COLIN
BUCHANAN
AND PARTNERS
Planning, Transport, Economics
Software, Market Research

SCEALA (Standing Conference of East Anglian Local Authorities)

CAMBRIDGE SUB-REGION STUDY

FINAL REPORT

In association with

Bone Wells Associates

&

Wardell Armstrong

Project No: 47681
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Newcombe House, 45 Notting Hill Gate
London W11 3PB

Telephone: 020 7309 7017
Fax: 020 7309 0906
Email: chris.stratford@cbuchanan.co.uk

EXECUTIVE SUMMARY

The Purpose of the Study

1 The Cambridge Sub Region Study, commissioned by SCEALA, was undertaken to provide an independent appraisal of options for development in this fast growing area of nearly half a million people, up to the year 2016. It thereby meets the requirements of the Regional Planning Guidance (RPG 6) for a study to develop a vision and planning framework for the Sub Region to inform the review of Development Plans, particularly the Cambridgeshire and Peterborough Structure Plan Review, on which consultation took place from February - April 2001.

2 A key objective is to identify ways of allowing continued growth of the Sub Region to support the growth of the research and technology based economy in more sustainable ways. This Study of the Sub Region is the first in the UK to be carried out under new Government Regional Planning Guidance (RPG) and the first at this scale to reflect new national development policies for a more sustainable society. Notable features of these national policies are a requirement for higher housing development densities, a priority to build on brownfield land and a 'sequential approach' to development, for which the order of preference is given as:

Within the built-up area of Cambridge

On the periphery of the built-up area of Cambridge, subject to a Green Belt Review

In a new settlement close to Cambridge

Within the built-up area of Market Towns, Larger Villages and previously established new settlements where good public transport access to Cambridge exists or can be provided

By extensions to Market Towns, Larger Villages and previously established new settlements where good public transport access to Cambridge exists or can be provided

3 This sequential approach concentrates development in cities and larger towns in preference to smaller towns and villages. This marks a significant shift from previous practice and experience in the Sub Region over the last 15 years, where development has been at lower densities, largely on greenfield sites and concentrated in smaller settlements. A further departure from previous exercises of this nature was the explicit inclusion of a review of the Green Belt in order to assess its possible role as a source of new housing. The Regional Planning Guidance also identifies the need for a new settlement in the Sub Region.

4 The estimated new dwelling requirement for the Study period 1996 - 2016 is 63,500 of which 56,000 (2,800 per year) have to be provided in the Cambridgeshire part of the Sub Region. The balance allows for some flexibility beyond 2016 and for development in adjoining county areas.

A Vision for the Sub Region

5 New Government policies at the national level have to be taken account of and should respond to the existing natural and man made environment of the Sub Region, including the historic heritage and townscape of Cambridge.

6 For this purpose a Vision for the Sub Region (as required by the RPG, particularly to provide a context for a Green Belt Review) has been developed as part of the Study. It provides a framework of aims and principles, which articulate national sustainability criteria and other key policies as objectives to be followed at the Sub Region level. These have been expressed as qualities and features to be promoted and safeguarded, ranging from the protection of the Sub Region's countryside and historic built environment and the encouragement of sustainable travel patterns, to promotion of the Cambridge area's internationally significant research and technology base. These safeguarded qualities form the basis of the sustainability criteria used to appraise development options. The Vision considers the spatial implications for Cambridge and the rest of the Sub Region.

7 It is a key feature of the Vision for the Sub Region that the area will continue to provide a 'springboard' for high technology innovation in the UK and will mature further as an international centre for knowledge-based industry. However, there is a recognised shortage of housing in relation to jobs, particularly close to Cambridge and major shortcomings in transport infrastructure. The main challenge for this Study has therefore been to address the provision of a sustainable pattern of new development, particularly housing, which can be integrated with traditional and new forms of transport investment.

Method of Study

8 The main Study tasks were to define criteria for testing capacity, feasibility (deliverability) and sustainability of options for growth. Then, using the levels of dwelling demand (provided by the RPG) and estimates of the scale of committed development (provided by the local planning authorities), to analyse the dwelling capacities of different parts of the Sub Region. The development of alternative approaches (or Options) to accommodate residual, non-committed development was then undertaken. Each Option has been tested to see how it performs according to sustainability criteria. The capacity assessments will need to be reviewed in more detail through urban capacity studies at a later date.

9 Additional land does not need to be found for dwellings already committed, where planning permission has been given and sites decided or where there is other land almost certain to be developed. These commitments together with windfall development makes up 65% of the growth (more than 40,000 of the 63,500 additional dwellings set by the RPG), leaving only a residual 35% to be located by the Study (22,000 dwellings). This figure was agreed by the Steering Group. The estimation of housing capacity to accommodate this 22,000 in the sensitive areas of the Sub Region was then undertaken.

10 The work was tackled through the preparation of a comprehensive Sites Database system, allowing systematic appraisal of possible development sites according to multiple criteria to assist in the determination of priorities for these sites. The individual site specific needs of major land uses in the Sub Region such as Cambridge University and Addenbrooke's Hospital were not part of the Study. This Database system and detailed Environmental Capacity assessments were used to review the Green Belt, to see if it had the potential to accommodate housing development without adversely threatening its core purposes. Similarly, detailed appraisals were made of the scope for increasing housing capacities in Cambridge City, the Market Towns and each element of the RPG sequence, especially through development on brownfield land and achieving higher densities.

11 Complementing these appraisals were other essential tasks (sectoral studies), including:

- Detailed planning policy and density reviews by district
- Assessment of the need for affordable housing by district
- Analysis of house prices and the housing market in response to increasing densities
- Case studies of three areas within Cambridge
- Transport network and investment assessments throughout the Sub Region
- Transport modelling assessment of MENTOR/SATURN modelling tests
- Assessment of public transport and high quality public transport (HQPT) potential in main corridors

RPG Elements

12 The above assessments allowed each element of the RPG sequence (as detailed in paragraph 2 above) to be analysed for their development potential.

13 The ***Urban Capacity of Cambridge City*** was assessed according to the progress of committed development, new sites identified and projected windfall sites, within the context of revised policies and densities. Possible ways of increasing the capacity of the city were assessed and the consequences of increasing capacity examined. The work suggested that high densities of 130 dwellings per hectare were realistic for flats in the city centre, providing good design and amenity could be ensured. There is also greater potential for backland development if access requirements can be met, practical difficulties of land assembly can be overcome and the likelihood of public controversy reduced. However, the number of housing units yielded would be comparatively small when compared to the needs of the Sub Region. Reduced and more flexible car parking standards for conversions would help increase the dwelling capacity of the City, however, better public transport would be needed to limit further congestion. The use of allotments was considered, but their capacity was seen as limited.

14 The ***Green Belt Review*** established that the primary purpose of the Green Belt is to preserve the special character of Cambridge and to maintain the quality of its setting. The secondary purpose is to prevent further coalescence of settlements. This was agreed with the Steering Group. These two main purposes guided the consideration of strategic development options, but inevitably mean that there is a tension between maintaining the Green Belt and accommodating future development needs. A broad review was undertaken of Green Belt land, which helped to identify sites on the inner edge for further assessment. Sites were assessed for their capacity to accommodate change, which depended on several criteria such as landscape character, topography, vegetation structure and cones of view. This was followed by an environmental capacity assessment framework for each individual site. The review concluded that 12,250 dwellings could be accommodated without harming the two main purposes of the Green Belt, at densities considered appropriate for peripheral urban expansion, subject to more detailed planning to accommodate all appropriate uses.

15 A detailed assessment was made of areas of search for potential ***New Settlements***. The search process identified broad locations according to criteria set by RPG which were refined into sites for appraisal purposes. There were 15 sites with sufficient capacity for 6,000 dwellings and some up to 10,000. A range of other criteria were then applied to the sites. This included absolute constraints such as SSSIs; non-absolute environmental constraints such as flood plain, drainage issues, brownfield land and pollution; accessibility criteria taking account of the effect of the 'Cambridge to Huntingdon Multi Modal Study' (CHUMMS) proposals, access to motorways, rail and park and ride; and capacity and implementability criteria for example the complexity of development. The short listed sites were Great Abington, Childerley Gate, Longstanton- Oakington and Waterbeach, however, each demonstrated drawbacks and weaknesses.

16 ***Market Towns, Larger Villages and Previously Established New Settlements (PENS)*** were assessed for their HQPT potential, employment potential, service availability, infrastructure and town character in order to establish their capacity for or sensitivity to growth and to guide the formulation of strategic options. A large number of possible sites were identified (with a capacity of 31,220 dwellings), that were subject to detailed capacity, implementation and sustainability tests in order to prioritise the sites most suitable for development.

Strategic Options for Testing

17 These appraisals were brought together to prepare three strategic Options, each using the five elements of the RPG sequence, as the basis for consultation in the Structure Plan Review. By

placing a different emphasis on each element, different development strategies emerged. The options are set out below:

- A 'Cambridge centred' option, which maximises urban concentration in the City and surrounding areas, including the inner Green Belt
- A 'Mixed strategy' option with part of the City and Green Belt housing distributed to the Market Towns (based on a relatively even spread from the RPG sequence and the best scoring sites)A Market Towns/Corridor option with a much larger proportion of growth allocated to these areas. This includes a variation on the chosen Market Town/Corridor distribution (Option 3 and 3A), maintaining the overall distribution of dwellings between city, Green Belt and corridors.
- Option 3 involves the use of the Huntingdon, St. Neots, Newmarket and Royston corridors; whereas Option 3A uses the Haverhill corridor instead of the Huntingdon corridor. The corridors for testing were selected according to the cost effectiveness of providing HQPT, the availability of housing capacity and the simultaneous consideration of various capacity constraints (e.g. secondary school capacity), efficient use of existing and committed infrastructure and the existing balance of jobs and housing (see table in Section 9). However, other alternative sets of corridors might have a role to play and could have been selected, for example, in relation to preferred new settlement locations (see 10.1.9). The testing of the Haverhill corridor was, in fact, an additional sub-option to examine the implications of going for growth there according to the wishes of the Steering Group.

	OPTION 1 **Cambridge Centred and Strong RPG Sequence**	**OPTION 2** **Mixed Strategy (Criteria-based)**	**OPTION 3** **Market Towns/Corridor Emphasis**
Cambridge City	3,500	2,500	1,500
Green Belt	11,000	8,000	4,000
New Settlement	6,000	6,000	6,000
Market Towns, Larger Villages and PENS	1,500	5,500	10,500
TOTAL	**22,000**	**22,000**	**22,000**

18 Each of the four options includes a different new settlement selected from the sites that most closely matched the performance criteria. As there were 4 new settlements accorded higher priority and 4 Options being developed, the new settlement that seemed most closely to follow the thrust of the strategy was chosen for that option. However, any of the new settlements could be applied to any of the options. Waterbeach was included in the Cambridge-centred option, Childerley Gate in the Mixed Strategy option and Oakington-Longstanton and Great Abington respectively in the two Market Towns/Corridors options. Maps of the Options are in Section 10.

Sustainability Testing

19 The sustainability testing process involved testing the performance of each option according to nine sustainability criteria. The nine sustainability criteria meet national objectives of maintaining high and stable levels of economic growth, social progress to meet the needs of everyone, effective protection of the environment and prudent use of natural resources. 17 indicators have been selected to measure these nine criteria. The sustainability testing process makes possible an assessment of the strategic options as themes. The overall result for the option does not reflect the

performance of the new settlement site, which has been separately tested (apart from certain transport related indicators). The detailed assessment of the pros and cons of each new settlement is set out in Section 8.

20 Options are scored according to their positive, slightly positive (some good), neutral or negative contribution to sustainability targets and the overall results are summarised in a comparative table. Option 1 performed the best overall and was assessed as 'Some Good'. It has comparatively positive effects in terms of increasing housing density and curbing car mileage for example and no significant negative effects compared to the performance of the other Options. Option 2 performed the next best overall and was assessed as 'Neutral to Some Good'. It performed comparatively well in curbing congestion and reducing average journey times to work, but performed poorly in terms of increasing water recharge through Sustainable Drainage Systems (SuDS). Options 3 and 3A were considered to have a 'Neutral' effect overall. For example both options performed comparatively poorly in terms of maximising use of public transport and increasing housing density. Section 10 examines the results in full.

Implementation Issues

21 Implementation of the potential growth in the Sub Region is a considerable challenge, in terms of administrative effort and funding. This requires the local authority planning process to lay down a framework for making timely decisions on the spatial aspects of development and for establishing new mechanisms and policies required to ensure efficient and sustainable development.

22 The main problems of funding relate to the 'infrastructure deficit' for publicly provided infrastructure, of which the largest element is transport infrastructure. To overcome this deficit will require mobilisation of higher levels of investment. The Government is looking at the potential for much-enlarged public and private partnership arrangements to meet the Sub Region's investment needs. Cambridgeshire County Council, East of England Development Agency (EEDA) and GO-East commissioned a study of how development can be effectively implemented in the Sub Region (called the Cambridge Sub Region Implementation Study).

1. INTRODUCTION

1.1 Regional Planning Guidance 6 and the Cambridge Sub Region Study

1.1.1 This Study was commissioned by SCEALA (Standing Conference of East Anglia Local Authorities) in Spring 2000 in response to the identification of the need to develop the planning framework for the Sub Region within the emerging draft Regional Planning Guidance 6 (RPG 6) for East Anglia. The RPG was published in November 2000 and it provides guidance for the period up to 2016.

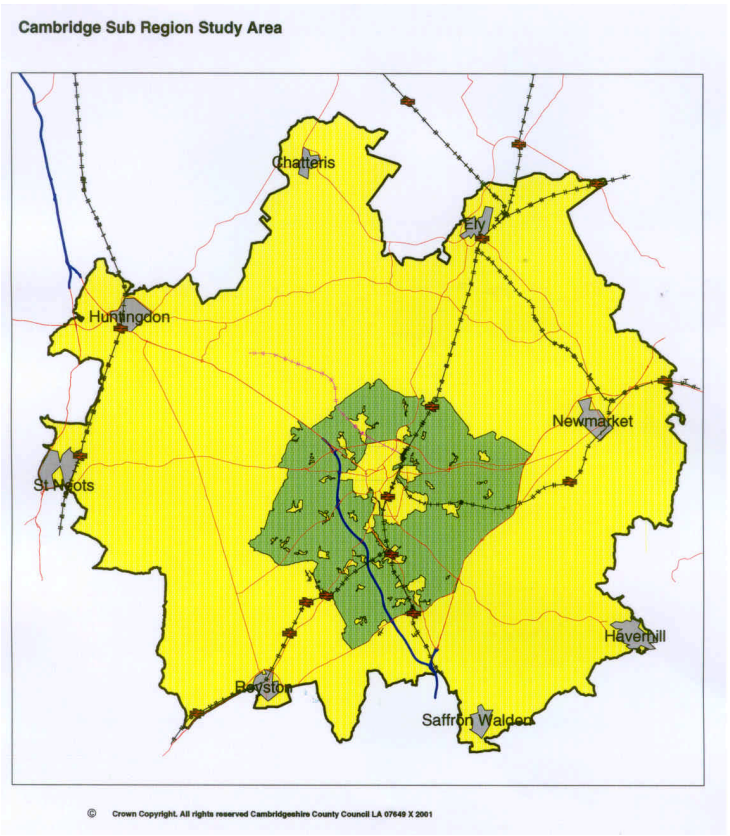
1.1.2 With regards to the Cambridge Sub Region the RPG states:

> ***'The Challenge is to develop a planning framework which will allow the sub-region's development needs to be met in a sustainable way, while protecting and enhancing the important environmental qualities of the city and surrounding area and achieving new development of the highest quality'.***

1.1.3 An independent and consistent appraisal of key options for development within the Cambridge Sub Region is required to inform the development strategy for and input to the Cambridgeshire and Peterborough Structure Plan Review and informs the development plans of adjoining counties, particularly Suffolk. This Study helps meet that need.

1.2 The Cambridge Sub Region

1.2.1 Cambridge Sub Region has a broad sphere of influence which, whilst not encompassing the entire County area, does extend beyond its southern and western boundaries. Its sphere of influence is defined by the immediate ring of Market Towns of Royston (Hertfordshire), Saffron Walden (Essex), Newmarket and Haverhill (Suffolk), as well as St Neots, St Ives, Huntingdon, Chatteris and Ely.



1.2.2 The Sub Region is an economically buoyant area, which is under considerable pressure for further rapid and substantial growth. This is due to the importance of its knowledge and service based economy, which amongst others includes high technology businesses ranging from computer software to medical research and biotechnology, education, health and administration services.

1.2.3 The Sub Region Study was commissioned to devise development options and strategies that maintain this economic vibrancy, meet development needs (particularly housing needs) and foster a more sustainable pattern of development. Consequently, the Study assesses the environmental and travel impacts of the different development options and considers the capacity of villages, towns and cities within the Sub Region to accommodate further new development. It also assesses housing density, affordable housing, housing development economics, public transport and High Quality Public Transport (HQPT) (defined by the Study as a bus service with a peak frequency of every 10 minutes and 30-minutes for rail services if available, see paragraphs 5.4.2 – 5.4.3 below) and implementation considerations. The Study has entailed a fundamental review of the Cambridge Green Belt and also identified possible locations for a new settlement. The context and aims of the Study are given in Section 2.

1.2.4 This Study provides a major input into the early stages of the new Joint Structure Plan for Cambridgeshire and Peterborough, which is already in preparation. A Deposit Draft Plan will be published early in 2002.

1.3 Management of the Study

1.3.1 The Study was managed at three different levels, namely: day to day management by officers of Cambridgeshire County Council; a Steering Group comprised of the officers of all the local planning authorities (Cambridgeshire, Suffolk, Cambridge City, South Cambridgeshire, Huntingdonshire, East Cambridgeshire, Fenland, Uttlesford (covering Saffron Walden), Forest Heath (Newmarket), North Hertfordshire (Royston) and St Edmundsbury (Haverhill)), SCEALA (Standing Conference of East Anglian Local Authorities), GO-East (Government Office for the East of England) and EEDA (East of England Development Agency); and, a Members Reference Group comprising members from each local authority in the Sub Region.

1.3.2 The Steering Group convened monthly. Their role was to ensure that the Study was fully informed of local issues and circumstances, to provide guidance on the Study methods and to check that the findings were robust and consistent across the Sub Region. The Members Reference Group was consulted at key stages of the Study and provided a useful sounding board for Study progress and for the emerging proposals.

1.3.3 In addition, meetings were held with stakeholder groups – transport, Ministry of Defence and English Partnerships, business development groups, utility authorities/companies, community service (education and health) groups and environmental protection groups. In total, some 30 stakeholder bodies were consulted to obtain information and to discuss key issues of the Sub Region Study.

1.4 Report Structure

Background
Section 2: Provides the Context and the Aims of the Study;

Section 3: Provides the Vision for the Sub Region;

Methodology

Section 4: Provides the Study Methodology;

Summary of Housing, Transport and Economic Studies

Section 5: Provides summaries of the key findings of the policy and sectoral studies, comprising a review of planning policy and density, housing development economics, Cambridge case studies, affordable housing, the transport network and traffic modelling and employment and economy;

Analysis of RPG Elements

The following sections examine the different development locations as identified and in the sequence contained within Regional Planning Guidance 6:

Section 6: RPG Element: Cambridge City;

Section 7: RPG Element: Green Belt Review;

Section 8: RPG Element: New Settlement Site Search and Analysis;

Section 9: RPG Element: Market Towns, Larger Villages and Previously Established New Settlements (PENS);

Analysis of Development Options

Section 10: Outlines the four Development Options and describes the sustainability process and the criteria;

Section 11: Summarises Key Implementation Issues.

Annex A: Provides a list of Capacity and Implementation Criteria.

1.5 Status of the Study

1.5.1 This Study has been prepared in response to the requirements of the Regional Planning Guidance for East Anglia to 2016 (RPG 6). Its analysis and findings will inform the reviews of development plans in the short to medium term, particularly in Cambridgeshire, but also with regard to those parts of the adjoining counties within the Sub Region. In advance of the RPG for the East of England, there is no mechanism to vary the annual house building rates between the different counties. However, the Study provides guidance on how those requirements can be met in ways that could contribute to the development needs of the Sub Region. The Study also indicates how the longer-term development of the Sub Region can be met. It is required to provide information on development options as an input to the Study of the London-Stansted-Cambridge Sub Region proposed in RPG 9 (for the South East). The RPG for the East of England is then required to review the planning framework for the Cambridge Sub Region in the light of the two studies, together with the results of monitoring and other changes.

1.5.2 The Study is intended to inform the Structure Plan process, but does not in any way pre-empt it. Nor does it make any recommendations for the development strategy or the development of any particular site. The analysis has been undertaken for purposes of the strategic assessment of options only. Also, it should be noted PPG 3 (Government guidance on housing) requires capacity studies to be undertaken to support housing land allocation in Local Plans (this is explained further in paragraph 9.3.3 below).

2. CONTEXT AND AIMS OF THE STUDY

2.1 Regional Planning Guidance 6: East Anglia (November 2000)

2.1.1 The Study was guided by the Proposed Changes to the Draft RPG published in March 2000 and then by the Regional Planning Guidance for East Anglia (RPG 6), which was published in November 2000 (the first one to be completed under the Government's new arrangements for regional planning) after the Study was commissioned. However, its requirements and policies have been incorporated within the Study work and findings.

2.1.2 The primary purpose of this RPG is to set the regional framework for development plans in East Anglia in the period up to 2016 – this guidance must be taken into account when formulating Structure and Local Plans and it is a material consideration in decisions for planning applications. The RPG also provides fundamental guidance on this Cambridge Sub Region Study and was produced with the participation of a range of local partners involving considerable consultation.

2.1.3 Also, the RPG sets housing targets and provides an order of preference for the location of new housing within the Sub Region, affirming that all elements in this sequence have a role to play in meeting housing need. It specifies that employment generating development should be located where good public transport, cycling and walking access exists or can be provided: within or by extensions of the built up area of Cambridge; in a new settlement close to Cambridge; and within or by extensions to the Market Towns. With reference to the Green Belt, the RPG specifies that a review should be carried out, starting from a Vision of the city and of the qualities to be safeguarded. It should consider how far the Green Belt is fulfilling relevant purposes and its influence on settlement form. It also specifies the criteria to be used in identifying any new settlement.

2.1.4 The RPG provides a slightly different housing target from that provided within the Draft RPG, at the outset of the Study. The overall housing target for East Anglia has been increased by 250 dwellings per annum, from 9,650 per annum to 9,900 per annum. At the regional level the target for Cambridgeshire remains the same, but it has been increased for Suffolk and Norfolk. Essentially, however, these increases in the adjacent counties relate to strategic growth areas located outside of the Sub Region.

2.1.5 The RPG sets out in Policy 8 the requirements for net increases for Cambridgeshire in dwellings, as an annual average:

4,000 (2,800 per annum in the part of Cambridgeshire within the Sub Region, excluding Hertfordshire and Essex, and 1,200 in the rest of Cambridgeshire County)

2.1.6 The RPG thus confirms, by implication, that the housing figures derived at the outset of the Study remain valid. The distribution was provided by SCEALA and the relevant planning authorities for 1996 to 2016, as follows:

County	Sub Region Target (Total County Target)
Cambridgeshire	55,900 (86,000)
Essex	1,500 (108,400)
Hertfordshire	1,060 (66,000)
Suffolk	5,000 (52,000)
Total	**63,460**

NOTE:
1 The Hertfordshire Sub Region target is capacity identified in the North Herts Draft Local Plan (February 2000 – now withdrawn).
2 Suffolk figures are taken from an assumed apportionment of District figures in the adopted Structure Plan and are not strictly targets.

2.1.7 The housing position is, as follows (with the target rounded up):

Target (1996 to 2016)	**63,500**
Existing commitments	20,730
Small Sites Allowance (under 1 hectare)	7,400
Provisional Urban Brownfield Sites Allowance	4,120
Residual	31,210
'Base Case' (committed development identified as part of this Study)	9,500
Residual Study Area Housing Target	**22,000**

NOTE:
1 Existing commitments are all sites with planning permission or allocated in a Local Plan but without planning permission as at mid 1996.
2 Small Sites allowance is an estimate of the supply to 2016, of dwellings from sites with capacity of less than 9 dwellings, together with new dwellings arising from conversions or changes of use.
3 Provisional urban brownfield sites is an estimate of the supply to 2016, of dwellings from previously used urban sites (urban sites included city, town and village sites). The estimate predated the NLUD survey.
4 The 'Base Case' is the sites not included in existing commitments identified with the Study Team in conjunction with District Officers, which had either been granted planning permission between mid 1996 and mid 1999 or were considered likely to come forward before 2016 regardless of the development strategy.

2.1.8 The Study area's residual housing target was drawn up by Cambridgeshire County Council (CCC), in partnership with the local planning authorities and County councils of the Sub Region. It should be noted that the residual figure of 22,000 is only approximately one third of the total dwelling growth for Sub Region. The residual requirements include an element of flexibility to allow for some capacity beyond 2016 (as required by RPG 6) and represent only a part of the substantial change in the Sub Region anticipated over the period to 2016. In accordance with PPG 3, existing commitments will need to be reviewed to ensure that they are in sustainable locations and that they use land effectively. It is anticipated that a greater density may be applied to outstanding planning permissions or local plan allocations in light of PPG3, which could make up for any shortfall if other outstanding commitments were not developed.

2.2 RPG Elements

2.2.1 The RPG provides an order of preference for the location of new housing within the Sub Region, as follows:

i) within the built-up area of Cambridge, subject to available capacity and environmental considerations;

ii) on the periphery of the City subject to a review of the Green Belt;

iii) in a new settlement close to Cambridge;

iv) within the built up area of market towns, larger villages and previously established new settlements, where good public transport access to Cambridge exists or can be provided, provided that growth in car commuting can be minimised; and,

v) by extensions to market towns, larger villages and previously established new settlements where good public transport access to Cambridge exists or can be provided, provided that growth in car commuting can be minimised.

2.2.2 Our analysis of commuting patterns and the current balance of jobs and housing has shown beyond doubt that there is a significant shortage of housing relative to jobs in and close to Cambridge. Therefore the priority for new development within the City and in areas to be released from the Green Belt is to provide additional homes. Any major residential extensions would nevertheless include within them a mix of uses to provide local facilities and employment on a scale appropriate to the local community.

2.2.3 RPG indicates that whilst each element of the RPG sequence has a part to play in meeting the needs for development in the Sub-Region, the priority for development should follow the sequence without necessarily incorporating all elements to achieve targets. However, by placing a different emphasis on each element, different development strategies emerge. This Study highlights the implications of 4 different strategies or options, which each involve all the RPG elements.

