

CHAPTER 7

Residential Density and the Demand for Urban Land

INTRODUCTION

7.1 The relationship between residential density and the amount of land needed to accommodate development has been the subject of long-running debate in the UK and overseas. PPG1 highlights the role of the planning system in securing economy and efficiency in the use of land and, as our review of development plans shows, making efficient use of land and reducing pressure for greenfield development are commonly-stated purposes for density policies.

7.2 The 1992- based household projections, which indicate that an additional 4.4m new households might have to be accommodated in England between 1991 and 2016, have renewed interest in the relationship between density and the urban footprint.

IN SEEKING TO SECURE THE EFFICIENT USE OF LAND, THE MOST SIGNIFICANT LAND SAVINGS ARE TO BE MADE BY MINIMISING DEVELOPMENT AT THE LOWEST DENSITIES

7.3 There is a linear relationship between net residential density and the amount of (residential) land needed to accommodate a given population, but successive increases in net residential density produce diminishing land savings.

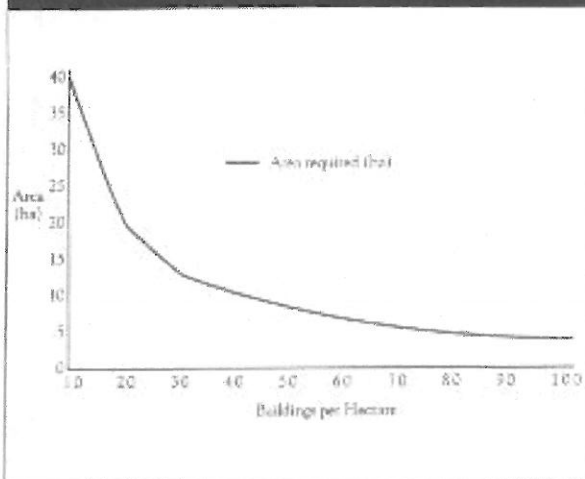
7.4 For example, while increasing net density from 10 to 20 DPH would reduce the amount of residential land needed to accommodate 1,000 dwellings from 100ha to 50ha, a similar 10DPH increase at a higher density – say, from 40 to 50 DPH would reduce the land requirement by only 5ha.

The research findings presented in this chapter show that:

- in seeking to achieve the efficient use of land, the greatest potential land savings are to be made by minimising the amount of development below about 20 DPH;
- residential density cannot be viewed in isolation from the need for supporting facilities and the demands for other urban land uses;
- the significance of residential density on the overall urban land requirement decreases as the proportion of non-residential uses increases; and
- the ability of new development to utilise spare capacity in existing facilities and services may influence overall land take more than the density of new residential development.

7.5 The implication is that, in seeking to secure the efficient use of land, the most significant land savings are to be made by limiting the amount of development below 20 DPH, rather than by increasing typical densities of 40 DPH and higher. Nevertheless, the aggregate land savings which will result in the latter case may have to be significant when viewed at either a district or material level. If the efficient use of land is an important objective, this suggests the need for minimum density standards.

Area Required to Accommodate 400 Dwellings at Different Net Densities



20DPH - Warren's Hall Farm, Sandwell



55DPH - Grovelands, Sandwell

7.6 As the following sections show, this basic relationship is subject to a number of largely self-evident, but important, caveats.

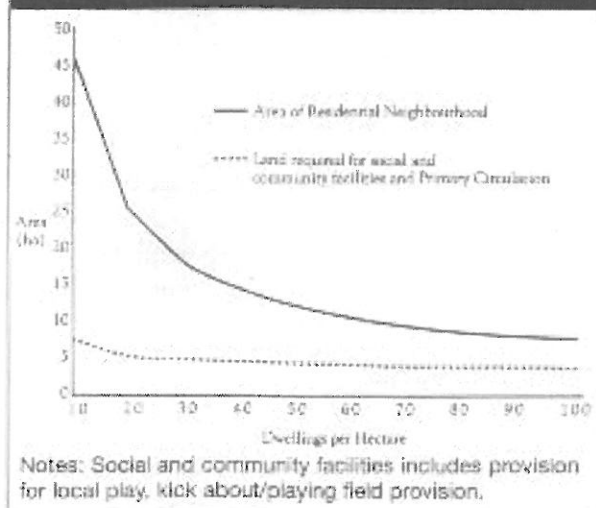
THE DENSITY OF RESIDENTIAL AREAS CANNOT BE VIEWED IN ISOLATION FROM THE DEMAND FOR OTHER LAND USES

7.7 Housing is the predominant land use in most town and cities, and the one throwing up the greatest demand for new development, but it cannot be viewed in isolation from the demand for other urban land uses.

