

# CEA in Policies and Plans: UK Case Studies

Dr Lourdes M. Cooper

This paper initially presents the legislative and regulatory requirements for assessing cumulative effects in plans and programmes in the UK. The two approaches for assessing plans in the UK, Sustainability Appraisal (SA) and SEA are discussed. A combined SA and SEA process is undertaken by Regional and Local Planning Authorities. The approaches, methods and findings in assessing cumulative effects within this combined approach are explored in case studies. The issues in assessing cumulative effects within this SA/SEA framework are discussed and recommendations for improvements are made.

Key words: Sustainability Appraisal, Strategic Environmental Assessment, Regional Spatial Strategies, Local Development Documents, Local Development Framework, Supplementary Planning Document, Supplementary Planning Guidance.

## 1. Introduction

This paper explores how cumulative effects are considered in spatial planning at regional and local development plan levels. To meet the European Strategic Environmental Assessment (SEA) Directive (2001/42/EC), planning authorities must assess the cumulative environmental effects of plans and programmes. In the UK, spatial plans are assessed through a Sustainability Appraisal (SA) process that incorporates the requirements of the SEA Directive.

This paper outlines government guidance on SA and SEA and examines current practice through case studies. Issues in assessing cumulative impacts using a combined SA and SEA approach are discussed and ways for improving the assessment of cumulative effects are suggested.

## 2. Requirements for Sustainability Appraisal and Strategic Environmental Assessment

The assessment of cumulative effects of plans and programmes are required under the Environmental Assessment of Plans and Regulations (2004)<sup>1</sup>, which transposed the SEA Directive to English law. The SEA Directive requires that the Information to be provided in the Environmental Report should include the following:

*“...the likely significant effects on the environment... These effects should include secondary, cumulative, synergistic, short, medium and long term permanent and temporary, positive and negative effects”.* (Annex 1 (f) and footnote)

Under the Planning and Compulsory Purchase Act (2004), sustainability appraisal is mandatory for Regional Spatial Strategies (RSS) revisions and for new or revised Development Plan Documents (DPDs) or Supplementary Planning Documents (SPDs). This Act also stipulates that the SA must meet the requirements of the SEA Directive.

DPDs and SPDs are part of the Local Development Framework (LDF) or Local Plan. DPDs include the Core Strategy, Site Specific Allocations and Area Action Plans. The core strategy sets out the spatial vision, spatial objectives and strategic policies for the development of the local authority area. SPDs provide guidance on specific issues, such as air quality, housing or design.

The Government's approach is to incorporate the requirements of the SEA Directive into a wider SA process that considers economic and social as well as environmental effects. Thus, in 2005,

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<sup>1</sup> S.I. 2004 No. 1633 The Environmental Assessment of Plans and Programmes Regulations 2004.

the Government issued guidance<sup>2</sup> on undertaking SAs of LDFs which incorporates the requirements of the SEA Directive.

### 3. Sustainability Appraisal and Strategic Environmental Assessment

SA and SEA are distinct processes. SEA focuses primarily on environmental issues while SA places emphasis upon economic and social issues as well as the environment. SEA is a process for evaluating the environmental effects of proposed policies, plans or programmes on an existing evidence baseline and serves to ensure that environmental issues are integrated into plan-making. SA examines environmental, economic and social considerations from an objectives-led perspective. To fulfil the requirements of the SEA Directive, the SA should include the collection of baseline information to identify key issues and problems for the SA to address.

#### 3.1 Sustainability Appraisal Process and Guidance

The Government has produced guidance on SEA<sup>3</sup> and SA<sup>4</sup>. The SEA guidance focuses on environmental issues while the SA guidance considers social and economic issues as well as environmental ones.

The SA process considers the principles of sustainable development throughout the plan preparation by examining planning policies, allocations and proposals for their broad compliance and contribution to sustainable development.

The SA process consists of the following stages:

- Stage A - Setting the context, establishing the baseline and deciding the scope;
- Stage B – Developing and refining plan options and assessing the plan’s effects;
- Stage C – Preparing the SA Report;
- Stage D – Consulting on the plan and SA Report
- Stage E - Monitoring the significant sustainability effects of the plan

Government guidance on SA sets out the key points in the assessment of secondary, cumulative and synergistic effects during the SA process. This is shown in Figure 1. In Stage A, the focus is on identifying key receptors and establishing their condition. In Stage B, the assessment focuses on testing the options and their likely cumulative effects. The guidance suggests that the assessment should predict the effects of the plan on key receptors and to consider the cumulative effects of other plans and projects with or without the plan on those receptors.

The Guidance recognise that there are issues and uncertainties in predicting effects, which may be due to the variation in natural systems and interactions; the lack of information, knowledge and scientific agreement regarding cause-effect relationships or the inability of predictive models to accurately represent complex relationships.

The SA Guidance also lists some techniques for assessing secondary, cumulative and synergistic effects: questionnaires, interviews and panels; checklists; matrices; causal chain/network/systems analysis; modelling; trends analysis; overlay mapping and GIS; expert Opinion; carrying capacity and threshold analysis.

Figure 1: SA Stages and the consideration of secondary, cumulative and synergistic effects (Source: ODPM (2005a))

Key Stages of SA	Key points in the assessment of secondary, cumulative and synergistic effects
Stage A: Setting the context and	<b>Identifying other relevant policies, plans, programmes and sustainability objectives</b> <ul style="list-style-type: none"> <li>▪ Identify key receptors which may be subject to cumulative effects;</li> </ul>

<sup>2</sup> ODPM (2005a) *Sustainability Appraisal of Regional Spatial Strategies and Local Development Frameworks*.

<sup>3</sup> ODPM (2005b) *A practical Guide to the Strategic Environmental Assessment Directive*.

<sup>4</sup> ODPM (2005a) *Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents*

<p>objective, establishing the baseline and deciding on the scope</p>	<ul style="list-style-type: none"> <li>▪ Consider any cumulative effects that other current and reasonably foreseeable plans, programmes and strategies may have on key receptors.</li> </ul> <p><b>Collecting baseline information</b></p> <ul style="list-style-type: none"> <li>▪ For each key receptor document: current status; how this has changed over time and how it is likely to change in the future without the implementation of the plan; what has led to the present condition; how close to capacity the receptor is;</li> <li>▪ Focus the assessment</li> </ul> <p><b>Identifying sustainability issues and problems</b></p> <ul style="list-style-type: none"> <li>▪ Identify receptors that are particularly sensitive, in decline or if practicable are near their threshold</li> </ul> <p><b>Developing the SA Framework</b></p> <ul style="list-style-type: none"> <li>▪ Developing of SA objectives, indicators and targets may be influenced by significant cumulative effects identified and receptor thresholds/capacity</li> </ul> <p><b>Consulting on the scope of the SA</b></p> <ul style="list-style-type: none"> <li>▪ Set out the likely significant cumulative effects of the preferred strategic alternatives and plan to consider cumulative effects as part of the rest of the SA process</li> </ul>
<p>Stage B: Developing and refining options and assessing effects</p>	<p><b>Test the plan objectives against the SA objectives</b></p> <ul style="list-style-type: none"> <li>▪ Testing the consistency between plan objectives and SA objectives may help highlight potential cumulative effects</li> </ul> <p><b>Developing the plan</b></p> <ul style="list-style-type: none"> <li>▪ Ensure that the different options selected for testing are also assessed for their secondary, cumulative or synergistic effects</li> <li>▪ The assessment of secondary, cumulative and synergistic effects of different options could be used to screen out unacceptable options</li> </ul> <p><b>Predicting the effects of the plan, including options</b></p> <ul style="list-style-type: none"> <li>▪ Predict and assess the cumulative effects of the plan on key receptors; e.g. the cumulative effects of current and reasonably foreseeable plans, programmes and strategies, with and without the plan</li> <li>▪ There is uncertainty in predicting effects and determining significance</li> <li>▪ The level of risk and uncertainty associated with cumulative effects increases at the higher levels because scales are broader and issues are generally larger</li> <li>▪ Document data limitations and inadequacies of data/information</li> <li>▪ There is no single approach for predicting cumulative effects</li> </ul> <p><b>Evaluating the effects of the plan, including options</b></p> <ul style="list-style-type: none"> <li>▪ Assess the difference between with the plan and without the plan scenarios and where practicable in terms of the capacity/threshold of the valuable environmental resources</li> </ul> <p><b>Consider ways of mitigating adverse effects and maximising beneficial effects</b></p> <ul style="list-style-type: none"> <li>▪ Document measures envisaged to mitigate cumulative effects.</li> </ul> <p><b>Proposing measures to monitor the significant effects of the plan's implementation</b></p> <ul style="list-style-type: none"> <li>▪ Document measures proposed to monitor significant cumulative effects recognising that it may be difficult what share of cumulative effects is due to the plan.</li> </ul>
<p>Stage C: Preparing the SA Report</p>	<p><b>Preparing the SA Report</b></p> <ul style="list-style-type: none"> <li>▪ Report cumulative effects in a transparent and accessible way and explain how they were identified and assessed.</li> <li>▪ Provide a description of how effects are assessed and which methods were adopted.</li> <li>▪ Provide a description of how the various forms of cumulative effects are most likely to occur in the plan.</li> <li>▪ Describe the significant cumulative effects of the plan on each receptor, recording assumptions and uncertainty.</li> </ul>
<p>Stage D: Consulting and Decision-making</p>	<p><b>Consulting on the plan and the SA Report</b></p> <ul style="list-style-type: none"> <li>▪ Use the consultation process to help predict and assess the cumulative effects of the plan.</li> </ul> <p><b>Appraising significant changes</b></p> <ul style="list-style-type: none"> <li>▪ Where significant changes are made to the plan identify changes in the cumulative effects.</li> </ul> <p><b>Decision making and providing information</b></p> <ul style="list-style-type: none"> <li>▪ Provide information on how the cumulative effects, along with other significant effects of the plan were taken into account in preparing the plan.</li> </ul>
<p>Stage E: Monitoring and implementation of the plan</p>	<p><b>Finalising aims and methods for monitoring</b></p> <ul style="list-style-type: none"> <li>▪ Monitor effects using the appropriate indicators which take account of cumulative effects as well as direct effects.</li> </ul> <p><b>Responding to adverse effects</b></p> <ul style="list-style-type: none"> <li>▪ It may be necessary to take action where significant adverse cumulative effects are identified as a result of monitoring</li> </ul>

#### 4. Sustainability Appraisal/SEA of Spatial Plans in Practice

In practice, a combined SA/SEA process is undertaken in assessing the effects of plans. Most SAs follow the procedure outlined in the SA Guidance. The appraisal consists of three stages:

compatibility appraisal between plan objectives and SA Objectives, options appraisal and detailed appraisal of policy and proposals. A matrix-based approach is commonly used to assess options or policies against Sustainability/SEA Objectives. The next section explores how cumulative effects of plans, policies and proposals are appraised in regional and local plans.