2.3 The Study Specification

2.3.1 The key aspects of the Study as described in the Study Specification were to:

- Provide a validation of the urban capacity of Cambridge City;
- Carry out a fundamental appraisal of the Cambridge Green Belt;
- Update and fill gaps in the varying information gathered by the local authorities on the Market Towns around Cambridge;
- Assess options for accommodating development in locations with good public transport links to Cambridge including Market Towns, Larger Villages and PENS;
- Give an indication of the potential and feasibility of developing a new settlement or settlements between Cambridge and the surrounding ring of Market Towns;
- Identify criteria relating to capacity, implementation and sustainability; and,
- Assess alternative options against these criteria.

2.3.2 These formed the basis for the different strands of the Study and influenced the sites selected to form the development options.

2.3.3 The individual site specific needs of major land uses in the Sub Region such as Cambridge University and Addenbrooke's Hospital were not part of the Study. This would have required specialised assessment outside of the Study Specification. A separate study of key worker and affordable market housing needs in Cambridge and South Cambridgeshire will report in winter 2001. In any event the overall development assumptions given by the County Council were deemed to include these requirements. In relation to the affordable housing needs of the Sub Region, they were analysed by District and inevitably include a proportion of key workers at these institutions. In addition, all

sites that may or may not be selected for development in the Sub Region, have been assessed for their potential to absorb development, irrespective of ownership and therefore include institutional lands.

2.4 Interpretation

2.4.1 The Study's key aim was to undertake an independent and consistent appraisal of options for accommodating substantial future growth within the Cambridge Sub Region, examining their sustainability, feasibility and capacity. Four different development options for the residual housing target of 22,000 dwellings have been formulated by placing a different emphasis on each element of the RPG development sequence and founded on those broad categories of development location:

Option 1: the 'Cambridge Centred Strong RPG Sequence Option' places the largest amount of residual growth in Cambridge and the inner Green Belt;

Option 2: the 'Mixed Strategy (Criteria-based) Option' places residual growth in all the above elements according to the outcome of the capacity criteria tests; and,

Options 3 and 3A: the 'Urban/Corridor/HQPT Infrastructure Investment Option' places a much larger proportion of the residual growth in Market Towns and in the transport corridors, which lead to them. Option 3 involves the use of the Huntingdon, St. Neots, Newmarket and Royston corridors; whereas Option 3A uses the Haverhill corridor instead of the Huntingdon corridor. The corridors for testing were selected according to the cost effectiveness of providing HQPT, the potential availability of housing capacity and the simultaneous consideration of various capacity constraints (e.g. secondary school capacity), efficient use of existing and committed infrastructure and the existing balance of jobs and housing (see table in Section 9). However, other alternative corridors might have a role to play and could have been selected, for example, in relation to preferred new settlement locations (see 10.1.9). The testing of the Haverhill corridor was, in fact, an additional sub-option according to the wishes of the Steering Group, to examine the implications of going for growth there.

2.4.2 All development options entail the development of a new settlement and to varying extents the expansion of Cambridge City into its inner Green Belt.

3. VISION FOR THE SUB REGION

3.1 The Approach

3.1.1 The purpose of the Vision is to provide the overall framework to define the specific objectives or criteria for assessing development options. Further, the scope of the Vision is closely related to the identification of capacity and sustainability criteria. The Vision is realistic and allows for achievable spatial development strategies to emerge.

3.1.2 The process of developing the Vision has involved sifting from relevant national and regional policy documents, recognising the historic 'vision' for Cambridge and distilling a new Vision, which incorporates these strands and is closely related to identified criteria. RPG 6 Policy 21 has been used as the guiding framework for developing a Vision for the Sub Region.

3.2 The Broad Vision

3.2.1 The Vision is to protect and enhance the important qualities of the Sub Region, build on its potential to provide an enhanced quality of life in more sustainable ways, enhance its major role in the regional and national economy and promote more sustainable patterns of movement. This is best illustrated by defining the qualities to be promoted and safeguarded and then describing the components of this Vision in more detail.

3.3 Qualities to be Promoted

3.3.1 The following key qualities of Cambridge and the Sub Region should be promoted in any future development strategy:

- ✓ Allow the Sub Region to develop further as a world leader in research and technology-based industries and the fields of higher education and research;
- ✓ Foster dynamism, prosperity and further expansion of the research and technology-based economy;
- ✓ Provide a more sustainable balance between rates of growth in jobs and housing, allowing the Sub Region to accommodate a higher proportion of the region's housing development;
- ✓ Promote a more sustainable and spatially concentrated pattern of locations for development and more sustainable travel patterns;
- ✓ Investigate and promote sustainable and integrated transport systems that relate closely to future development patterns in the Sub Region, with new development having a close relationship with homes, jobs and services and being located and designed to provide for sustainable modes of transport;
- ✓ Facilitate the provision of an attractive, accessible and ecologically rich countryside;
- ✓ Secure development of the highest quality;
- ✓ Provide a high quality of life and seek to avoid social exclusion, including by addressing the issue of affordability in the area;
- ✓ Be based on a coordinated approach to development, which maximises and integrates the different sources of investment; and,
- ✓ Allow scope for, rather than constrain, continuing development beyond 2016.

3.4 Qualities to be Safeguarded

3.4.1 The following key qualities of Cambridge and the Sub Region should be safeguarded and enhanced, regardless of future development strategy:

- Appropriate access to the surrounding countryside from Cambridge, the Market Towns, Larger Villages and existing New Settlements;
- Maintenance and enhancement of the essential elements of green corridors and wedges within the city, towns and villages, connected to the countryside;
- Separation between existing and new settlements ensuring that each settlement has a clear identity;
- Protection and enhancement of the landscape setting of settlements must be pursued in any new development; and,
- Safeguarding of all-important environmental qualities of the city and Sub Region, especially in Cambridge City, its historic townscape, urban green space and the setting of its buildings.

3.5 The Vision and its Spatial Consequences

Cambridge City and Surrounding Area

3.5.1 The original Study Specification suggested 3 different futures (Preserved City, Urban Hub and Expanded Urban Hub) for Cambridge City and its surrounding area. The Consultants propose that they be combined into a preferred overall theme of 'a Central and Expanded Urban Hub, consisting of a wider network of urban centres (with options as to the scale of this wider network)'. This combined theme can then be addressed in different ways within the four strategic development options. The theme of Preserved City is difficult to justify given the importance of providing more homes close to jobs in Cambridge and given the expectation for development identified through RPG 6.

3.5.2 There are a number of opportunities to enhance the role of rail transport in the Sub Region, particularly promoting increased station capacity, the opportunity for new stations, the potential for cross Sub Region services and for interchange with high quality public transport routes. Cambridge also has an opportunity to become Britain's leading cycle city. Other opportunities include: accommodating the service needs for a growing Sub Region, providing an enhanced urban edge with the possibility of new sub-centres (within environmental constraints) and giving greater access to the countryside.

3.5.3 It is important to understand the possible spatial consequences of this future, i.e. a 'Central and Expanded Urban Hub':

- Historic Cambridge will be the focus for an expanded 21st century city, but maintain its intimate character, historic features, heritage and good quality;
- Land use efficiency (utilising brownfield sites, increased densities, reduced parking, use of backland, enabling changes of use, encouraging mixed use and also high quality design) will be pursued;
- Continuing investment in the facilities and retail potential of Cambridge City, with potential for smaller sub-centres for shops, administrative services, culture, leisure, etc., only in areas of substantial new housing;
- Development of the University facilities of the City;
- Maintenance/enhancement of the landscape setting (protecting existing key settings and spaces and creating/enhancing new settings and spaces) to ensure its

relationship with the countryside;
- Enhanced cycling/walking in existing/new areas and enhanced public transport services including High Quality Public Transport (HQPT);
- Protection of existing environmental qualities/structure of the City; and,
- Provision of sufficient affordable housing, accessible to the city (jobs/services).

Remainder of the Cambridge Sub Region

3.5.4 The Market Towns, Larger Villages and previously established new settlements (PENS) will be developed, appropriately, in tandem with the City to reduce travel and to improve their viability and that of their surrounding rural areas. Their development and other new developments in the Sub-Region will aim to develop High Quality Public Transport Links and improve and enhance existing public transport links and/or walk/cycle networks. The development of each settlement will not be uniform, but will be appropriate to its location, public transport accessibility (including potential), role/function and identity, existing jobs/housing imbalance (if excessive), environmental quality and attributes and land availability. Where the jobs/housing imbalance is excessive there clearly need to be efforts to address that before further population expansion, e.g. the Haverhill corridor.

3.5.5 It is important to stress and enhance the polycentric urban structure of the Sub Region and to promote the location of a new settlement, which will assist in achieving key components of the Vision and be of crucial importance in providing ongoing development capacity beyond 2016.

3.5.6 The spatial consequences of this future, i.e. the 'Central and Expanded Urban Hub' (refer to paragraph 3.5.1) are, as follows:

- Larger settlements will expand, involving efficient use of land within and around the settlement for housing, possibly involving concomitant developments of the centre and employment areas;
- The landscape setting and key environmental qualities of each settlement will be maintained and enhanced;
- The role/function and identity of each settlement will be strengthened;
- The employment, retail and service role/function of the Market Towns should be enhanced;
- Accessibility by cycling/walking within the settlement and by public transport between the settlement and Cambridge (and possibly radially) will be improved resulting in more sustainable travel patterns; and,
- The future viability of the rural areas will be supported.

3.6 Components of the Vision

3.6.1 This Vision is broken down into the following four component themes:

ECONOMIC (covering population and housing, employment, knowledge based economy and clusters)

ENVIRONMENT & RESOURCES (covering urban form and character, environmental protection, landscape character, use of land and resources, air and water quality, biodiversity and open space)

QUALITY OF LIFE, SOCIAL AND CULTURAL (covering social infrastructure, health, equity/affordable housing and culture)

ACCESSIBILITY (covering public transport, accessibility to facilities and cycling/walking)

Economic Components

3.6.2 These are the drivers for the development of the Sub-Region. National and regional policy specify the future housing development (and hence population) up to and beyond 2016 and the need to allow the further development of the 'Cambridge phenomenon', in view of its importance to the national/regional economy.

1 *Housing* - accommodate the minimum housing requirements specified in the Regional Planning Guidance (as regularly updated), but allow scope for a higher requirement up to 2016 and continuing development beyond 2016, particularly utilising a new settlement. Also, accommodate adequate provision for affordable and key worker housing, as a means of addressing skill shortages and to maintain services;

2 *Employment* – facilitate the provision of employment to support the further development of the 'Cambridge phenomenon' together with housing provision in a sustainable balance;

3 *Knowledge based Economy* – promote Cambridge and its Sub Region as a primary location, within the UK and Europe, for higher education, knowledge based industries, innovation and research and development; and,

4 *Clusters* – foster existing clusters and promote the development of new clusters within the Sub Region using appropriate, recent research, facilitating the personal and business network(s) of the high-tech community. Also, promote the extension of clusters around Cambridge to locations beyond Cambridge and its immediate vicinity.

Environment and Resources Components

3.6.3 Development needs must be met in a sustainable way, whilst protecting and enhancing the important environmental qualities of the city and surrounding area and achieving high quality development.

5 *Use of Land* –use land efficiently as possible through the reuse of brownfield land (the regional target is 50% of all new development on brownfield land, which may not be achievable within the Sub Region). Also, higher density development should be promoted where access to jobs and facilities is available and which recognises locational influences on density provision;

6 *Use/Quality of Other Resources* – promote the efficient and sustainable use of energy, water and materials;

7 *Environmental Protection & Landscape Character/Setting* – identify and ensure the protection of all key environmental designations (such as: various EU designations, ESAs, SSSIs, Grade 1 agricultural land, woodland, groundwater and flood protection zones, Conservation Areas, areas of archaeological importance, Nature Conservation Areas, open space and recreational areas, mineral reserves, etc.) and specific landscape settings and protection areas; and,

8 *Urban Form/Structure, Character and Role/Function* – maintaining the separation of settlements within a rational development pattern and each settlement should have a defined role/function, which should enhance its polycentric structure. Cambridge will become the central and expanded hub of a wider network of urban centres within the Sub Region. New housing development in the Sub Region should be located close to jobs, public transport links and social infrastructure and have good access to the countryside. All new development should be high quality and integrated with sustainable modes of transport to support Components 2 – 4 above and 13 – 15 below. Adequate open spaces must be maintained in all settlements linking to the countryside.

Quality of Life, Social and Cultural Components

9 *Social Infrastructure* – schools, shops, hospitals/health centres, administrative services and leisure/recreation facilities must be provided and located conveniently in relation to existing and new housing development. Some decentralisation is to be encouraged to support the viability of other centres. New development must be located to ensure critical mass and viability of these facilities/centres, particularly in smaller settlements. Cambridge will provide a key function as a centre for administrative services, social infrastructure and shopping (within the City and not necessarily its town centre);

10 *Equity/Affordable Housing* – social equity is a priority with good access to jobs (in terms of opportunity, variety and location), services, housing and transport. Affordable housing provision, including key worker housing, in suitable locations (particularly to jobs, services and transport) throughout the Sub Region is critical to promote social inclusion, address skill shortages and maintain services;

11 *Health* – a healthy and uplifting environment in all settlements and their expansion is essential, maximising opportunities to reduce emissions/pollutants (particularly road transport), encouraging walking and safe cycling, manage waste and provide attractive open space/diverse landscape settings; and,

12 *Culture* – to promote and enhance Cambridge as a leading centre of culture and learning and to enhance the cultural facilities in other settlements in the Sub Region in tandem with other development.

Accessibility Components

13 *Accessibility to Jobs/Facilities/Countryside* – housing must be located close to jobs, social facilities (schools, hospitals/health centres and leisure) and have access to the countryside thereby assisting in the promoting sustainable modes of travel. New development must assist this aim;

14 *Public Transport* – promotion of integrated public transport provision (enhanced bus and rail travel within the Sub-Region and to/from other major centres) both by means of improvements to existing network services and by high quality rapid and frequent public transport systems; and,

15 *Cycling and Walking* – movement in Cambridge City Centre, in each main Market Town/Larger Village is to be primarily based on cycling and walking by providing appropriate facilities and by the location of new development and design.

4. METHODOLOGY

4.1 Technical Approach

4.1.1 The approach to formulating the Development Strategy Options entailed the following main stages, which are summarised below:

i. Establishing the Base Case, identifying sites and their development capacities, i.e. existing commitments and emerging development, both before and since 1996;

ii. Identifying the Sites Database, i.e. potential development areas;

iii. Review of Sub Regional Capacity and Priorities;

iv. Sites Prioritisation Process;

v. Deliverability; and,

vi. Option Formulation.

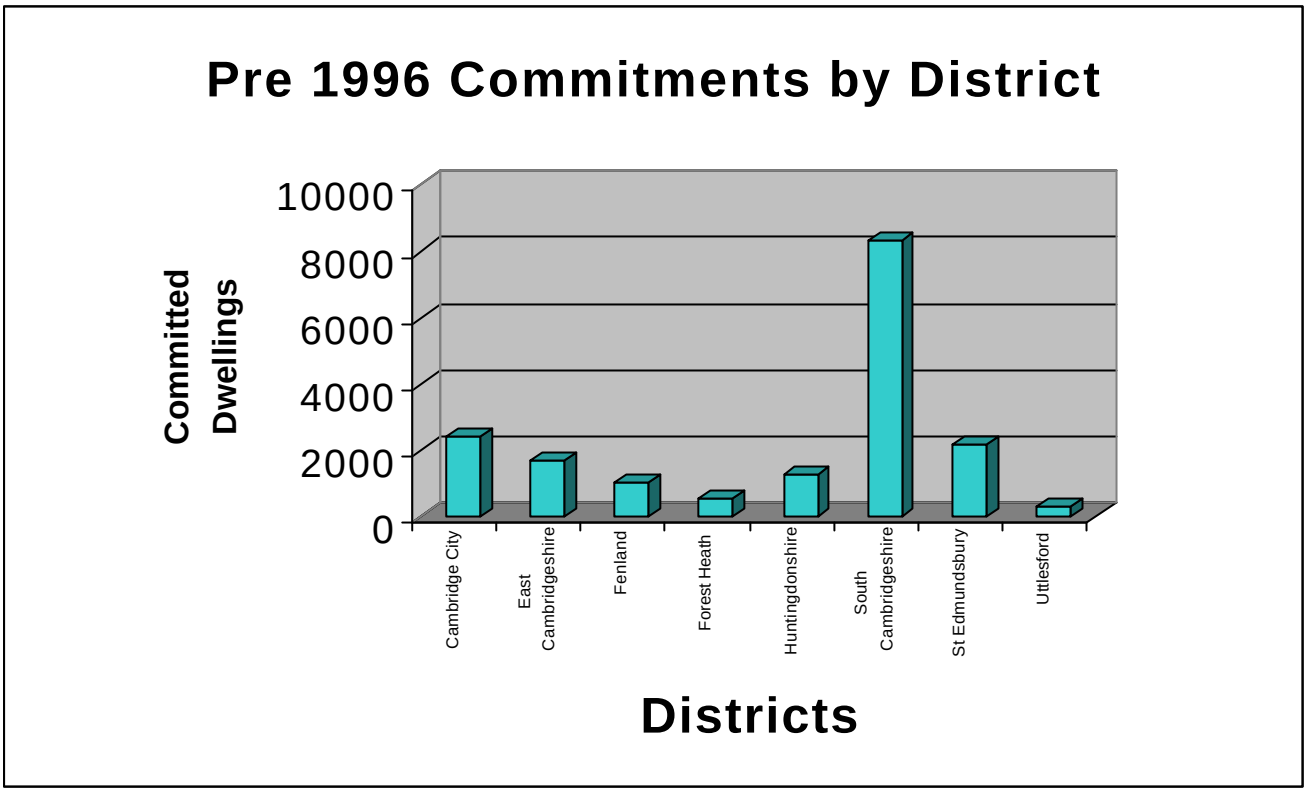
4.1.2 In parallel with the above process, the Consultants undertook work on housing development (density, affordable housing and housing development economics), a review of the Green Belt and environmental capacity assessment, transport, Market Towns, Larger Villages and PENS and broad work on the Sub Region's economic situation. This parallel work informed the identification and subsequent assessment of the potential development sites. Summaries of the findings of these parallel strands are contained in Sections 5-9 below.

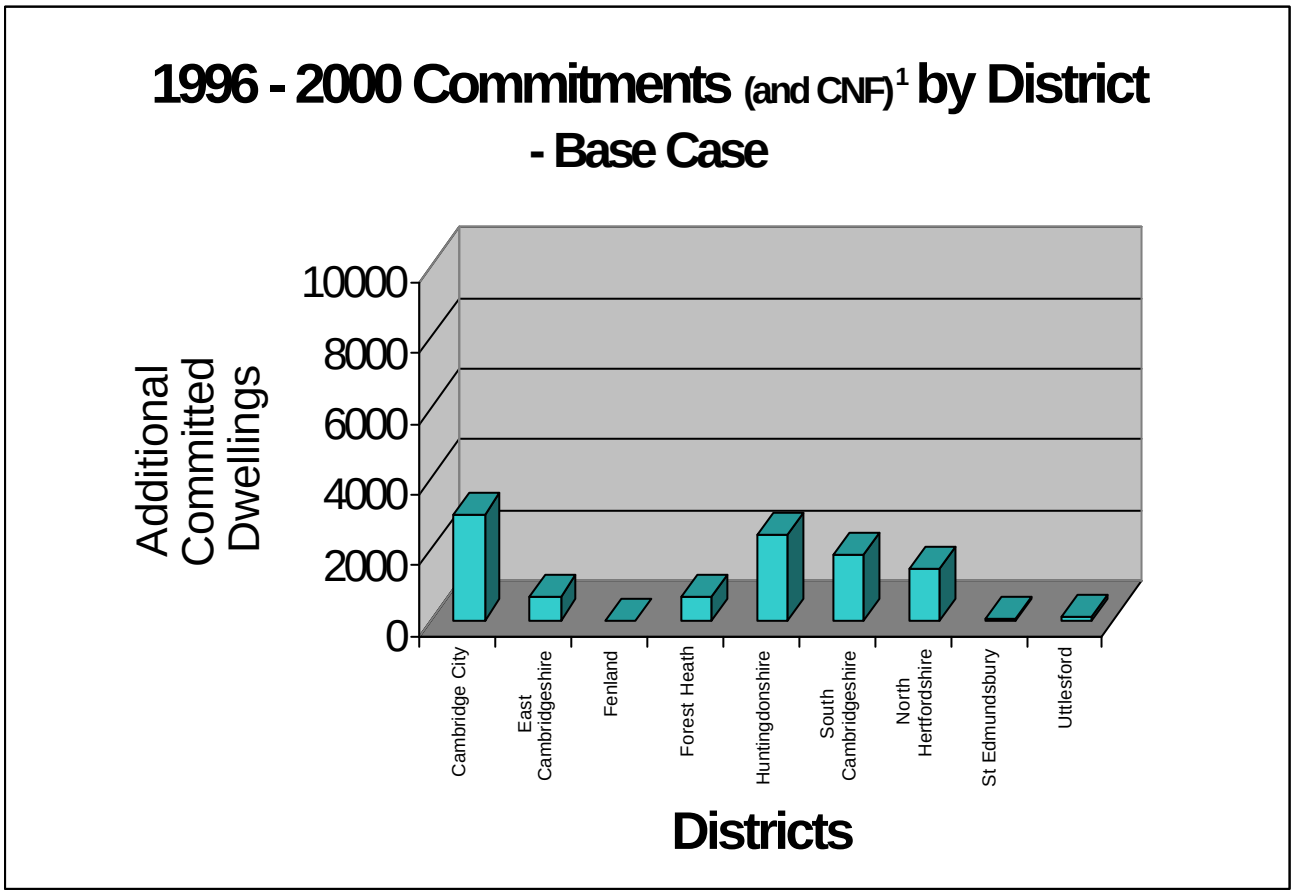
4.2 Establishing the Base Case

4.2.1 To investigate a full range of potential sites to meet the housing requirement for the Sub-Region, it was necessary to establish a detailed picture of existing commitments in the Sub Region assembled from data supplied by Cambridgeshire County Council and each District's Local Plan allocations. This consisted of Local Plan allocations, outstanding planning permissions, completions and additional non-committed sites likely to come forward in the near future and assumed to be developed in any event. Only sites over 1 hectare in size were considered because an estimate for smaller sites had already been made (see Section 2 table).

4.2.2 These sites were mapped and categorised as either pre 1996 commitments (which did not form part of the total Sub Region requirement) or as 'Base Case' (post 1996 commitments). The pre 1996 commitments assessment identifies all sites that are committed and are in the process of being implemented, as well as other relevant sites that have been implemented. The Base Case was vital to establishing how many dwellings are needed to fulfil the RPG housing target for the period up to 2016. Mapping these alongside the pre-1996 commitments helped to reveal potential development sites. It also helped to identify previous and forthcoming distributions of housing in the Sub Region.

4.2.3 The overall numbers of these commitments by District are set out in the two charts below for information (without the small site commitments). These reveal the large capacity of existing commitments.





[1] Cambridge Northern Fringe

4.2.4 The largest towns and districts within the Sub Region as expected, contribute the most sites to the 'Base Case' and pre 1996 commitments, for example Huntingdonshire. Furthermore the 'Base Case' for Cambridge City and South Cambridgeshire has relatively high totals due to inclusion of the Cambridge Northern Fringe sites. Finally, Royston (North Hertfordshire) has a relatively large 'Base Case' contribution because its Local Plan was published recently, which allocated several large housing sites. However, the District Council has very recently announced the withdrawal of that Plan, due to the need to complete urban capacity studies in compliance with PPG 3. By comparison the Local Plans covering the other districts' housing allocations contribute to the pre 1996 commitments.

4.3 Identifying the Sites Database

4.3.1 Absolute constraints to development were identified and mapped, indicating areas where development would not be allowed in any event. These comprised mainly environmental and statutory designations, as follows:

Built up sites (not identified in the National Land Use Database returns)	Ancient Woodland
Playing Fields	Sites with known mineral reserves
Historic Parks/Formal Public Open Space Areas	RAMSAR sites
SSSIs	Grade 1/Best and Most Versatile (BMV) agricultural land
High Risk Flood Plain areas (0.1 –1% annual probability, 100-1000 return period) (mapping from the Environment Agency is based on historical flood records/models and only gives a general indication of risk areas. EA requires consultation on specific proposals)	Newmarket Horse Racing and Stud lands
Ground Water Protection Zone – Grade 1	Cambridge University operational lands (refer to paragraph 2.3.3)
Scheduled Ancient Monuments	Cemeteries

4.3.2 Potential development sites, comprising 1 hectare or above in settlements and 5 hectares on the edge of settlements were then identified. Site selection took into consideration settlement pattern, size and form, obvious site specific constraints (access, topography and accessibility) and also issues such as coalescence and open space.

4.3.3 In total, 208 sites were identified in close consultation with each local planning authority. The process was deliberately broad to ensure that all obvious development options would be considered and assessed in detail. This ensures that the Study is robust and a balanced view is obtained. Nevertheless, the sites have been selected for testing purposes only and their inclusion does not imply local authority support or that they are suitable for future development. This Study is intended to provide a broad assessment of capacity and is not intended to pre-empt the future views of Local Plans, where a more detailed process of site selection and public consultation will take place.

