CHAPTER 3

International Practice

INTRODUCTION

3.1 This chapter examines on the use of density as a planning tool in the United States and in seven continental European countries. Practice is very varied, both between countries and within them, particularly in the USA with its long tradition of devolution to suit local circumstances. As in Britain, practice is not static; American planners, for example, are continually experimenting with new types of zones and development rights, and in France too there is a live debate on the most appropriate way to measure and control building density.

THE USA

- 3.2 Land-use planning in the US is governed by complex overlapping systems of federal, state and municipal legislation, ordinances and other local forms of nuisance control. I. The abundant supply of land, together with a firm belief in the inviolability of private property rights and a largely agrarian economy led most municipalities to conclude that they did not need a comprehensive land-use plan to control the general scale and location of development. Instead, they adopted local zoning ordinances which enabled residents to determine whether or not land could be subdivided and developed, and the nature of that development.
- 3.3 Growing recognition of the unsatisfactory piecemeal nature of this approach to development control has focused attention on the need for, and role of, comprehensive land-use planning. This has resulted in the development of 'refined' zoning techniques and practices, including the introduction of a larger number of zones, greater flexibility in the exercise of control over Floor Area Ratios (FAR)

and openspace/building ratios, and related performance standards². A growing number of states have passed legislation which requires developers to make a contribution to the cost of infrastructure³.

The research reported in this chapter shows that:

- in US planning, density is one of the measures used as part of the very elaborate local roung packages; Plaor Area Rain (FAR) is a very widespread concept, and minimum lot size is the most commonly-used form of density control;
- Belgian and French planning rely primarily on plot ratio to control building density, but as in Britain there is a complex interdetion with other controls contained in land use plans;
- in Germany, an explicit change has occurred in the rationals for density standards, towards sustainability and reducing the loss of open land, and this is now being incorporated into local plans;
- Italian practice includes national and regional density guidance which local plans must interpret in detail, but the trend is increasingly to use plot ratio, because of its mire direct role as a predictor of the resultant built form;
- the Netherlands, the country where care in the use of land has been taken the furthest, has an integrated package of policies and standards focused on urban concentration; residented densities are part of this; are contained in detailed municipal local plans, and have been raised over the last decade as part of the antispraul effort;

- Spain's regions, and the municipalities within them, set quite specific density standards for each type of settlement—the main focus is still avoidance of liverdevelopment; and
- Swedish practice principally uses plot ratio, but density per se does not seem to be seen as important as winter daylight or the availability of open space?

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- 3.4 Some municipalities are revising their zoning ordinances to encourage more compact and sustainable forms of development. Cluster zoning is being used to require the grouping of the prescribed number of dwelling units on a site so that the rest of the land can be laid out as amenity open space. The cluster option allows site planning to be more responsive to natural, man-made and historic features by reducing the developable plot size rather than the overall density. Intensity zones, based on environmental and design criteria, (e.g. open space, site coverage, density and/or FAR) are being adopted to guide new development to sites which are accessible and already possess basic infrastructure. Local residents, however, have expressed concern at the effectiveness of the new compatibility criteria used to ensure that mixed-use development will not have an adverse effect on adjacent residential properties. In one municipality, higher densities of 25 to 30 dwellings per acre (62 to 72 dwellings per hectare), together with tandem housing developments are being permitted near the central area to prevent further urban sprawl*. The zoning ordinances, however, are still the main instruments that are used to control the physical bulk and location of new development projects. These ordinances are sometimes very complex and lengthy documents which run to 800 pages and 1,000 pages respectively in the case of San Francisco and New York City.
- 3.5 Residential zones usually specify minimum for size, the front, rear and side set backs, the number of dwelling units and, where appropriate, the maximum permitted height of the buildings. The specification of minimum for size for single-family dwellings was the most common form of density control and, indeed, it was sometimes used to exclude people on the grounds of income, ethnic

origin or other criteria. Although exclusionary zoning has not found favour in the courts, it has been upheld when adopted for health and safety reasons. The specification of lot sizes and number of dwelling units is sometimes 'relaxed' to facilitate the clustering of dwellings in planned unit developments (PUD), thus allowing greater flexibility in respect of layout when coping with difficult terrain. Table 3.1 provides examples of the type of density requirements that are specified in zoning ordinances.

Table 3.1: Area, Yard and Bulk Requirements in a Medium Density Residential Zone, Jersey City, New Jersey

Requirement	Detached Dwelling	Row/House
Max FAR	N/A	N/A
Max Site Coverage	60%	50%
Min Lot Width	25 feet	16 feet/unit
Min Lot Depth	100 feet	100 feet
Min Lot Area	2,500 feet ²	10,000 feet ²
Max Density/Acre	17.5	23.3
Max Height	40 feet	40 feet

- 3.6 Mixed-use and non-residential development control have used a combination of measures such as minimum lot size, maximum lot coverage and height of buildings. The most widely used form of density control is still the Floor Area Ratio (FAR), which calculates the ratio of the permitted floorspace to the area of the site in question. In New York City, for example, the commercial FAR ranges from 1:1 to 15:1 depending on the district. In Midtown Manhattan, Lower Manhattan and Downtown Brooklyn, additional bonuses are generally permitted, as-of-right, in return for subway improvements, public plazas, the preservation of landmark buildings and, where appropriate, affordable housing. These bonuses can result in a 20% increase in permitted floorspace1,
- 3.7 More sophisticated tools are now being used by some municipalities in an attempt to ensure that new development is acceptable from an aesthetic,

economic, environmental and social point of view. The most commonly used mechanisms are as follows:

- Floating Zones which stipulate the planning requirements for an area without specifying precisely where they have to be applied. It is up to developers to demonstrate that their proposals are observing these requirements;
- Spot Zones which single out individual sites for either special or preferential development.
 This mechanism is sometimes used where there is no comprehensive land use plan;
- Planned Unit Development (PUD) —
 designates areas which can accommodate a
 range of different uses and densities. It is
 essentially a planning and design tool which is
 used for commercial, industrial, residential and
 mixed-use development. Sometimes it is used in
 conjunction with cluster zoning and it can also
 take the form of a floating zone;
- Transfer of Development Rights (TDR) –
 which allows a developer to transfer a portion
 of the height, bulk or density from one part of
 the area to another, in order to preserve a
 historic landmark building or feature;
- Incentive or Bonus Zones which entitle a developer to extra floorspace in return for community benefits; and
- Mixed-Use Zones and Special Districts this approach is becoming increasingly popular where major office developments are likely to include shops, restaurants, fast food malls, entertainment facilities and residential accommodation.
- 3.8 More flexible zoning provisions are sometimes adopted to meet the complex requirements of large-scale development projects. The most common of these is a specific plan. While a specific plan is not designed to increase the density, bulk or lot coverage, it can have that effect. In essence, a specific plan allows a developer to negotiate with the local authority to determine the specifications that would usually be set out in the zoning code. Under these circumstances the developer may be allowed to develop at a greater density in return for

amenities that would not otherwise be required of the development.

EUROPEAN PRACTICE: GENERAL

- 3.9 The preparation of detailed land-use zoning plans is a common feature of most European planning systems³. These plans include density standards which specify the number of dwellings or the amount of floorspace that will be permitted on each site. Municipal authorities sometimes relax these standards to promote new development and redevelopment in designated areas. In some countries (eg. Italy and Spain) residential density standards are prescribed in national legislation and constitute the basis for the exercise of public control in the absence of a detailed land-use plan.
- 3.10 The density provisions in these plans are reinforced by detailed regulations which prescribe the height, bulk, siting and uses of buildings, the spaces between huildings, and any easements for public utility services. In addition, environmental performance standards are often adopted because it is considered that they constitute a working basis for upgrading the quality of life in general and the improvement and transformation of the urban environment in particular. Although each country has adopted an individual approach, these environmental planning norms and standards are being used to regulate "functional zoning, building density in residential areas and industrial zones, the size of open spaces, including green areas, the number and type of social amenities and facilities, the organisation of transport, engineering installations in settlements, protection of the environment, care of buildings and places of historic and cultural importance, etc."15

BELGIUM

3.11 The three regions of Belgium (Brussels, Flanders and Wallonie) have devised their own planning systems. They have prepared 'structure plans' to control the location of new development and are using ratios to limit the amount of new residential development that will be permitted in rural areas. At present, 60% of all new dwellings

have to be located in urban areas. The municipal districts (and communes) are responsible for the preparation of general structure plans (plan du schma des affectations), detailed land-use plans (plans particuliers d'affectation du sol, PPAS), plot subdivision plans for new development areas (plan de lonissement) and the exercise of control over development. Density standards are laid down in the general and detailed land-use plans. The PPAS specify the land use, site coverage, the number and height of storeys, rouf design, pitch and height. space standards for balconies and terraces, outbuildings and parking provision. The V/T Ratio, which represents the ratio between site area and total floorspace, is the main mechanism for specifying and controlling density. Developers and residents sometimes promote amendments to the detailed plans in an attempt to raise or lower the density standards. The Building Regulations prescribe standards for gardens, the space between buildings and access to daylight and sunlight. These density and planning standards aim to preserve the character and environment of areas, to reduce traffic and atmospheric pollution, to preserve upen spaces and promote sustainable patterns of activity. There is a preference for single-family homes which make provision for office-working at home.

FRANCE

3.12 There is growing concern in France about the need to prevent further urban sprawl and the likely societal consequences of prescribing higher residential densities and more compact building forms. Different methods are used to calculate and control building bulk (eg. site coverage, number of storeys and height restrictions) and the intensity of occupation (eg. the number of residents and workers per hectase). Plot ratio (coefficient d'occupation du sol, COS) is widely used to control building bulk, irrespective of land use. COS represents the ratio of net floorspace (surface hors oesevre nette, SHON) to the net site area excluding roads. SHON, which excludes cellars, attics, operational plant and open land used for parking and amenity space, is used for planning purposes, including the granting of building permits, and property tax purposes. Reservations have been expressed about the use of COS to control the form and quality of urban development. A recent density

study has recommended that the following formula should be used to control building density:

Building density=site coverage x number of storeys total site area

Another approach is the use of SHOB (surface hors neutre brute) which includes all floorspace, basements, attics, operational plant, building superstructure, and outside access, parking and amenity 'open space'. It is considered that SHOB provides a better prediction of the likely building form and its impact on the street scene. The use of SHON for planning and property tax purposes, however, makes it difficult to introduce new methods of measuring density.

GERMANY

3.13 The German Federal Government establishes the national planning framework which is then articulated spatially by the Lander, Kreise and municipalities. These latter bodies prepare their own land-use plans (Flachennutzungsplan) which contain general guidance on densities. Specific density standards and related planning standards are laid down in the advisory sectoral plans (Sektorale or Teilräumliche Entwicklungspläne), in urban design statements (Städtehauliche), and in the detailed landuse plans (Bebauangspläne) which have the full force of law. Residential and non-residential densities are usually specified in terms of the maximum plot ratio that will be permitted in an area. Further detailed guidance on daylight and sunlight standards, heights, minimum set back from roads and neighbouring buildings is set out in the building regulations. This guidance is reflected in the detailed land-use plans. Environmental and ecological objectives are now deemed as important as traditional land-use goals. As a consequence, the rationale for density standards has shifted from health and safety issues to embrace sustainability (eg. raising densiries in the suburbs, promoting public transport, protecting open land and reinstating natural soil for ecological reasons). At the district level the land-use plans (Bebauangspläne) and the landscape plans (Landschaftspläne) require careful co-ordination. Density standards play an important role in maintaining and improving existing urban structure as well as preserving the character of particular

districts. In some cities, higher densities are being permitted in exchange for more open space and woodland.

