Infrastructure Deficit Study

2004 - 2021

Thurrock Borough Council April 2006

Infrastructure Deficit Study

2004 - 2021

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1. Introduction

1.1 Overview and study aims

- 1.1.1 Colin Buchanan has been commissioned by Thurrock Council to assess the effect upon the Borough's infrastructure of housing growth in Thurrock in the period to 2021.
- 1.1.2 To create and maintain sustainable living conditions and high-quality lifestyles for existing and future communities, it is essential that housing growth is properly accommodated within the Borough. It is paramount in the on-going development and regeneration of the Borough that Thurrock is seen as a place where people will choose to live and work. The perception of the quality of life within Thurrock will be a key factor in how the area is viewed by prospective residents and employers and will underpin regeneration.
- 1.1.3 Thurrock Council needs to be able to assess and understand the implications of the planned growth on the Borough's infrastructure. In particular there is a need to ensure that each local community has easy access to a full range of services.
- 1.1.4 The study identifies if and where deficits in facilities and infrastructure provision currently exist within the Borough and advises on the quantity and distribution of the new infrastructure that will be needed to serve any additional dwellings growth. Where deficits in infrastructure are current then they are included in the overall requirement for new infrastructure. This study therefore helps form the basis for medium and long-term plans for infrastructure procurement, informing the Council of the implications of further growth and of which parts of the Borough appear to be more capable of accommodating growth.
- 1.1.5 This study is one of a set of reports that informs the Council of the Borough's ability to accommodate growth. Other studies that have been commissioned and which will also need to be considered include assessments of Thurrock's open space landscape and green grid, its employment land and residential urban land supply (urban capacity).
- 1.1.6 Combined, these reports will be used by the Council to inform the preparation of the Local Development Framework.



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1.2 Demographics and Borough Planning

- 1.2.1 Thurrock's population, in line with most areas of Eastern and South Eastern England, has grown rapidly since the 1991 census and is set to continue to grow rapidly. The 2002 mid-year estimate of Thurrock's population was 145,235, 12.4% higher than the 1991 census figure of 129,200.
- 1.2.2 In the 2001 census, there were 58,485 households in Thurrock, which represented an average of 2.4 persons per household. The average household size has fallen since 1991 when it was 2.6 persons, and 1981 when it was 2.9 persons. The number of persons per household in Thurrock is expected to continue to fall, reaching a forecasted 2.16 in 2021. This is expanded upon in the Regional Planning section below.
- 1.2.3 An increase in population coupled with a decrease in household size equates to a significant increase in the number of households in the Borough. As a result, new housing has been, and will continue to be, developed in the Borough. This has been written into the Borough's Draft Unitary Development Plan, which projects future housing growth in Thurrock up to 2016.

1.3 Regional Planning

- 1.3.1 Projections for housing growth are also found in the East of England's Draft Regional Spatial Strategy - RSS14 (December 2004), which proposes allocations of growth in dwellings to 2021 to individual local authorities. In the draft RSS14 Thurrock, with 18,500, had the fourth largest housing allocation of any local authority in the East of England.
- 1.3.2 Recent draft projections produced by the ODPM and by EERA indicate an increase in population between 2001 and 2021 of 23,600 population (16%). These draft projections are included within a paper entitled "Revised 2001-based Population and Household Growth in the East of England, 2001-2021" that was published by EERA as supporting information for the Regional Spatial Strategy.
- 1.3.3 The ONS 2003-based population projections 2001-2021, indicate that Thurrock's population will grow from 143,300 in 2001 to 166,900 in 2021 an increase of 23,600 population. This projection is based upon recent trends. The final projections are anticipated shortly.
- 1.3.4 The "Chelmer Model Revised 2001-based projections of total population" produced for EERA by Anglia Polytechnic University (APU) included three different types of projection (nil-net migration, short term migration and dwelling-led). The dwelling-led projection is based upon the draft RSS provision of 18,500 and shows an identical increase of 23,600, though the



2001 base population of the Anglia Polytechnic model was 143,000 not 143,300.

- 1.3.5 In simple terms, the reason that an additional 18,500 dwellings is likely to only produce an increase in population of 23,600 is that the average household size is projected to continue to fall: from 2.43 in 2001 to 2.16 by 2021. This affects the existing, as well as the additional dwellings. While, an additional 39,960 people would be expected to live in the new housing, the population living in the existing housing in Thurrock is expected to have fallen by 16,360 across the planning period.
- 1.3.6 On the 7th February 2005, the East of England Regional Assembly (EERA) suspended its support for the East of England Plan. The decision to suspend support for the plan was made on grounds of 'lack of central Government funding for essential infrastructure for the region.' Nevertheless EERA did publish the Draft RSS14 for public consultation so as to not jeopardise the programme for ultimate adoption of the document. An examination in public into the draft RSS closed in March 2006.

1.4 Central Government Policy

- 1.4.1 Thurrock lies within the Thames Gateway, which is the Government's top priority for regeneration in the UK, and high rates of development are planned for the area over the forthcoming two decades. The Thames Gateway was designated as a growth area by Sustainable Communities Plan in 2003.
- 1.4.2 In January 2004 an Urban Development Corporation (UDC) became operational in Thurrock. Its aim is to deliver growth and drive forward regeneration of the area and, as such, it will need to consider how to secure the necessary improvements to infrastructure so as to secure sustainable communities and sustainable regeneration.

1.5 Scenarios

- 1.5.1 This study has contemplated the following growth scenarios:
 - Committed development within the draft UDP for the period from 2001 to 2016 with a projected population growth of 6,968; and
 - The draft RSS 14 level of 18,500 dwellings (2001 to 2021) with a projected population growth of 23,600.
- 1.5.2 With regards the manner in which growth (housing development), allowing for current local plan allocations and identified urban capacity, is to be allocated, possible broad locations for additional land that would need to be



released have been agreed with Thurrock. Five spatial distribution of dwellings growth have been assessed for the draft RSS14 growth scenario. This approach was valid because infrastructure requirements were found to be not necessarily sensitive to location; the infrastructure requirement of a particular site is often independent of that from other developments.

1.6 Study Outputs

- 1.6.1 In summary, this study:
 - provides an understanding of the levels of population growth that can be served by capacity in existing infrastructure;
 - considers any geographical variations in the existing provision of infrastructure;
 - quantifies additional infrastructure required to accommodate projected population growth in Thurrock to the year 2021, including that required to fulfil current shortfalls;
 - provides indicative costs to meet shortfalls in social infrastructure; and,
 - assesses and recommend different potential distribution options for the housing needed to accommodate this population growth.

1.7 Report Structure

1.7.1 This report is structured as follows:

Chapter 2: Method

Community and Social Infrastructure

Chapter 3: Baseline Assessment

Chapter 4: Housing Growth Distributions

Chapter 5: Infrastructure Requirements

Chapter 6: Indicative Costs

Transport Infrastructure

Chapter 7: Modelling



Chapter 8: Existing and future baseline impacts

Chapter 9: Development impact

Conclusions

Chapter 10: Spatial Considerations

Chapter 11: Conclusions



2. Method

2.1 Overview

- 2.1.1 The overall approach of this study has been to identify existing infrastructure and assess its ability to accommodate additional development. Where that capacity does not exist or is exceeded by requirements of additional growth, an assessment of what additional infrastructure is required to facilitate additional dwellings growth is made. This study also considers whether there are any locational advantages, in terms of infrastructure, i.e. can the need for additional infrastructure be minimised by locating development close to facilities that exist and have the capacity to absorb additional development.
- 2.1.2 The method can be summarised as follows:
 - Identify land supply and hence the requirement to release additional land to accommodate dwellings growth within each scenario;
 - Establish the baseline infrastructure position and identify and shortfalls in provisions;
 - Prepare housing distribution options (for each growth scenario) using broad locational advice from Thurrock Council but also taking into consideration infrastructure baseline information;
 - Assess infrastructure requirements consequent of different growth scenarios and distribution options;
 - Estimate costs of meeting shortfalls in provision (social and community infrastructure only); and,
 - Provide recommendations on spatial distributions and provide conclusions on infrastructure deficit.

2.2 Considerations

2.2.1 Most social and community infrastructure serves local needs and hence it is possible to produce a quantitative assessment of need relative to population.



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2.2.2 However, transport infrastructure and social and community infrastructure that has a more strategic catchment and also infrastructure that is provided by the private sector, is more difficult to assess and to quantify shortfalls/oversupply. The relationship of this type of infrastructure with population distribution is more complex. Retail (comparison shopping and some convenience shopping), hospitals, higher and further education and transport infrastructure are seen as key examples of this as the manner in which demand is met (relative to increasing population growth) is not necessarily bound by existing facilities and the manner in which services are provided within the District. For example Lakeside shopping centre serves a sub-regional catchment and so has the capacity to absorb all predicted population growth in Thurrock. But it would not be necessarily appropriate or desirable for new population to use that facility; needs may be better met locally or at Grays town centre. In addition, journey/travel patterns and mode choice react to the capacity of existing conditions, i.e. they are self modulating. This does not mean that not providing more infrastructure is a viable or recommended option, but is recognition of the limitations of applying ratio's to facilities and using simplistic models to assess infrastructure shortfalls. This matter is revisited at the end of the report.

2.3 Social and community infrastructure

- 2.3.1 A baseline for social and community infrastructure was developed by providing information on the location and size of existing facilities provided and postulating as to whether there is an under or over supply, given current population (2004). Information was obtained for the following facilities:
 - Education
 - secondary
 - primary
 - post-sixteen
 - general practitioners surgeries
 - community halls
 - libraries
 - social care services;
 - care of the elderly
 - disability care
 - learning disabilities
 - mental health services
 - children's services
 - utilities
- 2.3.2 Information was collected from a variety of sources including Thurrock Council, the Local Education Authority, Thurrock Primary Health Care Trust, the utility companies, general practitioners and community and



village halls operators. In addition, to supplement and verify the information collected, web searches were undertaken.

- 2.3.3 Information was inputted into a MapInfo Geographical Information System (GIS) database model (hereafter referred to as the GIS model), from which each facility or piece of infrastructure's position could be plotted. To match infrastructure capacities against new dwellings growth, including sites identified within the 2005 UCS, information was aggregated into geographical units or urban areas. Where appropriate, the capacity of separate facilities was aggregated to provide an indication of capacity for larger areas.
- 2.3.4 These urban areas have been defined by the Consultants for the purposes of this study, from a desk top analysis of the physical makeup of the urban area and transport infrastructure. It is assumed that residents would be able to access all facilities within these defined urban areas.

Dwellings growth and distribution

2.3.5 Thurrock Council provided advice on housing land supply and also on broad locations of growth. Given existing local plan housing allocations, plus identified urban capacity additional growth and the broad locations as to where it could be accommodated provided are, as follows:

Growth Scenario	Option Number	Total Additional Dwellings	Urban Area Dwellings	Total Green Belt Dwellings	Green Belt Location	
	1	18,500	Not specified,	Not specified, but	North or East of Grays	
Draft RSS 14			but comprises	comprises a small		
			most growth	proportion growth		
Draft RSS 14	2	18,500	15,500	3,000	Ockendon	
Draft RSS 14	3	18,500	15,500	3,000	East Tilbury	
Droft DCC 14	4 18,500	10 500	6 000	3,000 at East Tilbury		
Diall R55 14		18,500	12,500	6,000	3,000 at Ockendon	
Droft PSS 14	4A	18,500	15,500	3,000	2,000 Corringham	
Dialt KSS 14					1,000 Stanford-le-Hope	

TABLE 2.1: HOUSING DISTRIBUTION OPTIONS

- 2.3.6 The GIS model calculates each output area's accessibility to a range of facilities taking into consideration relative capacity to accommodate growth and demands placed on it by population given relevant walk distances (see Appendix 1).
- 2.3.7 The model was used initially to refine distribution of housing growth by comparing facilities with population (taking into consideration walk distance) and allowing for known capacity. Hence, the model identified locations that appear to benefit from substantial amounts of facilities that have capacity and are not serving substantial amounts of population,



relative to the remainder of the borough. Using outputs from the model, specific locations for new dwellings growth were selected.

2.3.8 The detailed methodology and outputs from this analysis are attached as Appendix 1 and will form a useful tool for preparation of the development plan to select sites for residential development and for development control purposes.

Infrastructure requirements

- 2.3.9 The GIS and spreadsheet model was used to analyse the implications of accommodating additional growth to the Borough by matching infrastructure capacity to growth and then calculating additional infrastructure requirements. Infrastructure needs were calculated using information from a number of sources, which offered information on facility requirements per head of population.
- 2.3.10 For retail uses, the demand for new floorspace in the Borough was calculated as an aggregate figure relative to population growth.

Costings

- 2.3.11 Costs for the provision of infrastructure are sourced from a number of sources, including Thurrock Council, service providers, Colin Buchanan's previous experience, and a recent report entitled "Costing the Needs of the South East Counties" produced for the County Councils of the South East of England in November 2004. This last source has been used because it provides a useful comparator against costs in other local authority areas. The same costs appear in Tym's subsequent June 2005 report "The Cost and Funding of Growth in South East England".
- 2.3.12 The costs for the infrastructure provision are only a guideline, given that they are broad-brush figures, which do not take account of locational differences, land values, or changes in the costs of provision over the period in question.

2.4 Transport infrastructure

- 2.4.1 A full methodology for assessing transport impacts is provided in Chapter 7 of this report and only a brief summary is provided below.
- 2.4.2 A Thurrock specific (links only) model was developed and used to determine capacity constraints on the network. The model was calibrated



using existing survey data, and where appropriate additional survey was undertaken.

- 2.4.3 The measure of road infrastructure capacity used was the ratio of existing Annual Average Daily Traffic (AADT) to Congestion Reference Flows (CRF), as follows:
 - Greater than 1 over-capacity,
 - 0.85 to 1 approaching capacity
 - below 0.85 operating acceptably.
- 2.4.4 The model was used to ascertain congestion and hence infrastructure capacity at 2021. In order to derive 2021 baseline traffic flows, growth factors were derived using TEMPRO. TEMPRO includes all committed development included in the UDP. To determine the effect of the additional housing growth, traffic generated under each of the development options was added into the model to derive future traffic levels congestions levels on each link.
- 2.4.5 Improvements to the road network were imposed to establish what scale of solution would be required to overcome problems identified, to achieve a ratio of AADT to CRF of 1 or lower.
- 2.4.6 Since the Study was commissioned, a new Eastern Region Traffic Model has been commissioned and prepared for and on behalf of EERA (and others) which models traffic flows on main road (links and junctions) within the East of England to 2021. Results from that model have not been available to this study. It would be useful to compare traffic flow data from that study with the assumptions made in this study.
- 2.4.7 With regards to rail; passenger survey data and TEMPRO were used to calculate baseline use of railways by station. For each development scenario additional patronage was assigned to stations with time allocations based on the LOTS study. It is assumed that London is the main destination.

2.5 Spatial considerations and conclusions

2.5.1 By comparing infrastructure requirements and costs of each potential spatial distribution it is possible to ascertain whether there are advantages (in infrastructure terms and hence overall deliverability) associated with particular locations for growth. This advice, will of course, need to be considered alongside other planning consideration such as regeneration and economic development, sustainable development and environment.



SOCIAL AND COMMUNITY INFRASTRUCTURE



3. Baseline assessment

3.1.1 This chapter analyses the Borough's existing provision of facilities and infrastructure, identifies where surpluses exists, and also where capacity has been reached or passed. A review of the current situation in the Borough is useful in itself, but it is also necessary as a baseline, against which to assess the impact of future residential developments.

3.2 Education

3.2.1 Education has been split into three elements: primary, secondary and postsixteen. Primary and secondary education is compulsory and provided by Thurrock Council, Local Education Authority (LEA). Post-sixteen education is not compulsory and is provided by a technical college and a sixth-form.

Primary

- 3.2.2 There are 46 primary schools providing a total capacity of 15,013 places. Some of these are full primary schools, others are only infants or juniors. The locations of the schools are shown in Map 3.1. The spatial distribution of the schools is consistent with the urban pattern of the Borough, with the majority located within the existing urban areas.
- 3.2.3 Information from the Draft Schools Organisation Plan 2004-2009, shows the number of places available per school, and the number of pupils attending each school. The amount of capacity at the Borough's primary schools varies, and this again can be seen on Map 3.1. The figures must be handled carefully because descriptions of capacity can be misleading where some schools may have spare capacity in some school years, but an over-supply of pupils in others. Only six primary school in the Borough are over-subscribed, amounting to 480 pupils. However, taking into account Borough-wide demand and overall availability there is an oversupply of school places of 1,850 places. Thus, whilst in some locations there are predicted deficits, demand could be met by transporting pupils and controlling catchment areas.





Secondary

- 3.2.4 There are 10 secondary schools (Map 3.2) within the Borough providing a total capacity of 8,949 places. In 2004, The Grays (59 additional pupils), Gable Hall (23 additional pupils) and The Aveley (7 additional pupils) were over-subscribed. By 2009, The Aveley, The Ockendon and Chafford Hundred Campus are forecasted to be over-subscribed by 908 pupils. Taking into consideration total capacity at all schools the level of oversubscription reduces to 650 pupils.
- 3.2.5 Chafford Hundred is a developing school in a new residential area, and currently five new classrooms are being built to provided an additional 150 places. However, including this additional capacity, the school is still forecasted to suffer from an excess demand of some 350 children in 2009. The Chafford Hundred school expansion was not taken into account with latest version of the SOP (because of timing of the work to prepare the SOP) and so overall oversubscription is estimated at 500 pupils, i.e. approximately half a secondary school
- 3.2.6 It can be seen from Map 3.2 that there are no secondary schools to the west of the borough in the Purfleet area, where significant housing development is planned in all the options being analysed. Map 3.2 also shows the amount of spare capacity at each of the Borough's secondary schools.
- 3.2.7 Several of the schools are located relatively close to settlement edges where there may be potential to develop new housing (as urban extensions) within walking distance.

Post-16

- 3.2.8 Only one school in Thurrock provides post-16 education and that is Knightmead Special School which caters for special education needs children only. All other post 16 education is provided by Palmer's College and Thurrock and Basildon College (Map 3.3).
- 3.2.9 Palmer's College has a single campus in Grays, and Thurrock and Basildon college has a campus in Grays, and one in Basildon. Thurrock and Basildon College also has two small teaching facilities within Lakeside Shopping Centre and in Basildon town centre.
- 3.2.10 Palmer's College is operating at capacity with 1,700 students, however, a new 12 classroom block is under construction and due for completion ready for the new academic year in September 2005. This new block will accommodate approximately 240 students at any one time. The average capacity of sixth form colleges is 2,300 students and ultimately Palmer's



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aim to expand up to this level of students. This depends, however, on additional demand arising from population growth.







- 3.2.11 Thurrock and Basildon College has approximately 2,600 full time students, and is operating at close to maximum capacity. Defining capacity for the college is not simple. For example, last academic year the college had 10,000 students taking courses but this comprised full time, part time, evening, one day and 14-16 link courses. For the purposes of this study, the full-time post-16 students have been used to measure capacity.
- 3.2.12 Thurrock and Basildon College is in the process of developing a property strategy assessing options for the most effective and efficient use of its campuses in meeting future demands. This will involve demolition and rebuild of some buildings on both campuses, with others being refurbished (the background work for the property strategy revealed that, whilst the college makes efficient use of its teaching space, there is scope for more effective utilisation of its auxiliary space).
- 3.2.13 The capital works programme will provide higher quality and more flexible buildings which will effectively further increase teaching capacity. The initial phase of work is anticipated to begin in September 2005 and a caveat to add here, is that the scale of redevelopment that takes place is dependent on funding being available. If the full redevelopment proposed in the property strategy takes place, then the floorspace of the college is likely to decrease by approximately 7,000 sq.m. However, this new floorspace will be more flexible teaching space will enable a greater number of students to be accommodated.
- 3.2.14 The ability of the college to provide for future education needs is in part dependent on the type of education required. The college is expanding what is called work based learning; these are vocational courses, such as logistics and transport and event management, which are often part-time courses with students on day-release from an employer.
- 3.2.15 To summarise post-16 education, the two colleges are meeting current demand and are expanding capacity in order to be able to meet future increases. It has not been possible to quantify the level of additional students that can be accommodated, because the types of courses provided and the space that is required and also teaching times will change over time in response to employer needs.

3.3 Health

3.3.1 The assessment carried out indicates that the primary sector is operating above capacity and that the secondary level is at about operating capacity.



Primary care

- 3.3.2 There are 46 GP surgeries within Thurrock with a total of 62 GPs (Map 3.4). Many of the GPs operate as single practitioners. Two of the surgeries (Purfleet Care Centre and Dilip Sabnis Medical Centre) are PCT managed health centres with the GPs employed directly by the PCT. The spatial distribution of surgeries is uneven with two clusters in central Grays and central Tilbury. The lack of GPs in the West Thurrock and Purfleet area reflects its industrial character, but this is where a number of large housing sites are coming forward for development.
- 3.3.3 There is a proposal out to public consultation for the creation of a care trust for Thurrock. A care trust would bring the services provided by the primary care trust (PCT) and many of the adult and disabled persons services provided by Thurrock Council's Social Care Directorate under a single management structure. The new trust would bring about a more integrated management of services provided to the elderly, disabled adults, the long term sick and adults with learning disabilities. The benefits of integrating the service management structure are; duplication would be eliminated; services are delivered more efficiently; accountability will be within one organisation; and, members of the public will have a single organisation to contact. In the longer term, it is possible that service integration may free up building space but at this stage it is too early to determine impacts/benefits.
- 3.3.4 Thurrock PCT confirm that they have no spare capacity with existing GP surgeries. The average GP patient list for Thurrock is 2,500 compared to a national average of 1,800 and there are eight vacant GP posts. If the PCT is to reduce patient lists to the national average they require 20 additional practitioners to serve the existing population.
- 3.3.5 A further problem that the PCT is facing in relation to GPs is that 30 of the current GPs are eligible for retirement, a number of whom are already aged 65 or older.
- 3.3.6 There is not only a shortage of GPs but nurses (practice and district) and health visitors too. These shortages place limitations on the level of service that can be provided.
- 3.3.7 As well as a shortage of staff the physical limitations of existing surgeries will restrict the level of future services provision. Increasingly services that have traditionally been provided within hospitals are being moved out to the primary level. In Thurrock this will be difficult because many current premises are converted private dwellings and are not able to be adapted to provide additional services. In addition, many GPs are sole practitioners, meaning that the surgeries will be small and, therefore, probably unable to provide a wider range of services.





- 3.3.8 A 2003 survey of GP surgeries within the PCT area revealed that a majority of them are in a poor state of repair and do not meet the requirements of the 1995 Disability Discrimination Act. In order to do so, many would need to be replaced or extensively refurbished.
- 3.3.9 Recruitment and retention of GPs and nurses is a major problem for the PCT with South Essex generally being a difficult area for recruitment and retention. It is understood that a number of nurses who used to work for the PCT have left to work within London where additional funding has resulted in higher wages. To try and overcome the shortage of GPs the PCT has centrally contracted six GPs from Spain. Normally GPs do not work for a PCT, they are partners within a surgery and are free to establish a surgery wherever they wish. By centrally contracting these new GPs the PCT can direct resources to the areas most in need.

Dentists

3.3.10 Map 3.5 shows the distribution of dental surgeries across Thurrock. The PCT advise that many dentists are operating at capacity in the Borough, and that the number of vacant NHS-assisted patient places is extremely limited. Hansard (15 November 2004) reports that there are 45 dentists in Thurrock which equates to approximately 3,250 population per dentists. The national average is 2,800 indicating that there is an under supply of dentists in Thurrock of 7 i.e. there should ideally be 52 dentists.

Secondary care

- 3.3.11 Basildon and Thurrock Hospital Trust provides hospital care for the Borough (Map 3.6). The trust also serves the population of Basildon and provides services to residents within parts of Brentwood and Castle Point serving a total population of 310,000. The facilities include Basildon Hospital, which provides the full range of hospital services, and Orsett Day Hospital, which provides day surgery, out-patients and diagnostic services. Attached to Orsett Hospital, but run by the PCT, is a minor injuries unit. Basildon Hospital will assume a tertiary role with the development of the Essex heart centre, which is due to open in 2007. The Heart Centre will provide cardiothoracic services for Essex and part of eastern London.
- 3.3.12 It is not possible to quantify whether or not there is spare capacity within the secondary level health care sector. Basildon Hospital met its waiting list targets in the year to March 2004. Although almost 4,000 people were on the waiting list, there was no one having to wait for more than nine months (target set by central government) for admission.







- 3.3.13 The Trust has problems with recruitment and retention of staff, partly because there is an image problem with the area and senior positions are hard to fill. The high cost of housing in South Essex makes it difficult to recruit junior medical staff and ancillary staff, such as cleaners and kitchen workers.
- 3.3.14 The Trust has recently commissioned a thorough survey of the estate, including a comprehensive appraisal of the hospital's condition and suitability for purpose. The Trust is currently preparing a revised estates strategy, which will detail the maintenance, improvement and development of the site over the next 5-10 years, including a backlog maintenance programme. When the Trust was granted Foundation status in April 2004 one of its key objectives was to improve the patient environment and improve maintenance programmes, and a sum has been allocated in the capital programme for each of the next 5 years to carry out works specifically targeted at improving the patient environment.
- 3.3.15 The ability of the hospital to meet future demand is largely dependent on the PCT and its ability to provide more services at the local level. Given the current situation within the Thurrock PCT, with its large number of single practitioner GPs, small surgeries and buildings in poor condition, it would appear that there is only limited capacity for services to be relocated from Basildon Hospital to the primary level.
- 3.3.16 Basildon Hospital also serves parts of Castle Point and Brentwood districts, therefore, population growth in these locations will also impact on the services provided by the Trust.

Specialist mental health care and other

3.3.17 The Acorns Centre in Orsett provides services for the homeless, travellers and asylum seekers and is staffed by a nurse practitioner. In addition, the South Essex Partnership NHS Trust operates Thurrock Community Hospital (out-patients only), which provides specialist mental health care and services to the elderly. The catchment of the mental health facility is much larger than Thurrock, and includes all of South Essex.

3.4 Retail

Spending Distribution

3.4.1 This section gives an overview of current retail provision in Thurrock. Our analysis, which is based upon the results of the Thurrock Retail Study (2000) divides retail spend into two categories – comparison and convenience. Broadly, convenience goods relates to food and drink and



other everyday items, such as tobacco, newspapers and household cleaning products.