7.8 At the local level, residential areas require community and social facilities, such as schools, open space, health centres and local shopping. The extent to which these are provided will depend on the size of the residential community and existing provision nearby. However, the emphasis on reducing travel demand and on building sustainable communities underscores the need to ensure that people are provided with good quality facilities close to home.

7.9 The point, in terms of the relationship between net residential density and the demand for land, is that the demand for such facilities, and the area required to accommodate them, arises more from population and its age and social structure than from the density of development.

Land Required to Accommodate 400 Dwellings including an allowance for local facilities



7.10 One may argue that more public open space will be needed where residents have less private space, or conversely that higher densities may provide opportunities for economies of provision. But as a general principle, the area needed for a primary school, or for a local open space meeting

needs for children's play, active sports and passive recreation, will not vary greatly with the density of the residential development.

7.11 Therefore, in looking at the overall amount of land needed to accommodate a residential community, a proportion of land given over to schools, open space and other community facilities will remain relatively constant regardless of density. The implication of this constant allowance for social and community facilities is that increases in net residential density now produce smaller marginal land savings than was the case in the first example where no allowance was made for supporting facilities. For example, doubling the net density from 10DPH to 20DPH now produces a 45% land saving compared to 50% before, while the increase from 40DPH to 50DPH saves 15% compared to 20%.

7.12 Density can however exert an important influence on the ability of an area to support a range of services (including public transport) as well as the pattern of provision and thus peoples' access to facilities. For example, an increase in net residential density from 30 to 40 DPH would (assuming an average household size of 2.2 persons) increase the population living within a 10 minute walk of a district centre (97.5ha) by around 5,500 persons. This could help extend and sustain the range of facilities provided not least in view of the forecast decline in average household size. It could also reduce the amount of land required to accommodate the population by around 80ha.

7.13 While the majority of new residential development will take place on comparatively small sites, that will not in itself require the provision of a new school or a new park, the development will still be contributing to the demand for such facilities. It would be wrong therefore to assume that provision for supporting facilities only needs to be taken into account in large or free-standing developments. Where new residential development in aggregate is generating the need of new community facilities, the land needed for them should be taken into account in considering the impact of residential density on overall urban land requests.

7.14 At the broader level it is clear that new residential development – and more importantly the people occupying the housing – can add to the demand for other services and facilities, such as shopping, employment, entertainment and leisure as well as higher order health and education facilities.

7.15 The extent to which new residential development results in a demand for new urban land will depend:

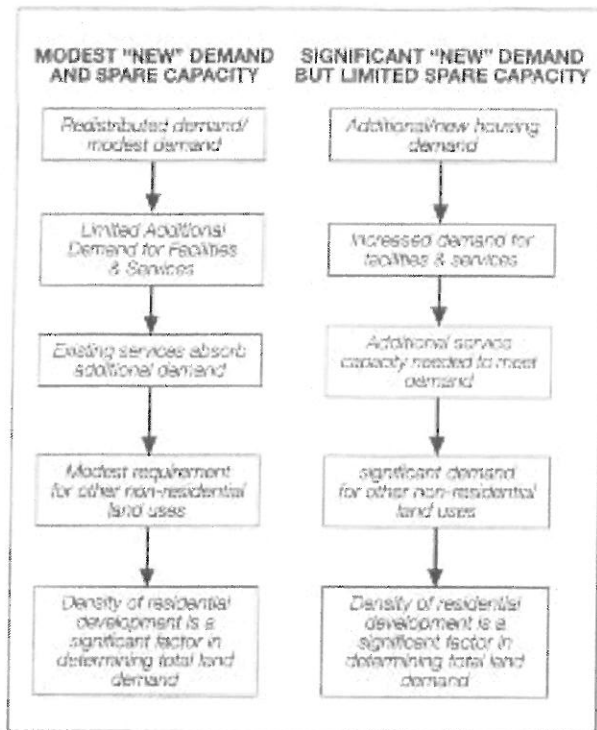
- on the extent to which the residential development reflects additional or new demand as opposed to relocated existing demand (i.e. the same population living in more dwellings); and
- the capacity of existing facilities to absorb the additional demands.