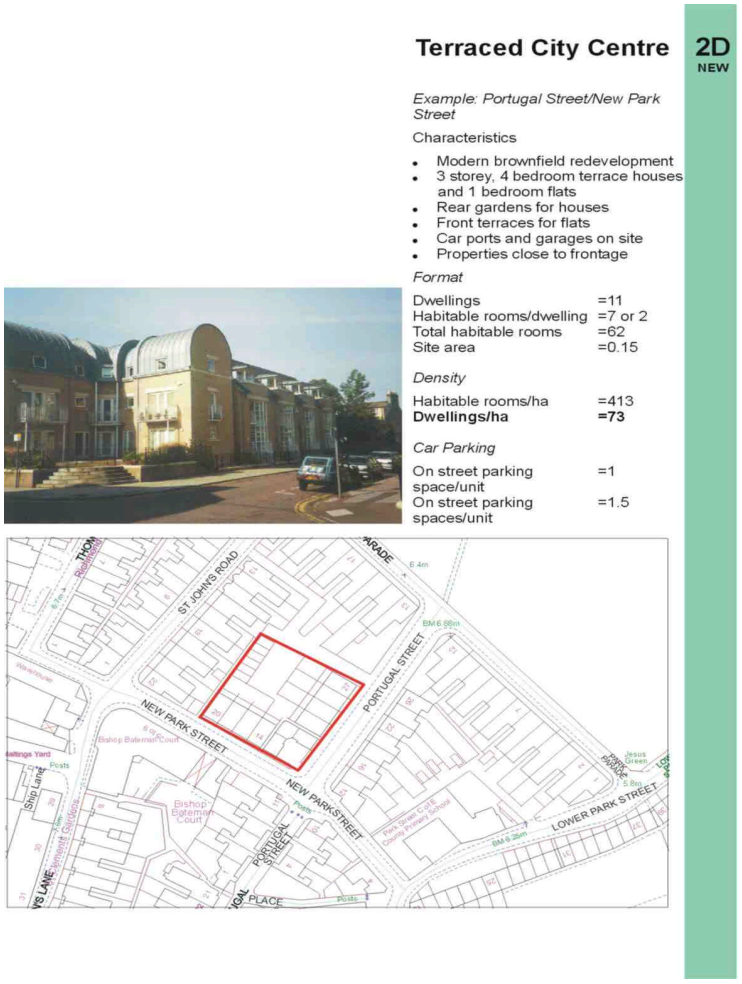
4.3.4 Based on a thorough review of relevant planning policy and density scenarios, template densities (refer to Section 5.1 below) were applied to sites according to their location and context, taking into consideration associated development requirements (roads, open space and other facilities). Thus, a 'Sites Database' potential development scenario was

ascertained and the theoretical capacity, at the assumed densities, is 292,320 new dwellings. But in no sense should this be regarded as real capacity, as it had not been subject to any appraisal of capacity or sustainability. This theoretical breakdown is, as follows:

RPG Element	Number of Sites	Potential Capacity
Cambridge Urban Area	10	4,270
Green Belt	34	106,500
New Settlement Sites (and extension areas)	16	131,550
Market Towns with Good Public Transport Links	99	50,000
Sites eliminated due to absolute constraints	42	-
Total	**201**	**292,320**

4.3.5 All land within the Sites Database was classified to one of 7 'planning contexts', reflecting the location and neighbouring uses of land. These contexts would then be applied to sites to determine housing capacity. Then an assumed average net density was applied to each context (refer to Section 5.1 below). This was used to estimate the average dwelling capacity for sites in that context. It does not imply that each individual site would be developed at that particular density, because individual circumstances would vary.

4.3.6 In the analysis to determine the appropriate net density by context, the Consultants developed housing density templates, based on both historic and recent examples of development in Cambridge. An example of a housing template is shown below.



4.4 Review of Sub Regional Capacity and Priorities

4.4.1 Before sites were prioritised a number of key assessments were undertaken to facilitate the 'Actions' below, more or less simultaneously. These are, broadly in order of importance, as follows:

a) Assessment of employment, school and utility infrastructure capacity of each Market Town. Larger Villages, PENS and Cambridge would not be undertaken. This is because villages/PENS capacity is being considered as a whole and is being considered in general terms; and, demand has been assumed to exceed capacity in Cambridge;

b) Assessment of the employment balance in Cambridge and in each town;

c) Assessment of likely required transport investment needs and broad costs; and,

d) Broad assessment of town centre retail capacity and the general character/ability to absorb expansion of each Market Town.

4.4.2 These assessments gave broad indications of spare capacity and threshold guidance for key areas/settlements, which guided the site allocation process described below.

4.5 Site Prioritisation Process

4.5.1 It is vital that the Site Prioritisation Process does NOT eliminate sites sequentially, since this may rule out sites that are required to make services viable or meet specific thresholds and thereby meet the RPG policy objectives. In order to prioritise the sites, each site identified was assessed and scored, using the following summary capacity and implementation criteria (the full list of capacity and implementation criteria used for this Study are contained in Annex A below). These summaries were termed 'Actions', as follows:

ACTION 1: Environmental Capacity Assessment
This test was split in two, one for those sites in the Green Belt and one for remaining sites, with a slightly different approach used for urban sites. Details of the Green Belt Review are contained in Section 7 below. Sites were visited and assessed according to their landscape and setting, vegetation structure, topography, biodiversity and for Green Belt sites, against the purposes of the Green Belt itself. Sites were scored as either having no potential to absorb development, potential to absorb development within a landscape framework or as a potential site for development.
ACTION 2: Accessibility to Existing Jobs, Schools, Shops and Public Transport
The walking accessibility of each site to a range of facilities schools, bus routes, shops, employment sites and leisure facilities broad range of facilities was measured. Threshold distances varied between 400 metres (5-minutes walk), 800 metres (10-minutes walk) and 1200 metres (15-minutes walk) depending on destination. The number and range of facilities would increase a site's accessibility score. Assumptions about the associated development with each development site were also made, which could also increase an individual site's accessibility score
ACTION 3: Contribution to HQPT
Each site was scored according to its distance from a High Quality Public Transport Route. The following thresholds distances were used: 600 metres, 600-800 metres and more than 800 metres, where 600 metres (approximately 7 minutes walk) was considered to represent the optimum maximum walking distance

ACTION 4: Broad Investment Requirements
An assessment of the broad investment requirements that would be required to facilitate development at settlement locations was made. Investment requirements comprised road, water supply and wastewater infrastructure development requirements and the requirement, if any, to develop or expand existing schools. Assessments were tailored to location - Cambridge and expansion into the Green Belt, Market Towns and finally the Larger Villages. In all, a comparative analysis of an individual site's propensity to facilitate the necessary investment was considered against land value and development demand
ACTION 5: Implementability and Timing
In considering the size of potential development sites (where larger sites are more complex as development would entail master planning and negotiations), any site specific constraints (which could delay on-site development) and also the scale of investment required to facilitate development, an indication of the complexity and, thus the implementability of individual sites, was derived. This process involved careful judgement and in some instances larger sites, although complex in planning terms could be more likely to achieve the significant investment that may be required. Conversely small sites might not, albeit that obtaining planning permission would be less complex

4.5.2 Each action generated a score of between 0 and 3 for each site, where 3 is considered negative and 0 is positive. Thus the maximum score that can be awarded to each site is 15 and the minimum is 0. Notably no site scored 0, 1 or 2, only three sites scored 3 and only seven sites scored 4. Approximately half the sites had scores of 8 or above.

4.6 Deliverability

4.6.1 The ability to deliver development options in the sub-region strategy is a vital consideration - otherwise the strategy would be unrealistic. However, ease of implementation is not assumed to override the need for a sustainable pattern of development. Therefore, the assessment of deliverability has been treated in the following way:

- where there are clear impediments to development within the timescale of the plan, sites or locations are not included in the options. There are relatively few locations where this would apply.
- where there are other implementation factors such as higher than normal development costs, size and complexity of sites, sites not available until later in the plan period, these factors have been taken into account in the overall assessment of sites but are not regarded as absolute.
- (additionally in the evaluation of new settlements, considerable weight is given to whether the site could potentially deliver development beyond 2016 and whether development would be in competition with other developments in the vicinity).

4.6.2 Although a number of developers have advanced land ownership and land options as an advantage in bringing about their proposals, this is specifically excluded as a factor in the analysis as our information may not be complete on all sites and it may change over time. The local planning authorities may need to take account of this issue if it appears to be a significant factor when specific locations are considered for inclusion in the development plan. Also, the selected strategy must include a range of sites, which can be delivered in the early part of the plan period.

4.6.3 It should be noted that the Cambridge Sub-Region Implementation Study is considering issues of deliverability in much more depth.

4.7 Option Formulation

4.7.1 The above assessments enabled all the sites to be ranked and then organised in compliance with the RPG elements, i.e. Cambridge City Urban Area, Cambridge Green Belt and then Market Towns, Larger Villages and PENS. New settlement sites were subject to a separate, more detailed assessment. Low scoring sites were then drawn in order of preference from each element to derive the options. Different options were derived by placing different emphasis on each element within the RPG sequence. Each option contains a new settlement, comprising 6,000 dwellings, which was chosen from those accorded highest priority in the assessment. As there were 4 new settlements accorded higher priority and 4 Options being developed, the new settlement that seemed most closely to follow the thrust of the strategy was chosen for that option. However, any of the new settlements could be applied to any of the options. The final choice will be a matter for the Structure Plan review process.

4.7.2 The derived options and their justification are explained in Section 10 below.

5. ANALYSIS OF KEY SECTORS

5.1 Housing

Policy and Density Review

5.1.1 A thorough assessment was made by the Consultants of national and regional policy and current Local Plan policies and recent best practice techniques in order to determine the potential measures to increased capacity, which could be used within the Sub Region. These revealed the following:

a) *Historic and Recent Housing Densities* – high densities have been achieved with good design without high rise development or compromising living conditions, e.g. in excess of 100 dwellings per hectare (dph). Densities have been influenced by strategic policies, often setting maximum densities resulting in poor land utilisation. Planning guidance has led this under-achievement. The density that can be achieved in new housing development has a major impact on the capacity of the Sub Region, especially in the city where land is very limited. One objective of recent Government housing policy is to encourage higher average densities of development to make more efficient use of land.

b) *Recent Policy Changes* – these broadly emerged in 1995 with large forecast increases in national household numbers. Following this, the 1998 Urban Task Force report and PPG 3 in 2000 have led the drive for increased densities and more efficient use of land, with an emphasis on the use of brownfield land.

c) *Recent Best Practice* – this has largely occurred since 2000 and has dealt with various approaches to urban capacity studies. Subsequently the Government has issued 'Tapping the Potential', which defines best practice clearly.

d) *Sustainable Residential Quality* – this is an approach to explore the potential for higher density and better design on housing sites. This approach uses historic and current densities by employing a series of generic housing types, then following a detailed site assessment, house types are allocated to sites to determine capacity. For this Study the method was refined in some detail and templates using a range of house types were created for 7 different 'planning contexts', which were then applied to land in each context to determine an average capacity. The following table describes the different types of development used.

Category	House Templates/ Types	Net Density Ranges (dph)	Assumed Density Scenarios (dph)
City Centre – Maximum Accessibility	Flats	97 – 122	110 – 130
City Centre - High Accessibility	Terraces, Flats	90 – 97	90 - 100
Other Inner Urban	Terraces	61 – 90	65 – 90
Outer Urban	Terraces	39 – 65	40 –65
Suburban/Outer Urban	Semi-detached houses	33 – 45	35 – 45
Urban Fringe	Detached/Semi-Detached	20 – 33	30 –45
Village Fringe/Rural	Detached houses	20	30 -35

dph = dwellings per hectare

Alternative Policy Frameworks – this aspect of the Study reviewed national policy and all Structure and Local Plans within the Study area to determine possible policies for application within the Study. This work identified the following alternative frameworks: the introduction of minimum density standards, reduced minimum and/or the introduction of maximum car parking standards or a more flexible system of targets, revised conditions for change of use to permit 'living over shops', etc., a greater latitude for backland development and the stimulation of windfall developments by innovative financial measures.

5.1.2 The results of this work were employed in a series of Case Studies within Cambridge to test the potential for increased capacity in different situations (see below).

Housing Development Economics

5.1.3 This aspect of the Study examined the economic implications of different development densities in different parts of Cambridge. It examined recent development and density trends and land values. In particular, the review of density shows that high densities in acceptable forms are possible. However, their practical achievement depends on the economic incentive for developers to build in this way. This depends on variable sale prices, building costs and building land prices for different types of scheme in different locations.

5.1.4 House and land prices in Cambridge have risen in recent years to a point where developers are already building with much increased densities, particularly in inner Cambridge. This trend is likely to continue, subject to the usual market cycles, so long as the supply of housing remains relatively restricted. In outer Cambridge the economic incentive to develop at high density is much less, but traditional low density forms, such as semi-detached houses at 30 dwellings per hectare (dph), are already less viable and developers are building at greater densities. Policy alternatives were suggested that would impose a minimum density and permit higher densities, which would vary depending on location.

5.1.5 In other parts of the Sub Region it is suggested that high-density development could only be realistically achieved in town centre locations or in major new developments close to central facilities and high quality transport services.

5.1.6 Policies to encourage higher density or to bring sites forward for development, such as imposed minimum or higher permitted densities, would vary depending on location. Limits to the size of particular market segments, such as small flats, mean that policies to encourage development of one kind of unit could risk over-supply. Restrictions on on-site parking, with the aim of increasing density, could be counterproductive, making developments less saleable.

5.1.7 Future trends to 2016 will affect the economics of development. Rising house prices will increase the incentive for higher density development. Changing demographics, which is leading to an older population and more small households over the next 15 years, will increase demand for well designed units for various types of smaller household, including higher density houses and flats.

Cambridge Case Studies

5.1.8 The Study selected three sites in Cambridge as examples to assess the capacity for future housing development. The sites were agreed with the Steering Group and highlighted the outcomes of different policy assumptions on different types of land.

5.1.9 Case Study 1: the Cambridge Northern Fringe (CNF) example illustrates the 'pros and cons' of developing relatively large areas of both greenfield and brownfield land on the edge of the built up area of the City. Whilst adjacent residential areas achieved densities of 75 dph, two scenarios were applied to the site assuming densities of 40 and 65 dph in the CNF West and 65 and 90 dph in the East and an average of 75 dph proposed as a viable density for this area. This took into consideration the proposed rail station at Chesterton Sidings. Given Cambridge and South Cambridgeshire open space standards, a higher density scenario would require extensive amounts of open space to be provided (40-47% of the site area). The need for land to buffer noise from the A14 had already been taken into account when looking at the capacity of the sites, so it may be necessary to either reduce the net developable area further or to reduce the open space standards.

5.1.10 Case Study 2: the assessment of the industrial part of Rustat Road demonstrates that although high density development (up 90-100 dph) could be physically achieved on small brownfield sites at accessible locations (close to the railway station) in central areas it would raise specific policy issues, notably to do with car parking and open space standards. Furthermore, relaxation of policy to enable a change of use of an employment site to residential would not necessarily provide an incentive for relocation of existing employment use, albeit that high residential land values would act as a strong incentive for conversion if such a site were to become available. Finally, careful and high quality design would be required.

5.1.11 Case Study 3: the third case study looked at the potential for developing allotment sites and private back gardens and backland in general and also at redeveloping large plots at higher densities. Whilst it may not be desirable to suggest the use of land of this kind for housing development, theoretically this is viable, even at relatively low densities. Although it is not likely that vast numbers of units could be gained from developing backland sites, a relaxation on constraints on backland sites could produce greater densities and in this respect some precedent for infilling is already established. Redevelopment of large plots at higher densities is not seen as particularly viable due to the current high market value of large houses with large gardens. However, a more relaxed policy towards increased density may encourage the market to realise some intensification in this manner. Relaxation of car parking and open space standards would again help achieve higher densities, but this would exacerbate existing deficiencies in open space.

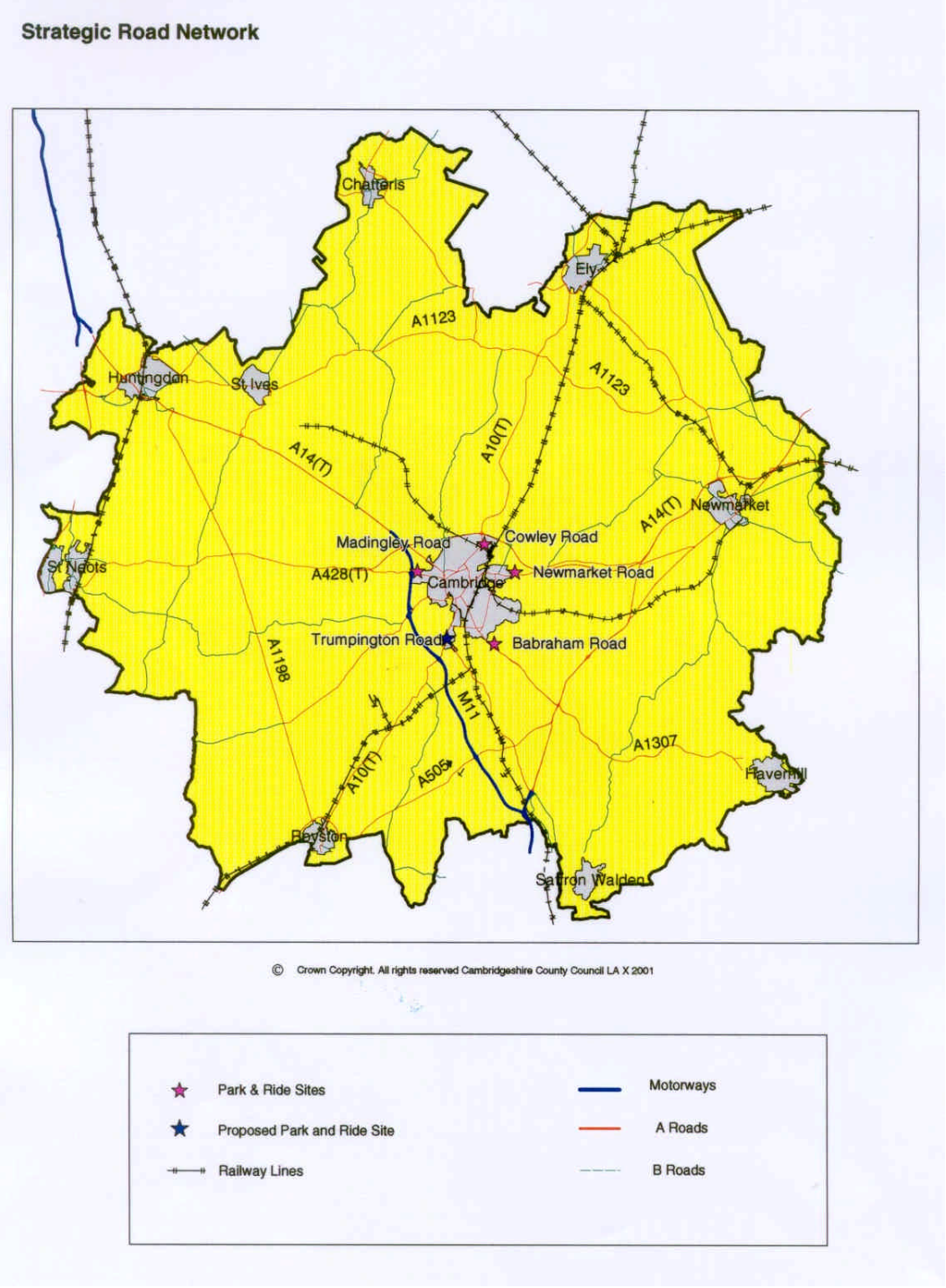
Affordable Housing

5.1.12 This aspect of the Study derived a broad estimate of housing need for the Sub Region from an analysis of housing needs surveys conducted by the local authorities. It identified different definitions of housing needs and the strategies for allocating affordable housing through the planning process. It estimated that 14,700 affordable dwellings would be needed to meet current affordable housing needs or 23% of the total number of dwellings required in the Sub Region. In order to go some way to meeting these past/current needs and the continuing future needs, a figure of 33% was recommended for sites that would constitute the development options. A figure of 25% was recommended for sites in Chatteris, although no sites in Chatteris came to form any of the options (see Section 10 below). This aspect of the Study and the figures derived do not take account of key worker or special needs requirements.

5.2 Transport

Network Assessment

5.2.1 An assessment of the existing traffic conditions (existing network, traffic flows and congestion, accidents and investment plans from the Cambridgeshire Transport Plan 2000) was made for each of the main routes emanating from Cambridge City to the surrounding Market Towns within the Sub Region.



5.2.2 The results are summarised below:

Newmarket Corridor

5.2.3 The A14 corridor does not currently suffer from congestion problems. However, the A14 has a high fatal accident record (in relative terms) on the edge of the city, which needs to be addressed. Investment in Park and Ride has been recently completed for this corridor.

Haverhill Corridor

5.2.4 The A1307 from Cambridge to Haverhill is approaching capacity between the city and Linton. The accident record (in relative terms) is better than on other corridors. Investment in Park and Ride, bus priority and a new rail station (Addenbrooke's) is planned for this corridor.

Saffron Walden Corridor

5.2.5 This section of the M11 on this corridor is approaching capacity. It does not currently suffer from significant congestion and does not have a bad accident record (in relative terms). There is no investment planned specifically for the corridor. Increases in traffic levels over the next 16 years are likely to lead to congestion especially at the corridor's northern end.

Royston Corridor

5.2.6 The Cambridge end of the A10 is approaching capacity here although the accident record along the corridor is not severe (in relative terms). There are plans to invest in Park and Ride and bus priority. The capacity problems on the A10 are likely to increase in the future and these will need to be addressed within the Study period.

St. Neots Corridor

5.2.7 There is currently congestion on the A428 to the west of Cambridge and this route has a bad fatal accident record (in relative terms). The planned dualling of the A428 from Cambridge to Cambourne will ease congestion on the corridor. The poor accident record (in relative terms) will also need to be addressed and safety taken in to account when making any planned capacity improvements to the corridor.

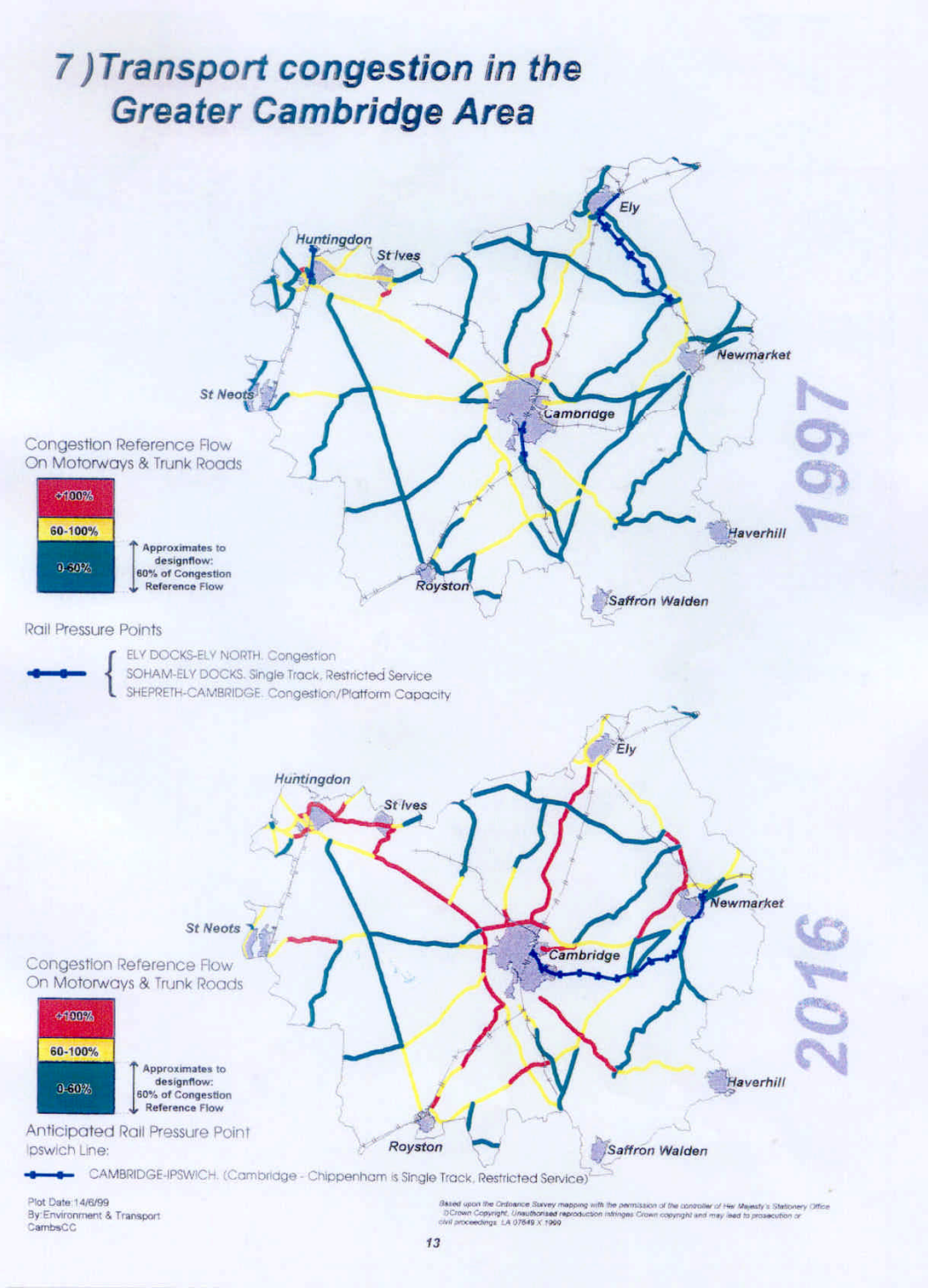
Huntingdon and St. Ives Corridor

5.2.8 There is currently severe congestion on the A14 from Cambridge to Huntingdon, particularly at its junction with the M11. The A14 from Cambridge to Huntingdon has the worst record of accidents of all the corridors with nearly 300 (both fatal and non-fatal in relative terms) between Girton and Godmanchester during 1997-1999. Although the accident rate is not exceptional in relation to national standards for this type of road, the high volume of traffic produces this large number of accidents. It is, however, this volume of traffic, with no alternative routes, that makes the repercussions of any accident particularly serious. The high accident record (in relative terms) and the bad congestion problems on this corridor will be addressed within the ongoing CHUMMS (Cambridge-Huntingdon Multi-Modal Study) study. Investment in the Cambridge-St Ives public transport scheme, Histon Road bus priority and A14 capacity and safety improvements would help to address these problems.

Ely/Chatteris Corridor

5.2.9 The southern section of the A10 Cambridge to Ely is over capacity and the rest of this route is approaching capacity. It has the worst record of fatal accidents for any of the corridors (in relative terms). Large concentrations of minor and serious accidents occurred

around Landbeach and Waterbeach. There are currently no plans to ease the congestion problems on the A10 north to Ely. Investment in Park and Ride at Cowley Road, plus bus priority and a new rail interchange station are planned for the corridor, but will do little to ease the congestion problems, which are likely to get worse especially if new development is located in this area. The lack of proposed solutions, plus the poor accident record on this road, is a gap in the planned investment for the Sub Region.