#### **4.1 Regional Spatial Strategies Sustainability Appraisal/SEAs**

A review of the eight SA/SEAs of Regional Spatial Strategies (RSS)<sup>5</sup> produced for England between 2005 and 2008 examined if and how cumulative effects were addressed. The review showed that six (75%) included an analysis of cumulative impacts. Although the sample is quite small, nevertheless, it indicated how cumulative effects were considered. The cumulative impacts analysis was included in the section which discussed the likely significant social, economic and environmental effects of policies and cumulative significant impacts were identified within appraisal matrices of policies.

Three SAs/SEAs in the sample included a separate appendix on the analysis of potential cumulative impacts<sup>6</sup>. These examples provided more detail regarding potential cumulative effects: sustainability issue the cumulative effect relates to; causes; affected receptors; limits, thresholds; relevant plans and programmes; influence of RSS and potential mitigation.

For example, the SA/SEA for Yorkshire and Humber<sup>7</sup> appraised the cumulative impacts of all the RSS policies on each SA/SEA component or resource. This provided an overall view of the RSS's impact on the resource. The detailed matrices identified causes of impact (which included other plans, strategies, etc.) and mitigation measures that the RSS and others could implement to address cumulative impacts. Identifying measures that can be addressed within the RSS and those that could be addressed by others is quite useful. The cumulative impact/receptor column, however, identified trends and their impacts and it was not so clear as to the receptors. An extract from the matrix is shown in Appendix B -1.

In other examples, the affected receptor is clearly identified. The matrices for the analysis of potential cumulative impacts for the SA/SEAs prepared for the North East RSS<sup>8</sup> and South East RSS<sup>9</sup> were organised according to a key sustainability issue. Under each issue, cumulative effects were identified, including causes; affected receptors; limits and thresholds; relevant plans and programmes; influence of the RSS and potential mitigation. This provides a clear indication of which plans, programmes or actions (in CEA literature referred to as current and Reasonably Foreseeable Future Actions (RFFAs)) have been considered and which together with the RSS have the potential for cumulative impacts on a receptor. However, the ways in which these plans and the RSS contribute to cumulative effects were not discussed. An extract of the matrix used in the North East RSS SA is included in Appendix B-2.

In general, the analysis in the SA/SEAs reviewed focussed on the cumulative impacts of the RSS policies and there was less attention to the cumulative impacts of alternatives or options. In terms of the overall approach, all the SA/SEAs followed the ODPM guidance, where baseline analysis identified key issues but the way in which other plans, programmes or actions and the RSS could cumulatively affect a receptor needs more detailed analysis.

#### **4.2 Local Development Framework Sustainability Appraisal/SEA**

To further explore how cumulative effects are considered in spatial planning, examples of SA/SEAs for local development plans were examined. The regional SA/SEA review provided an overall view

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<sup>5</sup> There are eight English regions and a list of Regional Spatial Strategy SA/SEAs reviewed is included in Appendix A.

<sup>6</sup> SA/SEAs for the North East RSS, South East RSS and the Yorkshire and the Humber RSS.

<sup>7</sup> EDAW/AECOM and Llevette-Therivel (2008) Final Sustainability Appraisal (Integrating Strategic Environmental Assessment) of the Yorkshire and Humber RSS Revision. Available at: [www.goyh.gov.uk](http://www.goyh.gov.uk).

<sup>8</sup> Environmental Resources Management (2005) Regional Spatial Strategy for the North East. Final Report of the Sustainability Appraisal. Available at: [www.northeastassembly.gov.uk](http://www.northeastassembly.gov.uk).

<sup>9</sup> Environmental Resources Management (2006) Sustainability Appraisal Report of the draft South East Plan. Available at: [www.seera.gov.uk](http://www.seera.gov.uk).

of current practice but in this section, the approaches, processes and methods used in local plan SA/SEAs, were examined in more detail. Three SA/SEAs were examined; these were identified through the author's recent work and through previous research. The examples consist of SA/SEAs of a DPD, an SPD and SPG. The SA of a DPD assessed the Core Strategy, which covered the whole area of the Borough. The other two examples were SA/SEAs for an SPD and an SPG, which were prepared for individual areas within local authorities. As in the regional SA/SEAs, the matrix method was used to consider cumulative effects.

#### **4.2.1 Sustainability Appraisal of the Core Strategy and Development Control DPD and Area Action Plans**

A Sustainability Appraisal of the Core Strategy and Development Control DPD and Area Action Plans was prepared by the London Borough of Tower Hamlets<sup>10</sup> in 2006 to assess the potential effects of plans. The Core Strategy area covered the whole Borough and the Area Action Plans provided detailed guidance on individual areas within the Borough.

Initially, the appraisal process involved an evaluation of each policy of the Core Strategy on whether the impacts would be short, medium or long term, reversible or irreversible. This analysis however, assumed that the policy was the only one being implemented, although in reality, there would be interactions between a set of policies.

The second stage consisted of jointly evaluating all of the policies for their cumulative impact. The SA/SEA points out that there may be collective effects which occur as a result of the policies being implemented in combination. The cumulative impact assessment was undertaken by combining the results of the other analyses of potential impacts into a summary matrix. This approach evaluated the combined impact of the preferred options upon SA/SEA objectives. It also assessed the cumulative impact of individual policy sections upon all the SA/SEA objectives. An example of the summary matrix assessing the cumulative impacts of the Core Strategy is included in Appendix C-1.

This approach was also applied in assessing the cumulative impacts of area action plans. The potential effects of policies were assessed and the cumulative impacts analysis consisted of appraising all the policies against SA/SEA objectives in a matrix.

A similar matrix approach was used in the following two examples. The processes followed in these next two examples are discussed in more detail to illustrate the SA/SEA process.

#### **4.2.2 Seven Sisters Neighbourhood Plan Sustainability Appraisal**

A Sustainability Appraisal of the Seven Sisters Neighbourhood Plan (2010-2025) was prepared to assess the potential social, economic and environmental effects of the Plan. The Plan has been prepared for the Bridge New Deal for Communities (NDC) for its area in South Tottenham/Seven Sisters, London Borough of Haringey. It is anticipated that the Neighbourhood Plan will directly inform London Borough of Haringey's Core Strategy. A Sustainability Appraisal<sup>11</sup> has been prepared by Hyder Consulting on behalf of the London Borough of Haringey to identify key sustainability issues for the NDC area and help with the evidence base for the Core Strategy.

##### ***Background***

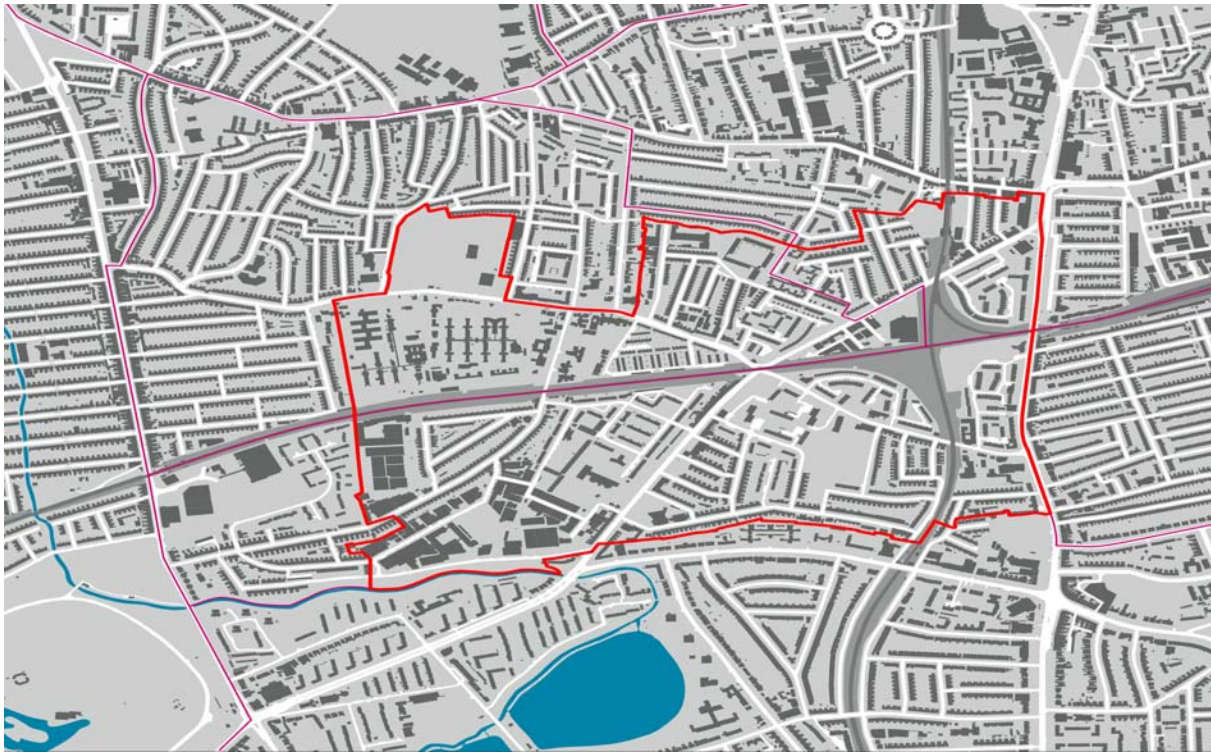
The Bridge NDC area covers around 119 hectares and is identified as an area of change, renewal and intervention. Initiatives seek to promote regeneration, tackle poverty and social exclusion. The Bridge NDC has around 11,000 residents and 4,500 homes. The area was chosen for the Haringey New Deal for Communities bid because it is one of the most diverse and disadvantaged areas in London and one of the most deprived in Britain. The area suffers from severe and