3.4.2 Comparison goods are in turn sub-divided into bulky and non-bulky goods categories. Tables 3.1 and 3.2 below show how the money spent on comparison goods by the residents of Thurrock was distributed between major centres, in and around Thurrock. The Borough's centres can be seen on Map 3.7.

TABLE 3.1 NON-BULKY COMPARISON GOOD SPEND: % OF TOTAL SPEND BY THURROCK RESIDENTS

Centre	% share of total spend by Thurrock residents
Lakeside	42%
Basildon	27%
Grays	10%
Romford	7%
Bluewater	2%
Total share of above centres	88%

TABLE 3.2 BULKY COMPARISON GOOD SPEND: % OF TOTAL SPEND BY THURROCK RESIDENTS

Centre	% share of total spend by Thurrock residents
Lakeside	51%
Basildon	26%
Romford	5%
Upminster	5%
Grays	3%
Total share of above centres	90%

- 3.4.3 The Lakeside Shopping centre and its associated retail parks receives, by some margin, the greatest share of the district's spend on both bulky and non-bulky comparison goods. Significant leakage from Thurrock is also revealed with 45% and 44% respectively of expenditure on bulky and non-bulky comparison goods being spent outside the Borough.
- 3.4.4 Within Thurrock, Grays is the major town centre, but only receives 10% of the non-bulky comparison goods spend, and 3% of the bulky goods spend. Apart from spending at Lakeside, there is very little inflow of expenditure into the Borough.





- 3.4.5 Convenience goods spending is more difficult to summarise, as in addition to the town centres, local shops and standalone superstores also command a significant market share. The Thurrock Retail Study notes that 'out-of-centre stores capture around 80% of convenience goods spending within the study area.' The main superstores within the Borough are the Tesco at Lakeside; the Asda at Thurrock Parkway, Tilbury; the Sainsbury's in Chafford Hundred (which was a Safeway at the time of the retail study); and the Morrison's in London Road, Grays, which opened after the retail study was published.
- 3.4.6 Outside of Thurrock, the Tesco Extra in Pitsea (8%) and the Tesco in Langdon Hills (7%) also hold a significant market share of the Borough's expenditure.
- 3.4.7 Corringham and Grays town centre capture 5% and 4% respectively of the Borough's convenience spending, the other five local centres share 8% between them.

Retail Offer – Grays

- 3.4.8 Grays town centre is classed as a district centre, and houses c.11,000 sq.m. of net retail floorspace. The proportion of comparison to convenience goods shopping at the time of the survey was close to the national average of 68%.
- 3.4.9 Grays was the dominant retail centre in the Borough until the opening of the Lakeside Shopping Centre in 1990. The Lakeside Centre has ten times more floorspace than Grays. Grays is still however the main administrative centre in Thurrock and the focus for service and cultural facilities.

Retail Offer - Local Centres

- 3.4.10 The net floorspace of the local centres and the proportion of this floorspace used for comparison and convenience goods shopping is shown in Table 3.3 below. Aveley is by some distance the smallest centre, and has the lowest proportion of comparison goods shopping. Socketts Heath (1,371 sq. m.), Tilbury (1,524 sq.m.), and Stanford-le-Hope (1,759 sq.m.) are of relatively similar size. Notably, Socketts Heath despite having the least net floorspace, has a greater proportion of floorspace given over to comparison goods (63.9%), than Tilbury (44.8%), and Stanford-le-Hope (56.5%).
- 3.4.11 Corringham (3,703 sq.m.) and South Ockendon (3,151 sq.m.) are by some margin the largest of the local centres. A greater proportion (43.9%) of floorspace in Corringham is used for comparison goods than in South Ockendon (39.3%).



Centre	Total Net Floorspace (Sq. M.)	Goods Type	Net Floorspace (Sq. M.)	Proportion (%)
Avolov	700	Comparison	67	9.6
Aveley		Convenience	633	90.4
Corringham	3,703	Comparison	1624	43.9
Connighan		Convenience	2079	56.1
Sockotte Hooth	1,371	Comparison	865	63.1
SUCKEUSTIEAUT		Convenience	506	36.9
South	2 151	Comparison	1237	39.3
Ockendon	3,131	Convenience 1914	60.7	
Stanford-le-	1 750	Comparison	994	56.5
Hope	1,759	Convenience	765	43.5
Tilbury	1,524	Comparison	682	44.8
		Convenience	842	55.2

TABLE 3.3 LOCAL CENTRES - FLOORSPACE

Health Check - Grays

- 3.4.12 In a survey that contributed to the retail study, 47% of respondents said that in Grays the quality and number of places to eat and drink was quite good or very good, with a further 31% describing them as average. However, nearly three-quarters of respondents described the entertainment and leisure facilities in the town centre as being poor or very poor. When compared with other centres, the most frequent criticism of Grays was a 'lack of choice of goods'.
- 3.4.13 Since the survey, the town's retail offer and position within the retail hierarchy has been strengthened with the opening of a large Morrison's store.

Health Check – Local centres

- 3.4.14 Qualitatively, the Thurrock Retail Study summarised that Aveley, Corringham and Socketts Heath were of 'average health', and that South Ockendon, Stanford-le-Hope and Tilbury were of 'below average health'.
- 3.4.15 These classifications were given as a summary of the centres' performances across a range of criteria, including vacancy rates, crime levels, turnover and profit trends, and retailers expectations of future market conditions.
- 3.4.16 The retail study comments that Corringham and Socketts Heath are expected to continue to perform well in the future. However in Aveley, even though the shops are currently performing well, other factors, such as its proximity to Lakeside, indicate that the health of this centre may be more fragile and that 'action is required to maintain its current performance'.



Infrastructure Deficit Study 2004 - 2021

3.4.17 The study also concludes that the health of South Ockendon, Stanford-le-Hope and Tilbury is 'below what we would expect of a centre exhibiting adequate signs of vitality and viability, and these centres are clearly in need of investment.'

3.5 Community facilities

Community Halls

- 3.5.1 There are 31 community halls within the Borough (Map 3.8). The majority are owned and maintained by Thurrock Council but managed by voluntary committees from the local community. There will also be a number of other facilities, such as, church halls which will also provide community facilities/services to varying degrees, but we have not been able to collect information on these.
- 3.5.2 The buildings which are owned by Thurrock Council are generally in good condition, although further surveys are to be undertaken to confirm the situation. One exception is Corringham Village Hall where the management committee are considering closing the hall on the basis that the building is not safe for public use. This is due to a failure to carry out maintenance work.
- 3.5.3 It is not possible to quantify whether or not any of the community halls have spare capacity. This would involve being able to collect data on a number of users for each and every activity, and determining the maximum number of participants that each activity can accommodate. Community halls fulfil an important but not exclusive function, by which we mean that many of the activities traditionally held in community halls can be held elsewhere, for example, in schools or churches
- 3.5.4 During the course of this study Colin Buchanan conducted a telephone survey of the people responsible for bookings at a number of the community halls. We concluded that a majority are operating at capacity. For almost all the halls surveyed there are evening activities every weekday evening, with all halls having afternoon activities several days a week. A few of the halls provide morning nursery facilities for young children. At weekends all of the halls are used for private hire functions such as birthday parties and wedding receptions.





Libraries

- 3.5.5 There are ten libraries within the Borough (Map 3.9) and Thurrock's Cultural and Leisure Services Department report that all are in reasonable condition. Planned service extensions are to a) provide a service in West Thurrock either via a mobile facility or a new-build static collection; b) to possibly develop a presence in the Barral Store in Purfleet, again either via a mobile service or a small static collection; c) provide a new static collection in Orsett to replace the one previously housed in Orsett Hospital; and d) possibly develop a new library in Aveley within a shared facility.
- 3.5.6 The libraries are increasingly being used for wider community events such as meeting space for the community forums, councillors' surgeries and various advisory services as well as being places where community events can be advertised.
- 3.5.7 There are limitations on expanding library service provision due to the size of some library buildings and to staffing constraints. Funding is also an issue, and the Libraries and Cultural Services position statement 2004 states that capital and revenue savings being sought by the Council are likely to make future maintenance and refurbishment of libraries a low priority. A survey of library stock found there to be poor availability of stock and an action plan has been devised to improve buying practices to reflect users borrowing and request data.
- 3.5.8 The number of library visits has increased significantly in recent years but it is below the level set out in the Public Library Standards¹ and indicates a relatively low level of library usage. Thurrock Libraries also fail to meet the Public Library Standards for opening hours outside the period 09:00 to 17:00. This statistic is misleading in that the opening hours of libraries have been tailored to suit the stated preferences of users when surveyed in April 2003. An extension of opening hours would depend on staffing and demand.

¹ Public Library Standards have been established by the Department of Culture Media and Sport and all LAs were expected to have achieved compliance by March 2004.




Estimate of shortfall/demand (libraries and community halls)

3.5.9 By comparing facilities (notably community halls and libraries) by urban area with population and then with ratios of provision, we can estimate shortfalls in existing provision. Results are provided below:

Urban area	Population	Existing facilities		Optimum level of facilities*		Under/Oversupply	
orbanaroa	(estimate)	Community Hall	Libraries	Community Hall	Libraries	Community Hall	Libraries
Aveley	7,409	2	1	2	1	0	0
Chadwell St Mary	9,890	2	1	3	1	-1	0
Corringham	14,254	3	1	4	1	-1	0
East Tilbury	4,231	2	1	1	0	1	1
Grays North	10,075	2	1	3	1	-1	0
Grays South	26,102	4	1	7	2	-3	-1
Ockendon	18,792	4	1	5	2	-1	-1
Orsett	2,083	1	0	1	0	0	0
Purfleet	5,021	1	0	1	0	0	0
Stanford-Le- Hope	12,384	2	1	3	1	-1	0
Tilbury	11,014	1	1	3	1	-2	0
West Horndon	1,457	0	0	0	0	0	0
West Thurrock / Chafford Hundred	16,510	4	1	5	1	-1	0
TOTAL	139,222	28	10	38	11	-11**	-2**

TABLE 3.4: EXISTING FACILITIES COMPARED WITH POPULATION

* Based on 1,500 dwellings per community hall (source: The cost and funding of growth in south east England)and 12,000 population per library (Source: consultant's estimates based on Roger Tym and Partners figures)

** The summation of facilities per urban block ignores positive figures as a surplus in one area is assumed to not ease a deficit in provision elsewhere.

3.5.10The above table show that the level of facilities per population varies significantly with some urban areas being much better off than others. The total requirement to meet shortfall is that required to overcome deficits based on ratios of provision only. The analysis does not take into consideration the quality and or size of existing facilities, i.e. shortfall and hence requirement is based on the assumption that facilities are of a set size and provide the same levels of service. Hence, these figures should be handled with caution.





Social care services/facilities

- 3.5.11 There are six dedicated facilities for people with learning disabilities (Map 3.10), five are day centres and one is a short break centre. There is some placement of people with learning disabilities in residential care (0.6 persons per 1,000 population), but increasingly they are housed in ordinary dwellings with people needing residential care being placed outside the borough.
- 3.5.12 There are 32 residential homes for the elderly within Thurrock and five day care centres (Map 3.10). The Council also provides home care services for the elderly.
- 3.5.13 A small number of disabled people are cared for by the Council in residential homes (0.3 per 1 000 people aged 18-64), many of these are in specialised placements outside the borough.
- 3.5.14 These services are proposed to be incorporated in to the Thurrock Care Trust (see above).
- 3.5.15 It has not been possible to quantify a current surplus or deficit capacity for social services/facilities from speaking to service providers. Information from service providers and the Thames Gateway South East RSS Technical Report relates only to the growth in provision required to accommodate future population growth.

3.6 Utilities

3.6.1 Utilities in the borough are provided by a number of companies.

Energy services

Gas supply

- 3.6.2 Mains gas is supplied by Transco with a variety of supply companies responsible for delivering gas to the end user. Transco have carried out a review of their mains supply network within the Thames Gateway and there is sufficient capacity to meet the increase in demand (up to draft RSS14 levels) without wide scale upgrading of the network. However, they acknowledge that there may be a need for local level upgrades (to reinforce mains) but they have yet to carry out a detailed analysis.
- 3.6.3 Transco have not provided a quantification of the level of spare capacity because they consider this information to be commercially sensitive. The



supply of gas is a commercial activity and Transco advise that they will respond to market demand to ensure there is sufficient supply.

Electricity supply

- 3.6.4 The National Grid delivers electricity to the borough but end users are able to choose their actual supplier. Supply into the National Grid is from a number of generating companies. EDF operate Tilbury power station and supply to the National Grid. Generation at Tilbury is determined by the requirements of the National Grid not Thurrock.
- 3.6.5 The National Grid operates the 400kV and 275 kV high voltage distribution network across the UK. The generating companies supply power into the system and the distributors feed it to individual consumers. The National Grid is responsible for ensuring that demand and generation balance. The high voltage distribution network has sufficient capacity for growth and will not require upgrading. Generation and distribution are the responsibility of the commercial generation and distribution companies
- 3.6.6 Decisions about creating new generating capacity are based on national level demand and the situation within Thurrock has to be viewed in this context. OFGEM, the Government's energy regulator, has revealed that across the UK there is 3.6GW of generation capacity in mothballed plants. The summer months always result in some plants being temporarily taken out of use and of this 3.6GW 1.2GW can be brought back into use over the winter period. The remaining 2.4GW will require substantial investment in the mothballed plant. OFGEM estimates that 0.8GW could be brought back into commission within about six months if required and that it is likely these facilities will be re-commissioned at some stage. The remaining 1.6GW will require anything up to two years to become fully functional and require considerable financial investment. In addition to the recommissioning of mothballed plant there is planning permission for plant with more than 9GW generating capacity across the UK.
- 3.6.7 Generating capacity is unlikely to be a constraint to growth. The level of growth at Thurrock is only a small percentage of overall demand growth across the UK and the Joint Energy Security of Supply (JESS) study produced by OFGEM and the DTI shows that there is sufficient new generating capacity coming on stream in the next few years to meet projected demand. Investment in additional generating capacity is driven by projected market demand, that is, if the generating companies consider that there will be sufficient demand to justify investment in increasing capacity then they will do so.
- 3.6.8 The primary area of investment required by the electricity industry within Thurrock will be in expanding the local distribution network. Discussions with EDF, the local infrastructure provider, reveal that the level of development proposed for Thurrock will not be constrained by the local



distribution network. EDF currently connect up approximately 100,000 dwellings a year and the additional level of development in Thurrock represents a limited increase in annual connections. EDF have also confirmed that they are aware of the Government's plans for development in the Thames Gateway and have taken this into account in planning for service provision

Water supply

- 3.6.9 Potable water to the borough is supplied by Essex and Suffolk Water. There are two water mains which serve Thurrock with water being transported from outside the borough.
- 3.6.10 Essex and Suffolk Water (ESW) have confirmed that the whole of Essex is marginally in water supply deficit for the existing population. However, plans have been devised, which they consider will meet population growth in Essex to 2026. The largest increase in supply will be at the existing reservoir at Abberton to the south of Colchester. In calculating drinking water requirements to 2026, ESW have used growth figures from the Essex Structure Plan and an additional 40,000 for the Thames Gateway area. This equals a total of 112,250 dwellings. ESW advise that higher levels of growth will be handled through their five year plans, which have to be agreed with OFWAT.
- 3.6.11 It should be noted at this point that there have been a number of large industrial uses in the ESW area that have closed down in recent years and which has freed up supply capacity, which can be taken up by domestic uses. Draft RSS proposed levels of growth will require enlargement of one of the mains to the borough. If higher growth was contemplated then both mains into Thurrock would need to be enlarged. It will also be necessary to install local reticulation but this will not be a constraint to development.
- 3.6.12 In the short to medium-term, water supply will not be a restraint to development, so long as permission is granted for the additional capacity at Abberton. However, water supply is an issue which transcends growth within Thurrock and is related to wider growth in the East of England region. Continued liaison between the planning sector and water supply industry will be required in order to ensure that development and supply remain in balance.

Waste water

- 3.6.13 Waste water and sewage is the responsibility of Anglian Water who operate a Sewage Treatment Works (STW) at Tilbury.
- 3.6.14 Information supplied by Anglian Water demonstrates that the existing network has sufficient additional capacity for approximately 4,000 dwellings. A caveat here is that the disposal network in the west of the



borough is almost at capacity and development in the Purfleet and West Thurrock area will require an upgrading of the network to increase capacity.

3.7 Concluding remarks

Location

- 3.7.1 Existing social infrastructure facilities are concentrated within the urban areas of Grays to South Ockendon, and Stanford-Le-Hope to Corringham.
- 3.7.2 The exceptions to this rule are secondary health care and retail provision. The principal hospital for the Borough is located in neighbouring Basildon and there is only a day hospital in Thurrock, whose location in Orsett is a short distance away from both of the two main urban areas. The retail sector is dominated by Lakeside which is an out-of-town centre with a majority of shoppers travelling by car. Smaller retail centres are distributed around the Borough, but there is no retail centre in Purfleet.

Capacity

3.7.3 It can be misleading quantifying under and over supply of facilities, because of variations in demand and in the nature of service provision. Nevertheless, it is possible to place a figure on overall levels of under/over supply. Under/over supply is only possible to estimate for certain facilities, and our analysis shows an existing under/oversupply as follows:

Facility	Under/Over Supply
General Practitioners	-20
Schools (2004)	
Primary	+1676
Secondary	-372*
Libraries	-2
Community Centres	-11
Dentists	-7

TABLE 3.5: OVERALL UNDER/OVER SUPPLY

Negative figures are under supply

Oversupply is the sum of oversubscribed and undersubscribed schools

3.7.4 Using standard cost ratios (which are explained in full in chapter 6), in order to overcome the above identified deficit the following scale of investment is required:



Facility	Under/Over Supply	Cost*	Cost
General Practitioners	-20	£2.5m per 4 GP health centre	£12,500,000
Schools (2004)			
Primary	0	£9,491 per pupil	£0
Secondary	-372	£14,904 per pupil	£5,544,288
Libraries	-2	£230,402 per library	£460,804
Community Centres	-11	£1.3m per community hall	£14,300,000
Dentists	-7	Assume same cost as GP	£4,375,000
		Total	£37,180,092

TABLE 3.6: COST OF OVERCOMING INFRASTRUCTURE DEFICIT (COMMUNITY AND SOCIAL)

* Source of cost ratios are provided at Appendix 2

- 3.7.5 The above analysis indicates that there are deficits in existing infrastructure and that these will need to be enhanced in order to meet the needs of current population. The estimated cost of doing this is £37m.
- 3.7.6 No allowance been made for open space, parks, learning disabilities, care for the elderly, children's services and mental health services.
- 3.7.7 This study has not assessed whether the current population would benefit from an increased service provision, or whether it is suffering as a consequence of deficits in current service provision. Nor has it undertaken an assessment of exact community needs, or examined indicators to ascertain whether communities are suffering from deprivation, have poor educational attainment or other such indicators and so the assessment of deficit identified must be read with caution.
- 3.7.8 Nevertheless, the figures do provide a strong basis for supporting the hypothesis that any additional population growth must be supported by comprehensive infrastructure provision that meets the needs of that new population.
- 3.7.9 In general, the lack of capacity will not prevent growth from occurring but substantial levels of investment will be required, and the rate at which development can take place will be affected by the ability of service and facility providers to source the necessary funding, provide the physical elements such as buildings, and recruit sufficient new staff.
- 3.7.10 Retail provision within the Borough is the one facility that would probably benefit from population growth. Increased spending within the Borough would increase the demand for the retail offer of centres that, according to the Retail Study (2000), are underperforming, often due to the nearby



presence of the Lakeside Shopping Centre. Grays and Aveley are notable examples of this.

- 3.7.11 Population-led increases in demand for the services and retail offer of the borough's retail centres could to lead to improvements in the quantity and quality of shops available at a centre, which in turn could lead to investment in physical environmental improvements. A combination of an improved retail offer and an improved environment in which to shop, may then lead to further increases in the usage of a centre. Proposed growth is therefore in this context an important opportunity.
- 3.7.12 The ability of a number of the infrastructure elements to accommodate future growth is not simply a result of growth within Thurrock. Basildon Hospital has a catchment area beyond the borough and is taking on a tertiary role for South Essex and parts of East London through its new cardiothoracic unit. The ability of Basildon Hospital to provide services to a growing population will be conditioned by the primary sector and whether or not services currently provided at the hospital can be provided at the primary level. From the analysis above it is apparent that the primary sector in Thurrock will not be able to take-on greater service provision because of the lack of suitable premises and difficulties with staff recruitment. Therefore, although not quantifiable, it is justifiable to assume that the current level of secondary health care will act as a brake on development levels if an acceptable standard of service is to be maintained.
- 3.7.13 Potable water supply may in the longer-term be a constraint, but Thurrock is only one component of the additional demand that will be placed on supplies. Potable water for domestic use needs to be given greater consideration in the context of overall growth within the East of England. Storage increases are planned but the financial and technical practicability of supplying additional rates of population growth has not been assessed. Once additional capacity levels have been identified, the timeframe involved in implementing new supply infrastructure could potentially delay the rate at which development can occur.
- 3.7.14 It is clear that there is limited capacity within the existing infrastructure for population growth in Thurrock to occur. Growth can only take place with substantial investment in all facilities and services, yet there is no indication that infrastructure constraints will cap the level of development, apart from possibly in the case of household water supply if investment is made. They will, however, affect the phasing of development as new facilities will have to be provided in conjunction with population growth in order to ensure the maintenance of an acceptable quality of service provision, and by extension quality of life.



4. Housing Growth Distributions

4.1 Introduction

- 4.1.1 This chapter explains land supply and sets out the amount of dwellings for which land will need to be allocated in order to meet the proposed growth scenarios, which are as follows:
 - Committed development within the draft UDP for the period from 2001 to 2016 with a projected population growth of 6,968; and
 - The draft RSS 14 level of 18,500 dwellings (2001 to 2021) with a projected population growth of 23,600.
- 4.1.2 Thurrock Council has provided broad locations for distribution of growth and but for the purposes of infrastructure testing more precise locations needed to be identified. This chapter explains how those have been chosen.

4.2 Supply

Allocations

- 4.2.1 The current UDP makes provision for additional dwellings growth in the period 1998 to 2016, as compared to the time period used in this study of 2001 to 2021. The amount of planned growth needs to be understood as this represents a proportion of the RSS14 growth requirements, but is already planned. RSS14 will mean that additional growth needs to occur, but that will build on the strategy and spatial distribution already planned to occur in the period to 2016 within the current UDP. This study has not concerned itself with the UDP growth prior to 1998 and the start of the RSS planning period.
- 4.2.2 Our assessment of current infrastructure capacity was undertaken in 2004 and hence we need, when considering impact of UDP growth, to only consider growth that is planned to occur in the period post 2004. We have however, for reasons of comparing the post-2001 UDP scenario with the RSS Scenario, offered a forecasted population growth in the UDP scenario from 2001 to 2016.



4.2.3 Information from Thurrock Council (Table 4.1) showed that in April 2004, there were 5,649 commitments for residential developments, and that in the UDP Scenario, this would result in a population growth of 1,891 between 2004 and 2016.

TABLE 4.1	-	RESIDENTIAL	DEVELOPMENT	COMMITMENTS	APRIL	2004,	AND
POPULATIC)N II	NCREASE 2004	TO 2016				

Urban Area	UDP Allocations April 2004	Additional Population in 2004 to 2016 Housing Stock	Decrease in Population of Pre-2004 Dwellings	Total Population Change April 2004 to March 2016
Aveley	37	80	-526	-445
Chadwell St Mary	63	136	-701	-565
Corringham	68	147	-1,014	-867
East Tilbury	74	160	-302	-142
Grays North	33	71	-714	-642
Grays South	1,032	2,235	-1,859	376
Ockendon	65	141	-1,334	-1,193
Orsett	112	243	-148	94
Purfleet	1,811	3,922	-356	3,566
Stanford-Le-Hope	80	173	-875	-701
Tilbury	290	628	-784	-156
West Horndon	0	0	-1	-1
West Thurrock / Chafford Hundred	1,984	4,297	-1,242	3,055
Area outside the Urban Blocks	0	0	-487	-487
TOTAL	5,649	12,235	-10,344	1,891

UDP Population Growth 2001 to 2016

- 4.2.4 The UDP population growth estimate of 6,968 above in paragraph 4.1.1 comprised the forecasted 2004 to 2016 population growth of 1,891, as shown in Table 4.1 above, added to an assumed population growth of 5,077 for the period 2001 to 2004.
- 4.2.5 The forecasted 1,891 population growth between April 2004 and March 2016 was derived by assuming, in line with Anglia Polytechnic's forecasts, that an average of 2.21 persons per household would live in the 5,649 homes being built in Thurrock between 2004 and 2016, and that 2% of these homes would be vacant. This gave a population in the new households of 12,235. In the same time period, a population loss of 10,344 is expected to occur in homes built up to March 2004. This is because the number of persons living in each of these households is expected to fall from 2.38 in 2004 to 2.21 in 2016. When 10,344 is subtracted from 12,235 a total of 1,891 is arrived at. The 2004 2.38 persons per household figure



was derived from Anglia Polytechnic's 2001 and 2006 persons per household figures assuming a straight line trend.

- 4.2.6 The 5,077 represents the number of persons in 2016 living in the homes built between April 2001 and March 2004. The 2016 persons per household figure was used, as 2016 is the year for which we are forecasting the population for, and the number of people living in these dwellings in 2016 is likely to be slightly lower than in 2004 due to a fall in numbers of person living in each household. 5,077 represents 98% of a 5,180 figure that was derived from multiplying the number of completions between 2001 and 2004 (2,344) by 2.21, the forecasted average number of persons per household in 2016. The 2% difference between 5,077 and 5,180 is an allowance for vacant properties, again taken from the forecasting of Anglia Polytechnic.
- 4.2.7 However, as explained in paragraph 4.2.2, the main concern of this report is population growth from 2004, and its effects on demand for infrastructure. In the UDP Scenario, the figure for population growth between 2004 and 2016 (1,891) is therefore key. The 6,968 population growth from 2001 to 2016 figure is offered only as an aid for comparing the UDP scenario against the RSS scenarios for whose planning period is 2001 to 2021. Our focus on these RSS scenarios will however be the change in population and its impact on infrastructure between this study's base year of 2004 and the RSS horizon year of 2021.

