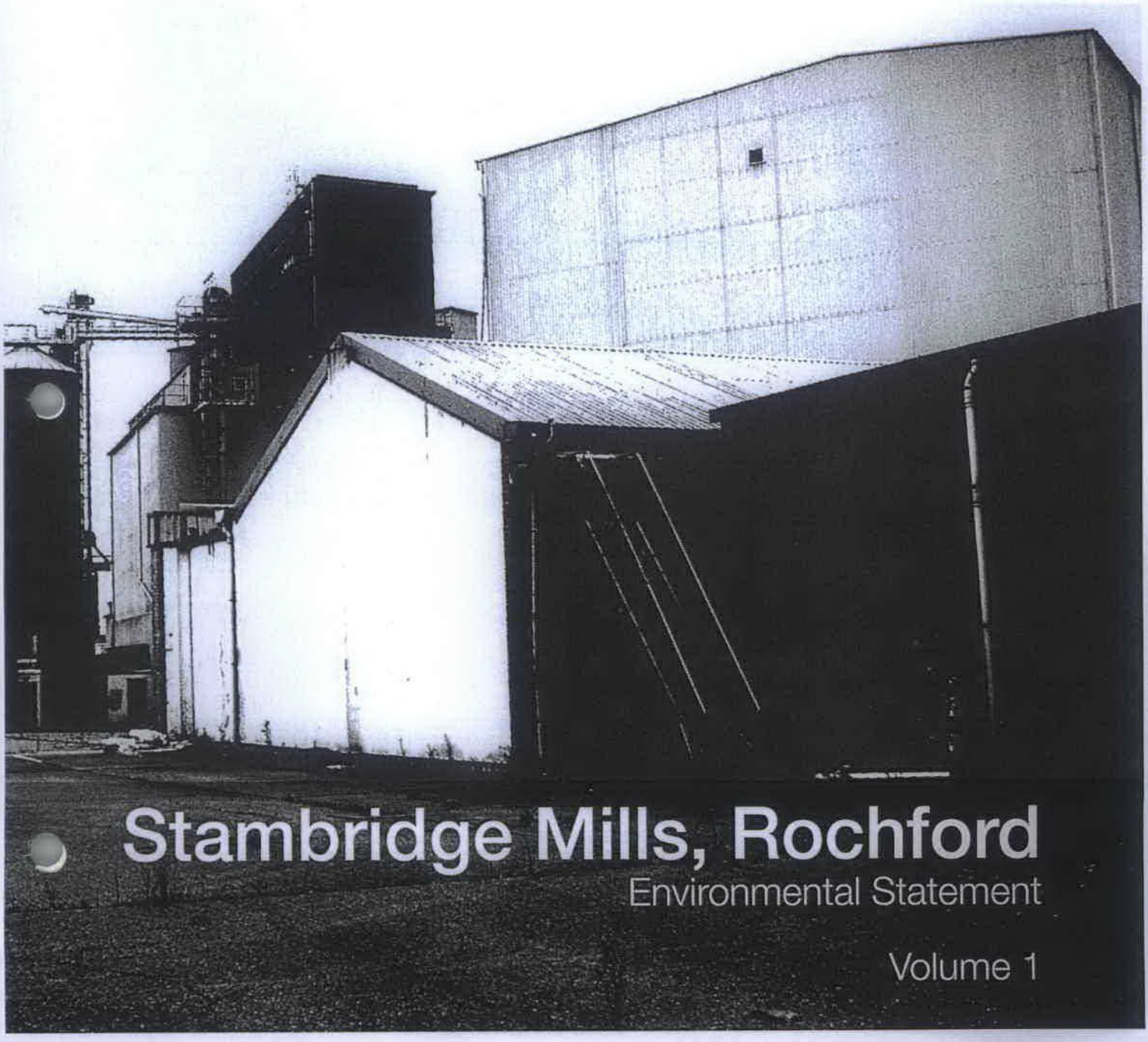
On behalf of **Inner London Group** | August **2011**



Stambridge Mills, Rochford

Environmental Statement

Volume 1

inner london group

PROJECT DIRECTORY

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CONTENTS

1. Introduction

2. Planning Policy Context

3. Socio-Economic Issues

4. Landscape and Visual Issues

5. Ecology and Nature Conservation

6. Transport

7. Air Quality

8. Noise and Vibration

9. Hydrology, Flood Risk and Surface Water Drainage

10. Contaminated Land and Geotechnical Issues

11. Summary

FIGURES

1. Introduction

Figure 1.1 Site Context Plan
Figure 1.2 Site Location Plan
Figure 1.3 Cumulative Schemes
Figure 1.4 Proposed Development
Figure 1.5 Ground Floor Plan and Proposed Bridleway Diversion
Figure 1.6 First Floor Plan
Figure 1.7 Second Floor Plan
Figure 1.8 Third Floor Plan
Figure 1.9 Roof Plan
Figure 1.10 Landscape Plan

2. Planning Policy Context

No Figures

3. Socio-Economic Issues

Figure 3.1 Projected Population Growth
Figure 3.2 Population Age Profile
Figure 3.3 Percentage Household Composition in 2001 for Rochford, the Region and England & Wales
Figure 3.4 Illustration of Household Dwelling Type 2001
Figure 3.5 Number of People Living in Households
Figure 3.6 Local Facilities Plan
Figure 3.7 Primary Fires per 100,000 population by fire and rescue service area, 2006

4. Landscape and Visual Issues

Figure 4.1 Photoview Location Plan
Figure 4.2 Photoviews
Figure 4.3 Environmental Designations Plan
Figure 4.4 Local Landscape Character Plan
Figure 4.5 Landscape Features Plan
Figure 4.6 Public Rights of Way Plan
Figure 4.7 Visual Analysis Plan: Public Rights of Way – Operational Phase

Figure 4.8 Visual Analysis Plan: Highways – Operational Phase

Figure 4.9 Visual Analysis Plan: Built Form – Operational Phase

5. Ecology and Nature Conservation

Figure 5.1 Application Site Location and Ecological Designations

Figure 5.2 Ecological Features

Figure 5.3 Recreational Land, Designated Sites and Potential Circular Walks

6. Transport

No Figures

7. Air Quality

Figure 7.1 Rochford Town Centre Receptors

Figure 7.2 Southend Road / Sutton Road Receptors

Figure 7.3 Stambridge Road / Mill Lane Receptors

Figure 7.4 Development Receptors

Figure 7.5 Diffusion Tube Locations

Figure 7.6 Areas Potentially Affected by Dust-soiling Impacts during the Construction Period

Figure 7.7 Areas Potentially Affected by Elevated PM_{10} Impacts during the Construction Period

8. Noise and Vibration

Figure 8.1 Noise Monitoring Locations

9. Hydrology, Flood Risk and Surface Water Drainage

No Figures

10. Contaminated Land and Geotechnical Issues

No Figures

11. Summary

No Figures

APPENDICES

1. Introduction

Appendix 1.1	Screening and Scoping Opinion Correspondence with Rochford District Council
Appendix 1.2	Screening and Scoping Opinion Correspondence from Natural England
Appendix 1.3	Consultee Responses from the Scoping Process
Appendix 1.4	Demolition / Construction Method Statements

2. Planning Policy Context

No Appendices

3. Socio-Economic Issues

No Appendices

4. Landscape and Visual Issues

Appendix 4.1	Countryside Character Area 81: Greater Thames Estuary
Appendix 4.2	Extract from Essex Landscape Character Assessment: Section 4.7 'Coastal Landscapes'

5. Ecology and Nature Conservation

Appendix 5.1	Information received from Essex Ecology Services (EECOS) – 2010
Appendix 5.2	Information received from Essex Mammal Surveys – 2010
Appendix 5.3	Information received from Invertebrate Group – 2010
Appendix 5.4	Information downloaded from Natural England's MAGIC and Nature-on-the-Map online databases
Appendix 5.5	Correspondence with Natural England, Environment Agency and London Southend Airport
Appendix 5.6	Citations in respect of The Crouch and Roach Estuaries SSSI / SPA / RAMSAR and The Essex Estuaries SAC
Appendix 5.7	WeBS bird data for Crouch and Roach Estuaries SPA
Appendix 5.8	Extracts from WeBS 2004/05 report pertaining to Couch & Roach Estuaries
Appendix 5.9	Invertebrate Survey March 2010

6. Transport

Appendix 6.1	Transport Assessment (included as a separate document at Volume 3)

7. Air Quality

Appendix 7.1 Receptor Locations

Appendix 7.2 Model Verification

Appendix 7.3 Adjustment of Short-Term Data to Annual Mean Equivalent

8. Noise and Vibration

Appendix 8.1 Noise and Vibration Assessment Technical Report

9. Hydrology, Flood Risk and Surface Water Drainage

Appendix 9.1 Flood Risk Assessment

Appendix 9.2 Water Quality Data from the Environment Agency

10. Contaminated Land and Geotechnical Issues

Appendix 10.1 Preliminary Risk Assessment

Appendix 10.2 Phase II Environmental Assessment

11. Summary

No Appendices

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

1 INTRODUCTION

1.1 Introduction

1.1.1 This Environmental Statement (ES) accompanies a planning application for the redevelopment of Stambridge Mills, Rochford, Essex, submitted on behalf of the Inner London Group. The development proposal provides 96 residential units set within a landscaped framework, together with associated public open space, parking, infrastructure services, and includes land for building improved flood defences. The new development would be accessed via the existing site entrance off Mill Lane. A Site Context plan is provided at Figure 1.1.

1.2 EIA Regulations and Procedures

1.2.1 The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 require that any proposed development that falls within the description of a Schedule 2 development within the meaning of the Regulations will require it to be subject to an environmental impact assessment where such development is likely to have a "*significant effect*" on the environment by virtue of such factors such as its nature, size or location.

1.2.2 Given that the proposed development falls within the category of "Urban Infrastructure Projects" (Schedule 2, 10 b) as described in the Regulations, the applicant's agents, Pegasus Environmental, requested a Screening Opinion of the competent Authority, Rochford District Council (RDC), to establish whether this scheme constitutes an EIA development as far as the Authority is concerned (correspondence included at Appendix 1.1).

1.2.3 Following the issue of the Screening Opinion, the Council's subsequent Scoping discussions with Natural England (see Appendix 1.2) led the Council to reconsider their Screening Opinion regarding the proposals (see Appendix 1.1). The Council informed the applicant that they no longer considered the proposals to constitute EIA development and would not issue a formal Scoping Opinion for this reason (see correspondence at Appendix 1.1). Notwithstanding the Council's position, the applicant requested copies of all consultee correspondence from the Scoping process (included at Appendix 1.3) and has produced an Environmental Statement (ES) to accompany the planning application, in accordance with the Council's original Screening Opinion. Contrary to the Council's stance, it is the applicant's opinion that the proposal is likely to have significant effects upon the environment and therefore requires an environmental impact assessment to address key environmental issues.

1.2.4 The area of land which has been subject to an environmental impact assessment lies to the east of the town of Rochford, immediately to the north of the River Roach. The application site and thus EIA study area includes the entire Mills complex and the land to the east and west of this which is required for the implementation of the flood defence improvements, identified in Figure 1.2. In total, this site area extends to 4.0 hectares.

1.3 Assessment Approach

1.3.1 The purpose of the EIA is to identify any environmental issues of significance in relation to the proposed development and to ensure that these are effectively addressed for both the construction and operational phases of the proposals. This ES provides data to identify and assess any environmental effects resulting from the proposed development which are likely to be of significance and provides a description of the measures envisaged in order to avoid, reduce or remedy, if possible, significant adverse effects.

1.3.2 The Environmental Statement has been prepared with reference to the following advisory documents:

- Institute of Environmental Management and Assessment *'Guidelines for Environmental Impact Assessment'* 2004.

- The Department of Environment: *Preparation of Statements for Planning Projects that Require Environmental Assessment: a Good Practice Guide, 1995.*

- Department of Transport: *Design Manual for Roads and Bridges, Volume 11; Environmental Assessment.*

- The Department of Environment, Transport and Regions: *Environmental Impact Assessment – A Guide to Procedures, 2000.*

1.3.3 In accordance with the Environmental Impact Assessment Regulations 1999, this Environmental Statement comprises the following information:

- A description of the development proposed comprising information about the site including the nature, size and scale of the development;

- The data necessary to identify and assess the main effects which the development is likely to have on the environment;

- A description of the likely significant effects, direct and indirect, on the environment proposed for development, explained by reference to its possible impact on: human beings, flora, fauna, soil, water, air, climate, cultural heritage, landscape and the interaction between any of the foregoing material assets;

- Where significant adverse effects are identified with respect to any of the foregoing, mitigation measures will be proposed in order to avoid, reduce or remedy those effects; and

- A summary in non-technical language of the information specified above.

Cumulative Effects

1.3.4 The EIA has considered the cumulative effects of the proposed development in combination with other schemes within the vicinity. The schemes which have been considered within the assessment of cumulative effects are shown on Figure 1.3 and described below:

- **Hall Road** – Planning application for 600 dwellings, a new primary school with playing fields, new public open space, two access points onto Hall Road, and new pedestrian and cycle links to Rochford town centre;

- **Brays Lane** – Planning application 100 dwellings, new access, new bus turning facilities, associated infrastructure and landscaping;

- **Rectory Road, South Hawkwell** – Planning application for 176 dwellings submitted in April 2011.

1.3.5 Each chapter in the ES includes a section on cumulative effects.

1.4 Site Description and Development Context

1.4.1 The development site consists of the disused complex at Stambridge Mills, and some adjacent strips of land to the immediate east and west extending along the frontage of the River Roach estuary, and which will accommodate proposed flood defence improvements.

1.4.2 The Mills complex is surrounded by the Essex Green Belt. The complex itself, with the exception of a small rectangle of hardstanding on the northern boundary, is outside of the Green Belt designation; however the land where the flood defence improvements are proposed is within the Green Belt.

1.4.3 The site lies to the east of Rochford town, adjacent to the northern bank of the River Roach. Between the site and the built edge of Rochford to the west lies pasture and playing fields associated with the nearby

college. To the east of the Mills complex lies the Broomhills residential care home and grounds and to the northeast lies a cricket ground. The Mills are accessed from the north by Mill Lane, which also provides access to approximately 12 residences situated on both sides of the lane. The lane runs southward from the junction with Stambridge Road to the north of the site for approximately 0.35km and ends where it accesses the Mills complex.

1.4.4 The western boundary of the Mills is formed by a thick conifer hedgerow, which also forms part of the northern boundary to the west of the access. To the east of the access, the remainder of the northern boundary is more open, with only sparse vegetation separating the site from the carehome property. The eastern edge of the site borders a ditch with dense hedgerow vegetation. The southern edge flanks the banks of the River Roach.

1.4.5 The Mill complex itself currently consists of industrial buildings and 6 silos, now disused, as well as large areas of hardstanding, a weigh bridge and a two storey residential dwelling. Fuel and oil tanks in enclosed storage areas also remain. Figure 1.5 details the existing structures at the Mills complex.

1.4.6 The site is at an elevation of approximately 4m Above Ordnance Datum (AOD). There is a slight fall in elevation from Stambridge Road at an elevation of 5m AOD to 3.5m AOD adjacent to the River Roach.

1.4.7 The buildings extend to approximately 31.5m in height in the south-eastern corner of the site, with the silos approximately 29m in height and the buildings in the southerly and westerly sectors ranging from approximately 28m down to 9m in height. Where the site borders the river bank it is elevated from the water's edge. There is very little vegetation on the site itself, with some ornamental shrub planting adjacent to the residential building and hardstanding carpark area in the north-west.

1.4.8 The land to the immediate west of the Mill complex is agricultural pasture. Several public footpaths and bridleways run through the pasture land and playing fields to the west of the Mill site. A strip of this land which fronts onto the estuary and currently accommodates earth flood defence bunds will also form part of the site, where the improved flood defences are to be implemented

1.4.9 To the east of the complex, the flood defence improvements will also require a strip of land along the estuary frontage and this is also included within the site boundary. This strip of land currently accommodates grassed earth bunds and borders property associated with the care home and adjoining open land.

1.4.10 The Crouch and Roach Estuaries Site of Special Scientific Interest (SSSI) lies approximately 350m to the south-east of the Mills complex and adjacent to the furthest eastern extent of the proposed flood defence improvements, which is also designated as a Special Area of Conservation (SAC) and a Special Protection Area (SPA) due to the saltmarsh and grazing marsh habitats present and the internationally and nationally important species of wildfowl and waders this supports.

1.4.11 The Mills complex is not in use at present, however there is 24 hour security in operation which results in lighting being used throughout the site, both in the security office and for observation across complex.

1.5 Description of the Proposed Development: Demolition, Construction and Operational Phases

1.5.1 The proposals are shown on Figures 1.4 to 1.10. The proposed redevelopment will entail the demolition of the existing structures, the construction of new residential dwellings and implementing areas of open space and landscape. To the east and west of the area where built form is proposed, improved flood defences in the form of new bunds are to be constructed along the river banks on the footprint of the existing but inadequate bunds, and the existing wharfside which forms the southern boundary of the site is to be replaced with a new sheet piled edge. Within the Mills complex, as a continuation of the defence provided by the new bunds a flood wall will be constructed along the southern portion of the site, set back from the water's edge.

1.5.2 The proposed redevelopment comprises the construction of 96 residential units comprising 17 one bedroom and 34 two bedroom apartments and 17 two bedroom 23 three bedroom and 5 four bedroom houses.

1.5.3 In addition to the redevelopment proposals, part of the scheme involves improvements to the flood defences along the estuary banks to the east and west of the Mills complex. Although earth bunding does currently exist in these locations, this is considered insufficient in height to adequately protect against tidal flooding from the estuary. The proposed improvements will involve the resiting and reforming of these mounds to a crest height of 6.3m AOD along the bankside. It is proposed to reuse some of the demolition material from the Mills complex for the core of these structures.

1.5.4 Within the Mills complex itself, the improved flood defence bunds will be continued in from the west, to meet a new sea wall proposed around the southern edge of the retained built form to a height of 6.3m AOD. This will continue across the site to meet the eastern bund improvements, ensuring continuous defence for the development from flooding. The existing wharfside forming the southern boundary to the Mills complex will be replaced by new sheet piled facing. The bund construction methodology is provided at Appendix 1.4.

Demolition and Construction Sequence

1.5.5 Below is the sequence of the major construction and demolition works to take place at the site. Method Statement provided by the project's engineering consultants for specific elements of the works are referenced where appropriate and these are included at Appendix 1.4.

1.5.6 Stage 1 will occur first, then Stage 2, with Stages 3, 4 and 5 occurring subsequently but with overlap between work elements to a certain extent. It is estimated that the enabling works (demolition; river defences; earthworks; foundations) will take approximately 12 months to complete; with a further 24 months estimated for the completion of the build.

1.5.7 Vehicular access during the demolition and construction phases will be via Mill Lane.

Stage 1: Demolition

1.1 Carry out pre-demolition surveys of existing buildings to be demolished;
1.2 Determine if asbestos is present and arrange suitable removal;
1.3 Demolished existing structures

Stage 2: Works to River Wall

2.1 Clear all areas required for piling equipment;
2.2 Install new piled river wall (wharfside edge). The new wharfside edge will be installed behind the existing wall using non-driven piling techniques.

Stage 3: Raise General Ground Levels

3.1 WAC tested material will be placed on site to fill site to the required level.

Stage 4: New Construction

Flats

4.1 Construct new loadbearing masonary structures
4.2 Install new timber floors
4.3 Repeat construction to roof level
4.4 Install new timber trussed roof rafters

Houses

4.1 Construct new block walls upto first floor level
4.2 Install new upper floor precast concrete units
4.3 Repeat steps 4.1 and 4.2 to roof level
4.4 Install new timber trussed roof rafters

Landscape

1.5.8 On the basis of the above specification of works, for the purposes of the impact assessment it has been assumed that the following plant are likely to be used during each stage of the construction process:

Demolition Works:
- Hydraulic Breakers
- Long Reach Hydraulic Excavators
- Mobile Cranes.
- Loading Shovels
- Mobile Crushers and Screeners
- Tipper Trucks
- Compressors

River Wall/River Defences:
- Hydraulic Breakers
- 360 Excavators
- Compressors
- Telescopic Crawler Crane
- Crawling Vibrationless Piling Machine

Raise General Ground Levels
- Hydraulic Breakers
- Tipper Trucks.
- Compactors and Rollers

Construction Works Superstructure:
- Hydraulic Breaker
- Piling Rigs
- Tipper Trucks
- Ready Mix Concrete Lorries
- 360 Excavators
- Compressors
- Tower Cranes
- Concrete Pumps
- Mobile Cranes
- Hand held power tools

1.5.9 Where possible, demolition arisings will be reused on site, for example in the construction of the flood defence bunds.

1.5.10 The amount of material required for the construction of the improved flood defence bunds is as follows:

Item	Unit	Quantity
Class A : General Items		
Insurances	sum	
Accomodation	wk	26
Class B : Ground Investigations		
Trial Pits	sum	
Testing	sum	
Class D : Demolition and Site Clearance		
General Site Clearance	sum	
Accomodation for 2no Pylons	sum	
Class E : Earthworks		
General Topsoil strip	sqm	34,000
Preparation of Excavated Surfaces	sqm	24,000
Import Clay	cum	23,000
Fill Topsoil	cum	3,500
Fill Clay	cum	23,000
Grass Seed	sqm	24,000
Class F : Insitu Concrete		
Outfall plus flap valves	no	4
Class I : Pipework etc		

750mm dia pipe incl bed and surround	m	68

Class P : Piles

Sheetpile cut off wall including 1m x .6m capping beam	m	234

Class R : Roads and Paving

Hardcore haul road (200mm dp) plus geotextile	sqm	6,000
Type 1 100mm dp to path plus geotextile	sqm	887
50mm wearing course	sqm	887
Remove hardcore off site	cum	1,200

Operational Development

1.5.11 The refurbished section of the proposed development would rise to 4 storeys.

1.5.12 Landscaping proposals for the site include the retention of the vegetation along the boundaries of the site wherever possible, bolstered by additional native planting across the open space within the site to provide an attractive living space for new residents.

1.5.13 It is proposed that vehicular access to serve the proposed development would be from the existing entrance at the southern end of Mill Lane.

1.5.14 The scheme would be lit using modern energy efficient lighting and cut off measures, consistent with the need to provide the necessary safety levels within streets and publicly accessible areas. This will help ensure minimal upward or sideward light spillage and light pollution throughout the site and the wider surrounding landscape. The street lighting associated with the residential areas would be lit to highway standards.

1.5.15 The scheme would be serviced by means of public transport services stopping along Stambridge Road to the north of the site. Improvements are proposed to the bus stop at this location, as well as contributions to provide more frequent services for this route. A new footway/cycleway is also proposed along Mill Lane to provide safe and easy access to the bus stop and the wider sustainable transport network. A new footpath is proposed along the top of the new bund to the west of the Mills complex to provide improved links to Rochford town and the wider public rights of way network. In addition the exiting Bridleway to the west of the site will be retained and diverted over the bund via 1:20 ramp.

Sustainability Objectives

1.5.16 The development objectives for the proposals at Stambridge Mills aim to achieve a sustainable development providing a high standard of design set within an attractive framework. These objectives include:

- To provide a sustainable development well related to the settlement of Rochford and its existing facilities which reduces the need to travel.
- To deliver a residential development and associated public and private open space areas.
- To provide a high quality development which responds to and respects the local townscape and landscape character, whilst establishing its own distinctive identity.
- To provide a mix of dwelling sizes, including 1 and 2 bedroom apartments and 3 & 4 bedroom houses.

- To provide improved flood defences for the area benefiting not only the development proposals but also existing residents along Mill Lane.
- To provide high quality clearly defined public realm and accessible open space.
- To provide a safe and attractive residential area with easy access linkages and movement through, to and from the site for pedestrians and cyclists to aid the reduction of the need to travel by car.
- Protection and wherever possible enhancement of the natural environment.
- Provision of sustainable drainage strategy for the proposed development.
- Potential for improved access to the countryside via public footpaths.

Phasing

1.5.17 For the purposes of the impact assessment, the earliest occupation date has been assumed as 2012.

1.6 Key Environmental Issues

1.6.1 Given the form of the proposed development, combined with the brownfield nature of the site, its situation within the Essex Greenbelt, and the proximity to the Crouch and Roach SPA/SAC/SSSI and existing residential areas, it is considered that the proposal could potentially have a number of significant effects upon the environment. The consultee responses received as part of the Scoping process (see Appendix 1.3) have highlighted the following environmental areas as those where potentially significant effects may arise and therefore these topics are addressed in the ES:

- Planning Policy Context;
- Socio-Economic Issues;
- Landscape and Visual Issues
- Ecology and Nature Conservation;
- Transport;
- Air Quality;
- Noise and Vibration;
- Hydrology, Flood Risk and Surface Water Drainage;
- Contaminated Land and Geotechnical Issues;

1.7 Structure of Environmental Statement

1.7.1 This ES comprises studies on each of the environmental issues identified as being of significance, which are supported with technical appendices where appropriate. This ES is structured as follows: Volume 1 comprises the main volume of the ES, and a breakdown of the contents of each of the chapters is provided below; Volume 2 contains the Supporting Appendices to the main volume of the ES; Volume 3 contains the Transport Assessment. This ES is accompanied by a Non-Technical Summary of the findings, which can be found at the front of Volume 1.

- Chapter 1 describes the proposed development and identifies the key environmental issues to be addressed. It also sets out the structure of this ES.

- Chapter 2 describes the planning policy context and the impact on human beings as a result of the proposed development. In so doing, it considers the development plan context in relation to the proposal and assesses the proposals at planning policy level. This chapter also outlines the main alternatives to this development.
- Chapter 3 considers the socio-economic implications that would arise as a result of development of the site for residential use.
- Chapter 4 considers how the landscape would be affected by the development and examines the visual effects of the proposals upon the nearby townscape and countryside.
- Chapter 5 reviews the ecological value of the site and its surroundings as they currently exists and establishes what effects would occur with development in place.
- Chapter 6 examines transport issues and reviews various modes of public and private transport based upon the findings of a transport assessment (TA) located in Volume 3 of the ES.
- Chapter 7 assesses the likely impact of the proposals on air quality for the locality.
- Chapter 8 considers the noise environment by assessing the noise originating from the construction and operation of the proposed development on neighbouring receptors, as well as considering the effects that surrounding noise sources will have on the proposed development. Impacts from vibration associated with the construction phase are also assessed.
- Chapter 9 considers the drainage, flood risk, water quality and hydrogeological issues associated with the development proposals.
- Chapter 10 appraises the site and the surrounding area for potential sources of contamination that may have an effect on the development. In doing so, this chapter identifies the underlying geology at the site and assesses the significance of any potential effects by way of a source-pathway-receptor methodology.
- Chapter 11 provides a summary of the ES's findings and conclusions. This information is also presented in a separate leaflet as a non-technical summary.

1.7.2 The chapters in Volume 1 are broadly structured as follows:

- **Introduction** – to introduce the discipline being assessed.
- **Assessment Approach** – to consider methodology, policy framework, relevant scoping criteria and any limitations of the assessment.
- **Baseline Conditions** – including baseline survey information.
- **Key Impacts and Likely Significant Effects** - identifying the impacts, evaluation of those impacts and assessment of the significance of these, considering both construction and operational effects.
- **Mitigation and Enhancement** – detailing the mitigation strategies for the significant effects identified and noting any residual effects of the proposals.
- **Summary** – a non-technical summary of the findings of the chapter is provided in conclusion.

1.7.3 For continuity, the appendices in Volume 2 are arranged and presented using the same reference numbers as the chapters as a means of providing supportive background and technical information.

1.7.4 Please note that the technical material has been compiled over the period between 2007 and March 2010. For this reason also, all site boundaries included in the technical appendices are indicative only: the definitive application red line boundary is provided on Figure 1.2.

1.8 The EIA Consultant Team

1.8.1 The consultants who have contributed to the preparation of this ES are referenced in the project directory at the front of this document.

1.9 Environmental Statement Availability

1.9.1 This ES is available for public viewing during normal office hours at the Rochford District Council Planning Department.

1.9.2 The ES may be purchased in Volumes, the costs for which are set out below:

- Non-Technical Summary – Free of charge
- Volume 1: Main Volume - £75
- Volume 2: Supporting Appendices - £75
- Volume 3: Transport Assessment - £50

1.9.3 For copies of any of the above please contact Pegasus Planning Group Ltd at the following address:

Pegasus Planning Group
Pegasus House
Querns Business Centre
Whitworth Road
Cirencester
Gloucestershire
GL7 1RT

Tel: 01285 641717
Fax: 01285 642348

KEY

Application Site Boundary

N

Information based on all known constraints

1.1	FIGURE
Site Context Plan	TITLE
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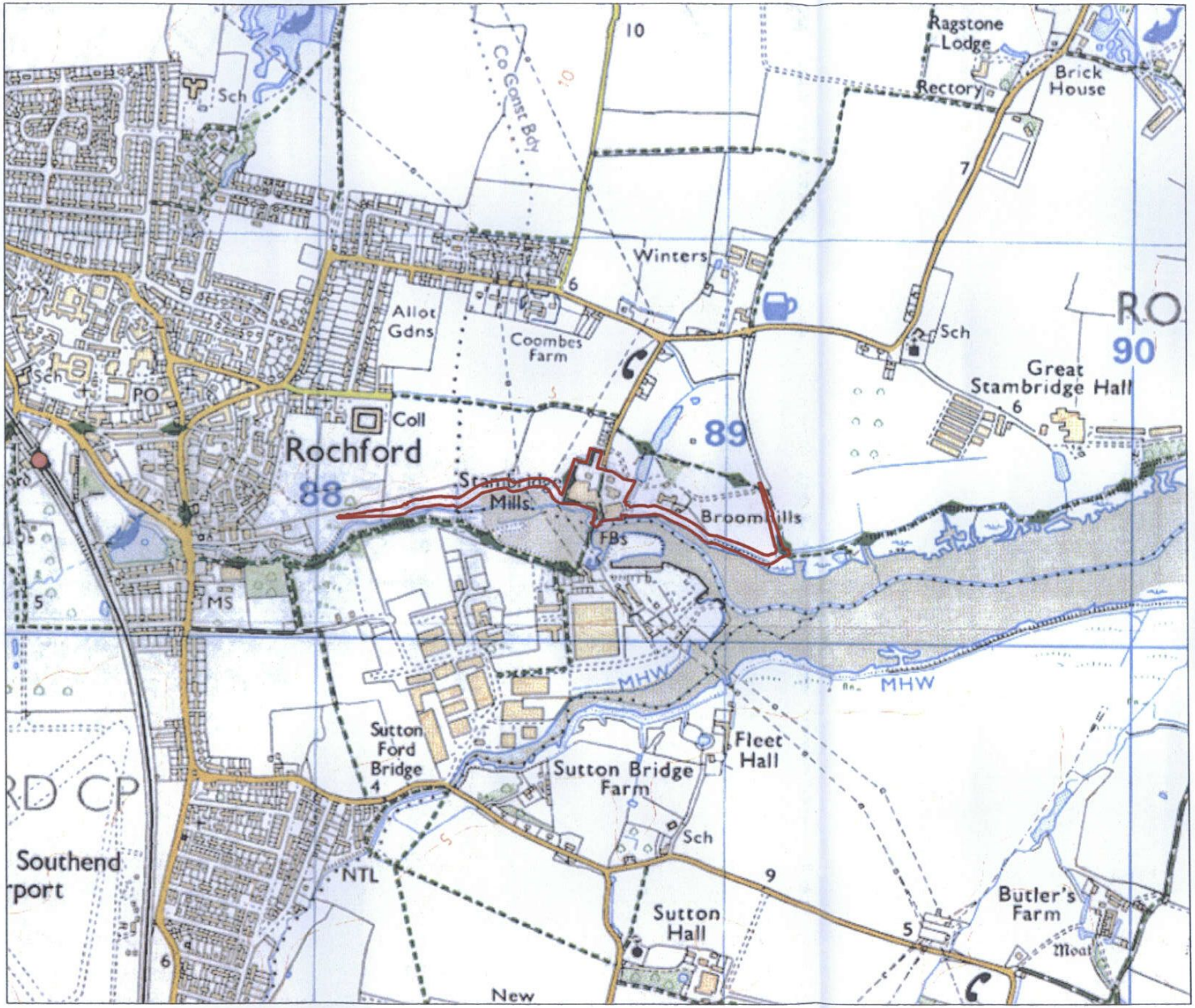
I.0105_23-1	DWG. NO.



N

Information based on all known constraints

KEY

Application Site Boundary

1.2	FIGURE
Site Location Plan	TITLE
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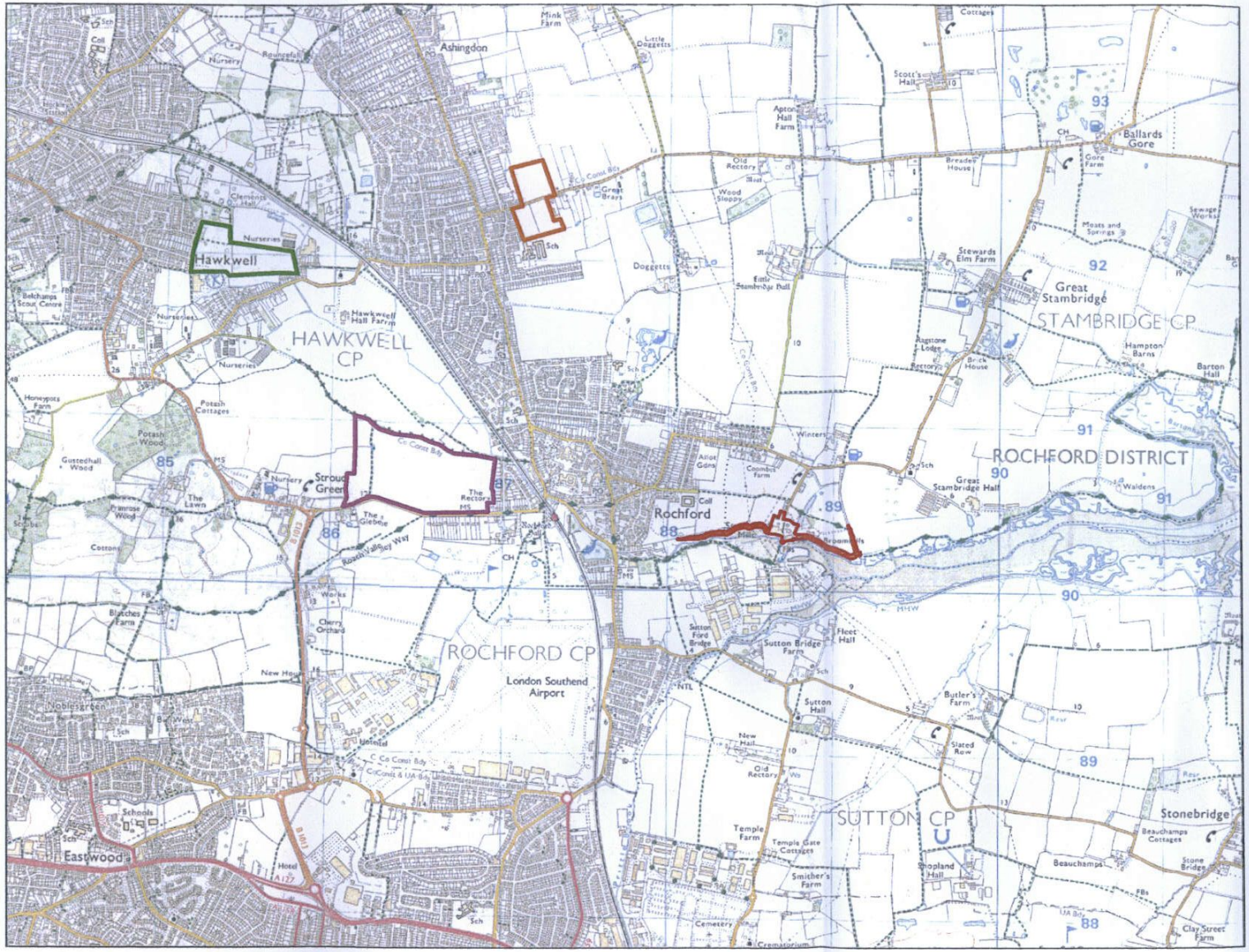

KEY

- Proposed Devlopment to the north of Hall Road
- Proposed Development at Brays Lane
- Proposed Development at Rectory Road, Hawkwell
- Application Site Boundary

1.3	FIGURE
Cumulative Schemes	TITLE
1:25,000 @ A3	SCALE
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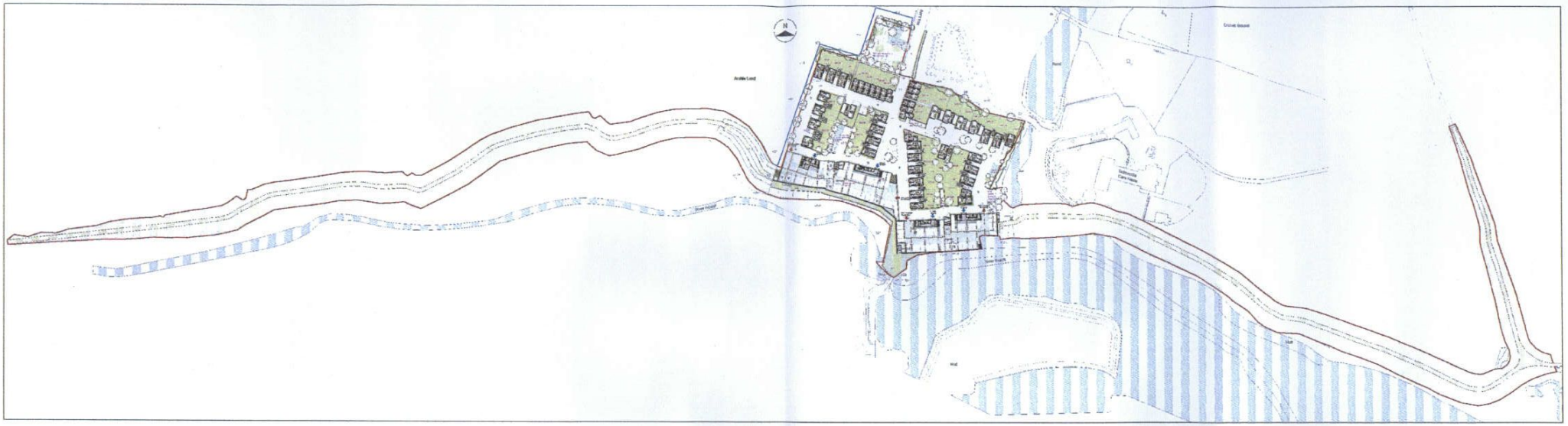

1.4	FIGURE
Proposed Development	TITLE
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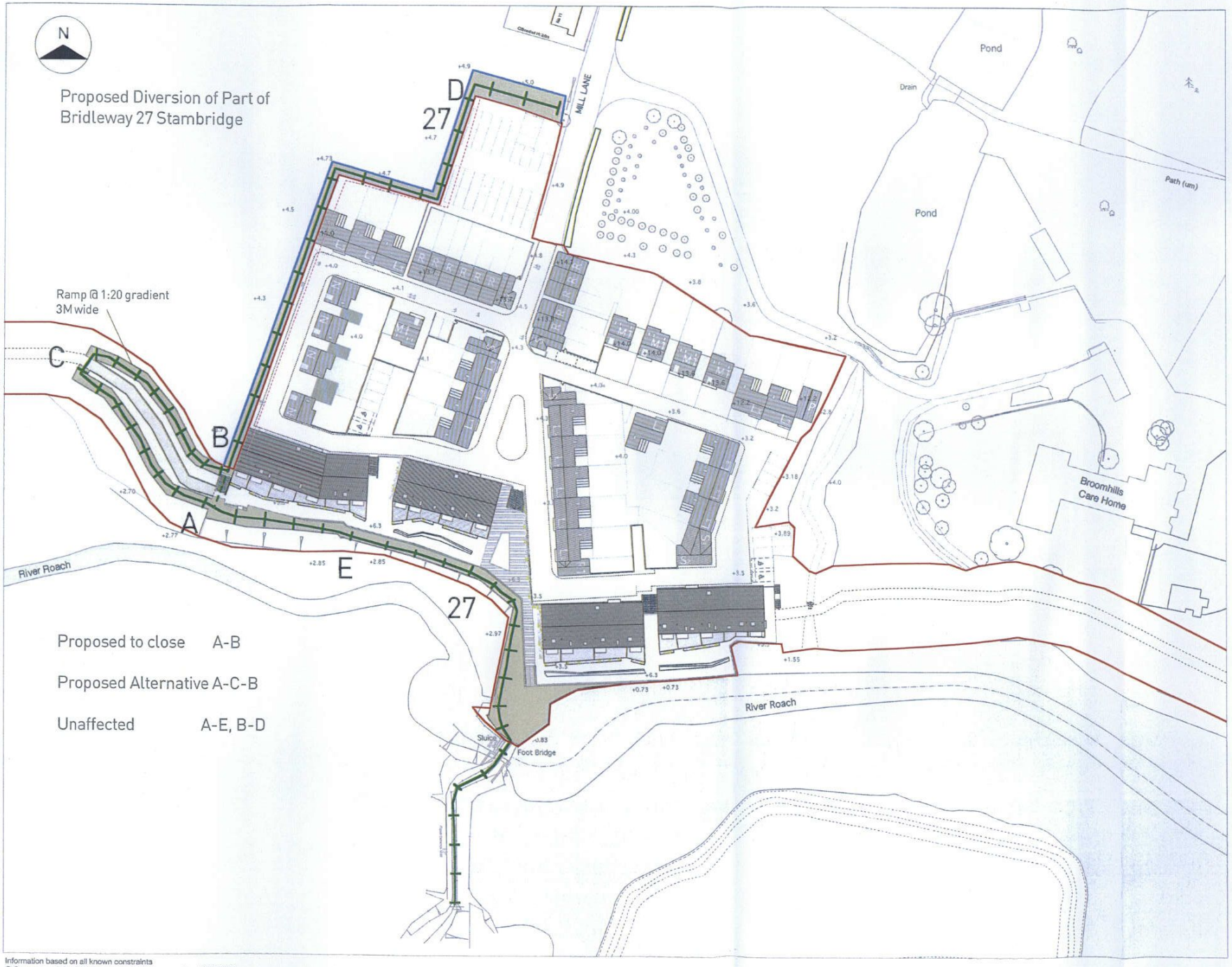
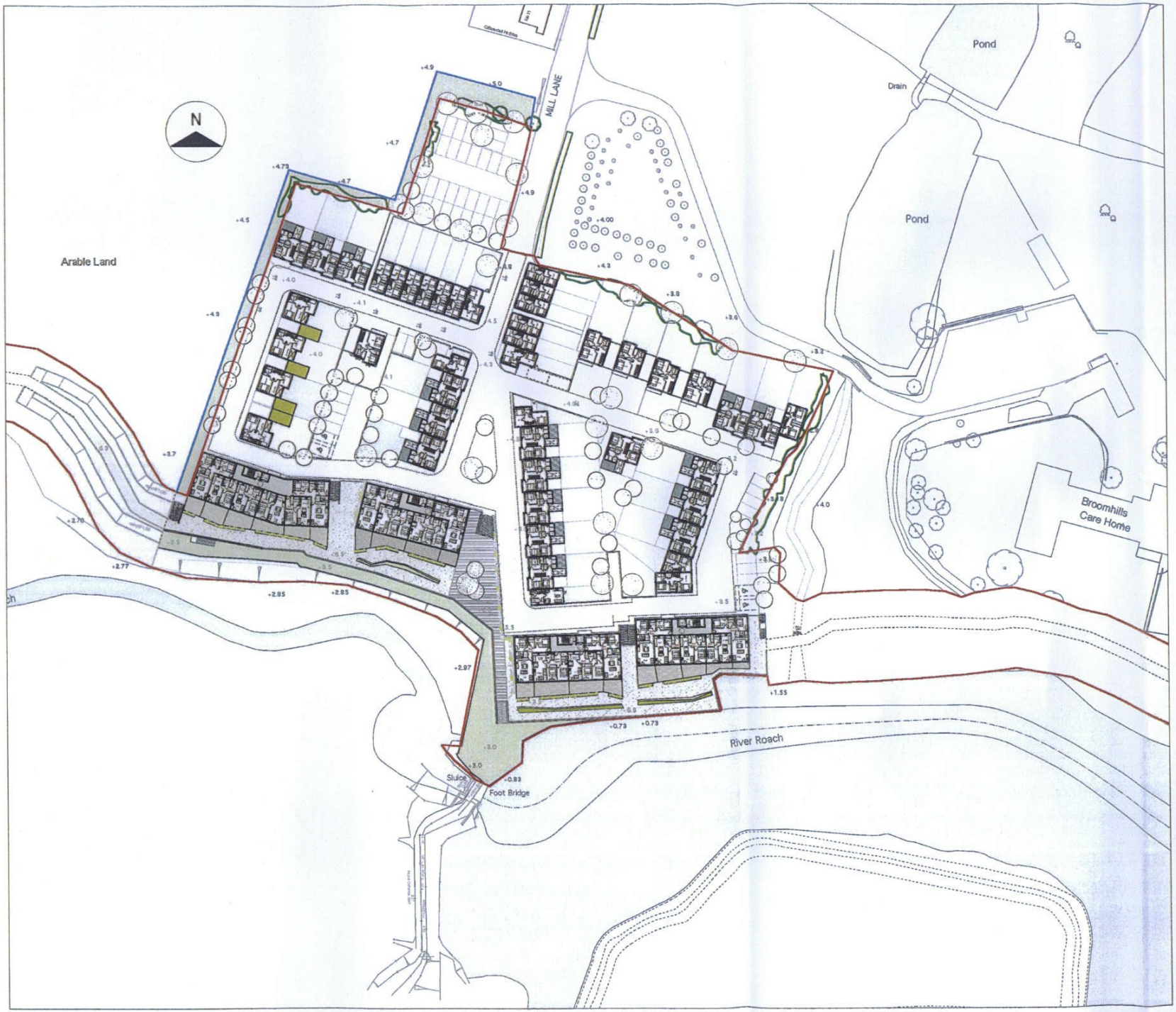
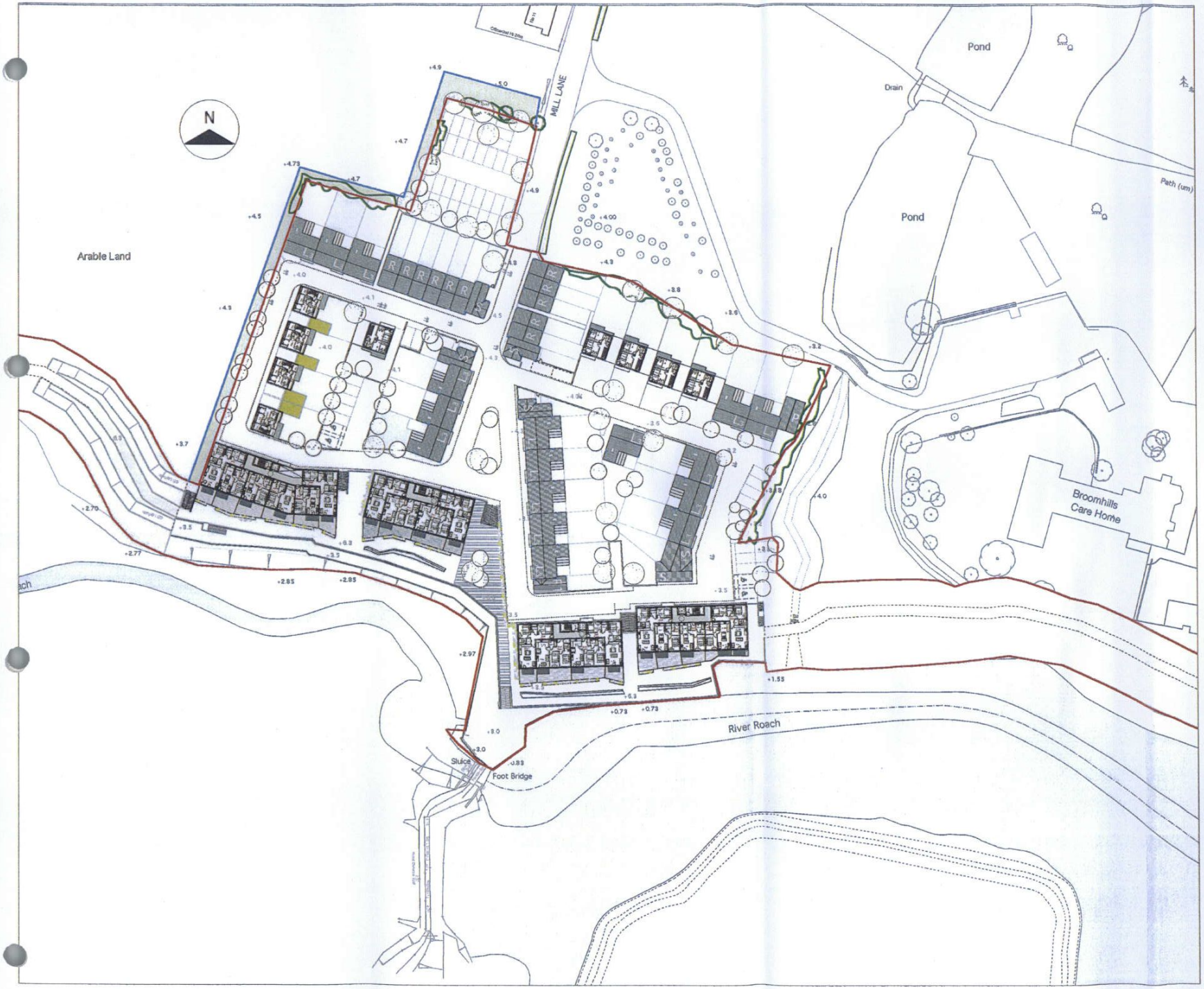


Information based on all known constraints

1.5	FIGURE
Ground Floor Plan and Proposed Bridleway Diversion	TITLE
1:1000 @ A3	SCALE
I.0105_44-A	DWG. NO.

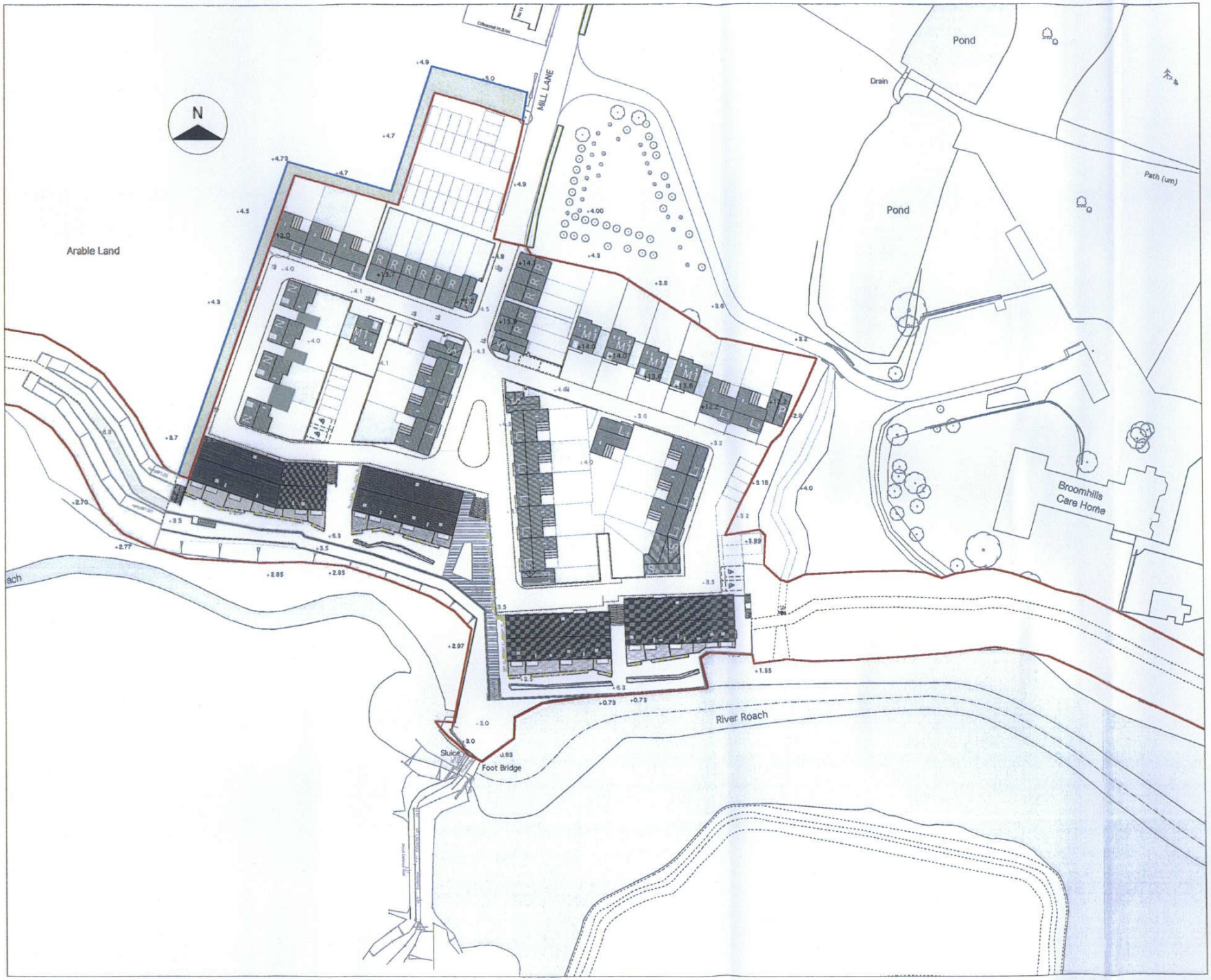


1.6	FIGURE
First Floor Plan	TITLE
1:1000 @ A3	SCALE
I.0105_44-A	DWG. NO.



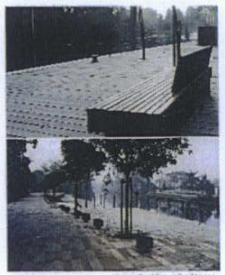
1.7	FIGURE
Second Floor Plan	TITLE
1:1000 @ A3	SCALE
I.0105_44-A	DWG. NO.

1.8	FIGURE
Third Floor Plan	TITLE
1:1000 @ A3	SCALE
I.0105_44-A	DWG. NO.



Information based on all known constraints

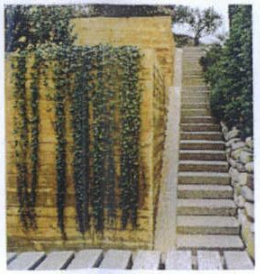
1.9	FIGURE
Roof Plan	TITLE
1:1000 @ A3	SCALE
I.0105_44-A	DWG. NO.

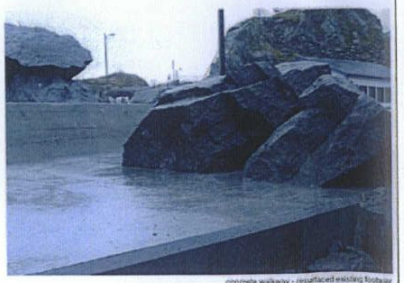

concrete strips - wharf terrace


hardwood decking - private terraces


concrete planters - wharf terrace


gabion walls and insitu concrete steps - apartments base


wall climbing plants - wharf edge


concrete walkway - resurfaced existing footway

Information based on all known constraints

0 10 20 30 40 50m

Landscape Proposals - paving and planting

1.Shared surface street(spine street and village square) in resin bound gravel or macadam base with stone chippings 'permeable surface' with block paving setts - aggregate laid on base of free drainage granular material- (colour tbc)

2.Shared surface street (secondary streets) in resin bound gravel or macadam base with stone chippings 'permeable surface' with block paving setts - aggregate laid on base of free drainage granular material- (colour tbc)

3.' CEDEC ' or similar self compacted gravel aggregate laid on base of free drainage granular material - wharf terrace (colour tbc)

4.Hardwood decking (private terraces)

5.Concrete block setts to define private boundaries to houses

6.Concrete upstand edge to 'cap' sheet piled wall

7.Structured planting to edge of entrance parking

8.Permeable Grasscrete paving to entrance carpark

9.Precast concrete horizontal strips to wharf terrace level

10.Wharf terrace level planters in concrete and timber

11.Specimen Trees to wharf terrace and 'village square'

12. Structure planting with close boarded timber fencing to western edge

13. Specimen trees to private rear gardens

14.Flood defence bund

15.Galvanised steel balustrading to wharf edge fixed to concrete upstand

16.Insitu waterproofed concrete steps

17.Self compacted gravel aggregate laid on base of free drainage granular material to bridleway/footway

18.225mm brickwork boundary walls to match house brickwork

19.Sheet piling to flood defence walls

20.Bridleway ramp surfaced with compacted gravel

21.Existing hedgerows retained were condition is good (refer to tree and hedgerow survey)

22.Close boarded timber fencing to private rear garden boundaries

23.Existing sheet piled wharf repaired to engineers detail

24.Existing wharf walkway resurfaced in concrete

25.Private rear gardens

26.Shrubplanting to fronts of houses within private boundary

27.Shurb planting to brickwork boundary walls and road edges

28.Gabion walls to edge of carpark/base of apartments galvanized steel baskets filled with crushed concrete from site

1.10	FIGURE
Landscape Plan	TITLE
1:1000 @ A3	SCALE
I.0105_44-A	DWG. NO.

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

2 PLANNING POLICY CONTEXT

2.1 Introduction

2.1.1 This chapter of the ES sets the planning policy background against which the proposed development of Stambridge Mills is to be considered. The scope of this chapter is to identify the relationship between the proposed development and the relevant policy statements contained within national Planning Policy Guidance and Statements, the regional spatial strategy (RSS) for the East of England, and saved local plan policies. Full regard is also had to emerging local development documents.

2.1.2 Section 38(6) of the Planning and Compulsory Purchase Act 2004 states that if regard is to be had to the development plan for the purposes of any determination to be made under the planning Acts, the determination must be made in accordance with the development plan unless material considerations indicate otherwise. Furthermore, paragraph 10 of 'The Planning System: General Principles' issued by ODPM in 2005 with PPS1 notes that "*local planning authorities must determine planning applications in accordance with the statutory Development Plan, unless material considerations indicate otherwise. If the Development Plan contains material policies or proposals and there are no other material considerations, the application should be determined in accordance with the Development Plan. Where there are other material considerations, the Development Plan should be the starting point, and other material considerations should be taken into account in reaching a decision. One such consideration will be whether the plan policies are relevant and up to date.*"

2.1.3 Section 38(3) of the 2004 Act states that the development plan is the regional spatial strategy for the region in which a location is situated and the DPDs which have been adopted/approved. In the case of Stambridge Mills, the statutory development plan comprises the East of England Plan (RSS), the saved policies of the Essex & Southend-on-Sea Structure Plan adopted in 2001, and the saved policies of the Rochford District Replacement Local Plan adopted 16th June 2006.

2.1.4 In the light of the content of Section 38(6) of the Planning and Compulsory Purchase Act 2004, this chapter reviews the nature/merits of the proposal described in the Stambridge Mills planning application within the policy context provided by relevant elements of the statutory development plan.

2.1.5 Paragraphs 13 and 14 of 'The Planning System: General Principles' issued by ODPM in 2005 indicate that the Government's statements of planning policy are material considerations which must be taken into account, where relevant, in decisions on planning applications whilst emerging policies can be regarded as material considerations, depending on the context. Equally, paragraph 18 of 'The Planning System: General Principles' refers to the weight to be attached to policies contained in emerging DPDs. Given that advice, this chapter also considers the merits of the planning application in the light of national planning policy guidance and the emerging Core Strategy for Rochford.

2.2 The statutory development plan

The East of England Plan (EEP)

2.2.1 The EEP was published on 12th May 2008. A High Court Hearing in May 2009 found in favour of a legal challenge brought by Hertfordshire County Council and St Albans District Council resulted in limited changes being made to elements of the EEP, but the majority of the policies in the Plan are unaffected. Those parts of the EEP directly relevant to Rochford are not affected by the High Court judgement. The Government has announced its intention to abolish Regional Spatial Strategies but the EEP currently retains full development plan status.

Spatial Strategy

2.2.1 Policy SS1 states that the strategy aims to bring about sustainable development. This will be achieved by applying the guiding principles of the UK Sustainable Development Strategy 2005, namely living within environmental limits, ensuring a strong, healthy and just society, achieving a sustainable economy, promoting good governance, and using sound science responsibly, and by applying the elements contributing to the creation of sustainable communities as described in Sustainable Communities: Homes for All. The elements of the latter include active, inclusive and safe; well run in terms of effective participation,

representation and leadership; environmentally sensitive; well-designed and built; well connected in terms of good transport services; thriving in terms of a flourishing and diverse economy; well served; and fair for everyone. Local Development Documents (LDDs) and other spatial strategies should help meet obligations on carbon emissions, and should adopt a precautionary approach to climate change. In particular, the strategy seeks to ensure that development maximises the potential for people to form a more sustainable relationship between their homes and workplaces and other regularly used services and facilities, and to respect environmental limits.

2.2.2 Policy SS2 states that the spatial strategy directs most strategically significant growth to the region's major centres. Within this context, LDDs should develop policies which ensure new development contributes to the creation of more sustainable communities, and should adopt an approach to the location of major development which priorities the re-use of previously developed land in and around urban areas.

