *Choice, Competition and Uncertainty*

7.2 To allow for site constraints, choice, competition and uncertainty, authorities should provide a five-year supply of readily available sites at all times, as the Yorkshire and Humber Plan already requires.

7.3 It is important to bear in mind that this advice relates only to quantitative land provision targets. As well as the quantity of land, planning authorities of course should consider qualitative requirements, to ensure that employment land allocations are commercially attractive and sustainable, that their locations fits into agreed spatial strategies and that they provide land for priority sectors and clusters.

### *Further Research*

7.4 Readers should bear in mind the limitations of our research. As discussed earlier, to provide a fuller understanding of the factors that drive the demand for employment land owe would need to build econometric models that incorporate the impact of many factors beyond numbers employed, including output and productivity, technical change and economic cycles. This task is far beyond our present brief. As part of the evidence base for planning in Yorkshire and the Humber, it would involve disproportionate effort and cost.

7.5 In this report, therefore, we have stayed within the traditional approach based on employment densities and provided broad standard assumptions, which may be altered to reflect local circumstances. To improve their knowledge of these local circumstances, authorities may wish go to the data sources used in our business survey. The IDBR for any local authority area, available from National Statistics, will provide a list showing the activity and employment of all local business units. Matched to the VoA online data, it can provide quantitative data on employment densities for any group of businesses, including

specific sectors and localities, and individual businesses that may be of particular interest to the authority.

Yorkshire Forward

# PLANNING FOR EMPLOYMENT LAND
## TRANSLATING JOBS INTO LAND

ROGER TYM & PARTNERS
Planners and Development Economists

Appendices

March 2010

# APPENDIX ONE

## Industrial and Warehouse Densities; Recent Evidence.

# INDUSTRIAL AND WAREHOUSE DENSITIES; RECENT EVIDENCE

| | Sq M | Sq Ft | Comment including factors creating variations |
|---|---|---|---|
| **King Sturge / Cranfield School of Management, April 2003** | | | |
| Modern warehouses of 9,290 m² (100,000 ft²) and over. | 95 | 1,023 | Based on a survey of modern warehouses of 9,290 m² (100,000 ft²) and over. Density of 1 per 95 m² includes drivers. If drivers are excluded the weighted average density changes to 1 per 109 m² (1,173 ft²). |
| **JLL/University of Reading, July 2004** | | | |
| B8 on business parks | 84 | 900 | If the single largest B8 occupier is removed the adjusted average is 64.3 m² (690 m²). |
| Non-B8 industrial on business parks | 37 | 400 | |
| **ProLogis study, Spring 2006** | | | |
| | 95 | 1,023 | Based on a survey of 33 businesses occupying ProLogis warehouses (typically of 100,000 ft² and over. Employment density figure includes drivers. |
| **East Midlands Strategic Distribution Study, MDST, 2006** | | | |
| B8 Distribution | 83 | n/a | Survey of 14 warehouses at Magna Park, Leices |
| **AtisReal Part 2 study, January 2007** | | | |
| B1c | 43 | 462 | |
| B2 | 84 | 902 | |
| B8 average | 52 | 552 | |
| B8 smaller scale | 43 | 465 | B8 smaller scale defined as under 23,225 m² (250,000 sq ft); |
| B8 standard sheds | 50 | 534 | B8 standard sheds defined as between 23,225 m² (250,000 sq ft) and 46,450 m² (500,000 sq ft); |
| B8 mega sheds | 60 | 647 | B8 mega sheds defined as over 46,450 m² (500,000 sq ft). |
| **GVA Grimley/Cranfield School of Management, Spring 2007** | | | |
| Manufacturing | c. 40 | 430 | Manufacturing densities have fallen over the past decade whereas distribution densities have increased. |
| Distribution | c. 55 | 590 | |

Source: King Sturge 2009

# APPENDIX TWO

## Employment Densities in England and Wales

## Employment Densities in England & Wales

Here we briefly compare Y&H to other regions. We do this using simpler 'top down' statistics; comparing VoA floorspace statistics, published by CLG, with ABI employment data.