Completions

4.2.8 Thurrock Council provided the study team with five urban area and Green Belt distribution options (Table 4.2), as follows:

Growth Scenario	Option Number	Total Additional Dwellings	Urban Area (000 dwellings)	Total Green Belt Dwellings	Green Belt Location
Droft BSS 14	0.22	19 500	Not specified, but most of	Not specified, but a small	North or East of
Draft RSS 14 One		16,500	the development	proportion of the total	Grays
Draft RSS 14	Two	18,500	15,500	3,000	Ockendon
Draft RSS 14	Three	18,500	15,500	3,000	East Tilbury
Draft RSS 14	Four	18,500	12,500	6,000	3,000 East Tilbury 3,000 Ockendon
Draft RSS 14	Four (a)	18,500	15,500	3,000	2,000 Corringham 1,000 Stanford-le- Hope

TABLE 4.2: URBAN AREA / GREEN BELT DISTRIBUTION OPTIONS (2001 - 2021)

4.2.9 Information from Thurrock Council shows that 2,344 dwellings were completed in the period April 2001 to April 2004. Therefore, between 2004 and 2021 to meet the total set out in draft RSS14, 16,156 dwellings need to be developed. As the 2,344 homes had been developed in urban areas, in every option they were subtracted from the total that are planned to be



developed in the urban areas between 2004 and 2021; the Green Belt release allocations remained unchanged.

4.2.10 The scenarios from Table 4.2, after being adjusted to incorporate the residential completions from 2001 to 2004, are set out in Table 4.3 below and in Figures 4.1 to 4.4a.

TABLE 4.3: URBAN AREA / GREEN BELT DISTRIBUTION OPTIONS – AFTER THEINCORPORATION OF 2001-2004 COMPLETIONS

Growth Scenario	Option Number	Total Additional	Urban Area (000	Total Green Belt Dwellings	Green Belt Location
		Dwellings	dwellings)		
			Not specified,	Not specified, but a	
draft RSS 14	One	16,156	but most of the	small proportion of	North or East of Grays
			development	the total	
draft RSS14	Two	16,156	13,156	3,000	Ockendon
draft RSS14	Three	16,156	13,156	3,000	East Tilbury
droft DSS14	Four	16 156	10 156	6.000	3,000 East Tilbury
	Four	10,150	10,150	6,000	3,000 Ockendon
droft DSS14	Four (a)	16 156	12 156	2 000	2,000 Corringham
	Four (a)	10,150	13,150	3,000	1,000 Stanford-le-Hope

Urban Capacity

4.2.11 Table 4.4 below shows results from the urban capacity study which have been disaggregated to urban areas.

|--|

Urban Area	Potential No. of dwellings
Aveley	234
Chadwell St Mary	430
Corringham	73
East Tilbury	263
Grays North	248
Grays South	3,825
Ockendon	1,539
Orsett	102
Purfleet	2,711
Stanford-Le-Hope	303
Tilbury	616
West Horndon	0
West Thurrock / Chafford Hundred	5,650
TOTAL	15,991

4.2.12 For Option 1, the total number of new dwellings to be built between 2004 and 2021 was 16,156. The number to be developed in Green Belt-release areas was not specified, but was described as 'small' by Thurrock Council.













Therefore, 15,991 dwellings were allocated to the urban areas and 165 to Green Belt release in North Grays. The 15,991 homes were allocated to the Urban Areas in accordance to the aggregated distribution of capacity identified in the UCS, as shown in Table 4.4.

- 4.2.13 In all remaining Options (2, 3, 4, 4a) the total allocation of housing for the urban areas in Thurrock is less than the capacity found in the same areas in the UCS. The UCS figures showing the total capacity in each urban area were reduced down by equal proportions to form new housing allocation totals, which when summed, equalled the total allocation for non-greenfield land in each of the Options in Table 4.3.
- 4.2.14 The housing and population distribution for each option is shown in the tables below. For each scenario option, an 'Additional Population in April 2004 to March 2021 Housing Stock' column has been included, which was calculated by multiplying the number of dwellings in each urban block by 2.16, Anglia Polytechnic's forecasted persons per household in 2021. We also reduced the population by 2% to account for vacant dwellings i.e. to convert from dwelling numbers to household numbers.
- 4.2.15 Our calculations to find the decrease in people living in the pre-April 2004 housing stock primarily centred around Anglia Polytechnic's forecasts for a fall in the number of persons per household from 2.43 in 2001 to 2.16 in 2021. Again, we used a figure of 2.38 for 2004, which was derived using a straight-line trend between Anglia's 2001 and 2006 figures.
- 4.2.16 To find the number of dwellings in April 2004 in each urban block we used Codepoint, an Ordnance Survey product that offers the number of domestic delivery points in each postcode. The edition used was May 2004, which was highly relevant to our base-date of April 2004. Using MapInfo GIS, we summed the number of delivery points within each urban block. This gave us an accurate picture of the number and distribution of dwellings across Thurrock. We found there to be 60,778 dwellings in the Borough.
- 4.2.17 The Anglia model used 2001 Census data to assume that there were 58,547 households in the Borough in 2001. Between 2001 and 2004, there were 2344 completions in the Borough, which equates to 2,297 households using a 2% vacancy rate. These two figures totalled gives 60,844 households in the Borough in 2004 only a difference of 64 from the number of dwellings found using Codepoint. We then increased the distribution created using Codepoint to match that of the calculated number of households in April 2004. This was done using a pro-rata method.
- 4.2.18 The population in 2004 of each urban block was calculated using 2.38 persons per household. The population for 2021 of this pre-April 2004 housing stock was calculated using 2.16 persons per household. By subtracting the 2021 figure from its 2004 equivalent, the decrease in population likely to occur in the pre-April 2004 housing stock for each



option was found. When this figure was added to that for the 'Additional Population in April 2004 to March 2021 Housing Stock', a 'Total Population Change April 2004 to March 2021' figure was produced.

- 4.2.19 The options shown in Tables 4.5 to 4.9 include a figure for the population decrease in rural areas i.e. those outside the urban blocks where significant numbers of dwellings have not been allocated to be built. The population here is therefore forecasted to fall due to the decline in persons per household between 2004 and 2021. However, this study has not assessed the future demand on Thurrock infrastructure from rural areas. For the purpose of this study, we have assumed that demand from outside the urban blocks remains constant as it is very difficult to model; for instance, it would be difficult to understand which centre people used for services.
- 4.2.20 To compare the RSS scenario 2004 to 2021 population growth set out in Tables 4.5 to 4.9 against the forecasts of Anglia Polytechnic, we needed to remove the 2001 to 2004 population growth from Anglia's 2001 to 2021 forecast. Anglia's 2001 base population was 143,000 and their 2006 population forecast was 148,817. Using a straight line trend, we assumed that the 2004 population was 146,490, and therefore that population growth between 2001 and 2004 was 3,490. When the figure of 3,490 is subtracted from Anglia's 2001 to 2021 forecast it totals 20,110 the population growth for 2004 to 2021. Our study assumes a population growth of 20,813 for the same period of 2004 to 2021 3.5% above the 20,110 figure. This 3.5% difference is relatively small given the long-term nature of the forecasts, and the difficulties of matching one method against another.



RSS14 - Option 1								
	Urban Dwellings (2004 - 2021)	Greenfield Dwellings (2004 - 2021)	Total Dwellings (2004 to 2021)	Additional Population from April 2004 to March 2021 New Housing Stock	Decrease in Population in pre-April 2004 Housing Stock	Total Population Change April 2004 to March 2021		
Aveley	234	0	234	495	-680	-185		
Chadwell St Mary	430	0	430	910	-908	3		
Corringham	73	0	73	155	-1,312	-1,158		
East Tilbury	263	0	263	557	-391	165		
Grays North	248	165	413	874	-924	-49		
Grays South	3,825	0	3,825	8,097	-2,406	5,690		
Ockendon	1,539	0	1,539	3,258	-1,726	1,532		
Orsett	102	0	102	216	-192	24		
Purfleet	2,711	0	2,711	5,739	-461	5,278		
Stanford-Le- Hope	303	0	303	641	-1,132	-490		
Tilbury	616	0	616	1,304	-1,015	289		
West Horndon	0	0	0	0	-2	-2		
West Thurrock / Chafford Hundred	5,650	0	5,650	11,960	-1,608	10,352		
Areas outside the Urban Blocks Total	0	0	0	0 34.199	-630 -13.386	-630 20,813		

TABLE 4.5: HOUSING DISTRIBUTIONS - DRAFT RSS14 SCENARIOS - OPTION 1



RSS14 - Option 2							
	Urban Dwellings (2004 - 2021)	Greenfield Dwellings (2004 - 2021)	Total Dwellings (2004 to 2021)	Additional Population from April 2004 to March 2021 New Housing Stock	Decrease in Population in pre-April 2004 Housing Stock	Total Population Change April 2004 to March 2021	
Aveley	192	0	192	406	-680	-274	
Chadwell St Mary	354	0	354	749	-908	-158	
East Tilbury	216	0	216	457	-391	66	
Grays North	204	0	204	432	-924	-492	
Grays South	3,147	0	3,147	6,662	-2,406	4,255	
Ockendon	1,266	3,000	4,266	9,030	-1,726	7,304	
Orsell	04	0	04	170	-192	-14	
Stanford-Le-Hope	2,230	0	2,230	527	-461	-605	
Tilbury	507	0	507	1,073	-1,015	58	
West Horndon	0	0	0	0	-2	-2	
West Thurrock / Chafford Hundred	4,648	0	4,648	9,839	-1,608	8,231	
Areas outside the Urban Blocks	0	0	0	0	-630	-630	
Iotal	13,150	3,000	10,150	34,199	-13,380	20,813	

TABLE 4.6: HOUSING DISTRIBUTIONS – DRAFT RSS14 SCENARIOS – OPTION 2



RSS14 - Option 3							
	Urban Dwellings (2004 - 2021)	Greenfield Dwellings (2004 - 2021)	Total Dwellings (2004 to 2021)	Additional Population from April 2004 to March 2021 New Housing Stock	Decrease in Population in pre-April 2004 Housing Stock	Total Population Change April 2004 to March 2021	
Aveley	192	0	192	406	-680	-274	
Chadwell St Mary	354	0	354	749	-908	-158	
Corringham	60	0	60	127	-1,312	-1,185	
East Tilbury	216	3,000	3,216	6,808	-391	6,416	
Grays North	204	0	204	432	-924	-492	
Grays South	3,147	0	3,147	6,662	-2,406	4,255	
Ockendon	1,266	0	1,266	2,680	-1,726	954	
Orsett	84	0	84	178	-192	-14	
Purfleet	2,230	0	2,230	4,720	-461	4,260	
Stanford-Le- Hope	249	0	249	527	-1,132	-605	
Tilbury	507	0	507	1,073	-1,015	58	
West Horndon	0	0	0	0	-2	-2	
West Thurrock / Chafford Hundred	4,648	0	4,648	9,839	-1,608	8,231	
Areas outside the Urban Blocks	0	0	0	0	-630	-630	
Total	13,156	3,000	16,156	34,199	-13,386	20,813	

TABLE 4.7: HOUSING DISTRIBUTIONS - DRAFT RSS14 - OPTION 3



RSS14 - Option 4									
	Urban Dwellings (2004 - 2021)	Greenfield Dwellings (2004 - 2021)	Total Dwellings (2004 to 2021)	Additional Population from April 2004 to March 2021 New Housing Stock	Decrease in Population in pre-April 2004 Housing Stock	Total Population Change April 2004 to March 2021			
Aveley	148	0	148	313	-680	-367			
Chadwell St Mary	273	0	273	578	-908	-330			
Corringham	46	0	46	97	-1,312	-1,215			
East Tilbury	167	3,000	3,167	6,704	-391	6,313			
Grays North	157	0	157	332	-924	-591			
Grays South	2,429	0	2,429	5,142	-2,406	2,735			
Ockendon	977	3,000	3,977	8,419	-1,726	6,693			
Orsett	65	0	65	138	-192	-54			
Purfleet	1,722	0	1,722	3,645	-461	3,185			
Stanford-Le- Hope	192	0	192	406	-1,132	-725			
Tilbury	391	0	391	828	-1,015	-187			
West Horndon	0	0	0	0	-2	-2			
West Thurrock / Chafford Hundred	3,588	0	3,588	7,595	-1,608	5,987			
Areas outside the Urban Blocks	0	0	0	0	-630	-630			
Total	10,156	6,000	16,156	34,199	-13,386	20,813			

TABLE 4.8: HOUSING DISTRIBUTIONS - DRAFT RSS14 - OPTION 4



RSS14 - Option 4a									
	Urban Dwellings (2004 - 2021)	Greenfield Dwellings (2004 - 2021)	Total Dwellings (2004 to 2021)	Additional Population from April 2004 to March 2021 New Housing Stock	Decrease in Population in pre-April 2004 Housing Stock	Total Population Change April 2004 to March 2021			
Aveley	192	0	192	406	-680	-274			
Chadwell St Mary	354	0	354	749	-908	-158			
Corringham	60	2,000	1,060	2,244	-1,312	932			
East Tilbury	216	0	216	457	-391	66			
Grays North	204	0	204	432	-924	-492			
Grays South	3,147	0	3,147	6,662	-2,406	4,255			
Ockendon	1,266	0	1,266	2,680	-1,726	954			
Orsett	84	0	84	178	-192	-14			
Purfleet	2,230	0	2,230	4,720	-461	4,260			
Stanford-Le- Hope	249	1,000	2,249	4,761	-1,132	3,629			
Tilbury	507	0	507	1,073	-1,015	58			
West Horndon	0	0	0	0	-2	-2			
West Thurrock / Chafford Hundred	4,648	0	4,648	9,839	-1,608	8,231			
Areas outside the Urban Blocks	0	0	0	0	-630	-630			
Total	13,156	3,000	16,156	34,199	-13,386	20,813			

TABLE 4.9: HOUSING DISTRIBUTIONS - DRAFT RSS14 - OPTION 4A



4.3 Locations for growth

- 4.3.1 The previous chapter describes baseline social and community infrastructure. This data was input into a spreadsheet and linked to GIS to create a model that calculates accessibility to a range of facilities taking into consideration relative capacity to accommodate growth and demands placed on it by population given relevant walk distances (see Appendix 1).
- 4.3.2 Data was assessed at the 'output area' level, which is a sub-ward geographical unit of information used by ONS that represents a very fine grain upon which to undertake analysis. It is therefore possible to advise with some precision on the most suitable areas for residential development, both in urban and green belt locations.
- 4.3.3 Each output area in the Borough received a score according to the number and type of facilities within whose catchment area it lay. Weighting was given to facilities that held spare capacity, as these would most easily be able to accommodate residents living in new housing development, i.e. new communities would benefit from existing facilities and could support them or could utilise any spare capacity.
- 4.3.4 Hence, the model identified locations which appear to benefit from substantial amounts of facilities which have capacity and are not serving substantial amounts of population, relative to the remainder of the borough. Using outputs from the model, specific locations for new dwellings growth were selected.
- 4.3.5 The detailed methodology and outputs from this analysis are attached as Appendix 1 and will form a useful tool to preparation of the development plan to select sites for residential development.

4.4 Summary

- 4.4.1 Chapter 4 set out the distribution of housing in each urban block for each option that is being tested. The distribution of housing that is projected to be built on previously developed land is based upon aggregating Urban Capacity Study information, which showed the number of homes that could be created at a number of individual sites around the Borough into figures for each urban area.
- 4.4.2 The urban area was chosen as a unit of analysis for ease of use, for ease of recognition, and because it is a geography that is based upon the physical reality of the Borough.



5. Potential infrastructure requirements

5.1 Introduction

5.1.1 This chapter provides an indication of future social and community infrastructure requirements consequent of new growth within each of the growth scenarios and respective distribution options.

5.2 Social infrastructure requirements

Education

5.2.1 For each urban block within each option, the number of new dwellings was calculated in Chapter 4. This figure was converted into a demand for school places using a variety of multipliers and assumptions agreed between Thurrock Planning Department, Thurrock LEA and Colin Buchanan. Different numbers of children per dwelling were assumed according to the size (in bedrooms) and type (flat or house) of home and whether it was market priced or affordable housing. Developments in urban locations were assumed to have different proportions of different housing sizes and types than those in greenfield locations. The proportions of different housing types and sizes in greenfield and urban developments are outlined in the tables below.

Dwelling Type	Total	Sub -Totals
1 bed flats	30%	
2+ bed flats	30%	100%
Houses	40%	
Market priced 1 bed flats	21%	
Market priced 2+ bed flats	21%	70%
Market priced houses	28%	
Affordable 1 bed flats	9%	
Affordable 2+ bed flats	9%	30%
Affordable houses	12%	

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Dwelling Type	Total	Sub -Totals
1 bed flats	15%	
2+ bed flats	15%	100%
Houses	70%	
Market priced 1 bed flats	10.5%	
Market priced 2+ bed flats	10.5%	70%
Market priced houses	49.0%	
Affordable 1 bed flats	4.5%	
Affordable 2+ bed flats	4.5%	30%
Affordable houses	21.0%	

TABLE 5.2: GREENFIELD DEVELOPMENT HOUSING TYPES

5.2.2 The above tables are indicative of future development patterns and have been agreed with Thurrock LEA.

Primary

- 5.2.3 This demand for primary school places was adjusted according to any capacity or deficit of pupil places identified in the Draft School Organisation Plan 2004 to 2009, produced by Thurrock LEA. By aggregating the number of spare or deficit pupil places at individual schools in 2008, as shown in the School Organisation Plan, it was possible to calculate aggregate numbers of spare or deficit pupil places per urban block.
- 5.2.4 The capacities at each school in 2009 are detailed within the School Organisation Plan, and have been calculated according to projections for population growth in Thurrock up to 2009. To bring our housing development projections in line with the forecasts in the school organisation plan, from each option being tested, the number of pupils expected to be living in homes that are projected to be built in the Borough up to 2009 was removed to avoid double counting. This accords with the method use for preparing the predicted pupil numbers in the schools plan, which forecasted its 2009 demand for schools places upon population growth rates set out in the UDP.
- 5.2.5 Where spare primary school places were identified within urban blocks, it was assumed that this would be used up before any additional facilities had to be constructed.
- 5.2.6 To calculate the numbers of new pupils that would be generated by the housing detailed in Tables 5.1 and 5.2, the pupils per home figures shown in Table 5.3 were used.



TABLE 5.3: PRIAMRY SCHOOL CHILDREN PER DWELLING

Dwelling Type	Pupils per dwelling
Market priced 1 bed flats	0
Market priced 2+ bed flats	0.109
Market priced houses	0.307
Affordable 1 bed flats	0
Affordable 2+ bed flats	0.1744
Affordable houses	0.4912

Nursery

5.2.7 Numbers of nursery pupils per household were lower than for primary schools due to the shorter length of time that children attend nursery schools. The numbers of nursery children per dwelling is shown in Table 5.4 below.

Dwelling Type	Pupils per dwelling
Market priced 1 bed flats	0
Market priced 2+ bed flats	0.022
Market priced houses	0.061
Affordable 1 bed flats	0
Affordable 2+ bed flats	0.0352
Affordable houses	0.0976

TABLE 5.4: NURSERY SCHOOL CHILDREN PER DWELLING

Secondary

5.2.8 The method for calculating the need for new secondary school infrastructure followed the same principles as that for primary and nursery schools, and the number of pupils per household is shown in Table 5.5 below.

Dwelling Type	Pupils per dwelling
Market priced 1 bed flats	0
Market priced 2+ bed flats	0.022
Market priced houses	0.061
Affordable 1 bed flats	0
Affordable 2+ bed flats	0.0352
Affordable houses	0.0976

TABLE 5.5: SECONDARY SCHOOL PUPILS PER DWELLING

Post-sixteen

5.2.9 The proportion of young people continuing in education post age 16 in Thurrock is approximately 75 percent, which is slightly below the national average. The post-16 figure is open to change for a number of reasons: 1) the Government is encouraging more students to continue in education; 2)



training programmes such as modern apprenticeships can influence the number of people attending collage and whether they attend full-time or part-time; 3) quality of education at secondary school level; and 4) employment market and availability of jobs.

5.2.10 The average size of a post-sixteen college is 2,300 full-time students. Thurrock and Basildon College is operating at 2,600 students and is aiming to increase capacity. Palmer's College is operating at 1,700 students, and is in the process of increasing its capacity to 2,100. It would like to further increase capacity if there is sufficient demand. This study has calculated the number of post-16 students as a proportion of secondary students and assumed that once 1,500 students are generated there is a need to provide an additional college.

Health

Primary

- 5.2.11 The primary health network in Thurrock is operating above capacity and therefore, wherever development is located, new facilities will be required. Even where there are existing surgeries many should ideally be replaced if they are to be fit to provide the range of services that the primary sector is increasingly providing.
- 5.2.12 In addition to the number of GPs required to meet future demand, the PCT estimate that they require 20 doctors in order to bring current patient lists down to the national average. Thus, even without population growth, there is a requirement for substantial investment in the primary sector in order to provide the level of service that they would wish.
- 5.2.13 For primary health, we have calculated the number of GPs required and then divided them into four practitioner health centres. The number of GPs is based on one GP per 1,800 people, this being the national average, and is being used by Thurrock Council when negotiating Section 106 agreements with developers. The rationale for grouping GPs into health centres is that the primary sector is moving away from the traditional GP surgery to a multi-service health centre approach with practitioners from different medical disciplines offering services. This is, in part, a practical response to a general shortage of GPs, but it also takes pressure off hospital services, as well as providing a more holistic service.



Secondary

- 5.2.14 The demand for additional secondary care has been calculated in terms of new beds required. We have use the ratio of 2.8 beds per 1,000 population. This ratio is from The cost & funding of growth in South East England report (June 2005) and was agreed with Thames Valley Health Authority. Note that advice from Epping Forest PCT to the study of the urbanisation impacts of the growth of Stansted Airport (by Colin Buchanan in 2003) identified a need for 5.05 beds per 1,000 population. This study for Thurrock has used the multiplier used by the recent Roger Tym report in order to enable direct comparison.
- 5.2.15 Discussions with Basildon and Thurrock NHS Trust reveal that the NHS does not have a standardised formula for determining when a new hospital is required. As stated above, the level of demand for hospital services is to a large extent dependent on the PCT and its ability to provide services at the local level. Hospitals are also working to maximise efficiency of their existing buildings rather than to plan for additional buildings.
- 5.2.16 As well as the districts of Basildon and Thurrock, Basildon Hospital also serves parts of Castle Point and Brentwood districts. Therefore population growth in these locations will also impact on the services provided by the Trust. Allowing for only half of Brentwood and half of Castle Point population growth shown in the RSS Dwellings led Chelmer Model, together with the whole of the population growth in Thurrock and Basildon Districts, an additional 26,600 people are expected to be living in the area served by Basildon Hospital in 2021 as compared to 2021. This equates to a need for 75 additional hospital beds.
- 5.2.17 No formulae exists as to when a new hospital might be required, but from examples that were identified, the size of hospitals vary in size from 100 beds to 850.
- 5.2.18 When planning for a new town, a general hospital would be built if a population of 50,000 was achieved. Thus, the level of growth that is being contemplated within the catchment of Basildon Hospital is of a scale that would in new town terms require slightly over half a new hospital.
- 5.2.19 This ignores the factors above, particularly detailed consideration as to how best to provide health care and the manner in which health care services are changing. Nevertheless, contemplating overall growth does give an indication as to the scale of changes that might be required to ensure continuation of adequate levels of health service.
- 5.2.20 The Thames Gateway South Essex Partnership's Technical Background Paper (June 2005) suggested that under RSS14 conditions, 350 hospital beds would be needed within their jurisdiction. Assuming that the perperson demand for hospital beds is constant across the TGSE area, this



equates to a demand for 257 additional beds from population growth in Thurrock. This is significantly higher than our figure of 60 beds as shown in the RSS scenario summary tables below.

5.2.21 From comparing the text in the TGSE report to that in the Roger Tym report², it seems likely that the difference is due to policy-related methodological reasons. The Tym report states "a growing range of health services being provided at primary level" while the TGSE states that their figure "does not take account of required changes in occupancy levels or further shifts away from inpatient modes of care". Following discussions with the TGSE, it was decided that in light of government policies to minimise hospital bed creation, we should follow the Tym's method.

Community facilities

Community halls

5.2.22 It has not been possible to quantify whether existing community halls have spare capacity or not. A telephone survey of the halls revealed in qualitative terms that the majority of community halls in the borough are operating at capacity. Most have organised events each evening of the week, they are used during the day for activities such as play schools and clubs, and they are hired out at weekends for private functions within the community. We have, therefore, assumed that new halls will be required to meet demand from the new population. Using the Roger Tym report (2005) and University of the West of England and Local Government Management Board design guide new provision is based on one community hall of 1,750 sq.m. floorspace for every 7,000 population.

Libraries

5.2.23 We have not sought to quantify capacity at existing libraries because there is no meaningful way of quantifying capacity. In addition, branch libraries serve a local community need and are better located within the community with people generally only travelling longer distances to use a main library that has extensive resources. In calculating future library need we have used the ratio of a 384 sq.m. static collection for every 12,000 heads of population. This ratio is from the Roger Tym study and the University of the West of England and Local Government Management Board design guide.

Social care services

5.2.24 Thurrock Council provided the consultants with an indication of the increased level of service provision required to meet population growth

² Costing the Needs of the South East Counties, Final Report, November 2004



under the draft RSS14 scenario. This information was based upon a multiplier provided by Thurrock Council of 38 care home places per 1,000 people over the age of 75, which was then used for the other options that were being tested.

5.2.25 Similarly, the number of adults with learning difficulties requiring accommodation has been calculated.

5.3 Mental Health

- 5.3.1 We have not fully assessed additional requirements for mental health services and facilities, and as such requirements do not appear in our main summary tables 5.6 to 5.14 below. However, The Thames Gateway South Essex's Sub-Regional Study did make reference to additional requirements.
- 5.3.2 They found that under RSS14 growth conditions, 19 extra beds would be needed, including two for psychiatric intensive care and 3 for low secure purposes. An extra 18 residential rehabilitation places would also be needed. Assuming that the demand in Thurrock per person for these services would roughly equate to that of the wider TGSE region, we reduced the above figures to 14 extra beds and an extra 13 residential rehabilitation places.
- 5.3.3 We used these RSS14 scenario figures and a pro-rate method to calculate a need for the UDP scenario, which would require an additional bed and an additional rehabilitation place.

Infrastructure requirement by growth scenario

5.3.4 By relating dwellings growth to the ratio's provided above, and for schools taking into account existing capacity, estimates of infrastructure consequent of new dwellings growth can be estimated. Results are provided in Tables 5.6 to 5.10 by urban area, below.