2.2.3 Policy SS7 contends that the broad extent of green belts in the East of England is appropriate and should be maintained.

Economic Development

2.2.4 Policy E1 provides indicative targets for net growth, and Policy E2 requires LDDs to ensure the availability of an adequate range of sites to accommodate these targets. Paragraph 4.11 states that surplus employment land may be released for housing or other pressing development needs in line with PPS3.

Housing

2.2.5 Paragraph 5.3 of the EEP notes that the annual average rate of housing anticipated at Policy H1, together with its distribution across the region, is a significant step towards a more adequate rate of housing provision to meet the needs of the region's growing and ageing population and slow down the deterioration in affordability.

2.2.6 Policy H1 states that through managing the supply of land for housing in accordance with PPS3, in their LDDs, and in determining planning applications, local planning authorities should facilitate the delivery of at least 508,000 net additional dwellings over the period 2001 to 2021. Taking account of completions to 2006, the minimum regional housing target for 2006 to 2021 is 402,540. Policy H1 states that district allocations "*should be regarding as minimum targets to be achieved, rather than ceilings which should not be exceeded.*" Over the period 2001-2021, the EEP anticipates, as a minimum, the delivery of 4,600 homes in Rochford. Policy H1 identifies the minimum requirement arising in the period April 2006 – March 2021 as 3,790 for Rochford. This residual figure arises as a result of the indication in Policy H1 that 810 had been completed in the Rochford area in the period April 2001-March 2006.

2.2.7 Paragraph 5.4 requires local planning authorities to plan for an upward trajectory of housing completions, seeking first to achieve the annual average development rates for 2006-2021 as soon as possible, "*then to make up any shortfall from the period before that rate is achieved. It is important that policies in existing plans do not constrain inappropriately the build-up of the house building rate while development plan documents which give effect to this RSS are put in place.*" Paragraph 5.5 explains that the particular circumstances in the East of England justify the approach whereby the housing allocations are to be regarded as a minimum target pending the proposed review of the EEP. This approach is taken because the figure established in Policy H1 "*falls significantly short of what is needed based on evidence about housing pressure, affordability and household projections.*"

2.2.8 Policy H2 states that within the overall housing requirement of Policy H1, Development Plan Documents (DPPs) should set appropriate targets for affordable housing taking into account the objectives of the RSS, local assessments of need, the need where appropriate to set specific targets for social rented and intermediate housing, evidence of affordability pressures, and the Regional Housing Strategy.

Regional Transport Strategy

2.2.9 Policy T1 states that to implement the vision and objectives of the RSS, the strategy gives a clear priority to increase passenger and freight movement by more sustainable transport modes. The objectives of the strategy include managing travel behaviour and the demand for transport to reduce the rate of road

traffic growth, encouraging the efficient use of existing transport infrastructure, enabling the provision of infrastructure and transport services necessary to support existing communities and development proposed in the spatial strategy, and improving access to jobs, services and leisure facilities. The successful achievement of these objectives will lead to improved journey reliability, an increased proportion of journeys by sustainable modes, sustainable access to areas of new development and regeneration, safe and sustainable movements between home, workplaces and other key destinations, increased proportion of freight movements by rail, safe, efficient and sustainable movement of passengers and freight to and from the region's international gateways, economic growth without a concomitant growth in travel, improved air quality, and reduced emissions.

2.2.10 Policy T2 states that to bring about a significant change in travel behaviour, a reduction in distances travelled, and a shift towards greater use of sustainable modes, authorities, transport providers and other delivery agencies should implement policies which promote awareness of and invest in a wide range of sustainable transport measures and initiatives.

2.2.11 Policy T14 states that parking controls should be used to manage transport demand and influence travel change.

Environment

2.2.12 Policy ENV3 seeks to ensure that internationally and nationally designated sites are given the strongest level of protection by local planning authorities and other agencies. Proper consideration should be given to the potential effects of development on the conservation of habitats and species outside designated sites. The region's wider biodiversity, earth heritage and natural resources should be protected and enriched through the conservation, restoration and re-establishment of key resources. Policy ENV6 requires local planning authorities, thorough their policies, proposals and programmes to protect the setting of listed buildings.

2.2.13 Policy ENV7 states that LDDs should require new development to be of a high quality which compliments the distinctive character and best qualities of the local area, and promotes urban renaissance and regeneration. New development should provide buildings of an appropriate scale, make efficient use of land, achieve (in the case of housing development) the highest possible net density appropriate to the character of the area and public transport accessibility, provide a mix of building types, have regard to the needs and well-being of all sectors of the community, address crime prevention and community safety, promote resource efficiency and more sustainable construction including the maximum re-use of material, reduce pollution, and maximise opportunities for the built heritage to contribute to physical, economic and community regeneration.

Carbon Dioxide Emissions and Renewable Energy

2.2.14 Policy ENG1 requires new development to be located and designed to optimise its carbon performance. New development of more that 10 dwellings should secure at least 10% of its energy from decentralised, renewable or low-carbon sources unless this is not feasible or viable.

Water

2.2.15 Policy WAT4 requires LDD to use Strategic Flood Risk Assessments to guide development away from areas at risk from flooding other than in exceptional cases where suitable land at lower risk of flooding is not available, and the benefits of development outweigh the risks of flooding, and appropriate mitigation measures are incorporated. Sustainable drainage systems should be incorporated in all appropriate developments.

Essex Thames Gateway

2.2.16 Essex Thames Gateway comprises the Essex part of the Thames Gateway Growth Area which is a regional and national priority for urban regeneration. With the exception of Southend Airport, the remainder of Rochford does not contain any key locations for development and change. Policy ETG1 seeks to substantially increase the numbers of jobs and homes in line with Policies E1 and H1, and to give the area a

more positive and attractive image building on its strengths and assets, and promoting excellence in the design of buildings. The quality of the natural and historic environments should be protected.

The Essex and Southend-on-Sea Structure Plan (ESSSP)

2.2.17 The ESSSP was adopted in 2001. All but six of its policies expired on 27th September 2007. Of the saved policies, Policy CC1 states that within the Coastal Protection Belt defined in adopted local plans, there shall be the most stringent restrictions on development within this rural and undeveloped coastline. Any development which is exceptionally permitted within this Belt shall not adversely affect the open and rural character, historic features or wildlife. However, the associated Local Plan policy has not been saved (see below).

The Rochford District Replacement Local Plan (RDRLP)

2.2.18 The RDRLP was adopted on 16th June 2006. On 5th June 2009, the Secretary of State issued a direction under paragraph 1(3) of Schedule 8 to the Planning Compulsory Purchase Act 2004 saving a number of policies of the plan. These saved policies will remain part of the development plan until they are replaced by adopted DPDs.

2.2.19 Chapter One of the RDRLP sets out a number of key policy objectives which can be summarised as follows:-

- To improve and enhance the environmental wealth of the district by only permitting development that is environmentally, socially and economically sustainable (Policy CS1);
- To protect, sustain and enhance the district's natural resources and cultural heritage through the application of the policies and proposals of the plan, and to ensure that new development contributes the environmental quality (Policy CS2);
- To ensure that development reduces the length, number and duration of motorised journeys, and that it encourages the use of alternative modes of transport (Policy CS3);
- To promote more compact patterns of development on all types of site through use of appropriate densities which minimise land requirements, and through mixed-use developments (Policy CS4);
- To consolidate the local economy, attract new investment, and allocate land for industrial and commercial uses (Policy CS5);
- To promote good design taking into account existing form, character and other features; providing landscaping arrangements which reduce impact and enhance the proposal and its surroundings; minimising the risk of crime and providing adequate space for waste storage, recycling and collection (Policy CS6);
- To protect and enhance the district's identity by conserving and enhancing buildings, their settings, areas of architectural and historic significance, green and other spaces, and encouraging a high standard of design for new development which respects and enhances local context (Policy CS7);
- To protect and enhance the district's identity by taking account of local identity, the suitability of the scale and design of the proposed development, and the use, where appropriate, of local and traditional materials (Policy CS8);
- To ensure that landscaping is an integral part of the design process for new development (Policy CS9); and

- To reduce energy and water consumption (Policy CS10).

2.2.20 In relation to the supply of new housing, the RDRLP seeks, inter alia, to provide sufficient housing to meet strategic needs, to deliver a mix of housing types and tenures including affordable housing, and to make best use of previously developed land within urban areas. Under Policy HP1, the provision of 3050 new dwellings is sought between 1996 and 2011. Policy HP3 states that the density of new residential development will be determined by the character of individual sites. Policy HP5 states that Planning Obligations relating to a range of infrastructure provision will be sought in relation to new housing development. Policy HP6 seeks a high standard of layout and design in new housing schemes, and Policy HP7 requires developers to provide evidence that schemes will conserve energy and water. Policy HP8 requires all residential schemes of more than 25 dwellings, or on sites of 1 hectare or more to provide 15% of the new dwellings as affordable housing. Policy HP10 requires all new housing development to reflect crime prevention guidelines on design and layout. Policy HP11requires purpose-built flatted accommodation to provide suitable storage and communal areas.

2.2.21 Policy EB1 states that B1, B2 and B8 uses will be permitted on existing employment sites subject to the scheme's impact on environmental considerations, ecology and traffic, and a range of other considerations. Policy EB9 restricted the use of Stambridge Mills to B1 use on the basis that other industrial uses, including B8 use, would not be appropriate on traffic and other grounds. Policy EB9 was, however, not saved.

2.2.22 Policy TP3 requires highway design associated with new housing development to be appropriate to the locality, and to incorporate measures which achieve safe traffic speeds and secure a pleasant and safe environment. Policy TP5 requires development to be well related to existing public transport infrastructure but where this is not the case, contributions towards the provision of public transport and alternatives to the private car will be sought. Policy TP8 sets down maximum car parking standards for new residential development.

2.2.23 Policy LT7 states that areas of public and private open space will be safeguarded. The western extremity of the proposed flood defence improvement bund falls within an area of public open space protected under Policy LT7. Policy LT10 seeks the provision of children's play spaces in new housing schemes or where this cannot be achieved, the negotiation of a commuted sum from developers for the provision or enhancement of a play space.

2.2.24 The eastern section of the application site, comprising the flood defence bund to the east of the main developed site, falls within a Special Landscape Area (the Crouch and Roach Marshes) identified under Policy NR1. Within these areas, development will not be allowed unless its location, size, siting, design, materials and landscaping accord with the character of the area. Policy NR7 states that development proposals which adversely affect areas identified as Local Nature Reserves, Wildlife Sites or Regionally Important Geological Sites will not be permitted unless it can be demonstrated that justification for the proposal clearly outweighs the need to safeguard the nature conservation value of the site. Policy NR8 states that the local planning authority will protect landscape features when considering proposals for development. Policy NR10, relating to the defined Coastal Protection Belt, has not been saved.

2.2.25 Policy PN7 states that applicants will be expected to demonstrate that the lighting scheme proposed is the minimum needed for security and working purposes.

2.3 Material Considerations

National Planning Policy

2.3.1 Paragraphs 13 and 14 of 'The Planning System: General Principles' issued by ODPM in 2005 indicate that the Government's statements of planning policy are material considerations which must be taken into account, where relevant, in decisions on planning applications whilst emerging policies can be regarded as material considerations, depending on the context. The most pertinent statements of Government policy relevant to the Stambridge Mills planning application are PPS1, PPG2, PPS3, PPS5, PPS9, PPG13, PPG17, PPG23, PPG24 and PPS25.

PPS1: Delivering Sustainable Development (January 2005)

2.3.2 Paragraph 3 of PPS1 states that sustainable development is the core principle underpinning the planning system. The Government set out four aims for sustainable development in its strategy published in May 1999. That strategy sought social progress which recognises the needs of everyone, effective protection of the environment, the prudent use of natural resources, and the maintenance of high and stable levels of economic growth/employment. These aims are to be pursued in an integrated manner. Planning should facilitate and promote sustainable development and inclusive patterns of urban and rural development making suitable land available for development, contributing to sustainable economic development, protecting and enhancing the natural and historic environment, the quality and character of the countryside, and ensuring high quality development through good inclusive design, the efficient use of resources, and ensuring that development supports existing communities and the creation of safe, sustainable, liveable and mixed communities.

2.3.3 Paragraph 17 notes that the Government is committed to protecting and enhancing the quality of the natural and historic environment, in both rural and urban areas. Paragraph 18 acknowledges that "*the condition of our surroundings has a direct impact on the quality of life and the conservation and improvement of the natural and built environment brings social and economic benefit for local communities. Planning should seek to maintain and improve the local environment and help to mitigate the effects of declining environmental quality through positive policies on issues such as design, conservation and the provision of public space.*"

2.3.4 Paragraph 21 seeks the prudent use of resources ensuring that they are used wisely and efficiently. The broad aim should be to ensure that outputs are maximised whilst resources are minimised, for example by building housing at higher densities on previously developed land rather than at lower densities on Greenfield sites. Paragraph 23 describes the Government's commitment to promoting a strong, stable and productive economy that aims to bring jobs and prosperity for all. Given these objectives, local planning authorities should ensure the provision of sufficient good quality new homes in suitable locations. Paragraph 27(viii) refers to the objective of promoting the more efficient use of land through higher density, mixed use development and the use of suitably located previously developed land and buildings. Planning should seek actively to bring vacant and underused previously developed land and buildings back into beneficial use to achieve the targets set by Government for development in previously developed land. Paragraph 27(ix) seeks to enhance as well as protect biodiversity, natural habitats, the historic environment and landscape and townscape character.

2.3.5 The document entitled 'The Planning System: General Principles' issued by ODPM with PPS1 in 2005 notes that local planning authorities must determine planning applications in accordance with the statutory development plan, unless material considerations indicate otherwise. Paragraph 17 deals with the issue of prematurity in circumstances where a DPD is being prepared, but has not yet been adopted. A refusal of planning permission on grounds of prematurity may be appropriate "*where a proposed development is so substantial, or where the cumulative effect would be so significant, that granting permission could prejudice the DPD by predetermining decisions about the scale, location or phasing of new development which are being addressed in the policy in the DPD. A proposal for development which has an impact on only a small area would rarely come into this category.*" Refusal of planning permission on grounds of prematurity will not usually be justified and planning applications should continue to be considered in the light of current policies. Nonetheless, paragraph 18 notes that account can also be taken of policies in emerging DPDs, although the weight to be attached to such policies depends upon the stage of preparation, increasing as successive milestones are reached. Where a DPD is at the consultation stage, refusal on prematurity grounds would seldom be justified "*because of the delay which this would impose in determining the future use of the land in question.*"

PPG2: Green Belts (Amended March 2001)

2.3.6 The main developed section of the application site, comprising all the mill buildings and the main areas of associated service roads and hardstanding, is situated outside the Green Belt. A small portion of hardstanding at the northern end of the site, adjacent to Mill Lane, and all of the land to the east and west of the main developed site, falls within the Green Belt. Paragraph 3.1 states that inappropriate development will not be approved in Green Belts except in very special circumstances.

PPS3: Housing (Updated June 2011)

2.3.7 Paragraph 2 of PPS3 notes that a principal aim of the guidance is to underpin the necessary step-change in housing delivery through a new, more responsive approach to land supply at the local level. Paragraph 9 states that the Government's key housing policy goal is to ensure that everyone has the opportunity of living in a decent home, which they can afford, in a community where they wish to live. In order to achieve this, the Government is seeking to improve affordability across the housing market, including an increase in the supply of housing.

2.3.8 Paragraph 10 notes that the Government's policy objectives provide the context for planning for housing through development plans and planning decisions. The planning system is expected to deliver housing developments in suitable locations, offering a good range of community facilities and with good access to jobs, key services and infrastructure. Equally, the planning system is required to deliver a flexible, responsive supply of land, managed in a way which makes efficient and effective use of land, including the re-use of previously developed land where appropriate.

2.3.9 Paragraph 16 describes matters to consider when assessing design quality in connection with proposed developments. Various issues need to be analysed including accessibility to services, the quality of layout, access to outdoor space, visual integration with existing context, the efficient use of resources during construction, a design-led approach to parking and access, the creation of a distinctive character, and the retention and re-establishment of biodiversity within residential environments. Paragraph 20 seeks a mix of unit sizes. Paragraph 36 asserts that in support of its objective of creating mixed and sustainable communities, the Government's policy is to ensure that housing is developed in suitable locations which offer a range of community facilities and with good access to jobs, key services and infrastructure. The priority for development should be previously developed land, in particular vacant and derelict sites and buildings. Paragraph 40 re-emphasises this approach by stating that a key objective is that local planning authorities should continue to make effective use of land by re-using land that has been previously developed. The national target is that 60% of new housing should be provided on previously developed land, although there is no presumption that land that is previously developed is necessarily suitable for housing development or that the whole of the curtilage should be developed (paragraph 41).

2.3.10 Paragraph 44 identifies means by which Local Planning Authorities can help to ensure that previously developed land is developed in line with the housing trajectory including considering whether sites that are currently allocated for industrial or commercial use could be more appropriately re-allocated for housing development. Paragraph 50 states that the density of development should not dictate that of new housing by stifling change or requiring replication of existing style and form. If done well, imaginative design and layout of new development can lead to a more efficient use of land without compromising the quality of the local environment.

2.3.11 Paragraph 52 declares that the Government's objective is to ensure that the planning system delivers a flexible, responsive supply of land. Paragraph 53 requires local planning authorities to establish their policies and strategies for delivering housing provision, including identifying broad locations and specific sites that will enable the continuous delivery of housing for at least 15 years from the date of adoption of a relevant LDD. Paragraph 54 requires local planning authorities to identify sufficient specific deliverable sites to achieve housing completions in the first five years. To be considered deliverable, sites should:

- Be available now;
- Offer a suitable location for development now and be able to contribute to the creation of sustainable, mixed communities;

- Be achievable in that there is a reasonable prospect that housing will be delivered on the site within five years.

2.3.12 To be considered developable, sites should be in a suitable location for housing and there should be a reasonable prospect that the site is available.

2.3.13 Paragraph 69 provides advice to local planning authorities when determining planning applications. In general, LPAs should have regard to:

- Achieving high quality housing;
- Ensuring developments achieve a good mix of housing reflecting the accommodation requirements of specific groups, in particular families and older people;
- The suitability of a location to accommodate housing, including its environmental sustainability;
- Using land effectively and efficiently;
- Ensuring the proposed development is in line with planning for housing objectives, reflecting the need and demand for housing in, and the spatial vision for, the area and does not undermine wider policy objectives such as addressing housing market renewal issues.

PPS5: Planning for the Historic Environment (March 2010)

2.3.14 Paragraph 7 states that the Government's overarching aim is that the historic environment and its heritage assets should be conserved and enjoyed for the quality of life they bring to this and future generations. Paragraph HE6.1 states that local planning authorities should require an applicant to provide a description of the significance of heritage assets affected and the contribution of their setting to that significance. The Broomhills residential care home, the curtilage of which lies to the east of Stambridge Mills, is a grade II listed building.

2.3.15 Paragraph HE7.1 states that local planning authorities, in considering planning applications, should seek to identify and assess the significance of any element of the historic environment that may be affected, including development within the setting of an asset. Local planning authorities are expected to take into account the particular nature of the interest in the asset and the value that it holds for this and future generations. This understanding should be used to avoid or minimise conflict between conservation of that significance and proposals for development.

2.3.16 Paragraph HE10.1 notes that local planning authorities, when considering applications for development within the setting of a heritage asset, should treat favourably applications that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset. Paragraph HE10.2 states that local planning authorities should identify opportunities for changes in the setting to enhance or better reveal the significance of a heritage asset. Taking such opportunities should be seen as a public benefit and part of the process of place-making.

2.3.17 The setting of an asset is defined in Annex 2 as "*the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.*"

PPS9: Biodiversity and Geological Conservation (August 2005)

2.3.18 Paragraph 1 of PPS9 confirms the Government's commitment to the protection of biodiversity and geological conservation through the planning system. It requires local planning authorities to fully consider the effect of planning decisions on biodiversity and geological conservation, and ensure that appropriate weight is attached to statutory nature conservation designations, protected species and biodiversity and geological interests within the wider environment. There are no statutory designated sites within the application site itself. The nearest designated site is the Crouch and Roach Estuaries SSSI located approximately 350m to the south-east of the Mills complex, adjacent to furthest eastern extent of the

proposed flood defence improvements. The SSSI is also part of the Crouch and Roach Estuaries SPA / Ramsar Site and the Essex Estuaries SAC.

2.3.19 Paragraph 13 recognises that the re-use of previously developed land makes a major contribution to sustainable development by reducing the amount of countryside that needs to be used. However, where sites have significant biodiversity or geological interest, local planning authorities and developers should aim to retain and incorporate this interest into any development of the site. Paragraph 14 considers the potential biodiversity and geological conservation gains which can be secured within developments, including the use of planning obligations.

2.3.20 National policy therefore implicitly recognises the importance of biodiversity and that with sensitive planning and design, development and conservation of the natural heritage can co-exist and benefits can, with appropriate measures, be obtained.

PPG13: Transport (Updated January 2011)

2.3.21 Paragraph 3 indicates that land use planning has a key role in delivering the Government's integrated transport strategy. By shaping the pattern of development and influencing the location, scale, density, design and mix of land uses, planning can help to reduce the need to travel, reduce the length of journeys and make it safer/easier for people to gain access to jobs, shopping, leisure facilities and services by public transport, walking and cycling. The consistent application of this approach will help to reduce some of the need for car journeys, by limiting the physical separation of key land uses, and enable people to make sustainable transport choices.

2.3.22 Paragraph 4 highlights the objectives underpinning PPG13 including the reduction in the need to travel, especially by private car, and promoting accessibility to jobs, shopping and leisure facilities by public transport, walking and cycling. Paragraph 51 requires local authorities to ensure that levels of parking associated with development will promote sustainable transport choices and the efficient use of land.

2.3.23 Paragraph 71 indicates that the likely availability and use of public transport is a very important ingredient in determining locational policies designed to reduce the need for travel by car. Paragraph 74 contends that walking is the most important mode of travel at the local level and offers the greatest potential to replace short car trips, particularly under two kilometres. Paragraph 75 indicates that local planning authorities, when determining planning applications, should pay particular attention to the design, location and access arrangements of new development to help promote walking as a prime means of access.

2.3.24 Paragraph 77 states that cycling also has the potential to substitute for short car trips, particularly those under five kilometres. In assessing planning applications, local planning authorities should seek to influence the design, location and access arrangements of development to ensure it promotes cycling.

PPG17: Sport and Recreation (July 2002)

2.3.25 PPG17 sets out Government policy on planning for open space, sport and recreation. The key objectives are to support urban renaissance and rural renewal, and to promote social inclusion, community cohesion, health and well being, and sustainable development. Local planning authorities should undertake robust assessments of existing and future needs, and set local standards for the provision of open space, sports and recreational facilities.

PPG23: Planning and Pollution Control (November 2004)

2.3.26 Paragraph 2 advises that any consideration of the quality of land, air or water and potential impacts arising from development is capable of being a material planning consideration. The planning system plays a key role in determining the location of development which may cause pollution either directly or indirectly, and in ensuring that other uses are not, as far as possible, affected existing or potential sources of pollution. The presence of contamination in land can present health risks but development presents an opportunity for remediation. Paragraph 10 states that the planning system should focus on whether a proposed use of land is acceptable, and the impact of such use, rather than controlling the processes or emissions themselves.

2.3.27 Paragraph 15 states that local planning authorities must be satisfied that planning consent can be granted on land use grounds having full regard to environmental impacts. This assessment will require close co-operation with relevant Government agencies.

PPG24: Planning and Noise (October 1994)

2.3.28 Paragraph 2 confirms that the impact of noise can be a material planning consideration in the determination of planning applications. Paragraph 8 explains that the guidance introduces the concept of Noise Exposure Categories, ranging from A-D, to help local planning authorities in the consideration of residential planning applications near transport-related noise sources. Category A represents circumstances when noise is unlikely to be a determining factor while Category D relates to a situation where planning permission should normally be refused. For Categories B and C, mitigation measures may make the development acceptable.

PPS 25: Development and Flood Risk (March 2010)

2.3.29 Paragraph 5 states that the aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding.

2.3.30 In determining planning applications, LPAs are required by paragraph 8 to ensure that applications are supported by Flood Risk Assessments as appropriate. The Sequential Test should be applied at site level to minimise risk by directing the most vulnerable development to areas of lowest flood risk. Priority should be given to the use of SUDS.

2.3.31 A sequential approach to determining the suitability of land for development in flood risk areas is stated as being central to PPS25 in paragraph 14. The Sequential Test indicates that the preference should be to locate new development in Flood Zone 1 i.e. less than a 1 in 1000 probability of flooding in any year. If there is no reasonably available site in Flood Zone 1, the flood vulnerability of proposed development can be taken into account in locating development in Flood Zone 2 (medium probability) and then Flood Zone 3 (high probability). Zone 3 is sub-divided into Zone 3a and 3b. In Zone 3a, 'more vulnerable' and essential infrastructure uses should only be permitted if the Exception Test is passed. Residential uses are categorised as 'more vulnerable' uses in Table D.2 of PPS25.

2.3.32 If, following the application of the sequential test, it is not possible, consistent with wider sustainability objectives for development to be located in zones of lower probability of flooding, the Exception Test should be applied (paragraph 18).

2.3.33 The majority of the application site is located within Flood Zone 3a, and is therefore subject to the requirements of PPS25 in respect of the Sequential and Exception Tests, and the need for the submission of a Flood Risk Assessment.

The Rochford Core Strategy (RCS) – Submission Document

2.3.33 The RCS has been submitted to the Secretary of State for independent examination. The hearings commenced in May 2010.

2.3.34 The RCS explains how the Council will deliver the spatial aspects of the vision set out in the Sustainable Community Strategy and the Council's Corporate Plan, as well as national and regional policies.

2.3.35 Policy H1 states that the Council will enable the delivery of housing to meet the requirements of the EEP, and will ensure that there is an adequate supply of land for the development of housing over a 15 year period. The Council will prioritise the reuse of previously developed land and ensure the delivery of appropriate sites within existing settlements identified by the Strategic Housing Land Availability Assessment 2009 (SHLAA). Specifically, Policy H1 identifies four existing industrial sites including Stambridge Mills for alternative uses including residential development. It states that any scheme for Stambridge Mills must include adequate flood mitigation measures to satisfy the PPS25 Exceptions Test. The policy states that the remaining housing requirement that cannot be delivered through the redevelopment of appropriate

previously developed land will be met through extensions to existing settlements. The general locations of these proposed extensions are specified in Policies H2 and H3.

2.3.36 Policy H4 seeks at least 35% of dwellings on all developments of 15 or more, or on sites greater than 0.5 hectares, as affordable housing. The Council will aim for 80% of affordable housing to be social housing, and 20% to be intermediate housing. The requirement for affordable housing will only be relaxed exceptionally where on-site provision is not possible or where a developer is able definitely demonstrate that 35% provision will be economically unviable, rendering the site undeliverable. Policy H5 specifies that a mix of dwelling types will be required in new developments, and Policy H6 requires new housing schemes to comply with Lifetime Homes Standards.

2.3.37 Policy CP1 states that the Council will promote good, high quality design which has regard to adopted Supplementary Planning Documents and emerging design guidance. Policy GB1 states that the Council will allocate the minimum amount of Green Belt land necessary to meet housing and employment needs but will direct development away from the Green Belt as far s practicable.

2.3.38 Policy ENV1 states that the Council will maintain, restore and enhance sites of international, national and local nature conservation importance. Policy ENV2 relates to the protection of the Coastal Protection Belt, and Policy ENV3 states that the Council will direct development away from areas of flood risk by applying the Sequential Test and, where necessary, the Exception Test as required by PPS25. Having regard to the very limited supply of previously developed land in the district, proposed development on previously developed land within Flood Zone 3 will be permitted if it provides a contribution towards the district's housing requirements that would otherwise require the reallocation of Green Belt land providing that it passes the Exception Test and is able to accommodate the necessary flood defence infrastructure. Policy ENV4 requires all residential development over 10 units to incorporate SUDs unless this is shown not to be viable on a particular site. Policy ENV5 restricts new residential development in Air Quality Management Areas. Policy ENV8 requires developments of 5 units or more to secure at least 10% of their energy from decentralised and renewable or low-carbon sources. Policy ENV9 requires a minimum of Code Level 3 of the Code for Sustainable Homes in all new residential developments. Policy ENV11 states that the presence of contamination will not be seen, in itself, as a reason to resist development. Applicants will be required to undertake appropriate investigation, remediation and mitigation measures to ensure the safe development of the site.

2.3.39 Policy CLT1 requires developers to enter into legal agreements to secure planning obligations, and the Council will apply standard charges to secure financial contributions towards off-site and strategic infrastructure. Policy CLT5 requires new public open space to accompany residential development having regard to current and projected need. Policy CLT7 requires new residential development to incorporate appropriate communal play space.

2.3.40 Policy T1 requires developments to be located and designed to reduce reliance on the private car whilst recognising that some impact on the highway network is inevitable. The Council will seek developer contributions to highway improvements where necessary. Policy T3 requires new development to be well located to public transport or to be accessible by means other than the private car. Developer contributions to sustainable transport infrastructure may be sought. Policy T5 requires the preparation of a Travel Plan for any residential development of 50 or more units. Policy T6 requires that where developments generate a potential demand for travel, a contribution to improved cycle and pedestrian routes will be sought. Policy T8 states that the Council will apply minimum parking standards.

2.3.41 Policy ED3 confirms that the Council will reallocate four existing industrial sites, including Stambridge Mills, for appropriate alternative uses. Of these four sites, Stambridge Mills is the only one which is entirely vacant at present although part of the Star Lane Industrial Estate (that previously used as a brickworks) is also vacant. Stambridge Mills is described at paragraph 11.32 of the RCS as being of *"poor quality"*, and having been identified within the Urban Capacity Study as a suitable site for housing. Issues around flood risk must be resolved prior to development of the site.

2.4 The Development Proposals for Stambridge Mills

2.4.1 The planning application proposes the redevelopment of the Stambridge Mills site to provide 96 new residential units in the form of 45 houses and 51 flats. All existing buildings will be demolished. Associated

parking, landscaping and open space will be provided along with improved flood defences within and to the east and west of the developed site.

2.4.2 In relation to the statutory development plan, residential development at Stambridge Mills would not accord with RDRLP Policy EB1 although the Local Plan's preference for B1 use at the site (as expressed in lapsed Policy EB9) represented a narrowing of potential commercial uses of the site. B2 and B8 uses would raise environmental concerns for neighbouring uses, and would generate heavy traffic movements on the local highway network. Furthermore, the site is vacant and in poor condition, and the existing mill buildings were designed for a specific use. Therefore, the weight to be attached to RDRLP Policy EB1 in relation to the retention of Stambridge Mills as an employment site is open to question.

2.4.3 The emerging RCS, which seeks to provide sufficient housing to meet the requirements of the EEP, places particular importance on directing new housing away from the Green Belt where possible, and on making full use of previously developed land. Policy H1 specifically refers to Stambridge Mills as an appropriate location for residential development, subject to flood mitigation measures, and the SHLAA identifies the site's capacity as up to 250 residential units. The provision of housing remains a national policy objective as set out in PPS1 and PPS3, and previously developed land remains the primary focus for such provision.

2.4.3 On the issue of flood risk, Rochford District Council has confirmed that Stambridge Mills has passed the Sequential Test required under PPS25. The Sequential Test carried out by the Council (Core Strategy Topic Paper 1) concludes that the supply of land in Rochford district outside the Green Belt and not subject to other constraints on development is limited, and that, with the exception of Green Belt land, there are no reasonably available alternative sites to Stambridge Mills in areas less at risk of flooding that have not already been accounted for within the SHLAA. Although there would be adequate areas of Green Belt land in lower flood risk zones which would have the potential to deliver housing, such use should not be considered ahead of an allocated site outside the Green Belt because residential development in the Green Belt is inappropriate having regard to the requirements of PPG2. Therefore, subject to the need to apply the Exception Test, residential development of Stambridge Mills would not conflict with the requirements of PPS25.

2.4.4 The majority of the existing developed site at Stambridge Mills lies outside the Green Belt, and the application proposals locate all new residential development outside the Green Belt. The northernmost section of the site, which is located within the Green Belt adjacent to the site entrance from Mill Lane, is currently vehicle hardstanding and is proposed to be re-used for car parking with associated landscaping improvements. Development of this part of the site will need to be justified on the basis of very special circumstances. The remaining sections of the site are included for the purposes of improving existing flood defences to the east and west of the main developed plot, and this operational development is not in conflict with Green Belt policy. The improved flood defences will not result in a loss of public open space under RDRLP Policy LT7.

2.4.5 National planning policy does not impose a presumption in favour of the reuse of all previously developed land for housing purposes. Some land may not be suitable in terms of the objectives of sustainable development. The site at Stambridge Mills is separated from the built-up area of the town of Rochford by open fields but is located within reasonable walking distance of the town centre. Improvements in the accessibility of the site by non car modes are likely to be necessary, as sought by PPG13. The reuse of the site would offer the opportunity to address any contamination issues associated with its previous use, and to re-use existing materials in connection with the proposed development, including the improvements to the flood defences. The proposed improvements to the flood defences have the potential to offer enhanced protection from flooding for existing residents in Mill Lane and at the adjoining Broomhills Nursing Home. The development of the site would also offer the potential for visual improvements to the site and the wider area, and to the setting of the adjoining listed building. These are all matters which will need to be assessed as part of the planning application process.

Summary and General Conclusions

2.4.6 Although the RDRLP seeks the retention of Stambridge Mills as an employment site, the prospect of such use coming forward is highly questionable in light of the purpose-built nature of the existing mill buildings. This original use ceased some years ago. A resumption of business use would generate

commercial traffic on the local road network, and would require the clearance of the existing buildings and the construction of modern business premises. The site is currently vacant and derelict, and the re-use of the site for employment purposes would seem highly unlikely.

2.4.7 The emerging RCS recognises that Stambridge Mills is no longer suited to employment use, and allocates the land for alternate use including residential development subject to the incorporation of adequate flood mitigation measures. The site is recognised by the RCS as a key element in the district's five year residential land supply. The EEP recognises that surplus employment may be released housing. The site falls within an area at risk of flooding, and the application scheme incorporates proposals for the improvement of existing flood defences. These improvements will offer collateral benefits in the form of improved protection for existing vulnerable residents in the vicinity of Stambridge Mills.

2.4.8 The development of Stambridge Mills would not conflict with Green Belt policy because the developable part of the application site falls outside the Green Belt. Although additional housing development could be physically accommodated in the northern part of the main plot, adjacent to the site entrance, this area lies within the Green Belt and its development for residential purposes would be inappropriate. Continued use of this land for parking, with associated new landscaping measures, could be justified on the basis of very special circumstances.

2.4.9 The proposal needs to be assessed against the Government's policy objectives for achieving sustainable development. In this regard, the re-use of previously developed land, the re-use of existing on-site materials, the removal of contamination, the enhanced protection from the risk of flooding of existing residents, and the visual enhancement of the site and the setting of adjoining listed building can all be regarded as benefits deriving from the proposed development. The proposals also incorporate measures which seek to encourage sustainable transport choices.

2.5 Consideration of Alternatives

2.5.1 When assessing the appropriateness of the proposed development of Stambridge Mills for residential purposes, it is also necessary to consider the potential suitability of alternatives considered by the applicant. This process is required to ensure that the proposed development at Stambridge Mills is the most suitable location in land use, environmental and sustainability terms, and to comply with the EIA Regulations.

2.5.2 The planning application seeks consent to develop the Stambridge Mills site for 96 new residential units. The main part of the application site, excluding the areas included or flood defence improvements, constitutes previously developed land. The site is vacant, and residential development in this location is deliverable within the next five years in that it meets the tests of availability, suitability and achievability set out at paragraph 54 of PPS3. The emerging RCS seeks to prioritise previously developed land for new housing, and such an approach is consistent with national and regional planning policy on sustainable development. The capacity of Stambridge Mills for up to 250 dwellings is identified in the SHLAA, and the site constitutes by far the largest single plot of previously developed land in the Council's five year land supply. Whilst other existing employment sites in the district are earmarked in the RCS for re-allocation to residential use, none of these is deliverable within the next 5 years with the exception of part of the Star Lane Industrial Estate. The SHLAA identifies a total capacity figure of 175 units for the Star Lane site but only just over half of this plot is currently vacant and available for development. The remaining existing employment sites which are proposed for re-allocation to residential use are at Rawreth Lane Industrial Estate and Eldon Way/Foundry Industrial Estate but both of these remain in use. According the SHLAA, the site at Rawreth Lane will not deliver housing until 2017. The site at Eldon Way/Foundry Industrial Estate is earmarked, under RCS Policy H1, for mixed use including community, leisure use, residential use and continuing employment use.

2.5.3 In light of the evidence contained within the SHLAA, there are no alternative available previously developed sites to Stambridge Mills which could deliver 96 new residential units within the next 5 years. Whilst the Council envisages that Green Belt land will need to be released for housing purposes, the quantum and general location of such releases will be determined through the RCS examination process. In the meantime, there are no alternative sites within the district which offer the potential to accommodate the quantity of new residential units proposed in the planning application for Stambridge Mills. In any event, it is clear that the Council relies upon the delivery of Stambridge Mills to contribute towards its five year supply of housing land, and that therefore any land which emerges through the Local Development Framework

process for release from the Green Belt for residential development within the next 5 years would not represent an alternative to Stambridge Mills.

2.5.4 The form and layout of the proposal has been subject to a lengthy design process which has considered a number of alternatives in terms of the intensity of use, the scale and arrangement of new buildings, and the potential retention of existing buildings.

2.5.5 Given that the site comprises a complex of purpose-built industrial structures designed, in the main, for specific use as a flour mill, the first alternative form of development considered was the full demolition of all existing buildings to allow for a high density new-build residential scheme. It was considered that this approach would allow for the use of the site to be maximised whilst ensuring contemporary standards of building construction and spacing. This alternative was subject to detailed discussions with the local planning authority (LPA), and was presented to the Inspire East Design Review Panel (IE). In overall terms, the feedback received from the LPA and IE was this approach was overly urban in character, and failed to achieve an edge condition which responded satisfactorily to the openness of the site's setting. In addition, this maximised approach failed to provide adequate open space within the main part of the site itself, and failed to create necessary visual and functional permeability through the site. For these reasons, the full redevelopment of the site in a form which maximised its use in an urban manner was rejected.

2.5.6 A revised scheme was prepared in December 2009 for informal consideration by the LPA and by IE. This proposed large scale apartment buildings in the general location of the existing main mill structures with lower scale housing development to the north and west in the vicinity of the site boundaries, and areas of open space between. The approach was welcomed by the LPA and IE as a significant improvement on the earlier alternative, in particular, in relation to improved permeability, the creation of a wharf-side frontage to the river, and the scale of housing. Various criticisms of the scheme remained however in respect of the relationship between the taller and lower elements of the scheme, the landscaping of the deck area adjacent to the wharf, and the general quantum of development.

2.5.7 A further iteration of the proposal arose in response to the earlier feedback, and proposed the partial retention of the structural framework of some of the existing mill buildings. However, following full assessment by the applicants, it was determined that this approach would not be economically viable.

2.5.8 The preferred scheme, the subject of the planning application, involves the full demolition of all existing buildings, and the construction of a mixed scale development comprising flats and houses. This approach results in a lower residential density than previous schemes. The proposal has been subject to extensive and detailed pre-application discussions with the LPA.

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

3 SOCIO ECONOMIC ISSUES

3.1 Introduction

3.1.1 This chapter of the ES assesses the likely significant effects of the proposed development on the existing infrastructure of services in the locality. The extent of residential development assessed is 163 dwellings, broken down into 45 dwellinghouses (17no. x 2 beds, 23no. x 3 beds and 5no x 4 beds), 51 apartments (17no. x 1 bed and 34no. x 2 beds) as described within Chapter 1. In order to assess a robust scenario, the highest number of bedrooms and therefore the highest number of potential occupants will be analysed in order to test the most significant range of socio-economic impacts likely to result from the development proposals.

3.1.2 In addition to the development proposed at Stambridge Mills, it is understood that a further 100 dwellings are proposed at Brays Lane to the east of Rochford, a further 176 at Rectory Road, South Hawkwell and a scheme for 600 dwellings at Hall Road. It is recognised that there may be instances where, whilst there may be sufficient capacity within various services to accommodate each individual development, the cumulative effect may be greater than the existing capacity. Where this is the case, it is assumed that the capacity will be filled by which ever development comes forward first. Given that this situation arises, the developer is aware that contributions may then need to be made in order to mitigate any impacts this development may have upon existing service provision. The first part of this chapter sets out the baseline context for the socio-economic character of this part of Rochford, including a review of the population statistics, projections, household composition, economic profile and unemployment rates.

3.1.3 The second section considers the likely significant effects of the proposed development on the following socio-economic aspects:-

- Health provision;
- Education provision;
- Cultural, Sporting and Leisure services;
- Emergency and Social Services;
- Social Inclusion and Sustainable Communities; and
- Economic and Employment position;

3.2 Assessment Methodology

3.2.1 The socio economic effects of the proposed development have been assessed by reviewing research from a number of sources. These include:

- data relating to population and household projections and forecasts;
- details of employment and unemployment data;
- information on the supply and demand for education facilities;
- Essex School Organisation Plan 2010 - 2015;
- Health data from the Primary Care Trust;
- Information on the location of doctors and pharmacies from the NHS website;

3.2.2 In all cases the most localised, site-specific data has been used, and where available, information for the Parishes of Rochford and Stambridge has been assessed. Where this has not been possible a more strategic assessment has been made at District or County level, or even at a Regional level where necessary.

3.2.3 The proposed development is assessed against the current position in respect of each socio-economic topic area. The provision of new facilities within the study area is also taken into account in assessing the likely significant effects of the proposal.

3.2.4 Where likely significant effects of the proposed development have been identified which would result in a shortfall of provision, mitigation measures are proposed. The potential effects are assessed as follows:

Consideration/Significance	Comment
Adverse - Major	Effect is likely to be significant and adverse. Mitigation measures are very likely to be needed
Adverse- Modest	Effect is likely to be modest and adverse. Mitigation measures may be needed
Adverse- Minor	Effect is likely to be minor and adverse. Mitigation measures unlikely but may be needed
Neutral/Negligible	Effect is neither adverse nor beneficial, and is of negligible impact
Beneficial - Minor	Effect is likely to be minor and beneficial.
Beneficial - Modest	Effect is likely to be modest and beneficial.
Beneficial - Major	Effect is likely to be significant and beneficial.

Population Trends

3.2.5 The population of Rochford District was recorded as being 78,400 in the April 2001 Census. 48.59% were male, making the sex composition of the District almost the same as the East of England (49% male) and England (48.7% male). The Office of National Statistics estimated the District's population to be 83,200 during the mid year population estimates 2008. This represents an overall increase of 4,800 people within the District since 2001. The County's population mid year estimates for 2008 indicates that Essex has an approximate population of 1,396,400. On comparison to the 2001 population census data this indicates an increase in the county of 85,478 over the 7 year period.

3.2.6 The Office of National Statistics mid-year estimates allow for natural change due to birth and deaths and an extra addition for net migration.

3.2.7 During 2002, the Office of National Statistics reported that Rochford District had a population density of approximately 468 people per km², significantly above the densities for East of England and England at an average of 284 and 380 people per km² respectively.

3.2.8 Unless more up to date information has been made available, it should be noted that the information used in this chapter is taken from the results of the 2001 Census. The next Census was held in 2011 but the data is not yet available.

Table 3.1: Population Projections for Rochford 2010 to 2015

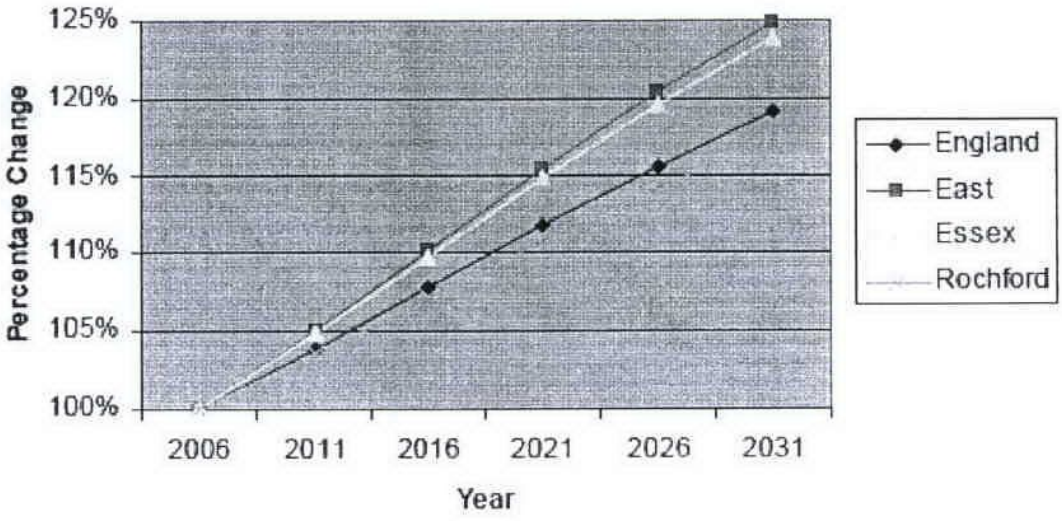
District	2010	2011	2012	2013	2014	2015
Rochford	83,400	84,000	84,600	85,200	85,700	86,300

(Source: *Office of National Statistics, 2008)*

Future Population Growth

3.2.9 With reference to the Rochford Annual Monitoring Report December 2009, the population of the District is expected to increase over the coming years. The Office of National Statistics has published population figures for the District based on the 2008 mid-year population estimates represented in Table 3.1 above, as well as anticipated birth, death and migration rates. These projections for the District, estimated that the District population at 2010 would be 83,400 and anticipates that by 2021 the population of the District will be approximately 89,800. The population projection is illustrated below in Figure 3.1.

Figure 3.1: Projected Population Growth



(Source: Rochford District Council AMR, 2009)

3.2.10 Table 3.2, shows the population forecast as produced for the East of England Regional Assembly by the Population and Housing Research Group at Anglia Ruskin University.

Table 3.2: Population Forecasts 2007 – 2021

	Population 2007	Population 2021	Population Change 2001-21	% Population Change 2001-21
Rochford	82,200	89,800	7,600	9.2

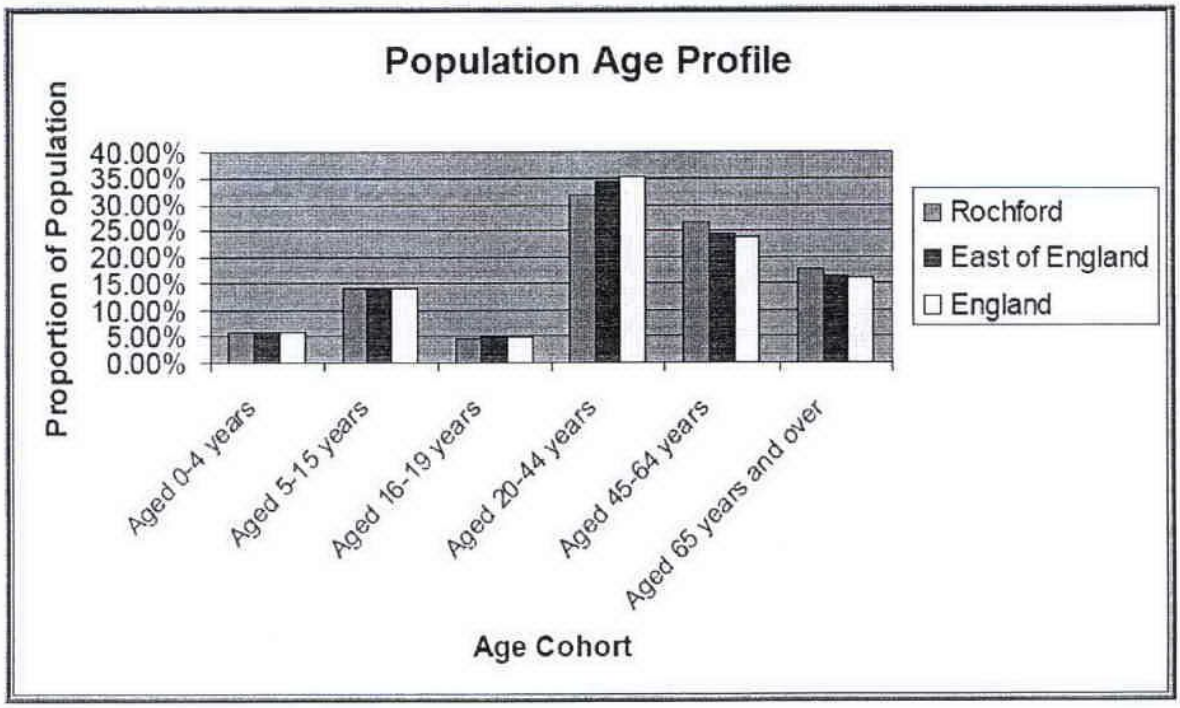
(Source: *Office of National Statistics, 2008)*

3.2.11 In Table 3.2 it can be seen that the projection indicates an overall population increase for Rochford, over the period 2007 to 2021, increasing approximately by 7,600. Up to 2021 the long term population growth in Rochford is around 9.2%. On comparison with other Districts in Essex, Rochford's population projections are one of the lowest, with areas such as Tendring and Colchester increasing by as much as 17.4% and 27.4% respectively.

Age Structure of the Population

3.2.12 Figure 3.2 shows the population age profile of Rochford. It indicates that approximately the proportion of people aged between 0 and 19 years in the District is broadly similar to that seen in both the East of England and England.

Figure 3.2: Population Age Profile



(Source: Office of National Statistics, 2008)

3.2.13 However, the proportion of people aged between 20 and 44 is slightly less (2.45% less than the Regional figure, 3.51% less than the National figure) in the district than when compared to the East of England (34.25%) and England (35.31%).

3.2.14 The demographic trends of Rochford suggest that the District has a slightly aging population, with those people aged 45 to 65 and over within the District being higher than that of the Regional and National picture. Table 3.3 represents the age profile breakdown as a percentage.

Table 3.3: Breakdown of Local, Regional and National Age Profile

Aged Group	Rochford (%)	East of England (%)	England (%)
0-4 years	5.70	5.97	5.96
5-15 years	14.07	14.13	14.20
16-19 years	4.43	4.66	4.90
20-44 years	31.80	34.25	35.31
45-64 years	26.54	24.54	23.75
65 & over	17.46	16.45	15.89

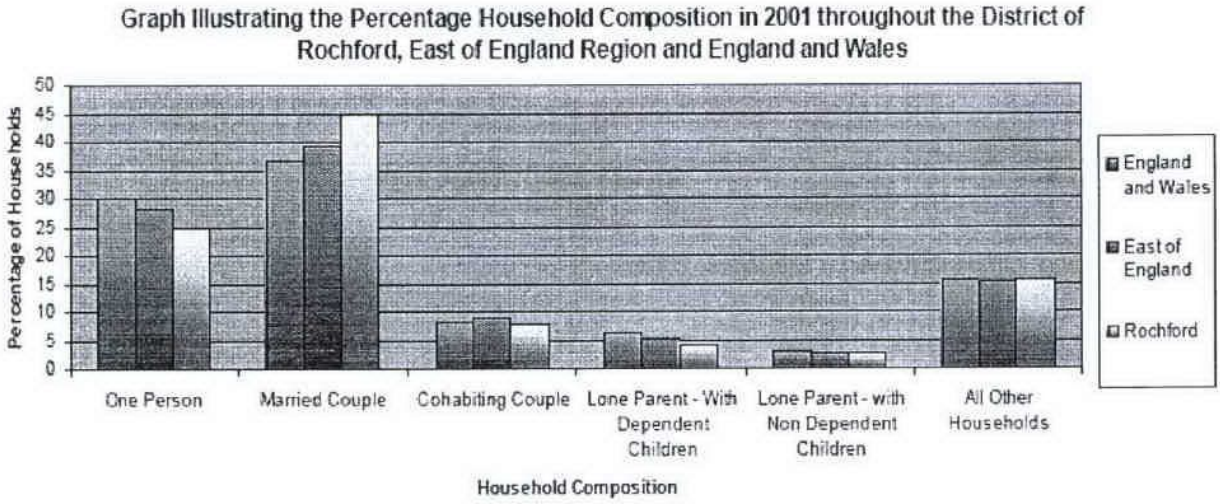
(Source: Office of National Statistics, 2008)

3.3 Household Trends

3.3.1 Nationally there is an average household size of 2.4 persons per dwelling, although there is evidence of this reducing to around 2.25 by 2011. Based on this National trend the proposed development would yield circa 400 people.

3.3.2 Illustrated below in Figure 3.3 are the Census 2001 percentage household compositions for persons within England and Wales, the East of England region and for the District.

Figure 3.3: Percentage Household Composition in 2001 for Rochford, the Region and England & Wales

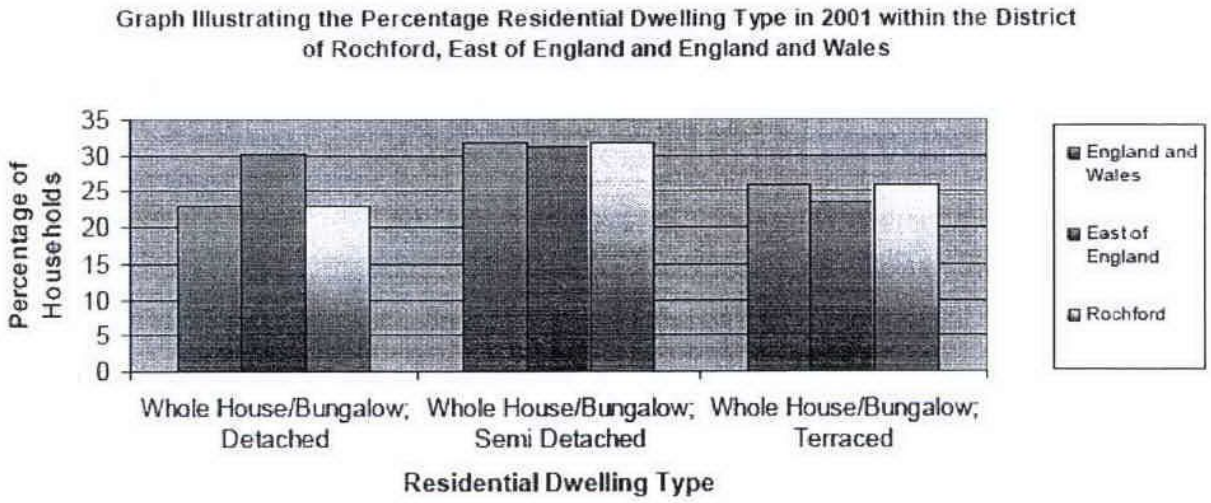


(Source: Office of National Statistics, 2001)

3.3.3 Figure 3.3 illustrates that Rochford (24.9%) contains a marginally lower proportion of one person occupancy households than the East of England (28.3%) and England and Wales (30%). The District displays divergence to the regional and national trends, as there are a substantial greater proportion of married persons throughout the District. However, the District demonstrates similar trends to the regional and national figures in the proportion of cohabiting couples, lone parents with dependant children and lone parents with no dependent children.

3.3.4 Figure 3.4 presents the percentage of household dwelling types within England and Wales, the East of England and Rochford at 2001.

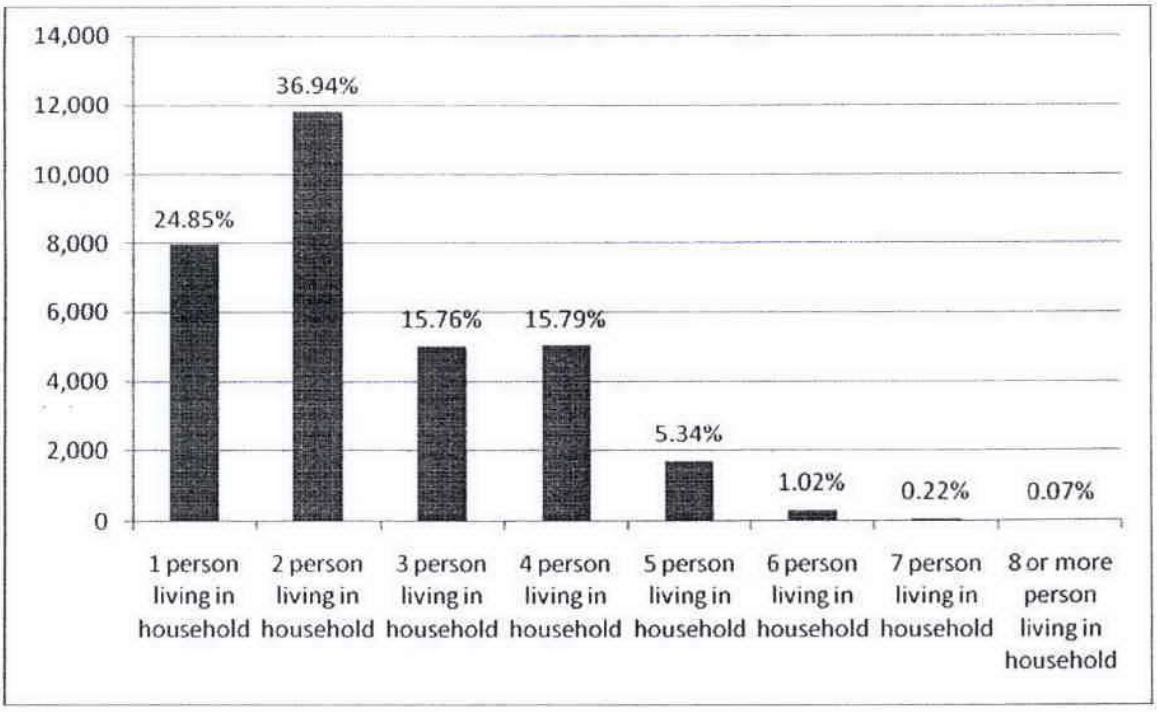
Figure 3.4: Illustration of Household Dwelling Type, 2001



(Source: Office of National Statistics, 2001)

3.3.5 Shown above in Figure 3.4 Rochford is seen has having a similar percentage of households occupying a semi detached house as national and regional levels. The District has a comparable number of detached dwellings (22.8%) to the average for England and Wales. However, noticeable from the graph is that the number of detached dwellings within the region is far greater than the District and National perspective. Furthermore the District of Rochford has a similar proportion of terraced dwellings as the national average, while the region has a marginally lower proportion of terraced houses.

Figure 3.5: Number of People Living in Households



(Source: Office of National Statistics Online, 2001 and Pegasus Planning Group Analysis, 2008)

Growth in Households

3.3.6 Calculating the growth in the number of households is derived from taking the number of dwellings and factoring in vacancy and sharing rates. Although the population figures show an increase in the future population, the number of households is predicted to only increase by approximately 3.1%. Using the dwelling led projections as shown in Table 3.4 below, the District of Rochford is predicted to see an increase of 1,000 dwellings (from 2001-2011). But the population is only forecast to rise by 1,200 over the same period, see Figure 3.2.

3.3.7 Table 3.4 highlights the household forecast information for Rochford District covering a 10 year period from 2001 to 2011. The data displayed has been taken from statistics provided by Essex County Council, and it is considered to be the most reliable forecast on the household changes in the District.

Table 3.4: Forecast Change in Households in the Rochford District 2001-2011

	2001 (Census Data)	2006	2011	Change
Households	31,952	33,100	33,500	+400
Household Change	-548	+600	+400	+1,000
% Change	-1.7	+1.8	+1.2	+3.1

(Source: Rochford District Housing Needs Survey, 2004)

3.3.8 Over the past decade there have been significant changes in household formations, which result in much higher household numbers when compared to population growth and average household size. There is a large increase in single person households through elderly people living longer, separation and divorce and young people forming single person households.

3.3.9 The East of England Plan identifies that a key priority in housing is to ensure the average annual delivery rates are quickly achieved, thereby meeting immediate needs and moderating the need for future increases. The Regional housing provision 2001 to 2021 highlights a minimum requirement to be achieved. Table 3.5 below shows Rochford District's regional housing provision up to 2021.

Table 3.5: East of England Plan Housing Provision 2001 to 2021

	Minimum Dwelling Provision 2001 to 2021 (net increase, with annual average rates in brackets)		
	Total to build (April 2001 to March 2021)	**Of which already build at April 2006**	**Minimum still to build (April 2006 to March 2021)**
Rochford	4,600	810 (160)	3,790 (250)

(Source: East of England Plan)

3.3.10 There is no simple relationship between the growth in various sizes of household and the demand for new dwellings since housing demand derives not only from new households but also from existing households, both of which are in a constant state of flux. Therefore in order to meet the change in composition of households within Rochford the proposed development needs to ensure that it provides housing appropriate to meet the needs of the full range of household needs. As a board base line figure the RSS dwelling provision of 4,600 when multiplied by the average household size for the Rochford area equates to a forecasted population of 11,040 by the end of the plan period.

3.3.11 Against this context the study area is presently unoccupied. At an average household size of 2.4 persons per dwelling, this proposed development of 96 dwelling units would yield approximately 230 people. Given the national trend towards decreasing household sizes, this is likely to be a maximum figure and will enable a robust case to be tested with regard to impacts upon social and economic facilities and services.