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<sup>10</sup> London Borough of Tower Hamlets (2006) Sustainability Appraisal of the Core Strategy and Development Control DPD and Area Action Plans.

<sup>11</sup> Hyder Consulting (2008) Sustainability Appraisal of The Seven Sisters Neighbourhood Plan

entrenched unemployment which is three times the London rate. Over 70% of residents belong to minority groups and around 180 languages are spoken locally. It has a very high proportion of young people and relatively low levels of educational attainment and vocational skills, leading to high levels of unemployment, poverty and benefit dependency. The area has generally been characterised by low standards of housing, poor health and environmental dereliction<sup>12</sup>.



Ward boundary — NDC boundary — Borough boundary —

Source: Urban Initiatives (2007)<sup>13</sup>

Figure 2: Spatial Framework and Neighbourhood Plan Study Area

### **Neighbourhood Plan (2010-2025)**

The purpose of the Neighbourhood Plan (NP) is to set out principles, proposals and actions to address problems which are specific to The Bridge NDC area, to manage change and guide the future development of the area. The plan provides an overarching spatial framework or master plan for area and specific sites within the area. The plan also provides a framework to help coordinate and improve the provision of services locally.

The Vision<sup>14</sup> for the area has been defined through themes and objectives:

Theme A: Connected Places, Connected People

- Improve quality and safety of cycle and walking routes to key local amenities;
- Improve access to public transport services;
- Control the impact of heavy freight traffic;

Theme B: Greenest district in Haringey

- Improve the range and quality of green spaces;
- Protect and enhance the area's heritage;
- Plan for sustainable development;

<sup>12</sup> The Bridge NDC, Strategic Plan (2007-2011).

<sup>13</sup> Urban Initiatives (2008a) The Bridge NDC Spatial Framework and Neighbourhood Plan Baseline Report

<sup>14</sup> Urban Initiatives (2008, ) Seven Sisters Neighbourhood Plan 2010-2025 Final Report, 1st Draft

Theme C: Community Focus, Neighbourhood Life

- Change perceptions of the area;
- Maintain and build the community;
- Improve access to community facilities;

Theme D: Open Neighbourhoods, Open Workplaces

- Make the neighbourhoods more mixed and more distinctive;
- Cluster similar activities to create a 'critical mass';
- Develop connections between the business community and resident community;

To meet the above objectives, the Plan identified physical and social initiatives and proposals. Plan proposals are the specific projects put forward to deliver the vision. Figure 3 below shows the areas which are likely to change if the plan proposals are implemented.

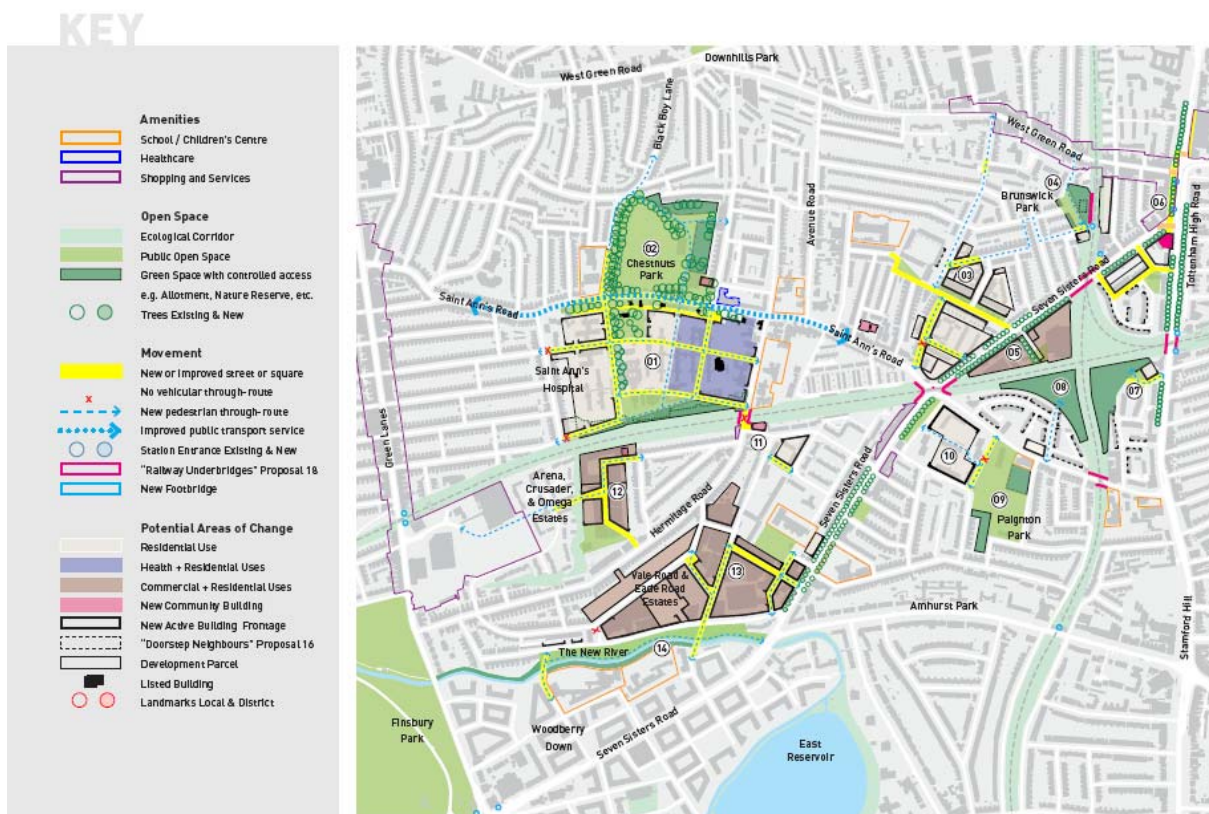


Figure 3: Proposals and potential areas of change<sup>15</sup>

*Urban Initiatives (2008b)*

**Sustainability Appraisal process**

The SA process followed the process undertaken for SAs of Supplementary Planning Documents (SPDs). SPDs may cover a range of issues, both thematic and site specific, which provide further details of policies in a DPD. In this case, the Neighbourhood Plan is a supplementary planning guidance (SPG) and not part of the LDF. The Neighbourhood Plan provides guidance for the

<sup>15</sup> Urban Initiatives (2008b) Seven Sisters Neighbourhood Plan 2010-2025 Final Draft.

development of the area and how regeneration could be achieved. It expands on Policy AC4: The Bridge – New Deal for Communities in the Unitary Development Plan for Haringey<sup>16</sup>.

The SA was carried out in line with guidance issued by Office of the Deputy Prime Minister (ODPM, 2005) in ‘*Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents*’ and Spatial Planning Policy Statement (PPS) 12 Local Spatial Planning (Department of Communities and Local Government DCLG, 2008).

Initially a baseline study was undertaken to characterise the area, identify issues and problems, indicators and targets. Some of the key sustainability issues and problems facing the NDC area include: high turnover of population; over-occupancy in family accommodation; low levels of employment and skills; crime “hotspots” around Seven Sisters tube station and along High Road, geographical severance due to transport infrastructure, topography and street pattern; traffic congestion and fragmentation of employment uses.

An SA/SEA Framework and SA/SEA Objectives were developed based on the objectives identified in relevant plans, policies and programmes at international, national, regional and local level. The appraisal consisted of three stages: i) appraisal of plan objectives; ii) testing of options to identify the most sustainable option; and iii) the appraisal of proposals. The objectives, options and proposals were appraised against the SA Objectives. Although cumulative effects were considered in appraising the options, a detailed appraisal of cumulative effects was undertaken during the proposals appraisal. The next section will discuss the assessment of proposals.

### ***Appraisal of Proposals***

The appraisal examined the detailed proposals of the Neighbourhood Plan and considered whether the identified sustainability issues were adequately addressed in the Plan. The Plan presented both physical and social initiatives, which were translated into detailed proposals. The physical initiative proposals were grouped together into:

- New street, park and bridge connections
- New and re-organised local services
- New and re-provided housing

The social initiatives were organised into:

- Developing community networks
- Developing institutional networks
- Developing business networks

A matrix appraising the effects of the Plan can be seen in Appendix C-2. This matrix appraises specific location proposals and generic proposals for different locations. The appraisal shows that the combined set of all proposals perform well in addressing social issues, physical severance and poor perception of the area.