5.3 Modelling Assessment

5.3.1 In order to provide some guidance on the transport impact of the emerging options, it was decided to use the four stage Land Use and Transport model, MENTOR/SATURN, to assess 9 hypothetical development option strategies that were devised by Cambridgeshire County Council prior to the establishment of the four options identified in this Study. These hypothetical options spread development to different areas of the region within Cambridgeshire County in a variety of ways. The outputs of these options, summarised below, provide a useful indication of how development strategies can alter travel patterns.

Mode Split

5.3.2 The modelling results show very little variation in modal split between each option tested, however, it did show variations in overall travel (distance), depending on the proximity of development to Cambridge. The only significant variation is between the numbers of car and rail trips (rail includes guided bus). The Market Towns option produces the fewest rail and most car trips and the Option with the majority of housing in Cambridge and Longstanton-Oakington producing the most rail and fewest car trips. The number of car trips varied by around 5% between these two options. The tests with transport improvements had the most marked effect on the car/public transport mode split for trips within the city. The Cambridge expansion option placed considerable amounts of housing beyond walking distance of the city and this reduced the use of the 'slow' modes, i.e. cycling and walking, in this option which might otherwise have had a larger mode share.

New Settlements

5.3.3 New settlements were tested at Oakington/Longstanton, Dullingham and Landbeach/Waterbeach. The siting of development at both Oakington/Longstanton and Waterbeach caused major congestion problems respectively on the A14 and A10.

Corridor Development

5.3.4 Development in the A10 corridor to Ely caused extreme delays on the A10 especially between Waterbeach and Milton. The capacity of this road will need to be increased if any development is to be located in this part of the Sub Region.

Public Transport

5.3.5 The model appears to indicate that if it were possible to supply a very high capacity bus service on all corridors then this would be well used in all options. The difficulty of providing enough new public transport capacity to meet demand, e.g. physical constraints in Cambridge, led the modellers to test also a 'Public Transport Constrained' scenario. This forces many of those who would wish to use public transport to use the car. The Consultants consider that neither scenario is an entirely realistic representation of what may occur. Therefore, the model outputs must be treated with caution. The Consultants consider that the difficulties of providing such unconstrained public transport capacity might be substantially overcome with sufficient investment.

5.4 Public Transport Review

5.4.1 HQPT was defined in the Study by two levels, defined as a premiere service and a secondary service. The premiere service is summarised below.

- ***Frequency*** – at least a 10 minute frequency of services in the peak flow direction (generally into Cambridge am and out of Cambridge pm) for buses. In addition to this, a 20 minute frequency during the inter-peak and 30 minutes for evenings and Sundays is required. Alternatively if a parallel rail route with a 30 minute rail service is available, then the bus frequency could be relaxed to 15 minutes in the peak flow direction and 30 minutes for the interpeak and hourly during evenings and Sundays. A 30 minute parallel train headway for rail services, would need to be interdependent with the bus services;
- ***Route*** – as direct as possible to Cambridge and through intermediate settlements;
- ***Priorities*** - dedicated lanes where necessary, to avoid congestion;
- ***Stops*** – a limited number of stops no more than 400m from significant housing developments; and,
- ***City Route/Stops*** – such as major peripheral employment, commercial and retail developments within the corridor and interchanges such as Park and Ride.

5.4.2 A secondary service involves:

- ***Frequency*** – at least a 30 minute frequency in the peak flow direction and in the inter-peak, with 60 minute frequency in evenings and as demand dictates for Sundays. If there is a 60 minute parallel train headway for rail services and 120 minute frequency in the inter-peak, evenings and Sundays, then the bus service could be relaxed to a 60 minute frequency and the rail service would be interdependent with the bus services;
- ***Route*** – diversions permissible to serve employment and less significant housing areas, providing the end-end timings do not generally exceed 133% of the premiere service running times;
- ***Priorities*** – dedicated bus lanes/routes, where necessary, to avoid congestion;
- ***Stops*** – serves all stops on route, including those within Cambridge. Stops should be within 600m of most housing developments or rail stations no more than 800m. A preferred cycling distance to rail stations of up to 3km is to be achieved.

5.4.3 In addition a viable HQPT service would also involve low floor easy access buses; quick boarding and alighting through pre purchased tickets and central exit doors; easily available route and timetable information; ancillary infrastructure such as shelters with electronic displays and good lighting; mechanical reliability and promotion and branding of routes and buses to encourage ridership.

5.4.4 The public transport network consists of distinct types of service:

- High frequency ‘walk-on’ services, usually better than 10-12 minute frequencies;
- 30-60 minute regular frequency services; and
- ‘bespoke’ timetables targeted to specific demands e.g. community transport.

5.4.5 Where there is a need to change between vehicles as a direct link cannot be justified, high quality interchanges, offering a pleasant, secure environment with refreshments available, combined with intelligent timetabling to minimise waiting times, can be the key factor in encouraging trips.

5.4.6 Using data on the existing population located on each of the corridors and available information regarding existing patronage on bus services on these corridors, an estimate was made of the likely additional population required to support a viable HQPT bus service along each corridor route.

Newmarket Corridor

5.4.7 Using the present limited stop half-hourly bus service as the basis for enhanced provision, a population increase of between 7,000 to 8,300 would be needed to support a 10-minute interval bus service either at High Quality Public Transport specification or, at least, throughout the working day. Although there is a parallel rail line, it takes considerably longer to travel to Cambridge City Centre and also involves a longer walk at the Newmarket end. It also entails a bus shuttle at the Cambridge end, which offers only 25% of the bus frequency, i.e. every 40 minutes. Thus overall, rail has been disregarded as a serious alternative.

Haverhill Corridor

5.4.8 The best-performing option, given the existing infrastructure, would be the specified High Quality Premiere level. Nevertheless, given sufficient priority measures to speed up the operation, an enhanced working day frequency would generate worthwhile benefits, such as a higher level of per capita ridership. High growth of 91% has already been achieved from the doubling of the former service to half-hourly. Population needs to increase by 7,000 to ensure the commercial operation of an enhanced service.

Saffron Walden Corridor

5.4.9 This corridor has rail facilities from Audley End and has three bus services. Improving the bus service and serving the smaller settlements with feeders would cover operating costs and come close to meeting the operator's requirements. Improving the service level all day would require some subsidy, but would make the overall service more attractive and would increase the per capita ridership.

Royston Corridor

5.4.10 The favoured solution for this corridor would be two parallel 20-minute frequency bus services on a coordinated interval, i.e. coordinated and managed bus frequency. The inter-peak rail frequency could be enhanced at marginal physical infrastructure costs and may generate sufficient additional business to cover the incremental operational costs. Insufficient data is available to estimate the additional population needed to achieve suitable levels of patronage on this corridor.

St. Neots Corridor

5.4.11 The operation of the premiere level 10-minute service (HQPT) assuming the additional population at Cambourne would appear to be commercially viable without further population. Two further hourly services could provide a secondary level of provision, half-hourly between Cambridge and Cambourne and an hourly to St. Ives or St. Neots, which could be further enhanced after the dualling of this section of the A428.

Huntingdon and St Ives Corridor

5.4.12 The overall service level currently provided already exceeds the High Quality corridor specification and this is shown by the existing high per-capita ridership level.

Secondary services operate to Willingham and other communities north of the A14 as well as via Cambourne to St Ives.

Ely Corridor

5.4.13 This corridor enjoys both a 2-3 train per hour rail service and an hourly fast bus service to Cambridge City supplemented by a 30-minute local service between Waterbeach and Cambridge. In order for an HQPT standard of bus service to become viable the population needs to be increased by 8,000, assuming that they were not also served by rail. An additional half-hourly local train service would appear to be easily accommodated on the existing infrastructure (subject to capacity constraints at Cambridge station), but it would need an estimated population increase of 19,000 in proximity to a station to support it. This could not be achieved by 2016.

Rail Investment and Potential

5.4.14 Rail is recognised as an important component of the existing and potential public transport system of the Sub-Region. We have assumed that its potential will be developed further and integrated within the overall development strategy. However, rail travel accounts for a relatively small proportion of total travel. Rail stations will continue to be provided at a relatively small number of locations. Rail therefore cannot be the mode of choice for everyone. But where rail access can be provided, it could be a vital ingredient in the core of new and expanded settlements, giving a rapid and direct link to Cambridge and other major centres.

5.4.15 If additional rail services were provided on four corridors (Newmarket, Audley End on the Saffron Walden corridor, Royston and Ely), then the possibility exists of operating two 'cross-Cambridge' routes. However, this would involve additional capital costs of new units and in Newmarket, possibly a new station or for activities to be centred on Dullingham station. Also, feeder bus services would be required at Audley End. It may be better to link all four 'new' legs to maximise efficiency. The Consultants consider that given current uncertainties surrounding rail investment and the long lead times involved, the opportunities for new development dependent on major rail investment are an unreliable basis for a Sub Region's development strategy at this time.

5.5 Employment and Economy

5.5.1 Strong growth is anticipated in the Sub-Region. Forecasts suggest that some 75,000 additional jobs will arise over the period 1996 to 2016 (County Council estimate based on 'Employment Change – Cambridge Sub Region, July 2000), an increase of over 30%, and this quantum of job growth is assumed to occur in all development options. This forecast was based on former growth rates covering a slightly different area and presumes there will be further allocations and windfalls, in addition to existing commitments, over the Plan period. The increase is largely driven by the strength of the high technology industries. The clustering of information and communications technology and biotechnology, together with the University's strength in science and supporting businesses are of national importance. The growth in population implied by RPG's dwellings target would also require growth in services located in existing service centres and alongside sites of population growth.

5.5.2 The location of employment growth within the Sub Region is important for the development of a Sub-Regional strategy and specifically for sustainability issues, such as the need to travel, commuting by car and the access to jobs of those living in affordable housing.

The approach adopted in the Study is to develop a 'Base Case' for the location of jobs, which would be common to all options, leaving a residual to be distributed according to the location of development in each option. The analysis therefore takes into account both existing and committed employment and the potential to improve future distribution.

5.5.3 At present, about 41% of the jobs in the Sub Region are concentrated in Greater Cambridge, i.e. the city plus adjacent built up areas, but only 29% of the population. The Market Towns contain about 36% of the jobs and 32% of the population (or up to 35% if peripheral villages are included).

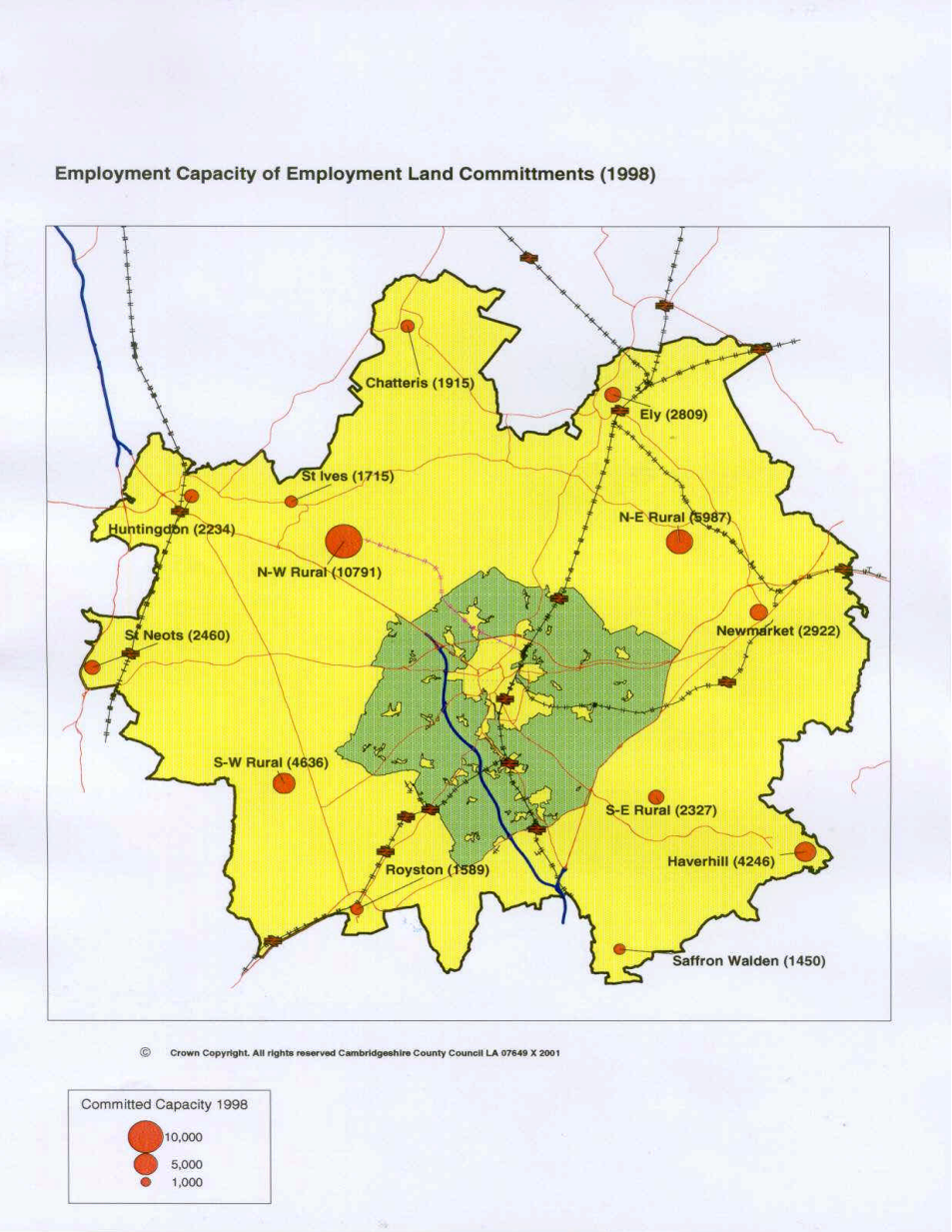
5.5.4 The substantial commitments of employment land in the Sub-Region as at 1998 will largely determine where future employment growth will occur but the location of future job growth cannot be predicted with certainty and will be influenced by the choice of development strategy. However, the location of existing clusters and other drivers for change, together with the pattern of land-use commitments for employment change, give some indication of the possible future distribution of employment change. Some industry sectors are expected to grow in all parts of the Sub Region including professional services and other business services. Research and development and high technology aspects of the economy also have good potential, depending on local strengths of particular clusters, e.g. biotechnology, software development, electronics, telecommunications and medicine.

5.5.5 In the period 2001 to 2016 it is anticipated that employment growth in the Cambridgeshire parts of the Sub Region could be distributed, as follows:

- 15% - 20% Cambridge – including health, retailing, computing, education and leisure. Growth may be affected by congestion levels.
- 35% - 40% South Cambridgeshire - including computing, health and construction. Growth will be affected by opportunity for expansion in major new developments and co-ordination of transport investment including public transport links.
- 30% - 35% Huntingdonshire - including transport, wholesaling, computing, services, health, retail and construction.
- 5% - 15% Fenland and East Cambridgeshire - including retailing, transport, wholesaling.

5.5.6 There is less information for those parts of the Sub Region outside Cambridgeshire, but all areas have some potential for further economic growth.

5.5.7 The capacity for some 54,000 jobs exceeds the estimated 44,000 increase in jobs on employment land. Only in Greater Cambridge, including some fringe areas outside the city administrative area, and Huntingdon would the continuation of the past growth trend in jobs exceed the jobs capacity of employment land commitments (allowing for about a third of the extra jobs, like those in schools and shops, which would not require employment land). For these two areas it is therefore a reasonable assumption, because growth potential exceeds allocations, that these land allocations will be taken up in the Study period. There are also one or two large proposals, which appear likely to go ahead, although the details are not determined. It is assumed that these would be implemented and therefore they are incorporated into the Base Case with assumptions on their capacity.



5.5.8 However, the extent that commitments will be taken up over the plan period, especially the larger ones, depends on the strength of market demand for space at the particular location. In most areas the allocations greatly exceed the projected employment growth, so it is not necessary to assume full take-up of allocations. Some large commitments are in places of relatively weak demand, and some, such as MoD land at Alconbury, are likely to develop over a longer period than the plan period. The Study has therefore made an assessment of the potential for employment growth in and around the Market Towns, reflecting past growth and a range of factors, such as the representation of high technology industry and road connections. The conclusion from this is that Huntingdon stands out as having a high potential, while Chatteris and Haverhill have a below average potential. Recent evidence for Haverhill suggests that there is an increased employment land take-up, which may suggest a somewhat better prospect than indicated in the comparative assessment undertaken. The other Market Towns are assessed as broadly similar.

5.5.9 Based on an analysis of commitments and growth potential, the additional quantum of jobs has been distributed throughout the Sub Region.

5.5.10 The location of some 84% of this additional quantum is effectively determined by the availability of committed land in areas of demand, and the service jobs, e.g. in schools, which would locate with the committed expansion in housing. Thus the location of jobs is not a major variable between options. The relative distribution in 2016 of jobs between Cambridge, the Market Towns and rural areas remains virtually the same as that for 1996. However, the distribution of dwellings resulting from the housing pipeline, produces a population shift towards the rural areas. The remaining jobs are distributed according to each option. For example, the new settlement will have a commercial centre and other services, as well as employment land.

6. THE RPG ELEMENTS: CAMBRIDGE CITY

6.1 RPG Elements

6.1.1 The RPG provides an order of preference for the location of new housing within the Sub Region, as set out in Section 2.2 above. This, and the following Sections 7 – 9, examine each of these elements in sequence, and then summarise the findings of separate studies, which assess their potential and propensity to absorb additional development.

6.2 Cambridge City Approach and Findings

6.2.1 Cambridge City is the first element of the RPG sequence. There is a huge demand for housing in Cambridge because of the concentration of jobs and services. However, there is little land available within the inner boundary of the Green Belt in which the city could expand and growth is generally occurring through conversion of other uses of land and infilling small plots when they become available.

6.2.2 The 'Cambridge – An Estimate of Urban Capacity' (1998) report was reviewed to provide an updated estimate of urban capacity for Cambridge in terms of new sites identified, the progress of Local Plan allocations and outstanding permissions and revised policy assumptions (e.g. car parking standards, density, change of use) and estimates of windfalls. In terms of windfall development, the Report assumed that 70 dwellings per year would be provided for the next 10 years, based on the current average number of completions. This would then fall to 50 dwellings per year as the number of potential sites is reduced.

6.2.3 A major opportunity for developing large areas for housing in the city lies in the Northern Fringe sites. The amount of development that could be absorbed by the Northern Fringe is dependent on the density and other uses proposed. A separate study was undertaken jointly by South Cambridgeshire District Council, Cambridge City Council and Cambridgeshire County Council. This study considered six development options for the land, which were subject to public consultation during November 2000. The resulting preferred strategy, recently approved by the relevant Committees of the three local authorities, is a mixed-use strategy, but allocates new dwelling numbers to each part of the site. The West CNF site is allocated up to 900 dwellings and the East CNF is allocated up to 1,530 or 1,950 dwellings (depending on alternative proposals for a waste management facility). This accords well with this Study's assumptions of 945 dwellings for CNF West and 1,982 dwellings for CNF East (assuming a substantial reduction in the land for the waste management facility).

6.2.4 The Sub Region Study, however, assumed the maximum amount of land is assigned to residential use, in line with the Option 1B of the South Cambridgeshire Study (with an assumed density of 45-60 dph). The Sub Region Study assigned the potential number of houses that could be built in the Northern Fringe to the 'Base Case', i.e. they were considered to be already committed and hence not a variable between the different development options being formulated by the Study.

6.2.5 There is also a significant need for affordable housing and special needs housing in Cambridge. It was difficult to provide affordable housing in Cambridge, as Government guidelines being applied require the provision of affordable housing, only on sites of 1 hectare and 25 units or more. There are few adequately sized sites in Cambridge and developers tend to avoid building any affordable units by limiting their developments to 24

units. However, RPG 6 Policy 10 now provides for the application of lower thresholds than set out in Circular 6/98, i.e. down to developments of 15 dwellings or 0.5 hectares.

6.2.6 The Study has analysed possible ways of increasing the capacity of the city to absorb more development and examined the possible consequence of various options, such as increasing the density of development and encouraging infilling and backland development.

6.2.7 Cambridge already has areas of high-density development, such as 3-4 storey terraces in inner Cambridge and modern flats and apartments also near to the centre of the city. It has a market for higher density development over a larger area than the other towns in the Sub-Region, although the further out of the city centre, the lower the commercial incentives are to build at higher densities, due to lower land values. The planning policy and density review work suggested densities as high as 130 dph were realistic for flats in the city centre, compared to 45 dph for detached and semi-detached houses that would be built on the urban fringe. Whilst higher densities are therefore feasible, developments would need to be well designed to ensure good residential amenity.

6.2.8 Local Plan policies already encourage the subdivision of existing residential properties, subject to certain conditions, such as parking provision and refuse storage. They also encourage the provision of residential accommodation over shops as an attempt to increase the number of housing units in the city. Policies are permissive of the change of use of employment land into residential use and the loss of residential land is strongly resisted. However, backland development is often not permitted. The planning policy and density review work suggests that, in light of growth pressures, there could be greater latitude for backland development if access requirements are met. Innovative urban design models for backland development could be applied to the Sub Region, e.g. small dwellings in rear gardens. However, there are practical difficulties of land assembly and the likelihood of public controversy. Even if the market for this kind of development is favourable and policies were permissive, the land yield and number of housing units that could be achieved would be relatively small compared to the Sub Region's need.

6.2.9 Other means of increasing the capacity of the urban area to absorb development would be a new incentive scheme to encourage 'living over the shop' (LOTS) and a reduction in the minimum car parking standards (for conversions), with a looser fitting system of targets. However, this may cause more congestion, particularly if public transport is not improved.

6.2.10 The Cambridge Local Plan protects open spaces of recreational and environmental value. The City Council do not consider that allotments represent a significant opportunity for urban densification and there is considerable local opposition to their development. However, the Study did explore the consequences of building on allotments and higher density development with reduced car parking and open space provision would not yield significant numbers on allotments and site layout would also need careful consideration.

6.2.11 A subsequent exercise to examine the environmental capacity of allotment sites in Cambridge distinguished between allotments that could be potential sites for development, those that could have potential for development, but require enhancement or creation of a landscape framework and those that are not currently suitable for development. It is worth pointing out at this stage that allotment sites were only used when formulating the Cambridge centred option of the four development options. This is because of their wider environmental

value, policy consideration and the limited capacity that they would yield (at net densities of 90 dph 2 allotment sites in the south west of Cambridge would only provide 250 units).

6.3 Broad Findings

6.3.1 The assessment found that the net additional dwelling capacity of Cambridge City to 2016 was 4,270 dwellings (with the use of allotment land) and 2,570 units (without the use of allotment land), at assumed densities ranging from 65 – 100 dph. These dwelling capacities were derived prior to more detailed capacity, implementation and sustainability tests to refine capacities for use in determining the options. The dwelling capacity of Cambridge is therefore not dependent on the release of allotment land. There are a range of possible capacities depending on density assumptions and the rate at which previously developed land comes forward for development. This assessment essentially validates the main finding of the 1998 Capacity Study that there is limited capacity within Cambridge.

7. THE RPG ELEMENTS: GREEN BELT REVIEW

7.1 Context

7.1.1 The Study Specification and Regional Planning Guidance (RPG) for East Anglia require a review of the Cambridge Green Belt taking full account of the purposes of the Green Belt as set out in the national Planning Policy Guidance Note 2 (PPG 2).

7.1.2 The strategic thrust of the Green Belt review has been to consider the role of Green Belt adjoining and close to the urban edge, in line with the preferred sequence of Regional Planning Guidance. Nevertheless, consideration has also been given to the role of the Green Belt surrounding the villages. We consider that there are some limited opportunities for further village expansion in the Green Belt provided that they are complementary to the overall strategy particularly in relation to improved public transport routes.

7.1.3 A review was undertaken of PPG2, the Cambridge Green Belt Local Plan, the Green Belt Local Authority Local Plans, previous studies on the Green Belt and the Study Specification, which was followed by discussions with the Green Belt local authorities.

7.1.4 The inner boundary of the Green Belt around Cambridge was first defined in 1965, with the outer boundary being detailed in 1971. Changes in the Green Belt have taken place since then and the current boundaries were identified in the Cambridge Green Belt Local Plan in 1992, with some revisions through the Cambridge Local Plan 1997. Recent studies have highlighted a number of sites that have been considered suitable for removal from the Green Belt.

7.2 Green Belt Purposes

7.2.1 An initial analysis of the relationship between the five PPG2 purposes of Green Belt and the aims of the Cambridge Green Belt Local Plan was undertaken. This was then compared with the aims of the Study.

7.2.2 The Cambridge Green Belt Local Plan identifies the main aim of the plan as being: 'To preserve the special character of Cambridge and to maintain the quality of its setting'. This corresponds to one of the PPG purposes, specifically: 'To preserve the setting and special character of historic towns".

7.2.3 The Study aims suggest that areas within the Green Belt should 'contribute significantly to the setting of the City, especially in terms of views of the City skyline and interface between city and countryside'.

7.2.4 The specific aims of the Cambridge Green Belt that relate to the other PPG2 purposes of Green Belt are, as follows:

- 'To control the urban expansion of Cambridge', which relates to the PPG2 purpose of 'To check the uncontrolled sprawl of large built up areas'.
- 'To prevent the further coalescence of settlements', which relates to the PPG2 purpose of 'To prevent neighbouring towns from merging into one another'.

7.2.5 The remaining specific aims of the Cambridge Green Belt closely relate to the PPG2 objectives in the use of land.

7.2.6 The purposes of the Cambridge Green Belt were discussed with the Green Belt local authorities. It was agreed that the 'setting and character' and that 'prevention of coalescence' were the key purposes. It was also agreed that 'control of urban expansion' should be interpreted as 'management of urban expansion' with the Green Belt Review highlighting those areas that could potentially be considered for development in the light of future requirements.

7.2.7 It was then agreed with the Steering Group that the following two purposes are critical to the Cambridge Green Belt:

Primary Purpose: To preserve the special character of Cambridge and to maintain the quality of its setting. Inherent in this purpose are the two further PPG 2 purposes of controlling the urban expansion of Cambridge and safeguarding the countryside from encroachment. Both these functions were considered of relevance in assessing the overall setting of the City of Cambridge.

Secondary Purpose: To prevent further coalescence of settlements. It was agreed with the steering group that to adversely affect the intricate settlement pattern within the Cambridge greenbelt would result in significant change in the setting of the city. Significant coalescence within the green belt, would also risk compromising other green belt functions of controlling the urban extension of Cambridge and also of safeguarding the countryside from encroachment.