3.4 Education Needs

Baseline Conditions

3.4.1 Essex Local Education Authority (LEA) is the education authority for the area. It has statutory responsibility to ensure that schools within the LEA are sufficient in number, character and equipment to provide education suitable for different ages, abilities, aptitudes and special educational needs.

3.4.2 Along with the growth of specific areas and the associated increase in the school population, the movement and mobility of pupils also has an effect on the provision of educational facilities within the county.

3.4.3 As a result of the proposed growth of Rochford District in the East of England Plan, there is the need to provide high quality schools for the expanding population. There is also a need to balance this expansion against the pressures of an aging population. This can lead to a subsequent reduction in the numbers of pupils at those schools, with a corresponding increase in capacity needed elsewhere to compensate.

3.4.4 The Essex School Organisation Plan (SOP) sets out the current availability of places in each area and is published during the autumn term of each year. The plan also includes a forecast predicting the picture in five years' time based on birth rates, feeder school numbers, historical trends, housing development and other local factors likely to affect admissions to particular schools. It is generally accepted that schools should not operate at 100% of their capacity, as it is important to retain some level of surplus to facilitate parental preference and for contingency planning.

3.4.5 The current adopted version of the SOP is the 2010-2015 version.

3.4.6 There is no set trigger for requiring a new school to be built. The LEA however has a policy of trying to avoid mixed age teaching whenever possible. A primary school of 210 places is the smallest size school that could achieve this aim. This number of pupils would be likely to be generated by around 700 new houses.

3.4.7 With regard to secondary education, new schools are only likely to be required to serve large new development schemes. Four forms of entry, or 600 pupils in the 11 to 16 age range, is the minimum secondary school size recommended by the Department for Education and Schools. This is the number of pupils that would be generated by a development of around 3,000 houses. In the planning context for new secondary schools, the LEA would aim to establish a school of at least six forms of entry or 900 pupils in the 11 to 16 age range. To achieve this size, and to integrate communities, it is likely that such a school would serve a wider area than just a new housing development. The precise number of new homes to trigger the need for a new secondary school thus requires careful consideration on a case by case basis.

School Population Projections 2009 - 2015

3.4.8 Table 3.6 below indicates the number of pupils expected to be educated within Rochford District. Within the primary school category the student population has consistently decreased and is forecast to continue falling at a slowing rate. Likewise, the number of secondary school pupils is forecast to continue declining over this period.

Table 3.6: Rochford District Pupil Numbers in Schools (2009 – 2015)

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Primary & Nursery	6,259	6,212	6,149	6,043	6,047	6,026
Secondary	5,732	5,747	5,716	5,673	5,552	5,463

(Source: The Essex School Organisation Plan (SOP) 2010-2015)

3.4.9 However, when new pupils arising from new housing developments are factored in, primary age pupil numbers are forecast to remain relatively stable. However, the number of secondary school pupils is forecast to continue to fall even taking into account an adjustment for new housing. These forecasts include an adjustment allowing for new housing as shown in Table 3.7 below.

Table 3.7: Rochford District Pupil Numbers in Schools (2009 – 2015) Forecast including adjustment for new housing

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Primary & Nursery	6,259	6,217	6,183	6,132	6,214	6,258
Secondary	5,732	5,749	5,733	5,718	5,649	5,614

(Source: The Essex School Organisation Plan (SOP) 2010-2015)

School Capacity Projections 2010 - 2015

3.4.10 The SOP is premised on matching the supply for school places as closely as possible with demand, and ensuring that education is provided as cost effectively as possible. Empty places represent a poor use of resources and the removal of surplus places is important to make effective use of revenue funding. The removal of surplus places can also open up capital funding opportunities for improvements to buildings and grounds that would otherwise not be available.

3.4.11 The demand for places at schools is derived by the forecast in the number of children that are likely to live in the area. Therefore the increase in demand is driven by both inward migration to the area, brought about by primarily, among other things, new developments in addition to the "natural" increase of the existing population. The population and household projections as described above are based on forecasts taken from the latest Census and mid-year estimate information from which birth, death and migration trends are applied in order to the forecast future population levels. Tables 3.8 and 3.9 show the capacity forecasts and surplus places for the District.

Table 3.8: Rochford & Rayleigh Primary School Capacity Forecasts 2010 - 2015

Capacity of Schools		Number of Roll			Surplus		
		Actual	Forecast				
2010	2015	2010	2015	2015 with Housing	2010	2015	2015 with Housing
6,985	6,738	6,259	6,026	6,258	726	712	480

(Source: The Essex School Organisation Plan (SOP) 2010-2015)

Table 3.9: Rochford & Rayleigh Secondary School Capacity Forecasts 2010 – 2015

Capacity of Schools		Number of Roll			Surplus		
		Actual	Forecast				
2010	2015	2010	2015	2015 with Housing	2010	2015	2015 with Housing
5,725	5,836	5,732	5,463	5,614	-7	373	222

(Source: The Essex School Organisation Plan (SOP) 2010-2015)

3.4.12 The schools within a 3 mile radius of the study area are shown on Figure 3.6.

3.4.13 Overall, for the primary schools identified in Table 3.8 above indicates that at 2010 there was a surplus of 726 school places, falling to a surplus of 480 spaces in 2015, after having already taken into account new housing proposed for Rochford.

3.4.14 At the secondary school level the District outlook is quite different. Currently there are not enough school places and at 2010 a deficit of -7 was recorded. However, reflecting the fall in primary schools' student populations as a result of demographic change, the student forecast for 2015 will provide a surplus of 222 school spaces, after having taken into account new housing proposals for the District.

Likely Significant Effects

3.4.15 The pupil generation rates provided by the LEA assume that one bedroomed units should be discounted as they are unlikely to house children. The factors used in the 2010 SOP for primary school pupils are 0.3 additional pupils per new house and 0.15 additional pupils per new flat. For secondary pupils, the ratios are 0.2 additional pupils per new house and 0.1 additional pupils per new flat.

3.4.16 With regards to the residential development at Stambridge Mills (96 dwellings minus the 17 one-bedroom flats, therefore comprising 45 houses and 34 flats) applying this ratio of primary to secondary school aged children, means that the development as proposed would deliver a need for some 19 additional primary school places and up to 13 additional secondary places.

3.4.17 If the existing and forecast surplus capacity figures for the schools are compared to the number of pupils likely to arise from the proposed development (it has been assumed that the earliest date the scheme is likely to generate new pupils is 2012/13, following the implementation and construction of the scheme and its occupation by residents), then there is already sufficient capacity within the existing primary and secondary school network in Rochford/Rayleigh to accommodate these new pupils, although the distribution of available places is a matter which will require further discussion with the LEA as Secondary School provision is under active review at the time of this assessment.

3.4.18 This analysis indicates that there is generally surplus capacity of forecast places at both primary and secondary level in the schools around the proposed development and within Rochford generally and that the demand for schools places arising from the proposed development can be accommodated within this surplus capacity. The proposals will therefore have a negligible impact on education services in the district.

Cumulative Effects

3.4.19 Given the surpluses estimated over the period to 2015, it is considered that even if the highest pupil product factor[1] of 0.3 primary pupils per dwelling and 0.2 secondary pupils per dwelling is applied to the proposed developments, the existing surplus capacity in the district could absorb the potential pupil increases without the need for further contributions by developers.

3.4.20 With regard to primary education provision, the Hall Road scheme would provide for a new primary school as part of that development proposal. Applying the LEA pupil multipliers to 600 dwellings would indicate some 180 additional primary school pupils would be generated which would be more than accommodated by the proposed new primary school. In respect of the other developments proposed, on a cumulative basis the Brays Lane scheme would generate 30 additional primary pupils, the Rectory Road scheme an 53 additional primary pupils, and that, added to the 19 generated by the Stambridge Mill development, would total an additional 102 primary pupils, well within the 480 surplus primary school capacity forecast in 2015 (which already takes into account new residential development in the District).

3.4.21 With regard to secondary school provision, the number of additional pupils would be some 188 additional places, which again could be met within the increase in capacity forecast for secondary schools over the next 5 years of 222 pupils. The forecast capacity by 2015 would be sufficient to accommodate the cumulative increase in pupils arising from all four schemes (13 additional secondary school pupils generated by the Stambridge Mills development, 120 additional secondary pupils generated by the Hall Road development, 35 additional secondary pupils generated by the Rectory Road development and 20 additional secondary pupils generated by the Brays Lane development, totalling some 188 pupils, which is within the available 222 pupil capacity in 2015).

Mitigation Measures

3.4.22 With regard to forecast school capacity from 2010 onwards in the vicinity of the proposed development there is sufficient capacity to accommodate the demand arising from the new development.

3.4.23 By analysing and comparing the School Organisation Plan with the number of proposed dwellings, it is anticipated that there is likely to be a beneficial local effect at both primary and secondary education levels arising from surplus school capacity being utilised by new pupils arising from this proposed development, thereby increasing the efficiency in use of resources and effectiveness in the use of revenue funding. Therefore, no mitigation measures are required.

3.5 Health Services Assessment

Baseline Conditions

3.5.1 The health of the population has an effect on the demand for health services including doctors, pharmacies, hospitals and health care workers. The type of housing influences the age of the person that is likely to live there, which in turn has an effect on the type of health facilities required. For example, a higher proportion of young couples will be more likely to start a family and will place different strains on the health service in the area than would a residential scheme predominantly designed for retired people.

3.5.2 Table 3.10 compares the health of the population of Rochford District with the regional and national average. It shows that there is a lower percentage of the population with a long-term illness and higher than average proportion whose health is described as 'good' which indicates that the residents of the proposed

[1] Pupil Product Factor taken from Essex County Council School Organisation Plan 2010-2015

development would not be expected to place above average demands on the existing and proposed health facilities.

Table 3.10: Health comparison between Rochford, the East of England and England 2001

	Population	With limiting long-term illness (Percentage)		Without limiting long-term illness (Percentage)		Percentage of People Whose Health was:		
						Good	Fairly Good	Not Good
Rochford	78,489	12,398	(16)	66,091	(84)	71	22	7
East of England	4,928,434	892,034	(18)	4,036,400	(82)	68	23	9
England	49,138,831	8,809,194	(18)	40,329,637	(82)	68	23	9

(Source: ONS, Neighbourhood statistics, 2001 census)

3.5.3 NHS South East Essex has the responsibility for ensuring the delivery of health services in the Rochford area. The impact of the proposed development of 96 dwellings on the provision of health services will have a proportionally greater impact on local services such as doctors' surgeries than those which are provided at a wider County level such as hospital or the ambulance services which serve a far wider population.

3.5.4 . Using information supplied by NHS South East Essex online, there are currently four doctors' surgeries located within 3km (2 mile) radius of Stambridge Mills. All are accepting new patients. These can be seen on the Local Facilities Plan at Figure 3.6.

- Rochford Medical Practice, Back Lane, Rochford, Essex, SS4 1AY (0.7 miles)
- The Puzey Family Practice, Back Lane, Rochford, Essex, SS4 1AY (0.7 miles)
- The Leecon Practice, 1 Leecon Way, Rochford, SS4 1TU (1.2 miles)
- Dr B Singh, 57 Lascelles Gardens, Rochford, Essex, SS4 3BW (1.9 miles)

3.5.5 These four practices accommodate approximately 16 full time Doctors. A range of additional services are provided from these practices, which include antenatal clinics, family planning and diabetes clinics.

Table 3.15: GP Surgeries Analysis

Surgery	No. of Patients	No. WTE GPs *	Average Number of Patients per WTE GP
Rochford Medical Practice	8,000	2	4,000
The Purzey Family Practice	11,500	7	1,643
The Leecon Way Practice	2,316	4	579
Dr B Singh	3,000	3	1,000

*This number does not include Locum GPs which are employed by each practice

(Source: NHS South East Essex, 2010 and telephone survey August 2011)

3.5.6 Practice list sizes give an indication of whether there is capacity for existing surgeries to absorb additional patients having regard to the number of patients per GP. The average number of patients per GP in the UK is approximately 1,800 and NHS South East Essex aspires to maintain similar levels of provision. From Table 3.15 it can be seen that three of the four surgeries are operating with less than 1,800 patients per GP, exclusive of Locum support. The average number of patients per GP across the surgeries currently stands at about 1,550 patients per GP, which indicates some existing capacity exists. The surgeries have confirmed that they remain open for new patients.

3.5.7 In addition the location of pharmacies in an area is a consideration when assessing healthcare provision. Pharmacies need to be located in close proximity to doctors' surgeries but also need to be well located close to other shops, services and public transport links. There are 5 pharmacies located within 2 miles (3km) of the Stambridge Mills site.

- The Co-Operative Pharmacy, 42 West Street, Rochford, Essex, SS4 1AJ (0.7 miles)
- Golden Cross Parade, 10 Golden Cross Parade, Ashingdon Road, Rochford, Essex, SS4 1UB (1.5 miles)
- Lloyds Pharmacy, Waitrose Store, Fossetts Way, Eastern Ave, Southend-on-sea, Essex, SS2 4DQ (2 miles)
- Morrisons (In-store Pharmacy), Western Approaches, Eastwoodbury Lane, Southend-on-sea, SS2 6UR (2 miles)
- Earls Hall Pharmacy, 8 Earls Hall Parade, Southend-on-sea, SS2 6NW (2 miles)

Likely Significant Effects

3.5.8 The 96 dwellings that are to be constructed as part of the proposed development will generate additional demand on the existing surgeries. As noted within the household section of this chapter, an average household size of 2.4 persons per dwelling would yield approximately 230 additional people at the proposed development. The standard is for one GP per 1,800 residents. This in itself would not lead to the need for an additional GP to be required in order to accommodate the effect of the proposed development, and taking into account the existing headroom resulting from the existing 13 GPs, this increase in demand on GP services is likely to have a negligible impact on primary health care services in the district

3.5.9 As well as an effect upon the primary health care provision, a population increase of approximately 230 people from the development proposals would not be expected to increase demand significantly upon health services provided at Spire Wellesley Hospital in Southend-on-Sea, the regional hospital. Consideration of the effect of the proposed development upon the emergency services within the District and the County is considered later in this chapter.

Cumulative Effects

3.5.10 As identified in Table 3.11, there is already existing capacity in the provision of GP services within the local area. Additional pressures would cumulatively result from the other proposed residential developments in the vicinity of Rochford at Brays Lane, Hall Road and Rectory Road. Cumulatively, these three developments could generate in the region of 876 additional dwellings which, at an average occupancy of 2.4 persons per household, would constitute an increase of some 2,100 potential patients.

3.5.11 Applying the standard ratio of 1,800 patients per GP to the 16 existing GPs, this would provide an existing capacity for 28,800 patients. The current number of patients registered with the surgeries stands at 24,816 patients, leaving a headroom 3,984 patients. Therefore, the effect of adding the population arising from all the developments cumulatively (2,330 patients) would still leave headroom in existing GP capacity in the area. No mitigation is therefore required.

Mitigation Measures

3.5.12 Given the existing surplus capacity, no mitigation is required either for the proposed development, or for the cumulative effect of the Brays Lane, Hall Road and Rectory Road schemes.

3.6 Cultural, Sporting and Leisure Services Assessment

Baseline Conditions

3.6.1 The provision of leisure and recreational facilities are a recognised and important aspect of people's lifestyles. The Department of Culture, Media and Sport emphasises the Government's support for Local Authorities to build up leisure facilities which meet the requirements of local people. The Department of Environment, Transport and the Regions (DETR) states that *"cultural, leisure and sporting activities are an essential ingredient to a lively and vibrant town, stimulating social and economic well-being. The Government, working with many partners, seeks to ensure a healthy cultural infrastructure to which there is access for the many, not the few, and to make use of its use as an educational resource".*

Recreation and Sports Provision

3.6.2 Rochford District Council has not published a relevant Leisure Facilities strategy. The town's facilities include a swimming pools, tennis courts, gyms, keep-fit and martial arts.

3.6.3 These existing recreation facilities are all within 5 miles (8 km) and are identified below:

- Shopland Hall Equestrian Centre, Shopland Road, Rochford, SS4 1LT (1.58 miles)
- Ballards Gore Golf Club, Rochford, SS4 2 DA (1.76 miles)
- Southend Leisure and Tennis Centre, Garon Park, Southend-on-sea, SS2 4FA (2.13 miles)
- Warriors Swim Centre, Warrior Square, Southend-on-sea, SS1 2JH (3.02 miles)
- Southend Lawn Tennis Club, Broadclyst Gardens, Southend-on-sea, SS1 3QP (3.17 miles)
- Shambhala Studios Ltd, Leighcliffe Building, Maple Avenue, Leigh on sea, SS9 1PR (3.79 miles)
- Belfairs Swimming Centre, Eaton Road, Leighbon Sea, SS9 3PF (4.24 miles)

(Source: UpMyStreet.com)

3.6.4 With reference to the Rochford Local Plan 2006, the Council notes that Indoor Sports and Leisure Facilities have been assessed against the Eastern Council for Sport and Recreation's standards, and they satisfy the relevant requirements for the provision of indoor sports facilities apart from the provision of an indoor bowls centre. Currently there are 4 bowls clubs all of which have long waiting lists, but there is no proposal to fill this gap between supply and demand.

3.6.5 There are also a number of public open spaces within the vicinity of the site. Cherry Orchard Jubilee Country park, will total approximately 93 hectares in size, with Phase one (around 40 hectares) completed, with Phase two also nearing completion. The Cherry Orchard Jubilee Country Park is to be situated 2.9km distance from the application site.

Likely Significant Effects

3.6.6 It is considered that the range of existing sports facilities in the locality have the potential to accommodate demand arising from residents of the proposed development.

3.6.7 As regards community and meeting places, it is considered that an increase in population of some 230 people arising from the proposed development would not be sufficient to support a new community facility.

3.6.8 As regards the provision of outdoor recreation, footpaths and recreational routes will also be provided as part of the proposals, as well as links to the existing network in the vicinity of the site that will contribute to the accessibility of the proposed and existing areas of open space. The applicant is willing to consider upgrades to the existing network of footpaths to enhance links with existing areas of open space, should this be considered appropriate.

Mitigation Measures

3.6.9 The Cherry Orchard Jubilee Country Park is seen as being particularly important as providing a large area of open space within the vicinity of the Stambridge Mills site which would be promoted for recreational purposes as an alternative to the adjacent Special Protection Area.

3.6.10 The applicant proposes contributions to enhance the PROW network in the vicinity of the site.

Residual Effects

3.6.11 The likely effect of the proposed development on open space, sports and community facilities will be a minor permanent, local adverse effect.

Cumulative Effects

3.6.12 The proposed developments at Brays Lane, Hall Road and Rectory Road include additional open green space and play space provision to mitigate for a potential increase in recreational impacts as a result of the development proposals, As such, no significant cumulative effects on outdoor recreation facilities are anticipated, should any or all development proposals be implemented.

3.7 Emergency and Social Services Assessment

Baseline Conditions

Emergency Services

3.7.1 A key objective within planning policy is to promote communities that are inclusive, healthy, safe and crime free, by creating safe and accessible environments where crime, violence and disorder or even fear of crime does not undermine quality of life or community cohesion.

3.7.2 This section gives an indication of the current level of crime and disorder recorded in Rochford District per 1,000 populations. It also provides a statistical breakdown for all 12 Essex Local Authorities within 6 key offence areas for the financial year 2004/05, together with a data table which amalgamates all the data received. Finally, there is a brief analysis of the trends in offending patterns within 5 of these areas.

3.7.3 Table 3.12 illustrates the most recent crime states for the Rochford District covering the period April 2005 to March 2006. Table 3.12 depicts the total number of offences per 1,000 of the population and compares the figure to the national average.

Table 3.12: All Offences in Rochford District per 1,000 population

Year	Total Number of Offences	Offences per 1,000 Populations	
		Rochford District	England & Wales
2002 / 2003	3,705	47.1	113.1
2003 / 2004	4,291	54.1	112.9
2004 / 2005	4,140	52.5	105.2
2005 / 2006	3,780	48.8	103.1
2006 / 2007	3,200	40.3	100.1
2007 / 2008	3,077	37.9	90.8
2008 / 2009	2,802	34.1	85.7

(Source: Home Office Statistics Online: All Crime for Rochford 2002 - 2009)

3.7.4 This indicates that the District has a significantly lower proportion of crime than that seen at a national level. The crime statistics also illustrate that there is a decreasing number of offences both at the district and national level, with crime reducing at a quicker rate at the district level than that seen nationally per thousand populations.

3.7.5 Table 3.13 presents crime figures per thousand for the Rochford District area, identifying areas of crime. All the data for the 6 crime areas have been taken from the 2006/07 financial year which represents the most recent data available. In order to allow comparisons, each of these 6 crime areas is examined for all the boroughs and districts within Essex and the English average to give insight to the County's performance as a whole.

Table 3.13 - Number and Type of Offences per District per 1,000 population

Offence Committed	Basildon	Braintree	Brentwood	Castle Point	Chelmsford	Colchester	Epping Forest	Harlow	Maldon	Rochford	Tendring	Uttlesford	Southend	Thurrock	England
Violence against the Person	14.8	10.4	11.2	8.7	12.1	14.7	12	23	7.7	5.9	12.9	9	17	14.7	15
Sexual Offences	0.8	0.8	0.4	0.5	0.6	0.8	0.6	1.1	0.5	0.4	0.7	0.3	1	0.7	0.9
Robbery Offences	1.2	0.2	0.4	0.6	0.6	0.6	1.1	1.3	0.1	0.2	0.4	0.1	1.6	1.2	1
Burglary Dwelling Offences	6.6	1.8	4.2	4.2	2.1	2.8	7.2	6	1.7	2.1	3.1	2.1	5.5	5.8	4.3
Theft of a Motor Vehicle	3.3	1.2	2.1	2.1	1.7	1.5	3.4	3.4	1.1	1.4	1.7	1	2.8	5.4	2.3
Theft from a Motor Vehicle	7.3	3.9	5.3	5.3	3.5	4.9	7.9	9.6	3.3	3.1	4.4	3.6	5.8	9.1	6.3

(Source: UpMyStreet.com, 2010)

3.7.6 As can be seen above 'violence against the person' covers all offences ranging from murder to transgression against an individual. With a reported 5.9 offences per 1,000 populations the rate of violent crime in the district is the lowest in the county. Across the other identified key areas Rochford has consistently low levels of offences.

3.7.7 Robbery offences are a relatively low occurrence. However, the Rochford District reports this offence occurring less than once every 1,000 population. This is the second lowest across all the other districts. Basildon, Epping Forest, Harlow, Southend and Thurrock can be seen to be exceeding the English average only at an approximate rate of one offence per 1000 populations.

3.7.8 Theft of a motor vehicle within Rochford District is also relatively low compared to the other local authorities within Essex. Thurrock District is the district in which car crime is a more serious problem with offences at a rate of 5.4 offences per 1,000 populations on comparison with only 1.4 offences per 1,000 populations within Rochford District. This again is again one of the Districts reporting the lowest number of incidences for this crime. The English average for vehicle crime is 2.3 per thousand population.

3.7.9 The situation of sexual offences is similar to the situation of robbery offences, with small numbers involved. However, it can be said that three districts in Essex are equalling the English averages and Harlow and Southend exceeding the English average. Rochford District is not one of these and the reported figure is less than one sexual offence per 1,000 populations.

3.7.10 Rochford District reports a rate of offending as just over 2 per 1,000 population for burglary of a dwelling; this is less than 50% of the English average. Performance within this field can be considered to be good within the District when compared to the figure for the financial year 2004/05 which recorded the district rate at 3 per 1,000 populations.

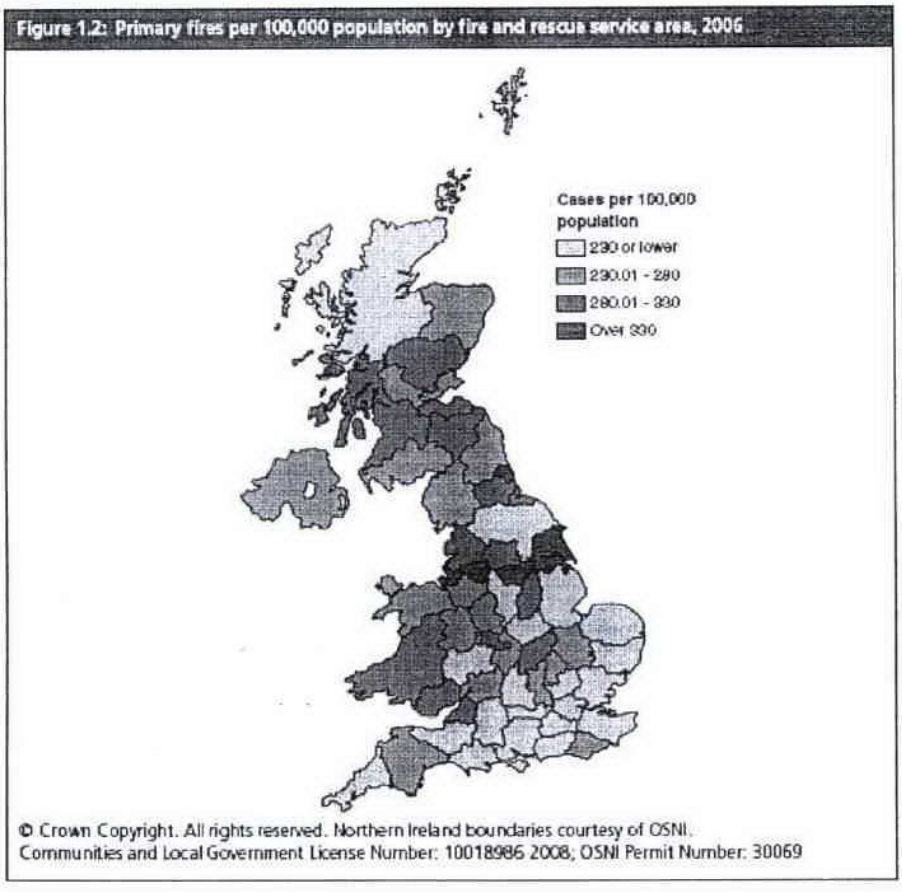
3.7.11 It is acknowledged that the assessment for the provision of resources for the police force is made on a budgetary basis. The impact of a new development on existing resources is assessed on whether the future police budget can provide sufficient policing to the new development. An assessment of this is not made until a planning application is formally submitted to the Local Planning Authority.

3.7.12 The fire service prepares a 'Fire Service Emergency Cover Model' that assesses each proposed new development in terms of its overall risk. The risk of a new property is graded as being high, medium or low using criteria that include the building type, the likely future occupants and other census data. The provision of emergency fire services is provided at this set level of risk.

3.7.13 In the year ending Sept 2008, United Kingdom Fire and rescue Services attended 760,000 fires or false alarms, 8 per cent less than the 2007 figure. Within the total, fires decreased by 8 per cent to 349,000, while false alarms fell by 3 per cent to 411,000. A total of 349,000 fires were attended in 2008, of which 40,000 (11%) were in dwellings. Findings from the 2004/05 Survey of English Housing on all outbreaks of fire experienced by households in England suggested that the fire and rescue service attend approximately one fifth of all domestic fires. This is because many of the fires recorded in the survey are minor and able to be put out by someone in the home, and therefore the fire and rescue service were not called.

3.7.14 Figure 3.7 illustrates the number of fires per 100,000 population recorded for 2006.

Figure 3.7: Primary fires per 1000,000 population by fire and rescue service area, 2006



(Source: DCLG, Fire Statistics, United Kingdom, 2006)

3.7.15 Figure 3.11 above indicates that the County of Essex recorded one of the lowest numbers of primary fires per 100,000 populations during 2006 with 230 cases or fewer. Nationally the total number of accidental primary fires in 2006 was 87,000. This would indicate that on comparison to the total number of national accidental primary fires, 0.26% occur in the County of Essex.

3.7.16 Assessment of the effect of development on operations on the east of England Ambulance Service takes place after the property is built.

Social Services

3.7.17 There are presently five libraries in Rochford District including one within Rochford. Rochford library is open 6 days a week and in addition to its lending library provides an internet service, DVDs and Audio books, as well as monthly book talks, weekly Baby & Toddler sessions every Friday afternoon and hosts various exhibitions throughout the year. Library facilities are also available in Great Wakering, Hockley, Hullbridge and Rayleigh.

3.7.18 Essex County Council provides informal educational activities and youth services throughout the District. The creation of Adolescent Services as part of the Vulnerable Children and Young People's Service came about under the Change for Children programme and the restructuring of services for children and young people in Essex. It comprises distinct teams with a common theme of working with teenagers, covering the whole spectrum from universal to complex and acute services.

3.7.19 The countywide and locally based area teams plan their work in consultation with Children and Young People's Strategic Partnership (CYPSP) to complement and support the work carried out in the teams around the school, child and community (TASCC). The service also has strategic leads for the authority on areas such as The Essex Teenage Pregnancy Strategy, Youth Opportunity Fund, Involving children, young people and their families, Positive Activities for Young People (PAYP), Youth Offending Service and Educational Visits Co-ordination.

Likely Significant Effects

3.7.20 In accordance with normal practice, further assessments will need to be undertaken by the local authority in relation to the additional requirements placed on the emergency and social services as and when the complete details of the proposed development and its buildings are submitted. Given that the population increase resulting from this proposal is only very modest (some 230 additional people) in the context of a district wide population of over 82,000 people (see Table 3.2), an increase of less than 0.5%, any effects area likely to be negligible and should not result in a significant effect.

Mitigation Measures

3.7.21 In the event that these more detailed assessments by the emergency and social services identify issues of concern, these will either be addressed through incorporating detailed design changes at the reserved matters stage, or consideration will be given to making Section 106 or other contributions towards specific matters and resource requirements if this proves to be justified.

Residual Effects

3.7.22 The ability of the current emergency and social services resources to accommodate the proposed development will not be precisely known until the scheme is evaluated by these services in due course. However, the above mitigation measures in the form of developer contributions, if based on evidence and justified, is anticipated to eliminate any residual adverse effects on the provision of emergency or social services as a result of the development proposals.

Cumulative Effects

The proposed developments at Brays Lane, Hall Road and Rectory Road will also place an increased demand on emergency and social services in the area, which would be in addition to those arising from the Stambridge Mills proposals. It is anticipated that a separate package of measures similar to those described above would be put in place by the local authority for these site(s) should this development come forward, in order to ensure that increased demand arising from this development could be accommodated by the emergency and social services, resulting in no adverse effects from the proposals on these resources, either in combination or separately.

3.8 Social Inclusion and creating Sustainable Communities

Baseline Conditions

3.8.1 Planning Policy Statement 1 (PPS1) reaffirms the Government's commitment to creating sustainable communities where people want to live and that will enable them to meet their aspirations and potential.

3.8.2 A Housing Needs Survey of the district was carried out in August 2004. The survey was carried out district wide, incorporating Rochford District and the neighbouring District's of Basildon, Castel Point Thurrock and Southend-On-Sea. The study established that 91.6% of residents lived in accommodation that suited their personal needs. The survey also found that affordability was a major issue, particularly for those newcomers to the residential market. The report concluded that annually there is a requirement for 393 affordable units per annum, 291 more than the current supply, and that there was a requirement to provide a more balance stock across both sectors with a need for smaller units, such as flats and apartments, particularly within the private sector of the market.

3.8.3 The mix of tenure of properties available in an area reflects the extent of housing choice available to that community. Tables 3.14 summarises the tenure of the dwellings in the Rochford District and compares them to the Regional and National perspective, 2001.

Table 3.14: Tenure of properties in Rochford

	Rochford (%)	East of England (%)	England and Wales (%)
Owner occupied: Owns outright	37.64	30.67	29.19
Owner occupied: Owns with a mortgage or loan	47.85	41.53	38.88
Owner occupied: Shared Ownership	0.26	0.51	0.65
Rented from: Council (local authority)[1]	5.61	11.61	13.21
Rented from: Housing Association / Registered Social Landlord	2.73	4.91	6.05
Rented from: Private landlord or letting agency	4.1	7.57	8.8
Rented from: Other	1.81	3.2	3.22

(Source: National Statistics, April 2001)

3.8.4 Evidence from Table 3.14 above, suggests that the Rochford District has a higher proportion of owner occupied property, a further 8.45% of the local population are owner occupiers outright than seen at the national level. A significantly lower proportion of local residents require assistance with housing. The percentage of population requiring assistance from the Council is -6% and -7.6% less than those seen on a regional and national level respectively.

3.8.5 Meeting the objective of social inclusion can be achieved through effective planning policies that build socially inclusive communities; and by ensuring that the impact of the development is considered and addresses accessibility for everyone (including the disadvantaged groups) to jobs, health, housing, education, shops, and leisure and community facilities.

3.8.6 Access to a vehicles helps to increase accessibility and promote social inclusion, it also reflects peoples lifestyles and requirements. Table 3.15 compares the percentage of cars in Rochford against those seen at a regional and national level.

Table 3.15: Access to Vehicles

	Rochford (%)	East of England (%)	England and Wales (%)
Households with no cars or vans	16	20	26
Households with 1 cars or vans	42	44	44
Households with 2 cars or vans	32	28	24
Households with 3 cars or vans	7	6	5
Households with 4 cars or vans or more	3	2	1

(Source: ONS, 2001)

3.8.7 Table 3.15 illustrates that a larger proportion of Rochford District has greater access to a vehicles than others reflected in the regional and national pictures.

Likely Significant Effects and Mitigation Measures

3.8.8 Wider issues of social inclusion are addressed by the development proposals through the inclusion of housing which is available to all sections of society. The proposed development will make contributions to the improvement of health care facilities to the betterment of the wider community. The development will also be fully inclusive of non-car users as it is anticipated that alterations will be made to bus routes in the area surrounding the study area to provide service to the development site. Further provision will also be made for cyclists and pedestrians through the provision of new footpaths and cycleways to link in with the existing network surrounding the site. The proposed development therefore represents a form of development which respects the principles of social inclusion.

3.8.9 The proposed development does not anticipate the delivery of specific affordable housing due to concerns over the viability of the project.

Residual Effects

3.8.10 The residual effect of the proposed development on housing and market housing levels within the District will be a permanent and minor beneficial one.

3.9 Employment Land Supply and Economic Circumstances

Employment Land Supply

3.9.1 The employment land supply policies of the Structure Plan (which are no longer current) and those of the Replacement Local Plan (which were derived from the Structure Plan policies and are also now largely redundant) were founded on the assumption that there are clear and predictable relationships between employment land supply and job growth. In practice, these relationships are known to be highly variable and the development for housing of a 1.8 hectare area of land previously used as a riverside flour mill is unlikely to be harmful to the regional economic strategy or the district economic strategy.

3.9.2 Annex C of the Government's *Guidance Note on Employment Land Reviews*[2] makes a number of points about translating employment forecasts into land requirements. The use of averages conceals a significant variation in actual figures and employment density ratios vary due to a number of factors such as:

- employment sector,
- activity,
- size of premises,
- location,
- point of the economic cycle,
- age of building,
- length of occupation,
- tenure and
- occupation costs

3.9.3 Replacement Local Plan Policy EB9 had limited the future use of Stambridge Mills to B1 business uses, which may include light industrial or office uses. However, questions raised in the Local Plan about its accessibility for B8 uses (requiring transit through Rochford Town Centre) also raised questions in relation to high-density office employment uses. The 2008 Employment Land Study considered it appropriate for light industrial use.

3.9.4 The most widely used source of information on employment densities, in addition to the Government's Guidance on Employment Land Reviews, is the report by Arup Economics and Planning for English Partnerships and the Regional Development Agencies[3], which reviewed a number of other sources.

3.9.5 For illustrative purposes, the number of potential jobs which could be generated on the Stambridge Mills land can be calculated using the relationships from these sources. Because of the location and site characteristics of Stambridge Mills, appropriate employment densities are more likely to be those for light industrial uses than for high-density office uses. The plot ratio (ratio of built floorspace to site area) was about 37% for the flour mills (6,306 square metres on 1.7 hectares). This would be a high plot ratio for a modern business park, where site coverage is typically 25% to 40%. 25% to 40% site coverage of 1.7 hectares implies a gross floor area of 4,250 to 6,800 which would convert into net floorspace of approximately 3,700 to 5,700 square metres (taking gross floorspace to be 15% to 20% above net lettable floorspace).

3.9.6 The 2008 Employment Land Study assessed the potential gross floorspace potential of Stambridge Mills at 7,200 sq m (say 5,760 sq m net).

3.9.7 On these assumptions, at an average employment density of 32 sq metres per worker, there would be the potential for 115 to 180 jobs to be generated on the site[4]. This calculation is subject to all the caveats about average employment densities listed above.[5]

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[2] ODPM, December 2004, *Employment Land Reviews: Guidance Note*

[3] Arup, July 2001, Employment Densities, Report for English Partnerships and the Regional Development Agencies

[4] If office employment is assumed, the density of employment would be approximately double that for industrial use.

[5] The employment densities quoted are consistent with those used by Roger Tym & Partners in *East of England Employment Land Review Guidance,* October 2007

3.9.8 The numbers of jobs calculated above would represent only 0.64% to 0.98% of the total jobs in Rochford in 2006 (19,000) or 3.8% to 5.9% of the total job growth targeted for Rochford between 2001 and 2021 in the East of England Plan (3,000).

3.9.9 However, jobs growth in Rochford and the Thames Gateway will not be affected by the change of use of this site to residential: partly because the estimated, average employment potential of the site was unlikely to be achieved and partly because there are other sites that are better suited to accommodate the key economic growth sectors than Stambridge Mills, which is now recognised in the Submitted Core Strategy.

3.9.10 The previous planning policy aim of protecting Stambridge Mills for Class B1 employment uses was based on outdated Structure and Local Plan policies which have now lapsed.

3.9.11 An area of land of less than 1.8 hectares at Stambridge Mills was most unlikely to have had strategic significance as an employment site, in any event, especially as it was subject to problems of viability for B1 use, because of poor road access and the costs of necessary site development works.

3.9.12 Recent studies have confirmed the potential for employment growth associated with London Southend Airport, in the area of the Joint Area Action Plan, and for general purposes on a variety of other sites in Rochford other than Stambridge Mills.

3.9.13 The Strategic Housing Land Availability Assessment confirmed the suitability of Stambridge Mills for other uses including housing, in the light of the District's housing requirements and the shortage of other appropriate sites outside the Green Belt, and the need to make the most efficient use of this brownfield site for housing.

3.9.14 A change of policy to one of supporting housing at Stambridge Mills is confirmed by the Submitted Core Strategy, which is now at an advanced stage and therefore carries significant weight. The change is reinforced by policies that make adequate provision for employment growth on Class B sites elsewhere in the District.

Significant Likely Effects

3.9.15 Having regard to the changed planning policy position with regard to Stambridge Mills, the site is no longer regarded by the Council as one that should be safeguarded for employment uses. It has been judged that the site is now better used to meet the District's housing needs.

3.9.16 Given that even if the site had been suitable for employment re-use, it would have contributed less than 1% of the total jobs in Rochford, the loss of this land for employment uses is regarded as a negligible impact.

Mitigation Measures

3.9.17 None are proposed in this regard given that the effect is assessed as being 'negligible'.

Residual Effects

3.9.18 The residual effect of the proposed development on the employment land supply within the District will be a permanent, minor adverse and not significant.

Economic Circumstances

3.9.19 The construction of the development itself will generate a number of short-medium term jobs. There will be a number of opportunities in a range of skills sectors during the construction phase. These will include a demand for construction workers, engineers and other skilled tradesmen.

3.9.20 Given that the economically active population is forecast to be in excess of the numbers of jobs created as part of the proposed development, the scheme will also provide a well located resident workforce for employment opportunities in the whole of the District and the surrounding area.

3.9.21 The proposed development also has the potential to generate additional expenditure within the local area as well as contributing to the economic and employment structure of the locality and wider town and region.

3.9.22 The expansion of population in the catchment of Rochford may impose additional demands on the existing facilities of the town centre. This may include a range of enhanced demands for environmental, cultural and retail provision which will need to be accommodated. This will have beneficial effects for the town centre: the proposed new development will assist in the enhancement of the town centre and increase the viability of the existing services by providing additional footfall for the shops and services, and providing an increased local customer base with additional available expenditure. In turn, this may encourage new investors to the town and lead to continuing regeneration of the area.

3.9.23 The scheme will create new job opportunities which will be available for existing as well as proposed residents. The proposed development will also help to provide a resident workforce for the employment opportunities at the town and wider regional level. The development will increase the vitality and viability of the town centre by providing increased local demand and expenditure.

3.9.24 The effects of the proposed development on employment levels within the town will be modest temporary beneficial effects for the building and construction trades, with a minor permanent beneficial local effect on town centre regeneration and the local economy.

3.10 Summary

Method of Assessment

3.10.1 The socio-economic impacts arising from the proposed development have been considered based upon an examination of population, employment and socio-economic characteristics. Impacts to health services, education provision, leisure services, open space, community facilities and social inclusion were assessed, both in the immediate locality and the town of Rochford and the wider District.

Likely Effects of the Proposed Development

3.10.2 The development proposes areas links to the existing footpath network to provide improved access to areas such as the new Cherry Orchard Jubilee Country Park for informal recreation opportunities.

3.10.3 Although the proposals would lead to slight loss of potential land for employment development within the District, this is not considered to be significant and new jobs will be provided for the area during the construction phase. New residents may also create additional demand for the existing facilities of the town centre, increasing viability of the existing services by providing additional footfall, and an increased local customer base with additional available expenditure. In turn, this may encourage new investors to the town and lead to a regeneration of the area's services.

3.10.4 It is anticipated that there is likely to be a positive local effect at both primary and secondary education levels arising from the surplus school capacity present in the District being utilised by new pupils arising from this proposed development, increasing the efficiency of the education resource in the district. There is sufficient surplus capacity forecast by 2015 to also accommodate predicted pupils numbers should the Brays Lane, Rectory Road and Halls Road developments all proceed.

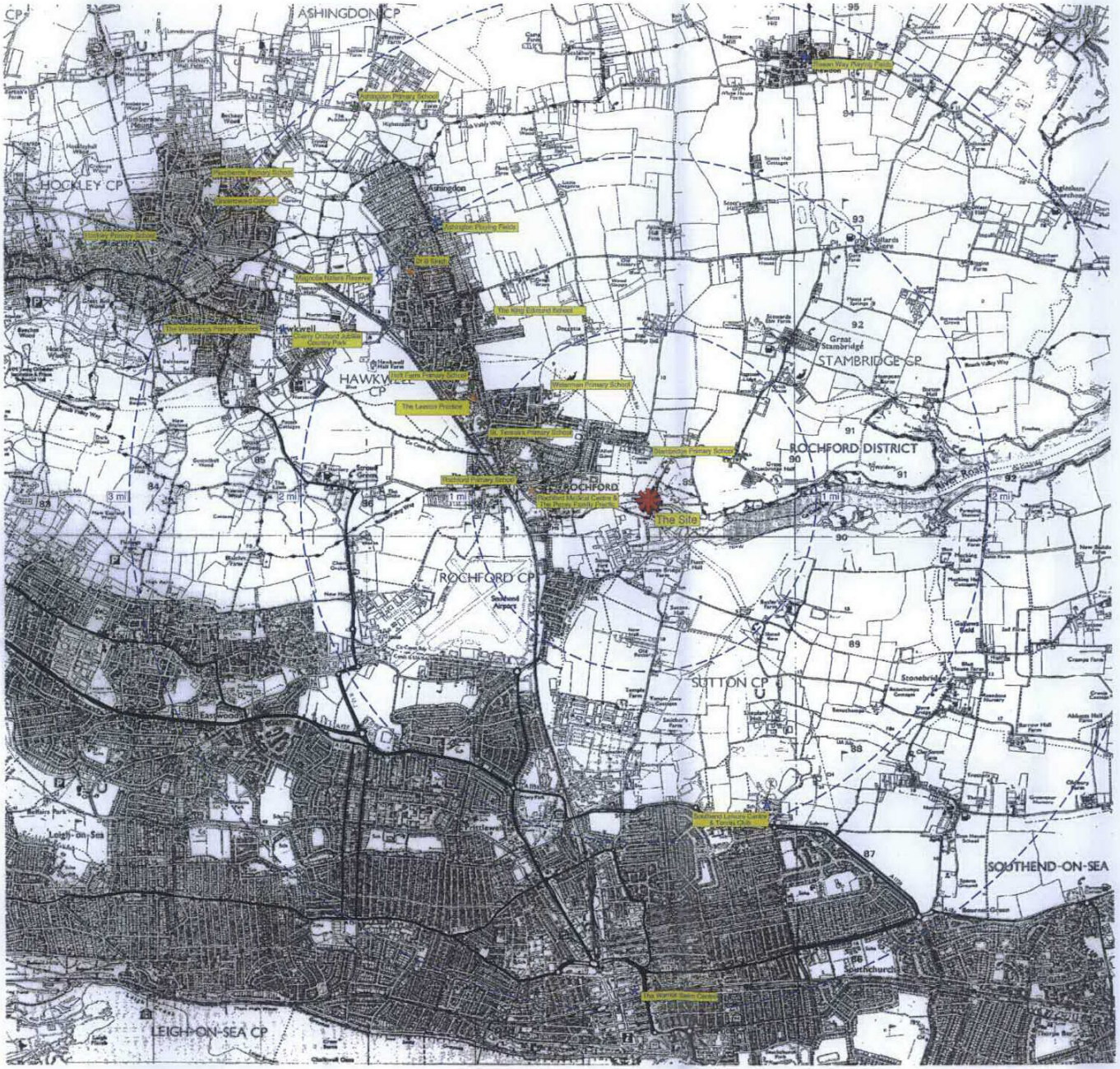
3.10.5 It is anticipated that there is likely to be a neutral local effect in respect of primary health care services arising from the surplus GP capacity present in the area being utilised by new patients arising from this proposed development, increasing the efficiency of the health provision resource in the district. There is

sufficient surplus GP capacity to also accommodate predicted patient numbers should the Brays Lane, Rectory Road and Halls Road developments all proceed.

3.10.6 Should the need for further community facilities, emergency services, library services, youth services or social services be demonstrated by the Local Authority once the Council has undertaken its assessment of the application, these can potentially be funded via developer contributions if justified by a sound evidence base.

New Situation

3.10.7 It is considered that the proposed development will have a beneficial effect on the socio-economic circumstances at the site and surrounding area, providing a range of housing contributing towards social inclusion; contributions to open space for future residents; and positive effects at both primary and secondary education levels through the utilisation of existing surpluses. If justified, developer contributions towards the provision of off-site services such as health and community facilities will offset increase in demand resulting from the proposed development and will improve these facilities for all users.



KEY

- Site Location
- Educational Facilities
- Doctor surgeries
- Leisure & Recreation
- 1 mile radius from site

3.6	FIGURE
Local Facilities Plan	TITLE
1:40 000 @ A3	SCALE
I.0105_01-1	DWG. NO.

N

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

4 LANDSCAPE AND VISUAL ISSUES

4.1 Introduction

4.1.1 This landscape and visual chapter assesses the likely significant effects of the proposed development on the application site and the wider area. The aim of this chapter is to identify the elements of the application site and its surroundings that are important in terms of its landscape value and which contribute to its character, and the extent to which these would be affected by the proposed development. A visual assessment has been conducted for the proposed development to identify receptors of views of the application site, and to determine the degree to which the development of the application site would have a visual effect upon the surrounding landscape and townscape.

4.2 Assessment Methodology

4.2.1 The landscape and visual assessments have been based on evaluation criteria in accordance with:

- Guidelines for Landscape and Visual Impact Assessment – Landscape Institute and Institute of Environmental Management and Assessment 2002; and
- Landscape Character Assessment Guidance for England and Scotland - Countryside Agency 2002.

4.2.2 The process can be broadly divided into four steps of:

- An outline of the landscape planning policy influencing the site and the surrounding area;
- A baseline study of the landscape character and visual receptors of the site and the surrounding area;
- An assessment of the effects of proposed development upon those landscape character and visual receptors; and
- A landscape strategy for the proposed development, incorporating measures to mitigate adverse effects.

Extent of Study Area

4.2.3 In order to provide a context for the landscape and take account of any strategic views, the study area has been extended 5km beyond the immediate application site. The study area extends to the northern edge of Ashingdon in the north, Southend-on-Sea to the south, the settlement of Rochford and beyond to the open landscape in the west, and along the mud flats and salt marshes associated with the River Roach in the east.

Landscape Planning Policy

4.2.4 A Core Strategy for Rochford is currently in the advanced stages of production but is not yet adopted policy; therefore reference has been made to the Rochford District Replacement Local Plan. An overview is given of the landscape planning policy that will have an influence on the study area and the surrounding area, so that the effects of development can be understood within a planning context.

Assessment Approach

Baseline Study

4.2.5 This stage involves the recording of existing landscape and visual receptors of the application site and its surroundings. The baseline study is divided under three headings: landscape character study; landscape study; and visual study.

4.2.6 As part of the desk top study to identify landscape receptors, reference has been made to 1:25,000 Ordnance Survey Maps, which identifies the dominant landscape features which contribute to the landscape infrastructure and landscape character of the application site and the surrounding study area. The maps are then summarised in the main text. The survey work was carried out in March 2010 to further establish and record the features present.

4.2.7 Desk top study and site survey work is used to identify public and private visual receptors which experience views into and out of the study area. Viewpoints have been selected to represent views seen by these receptors and are illustrated in Figure 4.1 and shown photographically in Photoviews Figure 4.2. Photographs have been taken using a 50mm lens. Public viewpoints considered include highways, public footpaths, and bridleways, places of work and recreation and residential properties. The baseline data compiles the following factors:

i. Location of viewpoint;

ii. Description of the existing view from each viewpoint;

iii. Distance between the observer and the scheme - close range is less than 500m

- medium range is 500m-1.5km

- long range is more than 1.5km

iv. Extent and context of the existing study area observed in the view; and

v. Sensitivity of the observer.

4.2.8 After the baseline study, a summary of the data is given, which includes a judgement on the capacity of the application site and the surrounding landscape of the study area to accommodate change through development and recognises opportunities for potential enhancement.

Assessment of Effects

4.2.9 The information collated under the baseline study is analysed and an assessment is made to quantify the effect of the development proposals on the landscape character, landscape features and the visual amenity of the study area.

Landscape Assessment

4.2.10 The landscape assessment is divided into two elements: effects on the landscape resources that make up the landscape of the Application Site area; and effects on the landscape character of the wider surrounding landscape.

4.2.11 The landscape character assessment considers the value of the dominant landscape features of the application site and their relationship with the study area and the surrounding landscape context. An assessment is then made of the nature and magnitude of effects of the proposed development on these components and gives a judgement as to the significance of these effects. The results of the assessment are then used to influence the design process so that important landscape characteristics can be retained and replicated where appropriate.

4.2.12 A landscape assessment evaluates the effects of the proposals on individual landscape elements, which have been identified in the baseline survey. The assessment considers the sensitivity of these resources and the magnitude of change that the proposals would create. The assessment concludes with a judgement as to the significance of these effects on the landscape infrastructure of the study area.

4.2.13 Tables 4.1 – 4.4 set out the criteria and significance thresholds for measuring the effects of the proposals on the landscape character and landscape infrastructure of the study area. The nature of the effects can be either, adverse, beneficial or neutral.

Thresholds – Landscape Receptors

Table 4.1: Criteria for Sensitivity

High	Valued features that combine to give unity, richness and harmony. These are landscape elements that may be considered to be of particular importance to conserve and which may be particularly sensitive to change in general and which may be detrimental if change is inappropriately dealt with. Exceptional may be used to describe smaller areas of especially high quality or Nationally or regionally recognised landscapes such as AONB's and National Parks.
Medium	Features that exhibit positive character but which may have evidence of alteration to/degradation/erosion of features. Potentially sensitive to change in general; again change may be detrimental if inappropriately dealt with but it may require special or particular attention to detail. Regionally or Locally recognised landscapes.
Low	Landscape elements generally with few, if any valued features. Scope for positive enhancement. Locally recognised landscape.

Table 4.2: Criteria for Magnitude of Change

Substantial	Total loss or major alteration to key elements/features/characteristics of the baseline landscape, or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape.
Moderate	Partial loss of or alteration to one or more elements/features/characteristics of the baseline, or introduction of elements that may be prominent but characteristic when set within the attributes of the receiving landscape.
Slight	Minor loss or alteration to one or more elements/features/characteristics of the baseline, or introduction of elements that are characteristic when set within the attributes of the receiving landscape.
Negligible	Very minor loss to one or more key elements/features/characteristics of the baseline, or introduction of elements within the surrounding landscape – virtually a no change situation

Table 4.3: Degree of Significance Thresholds for Landscape Receptors

Magnitude of change	**Sensitivity**		
	High	**Medium**	**Low**
Substantial	Substantial impact	Substantial impact	Moderate impact
Moderate	Substantial impact	Moderate impact	Slight impact
Slight	Moderate impact	Slight impact	Slight impact

Table 4.4: Definition of Significance criteria for Landscape Receptors

Impact	**Description**
Substantial adverse impact	The proposed scheme would result in effects that are at a complete/considerable variance with the landform, scale and pattern of the landscape that cannot be fully mitigated; would permanently degrade, diminish or destroy the integrity of valued characteristic features, elements and/or setting; would cause a very high quality landscape of recognised value to be permanently changed and its quality diminished.
Moderate adverse impact	The proposed scheme would be out of scale with the landscape or at odds with the local pattern and landform; will leave an adverse impact on a landscape of recognised quality.

Slight adverse impact	The proposed scheme would not quite fit into the landform and scale of the landscape; affect an area of recognised landscape quality.
Neutral impact	The proposed scheme would complement the scale, landform and pattern of landscape, maintain existing landscape quality.
Slight beneficial impact	The proposed scheme has the potential to improve the landscape quality and character; fit in with the scale, landscape and the pattern of the landscape; enable the restoration of valued characteristic features partially lost through other land uses.
Moderate beneficial impact	The proposed scheme would have the potential to fit in very well with the landscape character; improve the quality of the landscape through removal of damage caused by existing lands uses.
Substantial beneficial impact	The proposed scheme would fit in very well with the landscape character and would significantly improve the quality of the landscape through removal of damage caused by existing land uses.

Visual Assessment

4.2.14 A comprehensive visual assessment determines the degree of visual effects that the proposed development would have upon the visual amenity of the surrounding landscape and townscape. The assessment compares the change in the view that would result if the scheme were to be constructed.

4.2.15 Existing views from these locations were compared with those that would result if the scheme was to be constructed and the nature of change in the scenes was recorded as beneficial, adverse or neutral. To determine the degree of visual effect, in the field, the heights of landscape features such as mature trees together with estimated building heights were used to determine the visual profile of the proposed scheme and establish the zone of visual influence.

4.2.16 The street lighting associated with the residential areas would be lit to highway standards. The assessment has principally examined views which would be observed from public locations, although it has also considered private views from residential properties.

4.2.17 Two visual assessments have been made. These are for the construction phase and for the operational phase assessment that considers the effect that the development would have upon views once the scheme was established in the local landscape.

4.2.18 No Year 15 assessment has been made as it is considered that there would be no material change to the views within this time frame.

4.2.19 Tables 4.5 – 4.8 below set out the thresholds for visual receptors. Impacts on the visual amenity are determined by the relationship between the sensitivity of the receptor and the magnitude of change that would result from the proposals. Effects may be adverse, beneficial or neutral.

Thresholds – Visual Receptors

Table 4.5: Criteria for Sensitivity

High	Residential properties and public rights of way.
Medium	Sporting and recreational facilities.
Low	Industrial and commercial premises, highway users

Table 4.6: Criteria for Magnitude of Change

Substantial	For example, the majority of viewers affected/major changes in the view.
Moderate	For example, many views affected/ moderate change in the view.
Slight	For example, few viewers affected/ minor change in the view.
Negligible	For example, no perceptible change in the view.

Table 4.7: Degree of Significance Thresholds for Visual Receptors

Magnitude of change	**Sensitivity**		
	High	**Medium**	**Low**
Substantial	Substantial impact	Substantial impact	Moderate impact
Moderate	Substantial impact	Moderate impact	Slight impact
Slight	Moderate impact	Slight impact	Slight impact

Table 4.8: Definition of Significance Criteria for Visual Effects

Impact	**Description**
Substantial adverse impact	Where the scheme would cause a significant deterioration in the existing view.
Moderate adverse impact	Where the scheme would cause a noticeable deterioration in the existing view.
Slight adverse impact	Where the scheme would cause a slight deterioration in the existing view.
Neutral impact	No discernable improvement or deterioration in the existing view.
Slight beneficial impact	Where the scheme would cause a slight improvement in the existing view.
Moderate beneficial impact	Where the scheme would cause a noticeable improvement in the existing view.
Substantial beneficial impact	Where the scheme would cause a significant improvement in the existing view.

4.2.20 The night-time assessment is based on a comparison between the light sources which would be produced by the proposed scheme and the existing light sources in the urban fringe. Reference is made to any changes in the source of night glow as a result of the proposals in Section 4.10 Assessment of Visual Effects.

The Landscape Design Strategy

4.2.21 Both landscape and visual assessments are processes which involve the refinement of design proposals, in order to ensure an environmentally appropriate and acceptable solution is achieved. Mitigation measures are designed as an integral part of an iterative process of the planning and design of the project, and have been proposed from project inception when alternative designs or options have been considered. The development has been adapted and modified to take into account constraints and opportunities that are presented during the baseline analysis.

4.3 Landscape Planning Policy Context

4.3.1 The following is a summary of the planning policies and guidance documents specific to the landscape and visual issues relating to the proposed development.

National Planning Policy

4.3.2 National planning policy is referred to in the following Planning Policy Statement and Planning Policy Guidance Notes.

4.3.3 PPS 1 Delivering Sustainable Development (2005), advocates the need for planning policies to consider the quality, character and amenity value of the countryside (and urban areas) as a whole, with a high level of protection to the most valued townscapes and landscapes, habitats and natural resources. Planning should seek to maintain and improve the local environments with positive policy that seeks to enhance the environment.

4.3.4 PPS 1 also promotes good design. It advocates sustainable patterns of urban and rural development, with high quality and inclusive design to create integrated developments, incorporating well planned public spaces. A key message of this guidance is the protection and enhancement of the environment.

4.3.5 PPS1: Planning and Climate Change – supplement to PPS 1, December 2007: The supplement to PPS1 promotes decentralised and renewable / low carbon energy and sets objectives in the context of wider objectives such as housing delivery. The supplement addresses achieving zero carbon development as well as meeting economic and housing needs.

4.3.6 PPG2: Green Belts outlines the history and extent of Green Belts and explains their purposes. It describes how Green Belts are designated and their land safeguarded. Green Belt land-use objectives are outlined and the presumption against inappropriate development is set out.

4.3.7 Planning Policy Statement 3 sets out the Government's approach to planning for housing. It places emphasis on the need to locate development in suitable locations which offer a range of community facilities and with good access to jobs, key services and infrastructure to contribute towards creating mixed and sustainable communities. It encourages the creation of mixed use, sustainable developments and the principle of good design influenced by the context of the wider locality and sets out the Government's policies for the provision of housing, emphasising the priority placed on brownfield land. PPS3 seeks to ensure high quality homes, making the most of new building technologies. Layout should be based on thorough landscape and ecological survey, providing a framework for development that meets the needs of the people, whilst respecting the environmental constraints.

4.3.8 Planning Policy Statement 5 (2010) sets out Government policies for conservation and protection of the historic environment, whilst recognising the needs of a changing society. In addition to individual structures, the wider setting is also recognised as being of importance, affording qualities of regional diversity and local distinctiveness.

4.3.9 Planning Policy Statement 7 (2004) relates to sustainable development in rural areas and reiterates several objectives in PPS3. This includes the promotion of sustainable development which respects and, where possible, enhances local distinctiveness. It advocates the continued protection of intrinsic qualities of the open countryside, the most valued landscapes and environmental resources. Paragraph 17 discusses the countryside around urban areas, stressing the importance of accessibility for urban residents.

4.3.10 PPS 9 Biodiversity and Geological Conservation (2005), sets out policies to ensure that biodiversity and geological conservation are fully considered in planning decisions. This includes the need for survey of the environmental characteristics of local areas and the promotion of opportunities for biodiversity gain.

4.3.11 Planning Policy Guidance 17 (2002) sets out Government policies for planning open space, sport and recreation, ensuring that the needs of the local communities are known.

4.3.12 Planning Policy Guidance 25 (PPS25: Development and Flood Risk) sets out the Governments policy approach to development and flood risk. It aims to help deliver sustainable development which includes appraising risk, managing risk, and reducing risk through layout and design.

Regional Planning Policy

4.3.13 The East of England Plan (May 2008) sets out policies which seek to reduce the regions impact on, and exposure to, the effects of climate change, and puts in place a development strategy with the potential to support continued sustainable growth. The East of England Plan includes the following relevant policy:

- Policy ENV7: Quality in the Built Environment. This policy seeks to ensure the efficient use of land. The scheme at the Mills complex meets this policy in the re-development of a Brownfield site which provides a mix of uses and building types.

Local Planning Policy

4.3.14 The Core Strategy for Rochford is currently in the advanced stages of production but is not yet adopted policy; therefore reference has been made to the Rochford District Replacement Local Plan. The Local Plan includes the following relevant saved policy:

- Policy NR1: Special Landscape Areas. This policy seeks to protect those areas identified as Special Landscape Areas from development. The SLA lies to the east of the Mills complex. Only the eastern-most parts of the site where flood bund improvements are proposed lie within the SLA.