Proposals for improving public spaces and linking areas through pedestrian and cycling routes will improve social and community cohesion. Promoting cycling and walking would have indirect health benefits through exercise. Encouraging cycling could reduce car use, which may have indirect effects of reducing pollution and improving air quality.

However, there are potential conflicts in implementing the proposals. For example, opening areas to improve access and views may conflict with conservation objectives. For example, the proposed removal of the St Ann’s hospital Victorian wall to improve access conflicts with conservation objectives to preserve the wall because of its heritage value. Another area where

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<sup>16</sup> The Unitary Development Plan (2008) is the adopted Plan for the London Borough of Haringey, whose policies are saved until June 2009.



there is potential conflict is the provision of pedestrian and cycling routes in the New River area, which may result in disturbance to species and habitats loss.

There are sustainability measures proposed in the Plan but more could be provided to address the sustainable use of natural resources by promoting sustainable construction methods.

### **Cumulative Effects**

The cumulative effects assessment in this SA considered the effects of the Neighbourhood Plan proposals against the SA Objectives. The table below provides a summary of these effects.

Table 1: Cumulative effects of proposals on Sustainability Objectives

SA Objective		Neighbourhood Plan Proposals
1	To reduce crime, disorder and fear of crime	The following proposals have a combined effect of reducing crime and the fear of crime: <ul style="list-style-type: none"> <li>- providing continuous active frontage to all public spaces and streets which will allow natural surveillance;</li> <li>- securing areas through controlled access;</li> <li>- opening up areas in public spaces to allow natural surveillance</li> </ul>
2	To improve levels of educational attainment for all age groups and all sectors of society	Improving access in the area and to public transport as well as providing bridges to Woodberry Down to allow access to Lifelong Learning Campus may have an indirect effect on encouraging take up of courses.
3	To improve physical and mental health for all and reduce health inequalities	The combined effect of improving access to services and proposals which provide opportunities for exercise: <ul style="list-style-type: none"> <li>- provision of cycling and pedestrian routes</li> <li>- creation/improvement of open spaces for recreation;</li> <li>- provision of allotments and community gardens</li> </ul> would have indirect health benefits. In addition, open spaces could help relieve stress as well as allow socialising.
4	To provide greater choice, quality and diversity of housing across all tenures to meet the needs of residents	The Plan includes several proposals for housing, in particular for families, which will have a beneficial cumulative effect on the housing need in the Borough.
5	To protect and enhance community spirit and cohesion	Proposals for linking areas through pedestrian and cycle routes, providing public realm and open spaces and a community centre in Chestnuts Park would have a beneficial cumulative impact on community cohesion.
6	To improve access to services and amenities for all groups	Proposals to create and improve pedestrian and cycle routes and link areas would have a beneficial effect on access to services and amenities
7	To encourage sustainable economic growth and business development across the Borough	Proposals to improve access and the visual perception of the area and the clustering of businesses may encourage more businesses to move in.
8	To develop skills and training needed to establish and maintain a healthy labour pool	Proposals to develop connections between the business and residents communities through the Seven Sisters Online Service and the Business Network could help identify local training and employment opportunities.
9	To encourage economic inclusion	The Seven Sisters Online Service and Business Network could lead to employment opportunities and improve economic inclusion.

10	To improve the vitality and vibrancy of town centres	Proposals to improve access and linkage to the Seven Sisters centre and improvements to the public realm could lead to more people going to the centre, which in turn, would improve the vitality of this centre.
11	To protect and enhance biodiversity	Proposals to create new open spaces, allotments and gardens all contribute to beneficial cumulative effects on biodiversity. However, there may be adverse cumulative effects on habitats and species due to the pedestrian and cycle routes to be created along the New River.
12	To protect and enhance the Borough's townscape and cultural heritage resources	Proposals to improve public realm, protect and enhance the area's heritage assets would have a cumulative beneficial effect on townscape and heritage resources.
13	To protect and enhance the Borough's landscape resources	Proposals to improve the range and quality of open spaces would have a cumulative positive impact on the landscape resources.
14	To protect and enhance the quality of water features and resources	The proposals for New River would enhance the quality of the embankment area.
15	To encourage the use of previously developed land	Redeveloping existing properties for housing for families will have beneficial social effects.
16	To adapt to climate change	Incorporating Sustainable Drainage Systems (SuDs) in all new developments would improve drainage and help reduce flood risk.
17	To protect and improve air quality	Promoting cycling and walking could have a minor cumulative effect on air quality as it may reduce car use.
18	To limit climate change by reducing CO2 emissions	There are minor benefits from various proposals to reduce energy use and to generate energy but this depends on whether the technologies will be implemented.
19	To ensure the sustainable use of natural resources	There may be some cumulative benefits from waste reduction systems by businesses in Vale.
20	To promote the use of sustainable modes of transport	Improving quality and safety of cycling and walking routes, linking areas and improving access to public transport services cumulatively promote these modes of transport.

### ***Key appraisal results: cumulative impacts***

The key points and issues that can be drawn from the CEA are:

- The Neighbourhood Plan proposals overall are predicted to have a positive cumulative impact upon SA/SEA Objectives;
- The Plan will have an overall positive impact, particularly by providing new open spaces, improving access, promoting sustainable modes of transport and promoting SuDs and reduction in energy use;
- Negative impacts are predicted from proposals for change of employment uses to residential use in some employment areas.

### **4.2.3 Silverstone Development Brief Sustainability Appraisal**

A Sustainability Appraisal of the draft Silverstone Development Brief was prepared to ensure that the proposed development would be in accordance with the Planning and Compulsory Purchase Act 2004. The Development Brief is an SPD, which forms part of the planning framework for the area and therefore requires an SA/SEA.

The purpose of the draft Silverstone Development brief is to provide clarity and guidance to the established polices of the South Northamptonshire and Aylesbury Vale Local Plans for suitable

development for Silverstone Circuit. The draft Development Brief, when adopted, will be used to guide and become a material consideration in determining future planning applications and to establish land use and infrastructure requirements. The draft Development Brief includes 24 policies and guidance for the development of the site.

A number of draft SAs have been produced as the draft development brief has been revised, following public consultation. This paper is primarily based on the latest version<sup>17</sup> (September 2008).

## **Background**

Silverstone Circuit is a motor racing circuit near the village of Silverstone in Northamptonshire. It is best known as the home of the British Grand Prix, which it first hosted in 1948. Over the last five years, the British Racing Driver's Club (BDRC) and Silverstone Estates Limited have undertaken numerous schemes including obtaining a series of planning permissions to try to establish the goal of creating Silverstone as a world class motor sport venue. These applications have related primarily to improving the facilities at the motor racing circuit, pit and paddock complex and to a number of proposals relating to the Advanced Technology Park.

In 2007, the draft Development Brief of the Silverstone Circuit Masterplan was issued for consultation. A Sustainability Appraisal appraised the likely significant effects of implementing the master plan. Following consultations, the draft Development Brief was revised and a second Sustainability Appraisal was developed, which assessed the significant changes. The Masterplan include: a Pit and Paddock Complex; Silverstone Hub and Welcome Centre; Business Park; Advanced Technology Park; Education Campus; hotels; Manufacturers Display Zone; Indoor/Outdoor Exhibition Space; Sport and leisure Complex and a Technical Support Area.

The Silverstone Circuit site covers approximately 300 hectares set in an area which is predominantly rural in character. The race circuits and existing pit and paddock facilities are the dominant features of the site. Within the circuit itself, the land comprises a combination of hard surfaces and grassed areas, as well as the listed Luffield Abbey Farm. Outside the circuit, there are more than 40 industrial units on the western side of the circuit, all of which are connected with motor sport, and an area for rally, sprint and off road driving on the south eastern edge.

The Silverstone village is less than 1 km to the north of the circuit, with smaller settlements of Whittlebury and Dartford 2 km and 3 km to the northeast and south respectively. Silverstone Circuit and the surrounding estate are located partly in Northamptonshire and the southern part lies within the Aylesbury Vale District in Buckinghamshire. Figure 4 provides the context for the plan.

There are constraints to the development, which include a special landscape area, a country wildlife site, areas of important local gaps, the Stowe Area of attractive landscape and the Park and Garden of Special Interest. Figure 4 shows the planning and environmental designations.

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<sup>17</sup> Hyder Consulting (September 2008) Second Final SA Report of the Draft Development Brief for Silverstone Circuit.