This data is slightly different from our sample discussed in the main report. Our 'top down' analysis takes all VoA reported factory[1], warehouse or office floorspace divided by all jobs in sectors we think should occupy that space (from the ABI); which is a simpler and probably cruder analysis that ours above.

The top down analysis is also likely to show that space is used less intensively that our survey. This is because it in because it includes all vacant space whereas our sample only includes occupied space. The top down analysis also excludes some jobs our sample captures; most noticeably these self employed[2].

So the 'top down' analysis should not be used to estimate the employment capacity of property; but here it can help illustrate potential differences in F/L ratios between the regions.

### *Factory and Warehouse F/L Ratios in England and Wales*

The chart below shows average 'top down' F/L ratios for factory and warehouse space in England and Wales. The floorspace data is published by Central Government (CLG) using data supplied by the Valuation Agency.

In their analysis CLG combine workshops with factories to make a single 'factory' classification. But we know from our data that many workshop units are effectively smaller warehouses (i.e. B8 not B2) so when presenting the data we refer to CLG 'factories' as more generic 'industrial' space.

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[1] The data is drawn from CLG floorspace statistics. CLG combine VoA factories with VoA workshops.

[2] We know that around 7% of the total stock of industrial and warehousing space in Y&H is currently vacant and being offered to the market according to the published agents' statistics. But the true vacancy rate, including properties which for one reason or another are not being marketed is probably much higher.

Table A1 Top Down F/L Ratios for industrial and warehouse space in England and Wales

Sq m per worker

| | Industrial | Warehouse | WH & Ind |
|---|---|---|---|
| East Midlands | 66.5 | 100.5 | 77.7 |
| East of England | 56.7 | 88.9 | 68.5 |
| London | 43.8 | 57.3 | 51.3 |
| North East | 78.3 | 112.8 | 87.0 |
| North West | 64.5 | 106.6 | 78.5 |
| South East | 50.0 | 68.5 | 57.2 |
| South West | 52.8 | 91.6 | 65.0 |
| West Midlands | 72.1 | 105.3 | 83.2 |
| Yorks & The Humber | 78.1 | 102.7 | 86.1 |
| Wales | 77.0 | 101.6 | 83.3 |
| **Average** | **64.0** | **89.4** | **72.9** |

Source: ONS, CLG & RTP (ABI 2007)

The data shows that F/L ratios vary across England and Wales. Simplistically floorspace is used less efficiently the further the region is from London and the South East.

The fact that the South East is noticeably different is important to note given that the most comprehensive research to date is based on our work in 1997 for SERPLAN (later the South East Regional Planning Body). The F/L ratios we calculated for the South East are commonly used outside of the region because they are quoted in the English Partnerships guidance as potentially being suitable to use nationally; but this may not be appropriate.

There could be a variety of reasons why ratios in the South East are so different. This could partly be because land is more expensive, so floorspace is used more efficiently. But we suspect the primary reason is that the industrial structure of London and the South is different (which is only partly a reflection of land prices). We know from our survey of Y&H that the overall F/L ratios are influenced by large industrial factories and large warehouses, neither of which are as common in the South East of England as elsewhere in the Country.

The fact that F/L ratios could be at least partly related to industrial structure can be seen if we look at top town ratios using the ONS classification of local authorities in England[3]. Using this classification order, shown in figure A2 traditional industrial areas use space less efficiently than other local authority areas.

However this does not mean that local authorities should plan new space at these ratios. The top down densities will be heavily influenced by the areas existing industrial structure and particularly traditional industry whereas most new development is likely to be occupied by newer sectors. Also it is likely that there is a far higher quantity of vacant (and underused) space in 'traditional' manufacturing areas. New space is likely to be occupied more efficiently.