Statutory and Non Statutory Designations

4.3.15 The application site as a whole is not subject to any statutory or non statutory designations (Figure 4.2) although the eastern part of the site falls with the Essex Coast Environmentally Sensitive Area, which is nationally important because of its extensive areas of grazing marsh and river valley grassland, and within the Special Landscape Area designated by the Local Plan. These features are not currently affected by the existing Mills.

4.3.16 The north western corner of the Mills complex, an area of hard standing bordered by conifer trees, and the land required for the flood bund improvements lie within the Metropolitan Green Belt (Figure 4.3).

4.3.17 The Broomhills Care Home approximately 100m to the east of the site is a Grade II Listed Building.

4.3.18 There are no further landscape designations within a 5km radius of the site.

4.4 Baseline Landscape Character Study

National Character Classification

4.4.1 The study area lies on the eastern edge of Rochford, some 3.5km to the north of Southend-on-Sea. The Countryside Agency (now Natural England) in its character description of England and Wales includes this area in Volume 6, as part of the "Greater Thames Estuary" countryside character area No. 81 (see Appendix 4.1). The key characteristics of this landscape area are considered to be:

- Extensive open spaces dominated by the sky within a predominantly flat, low-lying landscape. The pervasive presence of water and numerous coastal estuaries extend the maritime influence far inland;

- Strong feeling of remoteness and wilderness persists on the open beaches and salt marshes, on the reclaimed farmed marshland and also on the mudflats populated by a large and varied bird populations;

- Traditional unimproved wet pasture grazed with sheep and cattle. Extensive drained and ploughed productive arable land protected from floods by sea walls, with some areas of more mixed agriculture on higher ground;

- Open grazing pastures patterned by a network of ancient and modern reed-fringed drainage ditches and dykes, numerous creeks and few vertical boundaries such as hedges or fences;

- Hedgerows are absent from the large rectilinear fields with trees beginning where the marsh ceases and the ground starts to rise on land overlying the London Clay lowlands. Generally, tree cover is limited to farmsteads and dwellings on the higher, drier pockets of ground;

- Distinctive military heritage on coastline such as Napoleonic military defences and 20th century pillboxes;

- Contrast and variety within the Estuary is provided by Sheppey, a long low island rising from a stretch of very flat marsh along the Swale estuary in Kent with low, steep, clay cliffs facing towards Essex across the Thames estuary;

- Numerous small villages and hamlets related to the coastal economy of fishing (at Mersea), boatbuilding and yachting. The historically important coastal cargo transport network of 'Thames Barges' developed as a result of settlement pattern;

- Modern day pattern of local parishes reflects the historical layout of settlements, surrounded by farmland on the higher ground inland, giving way to marsh down to the waterfront;

- Pressure on edges, particularly around major estuaries, from urban, industrial and recreational developments together with the associated infrastructure requirements often on highly visible sites against which the marshes are often viewed;

- The Thames edge marshes are themselves subject to the chaotic activity of various major developments including ports, waste disposal, marine dredging, urbanisation, mineral extraction and prominent power station plus numerous other industry-related activities such as petrochemical complexes.

4.4.2 The landscape of the site and the area immediately to the south, east and north of the urban settlement of Rochford features many of the above characteristics. The site itself is currently largely unbounded by vegetation with thin hedgerows to the north western edge and north eastern edge being particularly characteristic of the points above. The local landscape is also extensive, flat and low lying with little vegetation to break up views.

District Character Classification

4.4.3 The Landscape Character Assessment of the Essex Coast includes the study area within the Landscape Type 'Crouch and Roach Farmland' (see Appendix 4.2). At a more detailed level than the Countryside Agency Assessment, the Landscape Character Assessment of the Essex Coast narrows down the character area boundaries to smaller more defined parcels of land.

4.4.4 The report identifies that:

"The coastal character of the area is defined by the narrow estuaries which penetrate far inland, with associated mudflats, salt marsh and reclaimed marshlands, sometimes including grazing marsh."

4.4.5 The report goes on to highlight the lack of vegetation in the area, and states:

"There has been significant loss of hedgerows especially in the south of the area... resulting in a fairly open character. [There are] frequent long views across the farmland to the estuaries from higher ground."

4.4.6 The report further states that:

"Church spires and towers are often visually prominent in the landscape."

Study Area Survey Classification

4.4.7 Through a detailed site assessment it has been established that the study area immediately surrounding the application site comprises a number of character areas (Figure 4.4).

4.4.8 The application site is, within its broader context, bordered directly to the south by the River Roach estuary, beyond which lies the Purdeys Industrial Estate. The estuary also runs eastwards and consists mainly of mudflats and salt marshes.

4.4.9 To the west, between the application site and the residential area of Rochford, there is an expanse of agricultural land which is under arable production and falls within the Metropolitan Green Belt. This area is characterised by its flat landscape and lack of boundary vegetation, and is bordered to the north and west by the existing urban edge of Rochford. A public footpath dissects this agricultural area in an east-west direction.

4.4.10 To the north of the application site also lies agricultural land, bounded to the north by the Stambridge Road. Beyond the road the landscape is in agricultural use. This area is characterised by a generally flat landscape of open views, with little tree or hedgerow planting dividing the fields. Access is restricted to a scattering of public footpaths and narrow lanes.

4.4.11 To the immediate east of the Mills land lies the Broomhills Care Home, a Grade II listed building. This is contained within its own grounds within which is a small woodland area providing privacy for the residents. Further east, the landscape becomes sparser as the mud flats and salt marshes contain little vertical vegetation. There are isolated clumps of scrubby areas containing some trees, but in the main this is an open and level landscape.

4.4.12 The application site itself is split into two distinct character areas. The Mills complex is formed by one character zone (brownfield) and contains little landscape features of note, whilst the remainder of the application area lies to the east and west of the Mills complex and is formed by the existing river's edge and agricultural land that surrounds the Mills (Figure 4.4). The body of the Mills complex is an area of hard standing, upon which several buildings range in height and scale to form the old Mills. This site is bounded to the north west by tall conifer hedging and to the west by a line of field maples which gives way to bramble towards the southern extent of the boundary. A public bridleway also runs adjacent to the boundary of the Mills complex.

4.4.13 The southern boundary of the Mills complex is physically formed by the River Roach. A public bridleway follows the course of the concrete wharfside around the southern edge of the Mills before heading south on a footbridge over the watercourse towards the Purdeys Industrial Estate. There is a group of small field maples growing in the banked earth bund adjacent to the path and a group of overgrown brambles towards the centre of the southern boundary. There is no other vegetation of note. This boundary is characterised by the mass of built form which is the Mills.

4.4.14 The eastern boundary of the Mills complex is formed by a tall hedge to the north eastern corner, which is gappy and unmanaged. A building associated with the Mills forms the south eastern extent of the boundary. To the north, the boundary of the Mills complex is formed by a native hedgerow consisting mainly of hawthorn and holly, with some individual hedgerow trees scattered along its length. The access gates to the site are also contained within the northern boundary.

4.4.15 Outside the Mills complex the application area extends to include land which will incorporate flood defences in the form of bunds. This area is largely formed by the existing riverside habitats and agricultural land which contain the existing flood bunding adjacent to the River Roach (Figure 4.4).

Historic Settlement Character

4.4.16 Historically, the application site was a working Mills complex and adjacent farmland alongside the bank of the River Roach. However, the Mills are now decommissioned and disused. The site lies to the south eastern edge of the settlement of Rochford.

Summary

4.4.17 The study area has been included within both broad based and detailed landscape character assessments. The landscape in which the study area is situated is identified as 'Greater Thames Estuary' by the Countryside Agency (now Natural England) and is typically generally flat and level, with few landscape features such as hedgerows and woodland. On site survey revealed the area surrounding the site and the urban settlement of Rochford to be characteristic of this description.

4.4.18 The Landscape Character Assessment of the Essex Coast identifies the area including and surrounding the site as 'Crouch and Roach Farmland', of which significant characteristics are salt marsh and grazing marsh, frequent long views across farmland and intermittent hedgerow boundaries.

4.4.19 A detailed survey identified local character areas in the vicinity of the application site and showed that the Mills complex part of the site is set within the context of an area of brownfield land that is influenced by the urban area of the town to the north and west, and which gives way to the agricultural landscape to the north. To the south and east of the parts of the site proposed for flood defence improvements, the salt marshes and mudflats prevail and the landscape is generally more open.

4.5 Landscape Baseline Study

Landscape Description of the Application Site

4.5.1 The location of the Application Site is illustrated in Figure 1.2 and is split into two distinct areas as identified above. The Mills complex is generally a square area and largely comprises brownfield land situated to the south eastern most urban fringes of Rochford. The remainder of the site area is comprised of farmland and the existing flood defence bunds running alongside the northern bank of the River Roach.

4.5.2 The site is bordered by open salt marsh and mud flats to the south, agricultural uses to the north and west and residential uses to north-west with scattered dwellings to the north and east.

4.5.3 To the west the Mills complex element of the site is bordered by the Metropolitan Green Belt, which is separated from the site by the western boundary vegetation and post and wire fencing. A small portion of the Mills complex and all of the land where the flood defence improvements are proposed lie within the Green Belt. Within the Mills complex, this area is currently formed by hard standing bounded by conifer planting to the north and west.

4.5.4 The northern boundary of the Mills complex is clearly defined by the native hedgerow and associated trees which divide the site from the land owned by Broomhills Care Home beyond. The eastern boundary is formed largely by fencing, an area of hedgerow to the northern extent, and built form associated with the Mills to the south. The southern boundary is uncontained by vegetation but the boundary is formed by the River Roach.

4.5.5 The area proposed for flood protection improvements is bounded by the River Roach to the south and by existing agricultural land and Broomhills care home to the north.

Land Use of the Application Site

4.5.6 The study area is a Brownfield site forming an old Mills complex, and two strips of agricultural land extending westwards and eastwards from this location, where improvements to existing flood defences are proposed. The Mills complex contains large areas of hard standing and several buildings which vary in height and appearance. There are six silos to the eastern extent of the complex, which is currently without formal public access.

Vegetation within the Application Site

4.5.7 Figure 4.5 shows the existing landscape features on the application site.

4.5.8 There are no features within the centre of the Mills complex save for small areas of brambles and there are no features dissecting the site. A native hedgerow forms the boundary to the complex on the north and east, and a line of field maples to the west. To the south the boundary is largely open to the River and mudflats beyond.

Water Courses within the Application Site

4.5.9 There are no water features within the site.

Development Context and Land Use

4.5.10 Within the study area and outside of the application site, there are a variety of land uses (refer to Figure 4.3). To the south of the site the land use is principally industrial with a large area occupied by the Purdeys Industrial Estate development.

4.5.11 To the east the land is largely composed of rural farmland interspersed with scattered farmsteads and winding roads, and large areas of salt marsh and mudflats closer to the Estuary.

4.5.12 Directly to the west of the site, the landscape is protected by the presence of the Metropolitan Green Belt. Public access is restricted to one public footpath.

4.5.13 Further to the west lies the settlement of Rochford.

4.5.14 North, beyond the Stambridge Road, the land use is predominantly agricultural with large fields and intermittent hedgerow structures. A number of public rights of way cross this area and there are scattered dispersed small settlements of isolated farmsteads.

4.5.15 To the east of the site lies the Broomhills Care Home, a Grade II listed building, contained within its own grounds. Beyond the Broomhills site, the landscape is in agricultural use once more.

Topography

4.5.16 The site and immediate surroundings incorporate a generally level area at approximately 5m AOD. The ground rises very gently to the northwest to a local high point of 55m AOD at Rouncefall some 4.5km to the north of the site.

4.5.17 To the south the ground slopes even more gently up to 20m AOD at the northern fringes of Southend-on-Sea, whilst to the east and west, the topography remains level.

4.5.18 To the south east, the River Roach Estuary becomes gradually wider as it flows towards the coastline in the east.

Watercourses

4.5.19 There are no watercourse within the site itself, however the River Roach flows directly to the south of the site, and there is a small swale linking this watercourse with a fishing pond to the immediate north east of the Mills complex.

Vegetation within the Study Area

4.5.20 The predominantly agricultural land to the north and east of the Application Site is formed by large irregular shaped fields. The field boundaries are intermittent, and consist mainly of native hedgerows which are sporadic in nature. Trees occur infrequently as hedgerow trees or in small copses and shelter belts.

4.5.21 This open landscape continues to the south of the site and beyond the settlement of Rochford to the west.

Public Rights of Way

4.5.22 There are several public rights of way within the study area and whilst none cross the Mills complex itself, a National Trail which forms part of the Roach Valley Way, lies adjacent to the western and southern boundaries (Figure 4.6) and runs in an east-west direction adjacent to the area of proposed flood defence improvements.

Summary

4.5.23 The application site is currently a brownfield site which contains the old Mills buildings and associated hard standing; and sections of farmland accommodating existing flood defences along the edge of the river. There are little landscape features of note, none within the site, but the northern, western and parts of the eastern boundary are formed by hedgerows.

4.5.24 The northern part of the study area is dominated by agricultural farmland with intermittent hedgerows and some limited patches of woodland and shelter belts, whilst to the direct south the main land use is the Industrial Estate known as Purdeys. To the south beyond the mills lies the River Roach and associated mud flats.

4.5.25 A large portion of the study area is rural with an irregular pattern of fields and intermittent hedgerows, and dominated to the south east by the Estuary and the associated mud flats and salt marshes largely used for grazing ponies. Urban land uses are still significant with the settlement of Rochford to the west, and the larger settlement of Southend-on-Sea to the south.

4.6 Baseline Visual Study

General Views from the Application Site

4.6.1 Views out from the site are generally restricted to close and middle distance range views due to the flat and open nature of the site and surrounding area.

4.6.2 On site assessment was undertaken within the 5km zone, beyond which views became indistinct and the existing mill buildings became indistinguishable from the surrounding landscape.

Views out from the Application Site

4.6.3 Looking to the north of the Mills complex views are short range and predominantly urban in nature with the residential development at Mill Lane visible directly to the north of the site. Beyond these existing properties, there are glimpsed views of the agricultural landscape beyond.

4.6.4 Westerly views from the application site are dominated in the middle distance by the residential development associated with the eastern edge of Rochford, seen beyond the area of Green Belt directly adjacent to the site.

4.6.5 Views to the south from the southern exterior boundary of the site are experienced over the River Roach to take in close quarter views of the Purdeys Industrial Estate and associated built form. There is limited vegetation bordering the Industrial Estate.

4.6.6 Easterly views from the application site are of a rural nature, through the tree belt on the eastern boundary of the Mills complex and towards the Broomhills Care Home and associated grounds. To the south east there are glimpsed views out from the area of the site proposed for flood defence improvements over the River Roach, salt marshes and mud flats. Given the flat nature of the topography and the lack of intervening vegetation, these views extend to approximately 3km eastwards.

4.6.7 There are no longer range views out from the site due to the enclosed nature of the application site, the level topography and the amount of built form within the site.

4.6.8 Ambient light levels in the immediate vicinity of the study area are relatively high due to the street lighting along roads and streets, the glow from residential properties and from adjoining business premises. There is 24 hour security in operation at the Mills complex at present which results in lighting being used throughout the site, both in the security office and for observation across complex.

Existing public views towards the Study Area

Long Range Views (beyond 1.5km)

4.6.9 Long distance views of the site are restricted due to an absence of publicly accessible areas and the flat nature of the topography, which means there are few elevated viewpoints towards the site. Topography and intervening built form and vegetation means that the number of such visual receptors is few in number. These views are largely restricted to users of public footpaths such as the Roach Valley Way to the east of the site, the bridleway linking Mucking Hall to Butlers Farm in the south east, and the public highway leading from Little Stambridge Hall in the north. An elevated distant view towards the application site and the wider area is obtained by users of the Roach Valley Way to the north of Ashingdon at The Church of St Andrew, approximately 3.8km to the north west of the site.

Medium Range Views (500m – 2km)

4.6.10 The survey revealed that several middle distance views were obtained between 500m and 1.5km from the application site, and that these are mainly available from public rights of way and highways in the vicinity of the site. To the east, the Roach Valley Way at Great Stambridge Hall offers intermittent glimpsed and clear views of the application site due to the flat nature of the topography and the intervening vegetation. Sections of the Stambridge Road to the north east also offer glimpsed views towards the site. To the north, users of the public footpath linking Little Stambridge Hall Lane with the Stambridge Road obtain partial views of the study area.

Close Range Views (less than 500m)

4.6.11 These are largely restricted to public rights of way and highways users in places such as the agricultural land between the site and Rochford town, and the Roach Valley Way directly to the east and south of the site. Users of Mill Lane and Stambridge Road also achieve views of the application site. There are also close range views associated with residential properties at the eastern edge of Rochford, properties along Mill Lane and residents at the Broomhills Care Home to the east of the site.

Summary

4.6.12 Owing to the study area's level topography, close and middle distance views are extensive where vegetation and built form do not impede views towards the application site. Due to the lack of elevated points in the study area, the built form and vegetation serves to restrict longer distance views to the site from a high point or where there is a lack of settlement and vegetation to restrict longer views.

4.6.13 Given the existing height and mass of the Mills, the buildings are easily identifiable in the local landscape.

4.7 Assessment of Landscape Character Effects

4.7.1 The effects on landscape character are summarised in the following paragraphs.

Effect on National Landscape Character

4.7.2 In National character terms, the Mills complex forms a small pocket of Brownfield land in an area which has historically been in Industrial use. The surrounding area is made up of a patchwork of agricultural and residential uses.

4.7.3 The development of the site would change a small proportion of this wider landscape from Industrial use to residential development which respects the historic character of the site and surroundings. The retention of the boundary vegetation, the demolition and replacement of the existing structures, the sensitive

design of the development and layout of the built form would help to integrate the scheme into the receiving landscape. Therefore, the development would result in a **Negligible** magnitude of change on the wider area, which would be **Neutral** in effect.

Effect on District Landscape Character

4.7.4 In District character terms, the application site and the surrounding area fall within what is described as 'Crouch and Roach Farmland', of which the local area is typically formed by large tracts of farmland, river estuaries, long views and intermittent hedgerow boundaries interspersed with residential and industrial development.

4.7.5 The majority of the site currently relates more to the surrounding Industrial development although there is a degree of inter-visibility with the eastern edge of Rochford providing a visual relationship between this settlement and the site. Due to the height, massing and scale of the existing built form, the application site is distinctive in the local landscape.

4.7.6 Owing to the application site's predominantly Brownfield character and the existing form of the buildings within the site, the site does have the capacity to accommodate the proposed development without detriment to the setting of the wider landscape, in particular the farmland and land within the Green Belt. Therefore, the development proposals would result in a **Negligible effect** on the landscape character of the District.

Effect on Application Site Landscape Character

4.7.7 The proposed development of residential built form and associated landscaping would be complementary to those characteristic elements already found within the majority of the surrounding area as identified as part of the detailed Study Area assessment.

4.7.8 Where the proposed development and the rural landscape to the west adjoin, the retention of the existing boundary vegetation and proposed new tree planting would create a green buffer zone to the Metropolitan Green Belt beyond, without screening the development from view. The proposed building heights of a maximum 4 storeys would be of a smaller height than currently existing within the site, and would therefore lessen the visual presence of built form within the site. Consequently, the relationship of the western site boundary and the protected landscape of the Green Belt adjacent would experience a **beneficial effect** as a result of the proposed development being of a smaller, less intrusive size.

4.7.9 The retention of the northern site boundary hedgerow and proposed planting would enhance this boundary feature and provide a buffer to the Broomhills Care Home land beyond. Similarly, the eastern boundary would be enhanced with the proposals in place.

4.7.10 The effect of the proposals on the immediate character of the site would be to remove the existing Mill buildings, including the silos to the north eastern portion of the site, and to break up the massing of the built form within the site through the careful design and layout of the residential scheme. This would result in a **positive beneficial change** to the character of the site and the immediate surrounding area, which along with the intention to create new areas of tree planting, grassland and shrubs within the proposed development would bring about an improvement to the character of the site. Within the farm land areas of the application site, these already accommodate existing flood defence bunds, which would be raised as part of the development proposals. The character of this part of the application site would therefore be unchanged by the development proposals.

4.7.11 The landscape of the site is categorised as being of **Low Sensitivity**. The overall magnitude of change resulting from the proposed development would be **Moderate beneficial**.

4.7.12 In conclusion, the study area has the capacity to accommodate the proposed residential development, with associated access route, additional landscaping and flood defences, without significant detriment to the character of the wider landscape. The proposals would effectively replace the existing large-scale Mill buildings with well designed residential development, and retain other elements of the complex which would relate well to the existing urban edge of Rochford. The analysis suggests that important landscape elements such as the western and northern boundary hedgerows could be harnessed as part of

the proposed development, and would help to integrate the proposals into the receiving landscape, ensuring consistency with the local landscape character.

4.8 Assessment of Landscape Effects

4.8.1 This section of the assessment deals with the physical aspects of the Application Site and how the proposals would affect the existing landscape infrastructure:

Land Use

4.8.2 The current land use on the site is Brownfield land previously used as an Industrial Mill, and farmland currently accommodating flood bunds. The Mills complex contains large buildings and areas of hard standing with little vegetation.

4.8.3 For the Mills complex part of the site, the change in use would be from a derelict Brownfield site with no vegetation of note, to a new residential area with an improved and enhanced landscape framework. The land use is of **Low Sensitivity** and the magnitude of change would be **Substantial**. However, the provision of new landscaping combined with well designed residential development and a reduction in the massing and scale of the built form would result in a **Moderate Beneficial effect**.

4.8.4 Land use for the part of the site where improvements to the existing flood defence bunds are proposed would remain unchanged, resulting in a **negligible** degree of change and a **neutral effect** upon the landscape.

Topography

4.8.5 To accommodate the proposed development, there would be some changes to the levels within the Mills complex part of the site. It is proposed to create a podium to raise floor levels above the flood zone and to provide both understorey and ground floor car parking for the residents. These changes would not affect the proposed building heights.

4.8.6 The remainder of the application area would remain virtually level, consistent with its current appearance, except in the south east and south west of the site where bunding as part of flood protection measures is proposed. Although the bund height will be increased as a result of the development proposals, this would not have a substantial effect on the overall topography of the area. The overall magnitude of change on the application site topography would be **negligible**. This would lead to a **neutral effect**.

Watercourses

4.8.7 There are no water features on the site and as such there would be **no effect** overall.

Vegetation

Hedgerows

4.8.8 The existing boundary hedgerows would be retained where possible with the development in place.

4.8.9 In order to accommodate the residential development, the existing boundary hedgerows assessed as being of **Medium Sensitivity** as a landscape feature would be retained.

4.8.10 The development would provide the opportunity to provide infill planting and better management to these boundary hedgerows using indigenous species that reflect the typical mix found in the locality. In addition, hedgerow trees could also be introduced as a feature along the eastern boundary in particular.

4.8.11 The introduction of new planting would mature over time to bring about a **Substantial Beneficial** change to the area leading to positive residual effects upon the site and surrounding area.

Trees

4.8.12 The application site does not contain any trees of particular note except for the lines of conifers bordering the north western site boundary. This small section of the site falls within the Green Belt and as a result, there would be no change to these trees with the development in place.

4.8.13 New tree planting is proposed as part of the development both as an integral element within the public realm along streets and footways, and to improve the boundaries of the site. In particular this is proposed to enhance the western boundary with buffer planting to protect the adjacent Green belt, and the eastern boundary to protect the setting of the adjacent listed building, Broomhills Care Home.

4.8.14 The existing trees within the application site are assessed as being of **Medium Sensitivity**. As the trees along the north western boundary will be retained unharmed and with a buffer zone in place to the development, the magnitude of change brought about by the development would be **negligible** to the western boundary.

4.8.15 The overall Parameters Plan for the proposed development demonstrates consideration for the long term retention of all the tree planting and endeavours to ensure that the aesthetic and functional value of both the new and retained trees is maximised. The quality of any new tree planting will also be consistently high. Consequently, as a result of the development proposals, there would be an initial **Slight Beneficial effect** and this would improve over time as the new tree planting matures, bringing about positive residual benefits to the local area.

Summary

4.8.16 The application site would change from its current use as a majority Brownfield site of derelict Industrial Mill buildings to a new residential area. The development will not necessitate loss of the boundary hedgerows and trees bordering the site. There would be minor changes to the levels in the open landscape with the proposed flood protection measures in place, and slight changes to the topography of the Mills complex, however these changes would result in a **neutral effect** overall.

4.8.17 Overall the development proposals would result in an initial **Neutral effect** on the landscape resources of the application site. However, the proposed development has the potential to actually improve the landscape resources consistent with the character of the wider surrounding area. Therefore over time, the effect of the development and associated landscaping on the site would result in a **slight to moderate beneficial effect**, with positive residual effects on the site and surrounding area.

Conclusion

4.8.18 In overall terms, the study area and Application Site could accommodate development of this nature without significant detriment to the important landscape resources that are considered to be characteristic features of the study area; and which is already under the influence of urban and Industrial fringe activities. The new boundary landscaping for the proposed development would also seek to form part of the infrastructure for new development whilst improving the landscape framework of the site. Whilst the environmental context of these resources may change, the proposals would result in a net gain of resources across the study area. The proposals would accord with regional and local planning policy to safeguard and enhance those environmental assets which contribute to the local biodiversity and character of the area.

4.9 Assessment of Visual Effects

4.9.1 This assessment examines the visual implications of the proposed development. An assessment was made of public rights of way, public highways and built form, and this is shown in Figures 4.7, 4.8 and 4.9 respectively. The scheme has been analysed for both the construction phase and for the operational phase, assuming that the structural planting would have been implemented during the first planting season following completion of the scheme. There is no year 15 assessment as it is considered that there will be no material change in the views.

4.9.2 The visual assessment was made during early March 2010 when the majority of leaf cover had fallen from deciduous vegetation and therefore maximum visibility can be assessed. Summer views with full leaf cover have also been considered despite the lack of vegetation in the local area.

4.9.3 The proposed building heights were taken into account when undertaking the visual assessment to determine the degree to which the proposals would have an effect upon the visual amenity associated with the surrounding townscape and countryside in relation to the application site. The assessment also assumes that all phases of the development are completed.

4.9.4 The visual assessment considers the effect of the proposals upon a range of visual receptors including users of public highways, public rights of way and public spaces, and residential properties with particular attention given to those residential areas in closest proximity to the application site. Commercial properties have also been considered.

4.9.5 A series of 25 view points were identified that were representative of receptors within the study area that would experience a visual effect as a result of the development proposals (Figures 4.1 and 4.2). The following provides summarised descriptions of visual effects from those specific viewpoints.

Visual Impact Assessment

4.9.6 Two separate aspects of the site have been assessed in the Visual Assessment. The first being the Mills complex which is currently brownfield, disused Mill buildings which are proposed to be demolished and replaced with residential units. The second part of the application site is the area proposed for flood defence improvements which will involve the construction of bunds. Any impacts that may arise from the built form have been evaluated independently from any impacts which may arise from the bunds in the text below.

4.9.7 It should be noted that during the construction phase of the development, the effects on the visual amenity will be temporary in nature, and will be mitigated in part by the use of site hoarding to screen much of the construction plant from view. Any adverse effects during this phase will be lessened once the development is complete and the construction equipment removed from the site.

Long Range Views (over 1.5 kilometres) - Construction Phase

4.9.8 As identified in the baseline visual study, there are restricted long range views of the site due to the flat topography and intervening built form and patchy vegetation. However, due to the height and mass of the existing Mill buildings, they are a distinctive feature within the landscape.

Roach Valley Way between 'Waldens' and Great Stambridge Hall, looking west (photoview 20)

4.9.9 This view is the first point along this public footpath that the existing Mills can be glimpsed. The southern most corner of the existing Mill building is glimpsed in the gap between the farm buildings associated with Great Stambridge Hall, with the remainder of the built form hidden from view. During the construction phase, tall machinery may be visible above the intervening built form so that there would be a **slight** temporary change to the view, resulting in a temporary **slight adverse effect**. It would not be possible to see the construction works associated with the proposed flood defence improvements from this vantage point due to the intervening vegetation and built form, and the angle of the view. As a result there would be **no change** to the view, and a **neutral effect** upon the visual amenity during the construction of the bunds.

Bridleway linking Mucking Hall with Butlers Farm, looking north west (photoview 23)

4.9.10 This view is representative of the clearest long range view of the site from the area to the south east of the study area. The Mill buildings are clearly visible on the skyline. During the construction phase, the existing buildings are proposed to be removed, which will reduce the overall massing of the built form within the Mills complex. There would be construction equipment visible on the horizon during the development of the residential buildings relating to both the Mills complex and the proposed flood defences within the wider application area, causing receptors using this bridleway to experience a temporary slight change to the view, with the noise and activity on the site causing a **slight adverse effect** on the visual amenity of the bridleway.

Little Stambridge Hall Road, looking south (photoview 24)

4.9.11 The Mills are seen in the middle distance against the backdrop of the surrounding development – Purdeys Industrial Estate to the south and the existing residential development along Stambridge Road and Coombes Grove to the north and west of the site. During the demolition and construction on the site, there will be a **significant** change to the view, with construction equipment on the Mills complex being clearly visible, resulting in a **moderate/substantial adverse effect** upon receptors using this highway. The nature of the effect will be temporary however, and related solely to tall construction equipment as the proposed site hoarding will mitigate the effects of the on-ground plant.

Public footpath at the Church of St Andrew, Ashingdon, looking south (photoview 25)

4.9.12 Due to the long range of this viewpoint (3.8km from the application site), the site is indistinguishable from the surrounding backdrop of residential, commercial and industrial development. During the construction phase and on a clear day, tall machinery may be glimpsed at a distance, resulting in a **negligible** change to the view, and a **neutral effect** of a temporary nature.

Medium Range Views (500 metres to 1.5kilometres) – Construction Phase

Little Stambridge Hall Lane, adjacent to Coombes Grove (Photoview 6)

4.9.13 The site is largely hidden from view due to the intervening residential development along the Stambridge Road, however there is a partial view of the Mill buildings. During the construction phase of the development on the Mills complex, tall machinery may be visible although filtered by the intervening built form, resulting in a **slight** change to the view, and a **slight adverse effect**. There would be **no change** to the view during the construction of the flood defence improvements as the intervening vegetation and built form would screen views of the proposals.

Public Footpath linking Little Stambridge Hall Lane with Great Stambridge, looking south (Photoview 7)

4.9.14 The application site is located in the middle distance seen in context with the adjacent residential development along the Stambridge Road and Mill Lane, and with the Purdeys Industrial Estate seen behind. During demolition and construction on the Mills complex, tall machinery would be visible above the tree line associated with the Stambridge Road so that there would be a **Slight** change to the view, resulting in a temporary **Slight Adverse effect**. There would be **no change** to the view during the construction of the flood defence improvements as the intervening vegetation and built form would screen views of the proposals.

Public Footpath linking Little Stambridge Hall Lane with Great Stambridge, looking south (Photoview 8)

4.9.15 From this vantage point, the existing buildings on the site are largely hidden from view by the vegetation associated with 'Winters' Farm. It would be possible to glimpse taller construction equipment on the Mills complex during the construction phase, leading to a **slight** change to the view, resulting in a temporary **slight adverse effect**. There would be **no change** to the view during the construction of the flood defence improvements as the intervening vegetation and built form would screen views of the proposals.

From Stambridge Road looking south west (photoview 14)

4.9.16 This view is representative of those of vehicular users of the Stambridge Road when heading in a westerly direction towards Rochford. The application site is partially screened by vegetation associated with the Broomhills Care Home and the adjacent cricket ground, although the existing Mill buildings can be seen above the tree line. During the construction phase of the development on the Mills complex, there will be a **slight** change to the view with construction equipment clearly visible above and glimpsed through the trees. This would result in a temporary **slight adverse effect** upon receptors travelling westwards towards Rochford. It may be possible to glimpse plant associated with the construction of the flood defence improvements from this vantage point, leading to a **slight** change in the view and a **slight adverse effect** upon the visual amenity of highways receptors.

Junction of Stambridge Road and St Mary and All Saints Church, looking south west (photoview 15)

4.9.17 The Mill buildings are partially hidden from view by the built form to the south of the Stambridge Road, however it can be assumed that residential receptors of these properties would experience a more open view of the site from the rear of the property. Vehicular receptors would experience a glimpsed transitory view of the site, and during the construction phase this would lead to a **slight** temporary change in the view, causing a **slight adverse effect**. For residential receptors of these dwellings, during the demolition and construction phase tall machinery would be visible from the rear of the property leading to a **moderate** change in the view, and a **moderate/substantial effect** of a temporary nature. Site hoarding would help to mitigate the effects of construction.

Bridleway to the west of Purdeys Industrial Estate, looking north east (photoview 17)

4.9.18 The western elevation of the Mill can be glimpsed from this right of way, through the metal palisade security fence bordering the Purdeys Industrial Estate. The intervening elements of vehicles and buildings associated with the Estate, and the boundary fencing filter and restrict views to the site; however during the construction phase at the Mills complex it would be possible to glimpse tall machinery on the site, leading to a **slight** change to the view, and a **slight adverse effect** on receptors using the right of way. There would be **no change** to the view during the construction of the flood defence improvements as the intervening built form would screen views of the proposals.

Stambridge Road, looking south west (photoview 18)

4.9.19 Vehicular receptors heading in a southerly direction along the Stambridge Road from Great Stambridge experience middle distance views of the existing Mill buildings, partially obscured by intervening vegetation. During the construction phase on the Mills complex it will be possible to see the removal of the existing buildings which will bring about a **slight** change in the view, leading to a **slight beneficial effect** upon receptors. However, the presence of construction equipment will be clearly visible during the construction phase, causing a **slight** change to the view and leading to a **slight adverse effect** of a temporary nature. There would be no views of the proposed flood defence improvements during the construction period, and therefore **no effect** upon the landscape.

Roach Valley Way to the east of Great Stambridge Hall, looking west (photoview 19)

4.9.20 This view is representative of the open and flat nature of the landscape adjacent to the River Roach. Receptors using this right of way experience clear views to the Mill in the middle distance, seen in context with the development at Purdeys Industrial Estate to the south and buildings associated with Great Stambridge Hall to the east. During the demolition and construction phase of both the Mills complex and the flood defence improvements, tall machinery will be clearly visible, causing a **moderate** change to the view and resulting in a **moderate/substantial effect** upon receptors. The removal of the existing Mills buildings within the complex will lead to a positive change as the mass of the built form will be reduced within the site. This will lead to a **moderate** change to the view, and a **moderate/substantial beneficial effect** upon receptors using the footpath.

Lane adjacent to Sutton Bridge Farm, looking north (photoview 21)

4.9.21 The buildings associated with Purdeys Industrial Estate dominate views from this highway. The site is largely hidden from view by the built form and intervening vegetation, although it is possible to glimpse the upper limits of the existing Mill. During the demolition and construction phase, it will be possible to glimpse tall machinery on the Mills complex leading to a **slight** change in the view, resulting in a temporary **slight adverse effect**. There would be no views of the proposed flood defence improvements during the construction period, and therefore **no effect** upon the landscape.

Shopland Road adjacent to the electricity plant, looking north west (photoview 22)

4.9.22 This view is representative of those of vehicular users of the Shopland Road when heading in a westerly direction towards Rochford. The buildings of the application site can be clearly seen on the horizon and are an established feature of the local landscape. Electricity pylons dominate the view from this road. During the demolition and construction phase on the Mills complex, it will be possible to see tall machinery

operating which will lead to a **moderate** change in the view and a temporary **moderate adverse effect** upon vehicular receptors. The removal of the existing buildings from the site, would lead to a **significant** change in the view and result in a **substantial beneficial effect**. There would be no views of the proposed flood defence improvements during the construction period, and therefore **no effect** upon the landscape.

Close Range Views (less than 500 metres) – Construction Phase

Mill Lane, looking south (Photoview 1)

4.9.23 This view is representative of the direct view obtained from Mill Lane when heading in a southerly direction where the Mills complex occupies a large part of the foreground view. During the construction period, there would be a **substantial** change in the view and a temporary **Substantial adverse effect** with clear views of the works, plant and machinery given the close nature of the receptors. However, these effects would only be experienced on a temporary basis, during working hours and as such disruption to the residential receptors nearby should be mitigated There would be no views of the proposed flood defence improvements during the construction period, and therefore **no effect** upon the landscape.

Junction of Stambridge Road and Mill Lane, looking south (Photoview 2)

4.9.24 This view is representative of those of vehicular users of Mill Lane when heading in a southerly direction towards Broomhills Care Home and to Stambridge Mills. The application site is largely screened by the existing residential development along Mill Lane and the conifers to the north western boundary of the site itself. During the construction phase on the Mills complex, tall machinery and associated plant will be glimpsed in this framed view between built form and intervening vegetation. This would give rise to a **slight** magnitude of change and a temporary **slight adverse effect.** There would be no views of the proposed flood defence improvements during the construction period, and therefore **no effect** upon the landscape.

Roach Valley Way between Broomhills Care Home and Mill Lane, looking south (Photoview 3)

4.9.25 This view is representative of the view experienced by people using the footpath linking Mill Lane with the Broomhills Care Home and beyond along the Roach Valley Way. The existing Mills complex is clearly visible and dominates the view. There would be a **significant** magnitude of change leading to a temporary **substantial adverse effect** upon the visual amenity of this area during the construction phase due to the visibility of the tall machines and plant, which would however, be somewhat mitigated by site hoarding restricting views of the lower levels of the site. There would be no views of the proposed flood defence improvements during the construction period, and therefore **no effect** upon the landscape.

Footpath linking Rochford with Mill Lane, looking south (Photoview 4)

4.9.26 There is a glimpsed view of the Mill buildings from this right of way within the Green Belt. The vegetation associated with the north western boundary of the site is seen to the south of the line of properties along Mill Lane, with the existing Mills in the background. During construction on the site, it will be possible to obtain views of construction activities both within the Mills complex and the wider flood defence improvements area, which would lead to a **moderate** change to the view. There would be a temporary **moderate adverse effect** upon the visual amenity associated with this footpath within the Green Belt.

Stambridge Road at the edge of Rochford, looking south across the Green Belt (Photoview 5)

4.9.27 Vehicular receptors along this highway would experience an open view of the Mill buildings seen within the context of the surrounding residential development. During the construction phase of the development, the most noticeable change to the view will be the demolition of the building mass that currently exists. Receptors will also obtain clear views of the construction activities, vehicle movements and plant associated with the development within the Mills complex, and vehicles associated with earth movement activities related to the flood defence improvements, therefore the change in the view will be **substantial** for a period of time. The effect on the visual amenity of this view will be **significant adverse** during the construction phase, limited to a short and temporary duration.

Footpath linking Rochford with Mill Lane, within the Green Belt, looking east (photoview 9)

4.9.28 This view is representative of the view experienced by pedestrians using this footpath when heading in an easterly direction towards the Mill. The degree of change to the view during the construction phase will be **substantial**, as it involves the removal of the existing Mills buildings which will change the view substantially in the short term. This will lead to a **significant beneficial effect** upon the view during the construction phase of the development. However, during construction, tall machinery and plant equipment will be clearly seen on the site. This will cause a **substantial** change in the view, leading to a temporarily **significant adverse effect** on receptors using this right of way. It may be possible to glimpse plant associated with the construction of the flood defence improvements from this vantage point, leading to a **slight** change in the view and a **slight adverse effect** upon the visual amenity of the footpath.

Roach Valley Way adjacent to Purdeys Industrial Estate, looking north east (photoview 10)

4.9.29 Pedestrians using this right of way heading in an easterly direction to the north of the Purdeys Industrial Estate, obtain clear views to the western elevation of the Mill buildings. Machinery, construction traffic and movement will be visible on the Mills complex and in the area proposed for flood defence improvements, and for a temporary period, there will be a **moderate** change in the view, leading to a **significant moderate effect** upon the visual amenity of receptors along this right of way.

Roach Valley Way in the grounds of the Broomhills Care Home, looking west (photoview 11)

4.9.30 This view is representative of that gained by pedestrian receptors when travelling westwards along the Roach Valley Way towards Rochford. The site is clearly seen to the rear of the Broomhills Care Home (a Listed building) dominating the view. During the construction phase, it will be possible to see the demolition of the existing Mills buildings, and the movement of construction plant equipment on the Mills complex, leading to a **significant** change in the view. The effect on the visual amenity would therefore temporarily be **substantial adverse** during the construction period. From this vantage point it would be possible to see the removal of the buildings within the site. This would lead to a **significant** change in the view by reducing the mass of the built form on the Mills complex, resulting in a **substantial beneficial effect** on the visual amenity. Glimpses of plant associated with the construction of the flood defence improvements would be possible from this vantage point, leading to a **slight** change in the view and a temporary **slight adverse effect** upon the visual amenity of the footpath.

Roach Valley Way, looking west (photoview 12)

4.9.31 There is a direct view towards the site and associated buildings from this public right of way. The Broomhills Care Home is seen in the foreground of the Mill buildings, which are partially screened by this built form and the associated vegetation. During the construction phase it will be possible to see the demolition of the existing structures and construction equipment on the Mills complex, leading to a **substantial** change in the view, causing a **significant adverse effect** on the visual amenity for a period of time. Glimpses of plant associated with the construction of the flood defence improvements would also be possible from this vantage point, leading to a **slight** change in the view and a temporary **slight adverse effect** upon the visual amenity of the footpath.

Roach Valley Way, looking west (photoview 13)

4.9.32 This view shows the Mill buildings in context with the adjacent Purdeys Industrial Estate and the Broomhills Care Home, and illustrates the flat and open nature of the landscape, and the intermittent hedgerows. During construction on the Mills complex, pedestrians will obtain clear views of machinery and vehicles leading to a temporary **substantial** change in the view, and a **significant adverse effect** on the visual amenity of this right of way. Clear views of plant associated with the construction of the flood defence improvements would be available from this vantage point, leading to a temporary **substantial** change in the view and a temporary **significant adverse effect** upon the visual amenity of the footpath.

Public footpath within Purdeys Industrial Estate, looking north (photoview 16)

4.9.33 Receptors heading north along this public footpath are unable to gain views of the Mills due to the nature of the built form associated with the Industrial Units and the direction of the view. There will be **no**

change to the view during the construction phase on the site of the Mills complex or of the works associated with the construction of the flood defence improvements and as a result, there will be a **neutral effect** upon the visual amenity.

4.9.34 Overall, the effects on the visual amenity of the area will be adverse during the demolition process and with the construction equipment in place. However, given the temporary nature of the phase for construction on the site, and the mitigation measures such as intervening vegetation and built form, as well as site hoarding, the effects will be temporary in nature and experienced for a short period of time.

Distant Range Views (over 1.5 kilometres) - Operational Phase

Roach Valley Way between 'Waldens' and Great Stambridge Hall, looking west (photoview 20)

4.9.35 From this viewpoint, the proposals would be barely glimpsed and vernacular features would be indistinguishable in the gap between the agricultural buildings associated with Great Stambridge Hall. Likewise, the proposed boundary planting and flood defence improvements would not be visible from this distance. With the residential development in place on the site there would be a **negligible** change to the view, resulting in a **neutral effect** on the visual amenity and pedestrian receptors using the footpath.

Bridleway linking Mucking Hall with Butlers Farm, looking north west (photoview 23)

4.9.36 With the residential development constructed, the proposed buildings would still be visible on the skyline. However, the lower heights of the proposed units within the site would lead to a decrease in the massing of the built form on the site. From this distance, vernacular features, the flood defence improvements and proposed boundary vegetation would not be distinguishable but the decrease in scale and massing of the built form on the Mills complex would lead to a **significant** change in the view, causing a **slight/moderate beneficial effect** upon the visual amenity associated with this bridleway.

Little Stambridge Hall Road, looking south (photoview 24)

4.9.37 The proposed residential development would be seen in the middle distance against the backdrop of and in context with the surrounding development – Purdeys Industrial Estate to the south and the existing residential development along Stambridge Road and Coombes Grove to the north and west of the site. The reduction in building mass and scale would be clear from this viewpoint, as the mass of built form would be reduced and broken up with the development in place. There would be a **slight** change to the view, resulting in a **slight / moderate beneficial effect** upon receptors using this highway. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Public footpath at the Church of St Andrew, Ashingdon, looking south (photoview 25)

4.9.38 Due to the long range of this viewpoint (3.8km from the application site), the proposed residential development would be indistinguishable from the surrounding backdrop of residential, commercial and industrial development. There would be a **negligible** change to the view, and a **neutral effect** overall.

Middle Range Views (500 metres to 1.5 kilometres) – Operational Phase

Little Stambridge Hall Lane, adjacent to Coombes Grove (Photoview 6)

4.9.39 The site is largely hidden from view due to the intervening residential development along the Stambridge Road; however there would be a partial view of the proposals. The new residential development would be visible within the site, but would be seen in context with the intervening residential development. There would be a reduction in the heights and mass of the built form, resulting in a **slight** change to the view, and a **slight beneficial effect**. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Public Footpath linking Little Stambridge Hall Lane with Great Stambridge, looking south (Photoview 7)

4.9.40 The proposals would be seen in context with the adjacent residential development along the Stambridge Road and Mill Lane, and with the Purdeys Industrial Estate glimpsed behind. From this distance, it would be difficult to distinguish vernacular details of the proposed buildings, although the lessening of the mass and density of the built form and structures would be noticeable. There would be a **slight** change to the view, resulting in a **slight beneficial effect**. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Public Footpath linking Little Stambridge Hall Lane with Great Stambridge, looking south (Photoview 8)

4.9.41 Due to the intervening vegetation and the angle of the view, it would be difficult for receptors to distinguish the vernacular features of the proposed residential units or the flood defence improvements, leading to a **negligible** change to the view, resulting in a **neutral effect**.

From Stambridge Road looking south west (photoview 14)

4.9.42 This view is representative of those of vehicular users of the Stambridge Road when heading in a westerly direction towards Rochford. The development proposals would be partially screened by vegetation associated with the Broomhills Care Home and the adjacent cricket ground, although the upper storeys of the built form would be seen above the tree line. The reduction in massing and scale proposed with the development in place would cause a **slight** change to the view. This would result in a **slight beneficial effect** upon receptors travelling westwards towards Rochford. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Junction of Stambridge Road and St Mary and All Saints Church, looking south west (photoview 15)

4.9.43 The residential buildings would be partially hidden from view by the built form to the south of the Stambridge Road; however it can be assumed that residential receptors of these properties would experience a more open view of the site from the rear of the property. Vehicular receptors would experience a glimpsed transitory view of the Mills complex, which with the improved building materials and lower levels of built form in place would lead to a **slight** change in the view, causing a **slight beneficial effect**. For residential receptors of these dwellings, given the clearer views from the rear of the properties there would be a **moderate** change in the view, and a **moderate beneficial effect** to the visual amenity. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Bridleway to the west of Purdeys Industrial Estate, looking north east (photoview 17)

4.9.44 The view of the proposed built form from this bridleway is restricted by the intervening vehicles, storage compound and the security fencing. There would be little noticeable change to receptors using the right of way as the vernacular features of the proposals would not be easily distinguished, and the flood defence improvements would not be visible. There would be a **negligible** change to the view, and a **neutral effect** on receptors using the right of way.

Stambridge Road, looking south west (photoview 18)

4.9.45 Vehicular receptors heading in a southerly direction along the Stambridge Road from Great Stambridge would experience middle distance views of the proposals, partially obscured by intervening vegetation. The residential development would result in a reduction in the massing of the built form on the Mills complex which would cause a **slight** change in the view. As a result of the proposals, there would be a **slight beneficial effect** upon the visual amenity associated with this view. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Roach Valley Way to the east of Great Stambridge Hall, looking west (photoview 19)

4.9.46 This view is representative of the open and flat nature of the landscape adjacent to the River Roach. Receptors using this right of way would experience clear views of the proposals in the middle distance, seen in context with the development at Purdeys Industrial Estate to the south and buildings associated with

Great Stambridge Hall to the east. The removal of the existing built form would reduce the scale and massing of the structures on the site significantly. Together with the proposed residential development on the site, this would lead to a **moderate** change to the view, resulting in a **moderate beneficial effect** upon the visual receptors of this right of way. The bunds associated with the flood defence improvements would be visible from this footpath, however these would be seen in context with the existing bunding along the River Roach, causing a **negligible** change to the view, and resulting in a **neutral effect** upon the visual amenity of the footpath.

Lane adjacent to Sutton Bridge Farm, looking north (photoview 21)

4.9.47 The buildings associated with Purdeys Industrial Estate continue to dominate views from this highway. The proposed development would be largely hidden from view by the built form and intervening vegetation. This would lead to a **negligible** change in the view, resulting in a **neutral effect**. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Shopland Road adjacent to the electricity plant, looking north west (photoview 22)

4.9.48 This view is representative of those of vehicular users of the Shopland Road when heading in a westerly direction towards Rochford. Electricity pylons dominate the view from this road. With the development in place, the mass of the built form would be reduced, leading to a **significant** change in the view and resulting in a **substantial beneficial effect**. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Close Range Views (less than 500 metres) – Operational Phase

Mill Lane, looking south (Photoview 1)

4.9.49 This view is representative of the direct view obtained from Mill Lane when heading in a southerly direction where the proposals would occupy a large part of the foreground view. The proposed residential units would be seen in context with the existing residential development along Mill Lane to the north of the site. The reduction in scale and massing of the built form, and the more aesthetically pleasing vernacular features of the new development, would cause a **significant** change in the view. This would result in a **substantial beneficial effect** upon the visual amenity associated with this viewpoint, vehicular users of the highway and local residents. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Junction of Stambridge Road and Mill Lane, looking south (Photoview 2)

4.9.50 This view is representative of those of vehicular users of Mill Lane when heading in a southerly direction towards Broomhills Care Home and to Stambridge Mills. With the development in place, there would be a **negligible** change to the view given the intervening nature of the existing built form and associated vegetation. This would result in a **neutral effect** upon the visual amenity. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Roach Valley Way between Broomhills Care Home and Mill Lane, looking south (Photoview 3)

4.9.51 From this footpath, the proposals would be clearly visible and the residential development would dominate the view. With the decreased massing of the built form on the Mills complex, along with the improved materials used for the development and the proposed planting to the Mills complex boundaries, there would be a **significant** magnitude of change leading to a **substantial beneficial effect** upon the visual amenity of this area. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Footpath linking Rochford with Mill Lane, looking south (Photoview 4)

4.9.52 From this viewpoint, the proposals would be seen in context with the existing development along Mill Lane, viewed in the foreground. The use of vernacular materials and the removal of the flat grey elements on the site would bring about an improvement to the view. There would be a **moderate** change to the view, leading to a **moderate beneficial effect** upon the view for receptors along this public right of way with the development in place. A glimpsed view of the flood defence improvements to the west of the Mills complex would be available from this location, seen in context with the background vegetation and existing bunding to the northern and southern banks of the River Roach. There would be a **negligible** change to the view resulting in a **neutral effect** on receptors.

Stambridge Road at the edge of Rochford, looking south across the Green Belt (Photoview 5)

4.9.53 Vehicular receptors along this highway would experience an open view of the proposed residential development which would be seen within the context of the surrounding existing residential development at Mill Lane and Stambridge Road. The proposals would decrease the massing of the built form on the Mills complex, which would bring about a positive **moderate** change to the view. Receptors would experience a **moderate beneficial effect** with the proposed development in place. Distant views of the flood defence improvements would be available however these bunds would be seen in context with and as part of the surrounding landscape, leading to a **neutral effect** upon receptors.

Footpath linking Rochford with Mill Lane, within the Green Belt, looking east (photoview 9)

4.9.54 This view is representative of the view experienced by pedestrians using this footpath when heading in an easterly direction towards the Mill. The reduction in built form and massing will be clearly visible with the proposals in place leading to an improvement in the view. The use of less industrial materials in the residential development would lead to a **substantial** change to the view, resulting in a **significant beneficial effect** on receptors using this right of way. There would be slight and filtered views of the flood defences from this viewpoint, causing a **negligible** change to the view and therefore **no effect** upon the landscape.

Roach Valley Way adjacent to Purdeys Industrial Estate, looking north east (photoview 10)

4.9.55 Pedestrians using this right of way heading in an easterly direction to the north of the Purdeys Industrial Estate would obtain clear views to the western elevation of the development proposals. The increased boundary planting, the use of vernacular building materials and the decrease in scale and massing on the Mills complex would lead to a **moderate** change in the view. There would be a **moderate beneficial effect** upon the visual amenity of receptors along this right of way with the proposals in place. The flood defence improvements would be clearly visible from this footpath being located to the northern banks of the River Roach. However, they would be seen in context with the existing raised ground forms along the River, and would cause a **negligible** change to the view. This would result in a **neutral effect** upon the landscape.

Roach Valley Way in the grounds of the Broomhills Care Home, looking west (photoview 11)

4.9.56 The proposed residential development would be clearly seen to the rear of the Broomhills Care Home (a listed building). With the proposals in place, there would be a **significant** change to the view through the removal of the unsightly Mills buildings and the resulting decrease in scale and massing of the built form within the Mills complex. Good design and the use of residential building materials would improve the visual amenity associated with this right of way and that of the listed building, the Broomhills Care Home, resulting in a **significant beneficial effect**. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Roach Valley Way, looking west (photoview 12)

4.9.57 Direct view towards the site and associated buildings from this public right of way. The Broomhills Care Home is seen in the foreground of the proposals, which would remain partially screened by this built form and the associated vegetation. With the redevelopment complete, there would be a positive **moderate** effect upon the view of receptors along this public footpath. The decreased height and mass of the

proposals would lead to a **moderate beneficial effect** upon the visual amenity. There would be no views of the flood defence improvements from this viewpoint, and therefore **no effect** upon the landscape.

Roach Valley Way, looking west (photoview 13)

4.9.58 This view shows the proposed redeveloped Mill buildings in context with the adjacent Purdeys Industrial Estate and the Broomhills Care Home, and illustrates the flat and open nature of the landscape, and the intermittent hedgerows. With the proposals in place, there would be a **significant** change in the view due to the reduction in the built form on the Mills complex. The use of characteristic buildings materials and the removal of the industrial elements on the site would result in a **moderate beneficial effect** upon receptors using this footpath. From this viewpoint, the flood defence improvements to the east of the site would be clearly visible. These would be seen in context with the existing bunds along the northern bank of the River Roach and there would therefore be a **negligible** change to the view, resulting in a **neutral effect** overall.

Public footpath within Purdeys Industrial Estate, looking north (photoview 16)

4.9.59 With the proposals in place there will be **no change** to the view from this footpath. The intervening built form screens the site from view, resulting in a **neutral effect** upon the visual amenity.

Night Time Visual Assessment

4.9.60 At present, the Mills complex does have some existing light sources. There is 24 hour security in operation on the site with light emitting from the security office near the site entrance, and general lighting around the site for observation purposes. There is also an aviation light located on the top of the silos, which would be removed with the residential scheme in place.

4.9.61 The development proposals for the Mills complex would use modern energy efficient lighting and cut off measures, consistent with the need to provide the necessary safety levels within streets and publicly accessible areas. This will help ensure minimal upward or sideward light spillage and light pollution throughout the site and the wider surrounding landscape.

4.9.62 Given the relatively high ambient light levels in the local area from street lighting and the glow from existing residential properties and adjoining businesses, there would be little change in the view with the proposals in place. This **negligible** change to the view would result in a **neutral effect** overall.

Summary

4.9.63 A total of 25 representative viewpoints were identified within the study area, the majority of which fall within a range of 1.5km from the site. Longer distance receptor views from the surrounding area are generally restricted by a combination of the flat nature of the topography and lack of elevated viewpoints. In overall terms, the middle range viewpoints including public rights of way and residential properties would experience a temporary **slight/moderate adverse effect** on their view as a result of the construction phase, leading to a permanent **moderate/substantial beneficial effect** on the view with the development proposals in place.

4.9.64 During the demolition and construction phase, the majority of receptors close to the site would experience temporary **moderate to substantial adverse effects** due to the construction equipment and disruption.

4.9.65 With the development in place, these effects would be removed, with the majority of close range views experiencing permanent **slight to substantial beneficial effects**.

4.9.66 In overall terms, the development would result in a **moderate to substantial beneficial effect** on the visual amenity of the site and surrounding area through the reduction in building mass and scale within the site, and the use of better building materials which would be more in keeping with the residential context of the surroundings.

4.9.67 There would be an enhancement to the setting of the adjacent listed building, Broomhills Care Home with the development in place.

4.9.68 Growth of new planting implemented as part of the development will help to filter and frame the new development especially from those close range views from the Roach Valley Way public path and highways such as Mill Lane and Stambridge Road.

4.9.69 There would be no change to the views with the flood defence improvements in place as these would be seen in the context of being built upon the existing bunds running along the banks of the River Roach, leading to a **neutral effect** overall.

Conclusion

4.9.70 The flat nature of the landscape in the area surrounding Rochford and the Mills means there were relatively few long distance receptor points from where views of the proposals are identified. The assessment concludes that the development proposals would have negligible effects on the wider distant landscape setting in the area surrounding Rochford.

4.9.71 The majority of views were found to be from public footpaths, highways and residential development in the vicinity of the site along Mill Lane, Stambridge Road and Shopland Road. There would be no adverse visual effects resulting from the development as there would be a reduction in building mass and scale within the site, and an improvement to the aesthetics of the development through the use of vernacular building materials. It should be noted that whilst there would be a change to the views perceived by many of these receptors, this would be beneficial in nature, and the design of the development would fit well into the urban fringe context and would improve upon the current site situation.

4.9.72 In summary, the proposals present an opportunity to visually improve the appearance of this part of Rochford which would enhance the local character without detriment to the landscape beyond. The majority of receptors would initially experience a change to their view as a result of the construction of the development, which, once the proposals were in place, would be mitigated by the effect of good building materials and additional planting helping to integrate the scheme into the receiving landscape and affording partial filtering and softening of some of the built elements.

4.10 Cumulative Effects

4.10.1 An assessment of the proposed development cumulatively with those schemes identified in Chapter 1 has been undertaken. It is considered that there are unlikely to be any significant cumulative effects from a landscape and visual perspective due to the separation distances between the schemes which have been considered.

4.11 Mitigation

Construction Phase

4.11.1 Construction equipment is capable of contributing to the short term visual impact of activities associated with the proposed development for receptors. Appropriate positioning of materials storage areas that consider likely views towards these yards would aid in the reduction of visual impacts for receptors throughout the construction phase.

4.11.2 Likewise, on-site accommodation and working areas could adversely affect views from around the study area during the construction phase. Receptor sensitivity would be considered with regard to the siting of these areas.

4.11.3 Elements that have been identified as being retained will be appropriately protected throughout the construction phase to ensure their long term viability.

4.11.4 The implementation of good site management and maintenance would ensure that temporary deterioration to landscape resources, character and visual amenity would be kept to a practical minimum.

4.11.5 Mitigation measures have been established following the assessment of landscape and visual effects resulting from the development of the study area and would take the form of additional tree and hedgerow planting bordering and within the site, as well as good design and placement of the residential units within the site. Mitigation measures seek to address landscape and visual issues within the design of the development, so that they positively form an integral and beneficial part of the overall scheme.

Operational Phase

Landscape Character Effects

4.11.6 Mitigation of landscape character effects would aim to preserve landscape features which are typical characteristics of the local area. As a further measure these features would be restored or enhanced as appropriate, to ensure their long term contribution to the character of the area. Planting proposals would include the implementation of indigenous vegetation, where appropriate, in a form which would replicate patterns found within the study area and the wider area. This would help to minimise the effects of the development.

4.11.7 The development proposals would change the character of the Mills complex from a derelict Industrial area to a residential development, and would not extend the existing pattern of built form. It would result in a decrease in the massing of the buildings within the site. The area of site within the Metropolitan Green Belt (the north western corner) would remain open to ensure the aims of the Green Belt policy were maintained and respected.

4.11.8 The trees along the western boundary of the site would be maintained and managed to ensure their longevity and further planting would be proposed to ensure there was a buffer between the Green Belt and the development. The proposals would allow for further native planting to the northern and eastern boundaries which would provide a landscape framework and help integrate the development into the surrounding area.

4.11.9 The bunding proposed as part of the developments flood defences (Figure 1.3a of the ES) would be in keeping with the existing character of the mud flats and salt marshes as there are already several raised areas in the vicinity of the site.

Landscape Effects

4.11.10 Landscape mitigation of effects focuses on the protection of important landscape features within the site, and their enhancement and management through the development scheme.

4.11.11 There are no features within the site worthy of retention and therefore the development provides the opportunity to improve and enhance landscape elements within the site.

4.11.12 There would be little loss to the boundary vegetation of the site as it is proposed to retain and enhance all boundary vegetation where possible. New planting would seek to use native and indigenous species that are commonly found within the surrounding area to form a robust landscape framework for the development.

Visual Effects

4.11.13 The redevelopment of the Mills as a whole would reduce the scale and massing of the built form through the removal of the silos, and the breaking up of the rest of the Mill buildings. There would be an enhancement and improvement of the site due to the use of quality materials and good design which is considered to be a form of mitigation.

4.11.14 There are overall beneficial visual effects of the proposals and the design of the development has also focused on integration or enhancement of the development from close and middle range views. It is neither necessary nor desirable to try and screen the whole development using planting, as the measures

needed for this would not be characteristic of the local urban area or the wider landscape, and the building heights would not make this possible. However, it is proposed to use additional planting to soften the development and allow any views to be seen in context with the surrounding and adjacent residential built form.

4.11.15 Where possible the use of modern energy efficient lighting and cut off measures, consistent with the need to provide the necessary safety levels within streets and publically accessible areas, will help ensure minimal upward or sideward light spillage and light pollution.