7.16 Where thresholds are crossed new facilities will be needed and so the overall demand for urban land will increase.

7.17 This means that the relationship between changes in net residential density and the overall demand for urban land will be variable.

7.18 Where new residential development is driven by population growth, and the additional demands created by the increased population lead to increased demands for other non-residential uses, then the residential component of the total urban development would be smaller and the impact of changes in net residential densities on the total urban area would be much reduced.

7.19 Conversely, where new residential development reflects household rather than population growth, and existing urban services (schools, shops, leisure and entertainment facilities etc.) are able to absorb much of any increased demand, then the residential component of the new urban development will be larger and the impact of changes in net residential density on the overall urban area more significant. These relationships are summarised opposite.



THE ABILITY OF NEW DEVELOPMENT TO UTILISE SPARE CAPACITY IN EXISTING FACILITIES MAY INFLUENCE OVERALL LAND TAKE MORE THAN THE DENSITY OF NEW DEVELOPMENT

7.20 This discussion highlights the importance of the nature of the demands generated by new dwellings and the people occupying them, as well as the ability of existing facilities and the wider urban system to absorb some or all of these additional demands. The key variable in this, is which planning policies can influence the location of new residential development.

7.21 Indeed, in looking at the overall demand for urban land, the analysis suggests that locating new residential development in places where it can utilise spare capacity may be as, or more, important than its density in determining the overall demand for urban land.

CHAPTER 8

Measuring Density for Different Purposes

INTRODUCTION

8.1 This chapter is concerned primarily with the practicalities of using density as a planning tool. This may be to:

- calculate development land requirements;
- estimate site capacities; and/or
- control development on individual sites.

The research findings discussed in this chapter indicate that:

- density is a useful tool in estimating development land requirements or site capacities; but
- its effectiveness depends on applying the correct density measure to an appropriately defined site/development area;
- in terms of residential development the appropriate definition of site/development areas will vary according to the level and purpose of the application, but in general:
 - a "town or district density" is appropriate where a major mixed use development, such as a new settlement or major town extension is being planned;
 - a "neighbourhood density" is appropriate where a residential neighbourhood or urban quarter is being planned;
 - a "gross development density" may be appropriate where residential development is to take place on a number of adjoining sites which have not yet been precisely defined;

- a "net site density" is appropriate where only residential uses are being planned on a site;

- a "net developable site density" is appropriate at the level of detailed site planning and development control, especially where there are areas within a site which are not to be developed; and

- the appropriate definition of site/development area will vary at different stages of the planning and development process.

- the correct density measure will also vary according to the level and purpose of the application, but in general:

- dwellings per hectare is the most appropriate measure for estimating development land requirements, making housing land allocations and monitoring completions/take-up;

- dwellings or habitable rooms per hectare is useful in providing a broad indication of the intensity/form of development envisaged on a site or area; but

- neither dwellings nor habitable rooms is effective in predicting or controlling the form of development on a site – planning standards or plot ratio (building footprint and height) are more effective;

- other measures, such as bedspaces or child bedspaces, can be useful in particular circumstances;

- similar principles apply to the definition of site/development areas for commercial/mixed-use development; and

- *plot ratio is an effective means of controlling development volume, especially in areas where there is not an existing townscape context.*

DENSITY IS A USEFUL TOOL IN ESTIMATING DEVELOPMENT LAND REQUIREMENTS OR SITE CAPACITIES

8.2 The review of current practice in chapter 4 shows that density assumptions play an important part in estimating the development land requirements arising from a new dwelling requirement/forecast, but also occasionally from projections of employment growth.

8.3 Indeed without an assumption about how many "units" can be accommodated in a given area it would be impossible to move from forecast demand (homes or jobs) to an estimate of how much land will be needed.

THE EFFECTIVENESS OF DENSITY AS A PLANNING TOOL DEPENDS ON APPLYING THE CORRECT DENSITY MEASURE TO AN APPROPRIATELY DEFINED SITE/DEVELOPMENT AREA

8.4 While the principle of the approach is straightforward – a dwelling requirement or a site area is divided or multiplied by a density assumption to produce an estimate of the development land required or a site capacity – the practical application is more complicated and is dependent in particular on the appropriate definitions of site/development areas, as well as, to a lesser extent, on using the correct density measure.