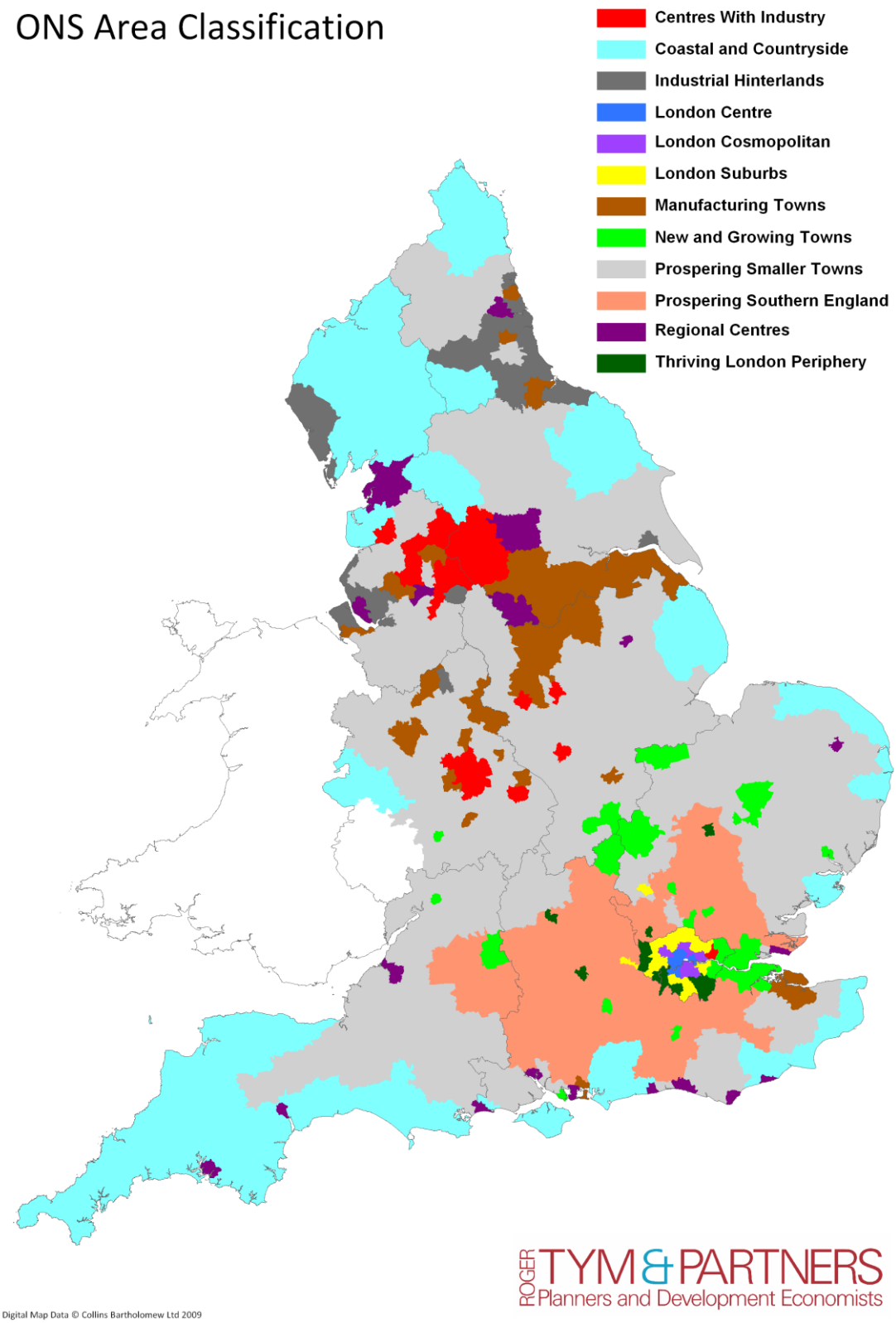
[3] http://www.statistics.gov.uk/about/Methodology_by_theme/area_classification/

Table A2 Top Down F/L Ratios for industrial and warehouse space by ONS LA type. Square metres per worker.