4.12 Landscape Design Strategy

4.12.1 Strategic landscape planting proposals have been incorporated into the scheme to address landscape and visual issues associated with the development. The planting proposals have included the implementation of native vegetation congruent in character and type with vegetation in the locality. The strategic planting proposal has a two-fold approach in that it bolsters the local landscape character of the surrounding area and also visually integrates the development into its surroundings to create an attractive environment.

4.12.2 The proposed features would be based upon a structural landscape framework. In brief this strategy allows for:

- The enhancement of planting along all site boundaries, with a buffer zone created both to the west by the Green Belt and the east to enhance the setting of the listed building, Broomhills Care Home.

- Use of tree and shrub planting within the development to provide some conservation value, and amenity features within the site.

4.13 Residual Effects

4.13.1 The implementation of good site management and maintenance would ensure that the temporary deterioration of the landscape resources and character would be kept to a minimum and would be perceived only at a local scale. Residual localised adverse effects resulting from the construction phase would be balanced by the proposed mitigation and enhancement measures.

4.13.2 Residual effects of the proposed development would relate mainly to the change in land use from a disused Industrial brownfield site to a residential area.

4.14 Summary

Method of Assessment

4.14.1 A comprehensive landscape and visual assessment has been conducted to establish how the visual amenity of the settlement and the surrounding landscape of Rochford would be affected by the development proposals. The assessment considers how the landscape infrastructure of the study area would be altered in terms of character and appearance.

Existing Situation

4.14.2 The study area has an open and expansive landscape to the north and east beyond the application area, with settlement to the west at Rochford, and industrial development to the south beyond the River Roach. The site currently comprises a disused brownfield site, formerly used as a Mill, and sections of farmland accommodating existing flood defences.

4.14.3 The majority of views within the study area are limited to close and medium range view points from within 500 metres to 1.5 kilometres of the site, with few longer distance views available due to the flat topography and lack of elevated viewpoints.

Potential Effects of Proposed Development

4.14.4 Visually, the proposals to develop the site for residential use would relate well to the existing settlement pattern, and would provide an enhancement of the site through the reduction of the built form's scale and massing within the site, and the use of vernacular building materials to improve the aesthetics of the structures at the site. The north-western portion of the site which falls within the Green Belt would be retained and related planting would be enhanced between the surrounding Green Belt and the new development.

4.14.5 The use of good design and high quality materials would bring about a positive enhancement of the site and the local area, with the addition of landscape features such as tree and hedgerow planting, which would lead to a beneficial effect upon the character of the site and surrounding area.

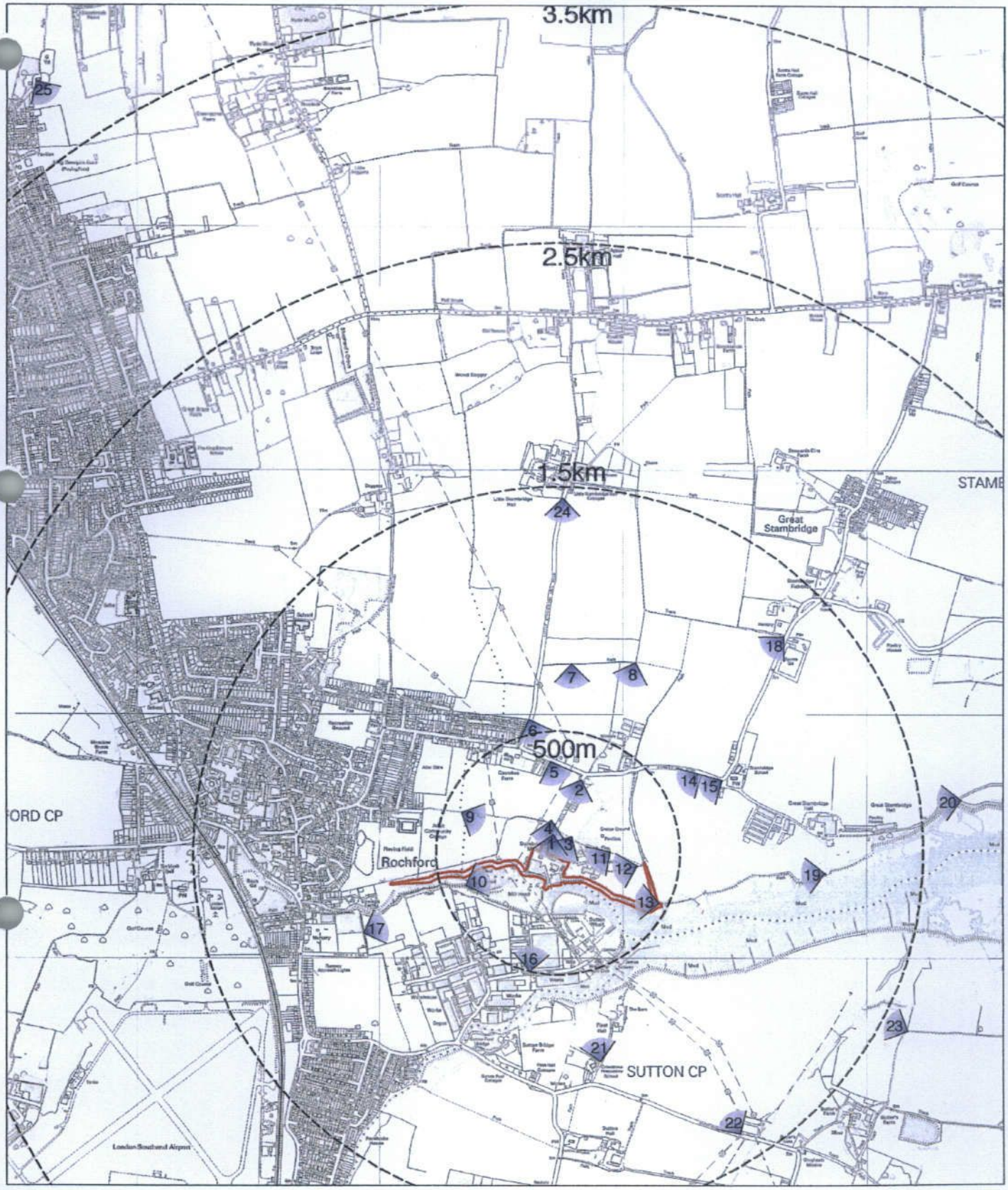
Mitigation Measures

4.14.6 The proposals do not aim to totally screen the development from view by dense planting, as this would be at variance with the local character of the landscape. The design strategy looks to improve the appearance of the area with partial filtering and softening of the development edge, thereby providing an attractive setting for those who currently reside in the area, and improving the existing views of the derelict industrial site.

4.14.7 It is considered that the good design and use of high quality building materials would form an enhancement and improvement at the site from the existing situation.

Conclusion

4.14.8 The assessment on character, landscape features and visual amenity of the site and surrounding area concludes that the site is well situated to accommodate the proposed development without detriment to the local area and with beneficial effects on the views of the site compared to the existing scenario.



KEY

- Application Site Boundary
- 24 Photoview Location
- Distance (radius)

4.1 FIGURE

Photoview Location Plan TITLE

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L0105_21-1 DWG. NO.

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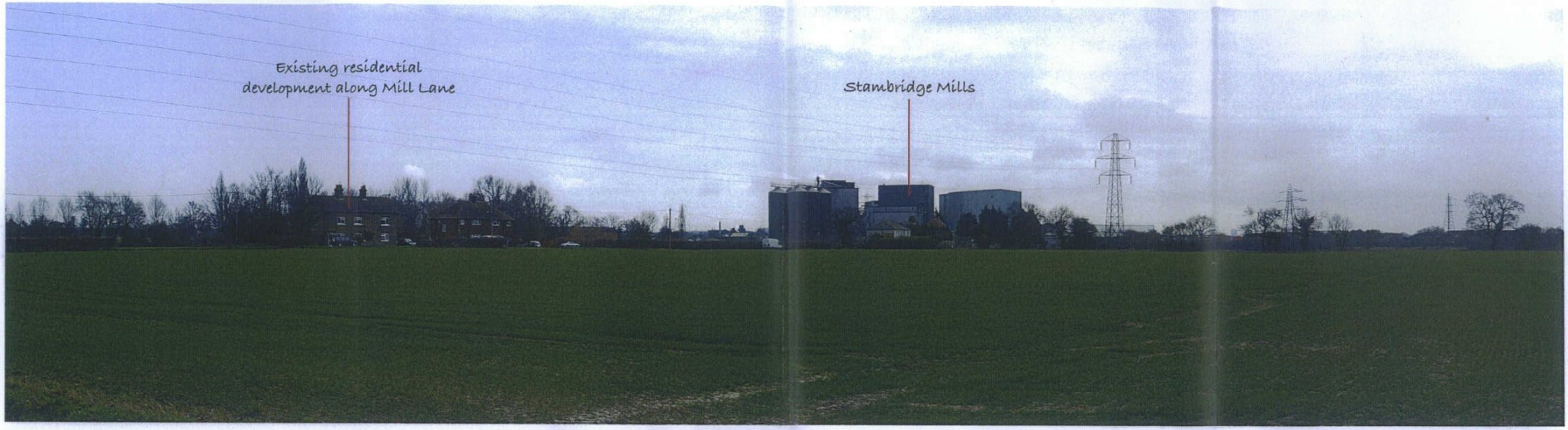
Photoview 1

Photoview 2

Photoview 3

Photoview 4



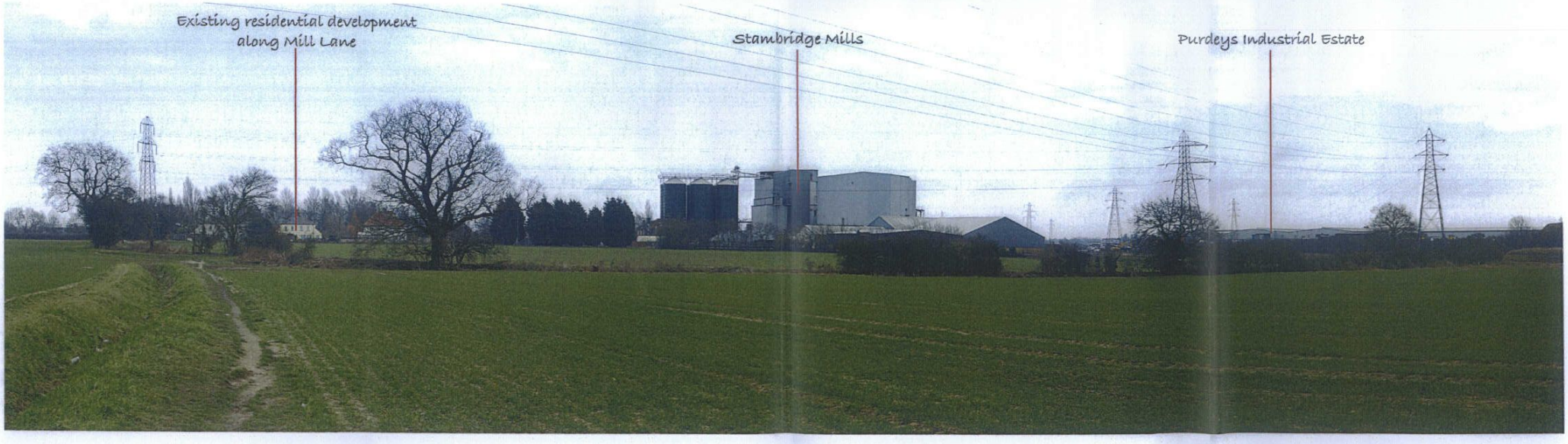
Photoview 5A

Photoview 5B

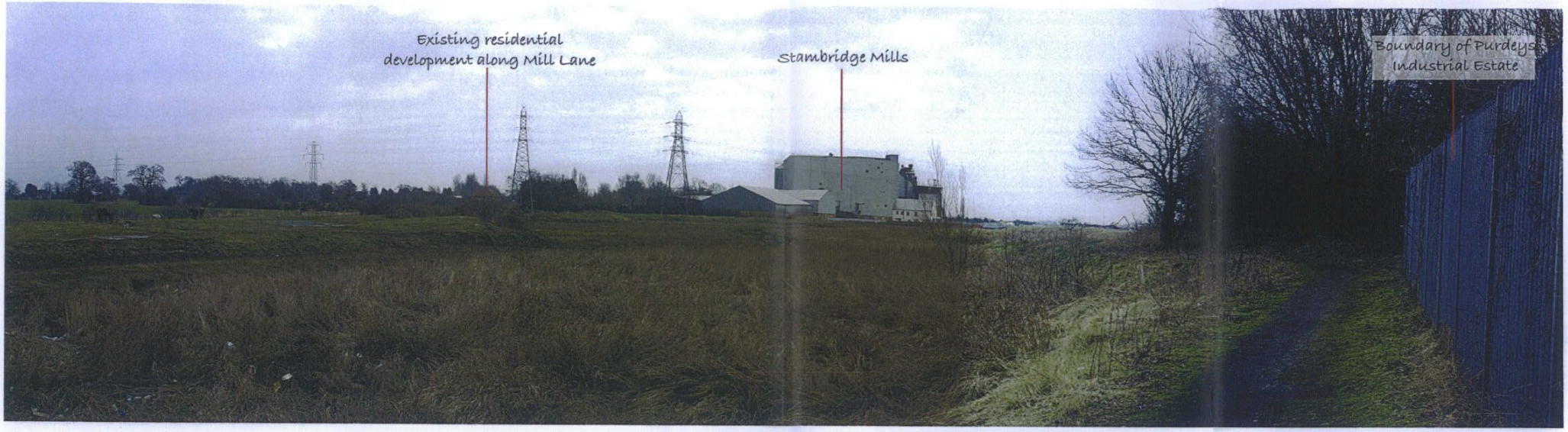
Photoview 6

Photoview 7

Photoview 8



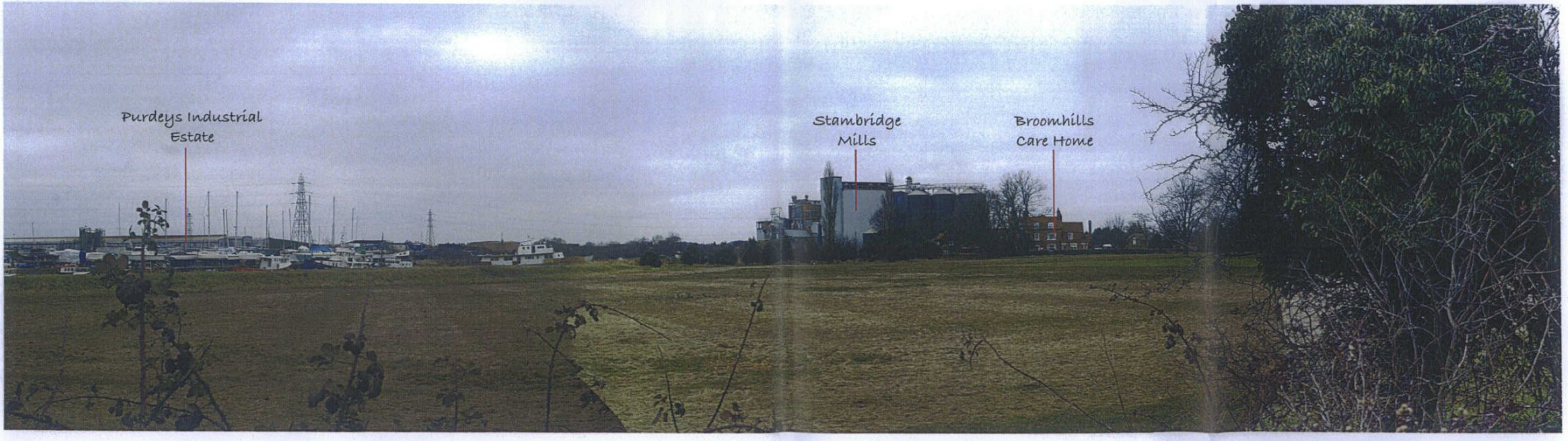
Photoview 9



Photoview 10

Photoview 11

Photoview 12



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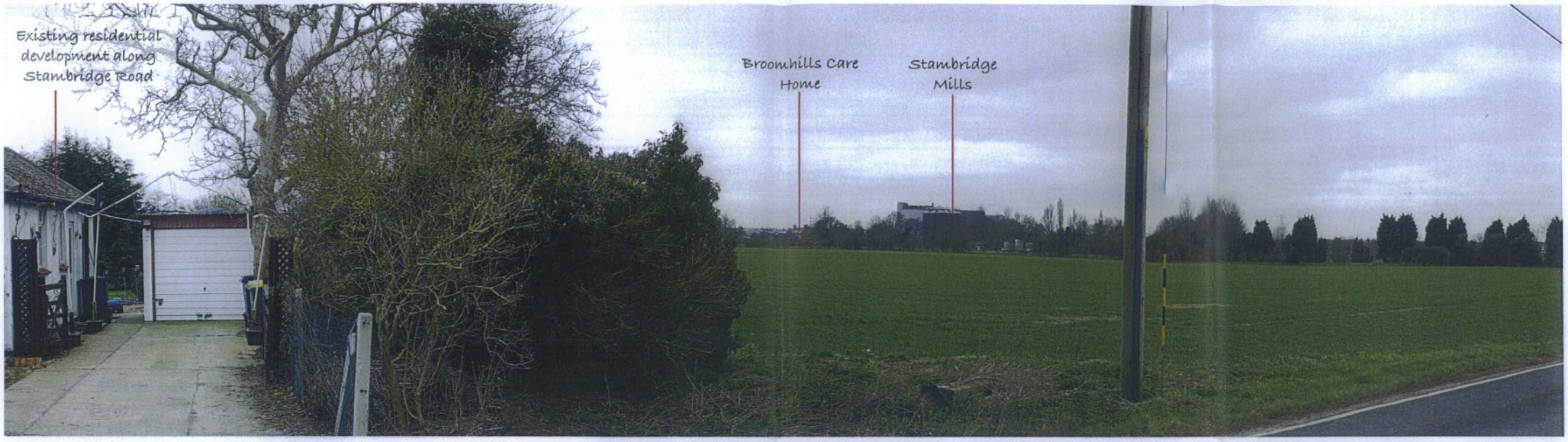
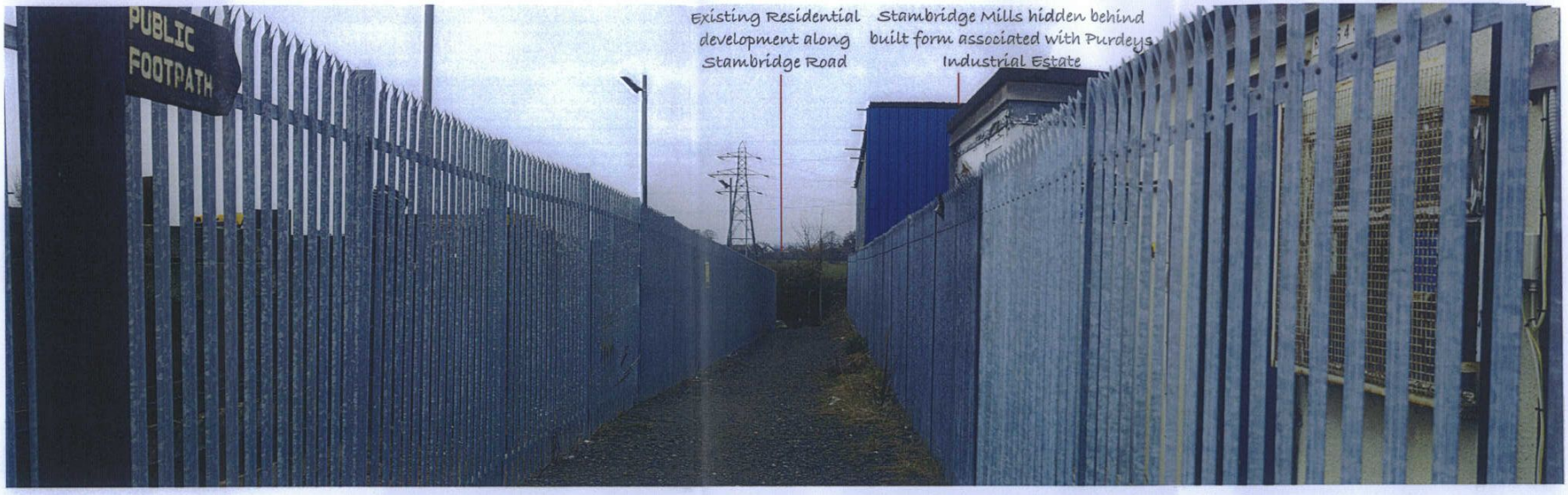


Photoview 14

Photoview 15

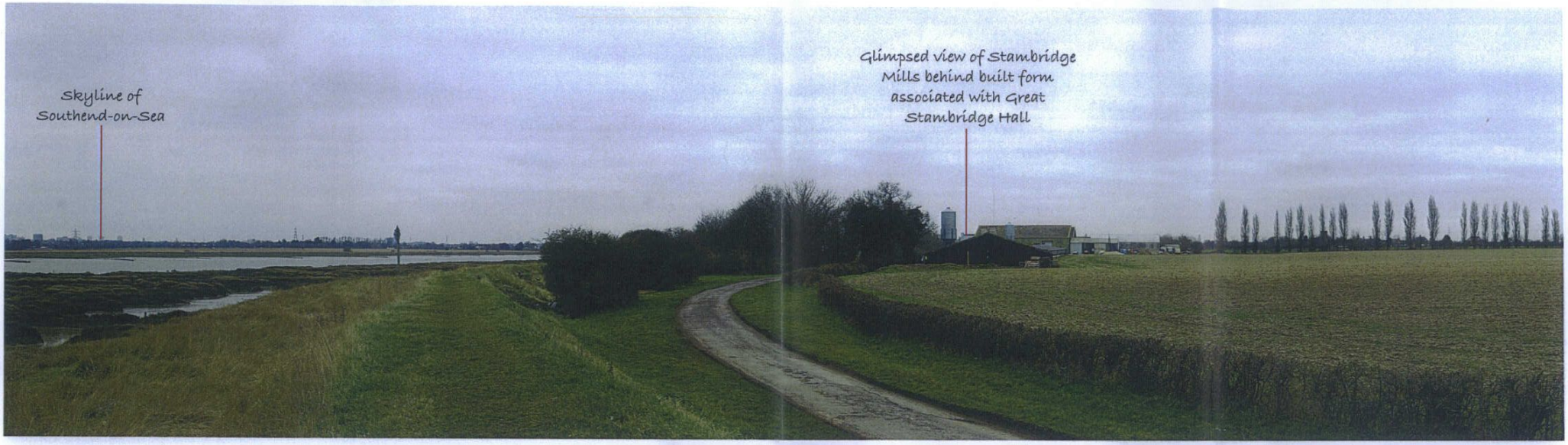


Photoview 16

Photoview 17

Photoview 18

Photoview 19



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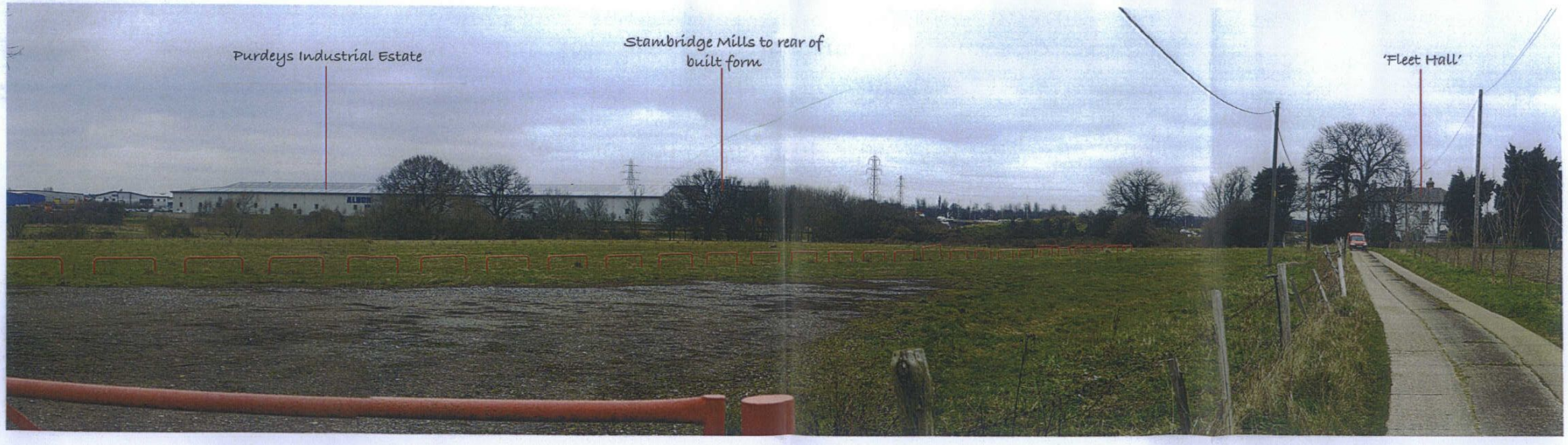

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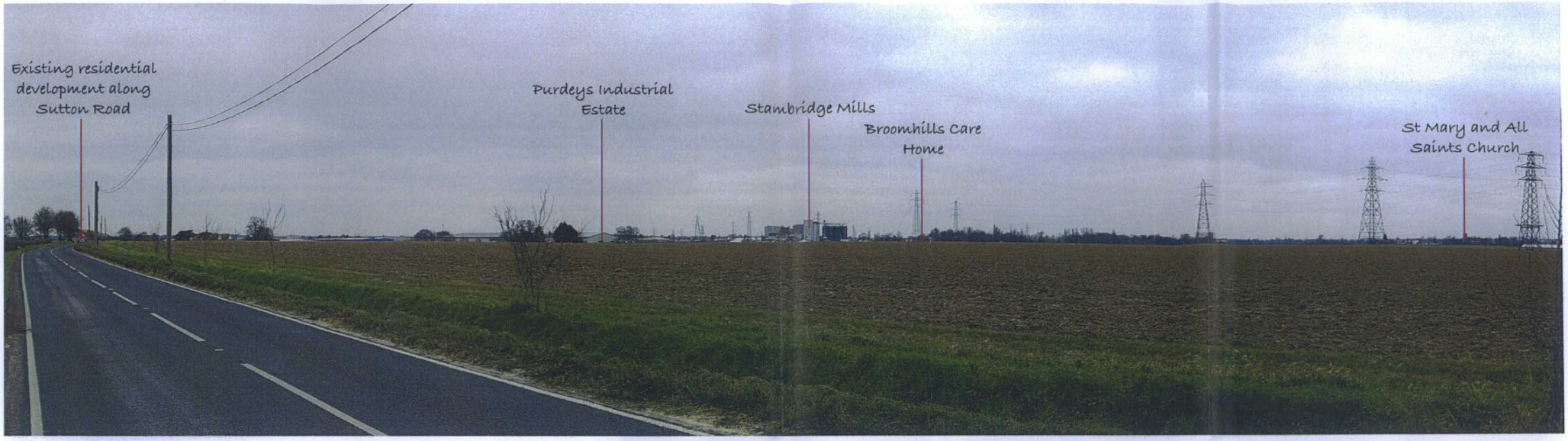

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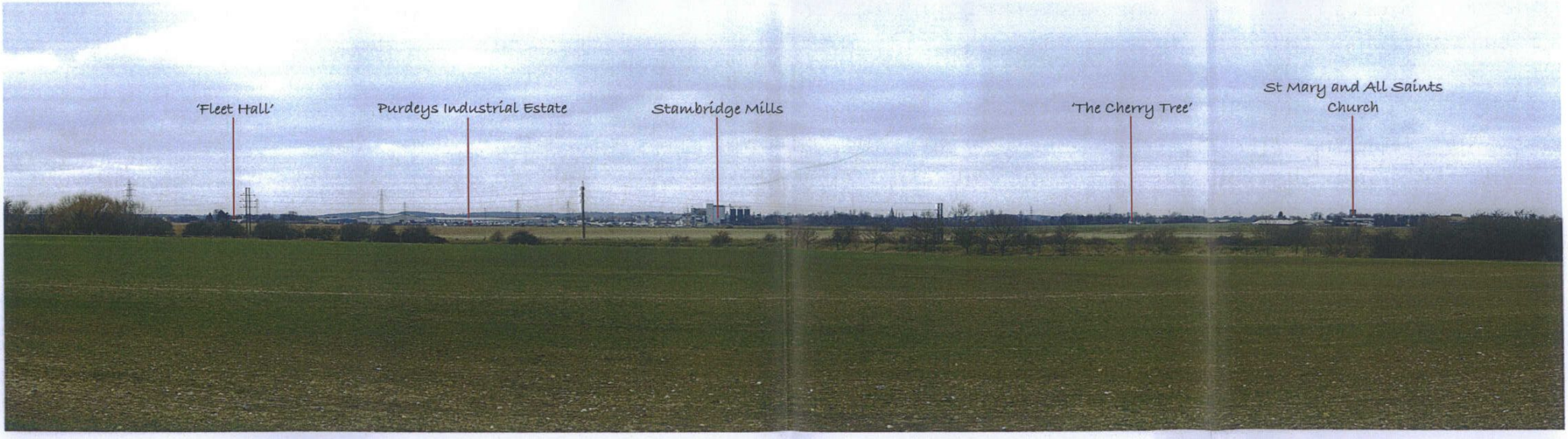
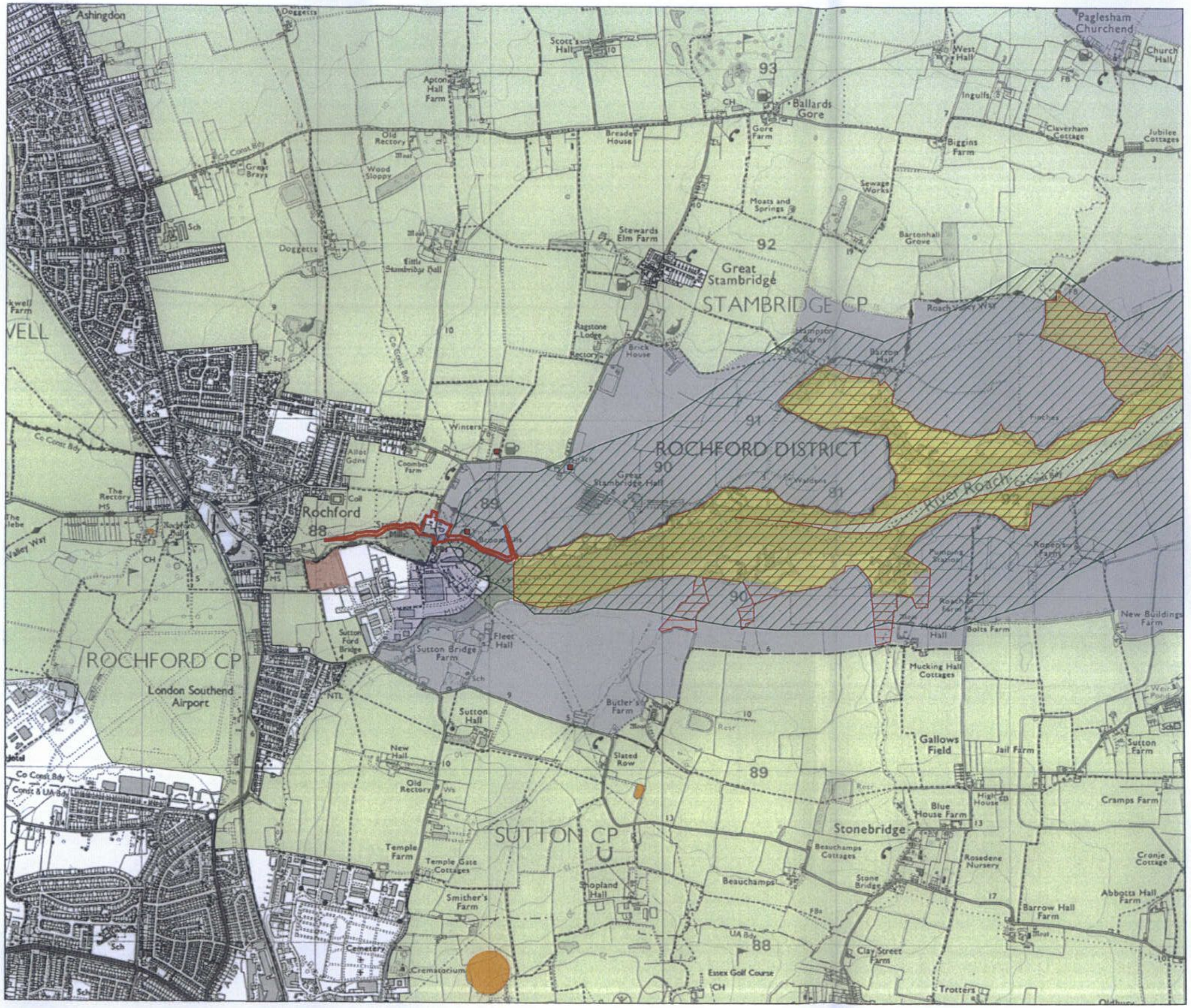


Photoview 23

Photoview 24

Photoview 25



KEY

- Application Site Boundary
- Metropolitan Green Belt
- Sites of Special Scientific Interest [SSSI]
- Special Landscape Area [Policy NR1]
- Area of Special Restraint [Policy TP11]
- Site of National and International Nature Conservation Importance [Policy NR5 & NR6]
- Environmentally Sensitive Areas
- Scheduled Ancient Monuments [SAM]
- Listed Buildings

4.3	FIGURE
Environmental Designations Plan	TITLE
1:25,000@A3	SCALE
I.0105_14-1	DWG. NO.

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KEY

- Application Site Boundary
- Agriculture
- Urban/Residential
- Allotments
- Airfield
- Education
- Sports/Recreation
- Industrial

4.4 FIGURE

Local Landscape Character Plan TITLE

1:20,000@A3 SCALE

L0105_20-1 DWG. NO.

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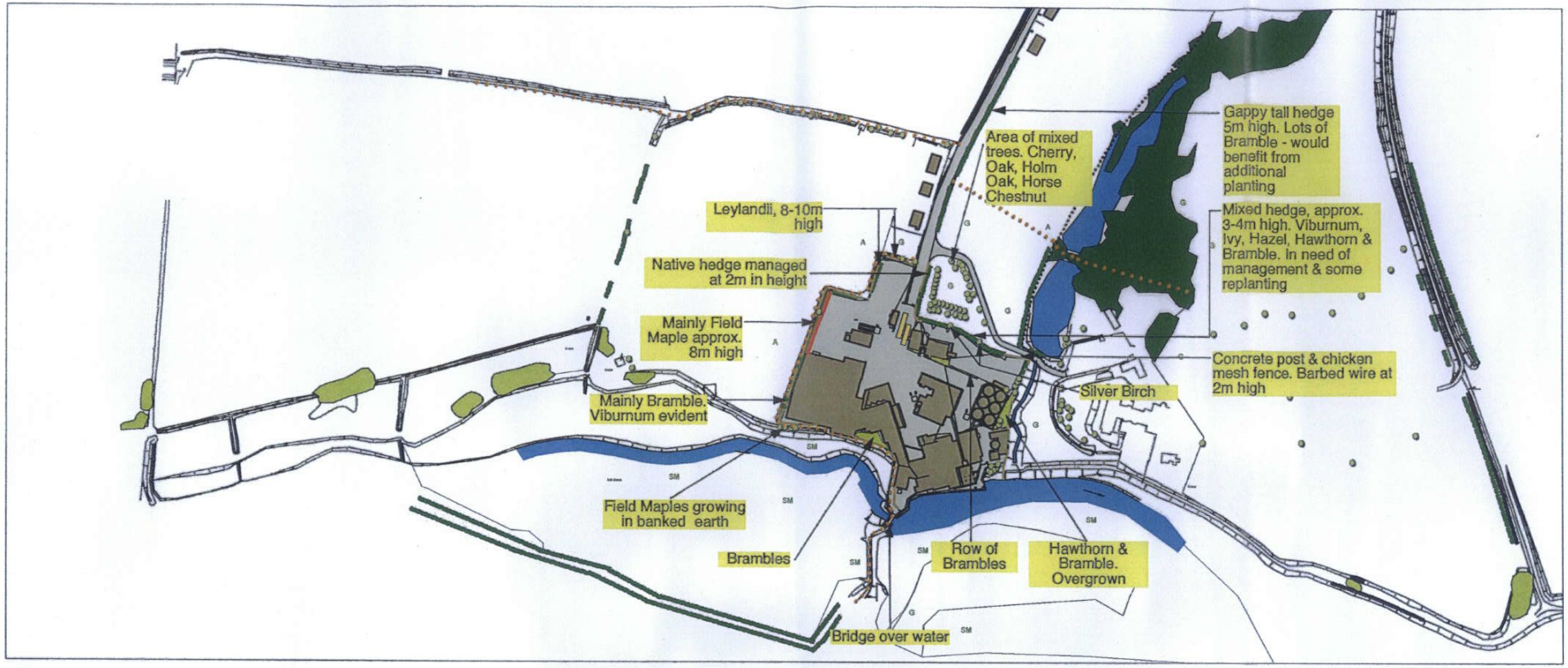

KEY

- Trees
- Tall Hedge (2m +)
- Tree Hedge
- Woodland
- Shrubs/Brambles
- Hard Standing
- Built Form
- Weighing bridge
- Grass
- Salt Marsh
- Arable
- Footpath
- 2m high chain link fence
- 2m high metal railings
- 1.5m high brick wall
- 1.5m high Post and wire fence

4.5 FIGURE

Landscape Features Plan TITLE

1:3,000@A3 SCALE

L0105_11-2 DWG. NO.

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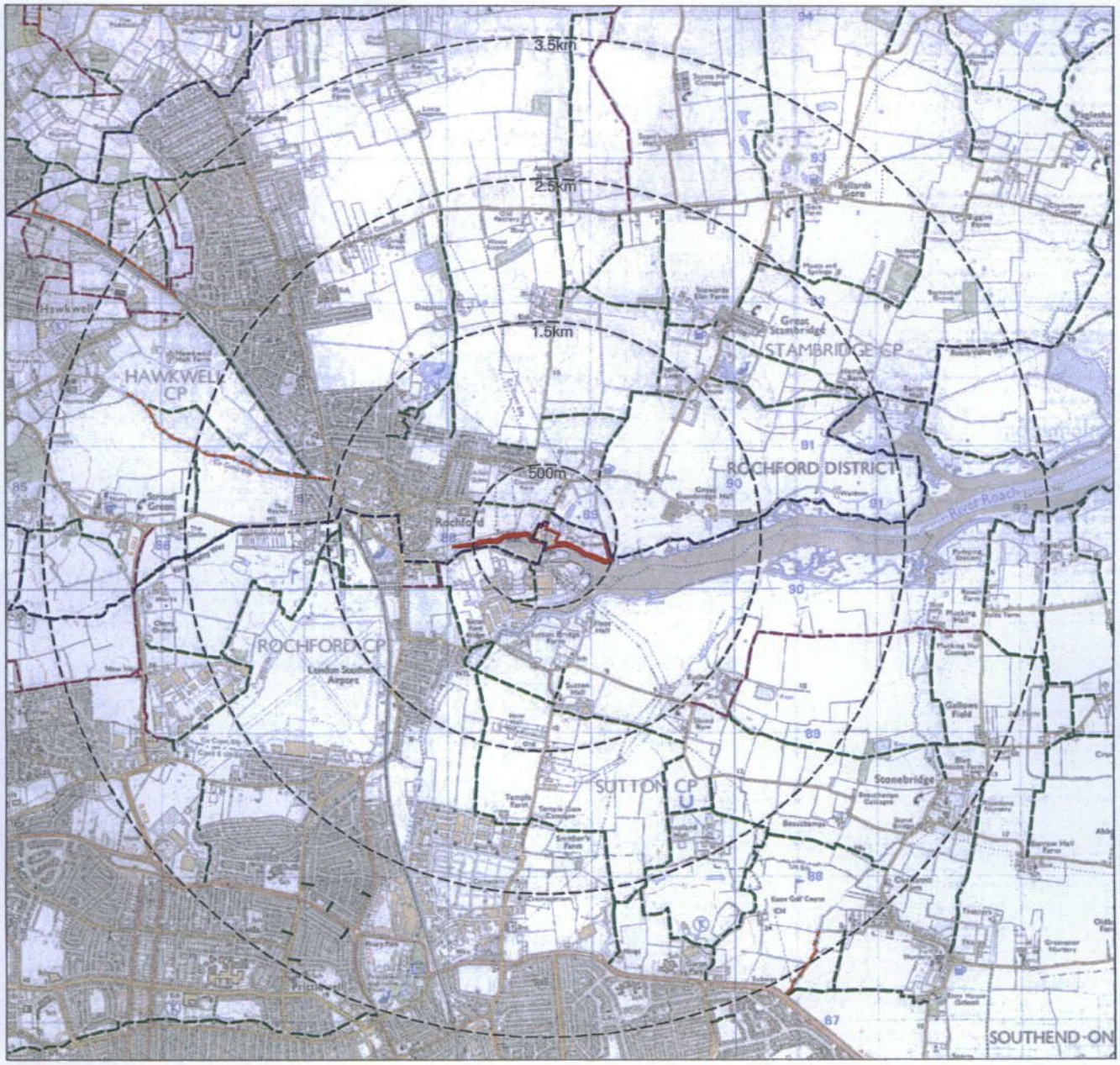

KEY

- Application Site Boundary
- Footpath
- Bridleway
- Byway
- National Trail
- Distance (radius)

4.6 FIGURE

Public Rights of Way Plan TITLE

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I.0105_06-1 DWG. NO.

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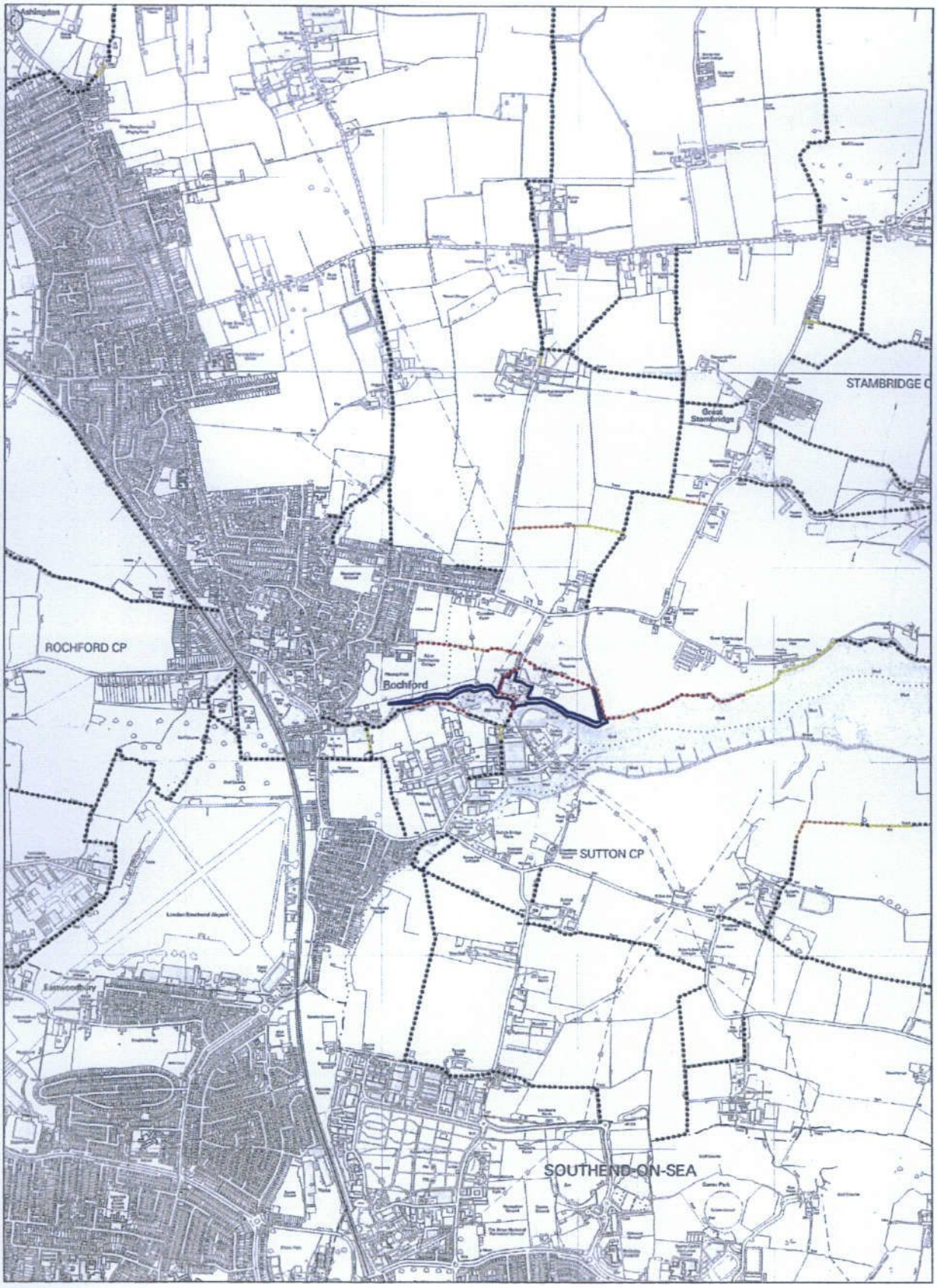

KEY

- Application Site Boundary
- Significant Effect
- Moderate Effect
- Slight Effect
- Neutral/No Effect

4.7 FIGURE

Visual Analysis Plan - Public Rights of Way Operational Phase — TITLE

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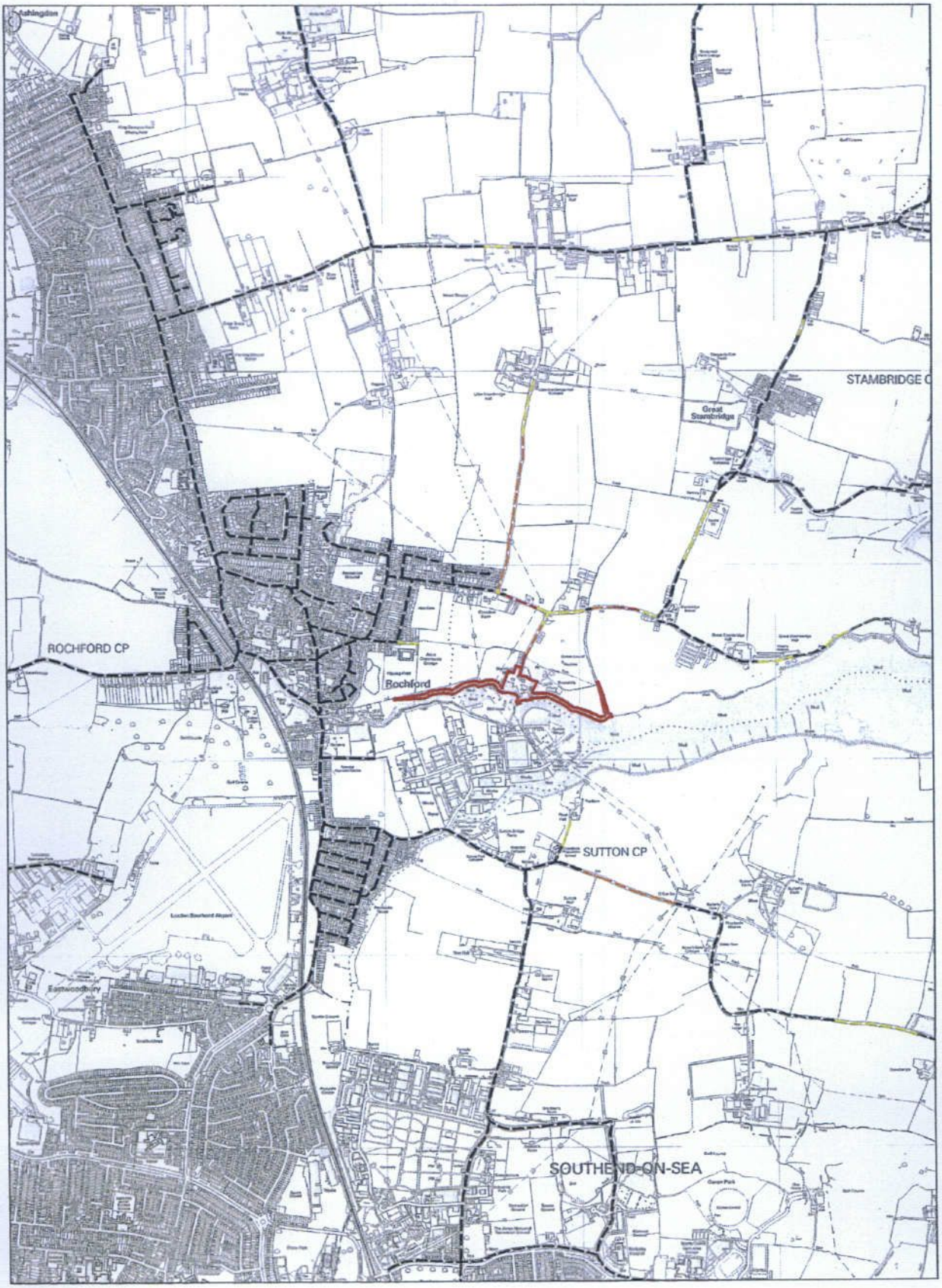

KEY

- Application Site Boundary
- Significant Effect
- Moderate Effect
- Slight Effect
- Neutral/No Effect

4.8 FIGURE

Visual Analysis Plan -Highways Operational Phase TITLE

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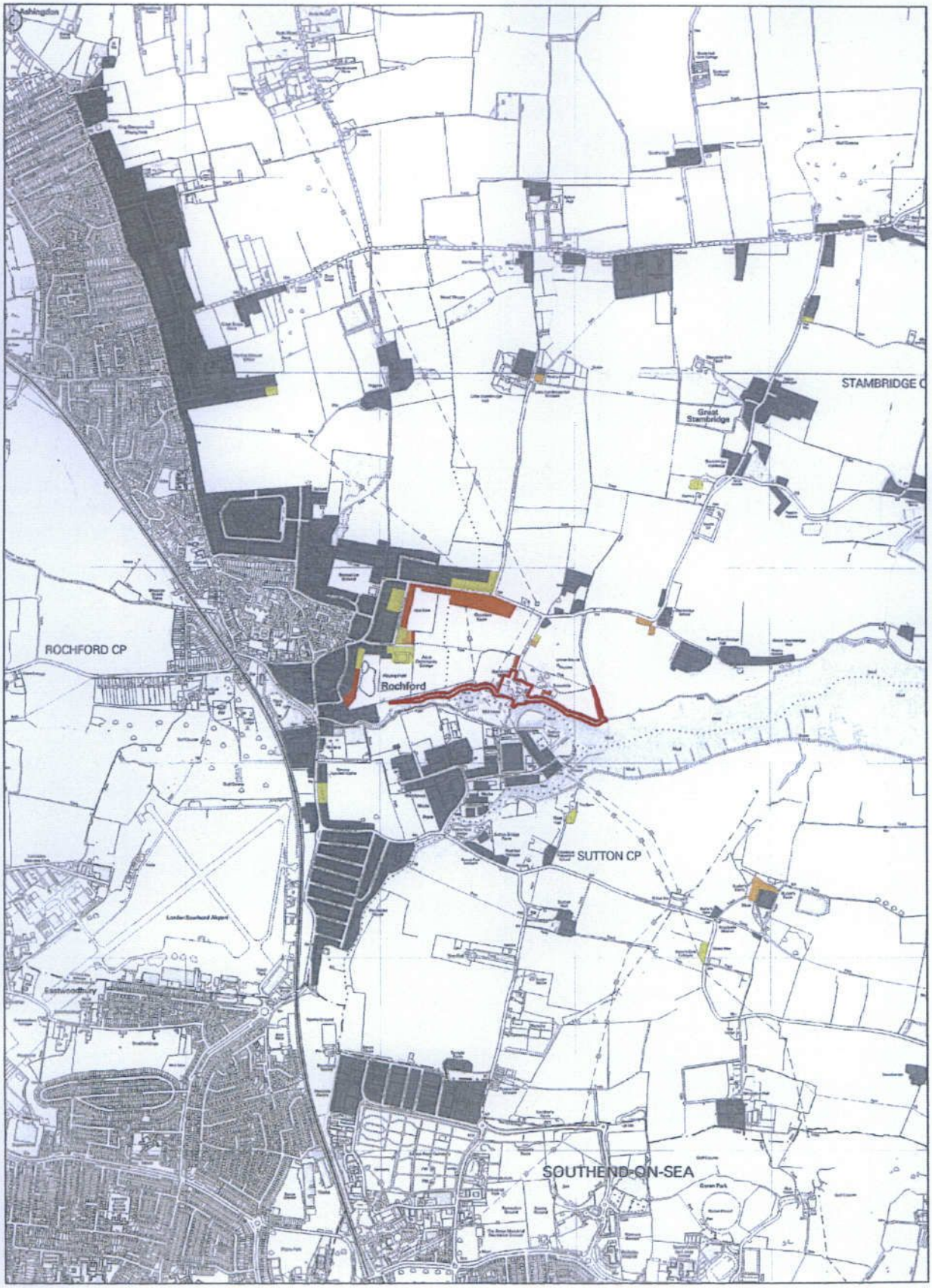

KEY

- Application Site Boundary
- Significant Effect
- Moderate Effect
- Slight Effect
- Neutral/No Effect

4.9 FIGURE

Visual Analysis Plan - Built Form
Operational Phase — TITLE

1:20,000@A3 — SCALE

L0105_18-1 — DWG. NO.

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1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

5 ECOLOGY AND NATURE CONSERVATION

5.1 Introduction

5.1.1 Ecology Solutions was commissioned by Inner London Group in August 2007 to prepare an Ecology and Nature Conservation chapter as part of an ES for land at Stambridge Mills, Rochford in Essex (see Figure 5.1).

5.1.2 In order to build up an accurate picture of the habitats and faunal use of the Site the ecological information contained within this chapter is drawn from surveys at the Site undertaken by Ecology Solutions between August 2007 and May 2008 with subsequent updates in August 2009 and March / April 2010. The survey was based around extended Phase 1 survey methodology, as recommended by Natural England. The habitat types present within the Site have been identified and mapped, providing an inventory of the basic habitat types present and allowing the identification of areas of greater ecological value (see Figure 5.2). Faunal activity, whether visually or by call was recorded during the course of the survey and specific attention was paid to the potential presence of any protected, rare, notable or Biodiversity Action Plan species, such as reptiles, and specific surveys were carried out for, Badgers *Meles meles*, bats, Black Redstart *Phoenicurus ochruros* and Water Voles *Arvicola amphibious*, together with an invertebrate scoping survey by a professional entomologist.

5.2 Assessment Approach

Methodology

5.2.1 The value of the ecological features identified through both field surveys and desk-top studies has been interpreted within the context of recognised methodologies and also within the planning policy context at a national, regional and local level. Habitat and species evaluations are based around the guidance issued by the Institute of Ecology and Environmental Management (IEEM)[1].

5.2.2 The methodology utilised for the survey work can be split into three areas, namely desk survey, habitat survey and faunal survey. These are discussed in more detail below.

Desk Survey

5.2.3 A desk study was undertaken in 2007 and 2008 and was subsequently updated in 2010. As part of the Desk Study the following organisations were contacted, in order to compile background information on the Site and its immediate surroundings;

- Essex Ecology Services (EECOS);
- London, Essex and Herts Amphibian & Reptile Trust (LEHART);
- Botanical Society for the British Isles (Southeast Essex Area);
- Essex Mammal Surveys;
- Essex Badger Protection Group;
- Essex Bird Watching Recorder;
- Invertebrate Group; and
- British Trust for Ornithology (BTO).

5.2.4 Responses were received from EECOS (Appendix 5.1), Essex Mammal Surveys (Appendix 5.2) and the Invertebrate Group (Appendix 5.3) in 2010. Responses received in 2007/2008 are referred to where necessary in this ES. Badger records received from Essex Badger Protection Group have not been appended to this ES for reasons of animal welfare.

[1] Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom* (version 7 July 2006). http://www.ieem.org.uk/ecia/index.html

5.2.5 Ecology Solutions also obtained further information on designated sites within a wider search area from the online Multi-Agency Geographic Information for the Countryside (MAGIC) database and Natural England's Nature on the Map. This information is reproduced at Appendix 5.4, and where appropriate on Figure 5.1.

Habitat Survey Methodology

5.2.6 The Site was subject to ecological surveys over a number of visits in August 2007 (excludes the seawall areas east and west of the Mill Site) and May 2008, with subsequent updates in August 2009 and March / April 2010, to ascertain the general ecological value of the land contained within the boundaries of the Site and to identify the main habitats and associated plant species, with notes on fauna utilising the Site.

5.2.7 Ecology Solutions survey work was based around an extended Phase 1 Survey methodology as recommended by Natural England, whereby the habitat types present are identified and mapped together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential value, which require further survey. Any such areas identified can then be examined in more detail.

5.2.8 The habitats present within the Site were classified into areas of similar botanical community types with a representative sample of those species present at the time of the Site survey being described where necessary.

5.2.9 The surveys were undertaken within the recommended optimal survey period for Phase 1 habitat and botanical surveys and it is therefore considered that the timings of the surveys allowed an accurate evaluation of the intrinsic ecological interest of the Site to be made.

Faunal Surveys

5.2.10 General faunal activity, such as birds or mammals observed visually or by call during the course of the surveys, was recorded. Specific attention was paid to any potential use of the Site by protected species, Essex Biodiversity Action Plan (BAP) species, or other notable species. For example, refugia along the seawalls were checked beneath for presence of reptiles.

5.2.11 Specific surveys were undertaken for bats, Badger and Black Redstart. The northern bank of the River Roach adjacent to the Site and the ditches within the Site were also checked for the presence of Water Vole. An invertebrate scoping survey was also undertaken by a professional entomologist.

Bats

5.2.12 Surveys for this group were completed in August/September 2007, May 2008 and August 2009. All buildings and trees within the Site were assessed for their potential to support bats in accordance with standard methodology[2,3]. All buildings were surveyed internally and externally for evidence of past or present bat activity and dusk and dawn emergence/re-entry and general activity surveys were also undertaken.

5.2.13 The probability of a building being used by bats as a summer roost site increases if it:

- Is largely undisturbed;
- Dates pre 20th Century;
- Has a large roof void with unobstructed flying spaces;
- Has access points for bats (e.g. along gaps at the eaves, under gaps in the roofing tiles, or along gaps within the wall built structure);
- The roof void is not too draughty;

[2] Mitchell-Jones, A J & McLeish, A P (Eds.) (2004). Bat Workers' Manual. 3rd edition. Joint Nature Conservation Committee, Peterborough.
[3] Mitchell-Jones, A J (2004). Bat Mitigation Guidelines. English Nature, Peterborough.

- Has wooden cladding;
- Has hanging tiles; and/or
- Is in a rural setting and close to woodland and water features.

5.2.14 Conversely, the probability decreases if a building is of a modern or prefabricated design/construction, is located within an urban setting, has a small or cluttered roof void(s), has few potential access points or is a heavily disturbed premises.

5.2.15 The main requirements for a winter/hibernation roost site are that it maintains a stable (cool) temperature and humidity. Sites commonly utilised by bats as winter roosts include cavities/holes in trees, underground sites and parts of buildings. Whilst different species may show a preference for one of these types of roost site, none are solely dependant on a single type; bats therefore utilise roosting sites on a transient basis.

5.2.16 **Internal Surveys.** Internal inspections of the buildings were undertaken to search for any features that provided suitable opportunities for roosting bats and evidence for their presence. Particular attention was paid to the roof structure with evidence searched for past and present activity within any voids and around joists and gaps between rafters and beams. Specific searches were made for bat droppings that can indicate present or past use and extent of use, as well as other signs to indicate the possible presence of bats, e.g. feeding remains, presence of stained areas, or areas that are conspicuously cobweb-free. Ladders, mirrors, torches, binoculars and endoscope were used, where necessary.

5.2.17 **External Surveys.** Exterior inspections of the buildings were also undertaken to identify any evidence of bat use (droppings suspended on cobwebs, staining around possible access points, etc). Binoculars, ladders and torches were used where necessary to inspect any inaccessible areas more closely.

5.2.18 **Tree Survey.** All trees within the Site were assessed for their potential use by bats using ladders binoculars and endoscope where necessary. For a tree to be classed as having some potential for roosting bats it must usually have one or more of the following characteristics:

- Obvious holes, e.g. rot holes and old woodpecker holes;
- Dark staining on the tree below a hole;
- Tiny scratch marks around a hole from bats' claws;
- Cavities, splits and / or loose bark from broken or fallen branches, lightning strikes etc; and/or
- Very dense covering of mature Ivy over trunk.

5.2.19 **Emergence/Re-entry Survey.** Buildings identified as having relatively greater bat roosting potential (i.e. buildings B1 and B2 – see Figure 5.2) were then subject to dusk emergence (September 2007 and August 2009) and dawn re-entry (September 2007 and May 2008) surveys to ascertain whether the buildings were being utilised by bats and, if bats were found to be present, to determine the type of bat roost (e.g. maternity, summer, hibernation). The surveys were undertaken by two experienced ecologists equipped with a combination of time expansion and frequency division / heterodyne bat detectors. Dusk surveys commenced half an hour prior to sunset and continued for an hour and a half after sunset. Dawn surveys commenced an hour and a half prior to sunrise until just after sunrise.