7.2.8 Further consultation was held with the Steering Group regarding the definition of setting and special character and the following was agreed:

Special Character, in addition to the City's historic core and associated university colleges, comprises:

- the green corridors and wedges connecting the city with the countryside; and,
- the separation between settlements to ensure their clear identity.

Setting comprises:

- views of the city; and,
- the placement and character of villages surrounding the city and the interface between the city and the countryside.

7.2.9 It is therefore apparent that the two main purposes of the Cambridge Green Belt consider the remaining Green Belt functions as identified within PPG2. These two purposes are thus both complementary and as interpreted, are comprehensive in addressing Green Belt functions in the context of Cambridge and as such provided a suitable framework for a Green Belt Review. There will inevitably be a tension between maintaining the Green Belt and accommodating future development needs. The planning authorities will have to consider how to resolve this tension in their Development Plans. Our approach has been to use the purposes of the Green Belt as the guiding principles in the consideration of strategic development options.

7.2.10 There is considerable overlap between the issues of setting and the nature of the special character of the city, which needed to be taken account of in the review. Comments from the Countryside Agency regarding the concept of Environmental Capital/Capacity were also incorporated into the review at a more detailed level by producing an Environmental Capacity Assessment Framework. This framework was applied to sites within the Green Belt to determine the wider range of environmental assets present at this level.

7.2.11 All sites within the Cambridge Green Belt were assessed in terms of fulfilling both primary and secondary purposes, i.e. setting and special character and prevention of coalescence at both the strategic and the site-specific levels. The concepts of Landscape Character and Environmental Capacity were also incorporated into the review as these are closely linked to the assessment of the likelihood of impacts on both setting and potential coalescence.

7.2.12 The strategic review of the Green Belt highlighted in broad terms areas where potential development could be accommodated and those areas where it would adversely effect setting and character and/or coalescence.

7.2.13 This was further refined by individual site assessments of sites within the Sites Database using the concept of Environmental Capacity as well as ascertaining whether sites fulfilled the two Green Belt purposes. The entire periphery of Cambridge was assessed at this level as well as further sites around Green Belt villages and the remainder of the Green Belt at a broad level. All sites were characterised into potential sites identified for development and those sites where either the primary and/or the secondary purposes of the Cambridge Green Belt apply.

7.2.14 The methodology adopted for the Green Belt Review can be summarised. The Cambridge Green Belt Study reviewed the Green Belt at the strategic level in order to identify areas, which may have the potential to accommodate housing development. The entire Green Belt was firstly assessed at a broad level to establish those areas where development could be accommodated without comprising the agreed Green Belt purposes. The 'setting and special character' of land within the Green Belt was assessed in terms of:

- Local character areas
- Topography
- Views of the city
- The interface between the city with its surrounding villages and the countryside.

7.2.15 The primary purpose of character and setting was examined by the assessment against the following factors:

- Local Character Areas - the capacity of an area to accommodate change is largely dependant upon landscape character. Different landscape character areas have different capacities to accommodate change. A landscape with an enclosed character, flat topography and a well-developed vegetation structure would generally have a greater capacity to accommodate change than open chalkland with rolling topography.
- Topography - this is critical with regards to the setting of Cambridge as it influences the visibility of the city as well as influencing landscape character.
- Visibility and cones of view - visibility of the historic core of the city is generally limited to identified cones of view from the Green Belt. Development within these cones could affect the character and setting of the city. Similarly the relationship between the rural/urban edge of both the periphery of Cambridge and the Green Belt villages could be influenced by development within these areas. Development could either adversely affect the setting of this edge or conversely where the existing edge is of low visual quality, development within a strong landscape structure could provide positive benefits.

7.2.16 The secondary purpose of prevention of coalescence was assessed at this broad level by examining the relationship of settlements to the built-up area of Cambridge. This established broad areas where both physical and visual separation could be maintained between Cambridge and villages within the Green Belt.

7.2.17 The next phase of the methodology looked at sites identified by the Sites Database by applying an Environmental Capacity Framework assessment to each site. This determined the effect of development with respect to the following aspects:

- Landscape and Setting - this determined the relationship of the site to the historic core of the city and the effect of development on the current urban or village edge. Proximity to green corridors/fingers/wedges was noted as was the importance of the site in preventing coalescence.
- Vegetation Structure - this is an important determinant in establishing a site's capacity to accommodate development.
- Topography - this is another important aspect in determining capacity.
- Biodiversity - this assessed at a broad level the conservation status and habitats present on the site.
- Transport - proximity to the seven corridors was noted.

7.2.18 This second phase of the methodology allowed grading of sites in terms of their suitability for potential development.

7.2.19 The capacity of an area to accommodate change is strongly influenced by its landscape character and topography. As an example, a landscape with an enclosed character resulting from a flat topography and well-developed vegetation structure could accommodate change relatively easily without necessarily affecting setting. Further screening by vegetation may be required to achieve this but this would not adversely affect the existing landscape character. By contrast an open chalkland character with rolling topography would generally have an extremely limited capacity to absorb development. Analysis of areas within the Green Belt in terms of landscape character and topography was therefore an important first step in assessing effects on setting and character, providing a basis for further examination of potential areas which could be removed from the Green Belt.

7.2.20 An analysis of views of the city from the Green Belt revealed there are relatively few locations where the historic core to the city is visible. Where views do exist, it is vital that these are not adversely affected by the subsequent placement of. This analysis provided a means of highlighting areas within the Green Belt which are particularly sensitive in terms of the special character aspect of setting.

7.2.21 The next strategic aspect of setting and special character was the relationship of the current rural/urban edge, on the inner boundary of the city and elsewhere, i.e. the village edge within the Green Belt. This aspect is closely linked to the existing vegetation structure and topography, which influences the capacity of areas on the urban edge to accommodate development. It is also important that such development does not affect the green corridors and wedges that extend into the city and which are important aspects of Special Character. The concept of 'green fingers' is illustrated in the previous *Cambridge Green Belt Landscape Setting Study*. They are important elements of city and Green Belt character and as such are of relevant consideration within the Green Belt Review. These link to 'green corridors',

which are covered by policy NE5 within the Cambridge Local Plan. 'Green Wedges' is a term used in the Study to refer to both green fingers and green corridors.

7.2.22 Areas where development could potentially be placed without having a negative effect on the urban/rural edge were identified from this analysis. In some cases development may have a positive effect on the appearance of this edge, given adequate landscape planting.

7.2.23 Prevention of coalescence, the secondary purpose of the Green Belt, was examined at the strategic level by examining the degree of visual and actual separation, which would need to be maintained between settlements. This analysis revealed that there were areas where development could potentially be accommodated within the Green Belt without generating coalescence and that this was strongly influenced by factors such as vegetation pattern, intervening topography and the location of existing development. In a number of cases however, the potential impact of coalescence on the form and setting of the city and the Green Belt villages was considered incompatible with new development.

7.3 Broad Findings

7.3.1 The broad findings from this overall strategic review of the Green Belt are:

- Development between Girton and Histon to the north-west of the city could create visual coalescence between the two villages. This is due to the open nature of the intervening countryside, which also forms one of the important Green Fingers/Corridors into the city contributing to special character. The placement of development between these villages would therefore conflict with both purposes of the Green Belt.
- Previous studies have suggested that development could be placed to the west of Cambridge, between the city and the villages of Coton and Madingley. The relatively enclosed, rolling landscape could potentially accommodate development. However, site surveys undertaken for this Study found that there were no opportunities to develop close to the city boundary without affecting the existing interface between the city and the countryside, one of the important aspects of setting. Furthermore, the ecological and historical importance of the area was likely to generate further constraints to sustainable development.
- The potential for development to the south of the city, along the existing transport corridors and river valleys presented a more varied picture. Here the low topography and high density of tree cover means that some areas have potential to accommodate development. The creation of wooded landscape frameworks to contain development could be appropriate in this area. However, in other areas, setting could be affected by development by impinging on the River Cam and Hobson's Brook Green Finger's/corridors. Further coalescence between the existing settlements of Trumpington and Great Shelford could also result unless the placement of development was carefully considered.
- Development to the south-east of Cambridge would be more likely to affect both setting and coalescence due to the open chalkland landscape of the Gog Magog Hills, which have views towards the historic core of the city. The sensitivity of this landscape therefore precludes development in this area.
- A flatter but still relatively open landscape extends to the east of Cambridge. Development between Cherry Hinton, Teversham and Fulbourn would be likely to create

coalescence although some enclosure, potentially allowing development, exists immediately north of Fulbourn (and south of the railway line). A master plan would be required for development at Cambridge Airport. Development could only be accommodated by the creation of a wooded landscape framework and a retained Teversham Green Finger (or green fingers), a significant component of the landscape setting of the city.

- Development between the Newmarket road (A1303) to the east of the city and the village of Milton would generally lead to coalescence between Fen Ditton and the city. However, there are some areas in this part of the Green Belt with an existing enclosed character, where development could be placed without affecting either coalescence or setting.
- Development between some villages could also lead to coalescence due to the open nature of the parts of the landscape. However, sometimes in villages within the Green Belt, there are a limited number of areas on the periphery where enclosure by hedgerows and trees would allow some development without adversely affecting either coalescence or the relationship between the village edge and the surrounding countryside.

7.3.2 Following this broad overview of the Green Belt, a number of sites were identified for further study. These were sites that did not possess characteristics that were recognised as being of particular importance: Grade 1 agricultural land (or best and most versatile land), sites of national importance for wildlife, e.g. Sites of Special Scientific Importance and Scheduled Ancient Monuments. Sites possessing such characteristics were excluded from further analysis as potential development sites.

7.3.3 Potential sites which were put forward were analysed in greater depth by recording an Environmental Capacity Assessment Framework sheet for each site. This examined the following aspects:

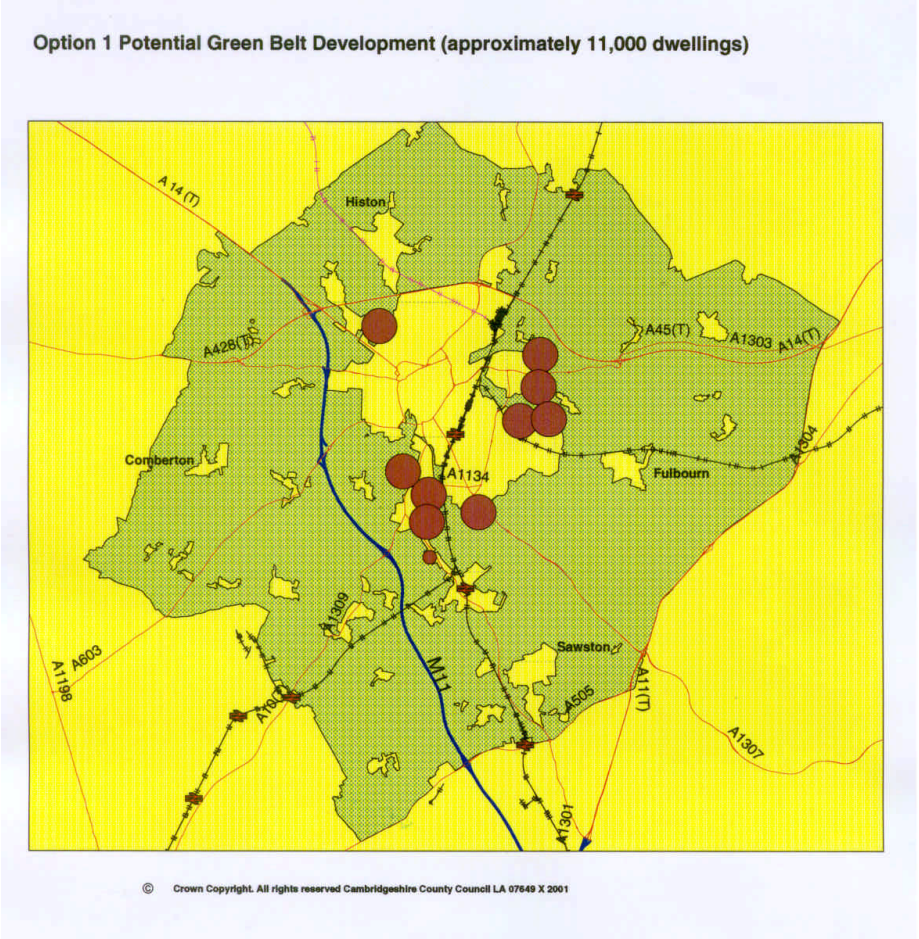
- Landscape and setting - this recorded setting and coalescence issues, (as applied at the previous strategic overview stage), which were directly applicable to the site.
- Vegetation structure - the presence of hedgerows, trees and woodland was established. This influences not only the capacity of sites to accommodate change and also indicates the presence of habitats for wildlife.
- Topography - this is another important aspect at the site level in determining capacity to accommodate change.
- Biodiversity - this was considered at a fairly broad level, considering current conservation status of the site, proximity to Green Corridors and identifying the presence of water-bodies which could be potential habitats for wildlife.
- Transport - the proximity to bus routes, public footpaths, cycleways and railways was recorded to determine the potential of the site in encouraging sustainable transport.

7.3.4 By analysing these Environmental Capacity Framework sheets it was possible to grade sites in terms of their potential suitability for development and, in addition, sites were selected on the basis of whether they still fulfilled the two identified Green Belt purposes. They also have been assessed in broad terms for potential impacts on biodiversity and proximity to sustainable modes of transport.

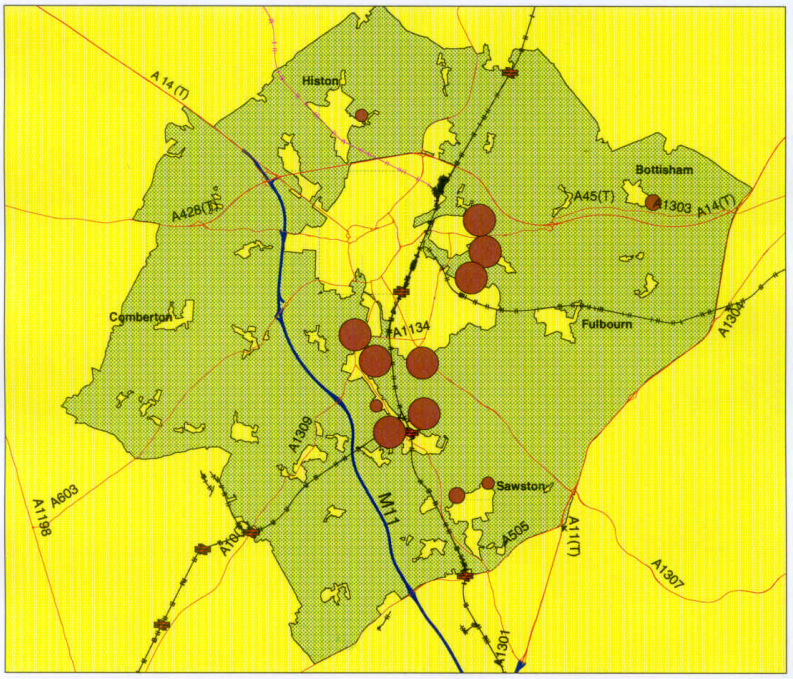
7.3.5 The scope for Green Belt boundary revisions is directly related to this site identification. Some 32 sites around the inner boundary and 31 other Green Belt sites were carefully assessed. The following maps indicate the potential capacity, which could be used within the Green Belt boundary. However, it is important to state that the application of remaining capacity and sustainability criteria (see Section 10 and Annex A below) at the site specific level was the next step in determining whether these sites represent the most sustainable development option.

7.3.6 The assessment concluded that the net additional dwelling capacity of the Green Belt to 2016, in the feasible locations described above, was 12,250 dwellings, at assumed density ranges of 45 – 65 dph. These dwelling capacities were derived prior to more detailed capacity, implementation and sustainability tests to refine capacities for use in the options.

7.3.7 When the Green Belt boundary is amended through formal review, the local planning authorities will be expected to ensure that sufficient land is identified for the foreseeable future. This is generally accepted as 25 years, which goes beyond the main timescale of this Study, which only runs to 2016. However, the housing requirements tested already include some flexibility for needs beyond 2016. Paragraph 10.2.1 notes that each option has some spare capacity to accommodate development above the requirement. Moreover, if a development strategy is chosen that does not use all suitable Green Belt sites, that potential could be held in reserve for the longer term.



Option 2 Potential Green Belt Development (approximately 8,000 dwellings)



Option 3/3A Potential Green Belt Development (approximately 4,000 dwellings)

8. THE RPG ELEMENTS: NEW SETTLEMENT

8.1 Approach

8.1.1 Following a number of proposals for new settlements made during the Public Examination into Draft Regional Planning Guidance in 1999 and initial work done during this Study, the Consultants undertook a full evaluation of potential new settlement sites throughout the Sub Region. The basic search parameters, following Policy 25 of RPG 6, were that any site would need to be located on one of the seven major corridors with existing or potential high quality public transport (HQPT) links to Cambridge. The search area was defined as a 2000 metre band (1,000 metres either side) of the main roads from the outer edge of the Cambridge Green Belt to the Market Towns of Newmarket, Haverhill, Saffron Walden, Royston, St Neots, Huntingdon/St Ives, and Ely. These incorporated rail corridors where these ran close to the main roads, but an exclusively rail corridor without a nearby trunk road was omitted, since a large settlement must have good road access to Cambridge. This is a requirement for provision of direct high quality bus services and other essential vehicle movement.

8.1.2 Additional to these locational and transport criteria, other requirements for candidate sites included the capacity to accommodate at least 6,000 dwellings and associated uses and preferably up to 10,000 or more. This number of dwellings would house approximately 15,000 – 25,000 people. The Steering Group advising on the Study asked the consultants to take an optimistic yet realistic view of the rate at which a new settlement might grow and hence its potential size by 2016. Implementation on site is unlikely to begin before 2006, leaving ten years of growth in the plan period. The maximum rate of growth in any year is unlikely to exceed 1,000 dwellings, based on experience at other large-scale developments, and the early years would almost certainly experience development below 500 per annum. An average rate of growth of 600 per annum therefore represents a very successful rate of progress - resulting in our estimate of 6,000 dwellings. The figure of 6,000 dwellings also represented. a basic sustainability threshold, e.g. large enough to support a new secondary school and associated facilities; and 10,000 dwellings was considered appropriate as it would provide potential for post-2016 development needs and for supporting a wider range of facilities within the settlement. The RPG then went on to specify further criteria:

- Proximity to Cambridge;
- location on or facilitating the provision of high quality public transport;
- the avoidance of national nature and historic environment designations;
- the avoidance of major groundwater protection areas and floodplain;
- making maximum use of previously developed land; and,
- avoidance of loss of high quality agricultural land as far as possible.

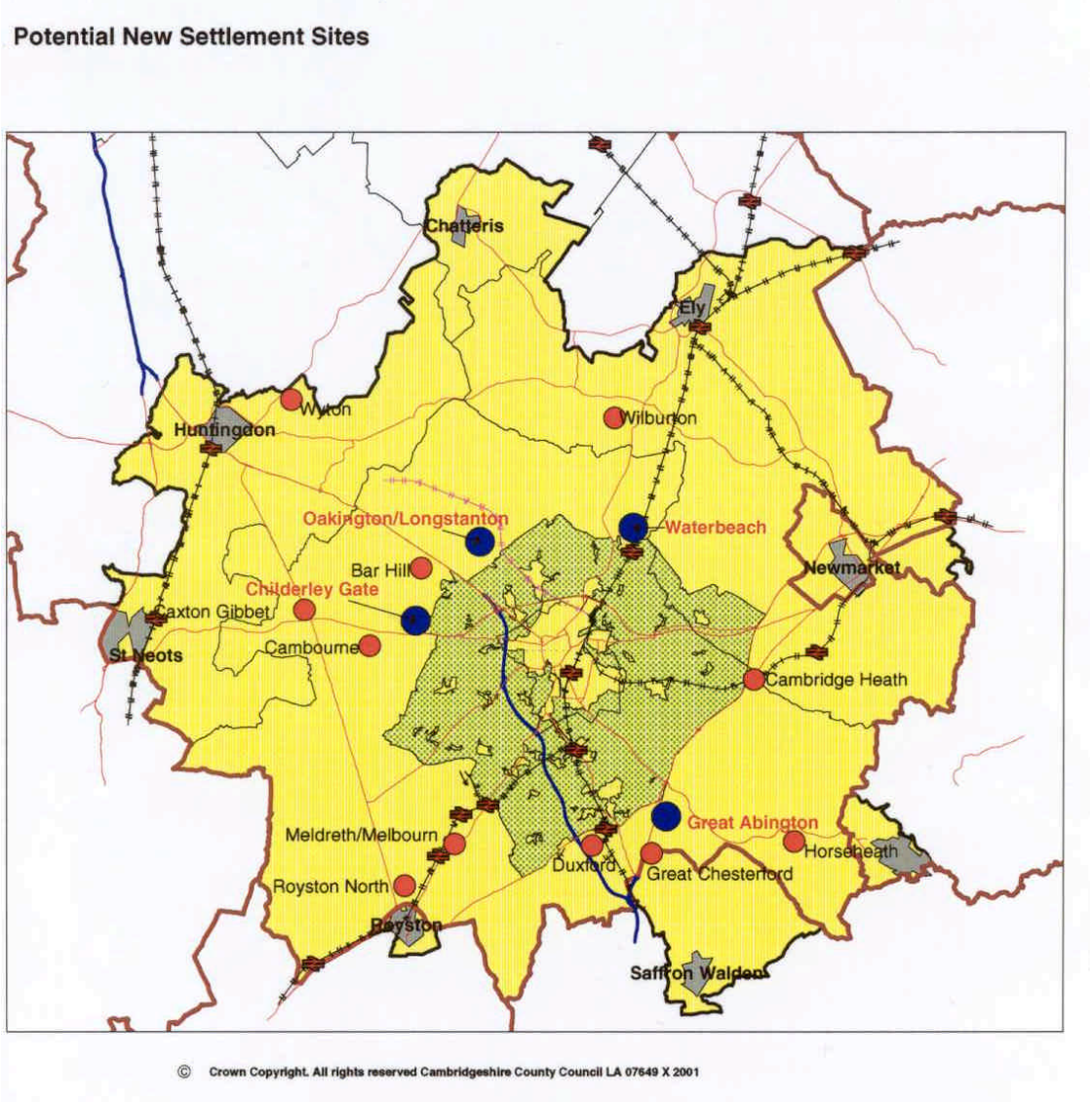
8.1.3 Further, although this strictly was a sifting factor rather than an absolute criterion, RPG guidance made it clear that a new settlement should be ‘close to Cambridge’. Although not defined, the County Council’s view expressed in the Public Examination was that within 5 miles distance was desirable and within 10 miles essential. Avoiding coalescence with other settlements was not assumed to be a constraint.

8.1.4 A practical search criterion arising from the capacity requirement was that the site had sufficient land to accommodate the minimum 6,000 dwellings. This was estimated following a review of appropriate residential densities, sufficiently high to meet current PPG criteria yet maintaining good design quality. New urban village schemes provided one of a number of yardsticks examined, from which a high but practicable density of 50 dwellings per ha (dph) net was provisionally adopted. Together with non-residential uses, the total land required for a 6,000 dwelling settlement was estimated to be 300 ha and 500 ha for 10,000 dwellings. However, in the event that the residential density assumption should be considered too high, a lower net density of 38.5 dph would only increase the size of site envelope required by about 7%, e.g. from 300 to 321 ha.

8.1.5 It is emphasised that identification of new settlement options formed part of the process of testing broader options for accommodating growth. New settlement alternatives were identified simply for that purpose as general locations, not to identify 'best sites' and certainly not to prepare recommendations for site selection. There was no presupposition that particular sites or outline proposals put forward by developers would be explicitly tested at any stage of the option development. However, proposals that met many of the requisite criteria were likely to overlap with new settlement options, in part if not wholly.

8.1.6 The search process involved the preparation of a long list of potential settlement locations. It was carried out through an overlay, on the measured corridors, of map data showing settlements and constraints and using field observations along each corridor. The areas that were broadly unconstrained, provided the basis for a long list of settlements, identified by application of a grid square overlay of the approximate size required for a new settlement. After identifying broad locations, the Consultants defined settlement sites for the purposes of appraisal. Variants on these site envelopes may be possible, but it was impracticable to deal with numerous variations for a considerable number of settlement locations. (For brevity the word 'site' is used in the report, but should be regarded as no more than the 'area of search' adopted for testing purposes.) A small number of sites were included which did not wholly meet all the criteria but which had sufficient grounds for at least broad consideration. On the other hand, new settlement 'concept' proposals were excluded, where these lacked a defined, suitable corridor location, e.g. 'Social City of East Anglia'. This left a long list of 15 candidate sites, each having with the exception of Cambourne broadly sufficient capacity for 6,000 dwellings (taking into account realistic extensions) including at least one on each corridor, see Figure XX and the table below.

8.1.7 Step 2 involved specification and application of the criteria set out in paragraph 8.1.12 together with additional transport and accessibility criteria. This included the Consultants' interpretation of 'PPG 25 - Development and Flood Risk' constraints. The approach adopted is detailed below



Key

- Higher Priority
- Lower Priority

Long List of New Settlement Sites

New Settlement Location	Distance from Cambridge[1]	Corridor/Distance from other Towns
Cambridge Heath [2]	16.5 km (10.3 miles)	A11 Newmarket 8.7 km (5.4 miles)
Horseheath	21.5 km (13.4 miles)	A1017 Haverhill 6.2 km (3.9 miles)
Great Abington	14.5 km (9.1 miles)	A1017 Haverhill 14.7 km (9.2 miles) A11/B184 Saffron Walden. 9.5 km (5.9 miles)
Duxford	12.6km (7.8 miles)	B184 Saffron Walden 9.8 km (6.1 miles)
Great Chesterford	19.5 km (12.2 miles)	A11/B1383 Saffron Walden. 6.3 km (3.9 miles)
Meldreth-Melbourn	15 km (9.4 miles)	A10 Royston 6 km (3.8 miles)
Royston North	20 km (12.5 miles)	A10 Royston 2.2 km (1.4 miles)
Childerley Gate	10.5 km (6.6 miles)	A428 St Neots 17.8 km (11.1 miles)
Cambourne*(extensions)* [3]	13.5 km (8.4 miles)	A428 St Neots 14.2 km (8.9 miles)
Caxton Gibbet	17 km (10.6 miles)	A428 St. Neots 10.8 km (6.8 miles)
Wyton *	29 km (18.1 miles)	A141 Huntingdon 5.0 km (3.1 miles)
Longstanton/Oakington * *New settlement expansion*	13.5 km (8.4 miles)	A14 St Ives 10.7 km (6.7 miles)/ A14 Huntingdon 17.7 km (11.1 miles)
Bar Hill *(extensions)*	11 km (6.9 miles)	A14 Huntingdon 15.1 km (9.4 miles)
Wilburton	17 km (10.6 miles)	A10 Ely 8.4 km (5.3 miles)
Waterbeach* *New settlement expansion A* *New settlement expansion B*	11.5 km (7.2 miles)	A10 Ely13 km (8 miles)

Notes:

1 Distance from Cambridge City centre (bus station/Drummer Street) to centre of new settlement, via main roads.

2 Also known as '6 Mile Bottom'.

3 Developers' additional proposed dwellings are 4,550 only.

* MoD sites; potential expansion areas identified for Longstanton-Oakington and Waterbeach.