| ONS Area | | Industrial | Warehouse | WH & Industrial |
|---|---|---|---|---|
| 1.1 | Regional Centres | 57 | 96 | 71 |
| 1.2 | Centres with Industry | 76 | 109 | 86 |
| 1.3 | Thriving London Periphery | 40 | 60 | 49 |
| 2.4 | London Suburbs | 44 | 71 | 57 |
| 3.5 | London Centre | 33 | 28 | 30 |
| 4.6 | London Cosmopolitan | 62 | 78 | 70 |
| 5.7 | Prospering Smaller Towns | 61 | 93 | 72 |
| 5.8 | New and Growing Towns | 57 | 101 | 75 |
| 5.9 | Prospering Southern England | 41 | 60 | 49 |
| 6.10 | Coastal and Countryside | 62 | 96 | 71 |
| 7.11 | Industrial Hinterlands | 72 | 108 | 82 |
| 7.12 | Manufacturing Towns | 77 | 104 | 85 |

Source: Source: ONS, CLG & RTP (ABI 2007)

Figure 1 ONS Area Classification



### *Office F/L Ratios in England and Wales*

The average 'top down' ratio for England and Wales is approximately 1:20 and London is slightly less efficient at 1:20.5 square metres per worker. The East Midlands is the most efficient region.

**Table A3 Top Down F/L Ratios for Office space in England and Wales**

| | Office |
|---|---|
| East Midlands | 17.2 |
| East of England | 19.3 |
| London | 20.5 |
| North East | 19.1 |
| North West | 20.2 |
| South East | 18.9 |
| South West | 18.8 |
| West Midlands | 21.6 |
| Yorks & The Humber | 20.0 |
| Wales | 18.4 |
| **England & Wales** | **19.7** |

Source: ONS, CLG & RTP (ABI 2007)

Looking at 'top down' densities using the ONS 2001 local authority classification confirms the fact office ratios do not vary much by geography.

There is no evidence of any rural / urban variance. The Regional Centres (which are urban local authorities) record the same densities as very rural Coastal and Countryside authorities and almost the same as the rural Smaller Towns. The New and Growing Towns classification (which includes the mainly urban Thames Gateway, Milton Keynes and other growth towns) report similar densities to their nearby rural authorities.

However as with industrial and warehousing densities the data suggests that industrial and manufacturing areas use space less intensively. But for offices the variance is small and not simple to explain. Industrial Hinterlands and Manufacturing Towns (which are all in the North of England) report the same densities as the Thriving London Periphery. London also reports densities similar to traditional industrial areas.

So there is no reason for planners to use different F/L ratios for different types of local authority and probably no justification to vary ratios between regions. Our 15.7 sq m per worker estimate (net internal, occupied space) is likely to be equally valid across England.

Table A4 Top Down F/L Ratios for Office space in England by ONS area classification. Square meters per worker.

| ONS Area | | Office F/L Ratio |
|---|---|---|
| 1.1 | Regional Centres | 17 |
| 1.2 | Centres with Industry | 21 |
| 1.3 | Thriving London Periphery | 23 |
| 2.4 | London Suburbs | 21 |
| 3.5 | London Centre | 20 |
| 4.6 | London Cosmopolitan | 21 |
| 5.7 | Prospering Smaller Towns | 18 |
| 5.8 | New and Growing Towns | 20 |
| 5.9 | Prospering Southern England | 19 |
| 6.10 | Coastal and Countryside | 17 |
| 7.11 | Industrial Hinterlands | 23 |
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Source: ONS, CLG & RTP (ABI 2007)

# APPENDIX THREE

## Employment Densities in Retail Foodstores

# Employment Densities in Retail Foodstores

This study sought to confirm F/L ratios for traditional B space floorspace i.e. offices, warehouses and general industrial space. But the method could be extended to cover most types of floorspace. As an example we estimate F/L ratios for retail foodstores in Y&H.

Estimating employment densities for foodstore operators is much simpler than most other sectors. This is because as retail consultants we maintain a database of supermarkets including how much floorspace is in each store. This data can easily be matched to IDBR employment data.

Outside of the sample discussed in the main report we matched 640 retail foodstore records across the Yorkshire and Humberside Region. Combined these stores employ nearly 55,000 people. Using our floorspace data and the IDBR employment data we can estimate F/L ratios for foodstores of different types and sizes.