5.2.20 **Activity (Back-tracking) Survey.** In addition, dusk and dawn activity surveys were undertaken during September 2007, May 2008 and August 2009, in order to gauge the level of importance of the Site to foraging and / or commuting bats. Again, two surveyors equipped with bat detectors were used to cover the Site. The activity surveys aimed to 'back track' any commuting bats recorded to their roosts to ensure any use of other buildings (other than B1 and B2) would be picked up.

Badgers

5.2.21 Particular attention was paid during the surveys undertaken for evidence of use of the Site by Badgers. This comprised two main elements. Firstly, searching for Badger setts. If any setts were encountered, the following information would be recorded:

i) The number and location of well used or very active entrances; these are clear from any debris or vegetation and are obviously in regular use and may, or may not, have been excavated recently.

ii) The number and location of inactive entrances; these are not in regular use and have debris such as leaves and twigs in the entrance or have plants growing in or around the edge of the entrance.

iii) The number of disused entrances; these have not been in use for some time, are partly or completely blocked and cannot be used without considerable clearance. If the entrance has been disused for some time all that may be visible is a depression in the ground where the hole used to be and the remains of the spoil heap.

5.2.22 Secondly, any Badger activity was noted, such as well-worn paths and runs, snagged hair, footprints, latrines and foraging signs.

5.2.23 Surveys were undertaken of the Mills complex and its immediate surrounds in August 2007 with areas along the seawalls (east and west of the Mills) surveyed in May 2008. An extended area of the seawalls (further west) was surveyed in April 2010 with checks of the Site also made at that time.

Black Redstarts

5.2.24 Survey visits were undertaken in May 2008 (at sunrise) and again in April 2010. Black Redstarts sing throughout the day when holding territory. The surveys were restricted to the Mills complex, which provides the area of greatest suitability for breeding Black Redstarts.

Water Voles

5.2.25 Specific searches were undertaken in May 2008 along the northern bank of the River Roach and the ditches within the Site for burrows, droppings (latrines), footprints, grazed vegetation and food caches. In addition to the specific searches for their evidence, a general appraisal of the suitability of the habitat present for this species was also undertaken.

Invertebrates

5.2.26 A Phase I invertebrate survey was undertaken by Colin Plant Associates in March 2010, which assessed the potential for the Site to support notable invertebrate assemblages. The survey comprised of a walkover of the Site, concentrating on the seawalls, and was used to determine if any further survey was considered necessary to assess the impacts of the proposed development.

Assessment of Effects

Identifying the Zone of Influence

5.2.27 The potential ecological impacts of the proposed development is largely focused on the Site and its immediate surroundings, but also extend to nearby sites designated for their ecological interest (e.g. SPA, SAC, SSSI and local wildlife Sites).

5.2.28 Regulations 61 to 66 of the Habitats and Species Regulations 2010 contain 'general provisions for protection of European Sites', and include provision for their protection from impacts derived from plans or projects. As such, potential impacts arising from the construction and operational phases of the proposed development in relation to such sites have been considered together with the potential impacts on other statutory and non-statutory sites within the vicinity of the Site.

5.2.29 Consideration has also been given to the following likely significant effects which may spread beyond the Site:

- Disturbance to populations within proximity during the construction phase due to noise or vibration;
- Disruption to habitats / populations within receiving range of dust, other air quality considerations during the construction and operation phase;
- Disruption to the normal diurnal patterns for species during construction and operation due to

lighting;

- Disturbance to habitats / populations within walking distance during the operation phase and
- Pollution to watercourses during the construction and operation phases.

Impact Assessment Methodology

5.2.30 The evaluation and impact assessment method is based on the guidelines produced by the IEEM, which avoids the provision of definitions as to how to assign habitats and species different levels of value and relies on an approach that involves professional judgement and the use of available guidance and information.

5.2.31 The value of each resource should be determined within a defined geographical context:

- International;
- National;
- Regional;
- County (or Metropolitan – e.g. in London);
- District (or Unitary Authority, City or Borough);
- Local or Parish; or
- Site.

5.2.32 A number of other key considerations include:

- Designated Sites and Features (e.g. SPA, SSSIs, ancient woodland, etc.);
- Biodiversity Value (Use of BAP, development plans and other published documents);
- Potential Value;
- Secondary or Supporting Value;
- Social or Economic Value; and
- Legal Issues.

5.2.33 For example, the Essex BAP has been used to assist in evaluating features and developing mitigation strategies, where necessary. Consideration has also been given to saved policies within the Rochford District Replacement Local Plan (adopted 2006) – see following section.

5.2.34 Having identified the ecologically important features likely to be affected by the proposed development, the current guidance promotes a transparent approach in which an impact is determined to be significant or not on the basis of a discussion of the factors that categorise it. This includes characterising the nature of the likely impacts on each important feature in terms of ecological structure and function, by considering the following parameters:

- Positive or Negative;
- Extent;
- Magnitude
- Duration;
- Reversibility; and
- Timing and Frequency.

5.2.35 Where it was concluded that there would be an impact (positive or negative and including cumulative impacts) on a defined site or ecosystem(s) and/or, where appropriate, the conservation status of habitats or species within a given geographical area, it was described as significant in the following terms: major, moderate, minor, negligible and none.

5.3 Legislation, Planning Policy And Other Reference Documents

Legislation

5.3.1 Specific habitats and species receive legal protection in the UK under various pieces of legislation, including:

- The Wildlife and Countryside Act 1981 (as amended);
- The Countryside and Rights of Way Act 2000;
- The Conservation of Habitats and Species Regulations 2010;
- The Hedgerows Regulations 1997;
- The Protection of Badgers Act 1992; and
- The Natural Environment and Rural Communities Act 2006.

5.3.2 Where relevant, the assessment takes account of the legislative protection afforded to specific habitats and species.

Planning Policy

5.3.3 The planning policy framework that relates to nature conservation issues at the Site is provided at the national, regional, county and local level. The following policy documents are relevant:

- Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS9) (August 2005);
- Draft Planning Policy Statement: Planning for a Natural and Healthy Environment (March 2010); and
- East of England Plan (May 2008);
- Essex and Southend-on-Sea Structure Plan (adopted 2001) – Saved Policies; and
- Southend-on-Sea Borough Local Plan Second Alteration (adopted 1999) – Saved Policies.

National Policy

PPS9: Biodiversity and Geological Conservation (2005)

5.3.4 Emerging draft consultation document PPS: Planning for Natural and Healthy Environment will eventually replace PPS9 subject to changes made by the Coalition Government. Whilst the current consultation draft brings about some alterations to the original document, essentially there is no significant material change to the guidance given in PPS9.

5.3.5 Planning Policy Statement 9 (PPS9), published in August 2005, confirms the Government's commitment to the protection of biodiversity and geological conservation through the planning system.

5.3.6 PPS9 requires local authorities to fully consider the effect of planning decisions on biodiversity and geological conservation, and ensure that appropriate weight is attached to statutory nature conservation designations, protected species and biodiversity and geological interests within the wider environment.

5.3.7 It also considers the potential biodiversity and geological conservation gains which can be secured within developments, including the use of planning obligations.

5.3.8 National policy therefore implicitly recognises the importance of biodiversity and that with sensitive planning and design, development and conservation of the natural heritage can co-exist and benefits can, with appropriate measures, be obtained.

Regional Policy

East of England Plan (May 2008)

5.3.9 On 6 July 2010, the Coalition Government revoked all regional strategies under section 79(6) of the Local Democracy, Economic Development and Construction Act 2009. This action was successfully challenged in the High Court by developer Cala Homes, and the decision concluded that Section 79 powers could not be used to revoke all regional strategies in their entirety. As such, regional strategies continue to form part of the Development Plan.

5.3.10 Guidance on policy for nature conservation at the regional level was administered at the county level by the Essex & Southend-on-Sea Joint Structure Plan (adopted 2001). The Secretary of State issued an amendment to the saved policies from this plan on 12 May 2008 to reflect approval of the East of England Plan.

5.3.11 The East of England Plan has seven policies under the environment section of which one relates specifically to nature conservation, Policy ENV3 Biodiversity and Earth Heritage, which states:

"... planning authorities or other agencies should ensure that internationally and nationally designated Sites are given the strongest level of protection and that development does not have adverse effect on the integrity of Sites of European or international importance for nature conservation."

County Policy

Essex and Southend-on-Sea Structure Plan (adopted 2001) – Saved Policies

5.3.12 Most of the planning policies contained in the adopted Structure Plan expired on the 27 September 2007 and are therefore no longer in effect. However, the Secretary of State has decided that a limited number of adopted Structure Plan policies should be 'saved' and should apply after this date. She issued a statutory Direction to this effect, since amended to reflect her approval of the East of England Plan on 12 May 2008. Of the six 'saved' policies, one has specific relevance to nature conservation: Policy CC1 The Undeveloped Coast – Coastal Protection Belt (protecting any undeveloped land within the coastal protection belt shall not adversely affect wildlife).

Local Policy

Southend-on-Sea Borough Local Plan Second Alteration (adopted 1999) – Saved Policies

5.3.13 Policies contained within the adopted Southend-on-Sea Local Plan were due to expire on 27 September 2007. The Secretary of State issued direction under paragraph 1(3) of Schedule 8 of the Planning and Compulsory Purchases Act 2004, saving a number of policies in the Replacement Local Plan. Of those 'saved' policies, one has specific reference to nature conservation. This policy is G7 – Coastal Protection.

5.3.14 These polices reflect those set out in county, regional and national plans, and are concerned with the protection of designated sites, biodiversity, protected species and habitats of value to nature conservation.

Other Guidance

The UK and Essex BAPs / Living Landscapes

5.3.15 The UK BAP lists over 40 habitats and around 400 species that are of the highest priority for conservation in the UK. The most recent list of UK BAP priority species and habitats was published in August 2007 following a 2-year review. *Pipistrelle Pipistrellus sp.* bat has been removed from the UK BAP list, although seven other bat species are still included as UK BAP species.

5.3.16 The 1999 Essex BAP listed 10 habitats and 26 species from this list that are of importance in the County of Essex. The Essex BAP is currently being re-written and the original 1999 Action Plan is now withdrawn. The new format will include targets and actions at a district level, where appropriate, and are

intended to be realistic and achievable. Habitat groups have been formed to frame the review process: Lowland Grassland, Lakes and Ponds, Rivers, Wetlands, Coastal, Marine, Urban and Brownfield. Each Group will contain sub-plans for more specific habitats. There will be no Species Action Plans as species will be addressed within the habitats where they are found. A number of these habitats are considered in relation to the Site, including Coastal and Floodplain Grazing Marsh, Coastal Saltmarsh, Intertidal Mudflats and Saline Lagoon habitats. The Urban and Brownfield Habitats local BAP is also considered in relation to the Site, although the Site would not conform to the Open Mosaic Habitats on Previously Developed Land UK BAP from which the Local BAP is to be derived (plan currently unpublished).

5.3.17 Living Landscapes are an initiative spearheaded by the Wildlife Trusts. The Essex Wildlife Trust and its partners have produced a Living Landscapes Map of Essex to identify 80 Living Landscape areas, based upon their existing ecological value and their potential. This places the Site within the Thames Medways Gravels South Key Biodiversity Network area (number 50), which is classed as 'Mosaic and Grassland' habitat, and adjacent to the Foulness islands Key Biodiversity Network area (number 79), which is classed as 'Coastal and Estuarine'.

Scoping Criteria

5.3.18 Although Rochford District Council do not consider that the proposed development is of a scale and nature that warrant an EIA, a letter dated 26 November 2007 acknowledges the applicants intention to submit an ES for the proposed development and provides a summary of Rochford District Council's 'Informal Scoping Opinion' on the environmental issues that the ES should address (refer to Appendix 1.1).

5.3.19 Consultation responses relevant to ecology and nature conservation were provided by Natural England (10 October 2007 and 24 October 2007), the Environment Agency (15 October 2007) and London Southend Airport (30 October 2007) (refer to Appendix 1.2 and Appendix 1.3). Further correspondence with Natural England by email was received on 24 April 2008, 19 May 2008 and 10 March 2011. This correspondence with Natural England, Environment Agency and London Southend Airport is included at Appendix 5.5.

5.3.20 The initial response from Natural England stated that it was considered *"that the proposed development **is** likely to have a significant effect on the European and international Site* [Crouch and Roach Estuaries SSSI, SPA and Ramsar Site], *either alone or in combination with other plans or projects. In determining any planning application, it will therefore be necessary for the competent authority to carry out an appropriate assessment of the implications for the Site in view of the Site's conservation objectives."* The likely impacts were cited as being *"Increased disturbance of wading birds, and especially of black-tailed godwits, both during the construction phase and as a consequence of the increased human activity resulting from the subsequent occupation of the residential accommodation."*

5.3.21 However, at that time Natural England had erroneously thought that the SPA Site was directly adjacent to the proposed development site. As such, following a meeting held on 23 October 2007, Natural England subsequently provided a revised opinion that *"subject to there not being any sewage or contaminated surface water discharges from the Site, the proposed development would **not** be likely to have a significant effect on the European and international Site, either alone or in combination with other plans or projects. We therefore no longer consider it necessary for the applicant to be required to provide further information relating to the usage of this area by wading birds and, in particular, to the area's importance, relative to other areas within the Crouch and Roach Estuaries SPA, for black-tailed godwits and other species."*

5.3.22 Since this initial correspondence with Natural England the proposed development site has evolved to incorporate improvement works to the flood defences (bunds). At the south-eastern corner of the Site the flood defences fall within the SPA/Ramsar Site/SSSI boundary. In respect of these additional proposals Natural England submitted a response on 24 April 2008 which states that *"subject to certain restrictions, Natural England does not intend to object to the proposed work to the flood defences as currently outlined."* The response goes on to state that *"the extreme south-eastern corner of the sea wall appears to be within the SPA boundary, which at this point includes the area from the crest of the sea wall down across the mud. Works to this part of the sea wall would therefore require consent from the EA* [Environment Agency] *under the Coast Protection Act, for which Natural England would be a consultee."*

5.3.23 Natural England was further consulted on the potential of the proposed development to include its own wastewater treatment works. In a response dated 19 May 2008 Natural England stated that they would defer to the Environment Agency as the competent authority with respect to discharge consents and *"rely of [sic] the expertise and judgement of their specialists, upon which our* [Natural England's] *comments will be based..."*

5.3.24 A meeting was also held with Natural England on 19 March 2010 to discuss subsequent amendments that had been made to the proposed development and ensure that there would be no consequent change in Natural England's view of the development. This covered all of the previous issues raised in prior correspondence and focused on the issue of the SPA/SAC/Ramsar/SSSI and Natural England confirmed that they had no in principle concerns with the proposed development. Further details of the items discussed are set out later within this Chapter in relation to the SPA/SAC/Ramsar/SSSI.

5.3.25 Further correspondence in March 2011 relayed changes to the proposed mix of the development (an increase in family housing and a reduction in apartments) and sought Natural England's view as to whether this would alter their previous stance. Again, Natural England confirmed that *"Assuming that other aspects of the proposal are unchanged (eg no direct footpath connection to the seawall to the east, contribution towards RoW improvements elsewhere in the vicinity), I don't think we would be likely to object."*

5.3.26 Like Natural England, the response from the Environment Agency also refers to potential impacts on the Crouch and Roach Estuaries SSSI/SPA/SAC and Ramsar site. These have been considered bearing in mind Natural England's revised opinion and correspondence (from 24 October 2007, 24 April 2008, 19 May 2009) and the March 2010 meeting with Natural England and subsequent March 2011 correspondence. As such, there is considered to be a requirement to assess potential hydrological impacts upon this designated site during construction and operational phases. A detailed assessment in this regard is included in Chapter 9 (Hydrology, Flood Risk and Drainage) of this ES.

5.3.27 The Environment Agency also refers to the potential need to carry out surveys for legally protected and/or UK BAP species given the derelict brownfield nature of the Site. This issue was also raised in the March 2010 meeting with Natural England. A full assessment of the potential presence of such species was undertaken as part of the ecology assessment.

5.3.28 The most recent response from the Environment Agency (22/07/11) echoes points to those raised in previous correspondence (05/03/10), which refers to the ecological enhancement of the new sea defences stating: *"... it would be good practice to install timber beams on the replacement sheet piling as this will provide a habitat for any aquatic species which may be in the area and will provide mitigation for any habitats which may be lost from the existing piling. There is also a significant opportunity to create some excellent wildlife habitat on the retaining bund over the geotextile matting and the new 6m earth bund. We would suggest seeding the earth bund and geotextile matting area with a wildflower mixture that would mimic the flower rich vegetation that is found on seawalls along the Crouch and Roach Estuaries. The mix sown should be tailored to provide forage for scarce butterflies and bumblebees. Typical species of the seawalls in the area are marbled white butterfly and the shrill carder bee (this bee is a national red data book and BAP species). The shrill carder bee will benefit from sowing of a wildflower mix containing legumes such as red clover, birds-foot trefoil and other leguminous plants. The earth bund would need to be managed with an appropriate mowing regime to allow the forage plants to flower and set seed each summer. Rotational mowing regimes (e.g. cut half the bund in late summer every year allows vegetation to remain uncut) are being trialled by the EA on a seawall at Paglesham and could be useful at this location as well."* This has been considered when formulating the sea wall proposals.

5.3.29 The response from London Southend Airport refers to the potential for birdstrike issues associated with the proposed landscaping scheme, and thus the ecology assessment has given due consideration to policy published by the Civil Aviation Authority (*CAP 772 Birdstrike Risk Management for Aerodromes - March 2007*)."

5.4 Baseline Conditions

5.4.1 The objectives of establishing the ecological baseline are twofold:

(i) to describe aspects of the natural environment and to identify important and protected habitats and species that could be adversely affected by the proposed development; and

(ii) to characterise features that could be positively enhanced, created, restored or managed, by establishing the occurrence, distribution and extent of ecological features on Site and in the surrounding area; and/or those species that could be positively managed to enhance their conservation status, distribution and abundance.

Site Description and Context

5.4.2 The Site covers an area of approximately 4 hectares and is located to the southeast of the town of Rochford. The River Roach and its associated saltmarsh habitat form the southern boundary of the Site. The area to the west and south of the Mills complex is designated as the River Roach at Rochford Local Wildlife Site (LoWS) (see Figure 5.1) which is a large area of saltmarsh and intertidal mudflats together with grassland fields and ditches. Beyond the River Roach is an industrial area and land surrounding the Site is largely undeveloped forming part of the open countryside to the north and east in particular. Arable land is present immediately to the north and west of the Site, and this area is the subject of a recent planning application for residential development (referred to as 'Coombes Farm' and which was rejected on Appeal but not on ecological grounds). The Crouch and Roach Estuaries SSSI, SPA and Ramsar Site, also designated as The Essex Estuaries SAC, is located approximately 400m to the southeast of the Mills complex, and is adjacent to the eastern edge of the site boundary.

5.4.3 The Mills complex itself comprises a number of large brick and metal clad buildings as part of the currently redundant Stambridge Mills. Within the curtilage of these buildings, large areas of hardstanding and some small areas of amenity planting are present. Hedgerows are present along lengths of the Site boundary. The southern boundary of the Mills complex abuts the River Roach and at low tide the River Roach recedes to leave an expanse of mudflat fronting the flood defence wall.

5.4.4 The sections of the Site to the east and west of the Mill buildings comprise existing vegetated sea walls. The proposals to strengthen the existing flood defences would involve works within part of the River Roach at Rochford LoWS and adjacent to the SPA/SAC/Ramsar/SSSI.

Designated Sites

Statutory

5.4.5 There are no statutory designated sites within the Site itself. The nearest designated site is the Crouch and Roach Estuaries SSSI located approximately 400m to the southeast of the Mills complex (see Figure 5.1), adjacent to the easternmost boundary of the site. The SSSI is also part of the Crouch and Roach Estuaries SPA / Ramsar Site and the Essex Estuaries SAC. This area is also part of the Mid-Essex Coast Important Bird Area (IBA) – see 'Non-statutory' below.

5.4.6 The Crouch and Roach Estuaries SSSI was notified in 1984 and 1990, with two areas being combined in 1996. The site was designated for regularly supporting an internationally important number of one species; Dark-bellied Brent Goose *Branta bernicula bernicula* and nationally important numbers of 3 species of waders and wildfowl; Black-tailed Godwit *Limosa limosa*, Shelduck *Tadorna tadorna* and Shoveler *Anas clypeata* (see Appendix 5.6).

5.4.7 The Crouch and Roach Estuaries SPA was classified on the 29th June 1998. The designated site qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of Dark-bellied Brent Goose (see Appendix 5.6).

5.4.8 The Crouch and Roach Estuaries RAMSAR site was also designated on 29th June 1998. It met three criteria for designation as a RAMSAR site; criteria 2, 5 and 6. Criterion 2 concerns Sites which support an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant and animal.

Criterion 5 concerns sites which support an assemblage of internationally important waterfowl. Criterion 6 concerns sites which supports a species of internationally important levels (see Appendix 5.6).

5.4.9 The Essex Estuaries SAC is designated for its Annex I habitats, which include Estuaries, Mudflats and sandflats not covered by water at low tide, *Salicornia* and other annuals colonising mud and sand, *Spartina* swards, Atlantic salt meadows and Mediterranean and thermo-Atlantic halophilous scrubs (see Appendix 5.6).

Non-Statutory

5.4.10 The River Roach at Rochford LoWS is an 8.1-hectare site partly located within the area of the proposed strengthened flood defence bunds west of the Mill complex. It was designated in October 2007 based on criteria relating to River Floodplain (HC10), Complex Riverine Habitats (HC20) and Coastal Grazing Marsh (HC21).

5.4.11 The Rochford District Local Wildlife Sites Review 2007 states: *"herb rich grassland; relict grazing marsh, reedbed and saltmarsh; Red Data Book horsefly Atylotus latistriatus; although partly inter-tidal the location of this site makes it vulnerable to adverse impacts from neighbouring industrial land use and so it is recommended for inclusion."*

5.4.12 Other LoWS are located in the vicinity of the Site, as shown on Figure 5.1.

5.4.13 The Mid-Essex IBA was designated in 1989 and incorporated other areas in 1992 to form its current extent. It is designated for its importance for breeding Terns *Sternidea* and wintering waders and wildfowl.

Ecological Features of the Site

5.4.14 The Site was subject to ecological survey over several visits between August 2007 and April 2010. Visiting the Site over this period allowed for an accurate botanical/habitat assessment of the Site to be made, as different plants are identifiable at differing times of the year. Also, the varying water levels of any ponds or ditches were assessed during times of potential flood / drought.

5.4.15 The following main habitat / vegetation types were identified within the Site and are shown on Figure 5.2:

- Hardstanding;
- Buildings;
- Tall Ruderal;
- Hedgerows;
- Scrub and Trees;
- Amenity Planting;
- Grassland (including Vegetated Sea Wall)
- Arable; and
- Ditches.

Hardstanding

5.4.16 Large areas surrounding the Mill Site are dominated by hardstanding. Grass and ruderal vegetation has colonised in cracks and drains with species present including Canadian Fleabane *Erigeiron candensis*, Broad-leaved Willowherb *Epilobium montanum*, Greater Plantain *Plantago major*, Prickly lettuce *Lactuca serriola*, Great Willowherb *Epilobium thirsutum*, Hoary Willowherb *Epilobium parviflorum*, Annual Meadow-grass *Poa annua*, Common Bent *Agrostis capillaris*, Yorkshire-fog *Holcus lanatus*, Spear Thistle *Circium vulgare*, Bristly Ox-tongue *Picris echioides*, Lesser Burdock *Arctium minus*, Toad Rush *Juncus bufonius*, Common Reed *Phragmites australis*, Nipplewort *Lapsana communis*, Common Ragwort *Senecio jacobaea*, False Oat-grass *Arrhenatherum elatius*, Mugwort *Artemisia vulgaris*, Annual Mercury *Mercurialis annua* and Black Nightshade *Solanum nigrum*.

5.4.17 Along the artificial flood defence wall to the Mill Site there were additional species that were more indicative of salt tolerant conditions and included species such as Common Orache *Atriplex patula*, Frosted Orache *Atriplex laciniata*, Sea Beet *Beta vulgaris*, Glasswort *Salicornia europaea*, Common Sea-lavender *Limonium vulgare* and Sea Purslane *Atriplex portulacoides*.

Buildings

5.4.18 There are a total of eight individual buildings/structures within the Mill complex, as marked B1-B8 on Figure 5.2. The Buildings present on the Mill complex consist of brick buildings with clay-tiled roofs, tall storage silos and brick and metal clad industrial buildings.

5.4.19 B1 is a single storey building of brick construction with a pitched clay-tiled roof. A few roof tiles were missing and gaps were present around the eaves allowing access to the roof void for roosting Feral Pigeon. B1 exhibits moderate potential for roosting bats.

5.4.20 Similar to B1, B2 is a two-storey building of brick construction with a twin pitched clay-tiled roof. It is joined to B1 by a single story brick built corridor with a copper sheet roof. A few tiles were missing in various places and would have allowed access to the roof void. Similar to B1, this building exhibits moderate potential for roosting bats.

5.4.21 B3 is an old garage and workshop of steel clad construction with a flat roof. It has a two large rollback doors. No roof voids are present and this in combination with its prefabricated structure renders it unsuitable for roosting bats.

5.4.22 B4 is a collection of six 30m high grain silos of steel construction measuring approximately 3-4m in diameter. The silos appeared to be sealed with no obvious access point for bats and therefore these structures are considered unsuitable for roosting bats.

5.4.23 B5 is of brick construction with a part single and two-storey specification at the northern elevation, comprising both shallow pitched and flat roofs, which rises to approximately 30m in total height at the southern elevation. Due to its prefabricated nature the building is considered unsuitable for roosting bats.

5.4.24 B6 represents a complex arrangement of various sub-buildings of brick and steel clad construction. They are generally approximately 10m in height comprising shallow pitched roofs and rising to approximately 30m in height with a flat roof towards the eastern elevation. Towards the east the buildings get taller to about 30m, and the roof is flat. Again, due to the building's prefabricated nature it is considered largely unsuitable for roosting bats.

5.4.25 Similar to B6, B7 represents a complex arrangement of various sub-buildings of brick and steel clad construction. Apart from a small pitched section along the southern elevation the roof structure is flat. The sub-buildings vary in height with the tallest section again being approximately 30m in total height. The western elevation is connected to B6 by small sub-building of steel clad construction. The buildings are again considered largely unsuitable for roosting bats.

5.4.26 B8 is of steel clad construction with a flat roof and an adjoining silo structure of approximately 15m in height. The building and the silo structure are considered unsuitable for roosting bats.

5.4.27 Only buildings B1 and B2 were deemed as having potential to support roosting bats, being the only buildings not constructed of pre-fabricated materials, which are generally avoided by roosting bats, and supporting clay-tiled roofs and enclosed roof voids, which are typical of structures associated with roosting bats.

Tall Ruderal

5.4.28 There is a small patch of tall ruderal vegetation in the northeast corner of the Mill complex between hedgerow H1 and H2. Species comprise Prickly lettuce *Lactuca serriola*, Great Willowherb, Spear Thistle, Bristly Ox-tongue *Picris echioides*, Nipplewort *Lapsana communis*, Canadian Fleabane *Erigeiron candensis*, Common Ragwort, False Oat-grass *Arrhenatherum elatius* and Mugwort.

Hedgerows

5.4.29 There are five individual hedgerows, marked as H1-H5 on Figure 5.2.

5.4.30 H1 runs along the eastern edge of Mill Lane about 20m before it adjoins the northern boundary of the Mill complex. The 20m section along Mill Lane is a monoculture Hawthorn *Crataegus monogyna* hedge of about 2m in height subject to regular cutting. The section along the northern boundary of the Mill Site is more unmanaged and sprawling in nature. It is dominated by Hawthorn, with Garden Privet *Ligustrum ovalifolium*, Silver Birch *Betula pendula*, Elder *Sambucus nigra*, and Alder sp *Ulnus*. The ground flora consists of Ivy *Hedera helix*, Common Nettle *Urtica dioica*, Bittersweet *Solanum dulcamara*, Common Mallow *Malva sylvestris*, Bristly Ox-tongue *Picris echioides*, Sun Spurge *Euphorbia helioscopia*, Bramble *Rubus fruiticosus agg.*, Nipplewort *Lapsana communis*, Broad-leaved Dock *Rumex obtusifolius*, Creeping Thistle *Circium arvensis*, Herb-Robert *Geranium robertianum*, Great Willowherb and Canadian Fleabane *Conyza canadensis*.

5.4.31 H2 is very fragmented and unstructured and runs along part of the eastern boundary of the Mill complex. It consists of predominantly Hawthorn and Elder with occasional Yew *Taxus baccata* and Grey Poplar *Populus x canescens*. The ground flora is dominated by Ivy with Bramble, Nipplewort and Common Reed also present with the latter colonising from the adjacent ditch.

5.4.32 H3 is a tall Leyland Cypress *X Cupressocyparis leylandii* hedge measuring approximately 8m in height. It runs along part of the northern boundary of the Mill complex, west of Mill Lane. The section running east-west is fragmented, however the section running north-south is continuous and fairly dense. Ground flora is sparse with some Common Mallow, Common Nettle and Bristly Ox-tongue.

5.4.33 H4 is a fairly well maintained hedge along part of the western boundary of the Mill complex and measures approximately 4m in height. A brick wall of about 1m in height and a chain link fence runs along its length. It is dominated by Field Maple *Acer campestre*, with Hawthorn and occasional Elder. Ground flora consists of Bramble, Ivy and occasional Common Nettle.

5.4.34 H5 is located in the south-eastern corner of the Site and runs adjacent to a footpath down to the flood defence wall from Stambridge Road. Measuring approximately 4m in height it is dominated in areas by Blackthorn *Prunus spinosa* and Elm, with Hawthorn and Elder also common. Ground flora comprises False Oat-grass, Meadow Barley *Hordeum secalinum*, Annual Meadow-grass, Meadow Foxtail *Alopecurus pratensis*, Common Mallow, Cow Parsley, Ivy, Lesser Burdock, Creeping Cinquefoil *Potentilla reptans*, White Dead-nettle, Common Nettle, Spotted Medick and Ribwort Plantain.

Scrub & Trees

5.4.35 Bramble scrub is dominant in a small area in the south of the Mill complex between building B6 and the boundary fence. Although restricted in their extent by the bramble scrub, some species that are also present within the hardstanding habitat are also present within this area.

5.4.36 In addition, areas of scrub are present in several locations along the bank of the River Roach in the western part of the Site. Species recorded include Blackthorn, Hawthorn, Bramble, Elder, Rose sp. and Common Broom *Cytisus scoparius*. The scattered trees within the site are identified in the arboricultural report.

Amenity Planting

5.4.37 There are areas of amenity planting associated with buildings B1 and B2. These areas are remnant beds that have been neglected. A few amenity species still remain and include Gorse *Ulex europaeus*, Ornamental Roses *Rosa sp.*, Butterfly-bush *Buddleja davidii*, *Berberis thunbergii* 'Atropurpurea' and various Cypress shrubs. A number of the species found within the hardstanding habitat have also colonised the amenity planting.

5.4.38 Amenity planting comprising largely non-native species is also present within the grounds of Broomhills Care Home which lies on the fringes of the flood defence construction corridor.

Grassland including Vegetated Sea Wall

5.4.39 The bank associated with the River Roach to the west of the Mill complex is a defunct vegetated sea wall.

5.4.40 The grassland to the landward side of the sea wall can be split into four compartments by drainage ditches (see below). The grassland in the three easternmost fields areas has been heavily grazed and poached by horses to the detriment of biodiversity. The LoWS citation, which this area forms part of, refers to the three eastern fields as being species-poor relict grazing marsh. Species present along this section comprise Yorkshire-fog, Spear Thistle, Dandelion *Taraxacum officinale* agg., Ground-ivy *Glechoma hederacea*, Red Dead-nettle *Lamium purpureum*, White Dead-nettle *Lamium album*, Rosebay Willowherb *Chamerion angustifolium*, Shepherd's-purse *Capsella bursa-pastoris*, Hedge Mustard *Sisymbrium officinale*, Hemlock *Conium maculatum*, Field Bindweed *Convolvulus arvensis*, Common Sorrel *Rumex acetosa*, Scentless Mayweed *Tripleurospermum inodorum*, Cut-leaved Crane's-bill *Geranium dissectum*, Sea Couch *Elytrigia atherica* and Frosted Orache *Atriplex laciniata*.

5.4.41 The westernmost field is cited as being relatively species-rich in comparison to the other fields, with Wild Carrot *Daucus carota*, Lady's Bedstraw *Galium verum*, Musk Mallow *Malva moschata*, Hemlock, Cornflower *Centaurea cyanus* and Corn Marigold *Chrysanthemum segetum* (the latter two assumed to be the result of introduced seed).

5.4.42 The bank associated with the River Roach to the east of the Mill complex also comprises a vegetated sea wall. Species present include Cock's-foot, Meadow Foxtail, Perennial Rye-grass *Lolium perenne*, Yorkshire-fog, Sea Couch, Creeping Thistle, Cow Parsley, Common Vetch *Vicia sativa*, Hairy Tare *Vicia hirsuta*, Bristly Ox-tongue, Smooth Sow-thistle *Sonchus oleraceus*, Ragwort, Yarrow *Achillea millefolium*, Ribwort Plantain, Black Medick *Medicago lupulina*, Broad-leaved Dock, Spotted Medick *Medicago arabica*, Common Bird's-foot-trefoil *Lotus corniculatus*, Cleavers, Field Bindweed, Wild Teasel *Dipsacus fullonum*, Goat's-Rue *Galega officinalis*, Red Clover *Trifolium pratense*, White Clover *Trifolium repens*, Wild Carrot *Daucus carota*, Goat's-beard *Tragopogon pratensis*, Bramble, Creeping Cinquefoil, Mugwort, Common Mallow, Common Mouse-ear *Cerastium fontanum*, Lesser Burdock, Daisy *Bellis perennis*, Greater Stitchwort *Stellaria holostea* and Horse-radish *Armoracia rusticana*. In addition, the non-native Duke of Argyll's Teaplant *Lycium barbarum* is also present.

Arable

5.4.43 An arable field is present within the Site to the west of the Mill complex. The existing arable to the north of the Site has recently been ploughed to extend into the Site and was previously grassland.

Ditches

5.4.44 There are a number of drainage ditches within the Site, as shown on Figure 5.2. These ditches are inter-tidal and only retain water during periods of high tide or during storm events. Vegetation is dominated by Common Reed *Phragmites australis* with occasional Common Glasswort *Salicornia europaea*.

Habitats Adjacent to the Site

5.4.45 The River Roach and its associated intertidal mudflat and saltmarsh habitat is present immediately to the south of the Site.

5.4.46 Two large interconnected ponds are located to the northeast of the Site, the closest of which is located within 10m of the Site boundary. These ponds are stocked with fish and are used for recreational angling purposes.

5.4.47 A small drainage ditch runs south of the pond. Again this drainage ditch is tidal and is colonised primarily by Common Reed.

Wildlife Use of the Site

5.4.48 Specific surveys were undertaken for bats (2007, 2008, 2009), Badgers (2007, 2008, 2010), Water Voles (2008), Black Redstart (2008, 2010) and invertebrates (2010).

5.4.49 In addition, general observations (whether visually or by call) made whilst undertaking the habitat surveys between 2007 and 2010, of birds and other mammals, were recorded and are considered within the context of this chapter.

5.4.50 Similarly the potential for the presence of any other protected or notable (including BAP) species was also assessed.

Bats

5.4.51 An assessment of the trees on Site did not identify any trees with high potential to support roosting bats.

5.4.52 During the specific bat activity surveys undertaken only very limited bat activity was noted, despite optimal conditions for bat foraging.

5.4.53 During the dusk emergence/activity survey undertaken in September 2007 a total of three registrations for Common Pipistrelle *Pipistrellus pipistrellus* (two registrations) and Soprano Pipistrelle *Pipistrellus pygmaeus* (one registration) were observed indicating some limited foraging activity along hedgerows H1, H3 and H4. No bats were seen emerging from buildings B1 and B2 and there was no other bat activity within the wider Mill complex. No bats were recorded entering buildings B1 and B2 during the dawn re-entry/activity survey undertaken in September 2007 and no registrations were made around the wider Mill complex during this time.

5.4.54 During the dawn re-entry/activity survey undertaken in May 2008 no bat registrations were picked up within the Mill complex and no bats were seen emerging from buildings B1 and B2

5.4.55 During the dusk emergence survey undertaken in August 2009 a total of four Common Pipistrelle registrations were recorded indicating some limited foraging activity again along hedgerows H1, H3 and H4. No bats were seen emerging from buildings B1 and B2.

5.4.56 No foraging activity along the River Roach was observed during any of the surveys.

5.4.57 Data received from Essex Mammal Surveys shows there are records for Common Pipistrelle, Soprano Pipistrelle, Noctule bat *Nyctalus noctula* and Daubenton's bat *Myotis daubentonii* within the data search area. The nearest record of roosting bats is approximately 400m to the north of the Site and this relates to a historic (1991) Pipistrelle *Pipistrellus sp.* roost.

5.4.58 No records were received from within the Site itself.

Badgers

5.4.59 A main Badger sett, comprising 15 entrances, was identified in the extended flood defence area to the west of the Mill complex during surveys in April 2010, as show on Figure 5.2.

5.4.60 There is also evidence that a culvert along the footpath through the arable fields to the northwest of the Site is occasionally used by Badgers, with evidence of prints and bedding noted outside the culvert entrances.

5.4.61 Two records of Badger setts were received from the Essex Badger Group for the wider search area. These are from 1995 and situated about 1.5km from the Site, across the Roach Estuary. Other Badger records were received from EECOS, although the majority are old records.

Water Vole

5.4.62 The section of the River Roach adjacent to the Site and the ditches within the Site do offer some potential although this is limited by their tidal nature. Nonetheless, the bank of the River Roach and ditches within the Site were subject to surveys for evidence of Water Voles and no evidence of use by this species was recorded during the survey work.

5.4.63 No records of Water Vole were received from within the Site. The nearest record is from 1998 located approximately 500m upstream of the Site along the River Roach.

Birds (including Black Redstart)

5.4.64 Only small numbers of common bird species were recorded within the Site, including Blackbird *Turdus merula*, Robin *Erithacus rubecula*, Great Tit *Parus major*, House Sparrow *Passer domesticus* and Green Finch *Carduelis chloris*. No Black Redstarts were recorded using the Site during the specific surveys. No Peregrines *Falco peregrinus* or Barn Owls *Tyto alba* were noted using the Site either.

5.4.65 The hedgerows and scrub habitats within the Site do represent suitable nesting habitat for common bird species. Nest remains for Feral Pigeon and House Sparrow were observed within buildings B1 and B2. Feral Pigeons are also prevalent in the other Mill buildings.

5.4.66 A single Redshank *Tringa totanus* was noted feeding on the mudflats adjacent to the Site in May 2008 and four Redshank were noted feeding on mudflats adjacent to the south of the Mill complex in April 2010. However, the majority of birds feeding on mudflats were noted to be within the SPA to the east with little use made of the area adjacent to the Mill complex.

5.4.67 Wetland Bird Survey (WeBS) data has also been received from the British Trust for Ornithology for the Crouch and Roach Estuaries SPA (see Appendix 5.7). This shows the relative use of the SPA, but does not indicate areas utilised specifically within the SPA.

5.4.68 In addition WeBS published a report in 2004/05 (see Appendix 5.8) that has details of the Crouch and Roach Estuaries low tide count information. It shows the distribution of Dark Bellied Brent Geese and Black-tailed Godwits throughout the estuary, in comparison to data from 1995/96. The distribution maps show that the Dark Bellied Brent Geese hardly used the upper Roach Estuary at all in either of the years surveyed. The Black-tailed Godwits use the upper Roach much more and particularly in the 2004/05 winter. However there is only very minor use by the Godwits in the area close to the Site.

5.4.69 Black-tailed Godwits have been shown to be fairly tolerant to disturbance from human presence[4]. Therefore, any Black-tailed Godwits that do utilise the estuary habitat close to the Site would likely be unaffected by the proposed development, although no use has been noted during any of the other species surveys.

5.4.70 Bird Data for the surrounding area was not received from the Essex Bird Watching Recorder.

Reptiles

5.4.71 Suitable habitat for this group is restricted to the vegetated habitat associated with the flood defence bunds along the southern boundary of the Site to the east and west of the Mill complex. Six Slow Worms *Anguis fragilis* were identified beneath wooden planks and plastic refugia found on the existing flood defence bunds to the east of the Mill complex in May 2008. Reptile surveys for the adjacent Coombes Farm application (margins of the fields) to the northwest of the Mill Site identified Slow Worm and Common Lizard *Lacerta vivipara* present and so they are considered very likely to be present on the flood bunds to the west of the Mill complex as well. However, the area to the west of the Mill complex has continued to be grazed intensively by horses reducing its current suitability for this group.

[4] Gill, J.A, Norris, K and Sutherland, W.J. (2001) The effects of disturbance on habitat use by black-tailed godwits *Limosa limosa*. *Journal of Applied Ecology* 2001

5.4.72 No records of reptiles were returned from LEHART specifically for the Site. Records of Slow Worm and Common Lizard were received from LEHART within the grid square containing the Site (only a four figure grid square was given) and from EECOS at Sutton Ford Bridge Pasture LoWS.

Great Crested Newt

5.4.73 There are records of Great Crested Newts *Triturus cristatus* within the data search area although none exist for the Site itself. The nearest record with a six-figure grid reference is from 2003 and is located approximately 1km to the northwest of the Site. There is a record from 2000 within the adjacent grid square (only a four-figure grid reference given) to the southwest of the Site.

5.4.74 There is no suitable aquatic (no ponds) habitat for Great Crested Newts within the Site. The ditches within the Site are not considered suitable for breeding purposes given their tidal nature. The ponds to the northeast of the Site are stocked with fish and as such do not present breeding opportunities for Great Crested Newt as the presence of fish would preclude this species through predation.

5.4.75 Any suitable terrestrial habitat for this species would be restricted to the scrub and vegetated areas associated with the flood bunds however given the absence of a suitable aquatic habitat nearby this species is not considered to be utilising the Site.

5.4.76 In light of the above, no further consideration to this species is given in this assessment.

Invertebrates

5.4.77 The vegetated sea wall was considered to offer some interest to invertebrate species (e.g. the LoWS citation) and a Phase I invertebrate survey was undertaken. The results of the survey are included at Appendix 5.9 and indicate that opportunities for notable invertebrates was low, with the only comment being that areas of unkempt mature Blackthorn (H5) had the potential to support Sloe Carpet *Aleucis distinctata* moth, which is a UK BAP priority and Notable/Nb species, with a southern and eastern distribution in England.

5.4.78 No further more detailed work has been recommended regarding invertebrates.

5.4.79 Data received from the Invertebrate Group shown there are records of a number of Red Data Book and UK BAP status invertebrates within the search area. There are records of Saltmarsh Horsefly *Atylotus latistriatus* (1994) for the LoWS. In addition, there are records for Long-horned Cleg *Haematopota grandis* (2005), Yellow-horned Horsefly *Hybomitra ciureai* (1986) and Cuckoo Bee *Sphecodes niger* Red Data Book flies and Cinnabar *Tyria jacobaeae* (2003), Dusky Thorn *Ennomos fuscantaria* (1984), Mouse Thorn *Amphipyra tragopoginis* (1984), The Rustic *Hoplodrina blanda* (1984) and Hedge Rustic *Tholera cespitis* (1984) UK BAP moths within the vicinity of the Site.

Other

5.4.80 Brown Rat *Rattus norvegicus* were identified as being present on the Site. Control measures are being employed to reduce numbers.

5.4.81 There is no evidence from the specific surveys undertaken at the Site, or from the desk study carried out, to suggest that any other protected or notable faunal species are present within the Site, particularly given the limited range and quality of habitats present.

5.5 Assessment of Potential Effects

5.5.1 This section identifies all likely significant effects, both during construction and post construction (positive and negative), such that any required mitigation can be identified where necessary.

The Principles of Site Evaluation

5.5.2 The methods and standards for site evaluation within the British Isles have remained those defined in 'A Nature Conservation Review' by Ratcliffe (1977). These are broadly used across the United Kingdom to rank sites, so priorities for nature conservation can be attained. Current SSSI designation maintains a system of data analysis that is roughly tested against Ratcliffe's criteria.

5.5.3 In general terms, these criteria are size, diversity, naturalness, rarity and fragility, while additional secondary criteria of typicalness, potential value, intrinsic appeal, recorded history and the position within ecological/geographical units are also incorporated into the ranking procedure.

5.5.4 Any assessment should not judge sites in isolation from others, since several habitats may combine to make it worthy of importance to nature conservation.

5.5.5 Further, relying on the national criteria would undoubtedly distort the local variation in assessment and therefore additional factors need to be taken into account, e.g. a woodland type with a comparatively poor species diversity common in the south of England may be of importance at its northern limits, say in the border county.

5.5.6 In addition, habitats of local importance are often highlighted within a local BAP. The Essex BAP highlights a number of habitats and where these occur within the Site, they are highlighted below.

5.5.7 Levels of importance can be graded at the international, national, regional, county or local level and in terms of low, medium or high value.

Designated Sites

Statutory Wildlife Sites

5.5.8 The nearest statutory designated nature conservation site is The Crouch and Roach Estuaries SSSI. This site is approximately 0.4km to the south-east of the Mill complex, adjacent to the eastern boundary of the site. It is also part of the Crouch and Roach Estuaries SPA / Ramsar Site and the Essex Estuaries SAC. This area is also part of the Mid-Essex Coast IBA (a non-statutory designation). By definition this site is of international ecological importance.

5.5.9 The Conservation of Habitats and Species Regulations 2010, referred to as the "Habitats Regulations" implement in Great Britain the requirements of the EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna, referred to as the "Habitats Directive" (Council Directive 92/43/EEC). The Regulations aim to protect a network of sites in the UK that have rare or important habitats and species in order to safeguard biodiversity.

5.5.10 Under the EC Habitats Directive, Member States are required to take special measures to maintain the distribution and abundance of certain priority habitats and species (listed in Annexes I and II of the Directive). In particular each Member State is required to designate the most suitable sites as SACs or SPAs. All such SACs and SPAs will form part of the Natura 2000 network under article 3(1) of the Habitats Directive.

5.5.11 Under the Habitats Regulations, competent authorities have a duty to ensure that all the activities they regulate have no adverse effect on the integrity of any of the Natura 2000 sites. Regulation 61 of the Habitats Regulations 2010 requires that:

> *"61(1) A competent authority before deciding to undertake, or give any consent, permission or other authorisation for a plan or project, which: -*

(a) is likely to have a significant effect on a European site or a European offshore marine Site (either alone or in combination with other plans or projects), and

(b) is not directly connected with or necessary to the management of that site,

must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.

...

61(5) In light of the conclusions of the assessment, and subject to regulation 62 (considerations of overriding public interest), the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

...

61(6) In considering whether a plan or project will adversely affect the integrity of the site, the authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given...."

5.5.12 The question of ascertaining whether a significant effect is likely at the screening stage, and in particular the issue of whether or not it is appropriate to consider avoidance and mitigation measures during the screening process (i.e. at Regulation 61(1) of the Habitats Regulations), has received considerable attention and been the subject of extensive debate, not least through a number of legal opinions offered by leading barristers.

5.5.13 In the High Court judgement passed in respect of Dilly Lane, Hartley Wintney, the judge, Mr Justice Sullivan, ruled that measures designed to avoid or mitigate adverse effects on the European site should be taken into account; if they are part of the plan or project, and should be considered at the screening stage since avoiding adverse effects on the European site is precisely what they are designed to do.

5.5.14 By supporting the principle that avoidance and mitigation measures should be considered at the screening stage, the judgement avoids the need for an appropriate assessment of each and every planning application.

5.5.15 In this case, the proximity of the Crouch and Roach Estuaries SPA / Ramsar site and the Essex Estuaries SAC has prompted consideration to be given to potential impacts on this Natura 2000 site in line with the above legislative context. This is the nearest statutory designated site to the Site.

5.5.16 The SPA, SAC and Ramsar sites are of value at the international level.

5.5.17 **Impacts**: It is considered that potential effects upon the qualifying features of the SSSI/SPA/SAC/Ramsar site could occur (without appropriate mitigation) through the following pathways:

- Modification of habitat – strengthening of flood defences
- Noise disturbance – construction and operational impacts;
- Recreational / Visual disturbance – construction and operational impacts;
- Air quality – construction and operational impacts;
- Light pollution – construction and operational impacts; and
- Hydrological Impacts.

5.5.18 These potential pathways are discussed in detail below, together with any mitigation measures where required.

Modification of Habitat

5.5.19 As cited in correspondence with Natural England the south-eastern corner of the proposed flood defences would fall within the SPA/SAC/Ramsar/SSSI boundary as the designated sites include the area

from the crest of the existing bunds towards the mud. As such, works to this part of the sea wall would modify a very small area of existing habitat within the SPA/SAC/Ramsar/SSSI and would require consent from the Environment Agency under the Coast Protection Act; Natural England would be a consultee.

5.5.20 Prior to mitigation, potential adverse effects are at the International level are of negligible - minor significance (being very localised).

5.5.21 **Mitigation.** A new flood defence bund is being constructed in place of the existing bund and this would be of a similar habitat to that existing, i.e. grassland. It is proposed that the new flood defence bunds (not just in this localised area adjacent to the SPA/SAC/Ramsar) will be enhanced through seeding with a flower-rich grassland mixture mimicking sea wall vegetation found within the Crouch and Roach Estuaries. The mix would be tailored to provide food sources for scarce butterflies and bumblebees and include flowers with both long and short corollas to provide nectar sources for both long-tongued and short-tongued bees. Efforts would be made to target Shrill Carder Bee *Bombus sylvarum* (a BAP and national red data book species) by including a mix of legumes such as Red Clover and Birds-foot Trefoil. The flood bund would be subject to an appropriate management regime as per trials by the Environment Agency at Paglesham, which involves a rotational mowing regime.

5.5.22 Following mitigation there would be no adverse effects on the SPA/SAC/Ramsar/SSSI.

Noise disturbance

5.5.23 Studies generally show that birds are disturbed by a sudden loud noise but have the ability to habituate (become accustomed to) to regular noises. For example, with specific regard to piling, which has the potential to create most noise during construction, this often consists of rhythmic "bangs", which, after a short period, birds will habitutate to[5]. Other research has also indicated that in general, birds appear to habituate to continual noises as long as there is no large amplitude 'startling' component[6].

5.5.24 In relation to monitored developments, e.g ABB Power Generation Ltd (Pyewipe), winter bird monitoring showed that there was no large-scale disturbance due to construction work on the site. Although two sudden events were seen to result in some localised disturbance responses this was not considered to have a major effect on surrounding bird populations and was found to be no greater than the effect arising from third party disturbance, including walkers and stopped cyclists, which were unrelated to the construction work[7]. Observations suggested that it was the initial sudden bang during piling activities, which caused the disturbance, and that subsequent bangs typically resulted in reduced disturbance, demonstrating habituation.

5.5.25 The findings in the above study were supported by other studies carried out for the Humber International Terminal development, which also indicated that the key factor in triggering disturbance was human presence[8]. Over 12 separate visits, disturbance by construction activities (which involved piling and reclamation of part of the foreshore) was observed on 3 occasions and in each case birds were disturbed over a small area and then rapidly resettled within the zone of disturbance (i.e. they did not leave the area). More recent surveys of the birds around the Immingham Outer Harbour in the Humber also indicated that such disturbance events are limited and are often attributable to non-Port related activities such as the presence of Peregrine Falcons or walkers on the mudflat[9].

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[5] ABP Research, 2001. ABP Grimsby & Immingham, Immingham Outer Harbour Environmental Statement. ABP Research & Consultancy Ltd, Research Report No. R.903.

[6] Hockin, D., Ounsted, M., Gorman, M., Keller, V., and Barker, M.A., 1992. Examination of the effects of disturbance of birds with reference to its importance in ecological assessments. Journal of Environmental Management, 36:253-286.

[7] ERM, 1996. South Humber Power Station, Pyewipe, Bird Monitoring Study, April 1996.

8 ABP Research, 2000. Humber Geomorphological Studies - Stage 2, 3D Modelling of Flows, Salinity and Sediment Transport in the Humber Estuary. ABP Research & Consultancy Ltd, Research Report No. R.854.

9 ABPmer, 2010. Humber Estuary: Environmental Management and Monitoring Plan: Data 2009 January 2010. ABP Marine Environmental Research Ltd, Report No. R.1587.

5.5.26 The ABP Teignmouth Quay Development estimated an approximate zone within which birds may be affected by disturbance from construction works (piling and dredging) to be typically about 200m[10]. The startling effects of sudden noise were quantified, based on published research, by the Environment Agency for the Humber Estuary Tidal Defences scheme. It was concluded that a sudden noise in the region of 80dB appears to elicit a flight response in waders up to 250m from the source, with levels below this of approximately 70dB causing flight or anxiety behaviour in some species. This may result in the effective loss of particular areas of habitat.

5.5.27 It is clear that it is only the initial sudden bangs, as opposed to 'constant audible disturbance' or the more rhythmic bangs once piling is in progress (to which birds readily habituate) that would cause disturbance to the birds. Such sudden bang noises are normally associated with driven piling techniques during the construction phase.

5.5.28 Disturbance can be particularly significant during periods of extreme weather. During severe weather, such as freezing conditions, birds need to feed constantly at low tide (a finite window of time) to maintain their energy levels. The concern is that disturbing roosting or feeding birds will cause them to fly away from feeding grounds or roosting sites resulting either in the loss of valuable feeding time and/or the expenditure of unnecessary energy in doing so.

5.5.29 The flood defence bund improvements would not involve the use of any piling activities with piling restricted to the area of the Mill complex e.g. for building foundations and potentially the works to the wharf wall. The Mill complex is over 250m from the SPA/SAC/Ramsar and, in any event, it is proposed to utilise open bore or continuous flight augured piling that is relatively vibrationless and does not give rise to sudden loud bangs. As such potential impacts in this regard are not relevant.

5.5.30 However, the flood defence works to the east of the Mill could generate noise that may potentially adversely affect feeding and roosting birds, particularly the works directly adjacent to the SPA/SAC/Ramsar.

5.5.31 Prior to mitigation, potential adverse effects are at the International level and are of minor significance (being very localised).

5.5.32 **Mitigation.** If necessary, works to the flood bund directly adjacent to the SPA/SAC/Ramsar/SSSI would be undertaken outside of the core winter months (November/December to February inclusive), i.e. when the bird interest is absent. Natural England will advise as to whether such restrictions are necessary and, if so, at what distance from the SPA/SAC/Ramsar this timing restriction of works should apply. It may be possible for construction work on the eastern flood bund to be undertaken during the core winter months provided no work takes place around high tide, when flocks of birds are pushed towards the Site and restricted to the mud-flats in the vicinity (whereas at low tide there will be alternative areas of mudflat available well away from the Site).

5.5.33 It is considered that works on the Mill complex itself and the flood bund defences to the west would not need to be restricted on this basis.

5.5.34 Following mitigation there would be no adverse effects on the SPA/SAC/Ramsar/SSSI.

Visual Disturbance

5.5.35 Birds often habituate readily to certain forms of constant visual disturbance such as repeated vehicle movements or other regularly moving objects, e.g. cranes. Such forms of visual disturbance therefore often have no significant effect on birds utilising the area around such activities.

5.5.36 Birds do not generally habituate readily to disturbance caused by unscreened views of the human form, i.e. silhouettes, and as such the potential for this disturbance type often need to be examined more closely. In this case, birds will have habituated to a degree to the baseline of people using the footpath along the northern edge of the SPA/SAC/Ramsar, whereby regular people movements are likely to be a daily occurrence throughout the year.

10 ABPmer, 2002. ABP Teignmouth Quay Development Environmental Statement. ABP Marine Environmental Research Ltd, Report No. R.984a.

5.5.37 It is considered that the Mill buildings are far enough away from the SPA/SAC/Ramsar as to render such potential effects insignificant. Further, it is considered that with the potential implementation of the timing restrictions on works to the flood bund east of the Mill complex adjacent/close to the SPA/SAC/Ramsar (as described above under 'Noise Disturbance') any visual disturbance would also simultaneously be avoided. In the event that timing restrictions are not considered necessary with regard to noise (see previous) then there is potential for some minor effects in this regard if works are undertaken during the core winter months.

5.5.38 Prior to mitigation, potential adverse effects are at the International level and are of negligible - minor significance (being very localised).

5.5.39 **Mitigation:** If considered necessary, screens could be erected behind contractors working on the eastern flood bunds adjacent/close to the SPA/SAC/Ramsar/SSSI to mask any silhouettes and avoid potential adverse impacts from unscreened views of human form.

5.5.40 Following mitigation there would be no adverse effects on the SPA/SAC/Ramsar/SSSI.

Recreational Disturbance

5.5.41 There are considered to be no potential significant deleterious effects to the qualifying features of the Essex Estuaries SAC through an increase in visitor pressure and land-based recreation disturbances. The condition assessment comment for the SSSI units associated with the SAC show that where a unit is in unfavourable condition; visitor pressure / recreation is not listed as an adverse factor. The unfavourable condition of units is principally as a result of inappropriate habitat management, and more commonly coastal squeeze. This is not surprising since access to much of the SAC by members of the public is limited by the very nature of the habitats, which are largely aquatic (estuary / marine). It can be concluded therefore that the habitats associated with the SAC are currently largely unaffected by recreational pressure. As such, it is considered that no specific mitigation in this regard would be necessary.

5.5.42 Bird species are the only designating feature of the Crouch and Roach Estuaries SSSI/SPA/Ramsar site which could potentially be impacted upon with regard to recreational disturbance. The Crouch and Roach Estuaries SSSI/SPA/Ramsar are primarily designated on account of its over-wintering bird populations and as such, it is considered that impacts are predominantly associated with the winter period. During winter, birds are more susceptible to adverse effects through disturbance, due to food sources being scarcer and efficient use of energy being of heightened importance to survival

5.5.43 A public footpath (the Roach Valley Way) which links with the Site via another public footpath runs adjacent to / along the flood bund which forms the northern boundary of the SSSI/SPA/SAC/Ramsar. This footpath is shown as National Trail / Recreational Footpath on the relevant OS map and is shown as a Public Right of Way on Figure 5.3, and it is possible that new residents could utilise this footpath for recreational purposes, including dog walking.

5.5.44 Habituation by birds to what could otherwise represent disturbance activities is well documented and given the recognised existing importance of this SSSI/SPA/Ramsar to birds and the fact that the coastal footpaths in this area are already subject to a regular level of pressure (designated National Trail / Recreational route), it is considered that any increase in visitor numbers associated with the proposed development would likely be of negligible significance to bird species. However, in the interests of providing a precautionary approach to potential impacts upon the SSSI/SPA/Ramsar, the proposed development has been designed in order to promote recreational usage of areas to the west away from the designated site.

5.5.45 Natural England has previously issued specific guidance regarding potential recreational disturbance on the Thames Basin Heaths Special Protection Area (TBHSPA). Whilst it is considered that the designating features and conservation objectives of the TBHSPA are different from those of the Crouch and Roach Estuaries SPA it is deemed that some of the principles of guidance relating to visitor pressure and disturbance can be utilised for such coastal SPAs.

5.5.46 Natural England guidance on the TBHSPA indicates that residents generally travel up to 5km for regular recreational activity. Accordingly, in the March 2010 meeting with Natural England a plan was tabled

that illustrates the abundance of alternative recreational resources in the area at this distance from the Site (see Figure 5.3). Recreational resources within this distance include:

- Cherry Orchard Jubilee Country Park;
- Magnolia Field Local Nature Reserve (LNR);
- Land Allocated as Existing Public Open space; and
- Various LoWS.

5.5.47 The above areas of land are both numerous in the local context and protected from future development, receiving protection through local planning policies (e.g. LT7 and NR7 (although the specific policy relating to Cherry Orchard Jubilee Country Park (LT3) has not been saved).

5.5.48 Cherry Orchard Jubilee Country Park, which will be a total of approximately 93 hectares (230 acres) in size, has had the first phase (around 40 hectares/100 acres) completed, with new notice boards, signage and leaflets to continue to be added as visitor numbers increase. The second (final) phase for the remaining area is ongoing and understood to be nearing completion, if not now completed.

5.5.49 According to Rochford District Council *"The park is taking shape out of a vision of turning an area of farmland into a public open space where everyone can enjoy all that the countryside has to offer. There are numerous public rights of way for walkers with much to see and enjoy."* There is also a car park available adjacent to the Country Park.

5.5.50 The Cherry Orchard Jubilee Country Park is to be situated 2.9km distance from the Site and will be promoted as part of the proposed development for recreational purposes as an alternative to the SPA. As the Country Park is also 'in construction' it provides a large area of alternative open space for the current population that may use the SPA, capable of reducing the current level of recreational pressure.

5.5.51 In the March 2010 meeting Natural England also highlighted that Hockley Woods, which is located just over 5km to the north-west (just beyond the boundary of Figure 5.3), provides a further recreational resource.

5.5.52 In addition to the Cherry Orchard Jubilee Country Park and Hockley Woods there are other allocated public open space areas in the vicinity allowing for recreation. These include part of Magnolia Field LNR. .