Application of Criteria to New Settlement Sites

8.1.8 Criteria were grouped into four categories:

- 'Absolute' criteria, interpreting this as unalterable factors, especially distance from Cambridge, and irreplaceable assets. National designations, such as SSSIs and GPZ1s were treated as 'absolute' criteria, although in exceptional circumstances a GPZ1 borehole for example could be closed down;
- 'Non-absolute' environmental criteria, encompassing flood plain setting and risk, drainage difficulty, use of brownfield land, environmental capacity, pollution and nuisance factors, existence of high quality agricultural land;
- Accessibility criteria, including HQPT and rail access, access to the motorway and trunk road network, facilitation of park and ride. These take account of ease of general sub-regional access, not just to Cambridge City. The implications of the CHUMMS transport study recommendations and local service opportunities were also taken into account.
- Capacity and implementation criteria, including long term expansion potential, development complexity (excluding site ownership factors) and competition with other development sites.

8.1.9 The ability to deliver development options in the Sub-Region strategy is a vital consideration, otherwise the strategy would be unrealistic. However, ease of implementation has not been assumed to override the need for a sustainable development pattern. Therefore, the assessment of development complexity has been treated such that where there are clear impediments to development, such as complexity of sites, where a very long period would be required for development of a landscape framework. These factors have been taken into account in the overall assessment of sites but are not regarded as absolute.

8.1.10 Additionally in the evaluation of new settlements, considerable weight is given to whether the site could potentially deliver development beyond 2016 and whether development would be in competition with other developments in the vicinity.

8.1.11 Although a number of developers have advanced land ownership and land options as an advantage in bringing about their proposals, this is specifically excluded as a factor in the analysis as our information may not be complete on all sites and it may change over time. The local planning authorities may need to take account of this issue if it appears to be a significant factor when specific locations are considered for inclusion in the development plan. Also, the selected strategy must include a range of sites that can be delivered in the early part of the plan period. It should be noted that the Cambridge Sub-Region Implementation Study is considering issues of deliverability in much more depth.

8.1.12 The implementation criteria applied to the long list of sites did not include ease and the cost of providing water and sewage treatment and cost of needed road improvements, not because these are unimportant, but since it was unnecessary to apply these to sites, which would be eliminated on other grounds. It is thus more appropriate to take these criteria into account following identification of a short list of preferred sites.

8.1.13 It has been argued that housing provision to meet the needs of Cambridge workers, as opposed to London commuters, could be a criterion of site preference. It has been stated, for example, that this might favour sites to the north of the city. The Consultants recognise these

considerations, which are reflected in the current policy of restraint to the south of Cambridge. However, this issue is part of a broader strategic issue which the new Structure Plan must address, i.e. to what extent will it be accepted for the Sub-Region to cater for housing demands arising at Stansted and other locations to the south of this County. This is not a matter required to be adjudged within the Study Specification, nor is there sufficient information on commuting trends on which to base any quantitative assessment. Therefore it has not been treated as a relevant criterion.

8.1.14 The table below sets out the grouped criteria adopted for Stage 2 appraisal of candidate new settlement sites.

Criteria for Assessment of Long List of Potential New Settlement Sites

CRITERIA	MEASUREMENT
Absolute Criteria	
Proximity to Cambridge	Road distance between centre of new settlement to Cambridge city centre (bus station/Drummer Street)
Avoiding key national designations	County Council GIS data - SSSIs, scheduled ancient monuments, RAMSARs, mineral reserves, archaeological designations, ancient woodland, conservation areas within site
Presence of GPZ1s	County Council GIS data
Grade1 agricultural land	DEFRA (MAFF) data
Non-Absolute Environmental Criteria	
Flood risk / Flood Plain [1]	Flood risk, flood mitigation position (based on discussions with Environment Agency) / Part or whole located in flood plain from indicative flood plain maps published by Environment Agency
Drainage difficulty	Assessment based on discussions with Environment Agency
GPZs 2 and 3	County Council GIS data
Environmental capacity [2]	Assessment of landscape and environmental suitability for development, based on field visits
Pollution /nuisance issues	Motorway and aircraft noise, landfill sites, factory emissions, electricity grid pylons
Good quality agricultural land [3]	Grade 2/3 agricultural land or 'Best and Most Versatile (BMV) agricultural land,' DEFRA (MAFF) data
Brownfield land	Existing documentation and estimates by Consultants
Accessibility to Cambridge and Sub-Region	
Motorway access	Straight line distance from centre of new settlement to nearest junction on the M11-A14-A11 'motorway' triangle
Trunk road sub-regional accessibility	Length of trunk road within 8km/5miles of centre of new settlement
CHUMMS implications	CHUMMS highway transport and accessibility impact – neutral, positive or negative

HQPT potential	Dedicated bus/rail track potential [4]
Access to rail line	Straight line distance to nearest rail line from new settlement centre
Access to rail station	Straight line distance to nearest rail station from new settlement centre
Cambridge accessibility (park and Ride)	Accessibility to Park and Ride sites
Local service opportunities	Proximity to Market Towns and links to surrounding villages
Capacity and Implementation Criteria	
Long-term site capacity	Capacity of proposed site to absorb 10,000 dwellings or more
Competition with other sites	Proximity to similar large-scale schemes (Cambourne)
Development complexity	Complexity of site including site fragmentation related to environmental designations, roads, etc. and extent of required landscape framework work required

1 Covering risk to both proposed development and settlement elsewhere.

2 Surface environmental capacity covering landscape, topography and ecology.

3 Adequate data distinguishing BMV land was not available. A provisional categorisation treated Grade 1 agricultural land as an absolute constraint and Grade 2 land as non-absolute.

4 Related to existing tracks with available capacity. Ordinary bus HQPT excluded as can be provided from each settlement.

Relative Significance of Criteria

8.1.15 Even where it is difficult to quantify or weight many criteria, there is often acknowledgement that certain criteria are more important than others. The Consultants made the following judgements:

- Absolute criteria as defined above should carry most weight. This means that distance from Cambridge (taking into account road length) is of key significance. Regardless of mode, every 100m further travelled will increase energy use and impact adversely on sustainability;
- Landscape and environmental suitability and long-term expansion potential are critical factors;
- A flood plain setting is considered an inherent disadvantage, although flood risk can be mitigated by development design. Similarly, basic environmental nuisances, which would impact on residents' environment, like motorway noise and presence of landfill sites, are treated as significant disadvantages.

8.1.16 Clearly other factors are very important, e.g. use of brownfield land for development is a national sustainability objective. In the Cambridge context, however, it is not likely to meet a high proportion of housing needs, especially over the long-term. It is also worth emphasising that transport criteria must reflect the reality of road accessibility for bus, truck and car use.

8.1.17 Assessment of sites against criteria considers differences. If all sites appear the same for a particular criteria, it is not necessary to replicate that assessment. As an example, no differences of drainage difficulty have been identified between sites, with one exception, and thus drainage is not described for each site.

CHUMMS Implications

8.1.18 The A14 Cambridge to Huntingdon Multi-modal Study (CHUMMS) tested four basic strategy options for the corridor:

1 a public transport solution,(Guided Busway along Cambridge-St. Ives line)
2 an A14 on-line widening Horningsea to Fenstanton plus bypass to Godmanchester and Brampton, along with Guided Busway, as option 1 above.
3 a Northern Alternative Bypass Route with LRT or Heavy Rail.
4 a Southern Alternative Route, plus Guided Busway as option 1.

8.1.19 Two further options were also tested following initial public consultation, a hybrid scheme involving a northern bypass of Milton and Oakington with on-line widening to Fenstanton, with the remainder of elements as option 2; and an outer route for A14 via Somersham, Ely and Newmarket.

8.1.20 On the basis of this testing work, the Study has put forward recommendations in the form of a 'Preferred Plan'. Its key elements, which are essentially as option 2 above, are:

1 Guided Busway- Huntingdon to Cambridge City Centre, with a link to Trumpington and Addenbrooke's, (later to be considered, running from Chesterton within existing rail corridor to City station and onto Trumpington). Also, this would be part of a wider bus network.
2 A range of Park and Ride facilities associated with 1.
3 Further public transport priorities in Cambridge and Huntingdon.
4 On-line widening of A14 from Horningsea to Fenstanton to dual 3 lane standard with local parallel roads.
5 Provision of a new dual 3-lane dual-carriageway from Fenstanton to west of A1, running south of Godmanchester, Huntingdon and Brampton.
6 Interchange modifications at Histon and Milton, including measures to enable buses to cross A14 (associated with new Park and Ride facilities).
7 M11, junction 13 and14 alterations.
8 Acknowledgement of the needs of non-motorised travellers, including cycle interchange with public transport.
9 Further demand management measures in Cambridge.
10 Rail improvement schemes like the East-West rail are seen as beneficial to the Study area and new stations in Cambridge are recognised as offering new interchange opportunities.

8.1.21 The basic impact of the CHUMMS recommendations is to improve general transport provision and accessibility to Cambridge for new settlement sites in the Cambridge-Huntingdon corridor - Wyton, Longstanton-Oakington, and Bar Hill. Conversely it is likely to exacerbate congestion problems related to the A10 and potential new settlements there of Waterbeach and Wilburton. For all other sites it is considered to have a neutral impact.

8.2 Broad Findings

8.2.1 The application of the selected criteria led to a grouping of the candidate sites in three categories: sites directly eliminated, sites performing better but still subject to major disadvantages (identified as lower priority) and sites accorded the higher priority (see below). This categorisation represents a judgement about relative advantages and disadvantages, which cannot be neatly quantified and the respective merits of various locations are finely balanced. With this proviso the Consultants' classification of the 15 long list sites, with key criteria assessments, is shown below.

8.2.2 The assessment of how settlements performed by the different criteria reflects the measure adopted, summarised in the 'Criteria for Assessment' table. To take an example, 'Accessibility to Park and Ride' was judged to be 'good' if a large Park and Ride facility was sited on the trunk road leading to Cambridge from the new settlement location and also permitted direct turning access. If there was no Park and Ride facility on the relevant trunk road, it would be judged as 'poor' and 'fair', if permitting an intermediate level of accessibility. 'Poor', 'medium' and 'good' are simply relative attributes according to the measurement used. Local service opportunities (see 'Criteria Assessment' table) refers to capacity to share services with nearby settlements, including market towns within 5km and the numbers of villages in close proximity. It should be noted that emboldened text in the table below indicates a factor's higher importance.

Preference Grouping

		Decisive Strengths	**Decisive Weaknesses**	**Other Issues**
Eliminated	Wyton	▪ Brownfield land ▪ Benefits from CHUMMS expansion capacity ▪ Local service opportunities	▪ **Very distant from Cambridge** ▪ **Low landscape suitability** ▪ **Limited long term capacity (<10,000)** ▪ Balancing viable but adoption process not identified ▪ Poor motorway access ▪ Poor park and ride access to Cambridge ▪	▪ Avoids environmental or other designations ▪ Avoids GPZs 1, 2 and 3 ▪ No Grade 1 land within site ▪ No flood risk ▪ No current noise / pollution within site ▪ Avoids BMV land ▪ Average sub-regional access ▪ Average distance from rail line / station
	Horseheath	▪ Good park and ride access to Cambridge ▪ Local service opportunities	▪ **Over 10 miles from Cambridge** ▪ **Very low landscape/environmental suitability** ▪ Contains GPZs 1, 2 and 3 ▪ Infiltration possible but time extensive trials required / adoption process not identified ▪ Contains BMV land ▪ Poor sub-regional access ▪ Far from rail line / station ▪ Complex site to develop	▪ **Can accommodate 10,000 dwellings** ▪ Avoids environmental or other designations ▪ No Grade 1 land within site ▪ No flood risk ▪ No current noise / pollution within site ▪ No brownfield land ▪ Average motorway access
	Great Chesterford	▪ **Long term dwelling capacity (>10,000)** ▪ Good motorway access ▪ Close to rail line and station	▪ **Relatively distant from Cambridge** ▪ **Very low landscape/environmental suitability** ▪ Part in flood plain, minor flood risk ▪ Infiltration possible but time extensive trials required / adoption process not identified ▪ Contains GPZ 3 ▪ Landfill within site ▪ Contains BMV land ▪ Poor sub-regional access ▪ Complex site to develop	▪ Avoids environmental or other designations ▪ Avoids GPZ1s ▪ No Grade 1 land within site ▪ No brownfield land ▪ Average park and ride access to Cambridge

		Decisive Strengths	Decisive Weaknesses	Other Issues
	Royston North	▪ Good sub-regional access ▪ Close to rail line and station ▪ Good park and ride access to Cambridge ▪ Local service opportunities	▪ **Over 10 miles from Cambridge** ▪ **Very low landscape/environmental suitability** ▪ Small SSSI within site ▪ Part in flood plain, minor flood risk ▪ Infiltration possible but time extensive trials required / adoption process not identified ▪ Contains BMV land ▪ Poor motorway access ▪ Complex site to develop	▪ **Can accommodate 10,000 dwellings** ▪ Avoids GPZs 1, 2 and 3 ▪ No Grade 1 land within site ▪ No current noise / pollution within site ▪ No brownfield land
	Wilburton	▪ **Long term site capacity (>15,000)** ▪ Good sub-regional access	▪ **Over 10 miles from Cambridge** ▪ **Low landscape suitability** ▪ Some Grade 1 land within site ▪ Flood plain setting, some flood risk ▪ Balancing viable but adoption process not identified ▪ Contains BMV land ▪ A10 congestion not helped by CHUMMS ▪ Distant from rail station	▪ Avoids environmental or other designations ▪ Avoids GPZs 1, 2 and 3 ▪ No current noise / pollution within site ▪ No brownfield land ▪ Average motorway access ▪ Average park and ride access to Cambridge
Lower priority	Duxford	▪ Good motorway access ▪ Close to rail line and station ▪ Good park and ride access to Cambridge ▪ Local service opportunities	▪ **Limited landscape/environmental suitability** ▪ **Limited long term capacity (<10,000)** ▪ Part in flood plain and some flood risk ▪ Infiltration possible but time extensive trials required / adoption process not identified ▪ Contains GPZs 3 ▪ Noise and pollution issues ▪ Contains BMV land ▪ Poor sub-regional access ▪ Need to edge into green belt to meet capacity requirements	▪ **Average distance from Cambridge** ▪ Avoids environmental or other designations ▪ Avoids GPZ1s ▪ No Grade 1 land within site ▪ No brownfield land
	Caxton Gibbet	▪ **Long term growth potential (>12,000)** ▪ Good park and ride access to Cambridge	▪ **Relatively distant from Cambridge** ▪ **Limited landscape/environmental suitability** ▪ Balancing viable but adoption process not identified ▪ Pylons along edge of site ▪ Contains BMV land ▪ Poor motorway access ▪ Distant from rail line/ station ▪ Competition from Cambourne	▪ Avoids environmental or other designations ▪ Avoids GPZs 1, 2 and 3 ▪ No Grade 1 land within site ▪ No flood risk ▪ No brownfield land ▪ Average sub-regional access
	Bar Hill	▪ **Close to Cambridge** ▪ Benefits from CHUMMS	▪ **Very low landscape/environmental suitability** ▪ **Limited long term capacity (<10,000)** ▪ Balancing viable but adoption process not identified ▪ Possible pollution from A14 ▪ Contains BMV land ▪ Distant from rail line / station ▪ Poor park & ride access to Cambridge ▪ Competition with Cambourne ▪ Complex site to develop	▪ Avoids environmental or other designations ▪ Avoids GPZs 1, 2, and 3 ▪ No Grade 1 land within site ▪ No flood risk ▪ No brownfield land ▪ Average motorway access ▪ Average sub-regional access

		Decisive Strengths	Decisive Weaknesses	Other Issues
	Cambourne	▪ **Relatively close to Cambridge** ▪ **Reasonable landscape/ environmental suitability** ▪ Good park and ride access to Cambridge ▪ Relatively easy site to develop	▪ **Problematic dwelling capacity (<10,000)** ▪ Balancing viable but adoption process not identified ▪ Contains GPZ 3 ▪ Contains BMV land ▪ Distant from rail line / station	▪ Avoids environmental or other designations ▪ Avoids GPZ1s ▪ No Grade 1 land within site ▪ No flood risk ▪ No current noise / pollution within site ▪ No brownfield land ▪ Average motorway access ▪ Average sub-regional access
	Meldreth-Melbourn	▪ **Long term site capacity (>10,000)** ▪ Good sub-regional access ▪ Close to rail line and station ▪ Good park and ride access to Cambridge ▪ Local service opportunities	▪ **Low landscape/environmental suitability** ▪ Part in flood plain and minor flood risk ▪ Infiltration possible but time extensive trials required / adoption process not identified ▪ Contains BMV land ▪ Complex site to develop	▪ **Average distance from Cambridge** ▪ Avoids environmental or other designations ▪ Avoids GPZs 1, 2 and 3 ▪ No Grade 1 land within site ▪ No current noise / pollution within site ▪ No brownfield land ▪ Average motorway access
	Cambridge Heath	▪ **Long term site capacity (>10,000)** ▪ Good motorway access ▪ HQPT potential (subject to additional links) ▪ Close to rail line ▪ Good park and ride access to Cambridge ▪ Local service opportunities	▪ **Relatively distant from Cambridge** ▪ **Limited landscape/environmental suitability** ▪ Archaeological designations within site ▪ Contains GPZ s1 and 3 ▪ Infiltration possible but time extensive trials required / adoption process not identified ▪ Contains BMV land	▪ No Grade 1 land within site ▪ No flood risk ▪ No current noise / pollution within site ▪ No brownfield land ▪ Average sub-regional access
Higher priority	Great Abington	▪ **Reasonable landscape/environmental suitability** ▪ Some brownfield land ▪ Good motorway access ▪ Good park and ride access to Cambridge ▪ Local service opportunities ▪ Relatively easy site to develop	▪ **Dwelling capacity limited (<10,000)** ▪ Contains GPZs 1, 2 and 3 ▪ Infiltration possible but time extensive trials required / adoption process not identified ▪ Contains BMV land	▪ Avoids environmental or other designations ▪ No Grade 1 land within site ▪ No flood risk ▪ No current noise / pollution within site ▪ Average sub-regional access ▪ Average distance to rail line / station
	Childerley Gate	▪ **Very close to Cambridge** ▪ Good sub-regional access ▪ Good park and ride access to Cambridge ▪ Relatively easy site to develop	▪ **Limited landscape/environmental suitability** ▪ **Limited long term capacity (<10,000)** ▪ Balancing viable but adoption process not identified ▪ Pylons within site ▪ Contains BMV land ▪ Distant from rail line / station ▪ Competition from Cambourne	▪ Avoids environmental or other designations ▪ Avoids GPZ1s 2s and 3s ▪ No Grade 1 land within site ▪ No flood risk ▪ No brownfield land ▪ Average motorway access
	Waterbeach	▪ **Good growth potential (>15,000) (subject to drainage considerations)** ▪ **Close to Cambridge** ▪ **Reasonable landscape/environmental suitability** ▪ Brownfield land ▪ Close to rail line and station	▪ On flood plain, some flood risk ▪ Balancing viable but pumping required and adoption process not identified ▪ Contains landfill sites ▪ Contains BMV land ▪ Poor strategic road access from A10 not helped by CHUMMS	▪ Avoids environmental or other designations ▪ Avoids GPZ1s 2s and 3s ▪ No Grade 1 land within site ▪ Average motorway access ▪ Average park & ride access to Cambridge

		Decisive Strengths	Decisive Weaknesses	Other Issues
Higher priority	Longstanton -Oakington	▪ **Close to Cambridge** ▪ **Reasonable landscape/environmental suitability** ▪ **Good growth potential (>15,000) (subject to drainage considerations)** ▪ Brownfield land ▪ Benefits from CHUMMS ▪ HQPT potential ▪ Local service opportunities ▪ Relatively easy site to develop	▪ Balancing viable but will require pumping and adoption process not identified ▪ Contains BMV land ▪ Poor sub-regional access (subject to transport improvements e.g. CHUMMS) ▪ Distant from rail line / station ▪ Poor park and ride access to Cambridge	▪ Avoids environmental or other designations ▪ Avoids GPZ1s 2s and 3s ▪ No Grade 1 land within site ▪ No flood risk ▪ No current noise / pollution within site ▪ Average motorway access

8.2.3 It is acknowledged that there is a continuum of relative performance among different sites judged according to the chosen criteria, such that placing sites in categories is bound to be an arbitrary process. Cambourne for example has some claim to be considered as a 'higher priority' site, but has been left in the 'lower priority' group because of the design and sustainability problems inherent in expanding from its present envelope to the 6,000-10,000 dwelling range.

8.2.4 A final appraisal was made of the four short listed sites, introducing additional criteria such as access to total and to high tech employment, summarised in the table below. The main conclusions drawn were:

- None of the four sites clearly emerge as having all-round advantages. All the sites demonstrate one or other drawback or weakness.
- The southern sites, Great Abington and Childerley Gate, possess the considerable handicap of limited capacity: expanding much over 6,000 dwellings, although for access to employment, proximity to Cambridge and avoidance of flood and drainage problems they both score highly. Childerley Gate, while closest of all sites to Cambridge, has two disadvantages not shared by Great Abington, of having no brownfield land and competing with Cambourne, a short distance west along A428. Great Abington is favourably located in terms of the availability of surrounding road network capacity and the growth of high technology employment on nearby campus sites.
- Both northern MoD sites, Waterbeach and Oakington, perform relatively well in terms of landscape impact and use of brownfield land. Even more important, they have much greater long-term capacity than the two more southerly sites although in the case of Waterbeach this must be closely examined given its flood plain setting. Of the two, Oakington fits most readily into the local settlement pattern, being able to serve other small towns and villages to east and west, reinforced by the HQPT potential of the proposed rapid transit system linking St Ives to Cambridge. The site is not in the flood plain but is difficult to drain, suggesting that solutions might be rather costly even if perfectly feasible. It may also be released sooner by the MoD. Waterbeach on the other hand faces a different problem of access. Already badly affected by congestion on the A10, confining movement to north and south, major expansion of the settlement would be difficult to justify without new eastern and western highway links. It would have benefited from the adoption of the northern bypass route, of the alternatives examined in the CHUMMS study.
- The access of New Settlements to Park and Ride sites (existing and potential) has been assessed, but has not been included in the table below because it is considered that Park

and Ride is of limited significance in relation to the provision of HQPT along the key corridors.

Comparison of Short-Listed New Settlement Sites

	Great Abington	Childerley Gate	Longstanton Oakington	Waterbeach
Absolute Criteria				
Positives	▪ Within 10 miles of Cambridge ▪ Avoids key environmental designations ▪ Avoids Grade 1 agricultural land	▪ Within 10 miles of Cambridge ▪ Avoids key environmental designations ▪ Avoids GPZ1s ▪ Avoids Grade 1 agricultural land	▪ Within 10 miles of Cambridge ▪ Avoids key environmental designations ▪ Avoids GPZ1s ▪ Avoids Grade 1 agricultural land	• Within 10 miles of Cambridge • Avoids key environmental designations • Avoids GPZ1s • Avoids Grade 1 agricultural land
Negatives	▪ Small part of site in GPZ1			
Non Absolute Criteria				
Positives	▪ Avoids flood plain/no flood risk ▪ High relative landscape suitability (No.1) ▪ Avoids potential sources of pollution ▪ Contains small amount of brownfield land	▪ Avoids flood plain/no flood risk ▪ Good relative landscape suitability (No.5) ▪ Avoids GPZs 2/3	▪ Avoids flood plain/no flood risk ▪ High relative landscape suitability (No.4) ▪ Avoids GPZs 2/3 ▪ Avoids potential sources of pollution ▪ 50% of site on non-agricultural land ▪ Contains large area of brownfield land	▪ High relative landscape suitability (No.3) ▪ Feasible adoption process identified for drainage ▪ Avoids GPZs 2/3 ▪ Contains some non-agricultural land ▪ Contains sizeable area of brownfield land
Negatives	▪ Drainage – infiltration feasible but time-extensive and adoption process not identified ▪ Site within GPZs 2/3 ▪ c.100% of site Grade 2 agricultural land	▪ Drainage – balancing possible but adoption process not identified ▪ Pylons along edge of site ▪ 100% of site Grade 2 agricultural land ▪ Contains no brownfield land	▪ Drainage – balancing appears viable with pumping but adoption process not identified ▪ 50% of site Grade 2 agricultural land	▪ 30% of site in defended flood plain but development could avoid flood risk ▪ Drainage – balancing viable with pumping ▪ Landfills within site ▪ c. 75% of site Grade 2 agricultural land
Accessibility to Strategic Transport Network				
Positives	▪ Above average access to motorway[1] ▪ Average sub-regional accessibility by trunk roads ▪ Average rail	▪ Average access to motorway[1] ▪ Above average sub-regional accessibility by trunk roads	▪ Average access to motorway [1] ▪ Positive implications from CHUMMS including proposed guided bus (HQPT) ▪ Good local service opportunities	▪ Average access to motorway[1] ▪ Above average rail accessibility

	Great Abington	Childerley Gate	Longstanton Oakington	Waterbeach
	accessibility ▪ Good local service opportunities		▪ Average sub-regional accessibility by trunk roads	
Negatives		▪ Poor rail accessibility	▪ Poor rail accessibility	▪ Below average sub-regional accessibility by trunk roads
Capacity/Implementation Criteria				
Positives	▪ Relatively easy development	▪ Limited long-term growth potential ▪ Relatively easy development	▪ Potential long-term expansion capacity ▪ Relatively easy development	▪ Potential long-term growth capacity
Negatives	▪ Constrained site no long-term growth potential	▪ Potential competition effect on Cambourne		
Other Factors				
Positives	▪ Nearby high tech employment growth		▪ Close proximity to fast growing employment area of Huntingdon-St Ives	
Negatives				

Notes: 1 – Defined as M11-A14-A11 'motorway triangle'

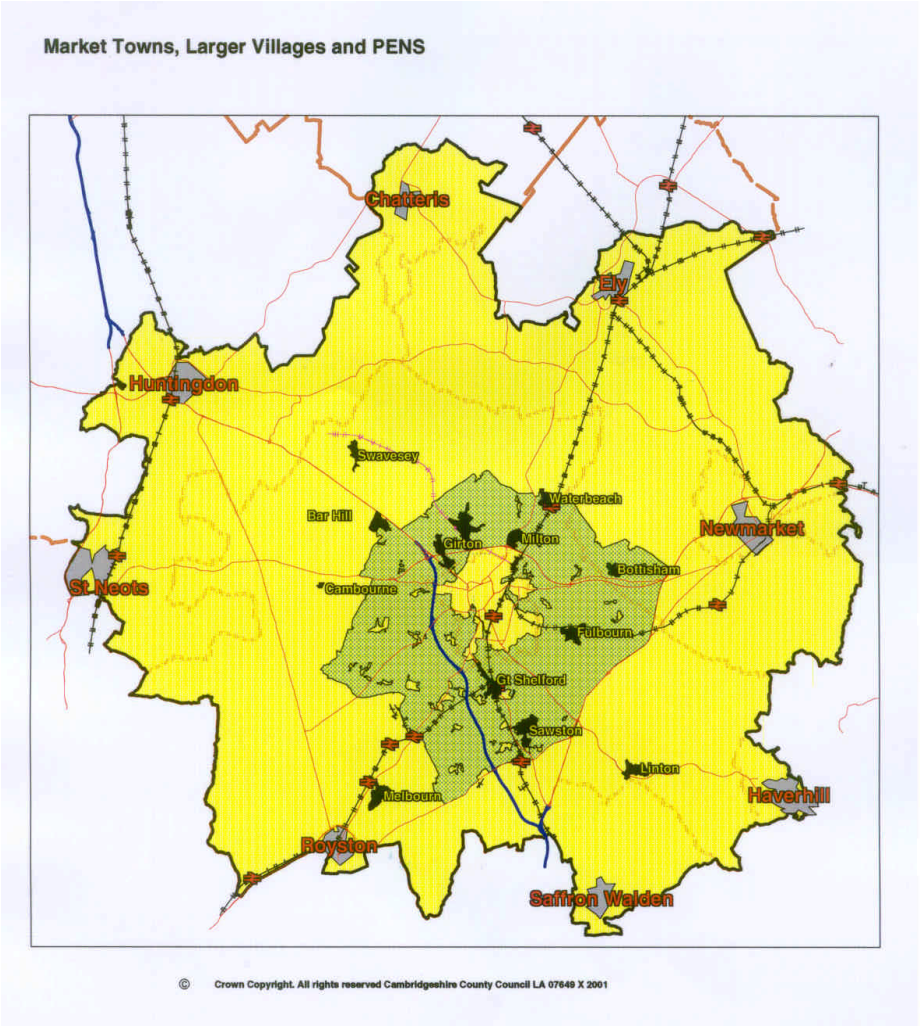
8.2.5 Any new settlement will have implications for adjoining or nearby settlements and the views of local communities should be taken into account in planning new settlements. All the new settlements identified would be capable of sensitive design to take account of nearby settlements.