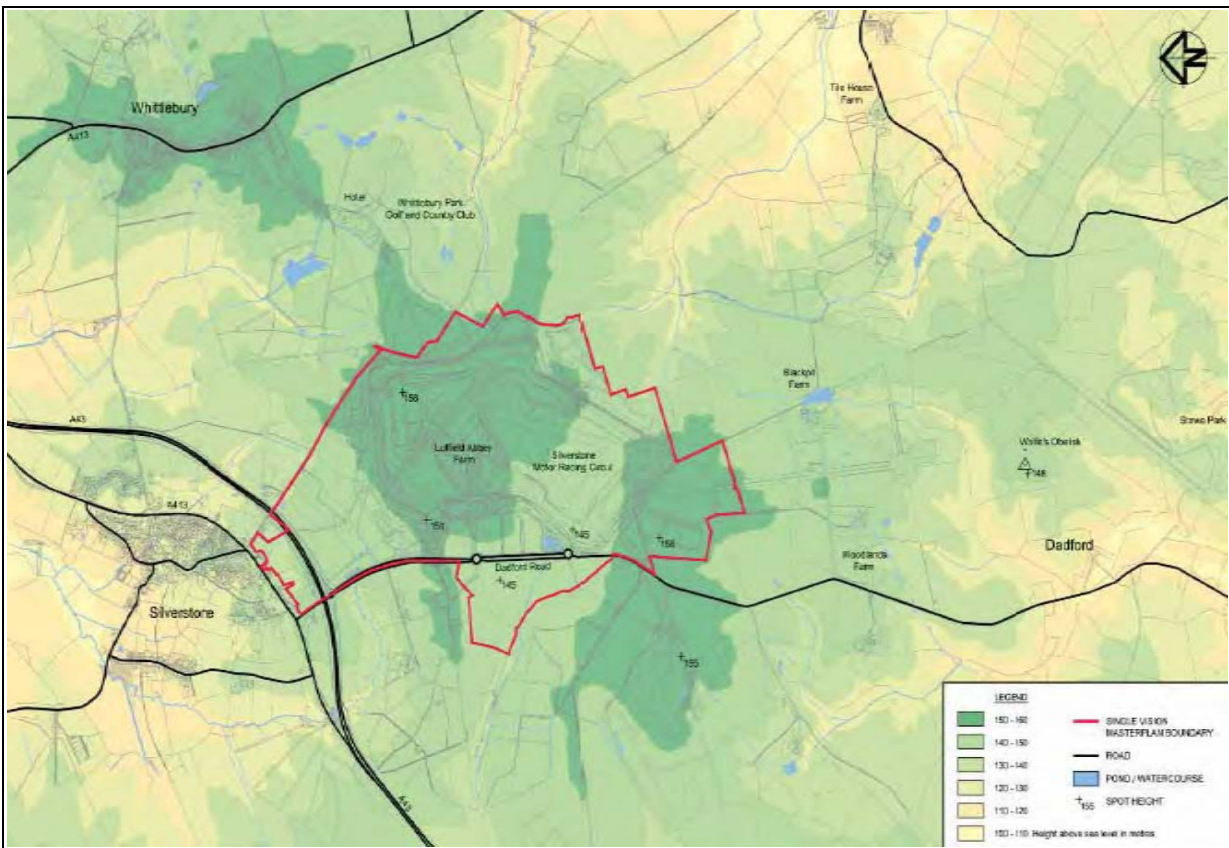


Figure 4 Site Context Plan

Source: Aylesbury and South Northamptonshire Council 2007<sup>18</sup>

## Sustainability Appraisal and SEA

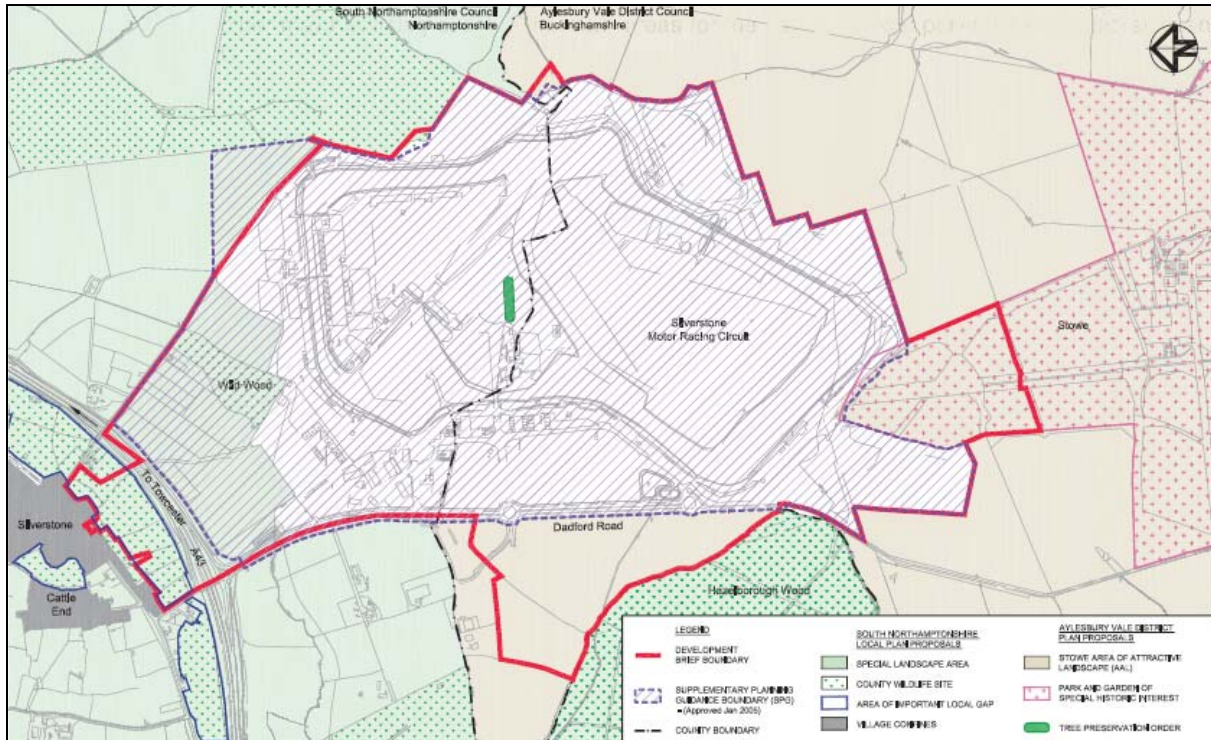
The Sustainability Appraisal incorporated the requirements of the SEA Directive and followed government guidance<sup>19</sup>. Analysis of the baseline information identified key issues. The key sustainability Issues identified in the SA include the following:

- Accessibility to the venue: reducing reliance on the private car and encouraging alternative forms of transport for staff and visitors
- Creation of diverse employment opportunities: Potential employment opportunities may not match the local rural skills base;
- Development of previously undeveloped land for technology/hotel use on land currently underutilised by parking on race/event days;
- Increase resource requirements during construction and operational management due to the proposed intensification of uses within the site;
- The need to protect and enhance, where possible, the quality of the rural landscape and to minimise impacts on the character and special qualities of Stowe Park;
- Retain or enhance the character and distinctiveness of the nearby towns and villages: the edge of the Silverstone village is located in close proximity to the boundary of the circuit (300 metres);
- The need to deliver effective drainage systems including SuDs to ensure the effective management of runoff and drainage at the site. There are localised flood risk issues at the site caused by inefficient drainage capacity.
- Retention and creation of additional green infrastructure/spaces;

<sup>18</sup> Aylesbury and South Northamptonshire Council (2007) Draft Development Brief Silverstone Circuit Masterplan for Consultation.

<sup>19</sup> ODPM (2005) Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents.

- The need to protect and enhance species and habitats and to provide compensation for any losses that occur;
- Impact on air and water quality;
- Climate change considerations: carbon dioxide emissions on race days and as a result of energy consumption during construction and operation management.
- Expected rise in noise levels due to the intensified activities of the site



**Figure 5: Planning and Environmental Designations** Source: Aylesbury and South Northamptonshire Council (2007)<sup>20</sup>

The Sustainability Framework and SA/SEA Objectives were developed based on the objectives identified in the Aylesbury Vale District Council LDF Scoping Report and the West Northamptonshire Joint Core Strategy SA Scoping Report. Fourteen SA/SEA Objectives were identified, relating to the following topics: Housing; Crime and Safety; Communities/Population; Health; Access and Transport; Biodiversity; Cultural Heritage, Landscape and Townscape; Climate Change and Energy; Waste; Land and Soils; Water; Economy and Tourism.

The SA/SEA consisted of three appraisals: i) the Development Brief objectives were appraised against the sustainability objectives, ii) strategic development options were tested against the SA/SEA objectives and recommendations were made regarding the option that best addressed the identified SA/SEA objectives; iii) detailed policies and proposals were assessed. This is to ensure that the identified sustainability issues are adequately addressed by planning requirements that will guide the use and development of the Silverstone Circuit.

### **Cumulative Effects Assessment**

A matrix based approach has been used in appraising objectives, options and policies. This approach has been widely used in Sustainability Appraisals and it enables a transparent appraisal to be undertaken. The matrix enabled the following information to be provided for each effect in accordance with the SEA Directive.

<sup>20</sup> Aylesbury and South Northamptonshire Council (2007) Draft Development Brief Silverstone Circuit Masterplan for Consultation.

Sensitive receptors were identified earlier in the process but the assessment of cumulative effects was undertaken during the assessment of policies. Table 2 shows an example of a matrix identifying potential effects and receptors.

Table 2: Potential cumulative effects, receptors and causes

Cumulative Effect	Affected Receptor	Causes
Habitat loss and fragmentation	Wildlife habitats	Use of land for development
Loss of tranquillity	Countryside	Noise from construction and operation
Impact on surrounding historic landscape	Countryside	Development, land take
Impact on air quality	People, townscape, countryside	Increase in traffic
Surface water run-off	Protected areas	Buildings
Increase in noise	people	Traffic, circuit activities
Increase in traffic congestion	People, air quality	Increase in visitors
Impact on green infrastructure	People, species, biodiversity	Landtake for building
Impact on views	people	Buildings in rural landscape

For the appraisal of cumulative effects of the plan, policies were appraised against SA Objectives. Based on this, recommendations for mitigation were identified. The cumulative impact matrix is included in Appendix C-3. Table 3 summarises the cumulative effects of the Development Brief policies on each SA Objective.