3.14 In Berlin the land-use plans (Flachennutzungspläne) specifies six plot ratio density zones (Table 3.2) with a view to preserving the traditional pattern of street blocks with their uniform building heights. Densities will be raised, where it is deemed feasible and appropriate, to encourage compact forms of mixed-use development.

Table 3.2: Approved Density Zones in Berlin, 1994			
Mixed I	Use:		
M1	Central Area	High Densities	
M2	Town Cantres	Medium Densities	
Reside	ntial Density Plot R	atio Zones	
W1	above 1.5:1		
W2	up to 1.5:1		
W3	up to 0.8:1		
W4	up to 0.4:1		

3.15 The City of Munich has adopted a compact green framework to guide long-term development. A study of the city's morphology has resulted in the designation of possible locations for mixed-use development and high rise buildings. The criteria used for designating these areas include access to public transport nodes, traffic generation and compatibility with adjacent land uses, and the existence of high-rise buildings and open space. Plot ratio standards, ranging from 0.9:1 to 2.4:1 have been adopted for the areas which are deemed suitable for redevelopment and restructuring, including sites within a radius of 150 to 600 metres of underground and fast regional train stations.

ITALY

3.16 An Iralian government decree passed in 1968 prescribed national density standards which still have to be observed today. It specified the building density, building height and the space between

buildings for the maira territorial zones, ie. historic, urban, scheduled for development, industry, agriculture, public services and areas scheduled for development. In residential areas at least 18 square metres of land per resident has to be set aside for communal use. Standards have been set for the allocation of this land between competing uses such as public open space (50%), education (25%), parking (14%) and public services (11%). Building density (densitá fondioria) is measured in terms of the ratio of its volume to site area minus the land which has to be set aside for community use (superficie fondioria). There is a growing preference for plot ratio because it provides a more accurate picture of the intensity of use that results.

3.17 In 1977 the regional authorities were granted extensive planning powers which included the preparation of advisory regional plans (Piani Intercommunali), the laying down of standards for the provision of roads and services, and the right to modify some of the land-use allocation ratios described in the 1968 decree. The general land-use masterplans (Piani Regolatori Generali) prepared by municipal authorities are mainly concerned with the formulation of a long-term development and zoning strategy. Local density standards are reformulated in the detailed land-use plans (Piani Particolarreggiati) prepared by municipalities and the implementation plans (Piani Lottizzazime) preparedi by developers. Although these plans must observe the prescribed national and regional density standards, there is some scope to modify their impact to reflect local circumstances. In residential areas the maximum density for new buildings must not exceed 50% of the average existing density, nor must ir exceed the prescribed national standard of 5m3 of accommodation for each square metre of the site in question. Where land is in short supply the municipal authority can determine the amount and location of the land that has to be set aside to meet the service requirements of residents. The rapid pace of urban development, however. has resulted in the construction of large areas of housing which lack basic services and communal facilities.

NETHERLANDS

3.18 Dutch planning policies, including guidance on density, are formulated at national and provincial levels (Streekplanner). The primary aims of these policies and guidance are to foster urban concentration and some dispersed concentration, with a view to saving land, reducing pollution and protecting the environment. Particular importance is attached to protecting the open land at the centre of the Randstad from the development pressures exerted by Amsterdam, Utrecht, Dordrecht, Rotterdam, the Hague and Haarlem.

3.19 The ABC policies, which originate from the national planning guidelines, seek to match the mobility needs of activities with the accessibility

- characteristics of locations. Location and accessibility profiles are assigned using the following criteria:
- work intensity (ie. gross floorspace (m²) per employee or worker);
- visitor intensity (ie. gross floorspace (m²) per visitor);
- car dependence (ie. the percentage of employees/workers dependent on a car for journey-to-work purposes); and
- road freight intensity (ie. the level of dependence of road freight to the husiness).

3.20 Residential and non-residential densities are laid down in the detailed land-use plans (Bestemmingsplan) prepared by municipal authorities. These density standards are complemented by the building laws which control the design and layout of new buildings. Residential densities are expressed in terms of the number of dwellings per hectare. Plot-ratio is used to control commercial and industrial floorspace provision. In the suburbs, residential densities have been raised from an average of 10 to 12 dwellings per acre (25 to 30 dwellings per hectare) in the 1980s to an average of 16 dwellings per acre (40 dwellings per hectare) in the 1990s to prevent further urban sprawl. In the historic centre of Rotterdam, the existing residential density is as high as 81 dwellings

per acre (200 dwellings per hectare), whereas on the outskirts of the city the average permitted density is 12 to 14 dwellings per acre (30 to 35 dwellings per hectare). Densities ranging from 4 to 24 dwellings per acre (10 to 60 dwellings per hectare) are permitted when large sites are being developed.

SPAIN

3.21 Spain's 17 Autonomous Communities, which operate at a strategic level, are empowered to adopt their own density standards within the parameters defined in national legislation. Individual municipalities are likewise empowered to adopt their own density standards whilst observing the general framework established by the Autonomous Communities. The standards vary quite considerably and are often very specific, as the examples in Table 3.3 below shows.