5.5.53 In particular, there are two allocated open space sites very close by to the west of the Mill complex (a reservoir and another parkland area adjacent to the River Roach at Rochford LoWS). These are roughly the same distance from the proposed residential element of the Site as the SPA/SAC/Ramsar/SSSI. The former is connected by the existing footpath to the south of the Roach whilst it is proposed that a new footpath be created along the new flood bund defences on the northern side of the Roach to link with the latter. These local routes would be strongly promoted for recreation as part of the proposed development.

5.5.54 Part of the Bridleway (27) that runs along the east side of the Mills complex and south over the River Roach is to be improved by way of a small diversion and with a new ramp up and over the proposed bund (with the footpath link maintained as per the current route with steps).

5.5.55 Off-site improvements will also be made to the footpath along Mill Lane if required for highway safety reasons and other contributions to Public Rights of Way are to be made (although not specified at this stage).

5.5.56 Finally, whilst the proposals at Coombes Farm were rejected on Appeal if they were to come forward in the future then this would provide a further 5.5ha plus of open space directly adjacent to the Mill Site as part of these development proposals. However, given the presence of the Cherry Orchard Jubilee Country Park to the west and other recreational resources cited above, the Site is not reliant on this area of open space coming forward to avoid potential impacts on the SPA/SAC/Ramsar/SSSI.

5.5.57 Work on the TBHSPA suggests that dog walkers require circular walks of approximately 2.3km – 2.5km. Accordingly on Figure 5.3 three circular walks of around this distance are shown from the

Stambridge Mills site (labelled W1 – W3) which do not pass by the SPA/SAC/Ramsar/SSSI. There are also other rights of way in the area that are also highlighted in the vicinity of the Mill Site, including footpaths, bridleways, byways and the Roach Valley Way. These routes offer a variety of different walking experiences in the area with walks possible along the Roach Valley, through a golf course (open landscape) / alongside Southend Airport and other areas of farmland. Indeed, for those desiring a long walk it is possible to walk to the Cherry Orchard Jubilee Country Park from the Site.

5.5.58 It is proposed that information will be made available to new residents through interpretation boards within the Site to identify the relative sensitivities of local natural resources and promote access away from the SPA.

5.5.59 Notwithstanding the above, Natural England stated in the March 2010 meeting that they do not consider that the proposed development is likely to result in any significant adverse recreational effects given it is a small, previously developed site with proposals for a predominance of flats. Reference was made to a recent Planning Inspectorate decision (APP/X1545/A/09/2105943/NWF) made on 1 December 2009 in relation to a development site in Maldon. The nature conservation aspects of the case are discussed at paragraphs 43 – 59, with paragraph 54 relating to the potential for recreational disturbance on the Blackwater Estuary SPA/Ramsar/SSSI in the context of flats and a corresponding reduction in the likelihood of dog ownership. This states *"While there could be dog owners within the development, this is unlikely to be large given that the accommodation would mostly comprise flats."*

5.5.60 It goes on to state that *"There is no direct link* [to the Blackwater Estuary SPA] *from the site and it is a considerable distance via a circuitous route to the north of the site."* It should be noted that there is no current footpath link to the SPA via the flood bunds to the east of the Mill complex, and people would have to take a circuitous route to the north to reach the SPA from the Mills Site. It is proposed that the eastern flood defences would remain fenced off so that access from the Mill Site is not undertaken informally in the future. A sign should also be placed on the fence stating that there is no formal right of way along the flood defences to the east, in order to further discourage such usage.

5.5.61 Whilst the mix of development since the 2010 meeting has changed such that the predominance of flats is now not as marked and thus dog ownership may be higher due to a greater number of family houses, in their March 2011 correspondence (Appendix 5.5) Natural England acknowledge that the total number of residents generated by the latest scheme would be reduced from that previously proposed and thus with all other aspects unchanged it is considered that the proposal would not likely give rise to a significant effect and thus Natural England would not likely object.

5.5.62 On the basis of the above it is not considered that the proposed development is likely to result in any significant adverse effects on the SPA/SAC/Ramsar/SSSI as a result of increased recreational pressures. As no significant impacts have been identified, no mitigation would be required.

Air Quality

5.5.63 Given the distance between the SPA/SAC/Ramsar and construction activity, it is predicted that there will not be any significant impact from dust deposition on habitats within the SPA/SAC/Ramsar. Specific measures are outlined in the mitigation section of Chapter 7: Air Quality, that would minimise the potential impact on other surrounding habitats. No further impacts in relation to air quality have been identified.

5.5.64 No significant impacts have been identified and no mitigation beyond that outlined in the air quality chapter would be required.

Light Pollution

5.5.65 The distance of the SPA / SAC / Ramsar Site from the Mill complex where the new residential dwellings are proposed means that the development would not be likely to have a significant impact upon qualifying species on the SPA/SAC/Ramsar during either the construction or operational phases.

5.5.66 In addition, the adopted lighting scheme will be designed to be generally low level and, if necessary, there will be a restriction of light to selected areas by fitting hoods that direct the light below the horizontal plane (preferably at an angle less than 70 degrees).

5.5.67 No lighting would be utilised during the construction of the flood defences and no lighting would be introduced to the defences during the operation phase.

5.5.68 No significant impacts have been identified and no further mitigation would be required.

Hydrological Impacts

5.5.69 The river frontage of the Mill Site will not change in shape and so is not likely to result in any hydrological effects downstream at the SPA/SAC/Ramsar.

5.5.70 It is considered that potential effects on the SPA/SAC/Ramsar from the construction phase of the proposed development are restricted to potential pollution entering hydrological systems that flow into / are connected to it. Potential water carried pollution could have detrimental effects on the nature conservation interest of the habitats, and subsequently the species within the designated site. Chapter 9 of this ES assesses the potential of pollutants entering watercourses and / or groundwater in the vicinity of the Site including systems, which flow into the Crouch and Roach Estuary. The significance of any pollution incident would be dependent on the severity of the pollution incident, the mitigation measures employed, timing of the mitigation and effectiveness of the mitigation measures. However, given the nature of the proposed development and given the sensitivity of the receiving water, normal pollution deposition or a pollution incident affecting nearby systems could result in a range of effects.

5.5.71 Prior to mitigation, potential adverse effects are on a site of International importance at a localised level and are of minor to moderate significance.

5.5.72 **Mitigation**: Safeguards will be put in place with regard to the storage and movement of materials, including fuels within the construction areas, are strictly adhered to ensuring the potential of contamination to ground water and surface water is minimised. An engineering strategy (standard practice), such as the use of interceptor fences, will be devised and implemented to ensure that no contaminated run-off, resulting from the construction activities, enters any hydrological systems.

5.5.73 Chapter 9 of this ES incorporates a range of mitigation measures to ensure that potential hydrological effects on the Crouch and Roach Estuaries are nullified. The drainage system will ensure that the flow rates and quality of any water entering the SPA/SAC/Ramsar will be of an acceptable standard. In order to implement the drainage strategy Land Drainage and additional Environment Agency Consents will be required and as such any such strategy will be subject to appropriate tests.

5.5.74 Following mitigation, potential adverse effects on the SPA/SAC/Ramsar would be of no significance.

Overall Impact on SPA/SAC/Ramsar/SSSI

5.5.75 Based on the above and with the range of mitigation measures proposed it is considered that any potential residual impacts would be reduced to a *de minimus* level. Therefore, it is unlikely that the proposals would result in a significant adverse effect on the SPA/SAC/Ramsar/SSSI either alone or in combination with any other plans or projects.

Non-Statutory Wildlife Sites

5.5.76 The proposed River Roach at Rochford LoWS lies partially within the Site boundary with the proposed flood defences and construction corridor to the west of the Mill complex passing through the four grassland compartments within the LoWS. The three eastern grassland compartments are species-poor grassland that have been severely overgrazed by horses. The westernmost compartment is relatively species-rich in comparison and is not subject to the overgrazing. The footprint of the proposed flood bund defences would be larger than the existing flood bund due to the request from the Environment Agency for a shallower gradient on the seaward facing wall (for ecological reasons) and, as such, a small section of each of the four ditches separating the compartments would need to be culverted. The ditch along the northern boundary of the LoWS would be unaffected by the sea wall proposals. The river corridor and associated areas of Reed and Saltmarsh (a priority habitat in the UK BAP) would be directly unaffected by the sea wall proposals. However, without mitigation there is potential for indirect effects during construction (e.g. silt deposition from adjacent works).

5.5.77 The LoWS designation also covers the mudflats (a national BAP habitat like Saltmarsh) adjacent to the existing artificial sheet-pile wharf walls of the Mill complex. The existing sheet piling will be replaced or reinforced with additional sheet piling. There are currently a number of options for the piled wall section:

1. To leave the existing sheet piled wall in and to clean and repair.

2. To pile outside the line of the existing wall, giving a new external wall and leaving the existing in situ – filling between with grout. This would result in a minimal land take of the mudflats (a matter of cm) adjacent to the existing wharf.

3. To pile inside the line of the existing wall and cantilever the deck over the top. Again the existing wall would be left in situ unless it was necessary to remove it.

4. To use an underpinning type sequence to withdraw the existing sheet piles and replace with new. In practice two lengths of sheet piling would be withdrawn initially, one new pile would be driven in and then one pile withdrawn and one driven in repeatedly along the length of the wall.

5.5.78 It is considered likely that either option 1 or 2 would come forward. Only option 2 would result in any direct effects to the adjacent mudflats and this would be very minimal/negligible.

5.5.79 The existing brick wall section around the culvert/bridge abutment has completely failed and fallen into the river. This would be removed and replaced with piling in the same way as the rest of the wall.

5.5.80 Given the proposal to introduce a footpath along the new flood bund defence there is the potential for greater pressures resulting from people walking along the new footpath, e.g. vegetation trampling. The saltmarsh, mudflat and riverine habitats do not lend themselves to recreation by walkers and so any impacts would be restricted to the grassland compartments. .

5.5.81 The next nearest non-statutory designated site is Doggetts Pond LoWS, which lies approximately 600m to the northwest of the Site. Sutton Ford Bridge Pasture LoWS is located approximately 700m south of the Site. These sites are sufficiently removed as to be considered unlikely to be affected by the proposed development.

5.5.82 By definition all of these sites are considered to be of local importance to wildlife, but given that LoWS are the replacement for the former Sites of Interest for Nature Conservation (a County designation) they could be considered of County value.

5.5.83 **Impacts**: Potential impacts are considered to be limited to effects on the River Roach at Rochford LoWS. Other non-statutory designated Sites are well removed from the Site. Potential impacts identified are limited to:

- Land take / Modification of habitat;
- Increased Recreational Pressure (vegetation trampling);
- Construction effects (e.g. silt deposition etc); and
- Hydrological effects.

5.5.84 Prior to mitigation, potential adverse effects are at the local to county level and are of minor to moderate significance.

Land take / Modification of Habitats

5.5.85 **Mitigation & Enhancements:** All works for the flood bund defences will be undertaken from the landward side with the construction area and access points illustrated on Figures 1.3a & 1.3b. This will avoid any direct impact / land take of the Saltmarsh/Riverine habitat in the adjacent section of the LoWS.

5.5.86 The loss of the existing grasslands within the LoWS will only be temporary whilst the walls are constructed. In addition, as cited with regard to the SPA/SAC/Ramsar above (Modification of Habitats) it is proposed to offset losses of primarily species-poor grassland and small sections of the ditches through the creation of grasslands on the new flood defence bunds with an enhanced botanical diversity with benefits for invertebrates. The grasslands would also be subject to appropriate management which would include the removal of the existing overgrazing by horses. The horses were also seen to be encroach and trample vegetation in the Saltmarsh and so these further pressures would also be removed. Overall, it is considered that the proposals would result in a significant net ecological benefit for the LoWS.

Recreational Pressure

5.5.87 **Mitigation:** Any trampling of vegetation will be along the main footpath through the grasslands which could result in patches of bare ground. The inclusion of bare ground areas, currently absent from the flood bunds, may actually be of benefit to invertebrates. In botanical terms, the proposals to create enhanced grasslands would more than offset potential trampling effects.

Construction Effects and Hydrological Effects

5.5.88 **Mitigation:** Mitigation in respect of issues such as dust deposition, contaminated run-off, pollution incidents and other potential hydrological impacts are discussed above in relation to statutory designated sites. These measures will also mitigate any potential adverse effects on the River Roach at Rochford LoWS and further details are provided in other relevant ES Chapters (e.g. Air Quality, Hydrology) and the construction method statement for the flood defence bund (Appendix 1.4).

5.5.89 Following mitigation and enhancements, potential effects are positive at the county level and of minor to moderate significance.

Habitats

Hardstanding

5.5.90 The Mill complex is dominated by hardstanding (and buildings) The existing hardstanding will be removed and replaced with habitats of a similar type as well as creating garden areas and other areas of amenity open space, which would have greater ecological value.

5.5.91 Such impacts are likely to be positive at the site level and of minor significance. No mitigation is required.

Buildings

5.5.92 Along with the hardstanding the buildings are the co-dominant feature at the Mill complex. The buildings on-site hold negligible ecological value. All the buildings were surveyed for their potential to support roosting bats, and there is no evidence to suggest that any roosts are present. There was limited use of some of the buildings by common bird species as nesting sites.

5.5.93 All the Buildings are to be demolished as part of the proposed development. The loss of the buildings is of no ecological significance, although consideration for the presence of nesting birds is necessary (see Birds).

5.5.94 As potential impacts would be at the site level and of no significance no mitigation is considered to be required.

Tall Ruderal Vegetation

5.5.95 A small patch of this habitat is present in the northeast corner of the Mill complex and would likely be lost to the proposed development as part of the landscaping scheme. This habitat is of low ecological value and any loss of this habitat by the proposed development will have no significant effect on the ecological value of the Site.

5.5.96 As potential impacts would be at the site level and of no significance no mitigation is considered to be required.

Hedgerows

5.5.97 Hedgerows are present around parts of the northern and eastern boundary of the Mill complex (H1 – H4). There is also a hedgerow present at the eastern end of the proposed flood defences (H5). Hedgerows are now a national BAP priority habitat. There are also some scattered trees.

5.5.98 Given the paucity of natural habitats within the Mill complex, this habitat is considered to be of greatest ecological value within the context of this part of the Site. However, none of these hedgerows would be classed as important under the Hedgerow Regulations 1997.

5.5.99 **Impacts:** The proposed development would not necessitate the removal of the existing boundary hedgerows although some removal may be desired as part of the landscaping scheme and to allow for the reconnection of the existing surface water drainage to the ditch on the eastern side of the Mill complex (e.g. H2).

5.5.100 Indeed, there may be some ecological benefit to the removal and replanting of certain hedgerows, e.g. H3 which comprises a fast growing non-native conifer that is of very limited ecological value, although it does have some limited value as a sheltered area for foraging bats and a nesting site for birds.

5.5.101 The proposed flood defence bund construction would necessitate the removal of the section of H5 within the footprint of the bund and associated construction area.

5.5.102 During the construction phase there is the potential for accidental damage to retained hedgerows from construction traffic.

5.5.103 Pre-mitigation, impacts are considered to be at the site/local level and of negligible to minor significance.

5.5.104 **Mitigation & Enhancements:** Where any sections of existing hedgerows or trees are to be lost then replacement planting would be provided. Indeed, in the majority of cases the removal and replanting of the hedgerows would be seen as beneficial to improve structure and species diversity in the long-term.

5.5.105 Where necessary, retained hedgerows and trees will be protected during construction using standard protective measures such as defined no-go areas for machinery, whereby a protection zone is demarked using appropriate fencing.

5.5.106 Areas of new planting, including native species, would also be provided within the areas of proposed open space/gardens.

5.5.107 The retained/enhanced hedgerows and new planting would be managed sympathetically to maximise biodiversity and to target a variety of faunal species (see below).

5.5.108 Following mitigation and enhancements, impacts are positive at the site level and are of minor significance.

Bramble Scrub

5.5.109 A small area of bramble scrub is present in the south of the Mill complex. The value of the isolated scrub habitat is very limited being dominated by a very common species that has encroached the area to the expense of the majority of other vegetation. Given the small size of the area of habitat its loss is not of ecological significance. However, again regard needs to be had for potential impacts on birds (see Birds section).

5.5.110 As impacts are at the site level and of negligible significance, no mitigation is required.

Grassland

5.5.111 Grassland to the west of the Mill complex, along the flood defence bunds, has been addressed as part of the consideration of impacts on the LoWS (Non-Statutory Sites). The area of grassland along the flood bunds to the east is relatively more diverse than the majority of that to the west of the Mill complex and is not covered by a LoWS designation.

5.5.112 This has also been partly discussed above with regard to impacts on the SPA/SAC/Ramsar site (Modification of Habitat).

5.5.113 **Impacts**: The existing but inadequate flood bund is to be replaced with a new bund and this would result in a loss of existing grassland from the new bund's footprint and associated construction area.

5.5.114 Prior to mitigation, excluding areas within the LoWS and SPA/SAC/Ramsar impacts on this receptor would be adverse at the site level and of moderate significance.

5.5.115 **Mitigation & Enhancement**: Enhanced grassland will be seeded on the new flood defence bund and this would be subject to an appropriate management regime with subsequent net ecological gains as previously described.

5.5.116 Following mitigation and enhancement, excluding areas within the LoWS and SPA/SAC/Ramsar, impacts would be positive at the site level and of moderate significance.

Arable

5.5.117 The area of arable habitat to the west of the Mill complex is not of ecological significance. As impacts would be at the site level and not of significance, no mitigation is required.

Adjacent Habitats

5.5.118 Habitats within the LoWS and the SPA/SAC/Ramsar have already been considered above.

5.5.119 There are other areas of saltmarsh and mudflats to the east of the Mill complex between the LoWS and the SPA/SAC/Ramsar that are not subject to any designation. Potential impacts on these habitats would be as described for the LoWS with the same mitigation proposed to avoid any direct impacts and mitigate any potential indirect construction effects. Further details are provided in the construction method statement for the flood defence bund and other relevant ES Chapters (e.g. Air Quality, Hydrology). Public footpath access to this area of the Site would not be proposed and, as described above, appropriate fencing and signage would be put in place to actively discourage any use by residents and impose a more circuitous route between the Mill complex and the SPA/SAC/Ramsar.

5.5.120 Following mitigation, potential effects are at the local level and of no significance.

<u>Impacts on Fauna</u>

Bats

5.5.121 **Legislation & Licensing**. All bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and included on Schedule 2 of the Habitats Regulations. These include provisions making it an offence to:

- Deliberately kill, injure or take (capture) bats;
- Deliberately disturb bats in such a way as to be likely to significantly affect:-

(i) the ability of any significant group of bats to survive, migrate, hibernate, breed or rear or nurture their young; or

(ii) the local distribution of that species;

- Damage or destroy any breeding or resting place used by bats;

- Intentionally or recklessly obstruct access to any place used by bats for shelter or protection (even if bats are not in residence).

5.5.122 The words deliberately and intentionally include actions where a court can infer that the defendant knew that the action taken would almost inevitably result in an offence, even if that was not the primary purpose of the act.

5.5.123 The offence of damaging or destroying a breeding site or resting place (which can be interpreted as making it worse for the bat) is an absolute offence. Such actions do not have to be deliberate for an offence to be committed.

5.5.124 Licences can be granted for development purposes by an 'appropriate authority' under Regulation 53 (e) of the Habitats Regulations. In the UK, the 'appropriate authority' is Natural England (the government's statutory advisors on nature conservation).

5.5.125 Licences can only be granted if the development proposals are in receipt of full planning permission and are for reasons of preserving public health or safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment. It must also be considered that:

(i) There is no satisfactory alternative;

(ii) The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

5.5.126 In some limited circumstances, consents may not be relevant or required or it may not be possible to resolve them in advance of making an application. As such, from 16 March 2009 Natural England has introduced a new licence condition (which will only be attached to a licence where appropriate) to ensure that licensed activities cannot begin before the relevant consents are secured.

5.5.127 Barbastelle *Barbastella barbastellus*, Bechstein *Myotis bechsteinii*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Noctule *Nyctalus noctula* and Horseshoe bats *Rhinolophus sp.* are UKBAP Priority Species.

5.5.128 **Site Usage.** No bat roosts (trees or buildings) have been found on the Site during any of the internal/evening emergence/activity surveys. Few roosting opportunities currently exist within the Site boundary for this group.

5.5.129 Very small numbers of common bats do forage/commute over the Site, primarily along the Hedgerows around the Mill complex. It is considered that the Site is currently not of great importance to foraging bats.

5.5.130 **Impacts:** Potential impacts from the proposed development on this group include small-scale loss of foraging/commuting habitat through hedge losses (see previous).

5.5.131 In addition during the operational phase of the proposed development disturbance to foraging and commuting habitat for bats may occur from light pollution, although Pipistrelle (recorded within the Site in low numbers) are generally tolerant of lighting and the lighting scheme is to be designed to be sympathetic to wildlife and minimise any spillage (see previous with regard to SPA/SAC)..

5.5.132 Prior to mitigation, impacts are on a European Protected Species at a local level and are predicted to be of minor significance.

5.5.133 **Mitigation & Enhancements**: New planting/gardens, management of existing features, and habitat creation will compensate for any loss of suitable foraging/commuting habitat to the proposed development and will provide enhanced foraging resources within the Site.

5.5.134 The lighting design for the proposed development will use low pressure sodium lamps in preference to high pressure sodium or mercury lamps along boundary features or, if this is not possible, UV filters would be fitted to mercury lamps. There would be minimised use of any upward lighting and restriction of light to

selected areas by fitting hoods that direct the light below the horizontal plane (preferably an angle less than 70 degrees). These measures will also avoid light spillage onto other features of ecological interest adjacent (e.g. the Estuary).

5.5.135 As a precaution, if more than one year has elapsed between the last bat survey and demolition of buildings B1 and B2, a further internal bat check for bats will be undertaken to ensure that a bat roost has not become established in the intervening period. In the unlikely event that a bat roost is found in any building on the Site, appropriate mitigation would be drawn up and a licence from Natural England sought for development activities.

5.5.136 Bat boxes will be erected on existing/ new planting or on poles at the boundary of the Site or other areas of open space to enhance roosting opportunities for this group.

5.5.137 Following mitigation and enhancements, impacts are positive at the European level and are of minor significance.

Badgers

5.5.138 **Legislation & Licensing.** The Protection of Badgers Act 1992 consolidates the previous Badgers Acts of 1973 and 1991. The legislation aims to protect the species from persecution, rather than being a response to an unfavourable conservation status.

5.5.139 As well as protecting the animal itself, the 1992 Act also makes the intentional or reckless destruction, damage or obstruction of a Badger sett an offence. A sett is defined as "any structure or place, which displays signs indicating current use, by a Badger". 'Current use' is defined by Natural England as any use within the preceding 12 months.

5.5.140 In addition, the intentional elimination of sufficient foraging area to support a known social group of Badgers may, in certain circumstances, be construed as an offence by constituting 'cruel ill treatment' of a Badger.

5.5.141 Local Authorities are therefore obliged to consult Natural England over any application that is likely to adversely affect Badgers.

5.5.142 Any work that disturbs Badgers is illegal without a licence granted by Natural England. Unlike the general conservation legislation, the Badgers Act 1992 makes specific provision for the granting of licences for development purposes, including for the destruction of setts.

5.5.143 Guidance produced by Natural England in 2002 developed guidelines on the types of activity that it considers should be licensed within certain distances of sett entrances. For example using heavy machinery within 30 metres of any entrance to an active sett, and lighter machinery within 20 metres, or light work such as hand digging within 10 metres, all may require a license.

5.5.144 More recent 'interim guidance' issued by Natural England in September 2007 specifically states "it is not illegal, and therefore a licence is not required, to carry out disturbing activities in the vicinity of a sett if no badger is disturbed and the sett is not damaged or obstructed."

5.5.145 The guidance goes on to state, "Where interference with a sett showing signs of use cannot be avoided during the development, a licence should be sought from Natural England."

5.5.146 Further clarification on disturbance activities was given in June 2009 guidance. However, this latest guidance no longer makes reference to any 30m/20m/10m radius as a threshold for whether a licence would be required. Nonetheless, it is known that tunnels may extend for 20m so care needs to be taken when implementing excavating operations within the vicinity of a sett and to take appropriate precautions with vibrations and noise, etc. Fires / chemicals within 20m of a sett should specifically be avoided.

5.5.147 The recent guidance allows greater professional judgement as to whether an offence is likely to be committed by a particular development activity and therefore whether a licence is required or not. For

example, if a sett clearly orientates southwards into an embankment it may be somewhat redundant to have a 30m-exclusion zone to the north.

5.5.148 It should be noted that a licence couldn't be issued until the site is in receipt of a full and valid planning permission and that generally licences are not granted between December and June inclusive to avoid disruption to the Badger breeding cycle.

5.5.149 **Site Usage.** There is evidence for the presence of a main sett on the periphery of the construction zone at the western end of the proposed flood defence bund.

5.5.150 The grasslands to the north (that include playing fields) and the arable areas to the north-west of the sett likely provide a foraging resource for Badgers utilising this sett, although the latter is more likely to be seasonal usage. The flood bund may also provide some foraging areas. Hedgerows within the wider area may also provide a further seasonal foraging resource, in terms of nuts and berries, as well as providing cover.

5.5.151 **Impacts.** The construction zone of the western flood defence bund would come directly adjacent to the main sett but the flood defence footprint would not directly impinge on the sett. The sett is located on a plateau adjacent to a hedge and a wooded plantation, and works in the area close to the sett are likely to be restricted to a top soil strip and proof rolling of the exposed formation prior to creation of the defence. Therefore although tunnels can emanate 20m from a sett entrance the activities proposed are unlikely to impact on the tunnel system.

5.5.152 The flood defence bund proposals would result in the loss of a small area of grassland that may be utilised by foraging Badgers, however, large expanses of grassland would remain within the wider area and it is clear that Badgers are not reliant on the existing flood bunds in this regard. Further, the loss of grassland is only temporary and would be reinstated once the new defences are constructed.

5.5.153 The proposed development would not sever any existing links to foraging areas and/or other setts in the local area.

5.5.154 The proposals for a footpath in close proximity to the sett would not likely result in any adverse effects as Badgers are known to be tolerant of this type of disturbance, building setts in gardens where children and pets regularly play as well as under roads and railways.

5.5.155 Prior to mitigation, impacts are at the County level and of minor significance.

5.5.156 **Mitigation & Enhancements**: The construction zone has been designed as far as possible to maximise the distance between the construction zone and the closest sett entrances. This would be marked out and taped off with hazard tape in advance of any works.

5.5.157 A licence from Natural England may be required for works to the flood defences within the vicinity of the main sett as this could constitute 'disturbance to a badger occupying a sett' depending upon the machinery to be used. The licence may also be required to cover potential damage to the tunnel system of the sett although this is considered unlikely.

5.5.158 The Mill Site would revert areas of current hardstanding to areas of open space/garden, that would include grassland, and this would likely provide further foraging resources for this species in the local area. However, mitigation is not reliant upon the creation of these grassland/gardens.

5.5.159 Planting of fruit/nut-bearing trees/shrubs as part of the landscape scheme or hedgerow bolster/replacement planting (see previous) could provide a further seasonal resource (although this needs to be considered carefully in the light of potential birdstrike issues – see below).

5.5.160 5.3.15. Following mitigation, impacts are at the County level and of no significance.

Birds

5.5.161 **Legislation**. Section 1 of the Wildlife & Countryside Act is concerned with the protection of wild birds. With certain exceptions all wild birds and their eggs are protected from intentional killing, injuring and taking; and their nests, whilst being built or in use, cannot be taken, damaged or destroyed.

5.5.162 Schedule 1 of the Wildlife & Countryside Act 1981 is a list of the nationally rarer and uncommon breeding birds for which all offences carry special (i.e. greater) penalties. These species also enjoy additional protection whilst breeding, as it is also an offence to disturb adults or their dependant young when at the nest.

5.5.163 **Site Usage.** Only common bird species have been recorded within the Site. These are known to utilise the buildings for nesting/roosting and are likely to utilise the hedgerows and, to a lesser extent, the isolated areas of scrub as a nesting and foraging resource.

5.5.164 House Sparrow, which were recorded at the Mill Site are UK BAP species and included on the Red List[11] of the Birds of Conservation Concern (published by the RSPB and others)[12]. A degree of non-statutory protection is afforded through planning policy to listed habitats and species. The statutory basis for listed BAP species and habitats is effectively provided by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 which requires the publication of a list of species of flora, fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity.

5.5.165 **Impacts**: The loss of scrub (e.g. to the flood bund proposals) and hedgerow would potentially impact upon nesting/foraging resources for some birds.

5.5.166 As the Site is within 13km of Southend Airport consultations have been carried out with the operator. Their scoping correspondence included reference to the likelihood of bird strike in relation to the Civil Aviation Authorities 'Safeguarding of Aerodromes: Advice Note 3'.

5.5.167 Impacts on birds utilising the Estuary are negligible, due to the fact that the level of use on the adjacent estuary, mudflats and saltmarsh is very low and includes species that are tolerant to a certain level of disturbance. The estuary utilised by a higher density of birds (i.e. the SPA/Ramsar) is at a distance where impacts would be *de minimus*, as agreed by Natural England (and as considered previously above with regard to 'statutory sites').

5.5.168 Prior to mitigation, impacts are at the local level and of minor significance.

5.5.169 **Mitigation & Enhancements:** Any tree or scrub (hedgerow) clearance work will not be carried out during the main nesting season (March to July, inclusive) unless prior checks of potential nesting areas are undertaken by an ecologist to ensure no nesting birds are present. Should nests be present, they will be protected until it can be confirmed that fledglings have left the nest.

5.5.170 The potential to enhance the Site for bird species has been carefully balanced with the need to prevent an increased risk to air safety and the operations of Southend Airport. New planting will provide compensatory/enhanced nesting and foraging opportunities for birds. Planting should be of a native species mix with only a few berry/nut bearing varieties, this will provide foraging opportunities in the future for birds, but with limited density to deter large foraging flocks (in line with CAP 772 and to ensure birdstrike risk is not increased). The landscaping scheme for the proposed development has been designed following the principles of CAP 772 such that it will not have any effect on the number or density of bird flocks, considered to represent a birdstrike risk (e.g. large wildfowl).

[11] Red listed species are those that are Globally Threatened according to IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery.

[12] http://www.bto.org/psob/bocc%202.pdf

5.5.171 Additional nesting opportunities will be created within the Site by the provision of 10 bird boxes, of varying designs, on new buildings or trees within the Site boundary. House Sparrow terraces will be included to mitigate for the loss of nest sites in the existing buildings.

5.5.172 Following mitigation and enhancements, impacts are positive at the local level and of minor significance.

Reptiles

5.5.173 **Legislation**. All six British reptile species receive a degree of legislative protection that varies depending on their conservation importance. Smooth Snake *Coronella austriaca* and Sand Lizard *Lacerta agilis* are highly localised in their distribution and receive full protection under the Wildlife and Countryside Act 1981 (as amended) and the Habitats Regulations 2010. Due to their specialised habitat requirements, there is no likelihood these species would be present within the Site.

5.5.174 Common Lizard, Slow Worm, Grass Snake *Natrix natrix* and Adder *Vipera berus* are much more common and widespread and are only partially protected under the Wildlife and Countryside Act 1981 (as amended) from:

- Intentional or reckless killing or injury; and
- Sale or other forms of trading.

5.5.175 The habitat of common reptiles receives no legal protection.

5.5.176 The common reptile species have been added to the proposed UK List of Priority Species.

5.5.177 The Essex BAP did not include action plans for any of the reptile species and no specific species action plans are to be drawn up in the emerging BAP.

5.5.178 **Site Usage**. A small number of Slow Worms have been found on the flood bunds within the Site. It is also known that the field margins of the area north/northwest of the Site (Coombes Farm) support low populations of Slow Worm and Common Lizard.

5.5.179 **Impacts**: There is potential to directly impact upon reptiles during the proposed flood defence works.

5.5.180 Prior to mitigation impacts are adverse on a nationally protected species at the local level and of moderate significance.

5.5.181 **Mitigation**: Implementation of a capture/relocation exercise will be undertaken to ensure no reptiles are killed or injured during the development activities. The footprint of the proposed flood defence bunds and construction corridor works will be cleared of reptiles prior to the works through an intensive capture exercise together with habitat manipulation and reptiles will be relocated to suitable adjacent areas. Reptiles will be able to recolonise the area once the works are complete and the management regime (and removal of grazing horses) should provide a more suitable habitat for this group.

5.5.182 Following mitigation, impacts are on a nationally protected species at the local level and of no significance.

Other Species

5.5.183 Following surveys and assessment of the Site there is not considered to be any relevant impacts relating Water Vole, Great Crested Newt or any other protected species.

5.5.184 **Impacts:** The only further potential impacts relates to the loss of habitat (mature Blackthorn) that could support the Sloe Carpet moth (a UK BAP species) through the impacts on H5. However, overall, the Phase 1 invertebrate assessment suggest that the Site is currently considered to be of negligible value to invertebrates and the opportunity could be taken to provide suitable habitats for notable invertebrates species within the area.

5.5.185 Prior to mitigation, impacts are potentially adverse at the local level and of minor significance.

5.5.186 **Mitigation & Enhancements:** Mature Blackthorn lost through impacts on H5 will be offset through the simple measure of replanting Blackthorn on the new flood defence bund or elsewhere within the Site.

5.5.187 The flood bund proposals provide the opportunity to significantly enhance the habitat present for invertebrates.

5.5.188 The addition of new planting will create habitats, and the addition of log piles, using material from any hedge removal/maintenance will enhance the Site for invertebrates

5.5.189 Following mitigation and enhancements, impacts are potentially positive at the local level and of moderate significance.

Overall Ecological Impact

5.5.190 Overall, it is considered that the majority of the Site is of low ecological value, although part includes a LoWS and a very small section of the SPA/SAC/Ramsar. With the mitigation proposed, the proposed development would not result in any adverse residual impact on habitats or species of any significance and there will be no net loss of features of ecological importance.

5.5.191 Where it is considered that there is a reduction in potential habitat for protected species, the proposed development will ensure that these are compensated for by replacement habitat of either equal size or greater quality.

5.5.192 Following mitigation and enhancement measures, as set out above, the overall impacts are considered to be positive at the local to county level and of minor - moderate significance and insignificant at the International level. The measures will ensure no net loss in Biodiversity terms.

5.6 Residual Effects

5.6.1 There are considered to be no significant adverse residual effects in ecology terms resulting from the development. Indeed, residual effects are considered to be positive at the local to county level and of minor to moderate significance (see Overall Ecological Impact above).

5.7 Cumulative Impacts

5.7.1 There are not deemed to be any significant cumulative impacts resulting from the development of the Mills site together with the adjacent Coombes Farm development should both sites ultimately be approved (indeed the Coombes Farm site was rejected on Appeal). The measures for the Mills site have been designed to offset any perceived impacts such that there are no significant adverse residual effects and thus negating any accumulation of significant adverse effects.

5.8 Summary

5.8.1 Overall, it is considered that the majority of the Site is of low ecological value, although part includes a LoWS and a very small section of the SPA/SAC/Ramsar. The new flood defences proposed provide the opportunity to enhance the ecological interest of the existing bunds (including areas within the designations) through creation of flower-rich grasslands and appropriate management.

5.8.2 The integrity of the SPA/SAC will remain unaffected by mitigating/avoiding potential adverse effects, e.g. to avoid disturbing activities during the more sensitive winter months in terms of noise and visual disturbance and standard measures to avoid air quality, light pollution and hydrological impacts. Significant

adverse recreational impacts are considered unlikely due to a number of factors outlined including the inclusion of flats within the scheme, the presence of alternative recreational resources in the vicinity, provision of interpretation boards to highlight sensitivities of the SPA/SAC and encourage recreational enjoyment at other locations and the circuitous nature of the existing link with the SPA/SAC.

5.8.3 All works for the proposed flood defences will be undertaken from the landward side to avoid direct adverse impacts on the LoWS habitats adjacent with measures to avoid indirect effects (e.g. air quality etc) on the SPA/SAC also serving to protect this receptor. Further, existing adverse pressures on the LoWS, such as horse overgrazing, would be removed following the development proposals. As such, overall it is considered there would be net gains in ecological terms for the LoWS.

5.8.4 The loss of habitats such as trees and hedgerows would be offset by compensatory planting with that being retained protected from accidental damage during construction such that following development the value of planting to wildlife would be enhanced.

5.8.5 No bat roosts are present within the site and only very limited foraging activity has been recorded within the site. The inclusion of an appropriate lighting scheme should avoid any adverse impacts with regard to foraging bats, although species recorded are relatively tolerant to lighting. The provision of new landscape features/gardens and provision of bat boxes would provide enhanced opportunities (roosting and foraging) for this group.

5.8.6 Badgers are known from the vicinity and licensing may be required for the flood defence construction activities due to presence of a main sett. Conversion of hardstanding areas to soft landscaping/gardens and incorporation of fruiting and other beneficial species in the landscape planting scheme should enhance foraging resources for this species.

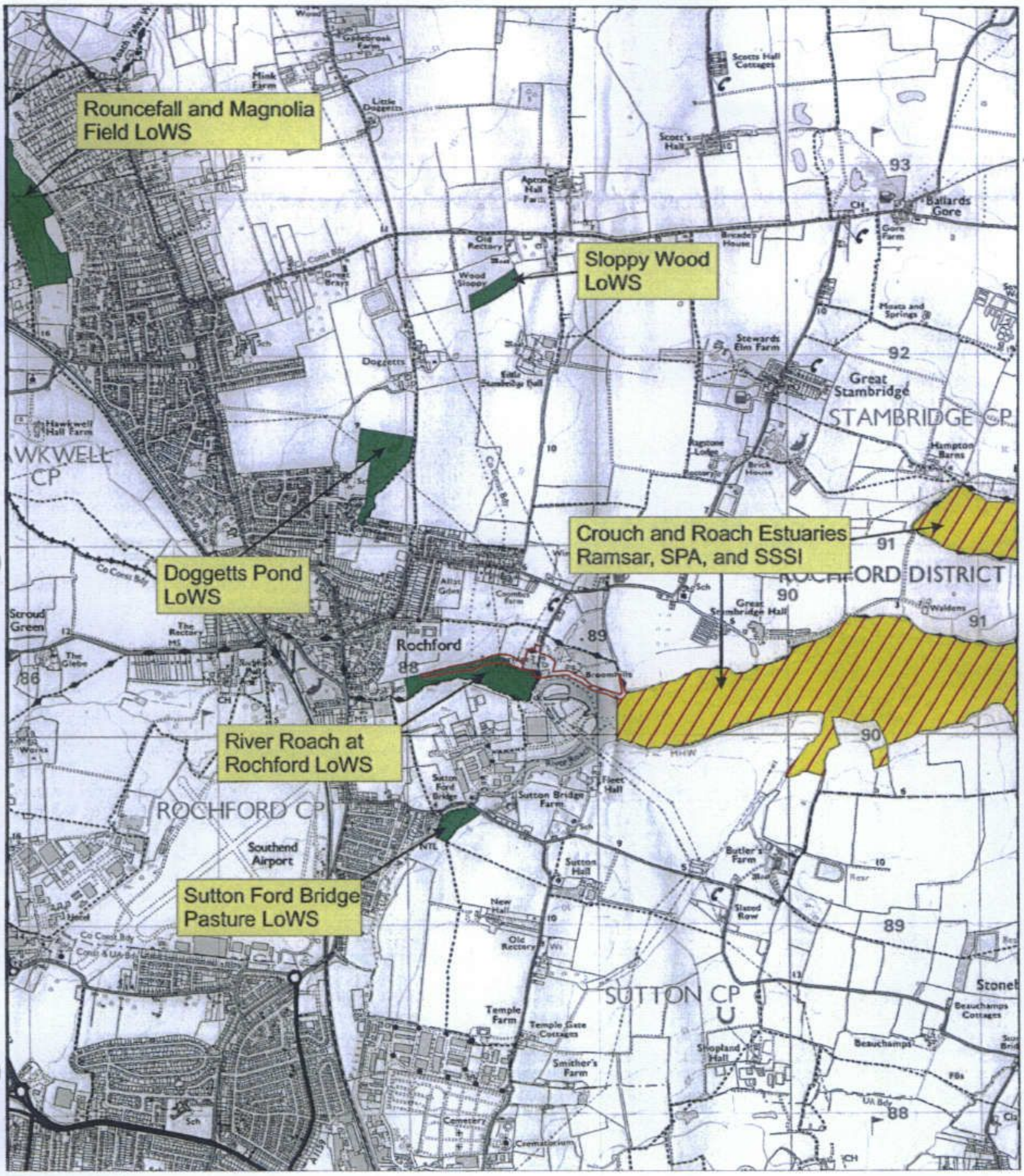
5.8.7 Measures have been put forward to avoid impacts on nesting birds and to enhance foraging and nesting opportunities post –development whilst having regard to potential birdstrike risk.

5.8.8 Presence of Slow-worms on the existing flood bunds and Common Lizard in the adjacent Coombes Farm site would require appropriate strategy of mitigation to avoid killing or injury during site clearance and construction.

5.8.9 With the mitigation proposed, the proposed development would not result in any adverse residual impact on habitats or species of any significance and there will be no net loss of features of ecological importance.

5.8.10 Where it is considered that there is a reduction in potential habitat for protected species, the proposed development will ensure that these are compensated for by replacement habitat of either equal size or greater quality.

5.8.11 Following mitigation and enhancement measures, the overall impacts are considered to be positive at the local to county level and of minor - moderate significance and insignificant at the International level. The measures will ensure no net loss in Biodiversity terms.



KEY

STUDY AREA LOCATION

SITE OF SPECIAL SCIENTIFIC INTEREST

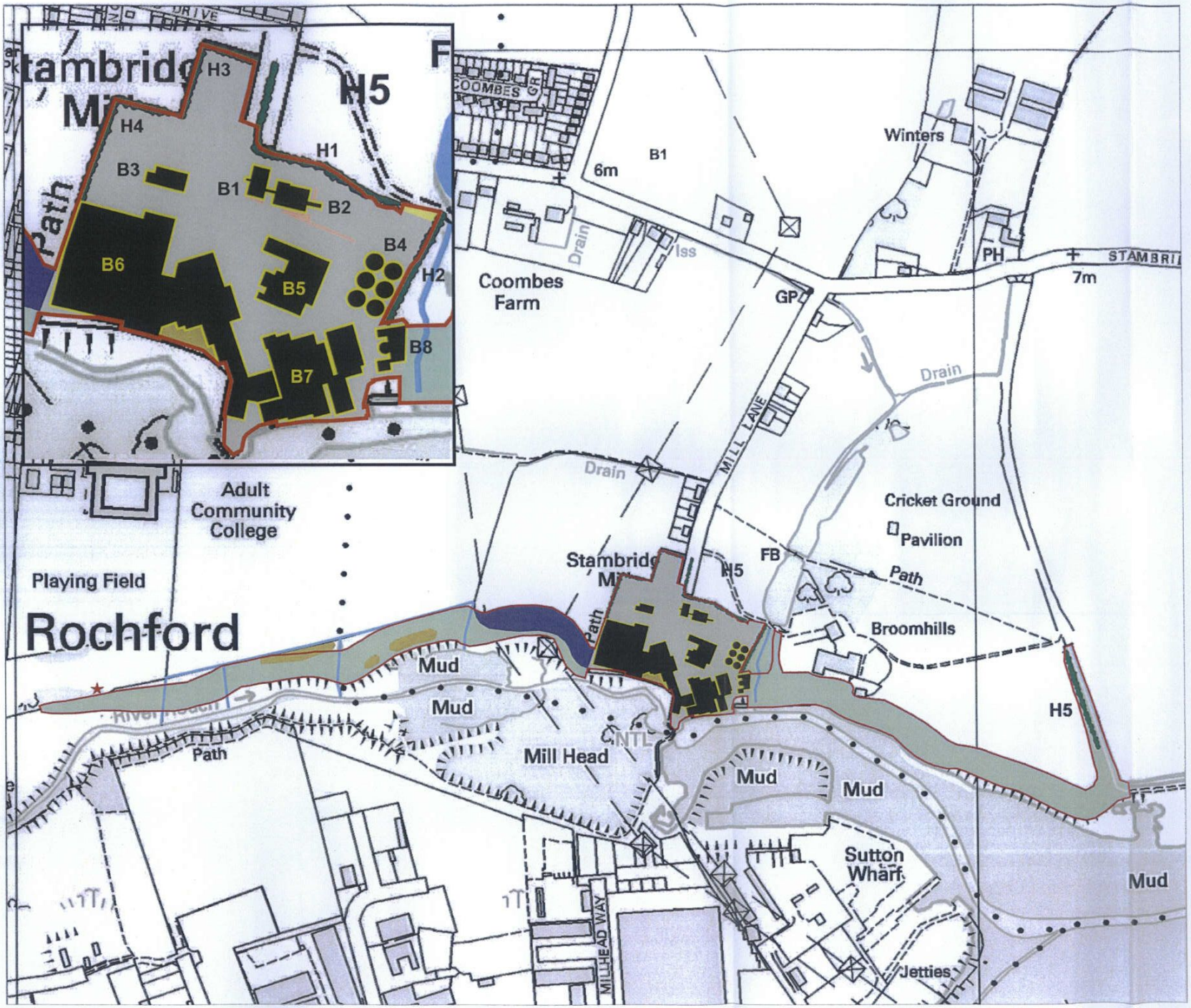
RAMSAR AND SPECIAL PROTECTION AREA (SPA)

LOCAL WILDLIFE SITES (LoWS)

5.1	FIGURE
Application Site Location & Ecological Designations	TITLE
1:1000 @ A3	SCALE
I.0105_43-1	DWG. NO.

N

Information based on all known constraints

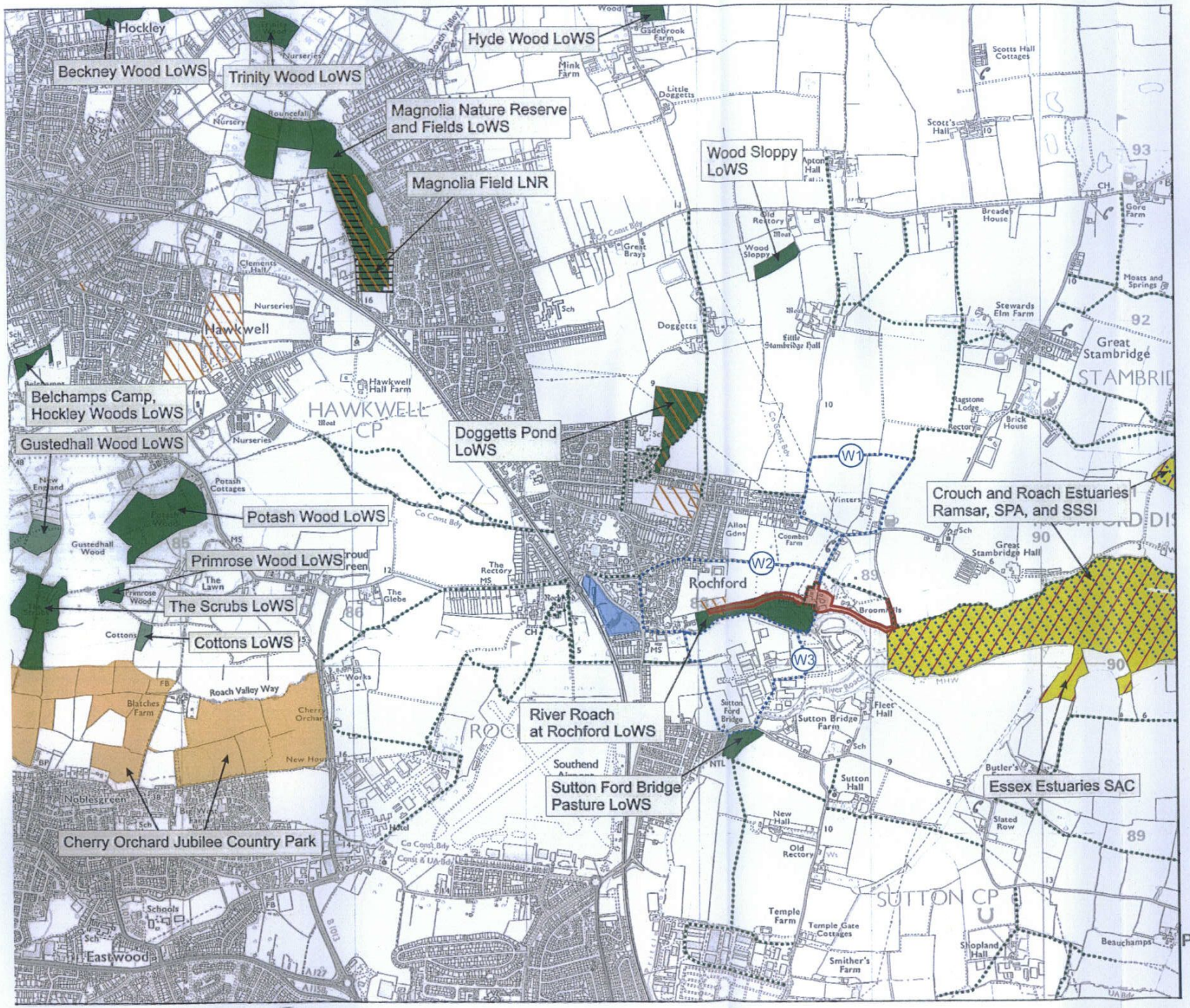


KEY

- STUDY AREA BOUNDARY
- BUILDINGS
- HARDSTANDING
- SEMI-IMPROVED GRASSLAND
- HEDGEROWS
- DITCHES
- TALL RUDERAL
- AMENITY PLANTING
- SCRUB
- ARABLE
- ★ APPROXIMATE LOCATION OF MAIN BADGER SETT

5.2	FIGURE
Ecological Features	TITLE
NTS @ A3	SCALE
I.0105_43-1	DWG. NO.

N



KEY

- SITE LOCATION
- RAMSAR & SPECIAL PROTECTION AREA (SPA)
- SPECIAL AREA OF CONSERVATION (SAC)
- SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)
- LOCAL NATURE RESERVES (LNR)
- LOCAL WILDLIFE SITE (LoWS)
- CHERRY ORCHARD JUBILEE COUNTRY PARK
- LAND ALLOCATED AS EXISTING OPEN SPACE
- EXISTING CIRCULAR WALK
- PUBLIC RIGHTS OF WAY WITHIN ~2.5KM WALKING RADIUS

N

5.3	FIGURE
Recreational Land, Designated Sites & Potential Circular Walks	TITLE
NTS @ A3	SCALE
I.0105_43-1	DWG. NO.

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

6 TRANSPORT

6.1 Introduction

6.1.1 Steer Davies Gleave has been appointed by Inner London Group to prepare a Transport Assessment and Travel Plan for the development of 96 residential units at Stambridge Mills in Rochford, Essex.

6.1.2 This section of the ES has been prepared by Steer Davies Gleave and assesses the environmental effects of the proposed residential development at Stambridge Mills and following completion and full occupation of the site. The background data presented within this section are covered in detail in the Transport Assessment (TA) produced to support the planning application and included at Volume 3 of this ES.

6.1.3 Although the development proposals will generate a number of trips to and from Stambridge Mills, the environmental effects of these trips will be minimal, other than the environmental effects arising from their mode of travel. In the main, people will travel by car, but facilities for sustainable modes of travel including travel by public transport, walking and cycling will be enhanced to encourage these modes and this is reflected within the Travel Plan (TP) document, also submitted as part of this application. Several mitigation measures are also proposed within the TA which will enhance the existing transport facilities to promote the accessibility of the site by all modes, with a view to reducing (single-occupancy) car travel. As such this ES has focused on assessing the environmental effects of the motorised vehicle.

6.1.4 The methodology adapted in assessing the environmental effects of the proposed development is as set out in the Institute of Environmental Assessment (IEA) document "Guidelines for the Environmental Assessment of Road Traffic".

6.2 Transport Policy

6.2.1 The TA and TP, submitted as part of this planning application, consider the transport policy in detail. Therefore, only a summary of the documentation relevant to the assessment of Stambridge Mills is presented in this ES section. Policy at national, regional and local levels consistently promotes the concept of sustainable development with accessibility by all travel modes.

6.2.2 The TA has been prepared with regard to the following policy documents:

- Planning Policy Statement 3 (PPS3): Housing (2010);
- Planning Policy Guidance 13 (PPG13): Transport (2011);
- Essex Second Local Transport Plan (LTP2) 2006-2011 (2006);
- The Essex Transport Strategy: the Local Transport Plan for Essex (2011);
- Rochford District Replacement Local Plan (2006); and
- East of England Plan: The Revision to the Regional Spatial Strategy for the East of England (2008).

6.3 Assessment Approach

6.3.1 The TA addresses the traffic and transportation implications of the Stambridge Mills proposals and both the TA and TP highlight measures which would be introduced to mitigate the impacts of the development and enhance the overall sustainability of the scheme.

6.3.2 The transport issues related to the Stambridge Mills proposals have been assessed using the significance criteria set out below.

Significance Criteria

6.3.3 In terms of assessing the environmental effects of traffic generated by the Stambridge Mills (and other committed developments), the IEA identifies that the following impacts should be considered:

- Severance
- Driver delay
- Pedestrian delay
- Pedestrian amenity
- Accidents and Safety
- Fear and intimidation
- Hazardous Loads

6.3.4 The impact of the Stambridge Mills proposals has been assessed using an impact scale of substantial, moderate and minor. Occasionally, where it assists in describing the level of impact, a negligible category has also been used.

6.3.5 There is no accepted definition of what constitutes a substantial, moderate or minor impact. Therefore definitions for the scale of impact are provided below for each IEA criterion to be considered within this section of the ES.

6.3.6 These terms are generally used to define the level of impact arising from traffic and transport. An exception to this is the assessment of severance, where impacts are defined as substantial, moderate or slight. A definition for these terms is provided below.

6.3.7 Each impact will also have a geographical consideration ranging from local through to national and international.

6.3.8 Also, when considering the potential impacts, these have been defined in terms of duration: short-medium term impacts could equate to those experienced during construction period; long-term impacts could equate to those to be experienced either beyond the construction period or upon completion and occupancy of the proposed development.

6.3.9 Finally, for each impact consideration has been given as to whether it is significant or insignificant in respect of its effects. For example; in theory high traffic flows may lead to substantial pedestrian delay, but if there are no pedestrians then this substantial impact may have an insignificant effect.

a. Severance

6.3.10 Severance is defined in the IEA guidelines as "the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to minor traffic flows if they impede pedestrian access to essential facilities" (IEA, p.34).

6.3.11 The Manual of Environmental Appraisal (MEA) approach, as described by the IEA, sets out a range of indicators for determining the significance of severance:

- Slight impact: Change in traffic: 30% or above;
- Moderate impact: Change in traffic: 60% or above;
- Substantial impact: Change in traffic: 90% or above;

6.3.12 No other categories are provided.

b. Driver Delay

6.3.13 Driver delay has been determined through interrogation of junction model outputs contained within the TA and as summarised within this section of the ES.

6.3.14 Given that no definition has been given for substantial, moderate or minor impact in the IEA Guidelines, the following definitions have been used based on professional judgement and the general perception of delays:

- Substantial impact: Change in delay: +90 seconds or above.

- Moderate impact: Change in delay: +60 to +90 seconds.
- Minor impact: Change in delay: +30 to +60 seconds.
- Negligible impact: Change in delay: -30 to +30 seconds.

c. Pedestrian Delay

6.3.15 No specific thresholds are provided within the EIA guidelines for assessing Pedestrian Delay and the guidelines recommend that "assessors use their judgement to determine whether pedestrian delay is a significant impact".

d. Pedestrian Amenity

6.3.16 Pedestrian amenity is "broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic" (IEA, p. 36). Within the IEA reference is made to the application of the MEA threshold which judges the significance of the changes to pedestrian amenity where traffic flow is either halved or doubled. No other definitions are provided.

6.3.17 With reference to the MEA thresholds, the following definitions have been used to assess impact of the proposals on pedestrian amenity:

- Substantial impact: Change in traffic: +50% or above
- Moderate impact: Change in traffic: +30% to +50%
- Minor impact: Change in traffic: +10% to +30%
- Negligible impact: Change in traffic: -10% to +10%

e. Fear and Intimidation

6.3.18 Fear and intimidation is considered within the IEA to be dependent on the volume of traffic, the proportion of heavy goods vehicles (HGVs), proximity to people or the lack of protection caused, for instance, by factors such as narrow pavement widths, poor crossing facilities and dangerous/inadequate pedestrian access points.

6.3.19 In the absence of any commonly agreed threshold the IEA recommends the use of the Halcrow Fox and Associates HFA (1990) methodology, which is shown in Table 6.1 below:

Table 6.1: Assessment of Fear and Intimidation

Degree of Hazard	Average Traffic Flow over 18-hr Day (veh/hr)*	Total 18-hr HGVs Flow (veh)*	Average Speed over 18-hr Day (miles/hr)
Extreme	1800+	3000+	20+
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15

* Two-way flow

6.3.20 Based upon the HFA thresholds set out in Table 6.1, the following definitions have been used to assess impact of the proposals on fear and intimidation levels:

- Substantial impact: Average hourly traffic flow – 1800+ vehicles
- Moderate impact: Average hourly traffic flow – 1200-1800 vehicles
- Minor impact: Average hourly traffic flow – 600-1200 vehicles
- Negligible impact: Average hourly traffic flow – up to 600 vehicles.

f. Accidents and Road Safety

6.3.21 No accident analysis has been undertaken as this was not requested by Essex County Council (ECC) Highways at the scoping stage.

g. Hazardous Loads

6.3.22 Although the need for transportation of hazardous loads has yet to be determined, it is anticipated that should the transportation of hazardous loads be required, then these movements would be confined to the main highway network to minimise impacts on the local road network wherever possible.

6.4 Baseline Conditions

6.4.1 The local road network generally consists of semi-rural and urban roads.

6.4.2 The key roads surrounding the site and Rochford town centre are:

- Mill Lane;
- Stambridge Road;
- East Street;
- North Street;
- South Street;
- West Street;
- Southend Road; and
- Sutton Road.

6.4.3 Details of the local highway network are provided within the TA.

6.4.4 Vehicles can access the site through Mill Lane, which connects the proposed development site to Stambridge Road and which provides links to Rochford town centre.

6.4.5 The site is bounded by Mill Lane to the North, a care home to the east, the River Roach to the south and agricultural land to the west.

6.4.6 The main access to the west is via the A127 Southend Arterial Road south of Rochford. The A127 provides links to the wider Essex area via the A130 and the A13 and a direct connection to the M25 (Greater London).

6.4.7 A series of Manual Classified Counts (MCCs) and Automatic Traffic Counts (ATCs) were undertaken to determine current traffic levels.

6.4.8 The AM and PM peak hour traffic flows have been used to determine the baseline conditions of the local highway network against which the future scenarios are assessed.

6.4.9 There are car parking spaces proposed for the Stambridge Mills development (including a minimum of 12 disabled car parking spaces), a minimum of 108 cycle parking spaces and a minimum of 9 motorcycle parking spaces.

6.4.10 Rochford railway station is approximately 1.6 km west of the development site. Rochford station is accessed via Bradley Way. Southend is situated approximately 7km to the south of the site.

6.4.11 Train services from Rochford are operated by National Express East Anglia, providing links to Southend, the wider Essex area and London.

6.4.12 Bus services in the local area are provided by Arriva and Stephensons of Essex. The nearest bus stop to the site is situated in Stambridge Road, at the junction with Mill Lane, approximately 380m from the site. This stop is served by route 60 which travels between Rochford to Southend and Paglesham via Rochford.

6.4.13 Two bus route 60 services operate Monday to Friday during the AM peak (between 0700-1000 hours) between Rochford and Southend-on-Sea.

6.4.14 During the off-peak period (1000-1600 hours), there is one service approximately every two hours and there is one service during the PM peak period (1600-1900 hours). The last service is at 1622 hours.

6.4.15 Route 60 services run approximately every two hours on Saturdays, between 0942 and 1426 hours. There are no services on Sundays/

6.4.16 For Route 60 services between Rochford and Pagelsham, there is one service during the AM peak period (0700-1000 hours), at 0915 hours and during the PM peak period (1600-1900 hours). The last service is at 1720 hours.

6.4.17 Route 60 services between Rochford and Pagelsham operate approximately every two hours during the weekday off-peak period (1000-1600 hours) and on Saturdays between 0932 and 1555 hours. No services operate on Sundays.

6.4.18 Stambridge Road has a dedicated footway, is subject to the national speed limit and connects the site with Rochford Town Centre approximately 1.4 km to the west. Mill Lane has an adjoining footpath to the west providing a direct link via Rocheway to the town.

6.4.19 To the south of the site is a footbridge over the River Roach, which links via a footpath to the Purdeys Industrial Estate.

6.4.20 There are two cycle routes in the area: 1) Shoebury Circular Route and 2) the Ashingdon to Hanningfield Reservoir cycle route. Both cycle routes pass through Rochford.

6.4.21 Manual Classified Turning Counts (MCCs) were undertaken on Thursday 10 June 2010 from 0700 to 0930 and 1630 to 1830 hours at the following junctions

- Mill Lane / Stambridge Road; and
- North Street / East Street / South Street / West Street

6.4.22 This data has been supplemented by the traffic counts used in the Transport Assessment for the neighbouring application at Coombes Farm undertaken in 2009 at the Bradley Way / South Street and Southend Road / Sutton Road (Anne Boleyn) roundabouts. This application has now been withdrawn, however the traffic surveys from the application will still be used to inform the junction assessments.