Table 3: Cumulative effects of policies on Sustainability Objectives

SA Objective	Development Brief Policies
1 Housing	The Development Brief will offer no housing benefits and will not contribute to housing needs.
2. Crime and Safety	Policy 23 (Design Principles) includes a requirement that buildings and layout should be designed to minimise crime, anti social behaviour and risk of terrorism. The combined impacts of these measures should have a positive effect.
3. Communities	There will be negative cumulative effects during construction (noise, dust, increased traffic and visual impacts) from Policy 1(Pit and Paddock) and Policy 4 (Advanced Technological Park)). Policy 4, however, includes landscape buffering, which should reduce these impacts. Policy 19 (landscape strategy and enhancement of views) and Policy 20 (preserving historical landscape) will have amenity benefits. Policy 21 (noise management strategy) and Policy 14 (requires transport assessment) will help ensure that potential impacts from traffic are addressed. Policies 4, 7 and 24 make provisions for green infrastructure, which would provide amenity areas for the community.
4. Health	Policy 24 (Green Infrastructure) and Policy 19 (Landscaping) will create areas that would be conducive to walking and exercise which could have an indirect positive effect on health. Also, the reinstatement of historic rides in Policy 5 will add to recreational amenities.
5. Access and Transport	There will be negative effects from increased traffic from the proposed development. Policy 14, which require transport assessments may identify measures to reduce impacts. There will be loss of access to open space but Policy 4 requires green infrastructure links and Policy 24 stipulates green infrastructure provision. These policies should help minimise potential adverse effects on access. In addition, Policy 14 requires links between the existing village and employment areas, which should help improve access.
6. Biodiversity	There will be cumulative negative impacts on biodiversity (loss of habitats and species) due to the proposed development. However, Policies 4, 5, 10 and 24 requires the provision of green infrastructure which could mitigate or reduce biodiversity impacts. Other policies that address biodiversity concerns is Policy 18 (Nature Conservation and Enhancement) which requires that surveys are carried out to mitigate construction impacts and Policy 16 (Flood Risk and Drainage) which requires that hydrological impacts on SSSI designated areas are considered.
7. Cultural Heritage, Landscape and	Overall the policies for cultural heritage, landscape and townscape are positive. Policy 5 includes provisions for soft landscaping, restoration of historic rides and the setting of buildings in a series of woodland glades. Policy 19 requires a

<b>SA Objective</b>	<b>Development Brief Policies</b>
Townscape	landscape strategy and Policy 20 provides for the preservation of historic buildings and historic landscape and a historic landscape study.
8. Climate Change and Energy	Policy 13, which specifies that the development meet 'excellent' BREEAM <sup>21</sup> rating will help ensure the reduction of energy use. However, climate change is addressed in a limited way and only through tree planting in Policy 19.
9. Waste	There is no specific waste policy which could have further improved environmental performance. Policy 13 requires 'excellent' BREEAM rating so waste will be considered as part of these assessments. This policy also requires provision of areas for storage of recycling waste in buildings and Policy 15 requires recycling of grey water.
10 Land and Soils	Policy 17 requires a remediation strategy for brownfield sites so that the remediation of these sites will have a positive cumulative effect. However, the loss of greenfield land will have a negative cumulative effect on soils.
11. Water	There will be negative impacts from increased demand for water as a result of the development but Policy 13 (which promotes reduction in water use), Policies 15 and 16 which require consideration of water supply and capacity issues should address the cumulative impacts of the proposed development on water.
12. Economy	The development of the site will be beneficial to the local economy in terms of employment and revenue from the commercial activities.
13. Education Skills and Training	There will be a positive impact on the local community due to opportunities for education and training. Positive indirect and secondary impacts could result from expanding the skills base, such as increased income for residents and a more diverse workforce.
14. Tourism	The overall effect of the development in terms of tourism is positive since it will attract a large number of visitors to the area, which will have knock-on benefits for the economy.

### ***Key appraisal results: cumulative impacts***

The key findings from the assessment of cumulative effects are:

- The development brief policies address economic and social SA/SEA Objectives well, although concerns remain relating to unknown potential impacts linked to access and transport, climate change, energy and waste.
- There will be positive impacts to the local community through the provision of increased access to education facilities and higher levels of tourism activity. The beneficial impacts generated by increased tourism activity, as a result of the new business and technology park will be widespread and are likely to be felt at regional level.
- The policies for leisure and conferencing facilities will progress most SA Objectives well, especially those relating to economy, health and community.
- Policies relating to planning considerations require that further studies should be carried out to identify mitigation measures (e.g. transport and hydrological studies). However, there are still measures that could improve the overall sustainability performance of the development, such as new policies to address climate change mitigation, waste reduction and water usage.
- Overall, the policies have strengthened SA Objectives relating to nature conservation and heritage. Creation of new woodlands, conservation sites and green links to support green infrastructure have been identified. Detailed requirements for cultural heritage assessments have been set out, with special considerations for Stowe Park.

<sup>21</sup> BREEAM refers to the British Research Establishment's Environmental Assessment Method which is a tool that allows the owners, users and designers of buildings to review and improve environmental performance throughout the life of a building. It is a widely accepted and respected scheme that sets a benchmark for environmental performance.

## 5. Conclusions and Recommendations

The case studies illustrate how current practice undertakes CEA within an SA/SEA framework. Some positive conclusions that can be drawn include the following:

- The SA/SEA approach provides an integrated appraisal where social, environmental and economic dimensions of sustainability are considered. This provides a more balanced approach towards the assessment of cumulative effects. It can also highlight how some policies or proposals may address an SA/SEA Objective (for example, a social objective such as providing affordable housing) but may have negative cumulative impacts on an environmental objective (biodiversity or water resources).
- SA process requires that indicators and targets should be identified during the baseline collection. These data will be used useful in determining trends and whether a key receptor is approaching a threshold and can be used in developing the monitoring framework. The monitoring programme could then identify if a cumulative effect has occurred and how the key receptor has been affected. Some cumulative impacts, however, may be easier to monitor than others.
- SA is a pragmatic, practical approach that can be used by planners and provide information to stakeholders and decision makers about the potential cumulative effects of policies and plans in a clear and understandable format.
- The matrix method usually applied in SAs provides a good visual summary of the assessment. The method is transparent and clearly shows how the assessment was undertaken and can be easily understood by stakeholders and decision makers. The method, however, has some limitations in that it does not show cause-effect relationships and the results are not quantified.
- Assessing the cumulative effects of policies on SA/SEA Objectives provides plan makers information on what the likely effects of policies are. Since the SA/SEA process is iterative, it provides an opportunity for plan makers to revise policies or include new ones to address potential cumulative effects.

Current SA/SEA practice assesses the cumulative effects of plans, policies and proposals on sustainability objectives in a way that can inform decision makers. But there are areas where CEA in SA/SEA needs to improve:

- In SA/SEA practice, as shown in these case studies, cumulative effects are appraised mainly during the third stage of the appraisal. Although cumulative effects may be considered during options appraisal, it is not as detailed as in the appraisal of policies or proposals. Assessment of cumulative effects should be undertaken more fully when considering options or alternatives.
- Although a review of plans, programmes and actions is undertaken in SA/SEA, this is carried out mainly to identify key sustainability issues and problems and help formulate the SA/SEA Objectives. In the SA/SEAs of local plans and some of the RSS examples, the assessment of cumulative impacts involved the assessment of the impacts of policies on SA/SEA objectives and did not include a more detailed analysis of the impacts of plans, programmes or actions combined with the Plan. This is an area that needs further development.
- The combined SA/SEA process remains an objectives-led approach, where plan objectives, options, policies and proposals are assessed against SA/SEA Objectives. Although the ODPM guidance suggests that the SA/SEA identify key receptors, the appraisal focuses on how the plan would affect SA/SEA Objectives. SA/SEA objectives are aspirational objectives for sustainable development. Assessing the impacts of a plan against these



objectives provide an indication of how the Plan performs in terms of sustainability. In terms of cumulative effects, the focus, as suggested in CEA theory should be the key receptor or the Valued Ecosystem Component. A re-focusing of the assessment on key receptors for the assessment of cumulative effects is therefore required if cumulative effects are to be assessed thoroughly.

Based on some of the limitations of the current SA/SEA practice discussed above, there is therefore a need for more detailed and tailored guidance on CEA in SA/SEAs than is currently provided. This detailed guidance should address the following issues: focusing on key receptors, detailed analysis of the cumulative effects of other plans, programmes and actions in combination with the proposed plan and trends analysis for key receptors. There is detailed CEA guidance available, for example, such as Addressing Cumulative Effects<sup>22</sup> and Considering Cumulative Effects<sup>23</sup> but these are not within the context of SEAs or SAs. The Guidelines for CEA in SEA of Plans<sup>24</sup> was prepared within the context of SEA and the UK but not that of SA. The detailed guidance could draw from the above and others in the wider CEA literature.

In conclusion, SA/SEA practice needs to focus more on key receptors and to consider the impact of the proposed plan in combination with other plans, programmes and actions more fully to improve effectiveness.

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<sup>22</sup> Canadian Environment Assessment Agency (1999) Addressing Cumulative Effects, CEAA, Gatineau, Quebec. Available at: [www.cea-acee.gc.ca/013/0001/0008/giude1\\_e.htm](http://www.cea-acee.gc.ca/013/0001/0008/giude1_e.htm).

<sup>23</sup> Council on Environmental Quality (1997) Considering Cumulative Effects. Executive Office of the President.

<sup>24</sup> Cooper, LM (2004) Guidelines for Cumulative Effects Assessment in SEA of Plans. EMPG Occasional Paper. 04/LMC/CEA Imperial College, London.