8.5 Selecting the appropriate definition of site/development area is important. Where non-residential uses, such as main roads, retail, employment and major open spaces, are being planned in conjunction with housing, an allowance needs to be made in the density assumption for the land that will be occupied by these non-residential uses.

8.6 At the site-specific level, if density controls are to produce the expected results, a density standard must be carefully related to the area accommodating the development.

8.7 At different stages in the planning of a new development area the definition of the site/development area will be refined from an overall density which embraces the full range of urban uses down to one which includes only the residential component of an individual site. As the focus narrows and the area becomes smaller the residential density assumption, in terms of the number of dwellings or habitable rooms per hectare, will rise.

THE DEFINITION OF SITE/DEVELOPMENT AREAS

A "town or district density" is appropriate where a major mixed use development such as a new settlement or major town extension is being planned

8.8 To estimate the land area required to accommodate a mixed-use development with a given number of dwellings, or the housing capacity of a development area, a residential density, which allows for the non-residential components of the scheme will be appropriate. This will tend to be a low "gross" density, which is perhaps best described as "town or district" density.

A "neighbourhood density" is appropriate where a residential community or urban quarter is being planned

8.9 A "neighbourhood density" which makes allowance for the provision of facilities/services (such as open space, play areas, primary schools and local shops) will be appropriate where a new residential community is being planned.

8.10 As well as being used to estimate a site area requirement, or dwelling capacity, a neighbourhood density would be an appropriate way of allocating housing land for development where the development is of a scale which requires the provision of local community and social facilities.

8.11 As more detailed master planning and design work is undertaken and individual housing sites are

identified within the scheme, it will be possible to ascribe more specific "net site densities" to them. However, it is important that in identifying/allocating the overall development area a density assumption is used that reflects the inclusion of social and community facilities, open space and other non-developable land.

8.12 The danger, of not doing this, is that provision will not have been made for the land needed for supporting facilities and if these are to be provided (and the number of dwellings is to remain the same) then either the development area will have to be enlarged or the net residential density will have to be increased so that the housing element can be accommodated on a smaller proportion of the site.

8.13 A neighbourhood density will therefore include in addition to residential land all the uses needed to support the new housing. These might include roads, open space, schools, local health centres/GPs surgeries, and local shopping as well as roads and cycle ways.

8.14 The density assumption will depend on the proportion of non-residential uses as well as the density of residential development itself. There are two ways in which a neighbourhood density assumption can be arrived at. Either by calculating the achieved neighbourhood density for developed areas which have a similar proportion of non-residential uses, or by going one step ahead and estimating likely net development densities for the residential sites and then applying the dwelling number to the neighbourhood area.

8.15 If the first approach is used it is important that the proportion of non residential uses is similar and that the planning and development standards applied to the "model" development are understood. If for example, the car parking standards applied to the proposed development are higher than in the model scheme or the dwelling sizes/building footprints are larger then the resulting character and impression of density may be higher than anticipated.

8.16 Because of the variables involved and because the area available for development will often tend to become smaller as site features are identified, or

design standards increased, it is important in using a neighbourhood density that a cautious estimate or range is used which can be refined as more detailed design work is undertaken.

Where individual housing sites have yet to be accurately defined a "gross development density" will be appropriate

8.17 A "gross development density" will be appropriate where development will take place on a number of neighbouring sites and where these have not yet been accurately defined. In such cases the definition of the site/development area will include site distributor roads, cycle ways and landscape buffer strips/structural planting (which may define the site boundary/development edge) and the density assumption applied will need to reflect the inclusion of these elements.

8.18 As with a neighbourhood density it will usually be prudent to use a cautious estimate which provides a degree of flexibility and reflects uncertainties about, for example, precise road alignments and junction layouts and the area required to accommodate them.

A "NET SITE DENSITY" WILL BE APPROPRIATE WHEN INDIVIDUAL RESIDENTIAL SITES HAVE BEEN IDENTIFIED

8.19 A "net site density" is a more refined estimate than a gross site density and includes only those areas which will be developed for housing and directly associated uses. This will include:

- access roads within the site;
- private garden space;
- car parking areas;
- incidental open space and landscaping; and
- children's play areas where these are to be provided.