TABLE 5.6: INFRASTRUCTURE REQUIREMENTS – UDP SCENARIO

	UDP Scenario											
Urban Area	Nursery School Places	Primary School Pupils	Secondary School Pupils	Post-16 Education Places	GPs	Hospital Beds	Community Hall	Libraries	Elderly Residential Care Places	People with learning difficulties requiring accommodation		
Aveley	1	0	267	200	0	-1	0	0	-2	0		
Chadwell St Mary	1	0	0	0	0	-2	0	0	-2	0		
Corringham	1	0	4	3	0	-2	0	0	-3	-1		
East Tilbury	2	0	4	3	0	0	0	0	-1	0		
Grays North	1	0	2	1	0	-2	0	0	-2	0		
Grays South	22	0	60	45	0	1	0	0	1	0		
Ockendon	1	0	154	115	-1	-3	0	0	-4	-1		
Orsett	2	43	6	5	0	0	0	0	0	0		
Purfleet	39	302	105	78	2	10	1	0	13	2		
Stanford-Le-Hope	2	0	0	0	0	-2	0	0	-3	0		
Tilbury	6	0	17	13	0	0	0	0	-1	0		
West Horndon	0	0	0	0	0	0	0	0	0	0		
West Thurrock / Chafford Hundred	43	552	608	456	2	9	0	0	11	2		
TOTAL	122	897	1,226	919	1	7	0	0	8	1		



TABLE 5.7: INFRASTRUCTURE REQUIREMENTS – DRAFT RSS14 SCENARIO – OPTION 1

Draft RSS14 - Option 1												
Urban Area	Nursery School Places	Primary School Pupils	Secondary School Pupils	Post-16 Education Places	GPs	Hospital Beds	Community Hall	Libraries	Elderly Residential Care Places	People with learning difficulties requiring accommodation		
Aveley	8	0	287	215	0	-1	0	0	-1	0		
Chadwell St Mary	15	0	0	0	0	0	0	0	0	0		
Corringham	2	0	4	3	-1	-3	0	0	-4	-1		
East Tilbury	9	0	23	17	0	0	0	0	1	0		
Grays North	14	0	37	28	0	0	0	0	0	0		
Grays South	126	212	336	252	3	16	1	0	20	3		
Ockendon	56	56	300	225	1	4	0	0	5	1		
Orsett	2	41	5	4	0	0	0	0	0	0		
Purfleet	72	467	194	145	3	15	1	0	19	3		
Stanford-Le-Hope	10	0	0	0	0	-1	0	0	-2	0		
Tilbury	18	0	49	37	0	1	0	0	1	0		
West Horndon	0	0	0	0	0	0	0	0	0	0		
West Thurrock / Chafford Hundred	178	1,223	970	728	6	29	1	1	37	6		
TOTAL	510	1,999	2,205	1,654	12	60	3	2	77	13		



Draft RSS14 - Option 2													
Urban Area	Nursery School Places	Primary School Pupils	Secondary School Pupils	Post-16 Education Places	GPs	Hospital Beds	Community Hall	Libraries	Elderly Residential Care Places	People with learning difficulties requiring accommodation			
Aveley	7	0	283	212	0	-1	0	0	-1	0			
Chadwell St Mary	12	0	0	0	0	0	0	0	-1	0			
Corringham	1	0	3	2	-1	-3	0	0	-4	-1			
East Tilbury	7	0	18	14	0	0	0	0	0	0			
Grays North	7	0	19	14	0	-1	0	0	-2	0			
Grays South	101	88	269	202	2	12	1	0	15	3			
Ockendon	139	468	522	391	4	20	1	1	26	4			
Orsett	1	38	4	3	0	0	0	0	0	0			
Purfleet	55	379	146	110	2	12	1	0	15	3			
Stanford-Le-Hope	8	0	0	0	0	-2	0	0	-2	0			
Tilbury	14	0	38	29	0	0	0	0	0	0			
West Horndon	0	0	0	0	0	0	0	0	0	0			
West Thurrock / Chafford Hundred	141	1,039	871	653	5	23	1	1	29	5			
TOTAL	493	2,012	2,173	1,629	12	60	3	2	77	13			

TABLE 5.8: INFRASTRUCTURE REQUIREMENTS – DRAFT RSS14 SCENARIO – OPTION 2



Draft RSS14 - Option 3												
Urban Area	Nursery School Places	Primary School Pupils	Secondary School Pupils	Post-16 Education Places	GPs	Hospital Beds	Community Hall	Libraries	Elderly Residential Care Places	People with learning difficulties requiring accommodation		
Aveley	7	0	283	212	0	-1	0	0	-1	0		
Chadwell St Mary	12	0	0	0	0	0	0	0	-1	0		
Corringham	1	0	3	2	-1	-3	0	0	-4	-1		
East Tilbury	100	356	267	201	4	18	1	1	23	4		
Grays North	7	0	19	14	0	-1	0	0	-2	0		
Grays South	101	88	269	202	2	12	1	0	15	3		
Ockendon	46	6	273	204	1	3	0	0	3	1		
Orsett	1	38	4	3	0	0	0	0	0	0		
Purfleet	55	379	146	110	2	12	1	0	15	3		
Stanford-Le-Hope	8	0	0	0	0	-2	0	0	-2	0		
Tilbury	14	0	38	29	0	0	0	0	0	0		
West Horndon	0	0	0	0	0	0	0	0	0	0		
West Thurrock / Chafford Hundred	141	1,039	871	653	5	23	1	1	29	5		
TOTAL	493	1,906	2,173	1,629	12	60	3	2	77	13		

TABLE 5.9: INFRASTRUCTURE REQUIREMENTS – DRAFT RSS14 SCENARIO – OPTION 3


	Draft RSS14 - Option 4											
Urban Area	Nursery School Places	Primary School Pupils	Secondary School Pupils	Post-16 Education Places	GPs	Hospital Beds	Community Hall	Libraries	Elderly Residential Care Places	People with learning difficulties requiring accommodation		
Aveley	5	0	278	209	0	-1	0	0	-1	0		
Chadwell St Mary	9	0	0	0	0	-1	0	0	-1	0		
Corringham	1	0	2	1	-1	-3	0	0	-4	-1		
East Tilbury	98	347	262	197	4	18	1	1	23	4		
Grays North	5	0	14	11	0	-2	0	0	-2	0		
Grays South	74	0	198	148	2	8	0	0	10	2		
Ockendon	128	415	493	370	4	19	1	1	24	4		
Orsett	1	34	2	1	0	0	0	0	0	0		
Purfleet	36	286	96	72	2	9	0	0	11	2		
Stanford-Le-Hope	6	0	0	0	0	-2	0	0	-3	0		
Tilbury	10	0	27	20	0	-1	0	0	-1	0		
West Horndon	0	0	0	0	0	0	0	0	0	0		
West Thurrock / Chafford Hundred	102	845	766	575	3	17	1	0	21	4		
TOTAL	475	1,927	2,138	1,604	12	60	3	2	77	13		

TABLE 5.10: INFRASTRUCTURE REQUIREMENTS – DRAFT RSS14 SCENARIO – OPTION 4



	Draft RSS14 - Option 4A												
Urban Area	Nursery School Places	Primary School Pupils	Secondary School Pupils	Post-16 Education Places	GPs	Hospital Beds	Community Hall	Libraries	Elderly Residential Care Places	People with learning difficulties requiring accommodation			
Aveley	7	0	283	212	0	-1	0	0	-1	0			
Chadwell St Mary	12	0	0	0	0	0	0	0	-1	0			
Corringham	63	0	169	127	1	3	0	0	3	1			
East Tilbury	7	0	18	14	0	0	0	0	0	0			
Grays North	7	0	19	14	0	-1	0	0	-2	0			
Grays South	101	88	269	202	2	12	1	0	15	3			
Ockendon	46	6	273	204	1	3	0	0	3	1			
Orsett	1	38	4	3	0	0	0	0	0	0			
Purfleet	55	379	146	110	2	12	1	0	15	3			
Stanford-Le-Hope	39	0	54	41	2	10	1	0	13	2			
Tilbury	14	0	38	29	0	0	0	0	0	0			
West Horndon	0	0	0	0	0	0	0	0	0	0			
West Thurrock / Chafford Hundred	141	1,039	871	653	5	23	1	1	29	5			
TOTAL	493	1,550	2,144	1,608	12	60	3	2	77	13			

TABLE 5.11: INFRASTRUCTURE REQUIREMENTS – DRAFT RSS14 SCENARIO – OPTION 4A



5.3.5 The table below summarises the above analysis comparing relative infrastructure requirements by growth scenario and option.

Option	Nursery School Places	Primary School Pupils	Second ary School Pupils	Post-16 Education Places	GPs	Hospital Beds	Community Halls	Libraries	Elderly Residential Care Places	People with learning difficulties requiring accommodation
UDP	122	897	1,226	919	1	7	0	0	8	1
Draft RSS14 Option 1	510	1,999	2,205	1,654	12	60	3	2	77	13
Draft RSS14 Option 2	493	2,012	2,173	1,629	12	60	3	2	77	13
Draft RSS14 Option 3	493	1,906	2,173	1,629	12	60	3	2	77	13
Draft RSS14 Option 4	475	1,927	2,138	1,604	12	60	3	2	77	13
Draft RSS14 Option 4A	493	1,550	2,144	1,608	12	60	3	2	77	13

TABLE 5.12: SUMMARY OF INFRASTRUCTURE REQUIREMENTS

5.3.6 The above tables do not take into account existing shortfalls / over-supply in infrastructure that are identified in Chapter 3, apart from schools where an assessment of growth requirements by location have taken into account existing supply shortfalls/oversupply.

5.4 Retail

- 5.4.1 In order to consider retail implications, a forecast of increase in retail expenditure that would result from the increased population in the Borough was undertaken and then the effects of this increase in total retail spending on the Borough's retail centres was assessed.
- 5.4.2 Forecasted population growth in each scenario from 2004 until the relevant horizon year (2016 for the UDP scenario and 2021 for the RSS option) was inputted into a retail forecasting model that converted the population growth into outputs showing the forecasted additional expenditure and additional floorspace that would be created between 2004 and the horizon year in each scenario. The main outputs are for convenience and comparison goods, but also shown are retail services, meals and drinks, and comparison goods of a convenience nature. Comparison goods of a convenience nature are non-food goods, which although typically defined as comparison goods sport many characteristics of a convenience good i.e. they are bought frequently, are inexpensive, and little time is taken to choose between them. Examples include most toiletries, pet food and medicines.



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- 5.4.3 The model takes account of the leakage of expenditure from the Borough i.e. the money spent in shops outside of the Borough by Thurrock residents. The Thurrock Retail Study (2000) provided data on convenience and comparison spending leakage from the Borough, and for the main it was assumed that the same percentage of expenditure will be spent outside the Borough in 2016 or 2021 as was in the retail study's survey year of 1999. The study showed that the leakage in convenience goods spending made-up 43% of the total spend by the Borough's residents, for bulky comparison goods it was 44%, and for non-bulky comparison goods it was 45%. As the model did not differentiate between the two types of comparison goods, it was assumed that 44.6% of the spending on all comparison goods by Thurrock residents was spent outside of Thurrock. Using the data available, 44.6% represented a best estimate of the leakage for the combined comparison goods market.
- 5.4.4 Three different sets of growth rates a low growth, a base growth, and a high growth model were used to produce three differing forecasts of the additional spending and corresponding retail floorspace that would result per annum in 2021 because of population growth in Thurrock. The growth rates for the model were created using different trends in spending increases from 1964 as depicted in the Family Spending Survey: 2002/3.
- 5.4.5 An additional scenario base with local convenience assumed that 75% of convenience spending, and comparison goods of a convenience nature spending would take place within the Borough. This scenario was developed due to the higher than average leakage on convenience goods spending from Thurrock. An improved retail offer within Thurrock is expected to clawback some convenience goods leakage. Indeed the new Morrison's superstore in Grays may have already led to an increased proportion of the Borough's resident's convenience goods spending being spent in Grays. Leakages from the minor sections of spending i.e. retail services, meals and drinks, and comparison goods of a convenience nature were derived from a combination of national averages and the retail study.
- 5.4.6 A further scenario assumed high rates of e-commerce growth with 25% of local expenditure being lost to e-commerce. With e-commerce in many respects still an embryonic growth industry, it is difficult to wholly discount such an scenario.
- 5.4.7 The figures showing the retail spend of the additional population in the Borough are all in 2003 financial year prices. In order that future and present can be compared, inflation between 2003 and 2016, or 2003 and 2021 has not been factored into the results.
- 5.4.8 The results of the analysis from the retail model are shown in Tables 5.13 to 5.16 below. Tables 5.13 and 5.14 shows the additional expenditure (£s)



that will be created per annum by the additional population in the Borough. Tables 5.15 and 5.16 show these results in floorspace equivalents.

TABLE 5.13: UDP SCENARIO –	SPENDING PER	ANNUM OF AD	DITIONAL PO	PULATION

UDP Scenario, 2016		Spend	hurrock (£ p.a)		
	Low Growth	Base Growth	High Growth	Base with Local Convenience (*)	Base with E- Commerce Growth
Convenience Goods	1,190,000	1,250,000	1,300,000	2,180,000	937,500
Comparison Goods	2,190,000	2,550,000	2,810,000	2,550,000	1,912,500
Retail Services	260,000	280,000	410,000	280,000	210,000
Meals & Drinks	890,000	950,000	990,000	950,000	712,500
Comparison of Convenience Nature	340,000	350,000	360,000	620,000	262,500
TOTAL	4,870,000	5,380,000	5,870,000	6,580,000	4,035,000

TABLE 5.14: RSS14 SCENARIO – SPENDING PER ANNUM OF ADDITIONAL POPULATION

RSS14 Scenario, 2021		Spend generated in Thurrock (£ p.a)									
	Low Growth	Base Growth	High Growth	Base with Local Convenience (*)	Base with E- Commerce Growth						
Convenience Goods	13,330,000	14,320,000	15,100,000	24,970,000	10,740,000						
Comparison Goods	28,400,000	34,960,000	40,100,000	34,960,000	26,220,000						
Retail Services	3,000,000	3,400,000	5,730,000	3,400,000	2,550,000						
Meals & Drinks	10,610,000	11,590,000	12,220,000	11,590,000	8,692,500						
Comparison of Convenience Nature	4,020,000	4,170,000	4,240,000	7,270,000	3,127,500						
TOTAL	59,360,000	68,440,000	77,390,000	82,190,000	51,330,000						

TABLE 5.15: UDP SCENARIO – ADDITIONAL FLOORSPACE NEEDED TO MEET DEMAND CREATED BY INCREASED RETAIL SPENDING IN THURROCK

UDP Scenario, 2016		Floo	rspace in Thu	rrock (sq. m.)	
	Low Growth	Base Growth	High Growth	Base with Local Convenience (*)	Base with E- Commerce Growth
Convenience Goods	160	170	180	290	128
Comparison Goods	610	710	790	710	533
Retail Services	40	40	60	40	30
Meals & Drinks	270	280	300	280	210
Comparison of Convenience Nature	60	60	70	110	45
TOTAL	1,140	1,260	1,400	1,430	945



RSS14 Scenario, 2021	Floorspace in Thurrock (sq. m.)								
	Low Growth	Base Growth	High Growth	Base with Local Convenience (*)	Base with E- Commerce Growth				
Convenience Goods	1,700	1,830	1,930	3,190	1,373				
Comparison Goods	7,210	8,880	10,190	8,880	6,660				
Retail Services	430	490	830	490	368				
Meals & Drinks	3,020	3,290	3,470	3,290	2,468				
Comparison of Convenience Nature	700	720	730	1,260	540				
TOTAL	13,060	15,210	17,150	17,110	11,408				

TABLE 5.16: RSS14 SCENARIO – ADDITIONAL FLOORSPACE NEEDED TO MEET DEMAND CREATED BY INCREASED RETAIL SPENDING IN THURROCK

5.4.9 The effect of major housing development in the Borough upon the Borough's retail offer could be dramatic. If spending by Thurrock residents was to increase by the levels postulated in draft RSS14, within the higher retail growth scenario some 11,400 sq.m of retail floor space could be required. The scale and potential impact of these floorspace figures is highlighted when compared against the current retail provision in Grays of 35,000 sq.m. If this increase in demand can be harnessed correctly, there is the potential for a significant improvement of the quality and quantity of the retail offer in Grays and Thurrock's local centres.

5.5 Utilities

- 5.5.1 Estimating infrastructure requirements in respect of utilities has been difficult because of either general reluctance of this industry to release information on their relative capacity to accommodate further growth or because this sector has simply not considered growth in the way that planning authorities need to in order to prepare development plans.
- 5.5.2 Nevertheless findings do provide an indication of likely issues that will be caused as a consequence of substantial additional growth.

Energy services

Electricity

5.5.3 Additional infrastructure will involve the installation of sub-stations to step down voltages from the national grid to domestic levels and the laying of distribution cable networks. The location of new development relative to existing sub-stations and mains cabling will determine the quantity of infrastructure required.



Gas

5.5.4 Transco have carried out a review of mains supply for the Thames Gateway as a whole and concluded that there is not a requirement for large-scale upgrading of the mains infrastructure. However, there may be a requirement for local upgrading but this will only be identified once they begin installing additional capacity. As well as laying distribution pipes from the supply mains to end users there will be a need to construct pressure reducing stations. These are small (4x5x2 metres) huts which reduce the gas pressure to a level that is safe to feed into domestic end users.

Water supply

- 5.5.5 Essex and Suffolk Water are seeking permission to increase water storage capacity at the Abberton Reservoir. Assuming that the scheme goes ahead the company anticipate that they can meet demand across the south Essex area to the year 2026. Increased demand for potable water has to be planned for in the context of growth within the wider East of England region.
- 5.5.6 Within Thurrock itself there are two feeding mains and depending the level of growth, one or both of these mains will need enlarging (RSS 14 levels requires only one). There will also be a need for the installation of an extended reticulation network the details of which can only be provided once the location of growth has been decided.

Waste water

- 5.5.7 Anglian Water provided a relatively detailed assessment of additional infrastructure although it they caveat that until exact development locations are allocated they are unable to provide details of exact requirements.
- 5.5.8 There is limited spare capacity in the waste water network (approximately 4,000 dwellings) across the borough, with the exception of the western part of the borough where the Aveley trunk sewer is effectively at capacity. Developing in the western part of Thurrock (where a majority of the brown field sites are located) will be a more expensive option than developing in the east. To the east, population densities are lower and it is a shorter distance to the sewage treatment works at Tilbury with fewer obstacles to negotiate.
- 5.5.9 Development at Purfleet and the west end of Thurrock will require 1.3km of 300/450mm diameter replacement sewer on the deep Aveley Trunk Sewer. Changes of use from industrial to residential development can have a significant impact on the flows discharging from the sites. At the present time there are limited discharges from industrial areas, confined to employees foul drainage and trade effluent discharges.



- 5.5.10 Development north of the Purfleet By-pass will require a new pumping station and 1 km rising main to London Road and upgrades to Corran Way pumping station which is hydraulically overloaded. 2.3km of replacement rising main plus trunk sewer upgrade downstream and upgrades to trunk sewers in Ockendon will be required if there is development to the north and west of the settlement.
- 5.5.11 Development in Little Thurrock will probably require one new pumping station, a 1.5km rising main to the Southern Trunk Sewer and an upgrade to Warren-le-Grays pumping station.
- 5.5.12 In the east of the borough there is limited spare capacity at the BATA Linford terminal pumping station and there is no spare capacity in the trunk sewerage system itself. Development on the east side of the Borough could gravitate to the pumping station, but development to the west and north would have to be pumped.
- 5.5.13 West Horndon and Tillingham areas do not fall within the Tilbury/Thurrock catchment and Anglian Water did not provide any information relating to the impact of development in this area.

5.6 Conclusions

- 5.6.1 Of those infrastructure types set out in Tables 5.1 to 5.8, the only one where there is some quantifiable spare capacity is within education and it has been assumed that this, where it exists, can be used before a new facility is required. Thus, the figures for new schools (primary and secondary) have taken into account spare capacity.
- 5.6.2 The quantum of new facilities, with the exception of utilities and retail has been calculated on a pro-rata basis and provides an indication of the level of facilities required. This is an indication of the very limited scale of spare capacity (if any) within existing infrastructure, so that new dwellings growth must largely meet its own infrastructure requirements or otherwise ensure that additional facilities are provided; either on site or elsewhere. Our assessment show that substantial new infrastructure is required to simply overcome existing deficits in infrastructure (see chapter 3).



6. Costing of facilities

6.1 Introduction

- 6.1.1 This chapter provides indicative costs for the additional social and community infrastructure requirements described in Chapter 5.
- 6.1.2 When calculating the level of investment required for infrastructure, the costs described are at current prices, and no allowance has been made for inflation, the cost of borrowing, nor the cost of land needed for the development of infrastructure. Also, the costs only cover the provision of infrastructure, not the ongoing maintenance and operation of facilities or any land acquisition. Many of the costs are dependent on the exact location of development, for example, utility costs are influenced by the distance between new infrastructure and new development.
- 6.1.3 Another factor that will influence the cost of provision is the ability to share facilities. For example, a health centre might include a public meeting room for use outside surgery hours.
- 6.1.4 The following paragraphs set out the different infrastructure types and give assessments of the costs involved. The costs used are derived from a variety of sources including the consultants' own experience elsewhere, direct from service providers, and the 'The cost and funding of growth in south east England' (June 2005) report .
- 6.1.5 No distinction has been made between capital that will be provided from the public or private sectors. It is acknowledged that a considerable amount of the capital required will be from the private sector. This may take the form of direct investment, by utility companies or retailers for example, and through the use of Section 106 agreements attached to planning permissions. However, the source of funding is not the issue here, but rather the level required *per se* in order to deliver the infrastructure to provide residents of Thurrock with a high quality living environment.



6.2 Education

Primary and Nursery education

- 6.2.1 The cost of a school extension per primary school pupil is £9,491. This cost also applies to nursery school pupils.
- 6.2.2 This figure is sourced from the Department for Education and Skills (DfES) and represents the national figure per pupil multiplied by a local multiplier of 1.07.
- 6.2.3 This cost of £9,491 does not include land, and it should be noted that to construct a new school from scratch may be more expensive given that it would not be possible to use existing facilities such as kitchens, canteens and halls.
- 6.2.4 Several of the primary schools within the borough are smaller than two form entry and there may be potential for expanding a number of these to accommodate future growth. The viability of this option is dependent on the location of new development. The recommended maximum walking distance for primary children is 800m, thus if there are substantial numbers of children outside this distance then a new school will be a more realistic option. In addition, expansion of existing schools should not be at the expense of outdoor space as this will reduce the quality of education provision.
- 6.2.5 If necessary, three forms per year schools could also be an option, if they best suited the geographical distribution of children.
- 6.2.6 At this strategic level, it is difficult to discern where it would be appropriate to build new schools, and where existing ones could be expanded. However, we have attempted to factor in the cost of new schools by raising the cost per pupil in areas where demand exceeds 420 additional places once any 2009 capacity has been used. 420 has been chosen as a figure because it represents the number of pupils in a two-form entry primary school. The cost of these pupils has been set at £10,875 per pupil, a figure taken from the "costing the needs of the south east report". This cost again does not include land values.

Secondary schools

6.2.7 The cost of a school extension per secondary school pupil is £14,904. This figure is sourced from the Department for Education and Skills (DfES) and represents the national figure per pupil multiplied by a local multiplier of 1.07.



- 6.2.8 This cost of £14,904 does not include land, and it should be noted that to construct a new school from scratch may be more expensive given that it would not be possible to use existing facilities such as kitchens, canteens and halls.
- 6.2.9 A number of the existing secondary schools within Thurrock are below 1,200 student capacity and there may be the potential to expand at least some of them to accommodate additional pupils. This could substantially reduce the cost of provision when compared with the building of new schools. However, this option is dependent on the location of new development and the physical capacity of a school's site to be expanded without compromising the standard of facility provision (that is, if expansion involves the loss of outdoor sports facilities this will result in a diminution of facilities and overall quality of education provision).
- 6.2.10 Each new whole secondary school was costed at £17,307 per pupil (excluding land values) a figure obtained from the "costing the needs of the south east counties" report (2004). However, none of the urban blocks in Thurrock are forecasted to have a demand of above 1,200 secondary school places once the existing capacity is used. Our method may therefore slightly understate the total cost of secondary school provision if the expansion of existing secondary schools is not always achievable.

Post-sixteen

- 6.2.11 The costs for providing post-sixteen education were provided by Thurrock and Basildon College and the Learning and Skills Council. Post-16 education is costed out at approximately £2,000 per sq.m. with 4.7 sq.m. of floorspace per full-time student. The recently completed South East Essex College in Southend cost £54m and provides education services to 5,500 full-time equivalent students.
- 6.2.12 The existing Thurrock and Basildon College has a floorspace of 27,584 sq.m. over its two main campuses and the cost of providing a new college in the borough of the same size will be £55m. However, the size of the college will depend on the type of courses being taught and it appears that Thurrock and Basildon has a relatively large floor area, which is in part because it provides space intensive courses such as construction and motor vehicle repairs.
- 6.2.13 A complementary option to providing new post-sixteen colleges is for secondary schools in the borough to provide sixth-form education. Thurrock LEA has no plans at the moment to provide such services but with substantial population growth this option will have to be explored. We do not have a costing for this option, but would anticipate that there should be substantial cost savings by being able to utilise existing staff and without the need to develop a complete campus.



6.3 Health care

Primary care

- 6.3.1 The costs for primary health care is based on services being provided in four GP health centres and the costs were provided to the consultants by Northamptonshire Heartlands PCT for the provision of a new health centre in Corby. The cost of a new four doctor health centre is approx £2.5m.
- 6.3.2 To bring Thurrock in line with the national GP : patient ratio an additional 20 doctors are required, this alone requires a backlog expenditure of £12.5m. In addition, many of the GPs' surgeries are not considered fit for purpose and there are a large number of single practitioners in the Borough, both of which hinders the provision of primary care as it is evolving.
- 6.3.3 We have not provided a cost for upgrading existing provision to modern standards, and to meet new primary service demands, but would anticipate this running into several million pounds. Cost savings may be possible by combining a replacement surgery with a new facility. By this we mean that where new development takes place and additional primary facilities are required and there is an existing surgery close-by which needs to be replaced, the two could be combined potentially reducing the number of new buildings required.
- 6.3.4 The costs provided below are simply based on the number of GPs required to serve the growth of population and are based on the two assumptions that firstly, there is no spare capacity within existing primary facilities and therefore wherever development is located new facilities will be required; and secondly it is assumed that new primary care provision will be based on four GP health centres.