Table 3.3:	Residential Density Standards
Adopted by	3 Autonomous Communities
in Spain	

Autonomous Community	Source	Residential Density Standards
Galicia	Local Land Act, 1985	Max density 75 dwelings/Ha (30/scre). Max plan area 110 metres* per dwelling. Special cases max density of 100 dwellings/ Ha (40/scre) with a maximum limit of 82% site coverage.
Navarra	Territory and Town Planning Act 1994	Population of over 25,000: Max density 50 dwellings/ Ha (20/acre) or 55% site coverage. Population 2,000 – 25,000: Max density 40 dwellings/Ha (16/scre) or 45% site coverage. Other areas: Max density 35 dwellings/ Ha (14/acre).
Valencia	Regulation of Urban Development	Mex density of 75 dwellings/Ha (30/acre). No increase in site

3.22 The focus is still on avoiding overdevelopment. Some 15% of all land brought forward for development must be ceded to the municipality for the benefit of the community. Landowners must also meet the cost of any additional infrastructure and offer additional planning gain.

SWEDEN

3.23 Density standards are no longer specified in Swedish planning legislation. The current national planning legislation, enacted in 1987, requires that the quality of new development should be 'acceptable'. Municipal authorities are empowered to determine the range of densities that are deemed appropriate in the light of local circumstances. Table 3.4 shows the ranges applied by one municipality. Residential density is measured in terms of the ratio of total floorspace to the total site area (including half the width of adjoining roads). This ratio is sometimes converted into habitable rooms per hectare. The most important environmental design parameter in Nordic countries is access to winter daylight and simlight. Habitable rooms and amenity open spaces should experience at least 4 to 5 hours sunlight at the autumn equinox. During the 1970s and 1980s an open space standard of 100m² per 100m2 of residential accommodation was adopted, but it was not enforced in high density inner city housing schemes.

3.24 A current study of the typology of Swedish urban development is investigating the density, site coverage and average height of buildings in 150 residential estates. Examples of two high-density residential projects in Stockholm are presented in Table 3.5. A number of the residents of the Sodra Station development, especially families with children, have complained about the lack of amenity and play space, inadequate natural lighting, the high cost of living in the estate and central area, and are moving to other districts.

Table 3.4: Residential Density Standards Adopted by the Municipality of Rubi (Cataluna)

	Residential Zone A (Medium to High Density)	Zone B (Medium Density)	Residential Zone C (Isolated Developments)
Ste	max 80%	max 45%	max 25%
Coverage			
Density	max 60 dwellings/Ha (24/acre)	max of 35 dwellings/Ha (14/acre)	max of 15 dwellings/Hs (6/scrs)
Land allocati	on:		
roads and parking community	25%	25%	25%
buildings	15%	10%	5%
open space	10%	1096	10%
private use	50%	55%	90%

NB: The site coverage standards are also applied to non-residential density as follows: Zone A: 75%; "Zone B: 6D%; Zone C: 30%

Table 3.5: High Density Housing Schemes in Stockholm

	Sodra Station	Hammerly Sjöstad
Inception Date	1985-1990	1996
Location	Central Area	5km from the Central Area
Density	960 rooms/ hectare	740 rooms/ hectare
Plot Ratio	2.8:1	1.8:1
Building Height	7-9 storeys	5-7 storeys
Open Space Standard	17 metres!/ dwelling	28 metres*/ dwelling

SUMMARY

- 3.25 Our review of international practice has shown that density standards are widely used to control residential and non-residential development. In the case of residential development, the density standards specify either the number of dwellings or the amount of floorspace (or occasionally both) that will be permitted on each site. Plot-ratio, or variants thereof such as the floor area ratio, are widely used to control non-residential development. Sometimes these numerical standards are complemented by height and site coverage restrictions.
- 3.26 There are variations, however, concerning the perceived role of density standards. In some countries, including Britain, density is being reappraised as a possible rool for use in the new drive for sustainability and protection of the finite land resource this is particularly true in Germany, and to some extent in Belgium, France and Holland. Other European countries still regard density control principally as a device to avoid overdevelopment and its unattractive side-effects; this is notably the case in Spain and France.
- 3.27 Most countries recognise the important role of density standards in promoting urban development. American practice varies so widely that it is difficult to generalise - in some towns, there is now interest in density control as one of the tools for promoting concentration and avoiding sprawl, but nationwide it is not a very important issue. One particularly interesting aspect of US practice is the planners' inventiveness in devising techniques and mechanisms for balancing economic, aesthetic and social objectives within the decision process. Attention is being focused increasingly (notably in Australia, Canada and the United States) on the role of density standards in promoting more compact, energy-efficient forms of development which make fewer demands on expensive urban infrastructure32.

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CHAPTER 4

A Review of Current Practice

INTRODUCTION

- 4.1 This chapter reviews how English planning authorities use density at different stages of the planning and development process and for different purposes.
- development plans, background papers and supplementary planning guidance of a sample of 2 authorities, listed overleaf, followed by a more indepth examination of the practice and experience of 9 of these authorities. This second layer of analysis involved interviews with forward planning and development control officers, as well as site visits to recently completed developments. In addition we undertook a series of interviews with professional institutions and other representatives of users of the planning system.



Plot ratio was used to control the development of this office development on Great West Road which is now the European HQ of the pharmaceutical company Smith Kline Beecham, The plot ratio is approximately 1:1.3.

The practice review shows that authorities use density in two different, but overlapping ways: first, as a general policy expression; and second, as a planning tool.

As a policy expression the main findings are:

- the main focus of density policies is residential development;
- density policies seek to fulfil a wide variety of purposes;
- generally-worded density policies are preferred to specific numerical standards; and
- density per se is rarely the key factor in planning decisions and appeals.