Retail floorspace is calculated differently to other types of floorspace. The key measurable is normally a stores sales area (net sales area) as opposed to the stores gross size. Table A5 shows F/L ratios for foodstores using the net sales area. Table A6 shows F/L ratios using gross areas; we don't have gross floorspace for data for smaller stores.

The 2001 English Partnerships guidance suggests a gross F/L ratio of 20 for foodstores. Our data shows that this figure is still appropriate, on average supermarkets and superstores require between 18 and 20 square metres (gross) for each job.

The noticeable exception is the discounters and to a lesser extent freezer halls. We don't have gross floorspace data for these operators but our analysis of net sales area shows discounters require one worker for every 46 square metres of net sales area; compared to between 10 and 13 square metres for normal supermarkets. Freezer halls require 15 square metres net per worker.

However our analysis shows that when quoting the employment capacity of new retail floorspace planners should not simply compare the number of new retail jobs to those created in other types of floorspace. This is because retail jobs are much more likely to be part time.

Table A5 Average F/L Ratios for foodstores in Yorkshire & Humber (Net Sales Area). Square Metres per worker.

| | Total Employment | Full Time Employment | Part Time Employment | Floorspace (net sales) sq.m | Average size (net sales) sq.m | Total Emp F/L | Full Time F/L |
|---|---|---|---|---|---|---|---|
| Convenience Store | 5,011 | 2,343 | 2,668 | 51,872 | 197 | 10 | 22 |
| Discounter | 987 | 235 | 752 | 45,058 | 751 | 46 | 192 |
| Freezer Hall | 764 | 125 | 639 | 11,796 | 437 | 15 | 94 |
| Supermarket <2,500 sq.m net | 9,824 | 5,910 | 3,914 | 128,396 | 662 | 13 | 22 |
| Superstore >2,500 sq.m net | 27,774 | 12,451 | 15,323 | 271,630 | 3,574 | 10 | 22 |
| Superstore >5,000 sq.m net | 9,845 | 3,533 | 6,312 | 114,414 | 6,022 | 12 | 32 |
| Grand Total | 54,205 | 24,597 | 29,608 | 623,165 | 975 | 11 | 25 |

Source: RTP & ONS

Table A6 Average F/L Ratios for foodstores in Yorkshire & Humber (Gross Area)

| | Total Employment | Full Time Employment | Part Time Employment | Floorspace (Gross) sq.m | Average size (net sales) sq.m | Total Emp F/L | Full Time F/L |
|---|---|---|---|---|---|---|---|
| Supermarket <2,500 sq.m net | 8,568 | 4,938 | 3,630 | 174,962 | 1,087 | 20 | 35 |
| Superstore >2,500 sq.m net | 27,774 | 12,451 | 15,323 | 491,035 | 6,461 | 18 | 39 |
| Superstore >5,000 sq.m net | 9,488 | 3,414 | 6,074 | 177,970 | 9,887 | 19 | 52 |
| Grand Total | 45,830 | 20,803 | 25,027 | 843,967 | 3,310 | 18 | 41 |

Source: RTP & ONS

Across Yorkshire and Humberside our IDBR data shows that around 30% of all jobs are part time. But in food stores around 55% of jobs are part time.

Discounters and freezer halls employ very few full time staff. For supermarkets and superstores the proportion of full time staff varies by store size.

Larger food stores employ proportionally fewer full time members of staff than smaller format stores. In a very large format store only 1/3$^{rd}$ of the staff are employed full time. But in a smaller supermarket 60% of employees are full time.

The data shows that a 10,000 square metre gross superstore/hypermarket employs (on average) 150 more workers than a store 2/3rds its size; but only 20 of these are likely to be full time. The additional 130 are part time workers.

**Table A7 Percent age of Jobs which are Full-Time by type of store**

| | Full Time Jobs (%) |
|---|---|
| Convenience Store | 47% |
| Discounter | 24% |
| Freezer Hall | 16% |
| Supermarket <2,500 sq.m net | 60% |
| Superstore >2,500 sq.m net | 45% |
| Superstore >5,000 sq.m net | 36% |
| Retail Total | 45% |
| Y&H Total | 70% |

Source: RTP & ONS

# APPENDIX FOUR

## SIC to Space