9. THE RPG ELEMENTS: MARKET TOWNS, LARGER VILLAGES AND PENS WITH GOOD PUBLIC TRANSPORT ACCESS

9.1 Approach

9.1.1 RPG 6 identifies Market Towns, Larger Villages and previously established new settlements (PENS) as the last category to accommodate development and specifies that development should only occur where good quality public transport links to Cambridge are available, or capable of being provided. The sequential priority is firstly, within the urban areas and secondly, as urban extensions.

9.1.2 The Larger Villages have been defined for the purposes of this Study by Cambridgeshire County Council in consultation with the Steering Group as having specific characteristics – a population of over 3,000, within a corridor between Cambridge and a Market Town (Newmarket, Haverhill, Saffron Walden, Royston, St. Neots, Huntingdon/St. Ives and Ely), with a secondary school or good public transport to one and a primary school, food shops, post office and doctor. These villages are in two groups: Histon/Impington, Linton, Melbourn, Great Shelford and Sawston; and the second group: Bottisham, Fulbourn, Girton, Milton, Swavesey and Waterbeach. The previously established new settlements are Bar Hill and Cambourne.



9.1.3 The analysis of public transport is therefore important in defining those locations that meet the RPG criterion. Where it is not already satisfied, the potential to provide high quality public transport in future depends on sufficient population to support a viable service. Time rather than distance is the key factor in determining the location of new developments within a HQPT corridor. It is apparent that sites at greater proximity to Cambridge may not necessarily be preferential if they rely on congested local roads for travel to Cambridge rather than a dedicated, high quality busway. A number of other factors also affect the development potential at these locations, namely:

- the availability of land free from absolute constraints, such as flood risk, environmental sensitivity and the like;
- the job opportunities available locally and the potential for local economies to grow in future, in order to minimise the need to travel;
- physical and social infrastructure capacities including roads, drainage, schools and other public facilities, as well as the thresholds where a certain minimum amount of development is needed to support facilities;
- other planning considerations such as the capacity of existing towns, especially their town centres, to absorb further activity resulting from growth, and the accessibility of potential development land to facilities, to minimise the need to use a car; and,
- the environmental capacity of potential development land.

9.2 Public Transport Links to Cambridge

9.2.1 A standard for high quality public transport (HQPT) has been defined to check whether this factor would rule out any of the corridors to the nine Market Towns. This standard, at the premiere level, essentially requires a 10-minute bus frequency during the peak, with limited stops and priority measures to avoid congestion – or a 30-minute rail frequency. Only the Huntingdon corridor currently has the requisite bus frequency and Royston the requisite train frequency. A secondary level requires a 30-minute peak frequency with more route diversions and stopping and a 60-minute rail frequency.

9.2.2 In future, HQPT could be provided by conventional bus on any of the Market Town corridors, although the following would need additional population to make services viable (see Section 5 above):

- Newmarket corridor – 3,000-3,500 additional dwellings threshold (of which 610 dwellings are already committed)
- Haverhill corridor – 3,000 additional dwellings threshold (of which some 2,340 dwellings are already committed, therefore no additional population is required)
- Saffron Walden corridor – 3,200 additional dwellings threshold (of which 480 dwellings are already committed)
- St. Neots corridor – 3,400 additional dwellings threshold (of which some 5,120 dwellings are already committed, therefore no additional population is required)
- Ely/Chatteris corridor – 3,400 additional dwellings threshold (of which some 1,440 dwellings are already committed)

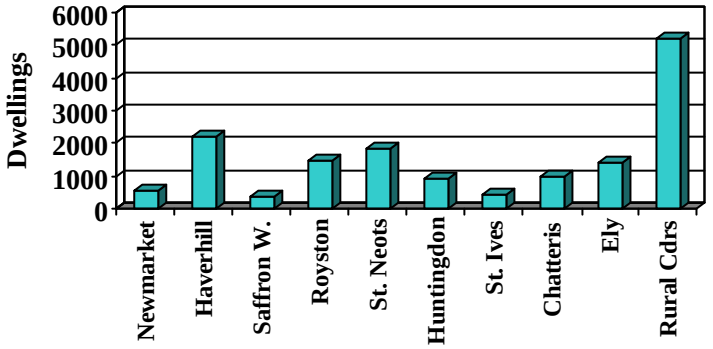
9.2.3 In the case of Royston there is insufficient data on bus operations to calculate whether additional population is needed.

9.2.4 This criterion therefore does not rule out any corridor and provides little basis for prioritising corridors for development. The capital costs for the infrastructure that would give bus priority on existing roads, outside Cambridge itself, are relatively modest.

9.2.5 The proposal for a light rail or guided bus service on the disused Cambridge to St. Ives corridor would provide a better service than a conventional bus on normal roads, although at a much higher capital cost. Experience has shown that new facilities of this kind can encourage more people to switch to public transport. This proposal could therefore improve public transport accessibility on the St. Ives corridor, but HQPT could be provided without it.

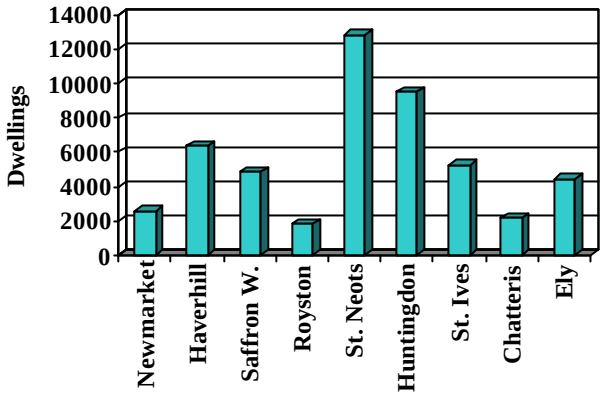
9.3 Available Land

9.3.1 The pipeline of development committed in the Market Towns and their corridors is substantial. The pre-96 commitments and the Base Case (sites over 1 ha undeveloped at the start of the plan period in 1996, plus those added since 1996, together with other developments that are considered very likely to go ahead in any scenario - see Section 2 for explanation) amount to 15,500 dwellings. Their distribution is shown in the Figure below. Capacity is relatively high within the rural corridors where it is over 5,000 dwellings and in Haverhill, Royston, St. Neots and Ely, where it is between 1,000 - 2,000 dwellings at each.



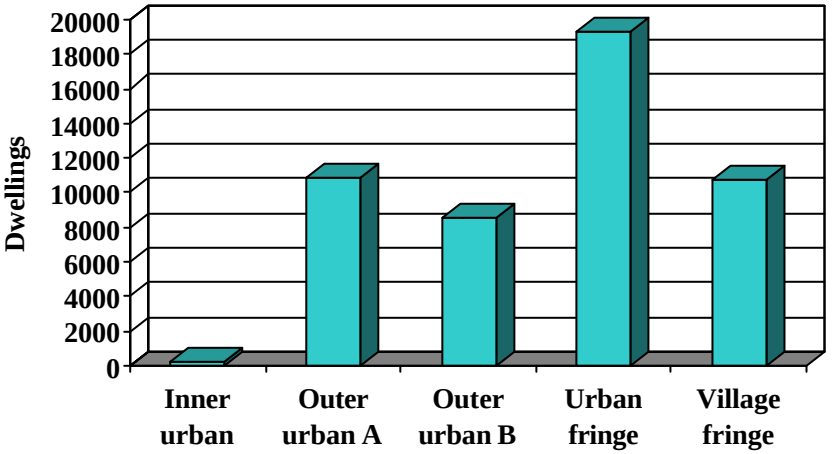
Pre-96 Commitments and Base Case Growth

9.3.2 The additional land that has been identified as free from absolute constraints, which does not imply that all this land is necessarily suitable for development, is shown diagrammatically in the figure below. This amounts to 2,000 hectares, with an estimated capacity of some 50,000 dwellings. St. Neots and Huntingdon have the largest amounts of identified land. Newmarket, Royston and Chatteris have below average amounts. Within the corridors, i.e. at larger villages and previously established new settlements, capacity is above average in the Saffron Walden, St. Neots, Huntingdon/St. Ives corridors.



Land identified without Absolute Constraints by Market Town Corridor

9.3.3 The identified land has been classified according to planning context, reflecting the location and neighbouring uses of land. The presumed average density for calculating dwelling capacity depends on this context. The figure below shows the identified land by context. This shows, as would be expected, that most of the land is on the edge of settlements. The largest category is 'urban fringe', which lies outside the existing urban envelope. Some of the land classified as 'outer urban', where higher density is appropriate, is also outside the urban envelope. There is very little brownfield land. Further work would be required to produce urban capacity studies for the Market Towns, as required by PPG 3, to validate the work within this Study and to determine capacity in more detail for Local Plan purposes. This Study is, however, adequate for Structure Plan Review purposes. Once completed the housing distributions may need amendment for the Market Towns, Larger Villages and PENS.



Dwellings capacity of identified land in Market Towns, Larger Villages and Previously Established New Settlements by Planning Context

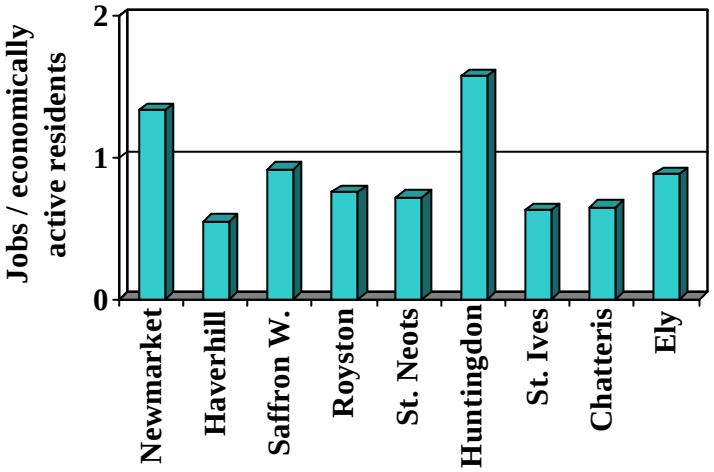
Note: see Section 5 for explanation of planning context.

9.4 Employment

9.4.1 The potential job growth in the Market Towns will affect the balance of jobs and population and so the opportunities available to residents to work locally, reducing the need to travel. Nevertheless, the complex trade-off for the family between home, job(s), schools, house prices, etc., actually leads many to live distant from their work. Given the large scale of commitments for employment land, the future distribution of jobs is to a large extent fixed (see Section 5). However, it is possible to influence this employment location through the Development Plan system.

9.4.2 The figure below shows in broad terms the *relative* balance of future jobs and economically active residents. This is before deciding the distribution of development in the different Sub Region development options, i.e. it does not include the quantum of housing and the residual jobs, the location of which varies according to the option. Huntingdon and Newmarket stand out as having more job opportunities in relation to residents than the others, while Haverhill, St. Ives and Chatteris have rather less. The effect of surrounding villages has been taken into account as far as possible. This chart needs to be interpreted cautiously as the towns are employment centres for surrounding rural catchments as well as their own populations and there are also significant employment centres in the rural areas, which complicate the picture. Generally, Market Towns and their rural hinterlands contain considerably more working residents than jobs. Also, a significant number of jobs do not necessarily imply that the variety of employment opportunities appropriate to the local community is present. For example, Newmarket could benefit from diversification and Haverhill would welcome hi-tech activities.

9.4.3 Recent evidence for Haverhill (refer to paragraph 5.5.6 above) results in a better future balance of jobs to residents up to 2016, than the assessment in the following chart.



Relative Balance of Jobs and Economically Active Residents by Market Town in 2016

Note: Population of adjacent settlements to Market Towns included at St. Neots, Huntingdon and St. Ives.

9.5 Services

9.5.1 Secondary schools require a population of between 5,000 and 10,000 dwellings to support them, with the lower number being an absolute minimum. A number of schools have short-term capacity up to 2005, but expansion beyond actual or potential capacity of existing schools would need to be at least 5,000 dwellings to justify a new school. Saffron Walden, Huntingdon, St. Ives and Royston have no long-term secondary school capacity and new schools would be needed.

9.5.2 Whilst town centre enlargement is difficult for most towns shopping floorspace is not likely to be a rigid constraint on growth. For most of the towns the need to maintain commercial vitality of town centres is a more important issue in the face of competition from larger centres and out of centre shopping. Growth in the catchment population can help.

9.5.3 Existing or proposed subsidiary service centres could improve sustainability of peripheral development, where capacity of the town centre is restricted and/or development potential is remote from the centre. Remoteness of potential development from the centre is an issue at St Neots, Huntingdon, Ely and St. Ives.

9.6 Infrastructure

9.6.1 The results of the recent MENTOR/SATURN model testing (not including CHUMMS recommendations) appear to show that, by 2016, expansion on every corridor would result in severe congestion at the Cambridge end. Problems would be especially acute on the Ely and Huntingdon/St. Ives corridors. At the Market Town end of the corridors, there appears to be little problem except on the St. Neots, Huntingdon, St. Ives and Ely/Chatteris corridors, where upgrading, with associated local improvements, would be needed at:

- western end of the A428, beyond Caxton Gibbet;
- the A14 Cambridge to Huntingdon and St. Ives; and,
- the A10 Cambridge to Ely and Chatteris.

9.6.2 The alternative enhancement solutions to the A14 corridor as proposed by the CHUMMS multi-modal study (Section 5 above) would particularly affect the road system around Huntingdon and, consequently access to potential development areas.

9.6.3 Surface drainage constraints of different kinds apply at Newmarket, Royston, St. Neots (north and east of the town), Huntingdon, St. Ives (north and east of the town) and Ely. Foul drainage capacity, i.e. new or expanded sewage treatment works and/or major upgrading of trunk mains and pumping capacity would be needed at all towns, for any substantial expansion.

9.6.4 Water supply capacity constraints exist at Newmarket, Haverhill, St. Neots, Huntingdon, Chatteris (possibly) and Ely, implying the need for investment, but no serious obstacle to expansion.

9.7 Town Character and Environmental Capacity

9.7.1 The character of a town and its vulnerability to different levels of town growth is a matter of judgement. Those towns judged by the consultants to be particularly sensitive, although not necessarily at risk from growth, are Saffron Walden, St. Ives and Ely. Newmarket's sensitivity to development due to its reliance on horse racing industry was taken into consideration. The physical capacity of town centres is relatively constrained at Royston, St. Neots and Chatteris, although Chatteris has potential to expand its central area

shopping facilities. Traffic congestion within the towns is a problem at Newmarket, Saffron Walden, Royston, St. Neots and Huntingdon. Coalescence was also an issue highlighted when large sites on the edge of settlements such as Barhill, Chatteris, Haverhill, Huntingdon and St Ives were considered.

9.7.2 The Study has assessed the Environmental Capacity, including issues of setting and landscape, for the areas of land identified at each Market Town, Larger Village and PENS. The methodology for this is outlined in Section 7. Results are contained within the Site Prioritisation Process, which are explained in Section 4 and also Section 10 of this report.

9.8 Broad Findings

9.8.1 The findings for the individual Market Towns, Larger Villages and Previously Established New Settlements as a group are summarised in the following table. The terms used in the table are relative rather than absolute assessments. This also sets out a conclusion on the relative priorities for housing growth between the towns. Note that these do not imply priority compared with prior categories in the RPG sequence.

9.8.2 The assessment found that the net additional dwelling capacity of the Market Towns, Larger Villages and PENS and their corridors to 2016 was 31,220 dwellings, at assumed density ranges of 30 – 65 dph. These dwelling capacities were derived, after a broad criteria assessment and prior to more detailed capacity, implementation and sustainability tests to refine capacities for use in determining the options.

Conclusions on Market Town/Corridor Relative Priorities

	HQPT Dwelling Threshold	Projected Employment Balance (jobs per resident)	Corridor/ Roads (town end) capacity	Infrastructure capacity	Secondary Schools Capacity/ Thresholds	Town Character	Relative Priority for Use in constructing Option
Newmarket	3,000-3,500	Above average	Little problem	STW & water supply constraints, aquifer requires care on discharges	2,500	Medium capacity, sensitive setting	High to Medium, to enable HQPT and because jobs balance relatively strong. But needs diversification to improve economic prospects of the town
Haverhill	3,000	Low	Little problem, near capacity west of Linton	STW upgrade and mains needed; water supply strengthening	6,400	Medium capacity, not sensitive	Medium to support HQPT, given investment to enhance attraction for jobs to improve projected weak jobs balance and recent evidence of improved prospects
Saffron Walden	3,200	Medium	Little problem identified in modelling	No problems identified	None, c. 5,000 dwellings threshold	Medium capacity, sensitive, congestion, at risk	Low priority as dwellings capacity too small to support new school or reach HQPT threshold , town character concerns
Royston	Not known	Medium –	Little problem identified in modelling	STW constraint, aquifer	720	Low capacity, not very sensitive, congested	High priority up to 720, possibly to assist HQPT, as school cannot expand further.
St Neots	2,400	Medium	Severe constraint, investment needed	Surface/foul drainage and water supply constraints,	5,000	Low capacity, congestion	High, as capacity exists, surplus sites potential for employment and services, road investment needed
Huntingdon and Godmanchester	none	High	Severe constraint, investment needed	Surface/foul drainage and water supply constraints	None, c. 5,000 dwellings threshold	High capacity, not average, sensitive, some congestion	High, to achieve school threshold and because jobs balance very strong – A14 upgrade needed

St Ives	None, light rail/guided bus would help modal shift	Medium, but near Huntingdon	Severe constraint, investment needed	Surface and foul drainage constraints	250 medium term capacity, then c. 5,000 threshold	Medium capacity, sensitive, minor risk	Medium, as jobs balance strong nearby, but dwellings capacity low for required new school; A14 upgrade needed, but not dependent on light rail/guided bus
Chatteris	None	Below average	Severe constraint on A10 corridor	Needs new STW and possible water supply trunk	3,000	Low capacity but expansion potential, average sensitivity,	Medium, as dwellings and school capacity exists, needs growth, but jobs balance weak, road corridor investment needed
Ely	3,400	Medium	Severe constraint on A10 corridor	Surface/foul drainage and water supply constraints	3,600	High capacity, sensitive centre and setting, could absorb growth if setting not compromised	High, to enable HQPT within school capacity, road corridor investment needed with public transport priorities
Larger Villages and PENS	Helps on Newmarket and Saffron Walden corridors	As town corridors, Green Belt villages near Cambridge jobs	All problematic towards Cambridge	Localised constraints especially drainage in St. Ives corridor, sewerage upgrading for larger sites	6,700 dwellings capacity at locations with schools	Large expansion at any village would affect character	Low priority generally for expansion as contrary to PPG 3 (paragraph 70) and generates car traffic, high priority where contributes to HQPT threshold, plus minor growth for affordable housing

10. STRATEGIC OPTIONS FOR TESTING

10.1 Introduction

10.1.1 The Consultants have developed 4 different strategic development options that are all consistent with the sequential approach required by RPG 6. Each option is based on a different interpretation of the RPG sequential approach and is founded on its broad categories of development location. It places a different emphasis and balance of priorities on each part of the sequence (Cambridge City, the Green Belt, a New Settlement, Market Towns, Larger Villages and PENS). Each Option should be significantly different in order to present distinct alternatives for the purpose of sustainability testing, to highlight the implications of strategic choices facing the Structure Plan preparation and to assist in a meaningful public consultation process.

10.1.2 Each option has been constructed by progressively adding sites according to the priorities assessed in the capacity and implementation testing, as explained in Section 4. The options have different implications for meeting post-2016 needs. Option 3 seeks to concentrate development into corridors, using two alternative versions. These reflect alternative thrusts for future development in either the Huntingdon or Haverhill corridors, to take advantage of the potentially cumulative effect of grouping development in particular corridors to secure major transport improvements.

10.1.3 The following table shows the number of dwellings sought in each RPG element in each Option (Option 3 includes 3 and 3A).

	OPTION 1 **Cambridge Centred and Strong RPG Sequence**	**OPTION 2** **Mixed Strategy (Criteria-based)**	**OPTION 3** **Urban Concentration/ HQPT and Infrastructure Investment**
Cambridge City	3,500	2,500	1,500
Green Belt	11,000	8,000	4,000
New Settlement	6,000	6,000	6,000
Market Towns, Larger Villages and PENS	1,500	5,500	10,500
TOTAL	**22,000**	**22,000**	**22,000**

10.1.4 Taking the new settlement capacity as a fixed quantum of 6,000 in each option, 16,000 dwellings remain to be allocated in the three RPG elements (Cambridge City, Green Belt and Market Towns, Larger Villages and PENS). For Option 1, some 95% of this variable component (14,500 dwellings) was distributed to Cambridge City and the Green Belt, reflecting the spatial concentration emphasis of this strategy. It also took the major part of the maximum available capacity calculated in Cambridge City and the Green Belt Review (Sections 6 and 7 above). Options 2 and 3 allow for progressively less concentration in the innermost areas, whilst being founded on the broad categories of development location set out in the RPG sequential approach. Some 4,000 - 5,000 dwellings are transferred respectively from the City and Green Belt to the Market Towns and corridors element, with Option 3/3A assumed to absorb 65% of the 16,000. All sites considered within this option formulation process could be developed up to 2016 and possibly beyond. This Study does not attempt to specify any specific timeframe for such development on any site.

10.1.5 The potential sites for a new settlement are all reasonably close to Cambridge and they do not affect greatly the broad spatial emphasis of each Option. There are nevertheless some linkages and relationships which influence the choice of new settlement site for each Option, particularly for the corridor Options 3 and 3A. The new settlement population will strengthen the public transport potential in each corridor. The increased concentration of housing and employment in these corridors may also foster higher levels of activity and local linkage within them than would occur if such development were scattered. This may provide some counterbalance to concentration of activity in Cambridge City. Options 1 and 2 could be linked to either of the other two new settlement locations.