As a planning tool the main findings are:

- dwellings/area is by far the most commonlyused measure, except in London where habitable rooms, area is preferred;
- density assumptions fulfil an important role in estimating development land requirements/site capacities; but practice varies between
 authorities;
- there is variation in practice in the way development derisities are calculated;
- other design standards are more important than density at the level of individual sites; but
- density provides a useful and intelligible shorthand for the form and type of development.

More generally, a review of recently completed a residential schemes found that

- in terms of urban form, higher density, new urban devolopments show a slightly wider mage of variation than new suburban developments;
- there was no consistent relationship between density and the layout style; and
- the quality of development is a recurrent, concern, but design quality was not seen to relate to density.

THE MAIN FOCUS OF DENSITY POLICIES IS RESIDENTIAL DEVELOPMENT

- 4.3 The vast majority of density policies are concerned with residential development. Very few authorities have a specific policy on the density of commercial development beyond a general policy such as that "new development should relate well to its surroundings in terms of scale".
- 4.4 Only one of the authorities we looked at the London Borough of Hounslow – has, and still applies, a development plan policy on the density of non-residential development.
- 4.5 The Leeds Central Business Area District Plan (1982), which remains part of the statutory development plan, includes a plot ratio policy relating to office development, but this is no longer applied and, in practice, has been replaced by a townscape/design-led approach. A similar approach is now also used by Camden, who dropped their use of plot ratio in 1992, partly on design grounds, but also noting the criticisms made of the approach in the Inspector's report to the City of London's UDP.

Local Authorities

- Sample Authorities
- O Case Study Authorities
- Sunderland City Council
- 2. Leicestershire County Council
- 3. Sandwell MBC
- 4. Bedford Borough Council
- 5. Thamesdown Borough Council
- 6. London Borough of Camden
- 7. London Borough of Hounslow
- 8. Plymouth City Council
- 9. London Borough of Bexley
- 10. Selby Borough Council
- 11. Leeds City Council
- 12. Kirklees MBC
- 13. Manchester City Council
- 14. Nottingham City Council
- 15. Cambridgeshire County Council
- 16. London Borough of Barnet
- 17. Westminster City Council
- 18. London Borough of Richmond Upon Thames!
- 19. Bansingstoke and Deane Borough Council
- 20. Bristol City Council
- 21. Hampshire County Council
- 22. Hastings Borough Council

DENSITY POLICIES SEEK TO FULFIL A WIDE VARIETY OF PURPOSES

- 4.6 The purposes identified for having a residential density policy are wide ranging and in some cases quite different.
- 4.7 By far the most common reason is to maintain the character of existing residential areas – identified by more than half of our sample authorities – but other purposes include reducing the need to travel, making efficient use of land resources, and promoting affordable housing by encouraging the development of smaller more affordable dwellings.
- 4.8 It is notable that two authorities —
 Manchester and Sandwell identify very different
 reasons for their density policy. While Sandwell's
 policy is concerned with "loosening the urban
 fabric" by encouraging lower-density development,
 Manchester's City Centre Design Strategy seeks to
 create a greater sense of urbanity through higherdensity development.
- 4.9 At a broader level a distinction can be drawn between, on the one hand, structure plans/UDP Part Is which emphasise strategic concerns about reducing the need to travel, making efficient use of land and matching dwelling sizes to flexibility, falling household size and affordability concerns, and on the other, local plans/UDP Part IIs, which tend to place more emphasis on the objectives of maintaining existing character, achieving good design and preserving open space.

GENERALLY-WORDED DENSITY POLICIES ARE PREFERRED TO SPECIFIC NUMERIC STANDARDS

4.10 There is widespread agreement that the diversity of circumstances and the range of housing needs within an area make it impractical to apply an authority-wide density standard, and that more generally-worded policies provide the necessary needs. Boroughs also interpret the standard differently. For example, Barner's maximum density is close to the bottom of LPAC's range, while Camden define different density ranges for different types of housing in different parts of the Borough.

Hounslow believe that plot rano provides an effective means of controlling the volume and balk of development and is a useful tool in relating the density of development to the capacity of local services and infrastructure, particularly the road network

Selby is a predominantly, rieral district facing strong development pressures. New housing development is a concern both because of the amount of land required and because of a shortfall in the processor of affordable housing.

The Local Plan housing allocations are based on an average density of 28DPH, which is higher than the 25DPH suggested in the North Yorkshire Structure. Plan The policy scales to minimise the amount of greenfield land taken for development and encourage developers to build smaller, more affordable homes.

Kings Lynn and West Norfolk have a policy which seeks to encourage higher-density development close to town centres and transport nodes. The policy seeks to support the achievement of three objectives:

- · reducing the need to travel;
- making efficient use of urban land; and
- encouraging the provision of smaller, affordable dwellings.

Under the policy "The Borough Chuncil will seek to negotiate a net density of in excess of 25 dwellings per hectare... for all rivio housing developments within walking distance of town centre and/or an existing or potential public transport ande".

4.11 Aside from the London authorities, the Cambridgeshire Structure Plan aims for a general density of 25–30 dwellings per hectare on greenfield sites and above this in urban areas. The guidelines of 25–30 dph is based on typical greenfield developments containing a preponderance of average family-size housing and

is considered to the consistent with energyefficient land use.

4-12 In most cases, however, the wording of density policies is much more general, typically requiring the density of new residential development to "be compatible with the character of the local area" or to "have regard to prevailing densities". The Leicestershire Structure Plan, for example, states simply that new residential development should be at the highest density possible consistent with the other policies of the plan.

DENSITY IS RARELY A KEY FACTOR IN PLANNING DECISIONS AND APPEALS

- 4.13 Between 1990 and 1995 "overdevelopment" or "cramped development" was a material consideration in just under 4,000 appeals around 45% of appeals decided during the period.
- 4.14 Authorities very rarely refuse planning permission on density grounds alone. More generally formulated reasons, such as "overdevelopment", which rely on a range of considerations such as impact on established character, scale, privacy, noise, and overshadowing, were considered more robust. This view is supported by an analysis of planning appeal decisions.