Secondary health

6.3.5 The Costing the Infrastructure Needs of the South East Counties study (Nov. 2004) provides a cost multiplier of £200,000 per bed and this has been used here. The Cost and Funding of Growth in South East England report (June 2005) showed higher costs per hospital beds of £350,000 per bed should be allowed for provision in major hospitals providing acute and specialist services, including teaching hospitals, and that an average of £200,000 per bed would be appropriate for beds in smaller local 'general' and cottage hospitals, and the new diagnostic and treatment centres. The majority of beds needed to service population growth in Thurrock would fall into this latter category, and as such we consider the figure of £200,000 per bed to be appropriate.



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6.3.6 The NHS has not contemplated building a new hospital in the area and so no actual cost has been provided for developing one.

6.4 Community facilities

Community halls

6.4.1 The cost used for the provision of community halls is again taken from "The cost & funding of growth in South East England" study (June 2005), and is £1.3m per hall.

Libraries

- 6.4.2 The costing used for library provision is from "The cost & funding of growth in South East England" (June 2005) and is £2,600 per square metre, based upon a 384 sq.m. static library in dedicated premises.
- 6.4.3 Costs can be reduced by greater use of mobile collection and multiuse of buildings, for example, sharing a community centre or an office block. With library provision there appears to be a particular issue relating to continued service provision related to libraries not being viewed as a priority service. Hence, library budgets are often the first to be cut. This is not sustainable practice and leads to unsustainable communities.

Care for the elderly

- 6.4.4 Cost multipliers used have been provided by Thurrock Council. A cost of £2.7m for a 40 place residential care home has been used.
- 6.4.5 The Thames Gateway South Essex Partnership were advised by Thurrock Council that the additional care for the elderly in the RSS14 scenario would cost £6.3m per annum. This is in addition to the capital costs outlined in our summary tables below.

Learning disabilities

6.4.6 Per person, the cost of a residential home for people with learning difficulties is assumed to be £2.7m for a 40 place residential home.



6.5 Mental Health Care

- 6.5.1 It is assumed here that, in line with our assumptions in paragraph 6.3.5, a mental health care hospital bed would have a capital cost of £200,000. Residential mental health care was assumed to cost £67,500 in-line with its equivalent for elderly care. These costs are therefore only indicative.
- 6.5.2 Table 6.1 below shows the amounts of, and costs of, the mental health care needed to treat the additional population in Thurrock.

Scenario	Number of Mental Health Care Hospital Beds	Number of Mental Health Care Residential Places	Cost of Mental Health Care Hospital Beds	Cost of Mental Health Care Residential Places	Total Cost
UDP	1	1	£254,399	£79,727	£334,125
RSS	14	13	£2,800,000	£877,500	£3,677,500

TABLE 6.1: MENTAL HEALTH CARE PROVISION AND COSTS

6.6 Utilities

6.6.1 The costs associated with utility provision are influenced to a large degree by the location of development, and the costs in this section are approximations gained from the various service providers prior to the selection of potential development locations.

Gas and electricity

6.6.2 EDF were not able to provide an indicative cost of installing the necessary infrastructure. The cost is dependent on location of new development relative to existing sub-stations and mains cables and also on whether new cabling has to be channelled across highways or rail lines. Similarly, with gas supply, Transco estimate that to lay a metre of gas pipe across a site costs approximately £100. If laying pipe entails digging up highways or bypassing other obstacles then the cost will increase significantly.

Water supply

6.6.3 Essex and Suffolk Water have invested approximately £30m since 2000 to provide additional storage capacity. There is sufficient water supply to accommodate population growth within Essex and Suffolk Water's area up to RSS14 levels. No indication has been provided as to the cost associated with further increasing water supply storage capacity beyond



RSS14. Upgrades and hence costs would need to be considered within the wider regional scale and not simply growth within Thurrock. The principal cost associated with water supply is the local distribution network and for RSS14, if growth is outside the urban areas, the distribution network could cost approximately £3m.

6.6.4 The largest cost with regard to drinking water supply will be in ensuring that there is sufficient supply and as this will be piped in from outside the borough, wherever in Thurrock development is located, there it is likely to make minimal difference to the overall cost of installing new infrastructure.

Waste water

6.6.5 The costings used here have been provided by Anglian Water Limited. To accommodate growth within the draft UDP the cost of new / upgrading infrastructure is £0.4m. To accommodate draft RSS14 growth the cost of new / upgrading infrastructure is £2.2m.

6.7 Option Costs

6.7.1 The costs per infrastructure type per urban area for each Option are shown in the following tables.



TABLE 6.2: INFRASTRUCTURE COSTS (£ '000S) - UDP SCENARIO

	UDP Scenario											
Urban Area	Nursery Education	Primary Education	Secondary Education	Post-16 Education	GPs	Hospital Beds	Community Halls	Libraries	Elderly Residential Care	Accommodation for people with learning difficulties		
Aveley	8	0	3,981	1,883	-155	-249	-83	-9	-107	-18		
Chadwell St Mary	13	0	0	0	-196	-316	-105	-11	-136	-23		
Corringham	14	0	59	28	-301	-485	-161	-17	-209	-35		
East Tilbury	15	0	64	30	-49	-80	-26	-3	-34	-6		
Grays North	7	0	28	13	-223	-360	-119	-12	-155	-26		
Grays South	211	0	888	420	130	210	70	7	91	15		
Ockendon	13	0	2,292	1,084	-414	-668	-222	-23	-288	-48		
Orsett	23	408	96	46	33	53	17	2	23	4		
Purfleet	371	2,869	1,559	737	1,238	1,997	662	68	860	144		
Stanford-Le-Hope	16	0	0	0	-244	-393	-130	-13	-169	-28		
Tilbury	59	0	250	118	-54	-87	-29	-3	-38	-6		
West Horndon	0	0	0	0	0	-1	0	0	0	0		
West Thurrock / Chafford Hundred	406	5,237	9,055	4,283	1,061	1,711	567	59	736	124		
TOTAL	1,157	8,514	18,272	8,643	826	1,332	442	46	573	96		



TABLE 6.3: INFRASTRUCTURE COSTS (£ '000S) - DRAFT RSS14 SCENARIO - OPTION 1

				RSS14	- Option 1					
Urban Area	Nursery Education	Primary Education	Secondary Education	Post-16 Education	GPs	Hospital Beds	Community Halls	Libraries	Elderly Residential Care	Accommodation for people with learning difficulties
Aveley	77	0	4,272	2,021	-64	-103	-34	-4	-45	-7
Chadwell St Mary	142	0	0	0	1	1	0	0	1	0
Corringham	16	0	66	31	-402	-648	-215	-22	-279	-47
East Tilbury	81	0	342	162	57	93	31	3	40	7
Grays North	131	0	549	260	-17	-28	-9	-1	-12	-2
Grays South	1,192	2,014	5,009	2,369	1,976	3,187	1,057	109	1,372	230
Ockendon	531	528	4,466	2,113	532	858	285	29	369	62
Orsett	19	390	81	38	8	13	4	0	6	1
Purfleet	687	4,432	2,886	1,365	1,833	2,956	980	101	1,273	214
Stanford-Le-Hope	95	0	0	0	-170	-275	-91	-9	-118	-20
Tilbury	174	0	730	345	100	162	54	6	70	12
West Horndon	0	0	0	0	-1	-1	0	0	0	0
West Thurrock / Chafford Hundred	1,694	11,604	14,464	6,842	3,595	5,797	1,923	199	2,496	419
TOTAL	4,837	18,968	32,866	15,546	7,448	12,012	3,983	412	5,172	869



	RSS14 - Option 2										
Urban Area	Nursery Education	Primary Education	Secondary Education	Post-16 Education	GPs	Hospital Beds	Community Halls	Libraries	Elderly Residential Care	Accommodation for people with learning difficulties	
Aveley	62	0	4,211	1,992	-95	-153	-51	-5	-66	-11	
Chadwell St Mary	115	0	0	0	-55	-89	-29	-3	-38	-6	
Corringham	11	0	47	22	-412	-664	-220	-23	-286	-48	
East Tilbury	65	0	273	129	23	37	12	1	16	3	
Grays North	67	0	280	133	-171	-275	-91	-9	-119	-20	
Grays South	954	837	4,008	1,896	1,478	2,383	790	82	1,026	172	
Ockendon	1,318	4,456	7,775	3,678	2,536	4,091	1,357	140	1,761	296	
Orsett	13	359	55	26	-5	-8	-3	0	-3	-1	
Purfleet	518	3,597	2,177	1,030	1,479	2,386	791	82	1,027	173	
Stanford-Le-Hope	76	0	0	0	-210	-339	-112	-12	-146	-24	
Tilbury	135	0	569	269	20	33	11	1	14	2	
West Horndon	0	0	0	0	-1	-1	0	0	0	0	
West Thurrock / Chafford Hundred	1,342	9,864	12,986	6,143	2,858	4,609	1,529	158	1,985	333	
TOTAL	4,676	19,096	32,381	15,317	7,446	12,009	3,983	412	5,171	869	

TABLE 6.4 INFRASTRUCTURE COSTS (£ '000S) – DRAFT RSS14 SCENARIO – OPTION 2



RSS14 - Option 3 Accommodation Elderly Nursery Primary Secondary Post-16 Hospital Community for people with **Urban Area** GPs Libraries Residential learning Education Education Education Education Beds Halls Care difficulties Aveley 62 0 4,211 1,992 -95 -153 -51 -5 -66 -11 Chadwell St Mary 0 0 -55 -89 -3 -6 115 0 -29 -38 Corringham 47 22 -220 -48 11 0 -412 -664 -23 -286 East Tilbury 3,378 1,885 2,228 3,593 1,192 123 260 948 3,985 1,547 Grays North 133 -171 -275 -9 -119 -20 67 0 280 -91 Grays South 954 837 4,008 1,896 1,478 2,383 790 82 1,026 172 435 54 1,922 331 534 230 39 Ockendon 4,064 177 18 359 55 26 -5 -8 Orsett 13 -3 0 -3 -1 Purfleet 518 3,597 2,177 1,030 1,479 2,386 791 82 1,027 173 0 0 -339 -24 Stanford-Le-Hope 76 0 -210 -112 -12 -146 Tilbury 135 0 569 269 20 33 11 1 14 2 West Horndon 0 0 0 0 -1 -1 0 0 0 0 West Thurrock / 1,342 333 9,864 12,986 6,143 2,858 4,609 1,529 158 1,985 Chafford Hundred 4,676 TOTAL 7,446 18,089 32,381 15,317 12,009 3,983 412 5,171 869

TABLE 6.5 – INFRASTRUCTURE COSTS (£ '000S) – DRAFT RSS14 SCENARIO – OPTION 3



RSS14 - Option 4										
Urban Area	Nursery Education	Primary Education	Secondary Education	Post-16 Education	GPs	Hospital Beds	Community Halls	Libraries	Elderly Residential Care	Accommodation for people with learning difficulties
Aveley	47	0	4,146	1,961	-127	-205	-68	-7	-88	-15
Chadwell St Mary	87	0	0	0	-114	-185	-61	-6	-79	-13
Corringham	6	0	26	12	-422	-680	-226	-23	-293	-49
East Tilbury	930	3,292	3,912	1,850	2,192	3,535	1,172	121	1,522	256
Grays North	50	0	212	100	-205	-331	-110	-11	-143	-24
Grays South	702	0	2,950	1,395	950	1,532	508	53	660	111
Ockendon	1,216	3,938	7,349	3,476	2,324	3,748	1,243	129	1,614	271
Orsett	6	325	26	13	-19	-30	-10	-1	-13	-2
Purfleet	340	2,714	1,427	675	1,106	1,783	591	61	768	129
Stanford-Le-Hope	56	0	0	0	-252	-406	-135	-14	-175	-29
Tilbury	95	0	399	189	-65	-105	-35	-4	-45	-8
West Horndon	0	0	0	0	-1	-1	0	0	0	0
West Thurrock / Chafford Hundred	970	8,023	11,422	5,403	2,079	3,353	1,112	115	1,444	242
TOTAL	4,505	18,293	31,869	15,075	7,445	12,007	3,982	412	5,170	868

TABLE 6.6 - INFRASTRUCTURE COSTS (£ '000S) - DRAFT RSS14 SCENARIO - OPTION 4



RSS14 - Option 4A										
Urban Area	Nursery Education	Primary Education	Secondary Education	Post-16 Education	GPs	Hospital Beds	Community Halls	Libraries	Elderly Residential Care	Accommodation for people with learning difficulties
Aveley	62	0	4,211	1,992	-95	-153	-51	-5	-66	-11
Chadwell St Mary	115	0	0	0	-55	-89	-29	-3	-38	-6
Corringham	600	0	2,521	1,192	323	522	173	18	225	38
East Tilbury	65	0	273	129	23	37	12	1	16	3
Grays North	67	0	280	133	-171	-275	-91	-9	-119	-20
Grays South	954	837	4,008	1,896	1,478	2,383	790	82	1,026	172
Ockendon	435	54	4,064	1,922	331	534	177	18	230	39
Orsett	13	359	55	26	-5	-8	-3	0	-3	-1
Purfleet	518	3,597	2,177	1,030	1,479	2,386	791	82	1,027	173
Stanford-Le-Hope	370	0	810	383	1,260	2,032	674	70	875	147
Tilbury	135	0	569	269	20	33	11	1	14	2
West Horndon	0	0	0	0	-1	-1	0	0	0	0
West Thurrock / Chafford Hundred	1,342	9,864	12,986	6,143	2,858	4,609	1,529	158	1,985	333
TOTAL	4,676	14,711	31,955	15,115	7,446	12,009	3,983	412	5,171	869

TABLE 6.7 - INFRASTRUCTURE COSTS (£ '000S) - DRAFT RSS14 SCENARIO - OPTION 4A



6.8 Cost Comparisons

6.8.1 The Table below provides a summary of costs per housing development options, and includes the costs of the mental health care summarised in Table 6.1:

Scenario	Option	Total Cost (£ '000s)	Cost per Dwelling
UDP	-	40,230	7,100
draft RSS14	1	105,790	6,500
draft RSS14	2	105,040	6,500
draft RSS14	3	104,030	6,400
draft RSS14	4	103,300	6,400
draft RSS14	4a	100,020	6,200

TABLE 6.8 - TOTAL COSTS PER OPTION

- 6.8.2 The higher cost per dwelling found in the UDP scenario is principally due to the cost of providing for the deficit in primary and secondary school places in parts of Thurrock being divided between fewer dwellings. In addition the location of allocated land within the UDP is not able to take advantage of available spare capacity.
- 6.8.3 To a limited extent, one should not compare the UDP option with the others as it is based on 2016 where different household size and population assumptions exist. Had we assumed that the number of persons per household was 2.16, as per the 2021 options, the cost per dwelling would have been lower.
- 6.8.4 Variance between options with the same number of dwellings in. the five draft RSS options is the result of two factors. Firstly, some distributions of housing were a better fit with school catchments where there was a capacity for new pupils; and, secondly where options contained a higher proportion of greenfield development, they are forecasted to require more school places, which results in a greater cost.
- 6.8.5 As a result of many infrastructure types being at capacity across the Borough, the development of new facilities is directly proportional to the number of projected future users. The geography of these users has not affected the total costs of provision. This study has not considered factors such as land values or any costs associated within bringing that land forward for development which will increased building costs.
- 6.8.6 The total infrastructure costs of the five draft RSS14 Scenario Options are all within £6 million of each other. This difference between the most expensive and the cheapest Options is small less than 6% in relation to total costs per Option in the region of £100 million.



6.9 Conclusion

- 6.9.1 The total cost figures, to overcome estimated capacity shortfalls, are low in comparison with the real costs of building the necessary infrastructure in the Borough because:
 - they exclude site acquisition costs and also any costs in respect of bringing land forward for development including site remediation and servicing.
 - no estimates have been made in respect of resolving current shortages in infrastructure.
 - no estimates are included for strategic improvements required to water or electricity supply networks to service overall levels of growth, although there are indications that this outlay is likely to be met by the private sector utility providers themselves.
 - It has been assumed that the cost of retail provision will be met by the private sector.
- 6.9.2 Even without these considerations, the costs of each Option are such that it is evident that significant levels of investment are required to provide the necessary infrastructure. Allowing for the growth already allocated in the draft UDP an additional £40m of expenditure is required. The growth proposed in the draft RSS14 significantly increases this cost to a figure in the region of £100m.
- 6.9.3 The main driver for infrastructure costs is growth, but overall costs per dwelling reduce as the number of dwellings increase from the UDP to the RSS Scenarios. This is because the cost of overcoming current deficits in education are high. Also, surprisingly, the relationship between housing distribution and capacity of schools infrastructure was such that UDP growth distributions performed poorly against future distributions which have benefited from knowledge of available infrastructure capacity.
- 6.9.4 This level of analysis for schools was possible because detailed supply information was able to be provided (to the nearest pupil). If similar quality information was obtained for other facilities, then there may well be other variations in cost (deficit), relative to distribution. Given the identified shortfalls in other facilities however, it is considered unlikely that additional capacity exists for new development to be able to benefit significantly, i.e. new development will justifiably be required to provide all necessary infrastructure to meet the needs of the existing population.
- 6.9.5 This does not negate the logic of seeking to locate new development close to or adjacent to urban areas that benefit from substantial ranges



of facilities. New communities will be more sustainable and integrate better into the existing urban fabric where there are clear ties and relationships with existing facilities. Also existing communities will benefit from access to a broader range of facilities, i.e. those that are provided as part of the new development (urban extension or otherwise). The more facilities that exist, the more likely that sustainable communities will develop. Obviously, commercial and operational viability of facilities will need to be carefully considered.

6.9.6 The distribution of the new homes does have an impact upon retail, and waste water provision in the Borough, despite it not being possible to quantify the cost.



TRANSPORT INFRASTRUCTURE



7. Transport Infrastructure

7.1 Introduction

7.1.1 The purpose of the transport aspect of the Thurrock Infrastructure Deficit Study is to assess the impact of a number of future population scenarios on the highway and rail networks in Thurrock, to identify shortfalls in provision, and to present recommendations on how any identified shortfalls could be addressed.

7.2 The Study Area

- 7.2.1 Thurrock is a Unitary Authority (formed in April 1998) located immediately to the east of London, on the north shore of the River Thames. It is traditionally an area of port-related activity, heavy industry, cement manufacture and mineral extraction, and much of its river frontage is highly industrialised³. As a result, there are high levels of Heavy Goods Vehicles on its road network.
- 7.2.2 Its proximity to the M25 to the west, and the Trunk Road Network has successfully attracted businesses to the area, and access and congestion issues, particularly in the western part of the Borough have already been identified in Thurrock's Local Transport Plan.
- 7.2.3 As a result of the area's proximity to London, there are high levels of out-commuting, with nearly 40% of the Borough's working population employed outside Thurrock (with most of these employed in London). The level of commuting by train is high, and a quarter-hourly service is provided between London Fenchurch Street and Tilbury/ Southend. However, there is a 'widely held public concern that the standard of rail services.....had fallen to an unacceptable level in Thurrock by the early 1990's due largely to a lack of investment in the line' (Local Transport Plan 2001-2006).
- 7.2.4 The existing road and rail networks in Thurrock is shown in Figure 1.

³ Thurrock Council Local Transport Plan 2001-2006





7.3 Review of available data

7.3.1 Thurrock forms part of the Thames Gateway; an area identified by Government Policy as having priority for economic regeneration and revitalisation in the adopted Regional Planning Guidance for the South East of England (RPG 9). Consequently, several studies focusing on transport issues in the area have already been undertaken in recent years. The key findings of these are outlined in the sections below.

London to Southend Movement Study (LOTS)

- 7.3.2 This study examined the key transport movements within the South Essex area of the Thames Gateway (which included the majority of Thurrock) identified shortfalls in existing transport provision, and broadly identified the component transport improvements necessary to assist in the regeneration and improved sustainability of the Thames Gateway area as a whole.
- 7.3.3 With regard to Thurrrock specifically, the assessment of the highway network in this study was of limited use, with only the M25, A13 and A1089 included in the study. Most useful in respect of this study, was the assessment of base conditions, of which the following points were most relevant:
 - 'The LOTS traffic model showed substantial am peak hour movements between Thurrock and Basildon' – this will be borne in mind when assigning potential development traffic in the Buchanan spreadsheet model
 - A suggested increase in standard from dual 2 to dual 3 carriageway along the A127, between the M25 and A129 (Rayleigh Weir) was put forward
 - 15% of total traffic on the A13 London Road composed heavy goods vehicles.

Public Transport Network Capacity Study

7.3.4 This analysis of rail line capacity was undertaken by Essex County Council in 2002 as part of the Structure Plan Review and included an analysis of rail line capacity for C2C (the main train operator serving the Thurrock area) for trains into Fenchurch Street Station. It was noted that under normal service conditions, the capacity of the service is



influenced by available approaches and platforms at the Fenchurch street terminus.

- 7.3.5 The Essex report also concluded that *'train paths on the c2c line are at capacity between Upminster and Grays'*. This stretch of the line is single track, however, and the service is restricted to four trains an hour: two in either direction. The main conclusions of relevance to the Buchanan study are:
 - during the peak hour only the Ockendon rail line between Upminster and Grays was classed as being unstable or at capacity;
 - the Ockendon line is single line operation affecting the rail capacity;
 - the London to Southend Central rail line is at effective capacity (0.85 is effective line capacity);
 - Chafford Hundred has capacity for 12 car trains but only has one platform; and,
 - Ockendon, Grays, Tilbury Stations, Stanford le Hope and Purfleet have 8 car platforms, and the remaining stations all have 12 car platforms.
 - All other remaining rail lines in the study area were operating at less than capacity

Thurrock's Local Transport Plan (and annual revisions)

- 7.3.6 This document includes an outline of planned and proposed transport infrastructure. However, only those proposals with agreed funding are taken into consideration here. These are:
 - West Thurrock Regeneration Ring Road scheme (Stage 1: QE2 Bridge to Stoneness Road)
- 7.3.7 Other road and rail improvement schemes, which have been identified in Thurrock's Transport Plan but do not yet have funding include the second phase of the West Thurrock Ring Road, a proposal to widen the route between the M25 J30 and Lakeside Retail Centre, and the provision of east facing slips on the A13 at the junction with the A126.
- 7.3.8 Other relevant issues identified in Thurrock's Local Transport Plan included high car ownership at Chafford Hundred at 50-60%; a requirement for improved bus and rail links from the Chafford Hundred;



a need for the removal of the one way system in Grays, and to remove through traffic from London Road. The need for improved accessibility generally in the Purfleet area was cited, and the limited availability of commuter parking at rail stations within the Borough was highlighted.

7.4 Choice of approach

- 7.4.1 Two alternative approaches have been considered for assessing the highway capacity implications:
 - The use of an existing area wide model as a basis for assessing the impact of traffic associated with different development scenarios.
 - The development of a spreadsheet model to calculate Congestion Reference Flows on the road network before and after development.

7.5 Investigation and Assessment of Existing Area Wide Models

- 7.5.1 Three existing models that could potentially be utilised for the study were identified and their suitability assessed for use in this study. These were:
 - The West Thurrock Model,
 - The London and South East Region Land Use and Transport Model (LASER) and
 - The Highways Agency Eastern Region Model.

The West Thurrock Model

7.5.2 The West Thurrock Model is a CONTRAM model developed in 1994 for the West Thurrock Transportation Study, based on 1991 roadside interview data. The model was updated in 1996 to include an Origin-Destination (OD) survey at Lakeside and again in 2000 from traffic surveys using matrix estimation techniques. However, this model is still based on 1991 matrices and has not been updated to take account of the results of the 2001 London Area Transport Study (LATS). Furthermore, the model covers only the west of Thurrock (to the M25/A13 junction to the north, the river in the south, the western limit of Grays in the east and Wennington in the west).



7.5.3 The limited geographical coverage of the model and the age of the base matrix data would require extensive surveys and substantial amounts of professional time to bring it up to a usable standard. This would fall well outside the scope of the current study and the use of this model was therefore ruled out.

The LASER Model

7.5.4 The LASER model was used in the Thames Gateway Study but the data sets used could not be verified, so the conclusions drawn were very broad and the Study suggests that the model cannot be relied upon at a detailed level. CB therefore ruled the use of this model out.

Eastern Region Model

7.5.5 The final model, produced for the Highways Agency, was the most promising. This is a SATURN based model of the whole of the Eastern Region, including Thurrock. However, as it is a very strategic model it only included 5 zones for the whole of the Borough and the network concentrated on the strategic roads network. The model is still under development and whilst it is likely that cordons will be available in the future, they could not be supplied at the time requested. The use of this model was therefore also ruled out at this stage.

7.6 Spreadsheet Model Methodology

- 7.6.1 As it became apparent that it was not possible to make use of any of the existing traffic models covering the area it was concluded that it would be necessary to develop a simple spreadsheet model to determine capacity constraints on the network, and to record the results of the spreadsheet calculations on a schematic road network of the area.
- 7.6.2 A site visit was undertaken, and an appropriate road network for inclusion in the study identified. This included not only the Trunk and A roads, but also a number of B class and unclassified roads which could potentially be used as local distributor roads by local traffic. The road network used as a basis for this study is shown in Figure 7.2, overleaf
- 7.6.3 Existing traffic flow data was obtained for as much of the road network for the study area as possible. Where information on the percentage of HGV's, or the directional split was unavailable, assumptions were made, based on similar roads for which more detail was available, or published standards were applied. Where important gaps were identified in the network, a programme of top-up traffic counts was scheduled. This data



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was then used to calculate base Congestion Reference Flows (CRF) on the links.





- 7.6.4 The CRF gives an estimate of the Annual Average Daily Traffic (AADT) flow at which the carriageway is likely to be congested in the peak periods on an average day⁴. Congestion occurs when the hourly traffic flows exceed the maximum sustainable throughput of the link, with one result being that queues will form.
- 7.6.5 The ratio of existing Annual Average Daily Traffic (AADT) to CRF was calculated for each link of the road network under existing conditions, and subsequently grouped into one of three categories, as follows:
 - Ratios of greater than 1 were identified as being currently overcapacity,
 - Ratios of values 0.85 1 will be identified as approaching capacity and
 - Ratios of below 0.85 were considered to be operating acceptably.
- 7.6.6 Data, time and budgetary constraints meant that this study focussed on assessment of link capacities only, and did not consider the impact of any future development on junctions within Thurrock. A separate study will be undertaken to deal with junctions.