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Urban Initiatives (2008b) *Seven Sisters Neighbourhood Plan 2010-2025 Final Report, Final Draft*. Prepared for The Bridge NDC and the London Borough of Haringey

## Appendix A

### List of SA/SEAs of Regional Spatial Strategies

1. EDAW/AECOM and Levett-Therivel (2008) *Final Sustainability Appraisal (Integrating Strategic Environmental Assessment) of the Yorkshire and Humber RSS Revision*. Available at: [www.goyh.gov.uk](http://www.goyh.gov.uk).
2. Environmental Resources Management (2005) *Regional Spatial Strategy for the North East. Final Report of the Sustainability Appraisal*. Available at: [www.northeastassembly.gov.uk](http://www.northeastassembly.gov.uk).
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8. URSUS (2007) *Sustainability Appraisal of the East of England Integrated Regional Strategy. Final Report*. Available at: [www.eera.gov.uk](http://www.eera.gov.uk).

Appendix B: Examples of Matrices from SA/SEAs of Regional Spatial Strategies

Appendix B-1: Example of Cumulative impact identification and mitigation matrix

Cumulative impact/receptor	Current situation; why it is a problem	Causes of impact	Targets/thresholds	Current and potential additional (in italics) policy responses by new RSS	Pointers for other plans and strategies (mostly those highlighted in italics)
<p><b>Social inequalities</b> – health inequalities, growing disparities, income levels, social exclusion</p>	<p>Kingston upon Hull is the most deprived local authority district (LAD) within the region, with the sixth most concentration of multiple deprivation in the country in 2004 ('up' six places from 2000). Bradford and Sheffield are the other most deprived in the region, although Sheffield has improved since 2000, dropping from 12<sup>th</sup> to 24<sup>th</sup> ranking in the country in 2004. Following changes in the way rankings are calculated, approximately two-thirds of the region's LADs have worsened their position since 2000, with York, Leeds and North East Lincolnshire experiencing the most dramatic increase in deprivation measured. There are also small pockets of deprivation in other parts of the region, especially rural areas, which are masked by surrounding affluence.</p> <p>Overall some 29.6% of all the region's Super Output Areas fall within the most 20% deprived communities, making the region the 3<sup>rd</sup> highest ranking in the country. This makes social exclusion and disparities a significant regional issue that must be tackled. People who are deprived are more likely to suffer poor health and lower education attainment and become less able to find employment.</p> <p>In 2003 12.5% of working age people in the region lived in workless households compared to the England average on 11.2%. The regional</p>	<p><b>General:</b></p> <ul style="list-style-type: none"> <li>• Distribution of wealth</li> <li>• Disjointed agencies</li> <li>• Poor health</li> <li>• Affordability of, and access to, basic amenities</li> <li>• Unemployment</li> <li>• Crime</li> <li>• Lack of skills, qualifications, aspirations</li> <li>• Discrimination</li> <li>• Environ. quality</li> <li>• Safety/security</li> </ul> <p><b>Plans etc.:</b></p> <ul style="list-style-type: none"> <li>• Regional/local housing and health strategies</li> <li>• Community Str.</li> <li>• RES</li> <li>• Local economic devel. &amp; regen. plans/strategies</li> <li>• RTS, LTP</li> <li>• Choice and competition in public services</li> </ul>	<p><b>National:</b></p> <p>By 2010, all social housing to be decent, and 130,000 extra vulnerable households in the private sector to have decent homes.</p> <p>Nobody in fuel poverty by 2016-18.</p> <p><b>Regional:</b></p> <p>RES: by 2010, halve the number of deprived wards</p>	<p>Focus on mobility and connectivity could exacerbate social inequalities</p> <p>Maximises access to and availability of key services and amenities</p> <p><i>Ensure cross-boundary issues are tackled, e.g. identifying spatially-specific regeneration areas and a 'sequential approach' to their prioritisation</i></p> <p><i>Encourage more mixed income development (affordable housing and normal market housing), access to transport and employment land an issue (especially in rural areas)</i></p> <p><i>Reduce the links between ability to pay and access to a good quality of life, through policies that (1) reduce the advantages of having a car by ensuring that the widest practicable range of amenities are accessible to everyone on foot, cycle or by public transport; (2) make sure that provision for local public service meets quality criteria so that nobody is deprived of good health care or schools by inability to pay for private provision; (3) expect all development to meet high quality design/ environmental/</i></p>	<p>Encourage community cohesion by tackling the needs of disadvantaged and minorities, whilst reducing the propensity for increased tensions.</p> <p><i>(Community Cohesion Plans) (RSS can however indirectly support this aim by encouraging an equitable supply of housing and local amenities that take account of local needs, including those of BME communities)</i></p>

Source: EDAW/AECOM and Levett-Therivel (2008) *Final Sustainability Appraisal (Integrating Strategic Environmental Assessment) of the Yorkshire and Humber RSS Revision*

Appendix B-2: Example of Cumulative Impact Matrix

Key sustainability issue	Causes	Cumulative/synergistic effects	Affected receptors	Limits, thresholds, current status etc	Relevant plans and programmes	Influence of RSS	Potential mitigation
<i>Water Resources</i>	Development is likely to lead to increased demand in those areas of the region targeted for the highest rates of growth for both water supply and water treatment. The latter is a potential problem and will require investment to treat domestic effluent to acceptable levels and prevent any deterioration in water quality and in the amenity values of rivers, lakes and beaches in the region.	Increases in the quality of domestic effluent will create pressure on existing systems/treatment works and on receiving waters and their quality. Any requirement for additional investment in infrastructure may lead to increased costs for the water industry and domestic consumers.	Wildlife habitats, Water courses, Beaches, Water Companies and consumers	Biological water quality in the North East is 'good' in 80% of the region's river length, although this does not yet meet national and regional objectives (90%). Water quality in urban areas is significantly poorer than in rural areas. Investment in sewage infrastructure has ensured an improvement in bathing water quality, and quality standards are now achieved in almost all locations. The region also has a surplus of water resources, partly due to a decline in demand from industry, and is able to export	RSS RHS RES LDF's AMP Catchment Management Plans WFD programmes BAPs	Housing growth will lead to increases in water consumption. This will create demand for new infrastructure for supply, storage and sewerage.	The critical issue-given the current positive status of the quality of water resources relates to treatment infrastructure. LDF's must contain policies to ensure that development and water treatment capacity proceed in parallel.

Source: Environmental Resources Management (2005) *Regional Spatial Strategy for the North East. Final Report of the Sustainability Appraisal.*

Appendix C: Examples of Matrices from SA/SEAs of Local Development Documents

Appendix C-1: Cumulative impacts of the Core Strategy and Development Control DPD

	Implementation	Spatial Strategy	Creating & Sharing Prosperity	Sustainable Neighbourhoods	Sustainable Environment	Well Connected Borough	Well Designed Place	Development Control	Economy & Employment	Retail & Town Centres	Housing	Social & Community Facilities	Open Space	Conservation	Utilities	Cumulative Impact of LDF on individual SA/SEA objectives
1. Health, healthy lifestyles, health inequalities	++	+	+	+	+	+	++	+	+	+	+	+	+	+	+	+
2. Quality, affordable housing	++	+	+	+				+			+					+
3. Social and community facilities	++	+	+	+	+	+	++	+		+	+	+	+	+		+
4. Regeneration, efficient use of land/buildings		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5. Urban design, local heritage	++	++	+	+	+	+	++	+		+	+	++	+	+	+	+
6. Safety, security, crime	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7. Occupation, self-worth, livelihood	+	+	+	+		+		+	+	+	+	+				+
8. Poverty, equality of opportunity	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
9. Need to travel, non-car transport	++	+	+	+	+	++	+	++	+	+	+	+		+		+
10. Air quality		+	-	-	+	+	+	+	-	+	0			+		+
11. Noise impact		+	0	-	-	+		+	-	+	+		+			+
12. Fuel poverty, energy use, renewables	+	+	-	-	++	+		+	-	+	+				+	+
13. Waste generation, recycling/recovery		+	-	-	++			+	-		+					+
14. Water quality and use		+	-	-	+	+		+	-		+			+	+	+
15. Species, habitats, green and open spaces	++	++	-	-	++	+	+	+	-		+		+	+		+
16. Flood risk, flood defences	+	+	-	-	+			+	-		+			+	+	+
17. Effect on existing residents	+	++	+	+	+	++	+	+	+	+	+	+	+	+	+	+
Cumulative Impact on SA/SEA objectives	++	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+

Source: London Borough of Tower Hamlets (2006) *Sustainability Appraisal of the Core Strategy and Development Control DPDs and Area Action Plans*.