The Sunderland LIPP explicitly recognises the need for density policies to reflect different circumstances as well as different policy objectives. The general objective is to maintain or increase densities in order to suppose community services and public transport use as well as to maintain development on greenfield sites, but the plan recognises that such opportunities are location specific and that there may be good reasons for departing from the general policy objective. In particular the Sunterland UDP is seeking a encourage low density, high-quality executive housing on designated sites to support its economic development objectives.

Density Zone	Family Housing	Mixed or Non-family housing
	Habitable rooms hectare	Habitable rooms
A Hampstead and Highgate	99 to 173	99 to 173
3 Rest of the Borough	173 to 210	173 to 247
Central Area	201 to 617	247 to 617

The Camden UDP specifies different density ranges for different housing types and for different parts of the Borough. The ranges specified reflect existing densities based on site surveys and census analysis of new and existing residential areas.

- 4.15 A review of 150 appeal decision letters issued between 1992 and 1995 shows that:
- the most important consideration in the majority of cases was the likely impact on adjacent properties or the character of the surrounding area;
- little importance was attached to the observance of numerical density standards, which were viewed only as providing a general guide; but
- some Inspectors were critical of authorities' failure to adopt numerical density standards or to provide technical density calculations to support their views on what constituted overdevelopment; and
- the view of Inspectors varied over the legitimacy of local authority concerns about the adequacy of internal and external space standards; some considered these market judgments for developers, others legitimate planning considerations.

DWELLINGS PER AREA IS THE MOST COMMONLY USED MEASURE, EXCEPT IN LONDON

- 4.16 By far the most commonly used density measure is DPH/A. Only the London Boroughs (who use habitable rooms) and Manchester (who use bedspaces) use different measures.
- 4.17 The London Boroughs use HRH, partly for historical reasons and partly because habitable rooms is considered to be a more refined measure in densely-developed areas and where a large proportion of new housing is flats. However, even in London, housing land allocations and indicative site capacities tend to be calculated and expressed in terms of dwelling numbers.

DENSITY ASSUMPTIONS FULFIL AN IMPORTANT ROLE IN ESTIMATING HOUSING LAND REQUIREMENTS

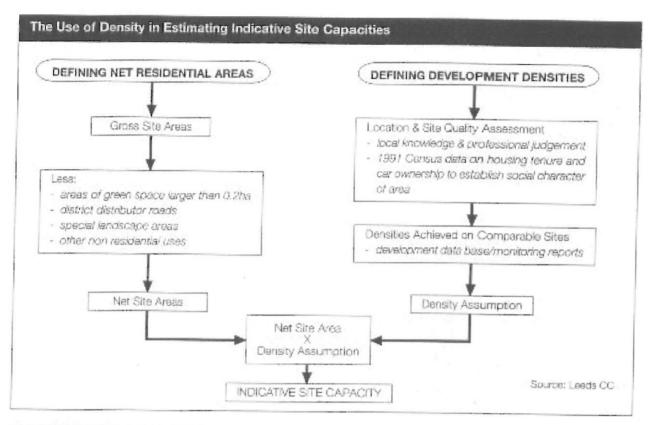
- 4.18 Density assumptions are widely used in assessing development land and particularly housing land requirements. While the essence of the approach is straightforward a site area or dwelling requirement is divided by a density assumption to produce either an estimate of capacity or a development land requirement in practice the approach depends on detailed assumptions about site areas and assumed development densities.
- 4.19 The most detailed assessments are made at the district level, when estimating site capacities as an input to the structure plan process and subsequently in allocating housing land to meet a structure plan housing target. Where there is not a firm indication of capacity (e.g. from a planning application or master plan), the most common approach is to use the density of recently completed schemes as a benchmark.
- 4.20 The density assumptions may be an authoritywide average or be related to a particular area, but in most cases they are based on net housing densities. The King's Lynn and West Norfolk Local Plan uses a working assumption of 10 dwellings per acre (c.25 DPH), while the Leeds UDP assigns

densities to sites by reference to densities achieved on sites of comparable quality.

- 4.21 In contrast the Hampshire Structure Plan.
 Review, in seeking to estimate the housing capacity of a number of potential large-scale development areas, uses a gross density assumption of 12DPH.
 This includes employment, community and open space uses as well as housing, and is based on a review of average density of new settlement proposals (see DoE 1992 pp 83–93).
- 4.22 These different approaches to the use of density assumptions clearly reflect different purposes and scales of analysis and development. They also raise questions about the relationship between housing development (and its density) and the need for other supporting facilities and land uses.

THERE IS A VARIATION IN PRACTICE IN THE WAY DEVELOPMENT DENSITIES ARE CALCULATED

- 4.23 There are minor, but significant, variations between authorities in the way development densities are calculated and expressed. The main difference is in how site areas are defined for density purposes whether net or gross areas have been used, and which elements have been excluded or included in the calculation. Adjoining roads, landscape and open space, in particular, are areas often subject to different approaches. These differences are often compounded by the lack of a clear explanation of how densities are or should be calculated.
- 4.24 These differences of definition can have significant implications for the value of sites, and can result in anomalies and unintended effects, such as where the inclusion of adjoining roads inflates a site area for density purposes, or where undevelopable areas within a site have been included in calculating the net site area. Practitioners and users consulted agreed that a common approach to the measurement and expression of density would be helpful. The diagram below summarises the approach adopted by Leeds City Council in using density to estimate site capacity.