8.20 It therefore excludes:

- major distributor roads;

- primary schools;
- open spaces serving a wider area; and
- significant landscape buffer strips.

8.21 A net site density is the most commonly used approach in allocating housing land in development plans and is appropriate for development on infill sites where the boundaries of the site are clearly defined and where only residential uses are proposed. It is also appropriate where phased development is taking place in a major development area (perhaps spanning different plan periods) and individual housing sites have been identified.

8.22 Unlike gross, neighbourhood and town/district densities, the density assumption used does not need to reflect the inclusion of non-residential uses, but is solely based on the form of housing development envisaged.

A "NET DEVELOPABLE SITE DENSITY" MAY BE APPROPRIATE AT THE LEVEL OF DETAILED SITE PLANNING AND DEVELOPMENT CONTROL

8.23 Within a net housing site area there may be areas which will not be developed for residential purposes such as children's play areas and internal site features such as roads, streams, mature tree groups or, on a contaminated site, areas which are to remain undeveloped because of ground contamination.

8.24 "net developable site density" discounts these elements to leave only that area which will accommodate residential units and it will therefore be of particular interest to the housebuilder.

8.25 However, the definition of a net developable area requires a detailed knowledge of the site and its features. Therefore a net developable site area will probably only be defined where a scheme has been designed for the site, or where an authority have prepared a detailed design brief. Where this work has been done it can be used in allocating housing land, but in majority of cases a less refined definition such as net or gross density will be used –

but this must be in conjunction with a density assumption which reflects the differences between the definition of site areas.

DENSITY MEASURES

8.26 As with the definition of site or development areas the appropriate density measure will vary according to the level and purpose of analysis.

DWELLINGS PER HECTARE IS THE MOST APPROPRIATE MEASURE FOR ESTIMATING DEVELOPMENT LAND REQUIREMENTS, MAKING HOUSING LAND ALLOCATIONS AND MONITORING TAKE-UP/ COMPLETIONS

8.27 Dwellings per hectare/area is well established as the preferred measure in using density to estimate development land requirements, allocating housing land and in monitoring achieved densities/completions. Given that housing demand is expressed in terms of household forecasts and dwelling requirements and satisfied by the provision of dwellings, it is difficult to see any other density measure better suited to this strategic role than dwellings.

DWELLINGS OR HABITABLE ROOMS PER HECTARE CAN BE USEFUL IN PROVIDING A BROAD INDICATION OF THE FORM/INTENSITY OF DEVELOPMENT

8.28 It is important that planners, architects, councillors, developers can visualise what different densities of development will look like when they are considering proposals and alternative design/policy approaches.

8.29 While neither dwellings nor habitable rooms can accurately predict building form, especially at higher densities (see below and chapter 6), they can be a useful measure in articulating the form and nature of development envisaged, and particularly in low to medium density development.

NEITHER DWELLINGS OR HABITABLE ROOMS IS EFFECTIVE IN PREDICTING OR CONTROLLING THE FORM OF DEVELOPMENT ON A SITE

8.30 The research findings presented in chapter 6 "Density and Built Form" show that neither dwellings or habitable rooms are effective in controlling building volume or built form at the site-specific level.

8.31 A key difficulty is that the floor area of dwellings and habitable rooms can vary substantially and this results in a potential variation in the building footprint/volume which is possible within a given density range.

8.32 This can be exacerbated by the way developers (subject to local market conditions) respond to different density measures – for example, building the largest houses at the maximum permitted density where density is expressed in dwellings.

8.33 An alternative system of building footprint and height plot ratio – (which is widely used elsewhere, see Chapter 3) does accurately define building volume. While this is not commonly used to control residential development in the UK, it is more effective than current approaches and especially where higher density housing is being developed (ie because the variations in floor area within individual dwellings/habitable rooms are increasingly multiplied as density rises).

OTHER DENSITY MEASURES CAN BE A USEFUL TOOL IN PARTICULAR CIRCUMSTANCES

8.34 Dwellings, habitable rooms and plot ratio/planning standards are concerned with the quantity and physical form of development, but the demand for services and needs of a residential area are largely determined by the people who live in the houses.

8.35 A fundamental problem is that density measures can only crudely predict occupancy and this will vary over the lifetime of a development, as the life cycle of residents change.