7.7 Scenarios investigated

- 7.7.1 The base and growth scenarios specifically assessed and compared were:
 - Existing Situation (based on recent traffic counts generally from 2001).
 - Future Year Base Cases 2021 using TEMPRO growth factors. TEMPRO growth factors include development that is included in Local Plans and should therefore reflect committed development traffic. The base case was changed to take account of potential of proposals to develop Shell Haven as major new port and logistics centre. Traffic flows presented to the Shell Haven Public Inquiry were used as a basis for adjusting flows, modified to allow for growth that TEMPRO had predicted would occur.
 - Future Year Development Option 1 This option is the 2021 base case with the addition of 204 dwellings in Aveley, 2752 dwellings in Purfleet, 5583 dwellings in West Thurrock/Chafford

⁴ TA 46/97 Volume 5, Section 1, Part 3. ANNEX D



Hundred, 666 dwellings in Grays North, 3669 dwellings in Grays South, 650 dwelling in Tilbury, 508 dwellings in Chadwell St Mary, 233 dwellings in east Tilbury, 273 dwellings in Stanford-Ie-Hope, 43 dwellings in Corringham, 1503 dwellings in Ockendon and 72 dwellings in Orsett.

- Future Year Development Option 2 This option is the 2021 base case with the addition of 171 dwellings in Aveley, 2305 dwellings in Purfleet, 4676 dwellings in West Thurrock/Chafford Hundred, 183 dwellings in Grays north, 3073 dwellings in Grays South, 544 dwellings in Tilbury, 425 dwellings in Chadwell St Mary, 195 dwellings in East Tilbury, 229 dwellings Stanford-le-Hope, 36 dwellings in Corringham, 4259 dwellings in Ockendon and 60 dwellings in Orsett.
- Future Year Development Option 3 This option is as Scenario 2 with 3195 dwellings in East Tilbury and 1259 dwellings in Ockendon.
- Future Year Development **Option 4** This option is the 2021 because with the addition of 132 dwellings in Aveley, 1779 dwellings in Purfleet, 3610 dwellings in West Thurrock/Chafford Hundred, 141 dwellings in Grays North, 2372 dwellings in Grays South, 420 dwellings in Tilbury, 328 dwellings in Chadwell St Mary, 3151 dwellings in East Tilbury, 177 dwellings in Stanford-Ie-Hope, 28 dwellings in Corringham, 3972 dwellings in Ockendon and 47 dwellings in Orsett.
- Future Year Development Option 4A This option is the 2021 base case with the addition of 171 dwellings in Aveley, 2035 dwellings in Purfleet, 4676 in West Thurrock/ Chafford Hundred, 183 dwellings in Grays North, 3073 dwellings in Grays South, 544 dwellings in Tilbury, 425 dwellings in Chadwell St Mary, 195 dwellings in East Tilbury, 229 dwellings in Stanford-le-Hope, 3036 dwellings in Corringham, 1259 dwellings in Ockendon and 60 dwellings on Orsett.
- 7.7.2 For each of the future years with development scenarios, estimates of the likely additional vehicular traffic generated by the residential development have been made. These have been based on the data shown in Table 5.2 on journeys per person per week by trip purpose shown in Table 7.1 and 2001 Census data on mode share for journeys to work for residents in Thurrock (at Ward level).



Journey Purpose	Trips
Commuting	4.0
Business	1.1
Education	1.5
Escort	2.5
Shopping	4.9
Other personal business	2.0
Visiting friends / relatives	3.1
Social / entertainment	2.4
Holidays / day trips	0.7
Other, including just walk	0.9
TOTAL	23.0

TABLE 7.1: NATIONAL AVERAGE JOURNEYS PER PERSON PER WEEK

- 7.7.3 Assuming that community, business, education and escort education trips take place on weekdays and all other trips are spread throughout the week it is possible to calculate the average daily person trip rate as 3.82. Average household occupancy in Thurrock is 2.16 people per unit, which equates to 8.25 person trips per day per household.
- 7.7.4 Applying the car mode share for each specific ward to the number of trips gives the average daily traffic generation of each scenario as shown in Table 7.2.


Scenario	No. of	No. of No. of		Daily Car	Trips
	Dwellings	Residents	Share	Additional Development	Scenario Total
	204	441	0.59	1001	
	2752	5944	0.53	11969	
	5583	12059	0.54	24952	
	666	1439	0.59	3244	
RSS14	3669	7925	0.51	15391	
Scenario	650	1404	0.55	2943	
Option 1	508	1097	0.61	2567	71803
Option	233	503	0.56	1182	
	273	590	0.61	1269	
	43	93	0.65	218	
	1503	3246	0.54	6682	
	72	156	0.65	385	
	171	369	0.59	839	
	2305	4979	0.53	10025	
	4676	10100	0.54	20898	
	183	395	0.59	891	
RSS14	3073	6638	0.50	12891	
Scenario	544	1175	0.51	2463	
Option 2	425	918	0.60	2400	71646
	195	421	0.56	989	
	229	495	0.60	1065	
	36	78	0.65	183	
	4259	9199	0.54	18934	
	60	130	0.65	320	
	171	369	0.59	839	
	2305	4979	0.53	10025	
	4676	10100	0.54	20898	
	183	395	0.59	891	
RSS14	3073	6638	0.51	12891	
Scenario	544	1175	0.55	2463	
Option 3	425	918	0.61	2147	73528
	3195	6901	0.56	16208	
	229	495	0.61	1065	
	36	78	0.65	183	
	1251	2719	0.54	5597	
	60	130	0.65	320	
	132	285	0.59	648	
RSS14	1779	3843	0.53	7737	
Scenario	3610	7798	0.54	16134	73574
Option 4	141	305	0.59	687	
	2372	5124	0.51	9950	

Table 7.2: Daily Car Trip Generated by the Different Development Scenarios



					1
	420	907	0.55	1902	
	329	708	0.61	1657	
	3151	6806	0.56	15985	
	177	382	0.61	823	
	28	60	0.65	142	
	3972	8580	0.54	17659	
	47	102	0.65	251	
	171	369	0.59	839	
	2305	1979	0.53	10025	
	4676	10100	0.54	20898	
	183	395	0.59	891	
	3073	6638	0.51	12891	
RSS14	544	1175	0.55	2463	
Option 40	425	918	0.61	2147	73520
Option 4a	195	421	0.56	989	
	229	495	0.61	1065	
	3036	6558	0.65	15394	
	1259	2719	0.54	5597	
	60	130	0.65	320	

7.8 Methodology for Assignment of Development Traffic

7.8.1 In order to more realistically reflect the effects of any new developments on network traffic information on the approximate location of the proposed new developments was taken into consideration. The journey to work destination for existing residents of each Ward have been used as a basis for assigning the traffic associated with each development scenario. Thurrock itself has been divided up into six zones. Two external zones of Basildon and Havering have been adopted, whilst traffic leading these zones has been assumed to head along the A13 or M25. Table 7.3 shows the percentages assigned to each destination from the wards affected by development.



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TABLE 7.3: DISTRIBUTION OF DEVELOPMENT TRAFFIC

Origin Ward	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Havering	Basildon	A13W	A13E	M25
Aveley	0.62	3.86	33.26	3.65	4.65	1.00	12.98	4.02	18.04	4.23	13.69
Purfleet	0.52	4.60	18.82	2.51	6.62	1.60	8.82	3.17	37.63	3.27	12.80
West Thurrock/Chafford Hundred	0.61	2.82	13.49	1.66	5.76	0.81	7.27	2.76	47.67	3.91	13.23
Grays North	1.29	9.11	14.32	3.71	18.17	1.30	5.85	5.83	21.60	5.65	13.17
Grays South	1.51	5.34	10.24	2.18	14.50	1.13	5.43	3.65	39.73	3.59	12.70
Tilbury	2.24	26.71	12.22	3.57	10.31	2.37	3.74	4.53	18.09	3.94	12.28
Chadwell St Mary	2.47	22.36	26.04	2.21	11.89	4.37	3.11	6.62	9.90	4.41	6.62
East Tilbury	5.44	20.81	27.56	1.97	7.83	2.49	5.35	8.91	9.90	5.49	9.19
Stanford-le-Hope	15.16	7.03	8.62	3.08	7.52	3.13	5.00	12.74	23.78	5.16	5.78
Corringham	23.74	7.0	10.79	0.79	8.16	2.79	2.37	17.68	8.21	4.74	13.73
West Hornden	0.41	4.11	10.89	12.65	6.96	2.49	14.04	3.03	30.22	5.50	10.70
Ockendon	0.41	4.11	10.89	12.65	6.96	2.49	14.04	3.03	30.22	5.50	10.70
Orsett	4.76	9.18	7.66	0.93	8.45	7.47	7.61	10.66	20.33	9.43	13.50



- 7.8.2 The study area was divided into 6 internal 'zones' based on groupings of wards within Thurrock, and a matrix of current origin and destination trip matrices was created from 2001 census information for journeys to work.
- 7.8.3 Subsequent assignment of traffic to road links around the network was based on these matrices, using the same assumptions of the most likely route to be taken for each specific origin and destination.
- 7.8.4 CRF's were then re-calculated for all relevant links on the network, with the additional development traffic in place, and changes in the AADT to CRF ratios were subsequently used to identify where the development traffic is causing problems

7.9 Rail Capacity

- 7.9.1 Thurrock is served by a rail line running from Shoeburyness to London Fenchurch and operated by c2c. The stations serving Thurrock are Stanford-le-Hope, East Tilbury, Tilbury Town, Grays, Purfleet, Chafford Hundred and Ockendon. The c2c line splits with some trains running via Ockendon. This section is only single track and has limited capacity. The northern edge of the study area is also served by a station at West Horndon.
- 7.9.2 The LOTS Study reviews existing rail data and capacities and makes the following relevant points:
 - London is the main destination for all stations except for Shoeburyness.
 - Journeys to work account for over 50% of all journeys.
 - There is evidence of spare passenger capacity east of the M25 for internal Thames Gateway South Essex Trips.
 - During the peak hour only the Ockendon rail line between Upminster and Grays was classed as being unstable or at capacity.
 - The Ockendon line is single line operation affecting rail capacity.
 - The London to Southend Central rail line is at effective capacity (0.85 of total capacity).



- Chafford Hundred has capacity for 12 car trains but only has one platform.
- Ockendon, Grays, Tilbury Station, Stanford-le-Hope and Purfleet have a car platforms.

Estimating Performance

- 7.9.3 In order to estimate the performance of the rail lines passing through Thurrock reference has been made to 1998 surveys of boards and alighters in the busiest direction on the c2c lines. This data has been used to calculate the number of passengers on trains at each stop on the route. The train capacities are dependent on the number of carriages. As the stops within Thurrock are restricted to 8 cars, the capacity of each train is approximately 800 people, except for the services running through West Horndon.
- 7.9.4 The ratio of occupancy to capacity for the peak hours (service starting between 08:00 and 09:00 and 17:00 and 18:00) have been calculated from the 1998 data. Ratios above 0.85 indicates the service is exceeding its effective capacity. This ratio has been calculated for each of the stations in Thurrock and the busiest station on the route (Barking in the AM peak and Fenchurch Street in the PM).
- 7.9.5 In order to determine the base saturation in 2021 rail growth factors from Tempro have been applied.
- 7.9.6 For each development scenario the estimated additional rail patronage in the peak hours as a result of development has been added onto the baseline figures. This additional demand has been calculated by taking the daily rail trips (calculated using the same methodology as the daily car trips) and assuming that 50% of them trip occur in the peak hour (25% in each peak). This is based on the data included in the LOTS study that over 50% of daily rail trips are journeys to work.
- 7.9.7 The additional trips have been assigned to each station based on the location of development. It has been assumed in the morning peak there will be an increased in borders at each station and, as London is the main destination, it has been assumed that they will alight at the busiest London station. The reverse in assumed in the evening peak.



8. Existing and future baseline conditions

8.1 Highway Network

- 8.1.1 Applying the methodology outlined in the previous section gives the results shown in full in Appendix 3 and graphically in Figure 8.1. In summary, the following links were found to be over-capacity under existing traffic flows (i.e. have AADT/CRF ratios of greater than 1.0):
 - A1306, Gray w/o A1012
 - B186 West Thurrock Way s/o A1306
 - A13 Horndon on the Hill
- 8.1.2 In addition, the following links are beginning to approach capacity (i.e. AADT / CRF ratios of between 0.85 and 1.0).
 - A1306 sw/o A13 Wennington
 - A13 sw/o Five Bells junction
 - A13 e/o A126
 - A127 e/o M25
- 8.1.3 The addition of traffic growth and extra traffic associated with development at Shell Haven to take the flows to a 2021 baseline situation worsen the performance of the links that already have AADT/CRF ratios greater than 1.0. All of the links that were approaching capacity under existing flows have AADT /CRF ratios over 1.0 in 2021.





- 8.1.4 Traffic growth also pushes the A1012 Elizabeth Road south of the A1306 and the A13 west of the A128 over capacity (AADT/CRF ratios of 1.067 and 1.021 respectively). Other road link that are approaching (i.e. AADT/CRF ratio of >0.85) in 2021 are:
 - A126 London Road west of junction with A1012
 - A1013 Stanford Road
 - A1306 Arterial Road west of the B186
 - B146 Fenner Road west of the A126
 - A128 Brentwood Road north of the A13
 - B186 Stifford Bridge south of the B1335
- 8.1.5 Figure 8.2 shows the performance of the road network diagrammatically under 2021 traffic flows.





8.2 Rail Network

8.2.1 Applying the methodology outlined in Chapter 7 gives the ratio of occupancy to capacity shown in full in Appendix 4. In summary, in both the base year tests and in 2021 taking account of the anticipated growth in rail usage there is capacity available on all lines assessed over the peak periods considered.



9. Development impact - Highways

9.1 Highway Network

- 9.1.1 Table 9.1 shows the CRF on all links that are over 0.85 for baseline and each development scenario.
- 9.1.2 Looking at the results shown in Table 9.1, as would be expected as the level of development increased the performance of the road network worsens. The main significant comparisons that can be made between the options are:
 - For the majority of the problem links (including the A1306, A1013 and A13) Development Option 1 to 4 and 4A have similar levels of impact.
 - The A126 London Road west of the junction with the A1012 and A13 west of the A128 are just within capacity under traffic flows from Options 1, 2, 3 and 4A, but are marginally over-capacity under Option 4.
 - The B186 Stifford Bridge south of the B1335 has CRF's at approximately 1.1 under Options 1, 3 and 4A, but at 1.4 under Options 2 and 4.
 - The High Road west of the A13 in North Stifford has CRF ratios in excess of 0.85 in Options 2 and 4, has no problems in Options 1 and 3.
 - The A126 London Road east of the junction with the A1012 has no capacity problems in Options 1, 2, 4 and 4A but is approaching capacity (CRF >0.85) in Option 3.
 - The A1306 east of the B186 is starting to approach capacity under Option 1 to 4, and 4A.
 - The A1014 The Manorway east of the A13 is over-capacity in Options 1 to 4, and 4A, but is noticeably worse in Option 4A than in the other options.
- 9.1.3 From these comparisons it can be seen that Option 1 and 2 have marginally less impact than Options 3 and 4. The location of the green-field development results in impacts in different locations. In Option 2, the greenfield development is focussed on Ockendon which causes significantly greater problems on the B186 Stifford Bridge and some problems on the High Road, North Stifford, west of the A13 which would



not occur if greenfield development were focused elsewhere. Option 3, which concentrates greenfield development in East Tilbury, results in less specific impact on these links and does not result in any other new links having CRF's above 1.0 (although the A1306 Arterial Road exceeds 0.85 when this area is developed). Option 4A, which has Greenfield development at Corringham has similar impacts to Option 3, except that it results in a small increase that pushes the A128 Brentwood Road north of the A13 over 1.0 and the A1014 The Manorway east of the A13 is worsened.



TABLE 9.1: EFFECTS AT DEVELOPMENT TRAFFIC

Road Link	Existing	2021	Option 1	Option 2	Option 3	Option 4	Option 4A
A1306, Grays w/o A1012	1.132	1.532	1.718	1.707	1.802	1.804	1.682
B186 West Thurrock Way s/o	1.154	1.498	1.519	1.516	1.516	1.512	1.516
A1306							
A13 Hornden on the Hill	1.032	1.504	1.712	1.713	1.697	1.698	1.773
A1306 s/o A13 Wennington	0.871	1.131	1.287	1.282	1.261	1.253	1.261
A13 sw/o Fire Bells	0.865	1.276	1.477	1.477	1.492	1.493	1.508
A13 e/o A126	0.929	1.056	1.187	1.173	1.184	1.170	1.213
A13 e/o M25	0.929	1.056	1.261	1.235	1.246	1.218	1.275
A127 w/o A128	0.998	1.032	1.032	1.032	1.032	1.032	1.032
A1012 Elizabeth Road s/o		1.067	1.614	1.562	1.531	1.465	1.531
A1306							
A126 London Road w/o j/w		0.879	0.973	0.984	0.991	1.000	0.957
A1012							
A1013 Stanford Road		0.869	0.920	0.908	0.908	0.899	0.908
A1306 Arterial Road w/o B186		0.960	1.163	1.150	1.256	1.259	1.122
B146 Fenner Road w/o A126		0.862	0.874	0.872	0.872	0.869	0.872
A128 Brentwood Road n/o A13		0.960	1.002	0.994	0.994	0.988	1.012
B186 Stifford Bridge s/o B1335		0.987	1.144	1.356	1.126	1.335	1.121
A13 w/o A128		1.021	1.188	1.187	1.246	1.245	1.229
A126 London Road e/o j/w			0.85		0.860		
A1012							
High Road, West of A13, North				0.949		0.929	
Stifford							
A1306 Arterial Road e/o B186			0.888	0.877	0.964	0.966	0.854
Buckingham Hill Road s/o							
A1013							
A1013 between Buckingham Hill							
Road and Orsett							
Buckingham Hill Rd s/o							
Muckingford Rd							
A1014 The Manorway, e/o A13			1.063	1.058	1.069	1.064	1.231
Stanford-le-Hope							
Lodge Ln, SE of Nutberry Ave,			0.932	0.912	0.912	0.890	0.912
Grays							
A1090 Stonehouse Lane,							
Purfleet							
A1012 North Stifford, n/o A1306							



9.2 Potential Improvement Measures

- 9.2.1 Assessing impacts on an area-wide level using changes in AADT/CRF ratio is a fairly coarse approach. However, it does indicate when link capacity is an issue, and it is possible to identify what benefit increasing carriageway width or reducing flows by diverting traffic onto other routes would have. The following tests have therefore been carried out:
 - i. The effects of re-assignment of traffic that would occur as a result of the introduction of east facing slips on the A13 junction with A126.
 - ii. The level of carriageway widening required on links with CRF's in excess of 1 to bring them below 1 with and without the improvement identified in (i) above.

East Facing Slips at A13/A126 Junction

- 9.2.2 At present, vehicles travelling from the east, Basildon and Southend towards Lakeside have to leave the A13 at North Stifford and use the A1306 rather than being able to leave the A13 and join the A126 direct. This puts a considerable amount of pressure on the A1306 under current traffic flows, which the addition of development traffic considerably worsens, particularly for development levels in excess of the RSS levels. The provisions of east facing slip roads at the A13/A126 junction would reduce the pressure on the A1306, but result in an increase in flow on the A13 immediately to the east of the A126 junction.
- 9.2.3 The spreadsheet model that has been used for this assessment is fairly coarse and it has been necessary to make some rough assumptions regarding amount of traffic that would divert from the A1306 to the A13/A126 if these slip roads were provided:
 - 25% of traffic on the A1306 east of the B186 would divert onto the A13/A126.
 - 12.5% of the traffic on the A1306 west of the B186 would divert onto the A13/A126.
- 9.2.4 Applying these assumptions and re-calculating CRF's for each development options affects the links shown in Table 9.2.

Road Link	Option 1	Option 2	Option 3	Option 4	Option 4A
A1306 Grays w/o A1012	1.352	1.341	1.436	1.439	1.315
B186 West Thurrock Way s/o A1306	1.369	1.366	1.366	1.362	1.366
A13 e/o A126	1.353	1.338	1.349	1.334	1.378
A126 London Road w/o j/w A1012	0.958	0.972	0.979	0.990	0.945
A1306 Arterial Road w/o B186	1.003	0.990	1.097	1.099	0.961
B146 Fenner Road w/o A126	0.717	0.715	0.715	0.713	0.715
A1306 Arterial Road e/o B186	0.780	0.770	0.859	0.861	0.746

TABLE 9.2: EFFECT OF INTRODUCTION OF EAST FACING SLIPS AT THE A13/A126

9.2.5 Looking at Table 9.2, as expected, the introduction of east facing slips at the A13/A126 junction reduces the AADT/CRF ratio on the A1306 and increases it on the A13 and A126. The decrease in CRF ratio on the A1306 w/o the A1012 and B186 are in the range of 0.15 to 0.35 whilst the increases on the A13 are only around 0.1. The east facing slips have a noticeable improvement on conditions on the A1306 although they alone do not entirely resolve the existing and future problems.

Potential Road-Widening

9.2.6 Each of the links that have CRF ratios in excess of 1 have been examined in more detail and the CRF's recalculated with the roads either widened or dualled. Single carriageway roads have first been tested increased to wide single carriageways (10m), then if this does not reduce the CRF ratio below 1 it has been assumed that they would be dualled. Table 9.3 shows the results of these tests.

TABLE 9.3: AFFECTS OF ROAD WIDENING / DUALLING ASSUMING NO OTHER IMPROVEMENTS TAKE PLACE

		Option 1	Option 2	Option 3	Option 4	Option 4A
A1206 Grove W/o A1012	Wide single	1.177	1.169	1.234	1.235	1.152
A1500, Glays w/0 A1012	Dual 2 lane	0.560	0.556	0.587	0.588	0.548
P196 West Thursde West a/2 A1206	Wide single	1.040	1.038	1.038	1.035	1.038
B 180 West Humock Way 5/0 A 1300	Dual 2 lane	0.497	0.496	0.496	0.495	0.496
A13 Hornden on the Hill	Dual 4 lane	0.856	0.856	0.848	0.849	0.887
A1306s/o A13 Wennignton	Wide single	0.881	0.878	0.864	0.858	0.864
A13 sw/o Fire Bells	Dual 3 lane	0.985	0.985	0.994	0.995	1.005
A13 e/o A126	Dual 4 lane	0.890	0.880	0.888	0.878	0.910
A13 e/o M25	Dual 4 lane	0.946	0.926	0.935	0.914	0.956
A127 w/o A128	Dual 3 lane	0.688	0.688	0.688	0.688	0.688
	Wide single	1.105	1.070	1.049	1.003	1.049
A 1012 Elizabeti Road 5/0 A 1500	Dual 2 lane	0.526	0.509	0.499	0.478	0.499
A126 London Road w/o j/w A1012	Wide single					
A1013 Stanford Road	Wide single					
A1206 Artorial Bood w/a B186	Wide single	0.797	0.788	0.860	0.862	0.768
A 1300 Alterial Road w/0 B100	Dual 2 lane					
A128 Brentwood Road n/o A13	Wide single	0.686				0.693
P196 Stifford Bridge a/o P1225	Wide single	0.784	0.729	0.771	0.914	0.768
B 160 Sullord Blidge S/0 B 1335	Dual 2 lane					
A13 w/o A128	Dual 4 lane	0.891	0.890	0.935	0.934	0.922
High Road w/o A13 north Stifford	Wide single					
A1306 Arterial Rd e/o B186	Wide single					
Buckingham Hill Rd s/o A1013	Wide single					
A1013 between Buckingham Hill Rd and Orsett	Wide single					
Buckingham Hill Rd s/o Muckingford	Wide single					
Road	Dual 2 lane					
A1014 The Manorway, e/o A13 Stanford-le-Hope	Dual 3 lane	0.709	0.715	0.713	0.709	0.821



- 9.2.7 Looking at each road link in turn and assuming that no other improvements are implemented:
 - The A1306 in Grays west of the A1012, the B186 West Thurrock Way s/o the A1306 and A1012 Elizabeth Road s/o A1306 are currently single carriageway roads. Widening these to provide 10m carriageways would not bring the CRF ratio below 1 in any of the development scenarios. Providing dual carriageways with 2 lanes in each direction would allow them to accommodate the anticipated traffic under all development scenarios with capacity to spare.
 - The A1306 s/o A13 at Wennington, A126 London Road w/o junction with the A1012, A1013 Stanford Road, A128 Brentwood Road n/o A13, High Road North Stifford, B186 Stifford Bridge south of B1335, A1306 e/o B186, Buckingham Hill Road s/o A1013 and A1013 between Buckingham Hill Road and Orsett are all currently single carriageway roads. If these were widened to have 10m carriageways they would have CRF ratios below 1 under all scenarios.
 - The A1306 Arterial Road west of B186 is a single carriageway. This would have CRF ratio of less than 1 if it were a 10m wide single carriageway under all scenarios.
 - Buckingham Hill Road south of Muckingford Road would have CRF ratios below 1 if it were a 10m single carriageway under all scenarios.
 - All of the dual carriageway links that have CRF's over 1 are brought below 1 with the additional of extra lanes in each direction. In some cases 2 additional lanes are needed, but most links can be brought within capacity by adding an extra lane in each direction. The carriageway width required to give CRF's below 1.0 are:

A13 Horndon on the Hill	Dual 4 lane
A13 w/o Five Bells	Dual 4 lane
A13 e/o A126	Dual 4 lane
A13 e/o M25	Dual 4 lane
A127 e/o A128	Dual 3 lane
A13 w/o A128	Dual 5 lane



9.2.8 If the east facing slips are provided at the A13 / A126 slips, the level of widening required to bring the CRF below 1 would reduce. Table 9.4 shows what the CRF's on the affected links under different improvement scenarios.

TABLE	9.4:	WIDENING	REQUIREMENTS	WITH	THE	INTRODUCTION	OF	EAST
FACING	S SLI	PS AT THE	A13/A126 JUNCTIO	N				

		Option 1	Option 2	Option 3	Option 4	Option 4A
A1306, Grays w/o A1012	Wide single	0.926	0.918	0.984	0.985	0.901
	Dual 2 Lane					
B186 West Thurrock Ways/o A1306	Wide Single	0.938	0.935	0.935	0.933	0.935
	Dual 2 Lane					
A13 e/o A126	Dual 5 Lane	0.812	0.803	0.810	0.801	0.827
A126 London Road w/o j/w A1012	Wide single					
A1306 Arterial	Wide single	0.687	0.678	0.751	0.753	0.658
Road w/o B186	Dual 2 Lane					
A1306 Arterial Road e/o B186	Wide single					

- 9.2.9 Looking at Table 9.4, it can be seen that if the east facing slips are constructed:
 - Widening the A1306 w/o A1012 to 10m is sufficient to bring the CRF below 1 in Scenarios 1 to 4 and 4A.
 - Widening the B186 West Thurrock Way s/o the A1306 to 10m brings the CRF below 1 in all scenarios.
 - The A13 e/o A126 would still require widening to dual 5 lanes
- 9.2.10 As before, a 10m wide single carriageway would be sufficient for the A126 London Road w/o the junction with the A1012 and the A1306 Arterial Road e/o B186 and the A1306 Arterial Road w/o B186 to have CRF's below 1 in all scenarios.