IN CONSIDERING DEVELOPMENT PROPOSALS OTHER DESIGN STANDARDS ARE CONSIDERED MORE IMPORTANT THAN DENSITY

- 4.25 There was widespread scepticism among authorities about the usefulness of density in considering development proposals, in particular where it is used in isolation from other standards.
- 4.26 Almost without exception, authorities regarded other development standards such as car parking, privacy, and garden size as more important. Indeed, a commonly-held view among development control officers was that density is derived from the application of other planning standards.
- 4.27 While density tends only to be a secondary concern in officers appraisal of applications, elected members often view density as an important standard which provides a good indication of the intensity of development and its acceptability.
- 4.28 While this is the general picture, there were a number of circumstances where density had been an important tool in considering the acceptability and implications of development. Practice

examples ranged from using the number of child bedspaces as an indication of potential demand for children's play, to estimating the additional demands of new commercial development on congested underground stations. More generally, Hounslow, as we have noted, consider plot ratio to provide an effective means of controlling the scale of commercial development.

DENSITY PROVIDES A USEFUL AND INTELLIGIBLE SHORTHAND FOR THE FORM AND TYPE OF DEVELOPMENT

- 4.29 Density is often seen as a useful shorthand for the form of development and type of housing an authority is seeking either in a development plan or in site briefing. This may relate to individual sites, which an authority may identify as suitable for "higher density" development because of their proximity to public transport or a town centre; or it may relate to different areas within a larger site where the authority is seeking a range of house types and/or believes particular areas of the site are suited to different densities.
- 4.30 Often briefs state an average net density, a density range for the development, and give an

indication of how different densities are to be distributed. However, in very few, if indeed any cases, is an explanation offered on how densitities should be calculated in terms of the definition of site areas.

REVIEW OF NEW RESIDENTIAL DEVELOPMENTS

4.31 Recently completed schemes can be regarded as a useful benchmark for the evaluation of how current policies and approaches are working in practice. The study team examined over forty developments in twenty-two local authority areas, and analysed six of the schemes in considerable detail, to evaluate the influence of density on built form. Details and photographs of the six case study schemes are presented on the following pages. The case study schemes were selected by the consultants based on suggestions from the local authorities.

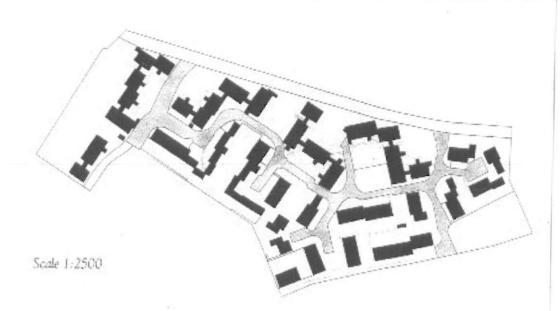
The developments studies fell into two categories, either side of the 30 DPH threshold: first, suburban developments (all houses); and second, urban schemes (houses and flats, at varying densities).

IN TERMS OF URBAN FORM, HIGHER-DENSITY NEW URBAN DEVELOPMENTS SHOW A SLIGHTLY WIDER RANGE OF VARIATION THAN NEW SUBURBAN DEVELOPMENTS

- 4.32 Suburban developments tended to vary only within a narrow range:
- low-density, large detached houses (up to 30 units per hectare); and
- higher-density, detached and semidetached/terraced smaller houses (up to 50 units per hectare).

- 4.33 Urban developments varied within a wider range. This is probably because they tend to relate to the established higher density and character of the surrounding area. They include:
- terraced houses and flats developed separately on different parts of a site at different densities;
- · a mix of houses and flats across a site; and
- mews-type developments of houses and flats on urban backland sites.
- 4.34 Layouts fell into two main categories
- cul-de-sac type minimal access, winding/organic road access to dwelling enclaves; and
- geometric, through-road layout type maximising site permeability and integration with the surrounding area.

ELMS VILLAGE LONDON BOROUGH OF CAMDEN





Site & Development Characteristics

Site Type

Urban Inner City

Net Site Area

2.7ha

Development form

Terrace housing & 4 storey flats

Development Components

Building Footprint (Industing George) 26%
Public Open Space 196
Private Garden Space 21%
Incidental Open Space 21%
Roads & Footpaths 17%
Parking (excluding garages) 14%

Development Density (net)

 Dwellings
 1C4 DPH

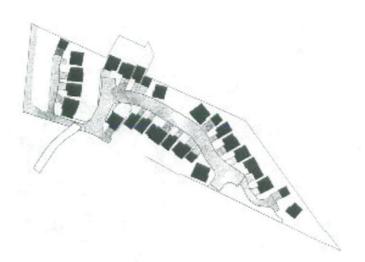
 Habitable Rooms
 340 HRH

 Plot Ratio
 1:0.69





WARREN'S HILL FARM SANDWELL METROPOLITAN BOROUGH COUNCIL



Scale 1:2500

Site & Development Characteristics

Site Type

Urban Greenfield

Ner Site Area

1.0ha

Development form

Detached Housing

Development Components

Building Footprint (Including Curages) 18%

Public Open Space

Private Garden Space

48%

Incidental Open Space

10%

Circulation Roads & Footpaths

17%

Parking excluding Garages

796

Development Density (NET)

Dwellings

21 DPH

Habitable Rooms

129 HRH

Plot Ratio

1 to 0.28





GROVELANDS SANDWELL METROPOLITAN BOROUGH COUNCIL





Site & Development Characteristics

Site Type

Urban Canalside

Net Site Area

4.3ha

Development form

Houses & 3-4 storey flats

Development Components

Building Footprint (Including Ganges) 20% Public Open Space 8% 36% Private Garden Space Incidental Open Space Canalside Circulation Roads & Footpaths 21% Parking excluding garages