8.36 More refined "potential occupancy measures" such as bed spaces or child bed spaces can be useful in gauging the potential demand for facilities such as schools and children's play. While there is no guarantee that bed spaces will be filled, an analysis of the potential occupancy especially by children is important in ensuring that their needs are properly provided for.

SIMILAR PRINCIPLES APPLY TO THE DEFINITION OF SITE DEVELOPMENT AREAS FOR COMMERCIAL/MIXED-USE DEVELOPMENT

8.37 The same basic principles about relating the correct density measure to an appropriately defined site/development area, apply to commercial/mixed-use development as have been described for residential development.

8.38 A gross development density will be appropriate were a major commercial development – such as a business park – is being planned, and where the density assumption needs to reflect the non-commercial elements within the scheme, such as distributor roads, open space, landscaping and car parking. The volume of development may be expressed in terms of the percentage site coverage or as a plot ratio.

8.39 A net development density will be appropriate where individual site areas have been defined and will relate the volume of development to the site area.

PLOT RATIO IS AN EFFECTIVE MEANS OF CONTROLLING THE VOLUME OF COMMERCIAL DEVELOPMENT

8.40 Plot ratio, which relates the volume of development permitted to the site area directly controls the volume of development, although further specification of building footprint and building height are needed to influence built form.

8.41 Plot ratio can be particularly useful in a new development area where there is no established development context. It also relates directly to value of completed development (i.e.

lettable/sellable floorspace) and, through the application of differential plot ratios, it can be effective in encouraging development either to locate in particular locations (e.g. town centres or transport nodes) or to include a contribution towards improvements to public transport accessibility that would enable higher plot ratios to be developed. The London Borough of Hammersmith and Fulham, for example, has adopted an approach which rewards better levels of public transport accessibility by permitting higher plot ratios. Six bands of accessibility (based on walking times to public transport and the level of service provided) have been calculated. These accessibility bands have then been used to define car parking standards and the development densities allowed. Hence, the better the public transport accessibility the higher the plot ratio and vice versa.

CHAPTER 9

Conclusions and Recommendations on Planning Policies and Practice

INTRODUCTION

9.1 The new sustainable development agenda has brought density back to the forefront of planning debate. Now traditional density concerns about adequate living space are matched by concerns to reduce travel demand and make efficient use of land resources.

9.2 The balance to be struck between these potentially conflicting objectives is hotly debated. Opinion is divided between those who view increased density as fundamental to achieving more sustainable patterns of living and those who see this approach as leading to reduce living standards.

9.3 We have encountered this debate at all levels:

- between strategic and district level authorities;
- between development planners and development controllers; and even
- between different generations of planners.

9.4 This study has specifically not sought to take a view on where the balance should lie – but it does seek to throw light on the debate, by:

- researching the relationship between density and a number of key issues and objectives on which it touches; and
- at a more mundane, but equally important level, considering how density can be used more efficiently and effectively to achieve objectives, whatever the policy approach.

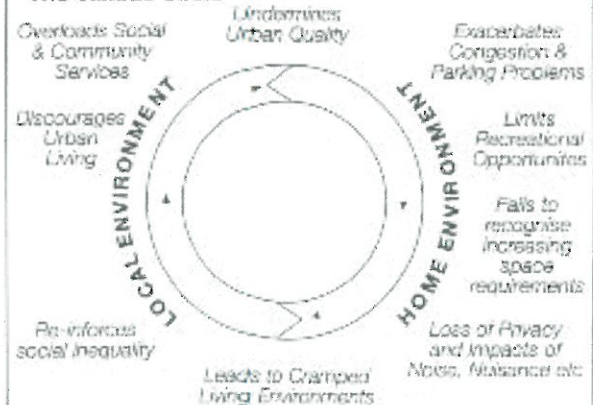
9.5 This final chapter of the report presents the conclusions of the research and sets out some of the key implications and, where appropriate, recommendations for planning policies and practice. An overall study conclusion is followed, first by conclusions on the use of density to achieve planning policy objectives, and then by recommendations on how density can be measured for different purposes.

Competing theories on the impact of increasing residential density

The Virtuous Circle



The Vicious Circle



Overall Study Findings

9.6 At the most general level the research shows that density is a useful concept in addressing a number of key policy objectives and as a planning tool.