10. Development impact - Rail

10.1 Performance Under Development Scenarios

- 10.1.1 Tables 10.1 and 10.2 summarise the ratios of occupancy to capacity at each of the stations under each of the development scenarios. Looking firstly at the AM peak period:
 - Under all scenarios there is space to board trains at Stanford le Hope and West Horndon.
 - The same applied to East Tilbury under all Options.
 - This problem expands as trains reach Grays and Purfleet, with trains being over-capacity at these stations under all scenarios(except Grays under Option 2).
 - On the Ockendon branch line demand would be more than twice the current capacity under all development scenarios and higher for scenarios that concentrate green field development around Ockendon.
 - As trains on the Purfleet and Ockendon branches approach London, the demand far exceeds current capacity
 - Under all scenarios the West Horndon line remains within capacity.
 - In the PM peak a similar situation occurs although, generally speaking, demand is not as far in excess of capacity as it is in the AM period.



	1999	2021	Option 1	Option 2	Option 3	Option 4	Option 4A
Stanford-Le-Hope	0.07	0.09	0.12	0.12	0.12	0.12	0.28
East Tilbury	0.10	0.13	0.18	0.18	0.50	0.49	0.34
Tilbury Town	0.13	0.16	0.28	0.26	0.59	0.56	0.42
Grays	0.24	0.29	1.14	0.95	1.39	1.24	1.17
Purfleet	0.27	0.33	1.57	1.32	1.75	1.53	1.53
Chafford Hundred	0.34	0.42	3.26	2.80	2.80	2.26	2.80
Ockendon	0.44	0.54	4.11	4.91	3.53	4.23	3.53
Barking (via Purfleet)	0.59	0.73	1.97	1.71	2.15	1.92	1.93
Barking (via Ockendon)	0.54	0.67	4.23	5.03	3.66	4.35	3.66
West Hornden	0.11	0.14	0.14	0.14	0.14	0.14	0.14
Barking (via West Hornden)	0.39	0.48	0.48	0.48	0.48	0.48	0.48

TABLE 10.1: RAIL PERFORMANCE IN THE AM PEAK PERIOD (RATIO OF OCCUPANCY TO CAPACITY)



	1999	2021	Option 1	Option 2	Option 3	Option 4	Option 4A
Stanford-Le-Hope	0.11	0.14	0.17	0.17	0.17	0.16	0.33
East Tilbury	0.18	0.22	0.28	0.27	0.60	0.59	0.43
Tilbury Town	0.21	0.26	0.38	0.38	0.69	0.66	0.52
Grays	0.27	0.33	0.97	0.97	1.15	1.03	0.99
Purfleet	0.36	0.45	1.38	1.38	1.52	1.35	1.35
Chafford Hundred	0.15	0.19	1.61	1.61	1.38	1.11	1.38
Ockendon	0.22	0.28	2.06	2.06	1.77	2.11	1.77
Barking (via Purfleet)	0.68	0.84	1.77	1.77	1.91	1.73	1.74
Barking (via Ockendon)	0.62	0.77	2.55	2.55	2.26	2.60	2.26
West Hornden	0.06	0.08	0.08	0.08	0.08	0.08	0.08
Barking (via West Hornden)	0.28	0.35	0.35	0.35	0.35	0.35	0.35

TABLE 10.2: RAIL PERFORMANCE IN THE PM PEAK PERIOD (RATIO OF OCCUPANCY TO CAPACITY)



10.2 Potential Improvements

- 10.2.1 We have tested two ways of increasing rail capacity; namely either increase the carrying capacity of each train or increase train frequency. Either of these approaches require infrastructure improvements. Increasing the size of trains results in a need for longer platforms, whilst increasing frequency needs more sophisticated signalling systems and / or additional tracks.
- 10.2.2 In order to determine what would need to be done to provide sufficient rail capacity to meet with the anticipated demand the following alternatives have been tested:
 - Increasing all platforms to be able to accommodate 12 car trains.
 - Increasing train frequencies until ratios of occupancy to capacity fall below 1.0
- 10.2.3 As the AM peak clearly has more capacity problems than the PM, these test have only been undertaken for the morning period. If the improvements identified can accommodate the morning demand, they will be more than sufficient for the PM period.

10.3 Increasing All Trains to 12 Carriages

10.3.1 Table 10.3 shows the implications of increasing all of the trains to 12 carriages, without any change to frequency. It can be seen that whilst this does improve the situation, the Purfleet line is still over capacity and the Ockendon branch still shows demand twice exceeding capacity.



	Option 1	Option 2	Option 3	Option 4	Option 4A
Stanford-Le-Hope	0.08	0.08	0.08	0.08	0.18
East Tilbury	0.12	0.12	0.34	0.33	0.23
Tilbury Town	0.19	0.17	0.39	0.38	0.23
Grays	0.76	0.63	0.93	0.83	0.78
Purfleet	1.04	0.88	1.17	1.02	1.02
Chafford Hundred	2.17	1.87	1.87	1.50	1.87
Ockendon	2.74	3.27	2.35	2.82	2.35
Barking (via Purfleet)	1.31	1.14	1.43	1.28	1.29
Barking (via Ockendon)	2.83	3.36	2.44	2.90	2.44

TABLE 10.3: AM PEAK RAIL OCCUPANCY/ CAPACITY RATIO WITH 12 CARRIAGE TRAINS



10.4 Increasing Frequency

- 10.4.1 As increasing the size of trains does not provide sufficient capacity by itself, the next tests that we have undertaken is to look at increasing train frequencies (still with 12 car trains). Table 10.4 shows the occupancy to capacity rations assuming train frequencies on the Purfleet line increase to 4 trains an hour and those on the Ockendon branch increase to 3 trains an hour.
- 10.4.2 It can be seen that for Scenarios 1, 4 and 4A this frequency of trains would be just about at capacity. For Scenario 2, the Ockendon branch would be over capacity and would require a frequency of 4 trains per hour to be within capacity. Under development Scenario 3, the Purfleet branch trains would be over capacity when they reached Barking at a frequency of 4 trains per hour. However, there is some spare capacity on the Ockendon branch and some of the trips originating before the lines split may transfer onto this route, which would reduce the problem.



	Frequency	Option 1	Option 2	Option 3	Option 4	Option 4A
Stanford-Le-Hope	7	0.049	0.047	0.047	0.044	0.116
East Tilbury Tilbury Town	7	0.073	0.069	0.207	0.203	0.138
	7	0.112	0.103	0.242	0.232	0.172
Grays	4	0.618	0.513	0.755	0.672	0.634
Purfleet	4	0.854	0.713	0.956	0.830	0.834
Chafford Hundred	3	0.795	0.681	0.681	0.547	0.681
Ockendon	3	1.001	1.198	0.858	1.030	0.858
Barking (via Purfleet)	4	1.051	0.911	1.154	1.029	1.032
Barking (via Ockendon)	3	1.030	1.227	0.887	1.058	0.887

TABLE 10.4: RAIL PERFORMANCE IN THE AM PEAK PERIOD (RATIO OF OCCUPANCY TO CAPACITY)

CONCLUSIONS



11. Spatial considerations

11.1 Overview

- 11.1.1 The assessment of baseline infrastructure shows high levels of deficit as compared with the current population. With regards provision for future growth, infrastructure requirements are essentially pro-rata to new housing development. Thus, it is the amount rather than the distribution of housing that is the key factor in determining the cost of each option. Analysis of growth implications on social and community infrastructure show that costs can be brought down by utilising available capacity in education infrastructure. With regards to transportation infrastructure, altering location of growth has different scales of impact on road and rail, indicating that location has implications on use of rail, public transport.
- 11.1.2 Nevertheless, if large-scale housing development is to occur anywhere in the Borough, the cost of infrastructure provision will be high, due to both a) the large numbers of homes that are being considered here, and b) the lack of spare capacity that exists in the current infrastructure provision.
- 11.1.3 It is not the case, however, that the standard of infrastructure that is implemented is purely a result of the amount of finance invested in it. It will depend on high quality strategic planning, as well as co-ordination between agencies. This chapter outlines some of the implications that the choice of housing distribution can have upon infrastructure provision and which need to be borne in mind, given that theoretically the amount of investment available to enhance infrastructure is limited so that choices need to be made as to where investment is made and how it might be best made.

11.2 Social and community infrastructure

11.2.1 Based on impacts of growth on social and community infrastructure, our study shows that impacts are reduced (or in other words less infrastructure is likely to be required to be developed) when developing within the eastern parts of the borough. This is because some eastern parts of the Borough have higher levels of capacity in their schools than the Thurrock average. Per pupil infrastructure provision costs are, therefore, below the Borough average as a higher than average number of pupils can be accommodated using existing facilities. This is best highlighted in Option 4a, which is the cheapest due to the high levels of development at Corringham and Stanford-le-Hope, which offer higher than average rates of spare capacity in their Examples of this are Corringham, which has the highest number of schools. forecasted primary school places, and the joint third highest number of secondary school places in 2009; and Stanford-le-Hope, which has the second highest number of forecasted secondary school places, and the fifth highest number of primary school places for the same year. In contrast, the highest deficits for both primary and secondary schools in found at West Thurrock/Chafford Hundred because of the nature of the ongoing housing development in that urban block. The areas with the



second highest deficits are Aveley for Secondary Schools and Purfleet for Primary Schools – both urban blocks are again in the west of the borough.

- 11.2.2 Our GIS model, explained in Chapter 2, and comprehensively detailed in Appendix 1, analyses the amount and capacity of facilities relative to populations within walking distance. Graphical maps illustrating outputs from the models are contained at Appendix 1 providing a spatial tool for selecting broad locations for growth on the basis of access to and relative capacity of facilities. Broadly speaking, as expected, town centres tend to benefit from the largest range of facilities. However, a number of urban edge locations also benefit from a high range of facilities and thus releasing greenfield land for residential development at these locations appear to be sensible. Individual locations will obviously need to be examined further.
- 11.2.3 With regards retail there are a number of additional observations to make and these are outlined below.

Retail

Regional and District Centres

- 11.2.4 Grays Town Centre has suffered from a lowered demand for its retail offer since the development of Lakeside. The Borough Retail Study, 2000 revealed that it has less national multiples than one would expect for a town of its size, and this is reflected in comments by shoppers who believe that its retail offer lacks choice. The Retail Study (2000) notes that 'a majority of shoppers visit Grays simply because it is close-by and convenient. On this basis, it is considered that, residents in East Tilbury are more likely than those in Ockendon to use Grays Town Centre in preference to Lakeside. This seems logical for reasons of geography, access and transportation.
- 11.2.5 An increase in trade in Grays town centre is likely to have a regenerative effect that will be more pronounced if development occurs at East Tilbury rather than at Ockendon. This is not to say that development at Ockendon will not increase the numbers of person trips to Grays town centre, just that the development of homes at East Tilbury is likely to have a more significant effect.
- 11.2.6 Substantial urban capacity for new housing development has been identified within proximity of Grays town centre, particularly within South Grays. This additional population should lead to a significant upturn in demand for retail and services in Grays town centre.
- 11.2.7 This expected increase in demand should be augmented and encouraged through improvements to the environment of Grays town centre. It is recommended that a formal design strategy or masterplan is adopted for the town centre in order that the most is made of what is a significant opportunity to improve its vitality and viability.
- 11.2.8 It is likely that Lakeside Centre will benefit from any new population that occurs within the Borough, but more so, if this new population is located closer to it in the south west of Thurrock. The proportion of trips to Grays or Basildon created by residents of new homes in the east of the borough is higher than those of homes nearer to Lakeside. Similarly, if greenfield development occurs at West Horndon, then these residents are more likely to choose Romford or Upminster as preferential



destinations to Lakeside, than if those homes had been built in areas like Ockendon that are closer to Lakeside.

11.2.9 Should shoppers choose to travel outside of the Borough to centres such as Basildon or Romford, this will create a leakage of spending from the Borough, which will lower levels of employment and, in some cases, investment in Thurrock. However, if shoppers travel to these centres in preference to Lakeside, this will relieve pressure on highly congested section on the A13 close to the shopping centre.

Local Centres

- 11.2.10New homes that are located in close proximity to the Borough's six Local Centres are likely to increase the demand for these centres' goods and services. As with Grays Centre, this is likely to have a regenerative effect. This contrasts with the UDP scenario where a fall in population is forecasted around each of the six local centres.
- 11.2.11As detailed in Chapter 3, the Retail Study (2000) identifies three local centres that were performing at standards close to what would be expected; Aveley, Corringham and Socketts Heath. Conversely, three were considered to be underperforming; South Ockendon, Stanford-le Hope and Tilbury. It can be argued that the three local centres, which are underperforming, are in most need of new population within their catchment.
- 11.2.12The table below shows how much growth could occur per option relative to each local centre. Those centres that were shown to be underperforming in the Thurrock Retail Study (2000) are highlighted in capital letters.

	Aveley	Corringham	Grays North	SOUTH OCKENDON	STANFORD- LE-HOPE	TILBURY
UDP	-445	-867	-642	-1,193	-701	-156
RSS14 - Option 1	-185	-1,158	-49	1,532	-490	289
RSS14 - Option 2	-274	-1,185	-492	7,304	-605	58
RSS14 - Option 3	-274	-1,185	-492	954	-605	58
RSS14 - Option 4	-367	-1,215	-591	6,693	-725	-187
RSS14 - Option 4A	-274	932	-492	954	3,629	58

TABLE 11.2 POPULATION CHANGES AROUND EXISTING LOCAL CENTRES

11.2.13 The local centre at South Ockendon is likely to benefit greatly from new urban capacity housing development that will lead to increased expenditure in convenience shopping. Tilbury and Stanford-le-Hope will benefit less from housing from urban capacity and thus need to rely on allocations. The above table shows that within option 4A, Stanford-le-Hope would benefit most. In the other RSS options there would be a fall in population at Stanford, though due to changes in personal retail expenditure patterns this should not necessarily be assumed to result in falling revenues at the centre. At Tilbury, the forecasted increases in population are low – being highest in Option 1 where an increase of 289 persons is forecasted. Other options are forecasted to result in minor population gain, apart from Option 4 where a population loss of 187 persons is predicted.



- 11.2.14 Little housing growth is projected for Corringham in any option, and so we do not consider that the centre will experience significant changes as a result of new housing development in the area. Falling populations in the existing housing may however impact upon it. Its relationship with Stanford-le-Hope will be of interest, as new residents in Stanford may choose to shop in Corringham, rather than their own local centre. In reverse, if the centre in Stanford improves, it may clawback customers who presently shop in Corringham.
- 11.2.15 The relatively low numbers of new homes projected for Aveley are unlikely to lead to major changes in the provision and offer of the centre, and with falling populations in the existing households, increasing expenditure rates per person will be needed to maintain the current offer of the centre.
- 11.2.16 Although, it requires further investigation to assess the demand, new local centres may be warranted in Purfleet, West Thurrock/Chafford Hundred and East Tilbury if these areas experience the high levels of housing growth shown within the above table.

11.3 Waste water

- 11.3.1 The waste water disposal network will require significant investment to upgrade the existing infrastructure. However, the level of investment and the cost will be significantly less in the east than the west. The sewage treatment works which serves the borough is located at West Tilbury and discharge from the west of this has to be transported a considerable distance to be treated.
- 11.3.2 In addition, the sewer network from the west passes through the existing urban area and upgrading infrastructure within an urban area is significantly more expensive than in greenfield locations because of the necessity of digging up roads and negotiating other infrastructure.
- 11.3.3 To put this in context, Anglian Water estimate that development in the West Thurrock/Chafford Hundred and Purfleet areas (which will take place on PDL) will require upgrading and new infrastructure costing approximately £2m. If development was to take place to the north or west of Ockendon then a further £1m worth of infrastructure work is required. Building in the east of the borough is estimated to require infrastructure works of £0.5m.



12. Conclusions

12.1 Overview

12.1.1 This chapter summarises the main conclusions arising from the study. This study has assessed the impact of growth on infrastructure within Thurrock, and is one of a set of reports that informs the Council of the Borough's ability to accommodate growth. Other studies that have been commissioned and which will also need to be considered include assessments of Thurrock's open space – landscape and green grid, its employment land and residential urban land supply (urban capacity).

12.2 Social and community infrastructure

Baseline assessment

- 12.2.1 Our assessment of existing social and community infrastructure shows that there are substantial deficits, particularly within education, health and community centres. Our results with regards community centres are to be treated with caution as our assessment is based on an average population per facility ratio and does not, therefore, take into consideration qualitative and quantitative factors. Nevertheless, it does give a strong indication of a deficit in community facilities.
- 12.2.2 Overall the infrastructure deficit in current facilities requires investment of approximately £37m.
- 12.2.3 There is limited scope for existing infrastructure to accommodate growth, because:
 - capacity in the education sector is minimal
 - the primary health sector is operating above capacity, secondary health is effectively at capacity
 - South Essex is an acknowledged water shortage area
 - the current waste water network has capacity for only an additional 4,000 dwellings
 - community halls are effectively operating at capacity (and ratio analysis identifies significant deficits)
 - parts of the primary highway network are at or close to capacity
 - there is no flexibility on the rail network to increase peak hour capacity, either through enhanced service levels or extended trains.



Future growth

- 12.2.4 Deficiencies within the existing infrastructure are not insurmountable but, as this study has demonstrated, high levels of capital investment are required. In order to accommodate additional RSS growth, not taking into account current deficits in social and community infrastructure circa £100m of investment is required.
- 12.2.5 Taking into account existing deficiencies in infrastructure, the total social and community infrastructure deficit is around £140m. The existing deficit means that investment in infrastructure should be achieved initially at least, at a faster rate than housing development.

Cost per dwelling

- 12.2.6 The cost per dwelling varies from £6,200 to £6,500 per dwelling within the RSS growth forecasts but is higher for UDP alone growth. This is because the cost per dwelling requirement is based on overcoming deficits in education infrastructure which are substantial. Thus, RSS growth figures appear cheaper simply because the deficit is being distributed between a larger amount of housing, as compared with UDP figures.
- 12.2.7 The above costs do not include any estimates for road and rail infrastructure where tested solutions to enable existing planned levels of growth contained in draft RSS14 will require very substantial and radical infrastructure enhancements. It is not possible to cost these with any degree of accuracy, but they would clearly dwarf the costs associated with social and community infrastructure.

Education

- 12.2.8 Although the school plan indicates that there is some surplus capacity at primary level, the quantity of growth and its location is already necessitating additional capacity at the primary level (the existing West Thurrock Primary School is to be replaced and a new school at High House in West Purfleet). Thus, any level of growth above that within the UDP will require investment in expanded and new primary facilities. The greater the level of population growth the additional investment will increase on a pro-rata basis.
- 12.2.9 The secondary sector has less spare capacity than the primary. Chafford Hundred school is having its capacity increased by 150 places but this is to meet current, not future, demand. Whatever levels of growth occurs, investment is required in expanding secondary school provision. As with primary education, the level of investment required will increase proportionally with population growth.
- 12.2.10 Post-16 education is more difficult to project because there are more variables than for primary and secondary education (for example, types of courses being demanded and the potential growth in work based learning when many students are part-time). The two existing FE colleges within the borough will be able to accommodate a significant level of growth in post-16 students. It is considered that once an additional 1,500 post-16 students are generated by population growth it is not realistic to expect the existing colleges to take-on more students and at this level an additional college



will be required. A college this size (200 students less than Palmer's College is at present) will cost approximately £14m at today's prices.

Health

- 12.2.11At the primary level Thurrock's health system is operating over capacity, therefore, what ever development takes place investment in the primary sector is required. As population growth increases the level of investment will have to increase and at least proportionally to ensure that the same levels of standard of service are retained; this in the context of a current shortage. The level of required investment in the primary sector will be substantial. There are insufficient qualified personnel at the moment to meet demand and many of the existing premises are sub-standard. In addition, an increasing level of service provision is being passed down to the primary sector from the secondary level (that is, hospitals) and this in itself requires considerable investment.
- 12.2.12 It has proved difficult to calculate the level of investment required at the secondary level because it is dependent on the ability of the primary sector to undertake services and to implement measures that will reduce demand for hospital services. In this study, the number of additional beds required as a result of population growth has been calculated and a cost attributed to this; but it is not possible to provide an indication as to how these beds will be provided. Many will be provided by reducing demand for hospital treatment and improving efficiency within existing infrastructure, but if the very high levels of growth postulated occur within the Thames Gateway and South Essex, it is difficult to imagine that either, a new hospital will not be required or the existing Basildon Hospital substantially enhanced.
- 12.2.13 If RSS14 levels of growth are achieved then from 2004 the amount of population within the catchment of Basildon Hospital (Thurrock, Basildon plus parts of Castle Point and Brentwood) will equate to approximately 26,600 people. This is equivalent of additional need for 75 additional hospital beds.
- 12.2.14 However, current health policy is to supply no additional new hospital beds, and instead to meet demand through efficiency gains in hospitals and a greater reliance on community health care. This implications of these forecasts will need therefore to be discussed further with Thurrock PCT and the Department for Health.
- 12.2.15 Communication with the hospital trust and the NHS centrally reveal that there is no set formulae for calculating when a new hospital is required but note that the Urban Task Force's Urban Renaissance indicates that a hospital is required per 50,000 population. However, the size of new and existing hospitals varies substantially. For example the new cardiothoracic unit at Basildon Hospital is 100 beds and a 321 additional bed unit was built when Orsett hospital was changed to a day hospital. Other general hospitals looked at for comparison are Southend at 850 beds, Northampton General at 700 beds, Kettering General at 500 beds, Medway Maritime at 545 beds and the 400 beds at Darent Valley Hospital in nearby Dartford.
- 12.2.16 It is therefore important that the health service is aware of and responds proactively to the level of growth that are going to occur within Thurrock, Castle Point, Basildon and Brentwood.



Utilities

- 12.2.17It is clear from the analysis above that energy supply is a function of the market and where there is demand the suppliers will supplier. The level of growth at Thurrock is only a small percentage of overall demand growth across the UK and the Joint Energy Security of Supply (JESS) study produced by OFGEM and the DTI shows that there is sufficient new electricity generating capacity coming on stream in the next few years to meet projected demand, and that there are sufficient gas supplies to meet demand.
- 12.2.18The supply of potable water is not a function of market demand. ESW are investing in additional storage capacity to meet growth at 40,000 dwellings above the Essex structure plan. ESW have to submit periodic spending and pricing reviews to OFWAT and it will be through this mechanism that decisions are taken on investment levels and new infrastructure. The ability of ESW to meet demand within Thurrock is not simply a function of population growth within Thurrock but also the exogenous factors of population growth in the wider South Essex area and of anticipated longer term climatic change; global warming.
- 12.2.19The waste water network requires substantial investment. Thames Water state that the extant infrastructure only has capacity for approximately 4,000 additional dwellings. However, the infrastructure in the western part of the borough (Purfleet and West Thurrock where a majority of the brown field sites are) is older than that in the east and population is higher in the west and any new development will require augmentation of the sewage network.
- 12.2.20Thames Water do not anticipate that a new sewage treatment works is required as a result of the growth scenarios tested here and have not given an indication of the level of growth at which a new works would be required.

12.3 Transport

Road

- 12.3.1 The ratio of Annual Average Daily Traffic (AADT) to Congestion Reference Flow (CRF) has been used to estimate the performance pf different links on the road network. AADT / CRF ratios of less than 0.85 indicate that the road should be operating acceptably, 0.85 1.0 that problems may be starting to occur and in excess of 1.0 that peak period congestion can be expected.
- 12.3.2 Under 2001 traffic flows, the number of links in Thurrock with AADT / CRF rations above 1.0 are limited, with problems mainly confined to the A13 at Horndon on the Hill, A1306 in Grays and the B186 West Thurrock Way. Projecting traffic flows forward to 2021 shows the performance of these links becomes worse and additional sections of the A13 also experience capacity problems. In addition, a number of other links are found to be approaching capacity in 2021, including the A126, A1013 and A128.
- 12.3.3 The main differences between these development options is the location of green field development. Option 1 considers this to be disbursed around all of the



development areas, Option 2 has it focussed in Ockendon, Option 3 in East Tilbury, Option 4 split between Ockendon and East Tilbury and Option 4a is focussed on Corringham. In terms of traffic impact, Options 1 and 2 have marginally less impact than Options 3 and 4. When green field development is focussed on Ockendon it causes specific problems on the B186, whereas focussing development in Corringham results in the A128 north of the A13 exceeding capacity. Green field development at East Tilbury does not specifically result in any particular link being pushed over-capacity, but does worsen the performance of the A1306. All of the options result in the A13, A1306 and A1013 being significantly over-capacity.

- 12.3.4 The scale of improvement that would be required to bring links with AADT / CRF rations above 1.0 below 1.0 has been tested. A potential improvement measure that could alleviate traffic problems on the A1306 is the introduction of east facing slips on the A13 / A126 junction. Testing this demonstrated that the introduction of slips would improve the performance of the A1306 in all scenarios and only slightly detrimentally affect the performance of the A13. However, the introduction of the slips is not sufficient to bring the A1306 within capacity under any of the scenarios.
- 12.3.5 The other option for increasing road capacity is widening. All links with AADT / CRF rations in excess of 1.0 were tested with increased carriageway widths / number of lanes. All single carriageways were initially tested widened to 10m and then dualled if this was insufficient to bring the link within capacity. Dual carriageways were widened in each direction until they were brought within capacity. The A1306 in Grays, the B186 West Thurrock Way and A1012 Elizabeth Road are single carriageways that required dualling under all scenarios. All other single carriageways that require improvement can be brought within capacity by widening to 10m under the RSS development scenarios. The A13 links that are over-capacity require the addition of at least one lane in each direction to bring them within capacity, and in some locations 2 additional lanes are needed.
- 12.3.6 In summary, the key highway impact conclusions are:
 - Under all development scenarios, the A13 is substantially over-capacity and would require widening by at least one lane in each direction (and in some locations widening by two lanes).
 - All development scenarios will require significant improvements in highway capacity by 2021 if anticipated demand is to be accommodated.
 - Development above the RSS levels causes significantly more impact and will require more extensive road improvements.
 - Options 1, 3 and 4a require fewer capacity improvements, and of these Options 1 and 3 have slightly less impact than Option 4a.