Development Density (NET)

Dwellings Habitable Rooms Plot Ratio

55 DPM 204 HRH 1:0.34

15%





CHADDLEWOOD SITE 8 PLYMOUTH CITY COUNCIL





Site & Development Characteristics

Site Type Peripheral Expansion

Net Size Area 3.9ha

Terraced and detached housing Development form

Development Components

Building Footprint (Including Gauss) 22% 1% Public Open Space 42% Private Garden Space

Incidental Open Space

Circulation Roads & Footpaths 22% 13%

Parking excluding Ganges

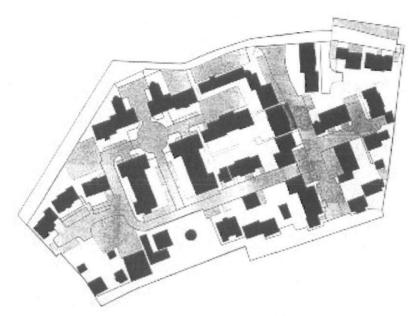
Development Density (NET)

48 DPM Dwellings 280 HRH Hahitable Rooms Plot Ratio 1:0.41 hrh





CORNEY REACH LONDON BOROUGH OF HOUNSLOW



Scale 1:2500



Site & Development Characteristics

Site Type

Urban Riverside

Net Site Area

3.3ba

Development form

Town Houses & Flats

Development Components

Building Footprint (Including Congest 24%)

Public Open Space 10% Private Garden Space 28% Incidental Open Space 2%

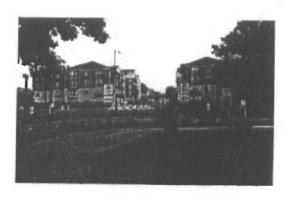
Circulation Roads & Footpaths 21% Parking excluding Ganges 15%

Development Density (NET)

 Dwellings
 72 DPH

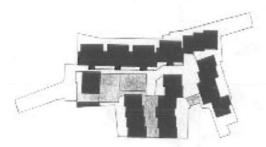
 Habitable Rooms
 260 HRH

 Plot Ratio
 1 to 0.34





SPENCER'S WALK LONDON BOROUGH OF CAMDEN



Scale 1:2500



Site & Development Characteristics

Site Type Urban Infill
Net Site Area 0.7ha
Development form Mews Housing

Development Components

Building Footprint (Including Gazages) 44%

Public Open Space
Private Garden Space 28%

Incidental Open Space
Circulation Roads & Footpaths 23%

Parking excluding Gazages 5%

Development Density (NET)

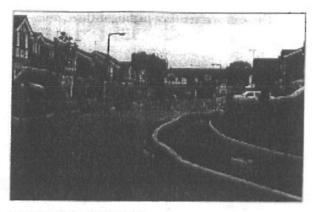
 Dwellings
 57 DPH

 Habitable Rooms
 220 HRH

 Plot Ratio
 1:0.84







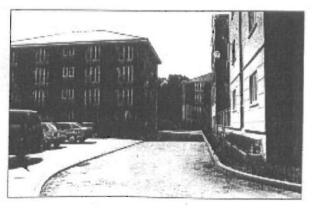
Low Density detailed houses



High density semi-detached houses



Mix of houses and flats



Flats on part of a site at higher densities

THERE WAS NO CONSISTENT RELATIONSHIP BETWEEN DENSITY AND THE LAYOUT STYLE

4.35 There was no consistent relationship between density and layout in either of these types, but when built-form characteristics are added to the equation, a pattern begins to emerge. This is analysed further in Chapter 6 "Density and Build Form".

4.36 Higher-density mixed residential development tends to adopt a geometric, regular grid layout. Examples are Grovelands and Corney Reach.

4.37 Geometric grid layouts usually require higher proportions of road space to total site area, in comparison with the cul-de-sac type. This is an almost inevitable consequence of achieving higher permeability and connectivity, but it also accommodates the majority of surface car parking. Warren's Hill, Chaddlewood and Elm Village are examples of this approach. The photographs show examples of the two approaches, as built.

4.38 Most grid layouts incorporated on-street parking, rather than court or on-plot arrangements. These different approaches to car parking have a considerable impact on the overall character of a development.

THE QUALITY OF DEVELOPMENT IS A RECURRENT CONCERN, BUT DESIGN QUALITY WAS NOT SEEN TO RELATE TO DENSITY

4.39 The study team repeatedly encountered concern amongst practising planners about the design quality of new development. The situation is not seen as disastrous, but there is a widespread that the system is not delivering its full potential benefits.

4.40 As part of the our assessment of how density control fits into overall practice, the team assessed the case-study schemes in terms of their overall quality and livability, on a basis of professional judgement and comparison with best practice elsewhere. This provides a qualitative background for the more detailed and quantitative analysis in Chapter 6.

We found that:

- design quality did not correlate at all strongly with density. The character of an area related partly to housing mix (i.e. houses only, in contrast to houses and flats), but primarily to the type of layout;
- the environmental quality of the geometric grid layouts was, in general, felt to be better than that of the cul-de-sac layouts;
- most new suburban developments appeared to have somewhat cramped private garden space in relation to unit size, and distances between houses were minimised to achieve the maximum number of units within a given site; and
- irrespective of layout type or density, there was generally a lack of well-located and designed formal or informal amenity.

- 4.41 These characteristics highlight three issues in current practice:
- lack of understanding of the thresholds between different housing types;
- little consideration of gross to net developable area prior to the application of density levels;
- lack of understanding of the relationship between building volume variations and density levels, whether expressed in habitable rooms or in dwellings per hectare.
- 4.42 Chapter 6 picks up some of these concerns by exploring the relationship between density – and different approaches to density control – and built form.