Appendix C-2: Seven Sisters Neighbourhood Plan Case Study: Appraisal of the Cumulative Effects of Proposals

Assessment of impacts of Plan Proposals																													
SA Objectives		Short Term	Medium Term	Long Term	Specific location proposals														Generic proposals for different locations								Cumulative Impacts of Proposals		
					St Ann's	Chestnuts Park	Culvert Road	Brunswick Park	Gourley Place	Apex House &	Ermine Park	Plevna Wildlife Gdn.	Paignton Park	Sir Frederick Messer	Tiverton Estate	Arena, Crusader & Omega	The Vale	The New River	Seven Sisters Rd	Doorstep Streets	Street Gardens	Railway Underbridges	Gardening Club	Youth & Comm. Spaces	Seven Sisters Online	Energy Action Zone		Local Landmarks	
1	To reduce crime, disorder and fear of crime	+	+	+	+	+	+	+	+	0	+	0	+	+	+	+	+	+	0	+	+	+	+	+	0	0	0	+	
2	To improve levels of educational attainment for all age groups and all sectors of society.	0	0	?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	+	0	0	0	+	0	0	0
3	To improve physical and mental health for all and reduce health inequalities.	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+	0	+	0	+	+	0	+	0	+	0	+
4	To provide greater choice, quality and diversity of housing across all tenures to meet the needs of residents.	+	+	+	+	0	+	0	+	+	+	0	+	+	+	+	+	+	0	0	+	0	0	0	0	0	0	0	+
5	To protect and enhance community spirit and cohesion.	0	+	+	0	+	+	+	+	+	+	?	+	?	+	+	+	+	+	+	+	+	0	+	+	+	0	+	+

**Assessment of impacts of Plan Proposals**

SA Objectives	Short Term	Medium Term	Long Term	Specific location proposals														Generic proposals for different locations								Cumulative Impacts of Proposals		
				St Ann's	Chestnuts Park	Culvert Road	Brunswick Park	Gourley Place	Apex House &	Ermine Park	Plevna Wildlife Gdn.	Paignton Park	Sir Frederick Messer	Tiverton Estate	Arena, Crusader & Omega	The Vale	The New River	Seven Sisters Rd	Doorstep Streets	Street Gardens	Railway Underbridges	Gardening Club	Youth & Comm. Spaces	Seven Sisters Online	Energy Action Zone		Local Landmarks	
6	To improve access to services and amenities for all groups	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>+</b>	<b>++</b>	
7	To encourage sustainable economic growth and business development across the Borough.	<b>0</b>	<b>?</b>	<b>?</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>+/_</b>
8	To develop the skills and training needed to establish and maintain a healthy labour pool.	<b>0</b>	<b>?</b>	<b>?</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>?</b>
9	To encourage economic inclusion.	<b>0</b>	<b>0</b>	<b>?</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>+/?</b>
10	To improve the vitality and vibrancy of town centres.	<b>0</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>?</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>+</b>
11	To protect and enhance biodiversity.	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>++</b>	<b>0</b>	<b>+</b>	<b>+</b>	<b>?</b>	<b>++</b>	<b>+</b>	<b>?</b>	<b>0</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>?</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>



Assessment of impacts of Plan Proposals

SA Objectives		Short Term	Medium Term	Long Term	Specific location proposals														Generic proposals for different locations								Cumulative Impacts of Proposals
					St Ann's	Chestnuts Park	Culvert Road	Brunswick Park	Gourley Place	Apex House &	Ermine Park	Plevna Wildlife Gdn.	Paignton Park	Sir Frederick Messer	Tiverton Estate	Arena, Crusader & Omega	The Vale	The New River	Seven Sisters Rd	Doorstep Streets	Street Gardens	Railway Underbridges	Gardening Club	Youth & Comm. Spaces	Seven Sisters Online	Energy Action Zone	
12	To protect and enhance the Borough's townscape and cultural heritage resources.	?	?	+	?	+	0	0	+	0	0	0	0	+	0	0	0	+	+	+	+	0	0	0	0	+	+/?
13	To protect and enhance the Borough's landscape resources	+	+	+	+	++	0	+	+	?	+	+	+	0	+	+	+	+	0	0	0	+	0	0	0	0	+
14	To protect and enhance the quality of water features and resources.	0	-	-	?	0	+	0	-	0	-	0	-	0	-	-	-	+	0	0	0	0	0	0	0	0	+/_
15	To encourage the use of previously developed land	+	+	+	0	0	+	0	+	+	+	0	+	+	+	+	+	0	0	0	0	0	0	0	0	0	+
16	To adapt to climate change	+	+	+	+	0	?	0	+	+	0	0	0	+	0	+	0	0	0	0	0	0	0	0	0	0	+
17	To protect and improve air quality.	0	+	+	0	+	0	0	+	?	+	0	0	?	0	+	+	0	+	0	0	0	0	0	0	0	?/+
18	To limit climate change by reducing CO <sub>2</sub> emissions	0	?	?	+	0	+	0	-	-	0	0	0	+	-	+	+	+	0	0	0	0	0	0	0	+	+/_

**Assessment of impacts of Plan Proposals**

SA Objectives	Short Term	Medium Term	Long Term	Specific location proposals														Generic proposals for different locations							Cumulative Impacts of Proposals				
				St Ann's	Chestnuts Park	Culvert Road	Brunswick Park	Gourley Place	Apex House &	Ermine Park	Plevna Wildlife Gdn.	Paignton Park	Sir Frederick Messer	Tiverton Estate	Arena, Crusader & Omega	The Vale	The New River	Seven Sisters Rd	Doorstep Streets	Street Gardens	Railway Underbridges	Gardening Club	Youth & Comm. Spaces	Seven Sisters Online		Energy Action Zone	Local Landmarks		
19	To ensure the sustainable use of natural resources.	<b>0</b>	<b>?</b>	<b>?</b>	<b>?</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>-</b>	
20	To promote the use of sustainable modes of transport.	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>?</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>?</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>+</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+</b>

**Key:**

Compatible	<b>+</b>
Unrelated	<b>0</b>
Potentially Incompatible	<b>+</b>
Positive and negative impacts	<b>+/-</b>
Uncertain	<b>?</b>

Source: Hyder Consulting (UK) Ltd. (2008) Sustainability Appraisal of the Seven Sisters Neighbourhood Plan.

Appendix C-3: Silverstone Case Study: Appraisal of Cumulative Effects of Policies on Sustainability Objectives

SA Objectives		Assessment of impacts of Plan Policies																								Cumulative Impacts on SA Objectives
		Policies																								
		Motor Sport		Business & Technology			Hotels		Leisure & Conferencing Development				Planning Considerations						Nature Conservation and Cultural Heritage							
1 Pit and paddock complex	2 Hub and Welcome Centre	3 Business Park	4 Advanced Technology Park	5 Education Campus	6 Housing	7 Hotels	8 Manufacturer Display Zone	9 Indoor/Outdoor Exhibition	10 Sport and Leisure Complex	11 Technical Support Area	12 Planning Application	13 Sustainability Principles	14 Movement & Parking	15 Water & Foul Sewage	16 Flood Risk & Surface Water Drainage	17 Contaminated Land & Hydrogeology	18 Nature Conservation & Enhancement	19 Landscape principles	20 Heritage & Archaeology	21 Noise	22 Air Quality	23 Design Principles	24 Green Infrastructure			
1	Housing:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	Crime and Safety	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	0	0	0	0	0	0	+	?	+	
3	Communities	+	+	+	+	+	0	+	+	+	+	0	+	?	0	0	0	0	+	+	+	+	+	+	+	
4	Health	0	0	+	+	+	0	0	0	0	+	0	0	0	0	0	0	+	+	0	+	+	+	+	+	
5	Access and Transport	?	?	-	-	-	0	-	-	-	-	0	+	?	0	0	0	0	0	0	-	?	0	+	-	
6	Biodiversity	+	+	+	+	-+	0	+	?	+	+	+	0	+	-	?	+	?	+	+	0	+	+	0	+	
7	Cultural Heritage, Landscape and Townscape	+	+	+	+	+	0	?	?	+	+	+	0	+	0	0	0	0	+	+	+	0	0	+	+	
8	Climate Change and Energy	-	-	?	?	?	0	+	+	+	+	+	0	+	-	+	0	0	0	?	0	0	-	0	0	
9	Waste	-	-	?	?	?	0	0	?	?	?	?	0	?	0	0	0	0	0	0	0	0	0	0	0	

Assessment of impacts of Plan Policies																											
SA Objectives		Policies																						Cumulative Impacts on SA Objectives			
		Motor Sport		Business & Technology			Hotels		Leisure & Conferencing Development			Planning Considerations					Nature Conservation and Cultural Heritage										
		1 Pit and paddock complex	2 Hub and Welcome Centre	3 Business Park	4 Advanced Technology Park	5 Education Campus	6 Housing	7 Hotels	8 Manufacturer Display Zone	9 Indoor/Outdoor Exhibition	10 Sport and Leisure Complex	11 Technical Support Area	12 Planning Application	13 Sustainability Principles	14 Movement & Parking	15 Water & Foul Sewage	16 Flood Risk & Surface Water Drainage	17 Contaminated Land & Hydrogeology	18 Nature Conservation & Enhancement	19 Landscape principles	20 Heritage & Archaeology	21 Noise	22 Air Quality		23 Design Principles	24 Green Infrastructure	
10	Land and Soils	?	?	-	-	-	0	?	+	+	+	+	0	+	0	0	0	+	+	+	+	0	+	0	+	+/_	
11	Water	?	?	-	-	-	0	-	-	-	-	-	0	+	0	?	?	+	0	0	0	0	0	0	0	-	
12	Economy	+	+	+	+	+	0	+	+	+	+	+	0	0	0	0	0	0	+	+	+	0	0	0	0	++	
13	Education Skills and Training	+	+	+	+	+	0	0	0	+	0	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+
14	Tourism	+	+	?	?	?	0	+	+	+	+	+	0	0	0	0	0	0	+	+	+	0	0	0	+	++	

**Key**

No sustainability constraints: development acceptable	+
Neutral or unknown effect	0
Sustainability constraints to development	-
Positive and negative impacts	+/-
Uncertain, potential sustainability issues	?

Source: Hyder Consulting (UK) Ltd. (2008) Sustainability Appraisal of the Draft Silverstone Development Brief.

Author: Dr Lourdes M. Cooper  
Address: Hyder Consulting UK Ltd.  
29 Bressenden Place,  
London SW1E 5DZ,  
United Kingdom  
Email: [lourdes.cooper@hyderconsulting.com](mailto:lourdes.cooper@hyderconsulting.com)  
Tel: +44 (0)870 000 3006

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