9.7 But, density cannot be viewed or applied in isolation from:

- other planning policy objectives;
- other planning tools or approaches; and
- the particular opportunities and/or constraints presented by a site area.

9.8 In short, density can be an aid to good planning practice at the strategic and local levels, but it cannot be a substitute for it. Used simplistically or without an understanding of its implications, density can result in unintended and undesirable effects.

Density and Planning Policy Objectives

9.9 A particular approach to density which supports one policy objective may compromise other policy objectives. The classic example is where a policy encouraging higher-density development close to town centres/public transport could conflict with an objective of protecting existing character (or vice versa).

9.10 But even a single policy approach can result in contradictory effects if it is not properly targeted. For example, while increasing residential density close to the public transport and local facilities will increase the number of people with the opportunity to meet their daily needs on foot or by public transport, increasing densities in areas away from facilities and public transport could further stimulate car dependency, if the development were insufficient to support local facilities and public transport services.

9.11 The role and contribution of density, in achieving the various planning policy objectives identified by authorities in their local development plans is variable. Local authorities need to focus their use of density where it has a real role to play particularly:

- in seeking to reduce travel demand; and
- in promoting economy in the use of land.

9.12 In respect of other stated objectives, such as promoting affordable housing, protecting open space, maintaining character or encouraging good design, density may have a supporting role to play, but its influence will be less direct and other policies and approaches will be more effective.

9.13 For example, the research findings reported in Chapter 6 show that current approaches to the measurement and expression of residential density are ineffective in predicting the volume and built form of development on an individual site and tend, together with standards on overlooking distances, roads and car parking, to produce undistinguished residential environments. Rather than using density policy and generally applied standards, design quality objectives may be better addressed through local and design guides and through site-specific design briefing which reflects the particular characteristics and opportunities/constraints of a site.

9.14 In developing and implementing planning policy, local authorities should ask themselves:

- can density make a significant contribution to achieving the desired policy objective?
- are there other policy objectives which may be undermined or threatened by a particular approach to density?
- does the success or failure of the policy approach depend upon other factors and policies? and
- are there other more effective ways of achieving the objective?

9.15 So, while density will generally have only a supporting role to play in respect of some policy objectives, it can make a significant contribution to reducing motorised travel demand and securing efficiency and economy in the use of land, but even here its role requires more detailed attention.

Density and Demand for Urban Land

9.16 The research findings reported in Chapter 7 show, not surprisingly, that increases in net residential density reduce the amount of residential land needed to accommodate a given number of dwellings.

9.17 However, it highlights two key qualifications to this: first, that successive increases in net residential density produce diminishing land savings, and second that the density of residential areas cannot be viewed in isolation from the other urban land uses needed to support them.

9.18 Both these qualifications have important implications for planning policies at the strategic and local levels:

- the first – that successive increases in net residential density produce diminishing land savings – indicates that the most significant land savings are to be achieved by minimising the amount of development below 20 DPH; and
- the second – that the density of residential areas cannot be viewed in isolation from other urban uses needed to support them – indicates that locating new residential development where it can take advantage of spare capacity in existing social/ community facilities and other urban services (e.g. shops, employment, leisure etc) will reduce the need for other, non-residential, uses and thus the overall demand for urban land.

Density and Reducing the Need to Travel

9.19 Density is an important variable in influencing travel demand, but its significance depends on accessibility to public transport and to at least local facilities.

9.20 In areas where people can walk to at least local facilities and to public transport, promoting higher-density residential development (ie of 40-50 DPH and over) will increase the number of people who have the opportunity to meet many of their daily needs on foot or by public transport.

9.21 But, where public transport accessibility is poor or where facilities are lacking – increasing the

density of development may well be counterproductive. Not only will it increase the number of people who are car dependent, but where they continue to rely on town and district centres for employment and services, it may through increased traffic levels undermine the residential potential of town and district centres.

9.22 Our conclusion about the use of density in addressing these two key policy objectives is that there is a very strong locational component to its effectiveness in practice.

9.23 At a strategic level, most larger towns and cities have the potential to offer the pre-existing social and transport infrastructure, which means that higher populations can be accommodated without pro-rata increases in motorised travel and demand for support facilities.

9.24 At a local level, within the towns and cities themselves, local authorities still need to consider whether a development can utilise space capacity – not all local centres within a strategically appropriate location will be able to either absorb additional households or meet the travel demand and land supply tests.