10.2 The Options

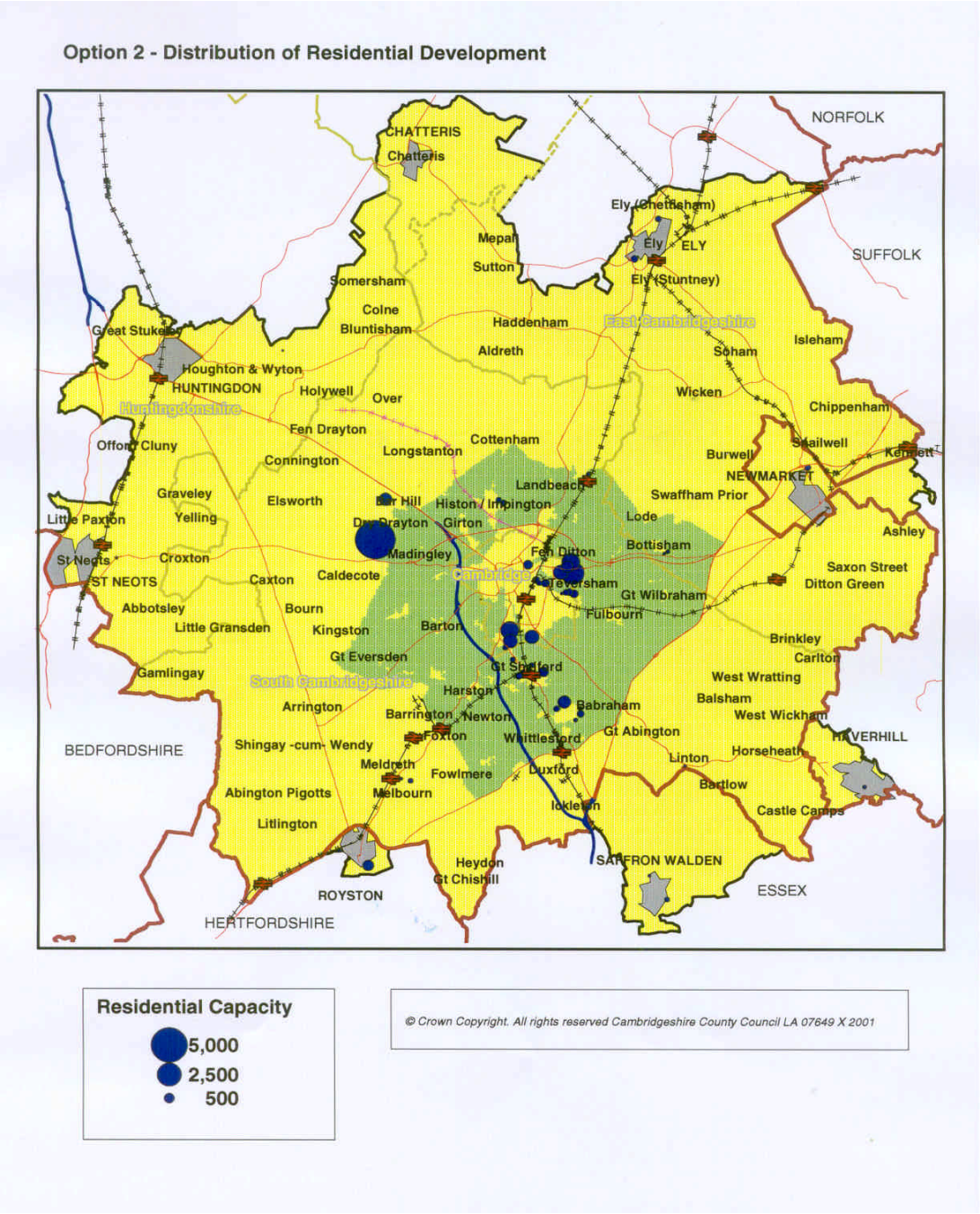
10.2.1 ***Option 1 is the 'Cambridge Centred Strong RPG Sequence Option'***. This concentrates more dwellings in and around the edge of Cambridge than in the other options. No sites in the Larger Villages are included nor any sites that scored badly, i.e. as lacking capacity to absorb development. The New Settlement is located at Waterbeach because it is close to Cambridge, has long-term potential growth capacity and may therefore assist this strategy of concentration. It also performed well in respect of landscape impact and use of brownfield land, and is capable of being drained. It also balances the growth allocated to the east, south and west of Cambridge in this option. This option encourages the highest possible densities in Cambridge. A large amount of development is concentrated on the urban fringe of Cambridge, whilst there is only a small amount of growth in the Market Towns. The sites that were actually chosen for this option have a potential capacity of 23,000.

Option 1 - Distribution of Residential Development

Residential Capacity

5,000
2,500
500

10.2.2 ***Option 2 is the 'Mixed Strategy or Criteria-based Option.'*** This has a relatively even spread of sites through the RPG sequence and is formed from the best scoring sites in each element. This option does not include sites scoring badly in Environmental Capacity assessments or sites with more significant constraints. It used higher densities in Cambridge and distributes growth more widely in the Market Towns, Larger Villages and PENS, although not on controversial sites. Sites in this option amount to a potential 23,960 dwellings, as several sites scoring equally in the capacity tests. The New Settlement in this option is located at Childerley Gate because considerable growth potential exists to the west in the St. Neots and Huntingdon corridors and a new settlement here would balance the growth allocated to the east and south of Cambridge in this option.



10.2.3 ***Option 3 and 3A constitute the 'Urban/Corridor/HQPT Infrastructure Investment Option'***. Options 3 and 3A apply more stringent standards to including sites in Cambridge and the Green Belt, consequently there are more dwellings to be accommodated in the corridors and Market Towns. Option 3 places development in the Newmarket, Royston and Huntingdon Corridors and Option 3A places development in the Newmarket, Royston and Haverhill Corridors. This option uses sites that scored relatively badly in the Environmental Capacity assessments in the Market Towns and Larger Villages element, in order to reach the target. The sites in Option 3 have a potential capacity of 24,690 dwellings, including a new settlement at Oakington/Longstanton, because it is located within the Huntingdon/St. Ives corridor, where significant future growth has been located. The sites in Option 3A have a potential capacity of 26,690 dwellings, including a new settlement at Great Abington, in the Haverhill corridor, where significant future growth is located.

10.2.4 The location of the new settlements of Oakington/Longstanton and Great Abington respectively in the Huntingdon and Haverhill corridors could in the long term boost the overall economies of those Market Towns, providing a wider choice of employment opportunities, attracting additional expenditure to support their centres, supporting HQPT within the corridors and generally attracting economic spin-off from Cambridge in the direction of the new developments. Although a choice was made on corridors for testing (see paragraph 2.4.1), other alternative corridors could be chosen to reflect different priorities.

10.3 Option Summary

10.3.1 In practice, many sites scored the same in the capacity and implementation tests, so there was no clear cut-off line at 22,000 dwellings. This meant it was possible for a

larger number of dwellings to be identified in each option than was actually necessary. This means some choices can be made if each option is only to comprise the 22,000 dwelling target precisely.

10.3.2 The four options selected are the Consultants' reasoned choices for evaluation purposes. However, many other options could be formulated/evaluated. The Consultants have not been required to recommend any option, but merely to present options for consultation and testing and to assist in subsequent decision making by the local planning authorities.

10.3.3 It should be noted that the sustainability testing process assesses the strategic options as themes. Whilst the new settlement in each option was tested in certain transport related indicators, the overall result for the option does not reflect the performance of the new settlement site. The detailed assessment of the pros and cons of each new settlement is set out in Section 8.

10.4 Sustainability Testing Process

10.4.1 Each option was tested against 9 sustainability criteria to assess how it meets with the Government's sustainability objectives and those contained in the RPG 6. Seventeen indicators for these 9 criteria were selected (refer to Section 10.4 below).

10.4.2 In summary, within each strategic option, each site has been subjected to each sustainability indicator test. The overall assessment of the option is derived from these results through an average or total of the scoring of the sites. For example, the average length of journeys between various land uses has been compared for each option, as have the differences between use of various modes of transport, the density of housing development and probable impacts on the landscape. The transport related indicators 1a, 2a, 3a, 4a, 4b, 4c and 4d were a product of the MENTOR SATURN Model.

10.4.3 The Options are scored as making either a positive, slightly positive, neutral or negative contribution to the sustainability target, in accordance with the DETR's Good Practice Guide on Sustainability Appraisal of Regional Planning Guidance (October 2000). This score is comparative rather than a definitive assessment of the options, i.e. the option may be considered negative in one respect, because it performs poorly compared to the other options, rather than it being inherently negative or bad. A comparative summary table setting out the test results is included within this Report, as recommended by the DETR Guidance.

10.5 Sustainability Criteria

10.5.1 The Sustainability Criteria were derived using a number of documents, such as the DETR's 'Guidance on Preparing Sustainable Development Frameworks' and 'Good Practice Guide on Sustainability Appraisal of Regional Planning Guidance'; Cambridgeshire and Peterborough's 'State of the Environment Report'; Cambridgeshire's 'Biodiversity Action Plan'; and the Cambridge Sub-Regional Transport Audit. In addition, Stakeholder consultations and Steering Group input was used.

10.5.2 The criteria support the Government's sustainability objectives of:

- Maintaining high and stable levels of economic growth;
- Social progress which recognises the needs of everyone;

- Effective protection of the environment; and,
- Prudent use of natural resources.

10.5.3 The Sustainability Criteria with their more detailed aims and indicators are listed below. Indicators 1a, 2a, 3a, 4a, 4b, 4c and 4d result from the MENTOR/SATURN transport model where each option, including its new settlement site was tested. The other transport indicator, 3c and all other indicators assessed each option but excluded the new settlement sites. As previously noted, the results of each test do not reflect the individual new settlement associated with each option.

1 Building economic activity on local strengths by facilitating development of high technology clusters to encourage stronger linkages between firms and specialisms within an area and encouraging high tech employment provision
i Aim – Achieve a reduction in average distance travelled to work and/or journey time; Indicator 1a – Average journey time from residential development to high tech employment sites
2 To provide for good accessibility to businesses within the region for the movement of goods and services
ii Aim – Reduce congestion and journey time for key sections of strategic network for goods and services; Indicator 2a - Travel time for key sections of strategic network
3 Discouraging social exclusion by maximising proximity of affordable new residential development to jobs, facilities and services and securing an appropriate mix of dwelling size, type and affordability to meet the changing composition of households in their area in the light of the likely assessed need
iii Aim – Reduce lengths/time of journey to work and to shops/leisure/schools from social housing; Indicator 3a Duration of journeys to work (new and existing employment sites) from social housing (assumed to be allocated to each site at 33%)
iv Aim – Encourage urban/village mixed use development allowing integration of uses, dwelling types (and modes of transport); Indicator 3b - % distribution of latest affordable housing stock against 2016 assumed stock distribution
v Aim – Maximise access to and use of public transport; Indicator 3c – Index of accessibility of the option for those using public transport (PTAL)
4 To improve atmospheric integrity and air quality by a reduction of greenhouse gas emissions and air pollutant levels in relation to NAQS standards and objectives. This is to be achieved by reducing energy consumption, implementing a modal shift in transport and reducing the need for travel
vi Aim – Decrease the % of population commuting under 5km to work (one way) by car; Indicator – 4a Number of (one way car trips under 5km to work)
vii Aim – Increase journeys to work by public transport; Indicator 4b – Public transport use
viii Aim – Reduce car mileage; Indicator 4c – Index of car mileage travelled
ix Aim – Increase use of Park and Ride; Indicator 4d – Park and Ride use
x Aim – Increase housing density to increase energy efficiency; Indicator 4e – Density of housing development (especially relevant if options vary in density profile)

5 To maintain and improve the quality of ground and river water
xi Aim – Compatibility with EA objectives to improve/maintain river and groundwater quality; Indicator 5a – River quality classification xii Aim - Increase water recharge through Sustainable Drainage Systems; Indicator 5b – Permeability of surfaces allowing recharge
6 To maintain and enhance the quality and distinctiveness of the landscape
xiii Aim – Minimise loss of countryside and features of historical and cultural importance valued for their quality; Indicator 6a – Existing landscape character and quality xiv Aim – Improve landscape quality and structure in development areas; Indicator 6b – General capacity to absorb development
7 To maintain and increase biodiversity
xv Aim – Potential for aiding achievement of BAP targets by increasing range, size and number of specific habitats appropriate to the local character/natural area; Indicator 7a – Achievement of regional BAP target for the following indicator species: Grey partridge (Perdix perdix), Dormouse (Muscardinus avellanarius), Song Thrush (Turdus philomelos), Bittern (Botaurus stellaris) and Water Vole (Arvicola terrestris)
8 To make towns and cities more attractive places to live, creating places and spaces with the needs of people in mind, which are attractive, have their own distinctive identity but respect and enhance local character
xvi Aim – Maximise urban green space and its contribution to urban quality and the improvement of linkages with open countryside; Indicator 8a – Proximity to public open space and to linkages to open countryside and,
9 Maximise the efficient use of land and buildings
xvii Aim - Maximise allocation of new housing on brownfield land; Indicator 9a – % of new dwellings on brownfield land or overall brownfield land take

10.6 Sustainability Criteria Testing Results

10.6.1 All the options performed relatively equally with respect to the distribution of affordable housing stock against 2016 assumed distribution and with respect to maximising the allocation of new housing on brownfield land on sites apart from the new settlements.

OPTION 1

10.6.2 Option 1, the Cambridge Centred option, has the most positive and slightly positive effects and the least number of negative effects overall, when compared to the other Options.

10.6.3 Option 1 has a positive effect in comparison with the other options in:

- increasing housing density, which helps to promote energy efficiency;

These help to protect the environment (Theme 3).

10.6.4 It also has a slightly positive effect in:

- limiting congestion on key sections of strategic network;
- increasing the use of Park and Ride;
- curbing car mileage in general;
- improving the landscape quality and structure in development areas;
- aiding the achievement of BAP targets; and,
- maximising urban green space and improving links with the countryside.

This is due to the inclusion of a larger number of Green Belt sites on the edge of Cambridge.

10.6.5 The effect of Option 1 on the quality of ground and river water is neutral and no options performed better than neutral in this test. Option 1 was also considered to have a neutral effect on the objectives to:

- increase public transport use for work journeys.
- reduce the average distance travelled to work and to reduce journey times to work from social housing;
- increase water recharge through SDS; and,
- minimise loss of countryside and features of historical and cultural importance valued for their quality.

Only Option 2 performed comparatively better than Option 1 in maximising access to and use of public transport.

OPTION 2

10.6.6 Option 2, the Mixed Strategy, has a positive effect in curbing congestion for key sections of strategic network and a slightly positive effect in limiting the average journey times to work, which both help the maintenance of high and stable economic growth (Theme 1).

10.6.7 Option 2 also has a slightly positive effect in:

- reducing journey times to work from social housing;
- maximising access to public transport;
- curbing car mileage;
- improving the landscape quality and structure in development areas; and,
- achieving BAP targets.

No other options performed significantly better than Option 2 in these tests, except for Option 1 in terms of car mileage.

10.6.8 Option 2 has neutral effects in 9of the 17 tests. It is neutral with respect to:

- maximising use of public transport;
- decreasing the number of car trips under 5km to work;
- increasing journeys to work by public transport;
- increasing Park and Ride use;
- increasing housing density to increase energy efficiency;
- minimising the loss of countryside and features of historical and cultural importance valued for their quality;

- improve/maintain river and groundwater quality;
- maximising urban green space and its contribution to urban quality and the improvement of linkages with open countryside; and,
- maximising the allocation of new housing on brownfield land.

10.6.9 Option 2 has a negative impact on the objective to:

- increase water recharge through Sustainable Drainage Systems.

It performs least well of all the Options with respect to this criterion.

OPTION 3

10.6.10 Option 3, the Urban Corridor/HQPT and Infrastructure Investment (Huntingdon) Option has a slightly positive effect with regard to:

- curbing car mileage: and,
- maximising the allocation of new housing on brownfield land

10.6.11 Option 3 has a neutral effect on objectives to:

- reduce journey times for overall travel to work and the length of journeys from social housing to work;
- decrease the number of people travelling under 5km to work by car;
- increase journeys to work by public transport;
- limit congestion for key sections of strategic network;
- increase use of Park and Ride;
- improve/maintain river and groundwater quality;
- minimise loss of countryside and features of historical and cultural importance valued for their quality (reflecting a balance of both positive and negative scores for individual sites);
- improve landscape quality and structure in development areas;
- aid the achievement of BAP targets; and,
- maximising urban green space and its contribution to urban quality and improvement of linkages with open countryside.

10.6.12 Option 3 has several negative effects, when compared to the other options. It has negative effects on objectives to;

- maximise access to and use of public transport;
- increase housing density to increase energy efficiency; and,
- increasing Sustainable Drainage Systems (SDS).

OPTION 3A

10.6.13 Option 3A, the Urban Corridor/HQPT and Infrastructure Investment (Haverhill) Option has a positive effect in:

- increasing use of Park and Ride.

10.6.14 It has a slightly positive to positive effect in maximising the allocation of housing on brownfield land.

10.6.15 It has a slightly positive effect in:

- maximising urban green space and its contribution to urban quality and improvement of linkages with the countryside.

10.6.16 It is considered to have a neutral to slightly positive effect in improving landscape quality and structure in development areas and in achieving BAP targets and a neutral effect in:

- reducing the average distance travelled to high tech employment sites;
- reducing journey times to work from social housing;
- curbing car mileage;
- maximising use of public transport; and
- decreasing the number of car journeys under 5km to work.

10.6.17 It has several negative effects in comparison to the other options including the aims to:

- limit congestion for key sections of strategic network;
- maximise access to public transport for work; and,
- increase housing density to increase energy efficiency.

10.6.18 Its effect on increasing water recharge through SDS was considered to be negative to neutral.

10.6.19 The overall summary of each option assesses Option 1 as ‘Some good’; Option 2 as ‘Neutral to some good’; and Options 3 and 3A as ‘Neutral’.

11. IMPLEMENTATION ISSUES

11.1 Transport Infrastructure

11.1.1 If housing development is to be located to the north of the city this will be highly dependent on capacity improvements on the A14 corridor. Only after the results of the Cambridge to Huntingdon Multi-Modal Study (CHUMMS) emerge can a proper and full assessment be made as to whether additional development could be accommodated in this location.

11.1.2 It is also the case that any development on and associated with the A10 Ely corridor would be entirely dependent on capacity improvements to this section of the A10 and major improvements to interchange facilities with A14.

11.1.3 The A428 towards St Neots would be relieved of some of the forecasted congestion if the A14 corridor can be improved. This would be as a result of reduced demand from trips travelling north on the M11, who are more likely to divert on to the A428 and avoid the congested A14. This could facilitate further development in and around the St. Neots corridor.

11.1.4 Studies have reinforced the necessity of providing HQPT on the relevant corridors at an early date.

11.2 Water Issues

11.2.1 The water issues in the Sub Region are those relating to flooding (or flood risk), drainage, public water supply and sewerage provision. Of these matters flood risk has attained a higher profile since the widespread and damaging floods in England during the Autumn and Winter of both 1999 and 2000. In Cambridgeshire, because the county is low lying and faces great development pressure, these problems have been heightened.

Flood Plain

11.2.2 Flood Plain maps issued by the Environment Agency in November 2000 confirm the extensive areas in the County that face potential risk of flooding, particularly in the northern part of the Sub Region and land adjacent to the courses of the Great Ouse and Cam. Riparian areas are generally subject to a higher level of development constraint, but since the degree of risk may vary considerably among areas mapped as flood plain and protective flood defence areas are not shown on the maps, they do not show definitive 'flood risk zones'. As a result the suitability of sites for development has had to be investigated on a site by site basis. Land where an apparent flood risk is present has been excluded from identified development potential. Exceptions are land north of Waterbeach and around Oakington, where more detailed analysis by the Environment Agency has shown that they are not precluded from development, although shown as a flood risk area on Environment Agency maps.

11.2.3 The recently published PPG 25 requires safeguards against flooding based on a precautionary approach to development in flood risk areas. The PPG proposes a sequential approach to the identification of land for development, with lowest risk land selected first. This means more constraint on development and/or additional costs to design defensive measures, than hitherto. The most constrained areas appear to be the Ouse valley market towns, especially St. Ives and Huntingdon. However, it is likely that

some other areas in the flood plain maps will emerge as being at relatively low risk. PPG25 states that the defended flood plain should also be very carefully assessed for flood risk before development can be contemplated. This particularly affects Waterbeach and Wilburton, which both contain areas of defended flood plain.

Drainage

11.2.4 For drainage, the most problematic sites remain the lowest lying. This particularly affects two of the shortlisted new settlement locations, Longstanton-Oakington and Waterbeach. The Environment Agency considers that drainage for Waterbeach can be handled using balancing ponds either within the development site itself or further west, with moderate land take but the necessity of pumping. Longstanton- Oakington presents greater difficulties because much of the land is very flat, but these too can be overcome in a similar manner. The disadvantages do not rule out these sites. In contrast development at the Great Abington and Childerley Gate sites can be more readily managed, subject to particular care to avoid aquifer and local watercourse pollution at Great Abington.

11.2.5 The Environment Agency does not make estimates of the costs of flood protection or drainage schemes. These would have to be calculated by developers in discussion with the Environment Agency, who will advise on detailed requirements once the specifics of development have been ascertained. Civil engineering requirements are likely to be mainly earth moving. Prevailing agricultural land values are modest, which suggests costs may be less than some built facilities like highways and social infrastructure.

11.2.6 Anyone developing the proposed sites will have to resolve the issue of long term maintenance of the drainage systems. The adoption of drainage systems (other than conventional piped systems) is a difficult matter because statutory obligations, accountabilities and funding are not clear.

Water Supply

11.2.7 Water Supply presents no intrinsic difficulty for any the four new settlement sites, or to any other part of the Sub Region, whether provided by the existing supplier, Cambridge Water Company or by Anglian Water. Off-site investment, mainly trunk mains but with some storage facilities, is estimated to cost of the order of £10 million (approximately £1,500 per dwelling). On-site mains costs would be borne directly by the developers and factored into housing costs. Costs of supply are likely to vary between companies since their sources of supply vary, e.g. Cambridge Water Company to south and east and Anglian Water to north and west. But subject to these considerations, the variation in the costs of supply to any of the four possible new settlements is likely to be under £5 million.

Waste Water Connection

11.2.8 The main variation in the costs of waste water provision relate to the concentration of development, it being much more cost effective to build a larger sewage treatment plant (STP) to serve a concentrated population than scattered or piecemeal development. Anglian Water estimated at the Public Examination into RPG 6 that the cost of servicing 35,000 dwellings of piecemeal development would be £21 million, but only £5 million if it was all concentrated in a new settlement. Between new settlement options of only 6,000 dwellings the variation in servicing costs would be very much smaller. The

cost of a new plant to serve this number of households would probably be about £9 million at current prices, but the final cost would depend on a range of factors such as requirement to serve industry as well as domestic users.

11.3 Other Infrastructure

11.3.1 Other infrastructure required includes utilities (power and telecommunications services) and social infrastructure, including health, education and other community services, such as police stations and leisure facilities. Much of the cost of these items is expected to be met through contributions from developers of large schemes.

11.3.2 Growth of the scale envisaged for the Sub Region will undoubtedly need substantial additional infrastructure in any event. The cost of this will be a feature of all options. For example, the new settlement will need a full range of infrastructure for a normal town of its size. Expansion of Cambridge and established towns can, to some extent, rely on existing infrastructure, where there is spare capacity. Small-scale infill and extensions can often be accommodated within the capacity of existing facilities. Where existing capacity is inadequate, costs for provision of new facilities may vary by location, for example where new trunk mains are needed, but much of the infrastructure under these headings would not vary much in cost wherever they are provided.

11.3.3 Power and telecommunications are not a strategic issue as the same extra supply capacity will be required in all options and the distribution networks do not present significant problems. Similarly, facilities required at the neighbourhood level, such as primary schools, local shops, local open space, will be an integral part of any housing expansion of significant size, e.g. more than 500 dwellings. In estimating the capacity of land, an allowance has been made for neighbourhood facilities (see Section 4).

11.3.4 There are plans to consolidate hospital services in the Sub Region at Addenbrooke's, with a major expansion, which includes space for commercial bio-medical research. For the purposes of the Study, this project is assumed to go ahead. However, no particular assumptions have been made about the future of Papworth Everard.

11.3.5 Secondary schools can be expanded by building extra classrooms, if they are they are below an optimal maximum size (taken as 10 forms of entry, which requires around 10,000 dwellings to support it) and the site is big enough or can be enlarged. A new settlement would support a new secondary school. Spare capacity in existing buildings, and in the longer term with construction of new space, exists in some of the Market Towns. Others will need new schools.

11.4 Development Body for New Settlement

11.4.1 The means and timetable for implementation of the proposed new settlement will be examined in the forthcoming Cambridge Sub Region Implementation Study. Models examined during the present Study included a traditional new town development corporation, a local authority based development consortium and a local/regional development agency involving a joint venture with the public sector and/or other agencies, such as the Regional Development Agency. These were alternatives to a wholly private sector development solution, which is considered unlikely to deliver the major development required within an acceptable timescale. It was concluded that the active

participation of partners that provided initial finance, development expertise and the maintenance of a strong local involvement in the development would be advantageous. However, the precise form of such participation and the role of private developers and landowners were not examined in detail in the Sub Region Study.

11.4.2 The timetable for development, originally envisaged by local authorities, assumed that the preparatory stages of a new settlement development, including site identification and establishment of a development vehicle, would not commence until completion of the Structure Plan Review process in 2002. Thus, master planning and initial infrastructure would be completed during the period 2006-2009. The RPG has proposed a fast track approach to infrastructure development, implying an acceleration of this timetable. This will be investigated and facilitated as part of the Cambridge Sub Region Implementation Study.

ANNEX A

Capacity and Implementation Criteria

1 In accordance with the Study Specification, a range of Capacity, Implementation and Sustainability Criteria were identified. The capacity and implementation criteria were used to identify sites and formulate strategic options and the sustainability criteria have been used to test the strategic options (refer to Sections 10.3 and 10.4 above) in accordance with DETR good practice.

2 The Capacity and Implementation Criteria can be summarised, as follows:

Physical Constraints and Utilities
- Adequacy of transport network and accessibility to jobs, shops and services
- Avoidance of flood plain risk
- Adequacy of water and drainage infrastructure
- Adequacy of electricity/gas supply
- Avoidance of heavily contaminated land

Environmental Constraints
- Protection of high quality and distinctiveness of landscape, including historic landscapes
- Maintenance of Green Belt objectives
- Protection of ecological features
- Protection of features of historical and archaeological significance
- Protection of agricultural land (Grade 1 and/or best and most versatile)
- Protection of groundwater and river water from risk of pollution
- Protection of aquifers and Groundwater Protection Zones (GPZs)
- Avoiding sterilisation of mineral reserves
- Maintenance of air quality
- Protection of biodiversity

Social Infrastructure
- Requirements for affordable housing
- Need for employment opportunities
- Adequacy of town centre facilities e.g. retailing, leisure, recreation
- Capacity of libraries (although this was not given much importance)
- Capacity of schools
- Capacity of public health care facilities
- Provision of (and protection of) public open space and recreational facilities 'greening the residential environment

Density of Development
- Maximisation of the density of development in all locations, as appropriate
- Increasing the density of development in central areas and in areas with good public transport networks
- Reduction in car parking standards

Implementation

- Potential to attract developer contributions for costs towards improvements to public transport, education and other social facilities, water, sewage and drainage infrastructure
- Ease of implementation – site-specific difficulties
- Availability of funding and the identification of funding gaps (this assessment will be undertaken as part of the Sub Region Implementation Study)
- Speed of implementation
- Absolute level of infrastructure cost
- Potential for growth post 2016

3 The above criteria were used to provide the 'Actions' described in paragraph 4.1.15 above. It should be noted that there is a degree of overlap between capacity and sustainability criteria.