Rail

12.3.7 A similar assessment methodology has been applied, based upon the relationship of occupancy to capacity. The 2001 and 2021 baseline tests show that the lines running through Purfleet, Ockendon and West Horndon are within capacity during the peak periods. However, under all development scenarios both the Purfleet and Ockendon lines have capacity problems. The performance of the Ockendon branch



is significantly worse than the Purfleet branch as train frequencies are lower. Development scenarios that focus on around Chafford Hundred and Ockendon (i.e. all options bar 3 and 4A) result in significantly greater impact on this line.

- 12.3.8 With regards increasing rail capacity, two solution scenarios were tested. Firstly increasing the size of trains from 8 carriages to 12 on both the Ockendon and Purfleet branches. Whilst this did improve capacity, trains on both branches remained over-capacity, with the Ockendon branch substantially so. The second enhancement was to test the effect of increasing train frequencies as well as train sizes. Increasing the Purfleet branch from 3 to 4 trains per hour resulted in Option 2 being within capacity on this line and Options 1, 3, 4 and 4A being only marginally over capacity.
- 12.3.9 In order to be able to increase frequencies on the Ockendon branch it will be necessary to construct an additional track parallel to the existing single track. Increasing frequencies to 3 trains per hour on this branch would result in Option 3 and 4A being within capacity whilst Option 1 and 4 and 5 would only be marginally over capacity. Option 2 requires 4 trains per hour to accommodate demand on this branch.
- 12.3.10 Thus, in summary, to accommodate RSS levels of development it will be necessary to increase platform lengths on both the Ockendon and Purfleet branches to 12 cars, construct a second track on the Ockendon branch and improve signalling to allow for at least 4 trains per hour on the Purfleet branch and at least 3 trains per hour on the Ockendon branch.

12.4 Spatial strategy and managing development

- 12.4.1 Based on the above analysis, so far as spatial strategy is concerned and also with regards managing development, we comment as follows:
 - Substantial enhancements are required to the road and rail network irrespective of spatial distribution of development;
 - Locating development to the east of the borough results in a larger scale of road infrastructure enhancement, a lower investment in school buildings, and marginally less investment in rail;
 - Locating development close to and in proximity to a range of facilities so that they can benefit from those facilities reduces social and community infrastructure requirements. Locating new development close to a good range of facilities maximises prospects of reducing the need to travel. Moreover, these types of locations are also more likely to be sustainable than locations which benefit from less facilities. Hence, given the impacts on transport infrastructure and the consequent scale of investment required, it is logical to explore options in such locations.
 - Some locations do not benefit from a good range of facilities. This study identifies a substantial deficit in current levels of infrastructure. Locating new development at these locations does increases the prospect of, or at least offers the possibility of increasing the range of facilities and thereby,


maximises prospects of reducing the need to travel. It will also lead to enhancement to existing communities.

- It is urgent that the need for a new hospital is investigated further if the forecasted deficit in supply of hospital beds cannot be serviced through new health care practice models.
- Investment in infrastructure must be front loaded in order to overcome existing deficits in infrastructure. It is not necessarily realistic or sensible to expect new development to provide the funding to overcome existing deficits, given that they will need to provide for the needs of the new growth, which requires substantial investment in road and rail infrastructure.
- The new growth represents an opportunity to re-invigorate Grays town centre but also local centres. This opportunity must not be missed and work as to the scale of change that could be achieved and the nature of change possible should be investigated now. Preparing an action area plans for the town centre will enable new growth to be linked to enhancement of the town centre.



Appendix 1 – Locational preferences for development

Introduction

Colin Buchanan calculated which output areas were most suitable for development on the basis of availability, choice and density of social and community infrastructure. Data was assessed by 'output area' a sub-ward geographical unit of information used by ONS. They are a smaller unit than wards and so represent a very fine grain upon which to undertake analysis and can advise with some precision on the most suitable areas for residential development, both in urban and Green Belt locations.

The measure used to assess an output's area's suitability for development was its accessibility to facilities and services, and the capacity of those facilities and services.

Using a GIS, the accessibility to facilities of output areas within the Borough was calculated as a means of identifying the most suitable development areas in terms of infrastructure provision.

Each output area in the Borough received a score according to the number and type of facilities within whose catchment area it lay. Weighting was given to facilities that held spare capacity, as these would most easily be able to accommodate residents living in new housing development.

The scores for each output area are shown on Maps 'Appendix 1.1' and 'Appendix 1.2', with those output Areas perceived to be more suitable for development receiving the higher scores. On the maps, warm colours have been used to display those output areas that received high scores and cold colours for those with low scores.

It is hoped that these maps will be a useful tool in helping to develop a phasing strategy for new housing developments, as those output areas with the highest scores for their accessibility to infrastructure are likely to be the most suitable for development earlier on in the study period. This is because their reliance on the installation of new infrastructure is lower.

Data Collection and Storage

To ascertain which output areas of the Borough have best access to services and infrastructure, two criteria needed to be assessed – the capacity of the facilities and the distance between population and the facilities.

Baseline data on existing infrastructure was collected and mapped using a Geographical Information System (GIS)⁵. This enabled visualisation and analysis of the relationship of the locations of i) existing facilities and service provision, and ii) factors such as population and housing densities. The database capabilities of the

⁵ In essence, though an over simplification, a GIS is a computer-based cartographic package, where every feature on a map has data attached to it in a database. This database can be queried and analysed.



GIS were used to store information about the Borough's facilities, demographics, political geography, utilities, and transport.

One key type of data that was stored in the GIS was the results of enquiries into the capacity of the Borough's facilities. Where possible, numerical information was used to assess capacity, though this was not available for all facilities. If a facility was known to have a deficit of capacity this was also quantified.

Assessing Access

The methodology for assessing accessibility to existing infrastructure was based upon the scoring of individual output areas. Output areas are the smallest geographical unit of aggregation for which census data is available, and therefore are commonly used for socio-economic analysis. This is important as it allows the results to be easily compared against, and integrated with, other information sets and studies.

A quantitative system, where each output area was assessed according to whether its centroid, or central point, was within the catchment area of a variety of facilities was developed. If the centroid was within the catchment area of the facility, it was deemed that the population of that output area had geographical access to that facility. To calculate the catchment areas, the facilities that had been geo-coded (or mapped) in the GIS were assigned a catchment area based upon distances set out in the UWE/LGMB⁶ Design Guide and also in the Urban Task Force's 'Towards an Urban Renaissance'. The sizes of the catchment areas used in this analysis are set out below in Table A1.1.

Facility	Catchment	Catchment Area, Source										
Secondary schools	1.5km	UWE/LGMB Design Guide										
Primary schools	600m	UWE/LGMB Design Guide										
Dentists	1km	UWE/LGMB Design Guide										
GPs	1km	UWE/LGMB Design Guide										
Elderly Day Care	600m	Consultant's Estimate										
Village Halls	600m	Urban Taskforce										
Libraries	2km	Urban Taskforce										
Learning Disabilities	1.5km	Consultant's Estimate										
Rail Stations	1km	Average of UWE and IHE										
Sports Centre	600m	Urban Taskforce										
Outdoor Sports Facility	1km	UWE/LGMB Design Guide										
Green Amenity Space	600m	Urban Taskforce										
Parks and Gardens	600m - 3km	Urban Taskforce										
Park (0 to 10,000 sq.m.)	600m	Consultant's Estimate in line with the Urban Taskforce										
Park (10,000 sq.m. to 20,000 sq.m.)	800m	Consultant's Estimate in line with the Urban Taskforce										
Park (20,000 sq.m. to 30,000 sq.m.)	1km	Consultant's Estimate in line with the Urban Taskforce										
Park (30,000 sq.m. to 40,000 sq.m.)	1.25km	Consultant's Estimate in line with the Urban Taskforce										

TABLE A1.1 FACILITY CATCHMENT AREAS

⁶ University of the West of England, and Local Government Management Board



Park (40,000 sq.m. to 65,000 sq.m.)	1.5km	Consultant's Estimate in line with the Urban Taskforce							
Amenity Space	600m	Consultant's Estimate in line with the Urban Taskforce							
Comparison Goods - Grays and Lakeside	1800m	Urban Taskforce							
Comp. Goods - Local Centres and Major Supermarkets	800m	UWE/LGMB Design Guide							
Corringham and Grays	1800m	Urban Taskforce							
Convenience Goods - Local Centres	800m	UWE/LGMB Design Guide							

Most of the catchment areas used are based upon walk distances. In line with national, regional and local planning policy, settlements should be developed according to the principles of sustainable development as set out in policy documents, principally PPS12 - Development Plans and Regional Planning Guidance, and PPS13 – Transport. For example, PPS13 aims to:

- promote more sustainable transport choices for both people and for moving freight;
- promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling, and
- reduce the need to travel, especially by car.

If these objectives are to be achieved then, as set out in the UWE/LGMB design guide and the Urban Taskforce's 'Towards and Urban Renaissance', housing and facilities should be located as closely as possible together in order to try to reduce the reliance on cars in society. If this can be achieved, it is then hoped that levels of congestion and harmful emissions can be reduced. Higher density developments, and environments that are more conducive to walking and cycling can be developed if the focus of policy is to encourage the use of travel modes other than the car.

The GIS software was used to calculate whether the centroid, or central point, of each output area was within the facility's catchment area. This method, though the normal way of performing the operation, has a weakness in that, due to the irregular shape, or size, of an output area, it was possible for the facility to be contained within a certain output area, and yet for that output area's centroid to lie outside the facility's catchment area. As a result, it was therefore possible for an output area in which a facility was located not to be included within the facility's catchment area.

This is illustrated in figure A1.1 below where the primary schools are shown as large round points towards the bottom of the plan, and the output area centroids as small squares. The centroid directly to the north of the primary school in *Output Area 1* can be seen to be just outside of the primary school's buffer, despite being within the same output area. *Output Area 1* would have been unfairly discriminated against if it had not been included as being within the catchment area of a primary school. To counteract this problem, in addition to those output areas whose centroid lay within the catchment of the facility, output areas that contained a facility were also automatically included as being within the facility's catchment.

Conversely, it is perhaps inappropriate that *Output Area 2* is included within the primary school's catchment area, as only a small proportion of its land area is within



600 metres of the school. However, there was no workable solution to this problem, except to highlight it as a inadequacy.

Another inadequacy of the GIS analysis is the failure to take account of the population distribution or ease of movement within an output area. This could only be overcome by using a large number of value judgements with no guarantee of greater accuracy.

FIGURE A1.1: THE SELECTION OF OUTPUT AREAS



Once those output areas that were adjudged to lie within the catchment areas of facilities were identified, we then proceeded to score them according to the type of facilities in whose catchment area they lay. Each facility type was assigned a borough-wide score, and for each output area, a total score was created according to the sum of the scores for the facilities in whose catchments they lay. The score for each facility type is shown in table A1.2 below. So, for example, if the centroid of an output area was only within the catchment area of a GP's surgery and a village hall, it would achieve a score of 6; '4' for the GP's surgery added to a score of '2' for the village hall.

The scoring system

Values attributed to capacity and access were combined within the scoring system. For example, an output area received 3 points for each secondary school that it was within the catchment of. To reflect the greater ease with which they could house additional pupils, those secondary schools with spare capacity were awarded bonus points according to the amount of spare places available. If an output area was within the catchment area of a school with 100 spare places in 2008, it would receive 3 points, and a further 3 – making a total of 6 – for the school having 100 spare places. If the school had more than 120 spare places, it would have been awarded a further 3 points, making a total of 9.



If a facility was at or over capacity, it could be argued that it is of little value to an expanding community, and should not therefore contribute to an output area's score. However, no adjustment was made for this in the scoring system because: i) more efficient use of buildings may be achieved; ii) problems with a lack of capacity at a facility may be due to staffing rather than because of the building itself; and iii) if possible, it may often be more cost-effective to extend an existing facility, than to build a new one elsewhere.

Individual scores for facilities

The capacities for schools were taken from the Thurrock Local Education Committee's Draft School Organisation Plan, July 2003. The bonus points for capacity were awarded according to multiples of thirty spare pupil spaces, that being a standard class size. Output areas within the catchment areas of primary schools with 30 or more places received 3 bonus points, whilst those within the catchment of a secondary school did not receive the 3 points unless the secondary school had 60 spare places. This decision reflects the difference in school sizes between primary and secondary.

All parks received the same score as it was assumed that increased attraction of a larger facility accounted for in their wider catchment areas. Similarly, differences in the size of retail centres resulted only in larger catchment areas.

Retail facilities that primarily sold convenience goods received a higher score than those whose primary offer was comparison goods. This is due to convenience shopping trips being more frequent than trips for comparison goods.

In terms of comparison goods shopping, if an output area was within the catchment area of Lakeside or Grays, as the major centres for this type of shopping in the borough, it received 6 points, rather than the 2 points given to output area that lay within the catchments of other centres and stores. The major supermarkets, though not traditionally thought of as comparison goods retailers were included alongside the local centres (Aveley, Corringham, Socketts Heath, South Ockendon, Stanfordle-Hope and Tilbury) as smaller comparison goods centres. This is because comparison goods shopping now makes up a major proportion of the major supermarket's floorspace and profits.

For convenience shopping, 6 points was awarded to those output areas that lie within the catchment area of a major free-standing supermarket, Corringham or Grays centre. Corringham, although defined as a local centre in the Unitary Development Plan, actually holds a greater holds a greater proportion (5%) of Thurrock's convenience goods spending than Grays (4%). Output areas lying with the catchments of the Borough's other local centres were awarded 2 points.



Facility	Score
Secondary schools	3
Secondary schools over 60 spare places in 2008 (Bonus)	3
Secondary schools over 120 spare places in 2008 (Bonus)	3
Primary schools	3
Primary Schools over 30 spare places in 2008 (Bonus)	3
Primary Schools over 60 spare places in 2008 (Bonus)	3
Primary Schools over 120 spare places in 2008 (Bonus)	3
Dentists	3
GPs	4
Elderly Day Care	2
Village Halls	2
Libraries	4
Learning Disabilities	1
Rail Stations	8
Community Sports Facilities	2
Outdoor Sports Facilities	2
Park (0 to 10,000 sq.m.)	1
Park (10,000 sq.m. to 20,000 sq.m.)	1
Park (20,000 sq.m. to 30,000 sq.m.)	1
Park (30,000 sq.m. to 40,000 sq.m.)	1
Park (40,000 sq.m. to 65,000 sq.m.)	1
Amenity Space	1
Comparison Goods - Grays and Lakeside	2
Comparison Goods - Local Centres and Major Supermarkets	2
Convenience Goods - Major Stores, Corringham and Grays	6
Convenience Goods - Local Centres	6

The total score for each output area was used to produce a thematic map, which when underlayed beneath a 1:50,000 Ordnance Survey map of the area to provide a visual indication of the output areas with greater access to facilities, and especially those facilities with capacity, and the relationship of these areas to the geography of the Borough. The converse is also true, and output areas with poor facility provision are also identifiable.

These results are shown on Map Appendix 1.1.

However, a drawback with this methodology and resulting map is that it does not take into account the population density of the output areas. Those areas where population densities are already high are likely to be able to accommodate less new homes than those where the population density is low. A score that was inversely proportional to the population of each output area was therefore subtracted from the total score that had been awarded to each output area on account of the access to facilities from it.

A second map – Map Appendix 1.2 - that shows the results for each output area, once the population density factor had been taken into account.





Appendix 2 – Social and Community Infrastructure Costs (multiplier assumptions)

	Nursery Schools	Primary schools	Secondary Schools	Post Sixteen full time students	GPs	Hospital beds	Community hall	Libraries	Elderly residential care places	People with learning difficulties requiring accommoda tion
Cost Explanat ion	DfES standard cost with local multiplier (x 1.07)	DfES standard cost with local multiplier (x 1.07)	DfES standard cost with local multiplier (x 1.08)	£9,400 per full time pupil	1GP per 1,800 pop. £2.5m per four GP health centre	2.8 beds per 1000 pop. £200,000 per bed	£1.3m per community hall	£2,600 per sqm for a static collection	£2.7m per 40 bed home	Assumed to be same as an elderly care home
Source	Thurrock LEA	Thurrock LEA	Thurrock LEA	Thurrock and Basildon College	Based on PCT in Northampton	The Cost & Funding of growth in South East England (June 2005)	The Cost & Funding of growth in South East England (June 2005)	The Cost & Funding of growth in South East England (June 2005)	Thurrock Council	Assumed to be same as an elderly care home
Numeric al Cost (per unit)	£9,491	£9,491	£14,904	£9,400	£625,000	£200,000	£1,300,000	£230,402	£67,500	£67,500

Appendix 3: Baseline Traffic flow results

			2001	2021			
					CRF		
Road No.	Location	AADT	CRF ratio	AADT	ratio		
A126	London Rd, Grays, w/o Quarry Hill, e/o j/w A1012	15922	0.438	20776.62	0.691		
A126	Lakeside Link, just south of A13	28433	0.399	37102.22	0.517		
A126	London Rd, w/o Eastern Way, and w/o j/w A1012	21895	0.677	28570.79	0.879		
A126	Dock Road, (east of the A1089)	12514	0.528	16329.52	0.686		
A1012	Elizabeth Rd s/o A1306	22027	0.774	30162.3	1.067		
A1012	North Stifford, N of A1306	35651	0.403	49251.38	0.567		
A1013	Palmers Ave (e/o A126 loop, w/o Hathaway)	12878	0.479	16804.5	0.622		
A1013	in Stanford Rd (before B188 jcn)	16326	0.669	21303.8	0.869		
A1089	St Andrew's Road, SE of Station, Tilbury (s/o a126 loop)	1989	0.037	2595.446	0.048		
A1090	Stonehouse Lane, Purfleet (w/o j/w m25, e/o j/w c road)	10465	0.304	15075.05	0.437		
A1306	Arterial Rd,E of W Th Way, (B186)W Thurrock	16833	0.516	23384.65	0.731		
A1306	Arterial Road, Grays w/o A1012)	31550	1.132	42588.87	1.532		
A1306	Arterial Rd,at railway brdg,W Thurrock (w/o B186)	18133	0.691	25081.02	0.960		
B146							
(B186)	Fenner Road, Chafford Hundred (w/o a126)	19658	0.664	25651.72	0.862		
B149	In Wood View, near bridge over A1089	10467	0.379	13658.39	0.492		
B186	West Thurrock Way, S of A1306	31768	1.154	41454.06	1.498		
CIII	Long Lane, E of Windsor Avenue	7241	0.270	9448.781	0.351		
CIII	Lodge Ln, SE of Nutberry Ave, Grays	17834	0.626	23271.59	0.813		
CIII	London Rd, E of A1090, West Thurrock	14445	0.501	18849.28	0.651		
CIII	Hathaway Rd, N of Ward Ave, Grays	6180	0.263	8064.282	0.341		
CIII	Weston Ave, W of W Th Way, W Thurrock	16212	0.528	21155.04	0.685		
CIII	Heron Way, S of A126/B186 junction	14941	0.629	19496.51	0.817		
CIII	London Rd, E of Butts Lane, Stanford-le-Hope	8910	0.294	11626.66	0.381		
A1014	The Manorway, E of A13 RAB, Stanford-Le-Hope	28644	0.376	65237.42	0.794		
B1420	Southend Rd, At railway Bridge, Stanford-le-Hope	11878	0.247	15499.6	0.321		
A1306	Just S of new A13, Wennington (B4 A1090 branches)	27144	0.871	35420.21	1.131		
A13	800m SW of Five Bells jn, Corringham (W/O A127??)	64999	0.865	98065.95	1.276		
CIII	Lower Dunton Rd at Lower Dunton Hall	3186	0.144	4157.411	0.186		
CIII	Dunnings Lane, S of Little Tillingham Hall	466	0.014	608.0834	0.019		
CIII	Stifford Clays Rd, N of A13, Grays (ASSUME High Rd)	2716	0.067	3961.058	0.118		
B188	Baker Street, Under A13 Bridge, Grays	1973	0.731	2574.568	0.086		
A128	Brentwood Rd, N of A13 Rab, Orsett	16243	0.731	21531.26	0.960		
B1007	North Hill, N of A13 Rab, Horndon on the Hill	9847	0.424	12849.35	0.551		
CIII	Buckingham Hill Rd,S of A1013, Stanford-le-Hope	9402	0.279	12268.67	0.362		
CIII	Butts Lane, S of Prospect Ave, Stanford-le-Hope	1530	0.075	1996.497	0.097		
CIII	Muckingford Rd,E of Sandy Ln Rab,Chadwell St Mary	5879	0.224	7671.507	0.290		
CIII	Romford Rd, N of Usk Road, Aveley	9971	0.293	13011.16	0.380		
CIII	Dennis Lane, SE of M25, Ockendon	3436	0.131	4483.636	0.171		
B186	North Rd, N of Cheelson Rd, South Ockendon (north tip)	11530	0.261	15045.5	0.339		
B186	Stifford Bridge, S of B1335, North Stifford	24191	0.761	31983.79	0.987		
B1335	Stifford Rd, W of M25 bridge, South Ockendon	14745	0.467	19240.75	0.607		
CIII	Purfleet Rd, W of Blenheim Gardens, Aveley	3771	0.109	4920.778	0.141		
B1335	Sandy Lane, E of A1306, Aveley	9457	0.314	12340.44	0.407		
A13	Horndon on the Hill	76123	1.032	113608.2	1.504		
A1013	Between Buckingham Hill Rd and Orsett Cock	13167	0.352	17517.39	0.468		
B186	Pilgrims Lane, S of Stifford Hill	14112	0.418	18414.75	0.543		
A13	1 km west of A128, Orsett	74959	0.702	112089.3	1.021		
CIII	Daiglen Drive, South Ockendon	9809	0.288	12799.76	0.374		



-					
			2001	202	21
					CRF
Road No.	Location	AADT	CRF ratio	AADT	ratio
CIII	High Road, W of A13, N Stifford	12544	0.434	16785.62	0.563
A1014	In Manor Way, Stanford-le-Hope	15093	0.215	19694.86	0.279
A13	east of a1089	65000	0.629	84818.5	0.648
A13	east of a126	96000	0.929	139184.7	1.056
A1089	s/o a13	24000	0.336	32759.3	0.352
A13	west of A1306	64228	0.501	97725.44	0.564
A13	west of m25	64252	0.501	86564.03	0.629
A1306	n/o B1335	20877	0.485	27242.4	0.630
A13	e/o M25	96000	0.929	139184.7	1.056
A127	w/o a128	71000	0.998	92647.9	1.032
A1306	w/o M25	14392	0.446	19165.74	0.574
A1090	w/o j/w London Road	3648	0.114	5145.897	0.143
A1013	w/o j/w A126	13625	0.408	18196.7	0.521
A1013		2951	0.154	4268.193	0.179
A12	s/o j/w Brentwood Road	5962	0.207	8140.238	0.262
	Brentwood Road	10198	0.323	13307.37	0.419
	Buckingham Hill Rd s/o j/w Muckingford Road	7991	0.244	10427.46	0.316
B1420	Church Rd n/o j/w A1014 op The Bull	1836	0.195	4135.914	0.183



Appendix 4: Rail Analysis

AM peak		Baseline						Required spare capacity								
Branch	No. of services	Capacity	1998 Осс		2021 Осс		Opt 1	RFC	Opt 2	RFC	Opt 3	RFC	Opt 4	RFC	Opt 4A	RFC
SLH	4	3200	234	0.07	290	0.09	411	0.13	391	0.12	391	0.12	368	0.12	971	0.30
E Til	4	3200	324	0.10	401	0.13	612	0.19	578	0.18	1742	0.54	1702	0.53	1158	0.36
ТТ	4	3200	406	0.13	503	0.16	937	0.29	866	0.27	2030	0.63	1948	0.61	1447	0.45
Grays	3	2400	569	0.24	705	0.29	2968	1.24	2461	1.03	3625	1.51	3225	1.34	3042	1.27
Purf	3	2400	642	0.27	795	0.33	4099	1.71	3423	1.43	4587	1.91	3988	1.66	4004	1.67
W Horn	4	4800	548	0.11	679	0.14	679	0.14	679	0.14	679	0.14	679	0.14	679	0.14
Chaf	1	800	270	0.34	334	0.42	2863	3.58	2452	3.07	2452	3.07	1969	2.46	2452	3.07
Ock	1	800	351	0.44	435	0.54	3604	4.51	4313	5.39	3089	3.86	3708	4.63	3089	3.86
Barking(W)	4	4800	1857	0.39	2300	0.48	2300	0.48	2300	0.48	2300	0.48	2300	0.48	2300	0.48
Barking (O)	1	800	434	0.54	538	0.67	3707	4.63	4416	5.52	3192	3.99	3810	4.76	3192	3.99
Barking (P)	3	2400	1409	0.59	1745	0.73	5049	2.10	4373	1.82	5537	2.31	4938	2.06	4953	2.06



PM PEAK

	No. of		Baseline								Required spare capacity						
Branch	services	Capacity	1998 Осс		2021 Occ.		Opt 1	RFC	Opt 2	RFC	Opt 3	RFC	Opt 4	RFC	Opt 4A	RFC	
SLH	4	3200	358	0.11	443	0.14	564	0.18	545	0.17	545	0.17	522	0.16	1125	0.35	
E Til	4	3200	568	0.18	703	0.22	915	0.29	880	0.28	2044	0.64	2005	0.63	1461	0.46	
TT	4	3200	665	0.21	824	0.26	1258	0.39	1258	0.39	2351	0.73	2269	0.71	1767	0.55	
Grays	4	3200	850	0.27	1053	0.33	3316	1.04	3316	1.04	3973	1.24	3573	1.12	3390	1.06	
Purf	4	3200	1162	0.36	1439	0.45	4743	1.48	4743	1.48	5231	1.63	4632	1.45	4648	1.45	
W Horn	4	4800	311	0.06	385	0.08	385	0.08	385	0.08	385	0.08	385	0.08	385	0.08	
Chaf	2	1600	246	0.15	305	0.19	2833	1.77	2833	1.77	2422	1.51	1940	1.21	2422	1.51	
Ock	2	1600	358	0.22	443	0.28	3613	2.26	3613	2.26	3098	1.94	3716	2.32	3098	1.94	
Barking(W)	4	4800	1357	0.28	1681	0.35	1681	0.35	1681	0.35	1681	0.35	1681	0.35	1681	0.35	
Barking (O)	2	1600	989	0.62	1225	0.77	4394	2.75	4394	2.75	3880	2.42	4498	2.81	3880	2.42	
Barking (P)	4	3200	2173	0.68	2691	0.84	5995	1.87	5995	1.87	6483	2.03	5884	1.84	5900	1.84	