9.25 In many other locations, particularly those with poor public transport or a lack of existing facilities, raising densities is likely often to be irrelevant to the aims, and even in some cases damaging because it is being applied without regard to the locational dimensions: More households will mean more land for additional facilities (so increases in net residential density will have a less significant impact on total land demand), and car dependency will, if anything, be re-inforced.

The Measurement of Density for Different Planning Purposes

9.26 The review of current practice shows that authorities adopt different approaches and assumptions in using density to estimate development land requirements/site capacities and to control development on individual sites. Variations exist in terms of the extent to which non residential uses are taken into account in the density assumptions made, as well as in the

detailed definition of site/developable areas for density purposes.

9.27 The appropriate approach to density will vary according to the stage in the planning and development process, and the purpose for which density is being used, as well as sometimes the particular characteristics of the site or area. However, it is important that the correct combination of site definition/areas, density assumptions and measures are used and that the approaches and assumptions adopted are transparent.

9.28 Chapter 8 has considered, in some detail, the key issues to be considered in defining site/development areas at different stages in the development process and for different purposes. But, in summary it is recommended that:

- a "town or district density" is appropriate where a major mixed use development, such as a new settlement or major town extension is being planned;
- a "neighbourhood density" is appropriate where a residential neighbourhood or urban quarter is being planned;
- a "gross development density" may be appropriate where residential development is to take place on a number of adjoining sites which have not yet been precisely defined;
- a "net site density" is appropriate where only residential uses are being planned on a site; and
- a "net developable site density" is appropriate at the level of detailed site planning and development control, especially where there are areas within a site which are not to be developed.

9.29 This framework of density terms and levels can provide the basis for a more consistent approach to the measurement of density, but adjustments may be needed to reflect particular circumstances. The key point is that the approach used and the assumptions made must be clearly explained so that users understand the basis of a density calculation/estimate.

9.30 There is less variation in practice in terms of the density measures used, and while the choice of measure can influence effectiveness its impact will generally be less significant than, for example, confusing a net density assumption with a gross site area. Nonetheless, it is important that the relative strengths and weaknesses of different measures are understood and reflected in practice.

9.31 The research findings discussed in detail in chapter 8 confirm that:

- dwellings per hectare is the most appropriate measure for estimating development land requirements, making housing land allocations and monitoring up take/completions;
- dwellings or habitable rooms per hectare is useful in providing a broad indication of the intensity/form of development envisaged on a site or area; but
- neither dwellings nor habitable rooms is effective in predicting or controlling the form of development on a site – planning standards or plot ratio approaches are more effective; and
- other measures, such as bedspaces or child bedspaces, can be useful in particular circumstances.

9.32 The research findings discussed in chapters 2, 3 and 8 confirm that:

- there is widespread recognition of the need for standards to control non-residential and mixed-use building volume, especially where there is no established development context; however
- in England, in contrast to practice in the United States and much of Europe, there is uncertainty concerning the need for building volume controls for non-residential development, and as a consequence few local authorities now include plot ratio density provisions in their development plans. This is unfortunate, given that research shows that plot ratio is an effective means of controlling the volume of development. For example, it is also being used by the London Borough of Hammersmith and Fulham to relate the

amount of development that will be permitted to the level of public transport accessibility.

Hence, it has the potential to encourage development to take place in suitable locations such as where public transport accessibility is high.

IN CONCLUSION

9.33 It is widely recognised that density control and policy have a role to play in achieving more sustainable patterns of development. But the resulting policy thrust, which tends to favour increasing residential density, has given rise to considerable debate about the potential conflicts with the wish to maintain and improve the quality of life in urban areas – also a fundamental objective of sustainable planning policies. Unfortunately, but perhaps not surprisingly, the debate has tended to become emotive and polarised and little consensus has been achieved.

9.34 We hope that this report has been able to throw some light on the complex and tangled issues raised by density control and policy, so that policy makers can better understand where and in what circumstances density policies have a significant role to play; where its influence will be secondary to other policies and approaches; and where they may be irrelevant or counter productive.

9.35 We hope too that the advice on the measurement and analysis of density will help to clarify practice in this area: both in the day to day practice of development control by local authorities and in contributing to an agreement by all sides of the urban capacity debate about the technical basis on which the debate should be held.