6.4.23 The anticipated year of completion is 2016. The future year base flows have been factored up using NRTF central growth factors, locally factored by TEMPRO (details of which can be found in the TA). Assessment of the trips characteristics has been used to examine the impact of the development.

6.4.24 The impacts of the proposals on the highway network have been assessed for a weekday AM and PM peak hour at the following junctions:

- Priority junction of Mill Lane/Stambridge Road (site access);
- East Street/South Street/West Street/North Street crossroads;
- South Street / Southend Road / Bradley Way; and
- Southend Road / Sutton Road

6.4.25 Three planning applications have recently been submitted for large residential developments in Rochford. One is for land north of Hall Road (to the west of Rochford town centre) which provides for up to 600 residential units, one is for 150 units on Brays Lane to the north of Rochford town centre and the third is for land on Rectory Road, north west of the town centre. The application submitted for the Rectory Road site proposed 330 units, which was subsequently rejected. However, this site has been earmarked for 175 units by the council. Similarly, the proposal at Brays Lane is to be withdrawn and resubmitted at approximately 100 residential units. However, as part of this assessment, committed development traffic generation has been taken from the previously submitted Brays Lane TA, which proposed 150 units and therefore assumes a worst case assessment.

6.4.26 Due to the size and proximity of these developments to Stambridge Mills, and their impact on the local highway network, we have included the forecasted vehicular trip generation from these developments within our trip calculations for Stambridge Mills. For the Rectory Road and Brays Lane sites we have

included the latter number of units of 175 and 150 respectively, as earmarked by the Council within our assessment.

6.4.27 Due to the proximity and location of these sites, they have been considered in this assessment for the Stambridge Mills application, to provide a 'worst case' evaluation of cumulative impacts to the transport network.

6.4.28 The capacity and operation of the junctions within the network have been tested using appropriate junction assessment software for the following scenarios within the TA:

- 2011 Base Year;
- 2016 Five Years after Base (no developments);
- 2016 Five Years after Base with Stambridge Mills only; and
- 2016 Five Years after Base with Stambridge Mills, Brays Lane, Rectory Road and Hall Road developments.

6.4.29 The baseline flows (2011) for the weekday AM and PM peaks are presented in Table 6.2 respectively. The flows presented within the tables are the total two-way vehicle flows on each of the network links.

6.4.30 The results of the junction assessments are provided within the TA and a summary is given later in this chapter.

Table 6.2: Existing (2011) Two-Way Traffic Flows on Nearby Roads

Location	% HGVs		Direction	Vehicular Flows	
	AM Peak Hour	PM Peak Hour		AM Peak Hour	PM Peak Hour
Stambridge Road (East of Mill Lane Junction)	4%	3%	2-way	296	229
Stambridge Road (West of Mill Lane Junction)	4%	3%	2-way	313	246
Mill Lane (south of Stambridge Road)	0%	8%	2-way	23	25
North Street (north of town centre junction)	1%	1%	Northbound	300	509
East Street (east of town centre junction)	3%	3%	Westbound	674	404
South Street (south of town centre junction)	3%	1%	2-way	779	738
West Street (west of town centre junction)	5%	4%	westbound	205	194
Southend Road (north of Sutton Road)	4%	3%	2-way	1941	2135
Sutton Road (east of Southend Road)	5%	2%	2-way	1947	1633
Southend Road (South of Sutton Road Junction)	5%	2%	2-way	1482	1472

6.4.31 The link that is most heavily trafficked locally during the AM and PM peak hour is Southend Road, with traffic flows of 1,982 and 2,135 respectively.

6.5 Construction Impacts and Mitigation

Potential Impacts

Demolition and Construction

6.5.1 The construction phase will require demolition of existing infrastructure and excavation through to construction, fit out and occupation.

6.5.2 This ES considers the movement of construction vehicles including the removal of spoil and materials from the Site and the import of building materials.

6.5.3 At this stage it has not been possible to provide estimates of vehicular movements associated with this process and therefore no assessments of the impacts of construction vehicles has been undertaken.

6.5.4 Construction vehicles would utilise the existing Site access on Mill Lane to Stambridge Road. All construction traffic entering and leaving the Site would be closely controlled ensuring the safety of pedestrians and other road users. Some loss of pedestrian amenity would be anticipated but no additional road crossing delays surrounding the Site would be expected, because all construction routes have low pedestrian flows and access to all bus stops is to be maintained. There could be some additional fear and intimidation where heavy vehicles are moving through areas with high concentrations of pedestrians. The overall impact of construction vehicles on pedestrian amenity would likely be of short-term minor adverse significance.

6.5.5 Deliveries to the Site would be carried out within normal site working hours where ever possible, and would where possible avoid peak travel times. Provision would be made to ensure that unloading of vehicles can be carried out on-Site wherever possible. Deliveries would be phased and controlled on a 'just in time' basis. This would minimise travel time around the Site and any associated noise and would prevent any parking whilst waiting on the street. All transportation to and on the Site would be on rubber-tyre vehicles to prevent damage to the highway and wheel washing plant or other would be used before vehicles leave unpaved sites.

6.5.6 The number of construction workers on-Site at any one time would depend upon the phasing of the development. To minimise traffic from Site staff, there would be a general policy of no car parking on Site and the labour force would be encouraged to use public transport, such as National Rail to Rochford station and then a site mini-bus service to shuttle operatives to the site. No parking on public roads would be allowed and the Contractor/Construction Manager would collaborate to enforce this. Provision would be made within the Site for essential on-Site parking. Site personnel would access the Site via security controlled gates, which would be segregated from vehicular access. The overall impact of construction workers on the transport network would likely be of short-term minor adverse significance.

6.5.7 Whilst no long-term road closures are envisaged, short term closures may be required in order to transport abnormal loads. If these are required, they would be undertaken at weekends or during evenings to minimise disruption to traffic and consent would be obtained from Rochford District Council (RDC) and ECC. Notice would be given by the Contractor to RDC and ECC, and other emergency services in advance of the required closure or diversion dates.

Mitigation Measures

Demolition and Construction

6.5.8 An Environmental Management Plan (EMP) would be implemented prior to commencement of demolition and construction works. This would be approved and enforced by the Council under a planning condition in the planning permission sought. This would ensure that:

- Haulage routes minimise impacts to sensitive receptors;

- Deliveries would arrive on a 'just in time' basis and where possible ensure deliveries arrive out of peak hours;
- Provision would be made to ensure that vehicles can be unloaded on the Site wherever possible, rather than on the adjacent roads;
- River barges would be used wherever feasible;
- The Site labour force would be encouraged to use public transport, and therefore parking for construction workers would be restricted;
- All transportation to and from the Site would be on rubber–tyred vehicles; and
- If short–term road closures to allow for deliveries and the installation/removal of tower cranes on the Site are required, consents would be obtained from RDC and ECC prior to this occurring.

Residual Impact Assessment and Conclusions

Demolition and Construction

6.5.9 There would be an increase of HGV movements during demolition and construction. Management strategies formed as part of the EMP would be implemented to ensure that any environmental impacts associated with their movements to and from the Site are minimised.

6.5.10 These would include a routing agreement to ensure that the most appropriate route is used between the Site and spoil processing/disposal site, along with wheel–washing and restricting the hours of operation. There would be a **short term minor adverse impact** along the designated routes.

6.6 Key Impacts and Likely Significant Effects

6.6.1 The supporting TA describes the number of trips which would be generated by the Stambridge Mills proposals. Traffic distribution and assignment of the additional trips onto the local network is also described in further detail in the TA.

6.6.2 The TA considers the combined future impacts on the local highway as a result of the 600 residential units on the land at Hall Road to the west of Rochford town centre, the 150 residential units on Brays Lane to the north of Rochford, and 175 units on Rectory Road, north west of the town centre.

6.6.3 Table 6.3 compares the link flows on the local highway network for the weekday AM and PM peaks for the scenarios previously mentioned.

6.6.4 Table 6.4 shows the net change in flows associated with the development scenarios

6.6.5 For the 2016 Future Scenario + Stambridge Mills development, Table 6.3 shows that the maximum peak two-way flow is 2,284 vehicles, which occurs in the PM peak hour on Southend Road, north of Sutton Road. However, Table 6.4 shows that the net increase in flows on Southend Road (north of Sutton Road) is only 26 vehicles (+1%).

6.6.6 For the 2016 Future Scenario + Stambridge Mills + Committed development, Table 6.3 shows that the maximum peak two-way flow is 2,313 vehicles, which occurs in the AM peak hour on Southend Road, north of Sutton Road. Table 6.4 shows that the net increase in flows on Southend Road (north of Sutton Road) is 269 vehicles (+13%) as a result of the committed developments.

6.6.7 For the 2016 Future Scenario + Stambridge Mills + Committed developments, the flows on Mill Lane (south of Stambridge Road) would be 62 and 73 vehicles for AM and PM peak periods respectively. This represents a net increase of approximately 158% and 170%, respectively (compared to the 2016 Base Future scenario). It can therefore be concluded that increased traffic flows on Mill Lane would have a substantial impact. However, it should be noted that the existing flows on Mill Lane are currently very low and the junction assessment illustrates that the flows associated with the Stambridge Mills development can be accommodated within the existing network capacity.

6.6.8 For the 2016 Future Scenario + Stambridge Mills + Committed developments, the flows on Mill Lane (south of Stambridge Road) would be 62 and 73 vehicles for AM and PM peak periods respectively. This

represents a net increase of approximately 158% and 170%, respectively (compared to the 2016 Base Future scenario). It has been assumed that there will be no vehicles associated with the committed developments using Mill Lane. It can therefore be concluded that increased traffic flows on Mill Lane would have a substantial impact. These flows are associated with the Stambridge Mills development, as Mill Lane will be the main access to the site. However, as mentioned above the existing flows are currently very low on Mill Lane and the junction assessment illustrates that the flows associated with the Stambridge Mills development can be accommodated within the existing network capacity.

Table 6.3: Estimated Two-Way Link Vehicular Flows Summary Table – Future Scenarios Weekday AM and PM Peak Hours

Location	Direction	Future Year 2016 Base		Future Year 2016 Base + Stambridge Mills		Future Year 2016 Base + Stambridge Mills + Committed Developments	
		AM Peak Hour (Vehicles)	PM Peak Hour (Vehicles)	AM Peak Hour (Vehicles)	PM Peak Hour (Vehicles)	AM Peak Hour (Vehicles)	PM Peak Hour (Vehicles)
Stambridge Road (East of Mill Lane Junction)	2-way	311	242	313	244	313	244
Stambridge Road (West of Mill Lane Junction)	2-way	329	260	367	303	367	303
Mill Lane (south of Stambridge Road)	2-way	24	27	62	73	62	73
North Street (north of town centre junction)	Northbound	316	537	330	562	330	562
East Street (east of town centre junction)	Westbound	710	427	736	443	736	443
South Street (south of town centre junction)	2-way	820	779	847	812	847	812
West Street (west of town centre junction)	Westbound	216	204	217	205	217	205
Southend Road (north of Sutton Road)	2-way	2044	2255	2068	2284	2313	2284
Sutton Road (east of Southend Road)	2-way	2050	1725	2050	1726	2117	1726
Southend Road (South of Sutton Road Junction)	2-way	1561	1554	1584	1584	1762	1584

Table 6.4: Net Change in Link Flows to 2016 Base Future Scenario – Weekday AM and PM Peak Hours

Location	Direction	Future Year 2016 Base + Stambridge Mills				Future Year 2016 Base + Stambridge Mills + Committed Developments			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Net Change (Vehicles)	% Change	Net Change (Vehicles)	% Change	Net Change (Vehicles)	% Change	Net Change (Vehicles)	% Change
Stambridge Road (East of Mill Lane Junction)	2-way	2	1%	2	1%	2	1%	2	1%
Stambridge Road (West of Mill Lane Junction)	2-way	38	12%	43	17%	38	12%	43	17%
Mill Lane (south of Stambridge Road)	2-way	38	158%	46	170%	38	158%	46	170%
North Street (north of town centre junction)	Northbound	14	4%	25	5%	14	4%	25	5%
East Street (east of town centre junction)	Westbound	26	4%	16	4%	26	4%	16	4%
South Street (south of town centre junction)	2-way	27	3%	33	4%	27	3%	33	4%
West Street (west of town centre junction)	Westbound	1	0%	1	0%	1	0%	1	0%
Southend Road (north of Sutton Road)	2-way	24	1%	29	1%	269	13%	29	1%
Sutton Road (east of Southend Road)	2-way	0	0%	1	0%	67	3%	1	0%
Southend Road (South of Sutton Road Junction)	2-way	23	1%	30	2%	201	13%	30	2%

6.6.9 The following junctions have been tested for the existing and future scenarios:

- Mill Lane/Stambridge Road;
- East Street/South Street/West Street/North Street crossroads;
- South Street / Southend Road / Bradley Way; and
- Southend Road / Sutton Road.

6.6.10 Details of the junction modelling are included within the TA. The results show that the Mill Lane/Stambridge Road junction has sufficient capacity to accommodate peak hour demand both in the existing and future year scenarios, as does the North Street / East Street / South Street / West Street junction in the town centre. The results for the South Street / Southend Road / Bradley Way junction demonstrate it will operate within capacity with just the Stambridge Mills development traffic and will operate just within capacity with the addition of both the Stambridge Mills and committed development traffic in future years. The Southend Road arm will however be approaching capacity when the committed development scenario is assessed.

6.6.11 At the Southend Road / Sutton Road junction the results show the junction operates within capacity with just the Stambridge Mills traffic and will operate over capacity with the addition of the committed development traffic in 2016 scenario in both the AM and PM peak hours. The Sutton Road arm of the roundabout will be over capacity and large queues will form during both the AM and PM peak hours, although in with just the Stambridge Mills proposals the junction would continue to operate within capacity.

Parking

6.6.12 There are 199 car parking spaces proposed for the Stambridge Mills development (including a minimum of 12 disabled car parking spaces), a minimum of 108 cycle parking spaces and a minimum of 9 motorcycle parking spaces. These are all provided in accordance with Essex County Council's local minimum standards.

a. Severance:

6.6.13 Using the range of MEA indicators for determining the significance of severance, as described in the IEA, Table 6.5 summarises the impact associated with the change in traffic flows for the 2016 + Stambridge Mills scenario and 2016 + Stambridge Mills + Committed Development scenario.

6.6.14 Table 6.5 shows that the change in flows on the routes will generally be under 30%, with the change in traffic flow only being in excess of 90% on one link (Mill Lane).

6.6.15 The potential impacts during the post-completion period would be local, with the magnitude of the impacts being principally on Mill Lane and Stambridge Road. Potential impacts during operation of the new development affect the town centre network and then dissipate elsewhere. The impacts would be typically of a medium-term to long-term impact, but the change in traffic flows would be predominantly of negligible impact, with a substantial impact on one link (Mill Lane).

b. Driver Delay:

6.6.16 The junction assessment results for the 2016 future scenarios without the committed development demonstrate that the 2016 + Stambridge Mills development scenario will result in an average delay of 0.01 minutes per vehicle in the AM peak and 0.01 minutes per vehicle in the PM peak for the Stambridge Road/Mill Lane junction, which would have a negligible impact. With the inclusion of the committed developments, the average delays remain at 0.01 minutes per vehicle during both the AM and PM peak hours and thus would have negligible impact.

6.6.17 For the East Street/South Street/West Street/North Street junction, the 2016 + Stambridge Mills development scenario will result in no additional delays in the AM and PM peak hours, and thus would have no impact. With the inclusion of the committed developments, there would be no additional delays in the AM peak hour, and 0.01 minutes per vehicle additional delay in the PM peak hour, thus resulting in a negligible impact.

6.6.18 The junction assessment results for the 2016 future scenarios without the committed developments demonstrate that there will be no additional delays in the AM peak hour and 0.01 minutes per vehicle in the PM peak for the South Street / Southend Road / Bradley Way junction, which would have a negligible impact. With the inclusion of the committed developments, the average delays increase to 0.02 minutes per vehicle during the AM peak hour and 0.05 minutes per vehicle during the PM peak hour and thus would have a negligible impact.

6.6.19 For the Southend Road / Sutton Road junction, the 2016 + Stambridge Mills development scenario will result in 0.01 minutes per vehicle additional delay during both the AM and PM peak hours, and thus would have negligible impact. With the inclusion of the committed developments, the delays increase to 0.25 minutes per vehicle in the AM and 0.13 minutes per vehicle in the PM peak hour thus resulting in a negligible impact.

c. Pedestrian Delay:

6.6.20 No specific thresholds are provided within the EIA guidelines for assessing Pedestrian Delay and the guidelines recommend that "assessors use their judgement to determine whether pedestrian delay is a significant impact".

6.6.21 Pedestrian improvements including enhancement to existing footways and new footways will ensure that the pedestrian impact is minimal.

d. Pedestrian Amenity:

6.6.22 The impact of pedestrian amenity has been assessed using the change in traffic flows following development.

6.6.23 As shown in Tables 6.3 and 6.4, the most significant changes in traffic flows will occur on Mill Lane south of Stambridge Road, as this will be the main access to the proposed site. Mill Lane will experience a 158% increase in traffic flows in the AM peak and 170% increase in flows in the PM peak for the 2016 + Stambridge Mills development. This would represent a substantial impact on pedestrian amenity. Mill Lane currently has a low level of flows (23 two way movements in the AM and 25 in the PM peak hours). The change in traffic flows on all other local roads shown in the tables will have negligible impact on pedestrian amenity.

e. Fear and Intimidation:

6.6.24 Fear and intimidation is considered within the IEA to be dependent on the volume of traffic, the proportion of HGVs, proximity to people or the lack of protection for people and pedestrians.

6.6.25 Table 6.2 shows the proportion of HGVs as a percentage of the 2011 existing flows.

6.6.26 The 2016 + Stambridge Mills development scenario will result in an increase in flows on each link of less than 600 vehicles per link, which would have a negligible impact.

6.6.27 The 2016 + Stambridge Mills + committed development scenario will result in an increase in flows on each link of less than 600 vehicles per link, which would also have a negligible impact.

f. Accidents and Road Safety:

6.6.28 No accident analysis has been undertaken. However, it is considered that there may be benefits to be accrued from the implementation of the proposed improvements (such as dedicated cycle/ foot ways) mentioned earlier within this Chapter.

g. Hazardous Loads:

6.6.29 Although the need for transportation of hazardous loads has yet to be determined, it is anticipated that should the transportation of hazardous loads be required, then these movements would be confined to the main highway network to minimise impacts on the local road network wherever possible.

Table 6.5: Summary of Impact of Change in Traffic Flows

Link	Direction	Future Year 2016 Base + Stambridge Mills				Future Year 2016 Base + Stambridge Mills + Committed Development			
		AM Peak Hour (%)	Impact	PM Peak Hour (%)	Impact	AM Peak Hour (%)	Impact	PM Peak Hour(%)	Impact
Stambridge Road (East of Mill Lane Junction)	2-way	1%	Negligible	1%	Negligible	1%	Negligible	1%	Negligible
Stambridge Road (West of Mill Lane Junction)	2-way	12%	Negligible	17%	Negligible	12%	Negligible	17%	Negligible
Mill Lane (south of Stambridge Road)	2-way	158%	Substantial	170%	Substantial	158%	Substantial	170%	Substantial
North Street (north of town centre junction)	Northbound	4%	Negligible	5%	Negligible	4%	Negligible	5%	Negligible
East Street (east of town centre junction)	Westbound	4%	Negligible	4%	Negligible	4%	Negligible	4%	Negligible
South Street (south of town centre junction)	2-way	3%	Negligible	4%	Negligible	3%	Negligible	4%	Negligible
West Street (west of town centre junction)	Westbound	0%	None	0%	None	0%	Negligible	0%	Negligible
Southend Road (north of Sutton Road)	2-way	1%	Negligible	1%	Negligible	13%	Negligible	1%	Negligible
Sutton Road (east of Southend Road)	2-way	0%	None	0%	None	3%	Negligible	0%	Negligible
Southend Road (South of Sutton Road Junction)	2-way	1%	Negligible	2%	Negligible	13%	Negligible	2%	Negligible

6.7 Mitigation and Enhancement

6.7.1 The TA report describes and assesses the mitigation measures that will be introduced to prevent the proposals resulting in material impacts on the local highway network. In addition, the TA and TP identify a raft of multi-modal measures that will enhance the accessibility of the site by sustainable modes. This will be achieved through the enhancement and provision of public transport (bus) services, cycle and walking routes and facilities.

6.7.2 The proposed improvements and Travel Plan will help reduce the environmental effect of the proposals. These are discussed in more detail below.

Proposed Improvements

6.7.3 To accommodate predicted increased levels in vehicular traffic resulting from the development proposals, four junctions have been assessed to examine their highway capacity and to ensure the forecast development traffic can be accommodated.

6.7.4 Details of the junction analysis are provided within the TA. In summary, these show that all local roads are able to accommodate anticipated levels of traffic generated by the proposals, with insufficient capacity only anticipated in 2016 at the Southend Road / Sutton Road junction with the inclusion of traffic generated by the committed development proposals.

6.7.5 Bus routes and frequencies will be reviewed to ensure that the site is accessible and to provide sustainable travel options to residents and visitors.

6.7.6 Linkage for pedestrians is considered fundamental in respect of promoting public transport.

6.7.7 Walking routes will also be provided, with dedicated footways constructed in, through and around the development to ensure permeability into and across the site. It is therefore proposed that a shared use footway/cycleway is installed along Mill Lane. This will provide a safe traffic free link from the development to the bus stop for pedestrians. It will also provide a designated route for cyclists from the development to Stambridge Road. The provision of a permissive path along the top of the flood bund from the development site west towards Rochford will be considered pending discussions with third party land owners.

6.7.8 Provision of significant levels of safe and secure cycle parking on-site will encourage the use of this mode. Motorcycle parking will also be provided.

6.7.9 It is considered that these mitigation measures will reduce the environmental impact of the development to mostly *negligible*. In terms of significance, none of the residual impacts are considered to have a significant long term environmental effect.

Travel Plan

6.7.10 A Residential Travel Plan (RTP) has been developed to support the Stambridge Mills proposals and to encourage the use of sustainable travel to and from the site.

6.7.11 The overall objective of the RTP is to facilitate sustainable travel to and from Stambridge Mills by residents and visitors.

6.7.12 A range of measures have been proposed within the RTP to achieve this objective. These measures include provision/extension of bus services and facilities (including bus routes and bus stops), car sharing, new walking routes and cycling routes/facilities and improvements to existing walking and cycling routes/facilities. This will enhance the accessibility of the site significantly to enable and encourage residents and visitors to choose more sustainable modes other than driving alone.

6.7.13 A Review and Monitoring Programme is also proposed for the RTP to determine the impacts of the Travel Plan and to assess the progress of the RTP, as the document evolves over time.

6.7.14 An Action Plan is also included within the RTP which sets out the implementation programme of the TP.

6.8 Summary

a) Introduction

6.8.1 Steer Davies Gleave has been appointed by Inner London Group to prepare a Transport Assessment and Travel Plan for the development of 96 residential units at Stambridge Mills in Rochford, Essex.

6.8.2 This section of the ES has been prepared by Steer Davies Gleave and assesses the environmental effects of the proposed residential development at Stambridge Mills and following completion and full occupation of the site. The background data presented within this section are covered in detail in the Transport Assessment (TA) produced to support the planning application and included at Volume 3 of the ES.

6.8.3 Although the development proposals will generate a number of trips to and from Stambridge Mills, the environmental effects of these trips will be minimal, other than the environmental effects arising from their mode of travel. In the main, people will travel by car, but facilities for sustainable modes of travel including travel by public transport, walking and cycling will be enhanced to encourage these modes and this is reflected within the Travel Plan (TP) document, also submitted as part of this application. Several mitigation measures are also proposed within the TA which will enhance the existing transport facilities to promote the accessibility of the site by all modes, with a view to reducing (single-occupancy) car travel. As such this ES has focused on assessing the environmental effects of the motorised vehicle.

6.8.4 The methodology adapted in assessing the environmental effects of the proposed development is as set out in the Institute of Environmental Assessment (IEA) document "Guidelines for the Environmental Assessment of Road Traffic".

b) Baseline Conditions

6.8.5 The local road network generally consists of semi-rural and urban roads. The key roads surrounding the site and Rochford town centre are:

- Mill Lane;
- Stambridge Road;
- East Street;
- North Street;
- South Street;
- West Street;
- Southend Road; and
- Sutton Road.

6.8.6 Vehicles can access the site through Mill Lane, which connects the proposed development site to Stambridge Road and which provides links to Rochford town centre.

6.8.7 The site is bounded by Mill Lane to the North, a care home to the east, the River Roach to the south and agricultural land to the west.

6.8.8 The main access to the west is via the A127 Southend Arterial Road south of Rochford. The A127 provides links to the wider Essex area via the A130 and the A13 and a direct connection to the M25 (Greater London).

6.8.9 A series of Manual Classified Counts (MCCs) and Automatic Traffic Counts (ATCs) were undertaken to determine current traffic levels. The AM and PM peak hour traffic flows have been used to determine the baseline conditions of the local highway network against which the future scenarios are assessed.

6.8.10 Rochford railway station is approximately 1.6 km west of the development site. Rochford station is accessed via Bradley Way. Southend is situated approximately 7km to the south of the site. Train services

from Rochford are operated by National Express East Anglia, providing links to Southend, the wider Essex area and London. Bus services in the local area are provided by Arriva and Stephensons of Essex. The nearest bus stop to the site is situated in Stambridge Road, at the junction with Mill Lane, approximately 380m from the site. This stop is served by route 60 which travels between Rochford to Southend and Paglesham via Rochford.

6.8.11 Stambridge Road has a dedicated footway, is subject to the national speed limit and connects the site with Rochford Town Centre approximately 1.4 km to the west. Mill Lane has an adjoining footpath to the west providing a direct link via Rocheway to the town.

6.8.12 To the south of the site is a footbridge over the River Roach, which links via a footpath to the Purdeys Industrial Estate.

6.8.13 There are two cycle routes in the area: 1) Shoebury Circular Route and 2) the Ashingdon to Hanningfield Reservoir cycle route. Both cycle routes pass through Rochford.

c) Likely Effects and Mitigation

6.8.14 This assessment shows that the impact of changing traffic volumes and patterns associated with the Stambridge Mills development would typically not result in an impact greater than slight/minor. However, this excludes an analysis of accidents, although the small increase in vehicular flows and their residentially related nature would mean there would likely be little difference to the base.

6.8.15 Impacts in terms of severance, driver delay, pedestrian amenity, and fear and intimidation are mainly negligible to minor throughout, with the exception of severance and pedestrian amenity on Mill Lane, largely as a result of the low existing vehicular flows. However, with the introduction of a shared foot/cycleway on Mill Lane the residual impact on Mill Lane would be reduced to moderate.

d) Conclusion

6.8.16 Due to mitigation measures, none of the impacts are considered to result in a long term significant environmental effect.

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

7 AIR QUALITY

7.1 Introduction

7.1.1 This chapter describes the potential air quality impacts associated with the proposed residential development at the Stambridge Mills site, Rochford. The assessment has been carried out by Air Quality Consultants Ltd on behalf of the Inner London Group.

7.1.2 The proposed development site lies approximately 1 km to the east of Rochford town centre. It is bounded by agricultural land to the north and west, Broomhills Care Centre to the east, and to the south by the River Roach. Beyond the River Roach lies Purdeys Industrial Estate.

7.1.3 The proposed development will comprise up to 96 residential units, including 45 houses and 51 apartments. Rochford District Council has not declared any Air Quality Management Areas (AQMAs) in close proximity to the site, however it has concerns regarding concentrations of nitrogen dioxide within Rochford town centre, which are currently being investigated with additional monitoring. The development would lead to an increase in traffic on the local roads, which may impact on air quality at existing residential properties. The new residential properties will also be subject to the impact of road traffic emissions from the adjacent road network. The main air pollutants of concern related to traffic emissions are nitrogen dioxide and fine particulate matter (PM_{10} and $PM_{2.5}$).

7.1.4 There is also the potential for the demolition and construction activities to impact upon both existing and new properties. The main pollutants of concern related to construction activities are dust and PM_{10}.

7.1.5 This chapter describes existing local air quality conditions, and predicted air quality in the future assuming that the proposed development does, or does not proceed. The assessment of traffic-related impacts focuses on 2012, which is the earliest anticipated year of opening. The assessment of construction dust impacts focuses on the anticipated duration of the works.

7.1.6 This assessment has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Rochford District Council.

7.2 Assessment Approach

Methodology

Existing Conditions

7.2.1 Existing sources of emission within the study area have been defined using a number of approaches. A site visit has been carried out to identify existing sources from a visual inspection of the area. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2011a). Local sources have also been identified through discussion with Rochford District Council's Environmental Health team, as well as through examination of the Council's air quality Review and Assessment reports.

7.2.2 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority within Rochford. The background concentrations across the study area have been defined using the national pollution maps published by Defra (Defra, 2011b). These cover the whole country on a 1x1 km grid.

Road Traffic Impacts

Sensitive Locations

7.2.3 Concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been predicted at a number of worst-case locations both within, and close to, the proposed development. Receptors have been selected to represent these worst-case locations. Relevant sensitive locations are places where members of the public might be

expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, sensitive receptors will generally be residential properties, schools, nursing homes, etc.. When selecting these receptors, particular attention has been given to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links.

7.2.4 Twenty-two existing residential properties have been identified as receptors for the assessment. An additional six receptor locations have been identified within the new development, which represents the worst-case exposure to existing sources. These locations are described in Table A7.1 (Appendix 7.1), and shown in Figures 7.1 – 7.4. In addition, concentrations have been modelled at the five diffusion tube monitoring sites within Rochford (Figure 7.5) in order to verify the modelled results (see Appendix 7.2 for verification method).

Impact Predictions

7.2.5 Predictions of nitrogen dioxide, PM_{10} and $PM_{2.5}$ concentrations have been carried out for a base year (2010), and the proposed year of opening (2012). For 2012, predictions have been made assuming both that the development does proceed (With Scheme), and does not proceed (Without Scheme). In addition, the cumulative impacts of the Stambridge Mills, Brays Lane, Hall Road and Rectory Road, South Hawkwell development proposals have also been considered (With Scheme Cumulative).

7.2.6 Predictions have been carried out using the ADMS-Roads dispersion model (v3). The model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the proportion of heavy duty vehicles (HDVs), road characteristics (including road width and street canyon height, where applicable), and the vehicle speed. Vehicle emissions are calculated within ADMS-Roads (v3) using this information and emission factors from the Emission Factor Toolkit (EFT, Version 4.2.2) published by Defra (Defra, 2011b). It is also necessary to input background pollutant concentrations. These have been derived from the national maps discussed in the section on Existing Conditions.

7.2.7 The model has been run using the most recent full year of meteorological data (2010) from the monitoring station located at Southend Airport, which is approximately 2 km south-west of the Stambridge Mills site, and is considered suitable for this area.

7.2.8 AADT flows, and the proportions of HDVs for each scenario have been provided by Steer Davies Gleave, the applicant's transport consultants for these proposals, for each of the assessment scenarios. Traffic speeds have been estimated from local speed restrictions and take account of the proximity to a junction. Traffic data used in this assessment are summarised in Table 7.1.

Table 7.1: Summary of Traffic Data used in the Assessment[a]

Road Link	2010	2012 (Without Scheme)	2012 (With Scheme)	2012 (With Scheme Cumulative)
West St	2,138 (4.5%)	2,183 (4.2%)	2,183 (4.2%)	2,183 (4.2%)
North St	5,623 (1.0%)	5,746 (1.1%)	6,013 (1.1%)	6,013 (1.1%)
East St	4,465 (3.0%)	4,554 (3.1%)	4,733 (3.1%)	4,733 (3.1%)
South St	8,151 (2.0%)	8,318 (2.1%)	8,697 (2.1%)	8,697 (2.1%)
Southend Road N of Sutton Rd	23,373 (3.5%)	24,075 (3.2%)	24,398 (3.2%)	26,513 (3.3%)
Sutton Road	17,883 (3.6%)	18,418 (3.9%)	18,418 (3.9%)	18,852 (3.9%)
Southend Road S of Sutton Rd	16,113 (4.0%)	16,592 (4.0%)	16,915 (4.0%)	18,596 (4.0%)
Stambridge Rd W of Mill Lane	2,717 (4.0%)	2,773 (3.9%)	3,263 (3.9%)	3,263 (3.9%)
Mill Lane	256 (4.5%)	290 (4.8%)	802 (4.9%)	802 (4.9%)
Stambridge Rd E of Mill Lane	2,528 (3.6%)	2,583 (3.6%)	2,617 (3.6%)	2,617 (3.6%)

[a] Values in parentheses are proportions of HDVs.

Construction Impacts

7.2.9 Locations sensitive to dust emitted during construction will be places where members of the public are regularly present. Residential properties and commercial operations close to the site will be most sensitive to construction dust. Any areas of sensitive vegetation or ecology that are very close to dust sources may also be susceptible to some negative effects.

7.2.10 It is very difficult to quantify emissions of dust from construction activities. It is thus common practice to provide a qualitative assessment of potential impacts, making reference to the assessment criteria set out in Table 7.4 and Table 7.5.

Assessment Criteria

Health Criteria

7.2.11 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality Regulations 2000 (Stationery Office, 2000) and the Air Quality (England) (Amendment) Regulations 2002 (Stationery Office, 2002). The relevant objectives for this assessment are provided in Table 7.2.

Table 7.2: Air Quality Objectives for Nitrogen Dioxide and PM_{10}

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour mean	200 $\mu g/m^3$ not to be exceeded more than 18 times a year
	Annual mean	40 $\mu g/m^3$
Fine Particles (PM_{10})[a]	24-hour mean	50 $\mu g/m^3$ not to be exceeded more than 35 times a year
	Annual mean	40 $\mu g/m^3$

[a] Measured by the gravimetric method.

7.2.12 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below 60 $\mu g/m^3$ (Defra, 2009). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level.

7.2.13 The European Union has also set limit values for both nitrogen dioxide and PM_{10}. Achievement of these values is a national obligation rather than a local one. The limit values for nitrogen dioxide are the same levels as the UK objectives, and are to be achieved by 2010 (Stationery Office, 2007). The limit values for PM_{10} are also the same level as the UK statutory objectives, and were to be achieved by 2005.

7.2.14 More recently, new health criteria have been introduced for $PM_{2.5}$ and these are shown summarised in Table 7.3. The 2007 Air Quality Strategy (Defra, 2007) sets out both an exposure-reduction approach and a "backstop" annual mean objective for $PM_{2.5}$. The former is an objective focused on reducing average exposures across the most heavily populated areas of the country, and is not directly applicable to individual schemes. It is supported by the "backstop objective" or concentration cap to ensure a minimum environmental standard. These $PM_{2.5}$ objectives have not been included in Regulations.

7.2.15 A new air quality directive (2008/50/EC) was adopted in May 2008, and includes a national exposure reduction target, a target value and a limit value for $PM_{2.5}$. The UK Government transposed this new directive into national legislation in June 2010 (Stationery Office, 2010).

Table 7.3: Relevant Air Quality Criteria for $PM_{2.5}$

	Time Period	Objective/Obligation	To be achieved by
UK objectives	Annual mean	25 µg/m^3	2020
	3 year running annual mean	15% reduction in concentrations measured at urban background sites	Between 2010 and 2020
European obligations	Annual mean	Target value of 25 µg/m^3	2010
	Annual mean	Limit value of 25 µg/m^3	2015
	Annual mean	Stage 2 indicative Limit value of 20 µg/m^3	2020
	3 year Average Exposure Indicator (AEI)[a]	Exposure reduction target relative to the AEI depending on the 2010 value of the 3 year AEI (ranging from a 0% to a 20% reduction)	2020
	3 year Average Exposure Indicator (AEI)	Exposure concentration obligation of 20 µg/m^3	2015

[a] The 3 year running annual mean or AEI is calculated from the $PM_{2.5}$ concentration averaged across all urban background monitoring locations in the UK e.g. the AEI for 2010 is the mean concentration measured over 2008, 2009 and 2010.

Construction Dust Criteria

7.2.16 There are no formal assessment criteria for dust. In the absence of formal criteria, a set of distance based criteria has been developed (Table 7.4). These criteria are based on the professional experience of the consultants, drawn from many years of involvement with assessments of different types of project, together with discussions with practitioners in the field, and consideration of a range of published reports.

Table 7.4: Assessment Criteria for Dust from Construction Activities, with Standard Mitigation in Place

Source		Potential Distance for Significant Effects (Distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}[a]**	**Vegetation effects**
Major	Large construction sites, with high use of haul routes	100 m	25 m	25 m
Moderate	Moderate sized construction sites, with moderate use of haul routes	50 m	15 m	15 m
Minor	Minor construction sites, with limited use of haul routes	25 m	10 m	10 m

[a] Significance based on the 2004 objective, which allows 35 daily exceedences/year of 50 µg/m^3

7.2.17 There is also the possibility of dust being tracked out of the site along roads. Table 7.5 sets out the assessment criteria in terms of distance from the site to which significant dust may be tracked out and the potential distance from the roadside for significant effects.

Table 7.5: Assessment Criteria for Construction Dust Track-Out with Standard Mitigation in Place

Source		Potential Distance from roadways for Significant Effects (Distance from edge of road)		
Scale	**Distance along roadways that dust might be tracked**	**Soiling**	**PM_{10}**	**Vegetation effects**
Major	250 m	50 m	15 m	15 m
Moderate	100 m	25 m	10 m	10 m
Minor	25 m	15 m	5 m	5 m

7.2.18 The scale of the development with respect to the assessment of construction dust has been determined using the best practice guidance for the control of dust from construction and demolition, published by the Greater London Authorities in 2006 (GLA, 2006). The guidance categorises construction sites as "Low", "Medium" or "High" risk in relation to dust generation based on criteria outlined in Table 7.6, below. The guidance has been designed for construction sites in Greater London, but may still be usefully applied to the assessment of construction dust at sites outside of Greater London.

Table 7.6: GLA (2006) Site Evaluation Guidelines

Category	Description
Low Risk Sites	Developments of up to 1,000 m^2 of land and; Developments of 1 to 10 properties and; Potential for emissions and dust to have an infrequent impact on sensitive receptors.
Medium Risk Sites	Developments of between 1,000 m^2 and 15,000 m^2 of land and; Developments of 10 to 150 properties and; Potential for emissions and dust to have an intermittent or likely impact on sensitive receptors.
High Risk Sites	Developments of over 15,000 m^2; Developments of over 150 properties or; Major developments referred to the Mayor and/or the London Development Agency, or; Major Development defined by the London borough or; Potential for emissions and dust to have a significant impact on sensitive receptors.

Descriptors for Air Quality Impacts and Assessment of Significance

7.2.19 There is no official guidance in the UK on how to describe the nature of air quality impacts nor to assess their significance. The approach developed by the Institute of Air Quality Management[1] (IAQM, 2009), and incorporated in Environmental Protection UK's guidance document on planning and air quality (EPUK, 2010), has therefore been used. This involves three distinct stages: the application of descriptors for magnitude of change; the description of the impact at each sensitive receptor; and then the assessment of overall significance of the scheme.

7.2.20 The definition of impact magnitude is solely related to the degree of change in pollutant concentrations, expressed in microgrammes per cubic metre, but originally determined as a percentage of the air quality objective. Impact description takes account of the impact magnitude and of the absolute concentrations and how they relate to the air quality objectives or other relevant standards. The descriptors for the magnitude of change due to the scheme are set out in Table 7.7, while Tables 7.8 and 7.9 set out the impact descriptors. These tables have been designed to assist with describing air quality impacts at each

[1] The IAQM is the professional body for air quality practitioners in the UK.

specific receptor. They apply to the pollutants relevant to this scheme and the objectives against which they are being assessed.

Table 7.7: Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations

Magnitude of Change	Annual Mean NO_2/PM_{10}	No. days with PM_{10} concentration greater than 50 $\mu g/m^3$	Annual Mean $PM_{2.5}$
Large	Increase/decrease ≥4 $\mu g/m^3$	Increase/decrease >4 days	Increase/decrease ≥2.5 $\mu g/m^3$
Medium	Increase/decrease 2 - <4 $\mu g/m^3$	Increase/decrease 2 - 4 days	Increase/decrease 1.25 – 2.5 $\mu g/m^3$
Small	Increase/decrease 0.4 - <2 $\mu g/m^3$	Increase/decrease 1 - 2 days	Increase/decrease 0.2.5 - <1.25 $\mu g/m^3$
Imperceptible	Increase/decrease <0.4 $\mu g/m^3$	Increase/decrease <1 day	Increase/decrease <0.25 $\mu g/m^3$

Table 7.8: Air Quality Impact Descriptors for Changes to Annual Mean Nitrogen Dioxide, PM_{10} and $PM_{2.5}$ Concentrations at a Receptor

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration [a]		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective/Limit Value *With* Scheme (≥40 $\mu g/m^3$ of NO_2 or PM_{10}) (≥25 $\mu g/m^3$ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value *With* Scheme (36-<40 $\mu g/m^3$ of NO_2 or PM_{10}) (22.5 - <25 $\mu g/m^3$ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value *With* Scheme (30-<36 $\mu g/m^3$ of NO_2 or PM_{10}) (18.75-<22.5 $\mu g/m^3$ of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value *With* Scheme (<30 $\mu g/m^3$ of NO_2 or PM_{10}) (<18.75 $\mu g/m^3$ of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value *Without* Scheme (≥40 $\mu g/m^3$ of NO_2 or PM_{10}) (≥25 $\mu g/m^3$ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value *Without* Scheme (36-<40 $\mu g/m^3$ of NO_2 or PM_{10}) (22.5-<25 $\mu g/m^3$ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value *Without* Scheme (30-<36 $\mu g/m^3$ of NO_2 or PM_{10}) (18.75-<22.5 $\mu g/m^3$ of $PM_{2.5}$)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value *Without* Scheme (<30 $\mu g/m^3$ of NO_2 or	Negligible	Negligible	Slight Beneficial

PM_{10}) (<18.75 µg/m^3 of $PM_{2.5}$)			

[a] Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible.

Table 7.9: Air Quality Impact Descriptors for Changes to Number of Days with PM_{10} Concentration Greater than 50 µg/m^3 at a Receptor

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration [a]		
	Small	Medium	Large
Increase with Scheme			
Above Objective/Limit Value *With* Scheme (>35 days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value *With* Scheme (32-35 days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value *With* Scheme (26-32 days)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value *With* Scheme (<26 days)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value *Without* Scheme (>35 days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value *Without* Scheme (32-35 days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value *Without* Scheme (26-32 days)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value *Without* Scheme (<26 days)	Negligible	Negligible	Slight Beneficial

[a] Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible.

7.2.21 The IAQM guidance is that the assessment of significance should be based on professional judgement, with the overall air quality impact of the scheme described as either, 'insignificant', 'minor', 'moderate' or 'major'. In drawing these conclusions, the factors set out in Table 7.10 should be taken into account.

Table 7.10: Factors Taken into Account in Determining Air Quality Significance

Factors
Number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance.
The number of people exposed to levels above the objective or limit value, where new exposure is being introduced.
The magnitude of the changes and the descriptions of the impacts at the receptors i.e. using the findings based on Tables 7.7, 7.8 and 7.9.
Whether or not an exceedence of an objective or limit value is predicted to arise in the study area where none existed before or an exceedence area is substantially increased.
Whether or not the study area exceeds an objective or limit value and this exceedence is removed or the exceedence area is reduced.
Uncertainty, including the extent to which worst-case assumptions have been made
The extent to which an objective or limit value is exceeded, e.g. an annual mean NO_2 of 41 $\mu g/m^3$ should attract less significance than an annual mean of 51 $\mu g/m^3$

Policy Context

Air Quality Strategy

7.2.22 The Air Quality Strategy (Defra, 2007) provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Planning Policy

7.2.23 National policy on air quality and planning is set out in Planning Policy Statement 23 (PPS23) (ODPM, 2004). This contains advice on when air quality should be a material consideration in development control decisions. Existing, and likely future, air quality should be taken into account, as well as the presence of any AQMAs. PPS23 notes that the findings of local authority air quality reviews and assessments will be important, as they will identify local air pollution problems, which may in turn influence the siting of certain types of development. The need for compliance with any statutory environmental quality standards or objectives, including the air quality objectives prescribed by the Air Quality Regulations 2000 (Stationery Office, 2000) and Amending Regulations 2002 (Stationery Office, 2002), will also be a factor in determining whether air quality is a material consideration.

7.2.24 Further emphasis is given to the importance of air quality objectives and AQMAs in the Appendices to PPS23. The impact of a development on air quality is likely to be particularly important:

- where the development is proposed inside, or adjacent to an AQMA;
- where the development could in itself result in the designation of an AQMA; and
- where to grant planning permission would conflict with, or render unworkable, elements of a Local Authority's air quality action plan.

7.2.25 PPS23 states clearly that not all planning applications for developments inside or adjacent to AQMAs should be refused, even if the development would result in a deterioration of local air quality, as such an approach could sterilise development.

Regional Policies

7.2.26 On 6th July 2010, the Secretary of State for Communities and Local Government revoked Regional Strategies with immediate effect. In the longer term the legal basis for Regional Strategies will be abolished through the "Localism Bill" and new ways for local authorities to address strategic planning and infrastructure issues based on cooperation will be introduced. The impact of this change on local planning processes is still unknown. For completeness, the relevant policies from the East of England Plan (Stationery Office, 2008) are discussed below. There are no specific policies relating to air quality, however a number, relating to traffic management and environmental protection, include reference to the impact of development, and in particulr development-related traffic, on pollution, .

7.2.27 Policy ENV7: Quality in the Built Environment, states that:

> *"New development should…..reduce pollution, including emissions, noise and light pollution.."*

Local Policies

7.2.28 The Rochford District Replacement Local Plan was adopted in June 2006 (Rochford DC, 2006), however, neither of the policies relating to pollution and air quality (PN1 and PN4) were adopted beyond June 2009.

7.2.29 Recent changes to the planning legislation require the Council to replace the Local Plan with a Local Development Framework (LDF) (Rochford DC, 2009a). This portfolio of planning documents, individually known as Local Development Documents, will deliver the spatial development strategy for Rochford and build upon existing local and regional strategies and initiatives. The Council is currently in the process of preparing the Core Strategy.

7.2.30 The Core Strategy Submission Document (Rochford DC, 2009b) recently submitted to the Secretary of State for independent examination contains Policy ENV5 – Air Quality which states:

> *"New residential development will be restricted in Air Quality Management Areas in order to reduce public exposure to poor air quality.*
>
> *In areas where poor air quality threatens to undermine public health and quality of life, the Council will seek to reduce the impact of poor air quality on receptors in that area and to address the cause of the poor air quality. Proposed development will be required to include measures to ensure it does not have an adverse impact on air quality."*

Limitations

7.2.31 There are many components that contribute to the uncertainty of modelling predictions. The model used in this assessment is dependant upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as the model is required to simplify real-world conditions into a series of algorithms. An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see Appendix 7.2). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of baseline (2010) concentrations.

7.2.32 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections as to what will happen to background pollutant concentrations, and to vehicle emissions.

7.2.33 Recently however, a disparity between the road transport emission projections and measured annual mean concentrations of nitrogen oxides and nitrogen dioxide has been identified by Defra (Carslaw et al, 2011). This applies across the UK, although there is considerable inter-site variation. Whilst the emission

projections suggest that both annual mean nitrogen oxides and nitrogen dioxide concentrations should have fallen by around 15-25% over the past 6 to 8 years, at many monitoring sites levels have remained relatively stable, or have even shown a slight increase.

7.2.34 The precise reason for this disparity is not known, but is thought to be related to the actual on-road performance of diesel vehicles when compared to the calculations based on the Euro standards. It may therefore be expected that nitrogen oxides and nitrogen dioxide concentrations will not fall as quickly in future years as the current projections indicate. However, at this stage, there is no robust evidence upon which to carry out any revised predictions.

7.2.35 The implications for this assessment are that the nitrogen dioxide concentrations predicted in 2012 may be higher than shown, although baseline concentrations in 2012 should still be lower than those predicted for 2010.

7.2.36 It must also be borne in mind that the predictions in 2012 are based on worst-case assumptions regarding the increase in traffic flows, such that all committed developments and the Proposed Development, are assumed to be fully operational. This will have overestimated the effects, which will, in part, offset any potential underestimation as described above.

7.3 Baseline Conditions

Site Description and Context

7.3.1 The proposed development site lies approximately 1 km to the east of Rochford town centre. It is bounded by agricultural land to the north and west, Broomhills Care Centre to the east, and to the south by the River Roach. Beyond the River Roach lies Purdeys Industrial Estate.

Baseline Survey Information

Outcomes of Review and Assessment

7.3.2 Rochford District Council has investigated air quality within its area as part of its responsibilities under the Local Air Quality Management (LAQM) regime. On the 27th January 2010, an AQMA was declared in the vicinity of Rawreth Industrial Estate in Rayleigh for PM_{10}. Rayleigh lies approximately 8 km to the west of the application site, and the AQMA has no significant bearing on the proposed development.

Industrial Sources

7.3.3 A search of the UK Pollutant Release and Transfer Register website (Defra, 2011a) did not identify any industrial or waste management sources within 1 km of the proposed development. The Purdeys Industrial Estate lies to the south of the proposed development site, on the opposite site of the River Roach. The industrial estate is occupied by a number of commercial and light industrial facilities. During the site visit, two operations which are potential sources of dust emissions were identified. These are JKS Aggregates at the west end of Purdeys Way and an unidentified operation to the northeast of Welton Way (possibly associated with the adjacent Eco Logic Recycling). These activities are located some distance (at least 200 m) from the southern boundary of the proposed development. They are considered to represent a low risk to the proposed development site.

Aircraft Emissions

7.3.4 London Southend Airport lies over 1.2 km to the south west of the proposed application site. The impact of aircraft emissions on residents of the proposed development has not been assessed on the basis of criteria published in LAQM.TG(09). This guidance confirms that emissions of PM_{10} from airports are insignificant, and that significant impacts associated with nitrogen dioxide are only likely to occur in the vicinity of airports with an annual throughput of passengers in excess of 10 million passengers per annum, or where the NOx background concentration is greater than 25 $\mu g/m^3$. The NOx mapped background concentration at Southend Airport in 2012 is 24.9 $\mu g/m^3$ (Defra, 2011b), which is below the criterion. In January 2010, Southend-on-Sea Borough Council Development Control Committee resolved to approve

Planning Permission for a runway extension that would allow the airport to grow to just under 2 million passengers in 2020. This remains below the criterion in the guidance.

Monitoring Data

7.3.5 Rochford District Council operated five roadside diffusion tubes within Rochford (Environmental Scientific Groups, 50% TEA in acetone). Monitoring commenced at these locations in March 2009. Data for these sites have been provided by Rochford DC. The short-term data for the North Street tube have been adjusted to represent a 2009 annual mean following guidance in LAQM.TG(09) (see Appendix 7.3 for further information). Data are presented in Table 7.11. All measured concentrations are below the annual mean nitrogen dioxide objective in 2009.

Table 7.11: Summary of Nitrogen Dioxide (NO_2) Diffusion Tube Monitoring (2009)[a]

Site ID	Location	Annual Mean (µg/m^3)
WS	West St	23.8
NS	North St	25.6
ES	East St	26.7
SS	South St	33.9
SER	Southend Road	29.8
Objective		**40**

[a] All data have been bias adjusted using the 2009 national factor (of 0.92) from version 02/10 of the spreadsheet available at www.uwe.ac.uk/aqm/review.

7.3.6 There are no automatic monitoring sites within the Rochford District Council area. PM_{10} and $PM_{2.5}$ concentrations measured at the Southend-on-Sea and Thurrock urban background automatic monitoring stations, operated as part of the Automatic Urban and Rural Network (AURN), are therefore summarised (where available) in Table 7.12. Concentrations were well below the relevant objectives and limit values in 2009.

Table 7.12: Summary of PM_{10} and $PM_{2.5}$ Monitoring (2009)

Site	PM_{10} Annual Mean (µg/m^3)	No. Days >50 µg/m^3	$PM_{2.5}$ Annual Mean (µg/m^3)
Southend-on-Sea AURN	-[a]	-	13.2[b]
Thurrock AURN	20.6[c]	6	-
Objectives	**40**	**35**	**25**

[a] Monitoring ceased January 2009. Data capture only 7% therefore no meaningful data available.

[b] Monitoring commenced 1st February 2009. Monitoring using FDMS. Data unadjusted. Data capture for 2009 91.0%.

[c] Reference equivalent. Monitoring carried out until 17th March using a TEOM (VCM adjusted www.volatile-correction-model.info/), then by FDMS from 20th March 2009 (unadjusted). Data capture for 2009 96.7%.

7.3.7 In addition to these locally measured concentrations, estimated background concentrations in the study area have been obtained from the national maps (Table 7.13).

Table 7.13: Estimated Annual Mean Background Pollutant Concentrations in 2010 and 2012 (µg/m^3)

Year	NOx	NO_2	PM_{10}	$PM_{2.5}$
2010	24.2 – 27.0	16.7 – 18.3	17.3 – 18.9	11.6 – 12.2
2012	22.6 – 24.9	15.7 – 17.1	17.0 – 18.5	11.3 – 11.8
Objectives	-	**40**	**40**	**25** [a]

[a] There are no objectives for $PM_{2.5}$ that apply during these years, however the European Union limit value of 25 µg/m^3 is to be met by 2015.

7.3.8 The ADMS-Roads model has been run to predict baseline concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ at each of the existing receptor locations identified in Appendix 7.1. Concentrations have been predicted at ground floor, although for receptors 3 and 9, there is no relevant exposure at ground floor and the predicted concentrations are therefore worst-case. The results, covering both existing baseline and future year baseline (Without Scheme), are set out in Tables 7.14 and 7.15. The highest predicted concentrations are at Receptor 7, which is a ground-floor property on East Street, close to the junction with South Street / North Street / West Street, and which, in 2010, is predicted to exceed the annual mean objective. This predicted exceedence is inconsistent with Rochford DC's findings, as an AQMA does not exist within Rochford town centre. By 2012, concentrations at all locations are predicted to have reduced, such that there are no exceedences at any location.

Table 7.14: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide (µg/m^3)

Location	Annual mean	
	2010	**2012**
Receptor 1	30.2	27.9
Receptor 2	23.9	22.2
Receptor 3	29.7	27.8
Receptor 4	23.4	22.1
Receptor 5	22.4	21.3
Receptor 6	21.9	20.8
Receptor 7	**41.6**	38.8
Receptor 8	28.4	26.4
Receptor 9	27.3	25.5
Receptor 10	25.4	23.5
Receptor 11	34.8	32.2
Receptor 12	35.1	32.5
Receptor 13	34.6	32.0
Receptor 14	35.2	32.8
Receptor 15	29.9	27.8
Receptor 16	30.5	28.3
Receptor 17	19.8	18.5
Receptor 18	19.4	18.2
Receptor 19	19.2	17.9
Receptor 20	21.1	19.7
Receptor 21	20.4	19.4
Receptor 22	19.3	18.2
Objective	**40**	**40**

Table 7.15: Modelled Baseline Concentrations of PM_{10} and $PM_{2.5}$

Location	PM_{10} [a]				$PM_{2.5}$	
	Annual mean (µg/m³)		No. Days >50 µg/m³		Annual mean (µg/m³)	
	2010	2012	2010	2012	2010	2012
Receptor 1	20.5	19.9	4	3	13.5	12.9
Receptor 2	19.6	19.1	3	2	12.8	12.3
Receptor 3	19.5	18.9	3	2	13.2	12.7
Receptor 4	18.6	18.1	2	2	12.7	12.2
Receptor 5	18.3	17.9	2	1	12.3	12.0
Receptor 6	18.2	17.8	2	1	12.2	11.9
Receptor 7	21.3	20.6	5	4	14.8	14.0
Receptor 8	20.5	19.9	4	3	13.4	12.9
Receptor 9	19.0	18.5	2	2	12.9	12.4
Receptor 10	20.1	19.6	4	3	13.1	12.7
Receptor 11	22.1	21.3	6	5	14.6	13.9
Receptor 12	22.1	21.4	6	5	14.6	14.0
Receptor 13	19.9	19.3	3	3	13.7	13.1
Receptor 14	20.0	19.4	3	3	13.7	13.1
Receptor 15	19.2	18.6	2	2	13.0	12.5
Receptor 16	19.4	18.9	3	2	13.2	12.7
Receptor 17	17.7	17.3	1	1	11.9	11.5
Receptor 18	17.6	17.3	1	1	11.8	11.5
Receptor 19	17.6	17.2	1	1	11.8	11.5
Receptor 20	18.0	17.6	1	1	12.3	11.9
Receptor 21	17.9	17.6	1	1	12.2	11.8
Receptor 22	17.8	17.4	1	1	12.1	11.7
Objective	**40**	**40**	**35**	**35**	**25** [b]	**25** [b]

[a] The numbers of days with PM_{10} concentrations greater than 50µg/m³ have been estimated from the relationship with the annual mean concentration described in Defra, 2009.

[b] There are no objectives for $PM_{2.5}$ that apply during these years, however the European Union limit value of 25 µg/m³ is to be met by 2015.

7.3.9 The predicted annual mean concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ are below the objectives (or limit value) at all receptors in both 2010 and 2012. The numbers of days with PM_{10} concentrations above 50 µg/m³ are also below the objective at all receptors.

7.4 Main Impacts and Likely Significant Effects

Construction Impacts

7.4.1 The brownfield element of the site, where the built form development is proposed, is currently occupied by the disused Stambridge Mills flour mill. Prior to construction, these existing buildings will be demolished. The development will also benefit from improvements to the flood defence barrier, which will be an earth embankment constructed alongside the River Roach on the site of the existing but inadequate flood bunds. The greatest potential for construction impacts is likely to be from the demolition period, and from the passage of vehicles travelling across unpaved ground during periods of dry weather. There is also the potential for dust emissions during the handling of dusty materials and the cutting of stone/concrete. Dust may also be tracked out of the site onto the adjoining road network. The construction phase may last up to 4 years, however, any impacts would be of a localised and temporary nature.

7.4.2 The construction site is considered to be "Medium" risk based on the criteria outlined in Table 7.6. Consequently, the construction activities are judged to be "Moderate" in scale. Based upon the criteria defined in Table 7.4, and assuming that standard mitigation measures are applied, significant dust-soiling impacts could therefore occur within a distance up to 50 m from the source, whilst PM_{10} impacts could extend out to 15 m.

7.4.3 In addition, any new properties occupied prior to completion of construction, which lie within 50 m or 15 m of construction activities, would also be at risk of dust-soiling and increased PM_{10} concentrations, respectively. Dust can also be tracked out of construction sites onto neighbouring roads. This can then be raised as airborne dust by passing vehicles. With mitigation, it is considered that there is a potential for significant dust to be found along off-site roads up to 100 m from the site entrance, with dust-soiling impacts potentially extending up to 25 m and elevated PM_{10} impacts potentially extending up to 10 m, either side of these roads.

7.4.4 The Broomhills Care Centre lies within 50 m of construction activities relating to the flood defence barrier. It is therefore at risk of dust-soiling impacts during the construction of the embankment. Its southern most façade also lies within 15 m of these activities, and is therefore at risk of experiencing elevated PM_{10} concentrations. Properties 6 to 11 Mill Lane lie within 25 m of the site access road and are therefore at risk of dust-soiling as a result of trackout. The façades of these properties also lie within 10 m of the road and are therefore at risk of elevated PM_{10} concentrations as a result of trackout.

7.4.5 It should be noted, however, that it is the distance from the dust-emitting source that is important, and the majority of construction activity would take place away the Broomhills Care Centre, and that dust emissions from the access road can be very effectively controlled (see section 7.5), and it is not likely that significant impacts would occur along Mill Lane.

7.4.6 The locations that could potentially be affected by elevated dust levels and PM_{10} concentrations during demolition and construction are shown in Figures 7.6 and 7.7, respectively.

7.4.7 The Crouch and Roach Estuaries SSSI lies adjacent to the flood defence barrier at its eastern extent, and thus within the 15 m buffer within which impacts may occur. The effects of construction activities on the SSSI habitats are considered further in Chapter 5, Ecology and Nature Conservation.

7.4.8 Any effects from construction activities will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. Such conditions would only arise occasionally during the construction period, further limiting the potential for any impacts.

7.4.9 Mitigation measures to reduce and limit any impacts from the construction phase are set out in section 7.5.

Operational Impacts

Stambridge Mills

Road Traffic Impacts

7.4.10 Predicted annual mean concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$, as well as days with PM_{10} >50 $\mu g/m^3$, are set out in Table 7.16, for both the "Without Scheme" and "With Scheme" scenarios.

Table 7.16: Predicted Concentrations of Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$ in 2012 - Annual Mean ($\mu g/m^3$) and Number of Days with PM_{10} > 50 $\mu g/m^3$

Location	2012 "Without Scheme"				2012 "With Scheme"			
	NO_2	PM_{10} [a]		$PM_{2.5}$	NO_2	PM_{10} [a]		$PM_{2.5}$
	Annual Mean	Annual Mean	Days	Annual Mean	Annual Mean	Annual Mean	Days	Annual Mean
Receptor 1	27.9	19.9	3	12.9	27.9	19.9	3	12.9
Receptor 2	22.2	19.1	2	12.3	22.2	19.2	2	12.3
Receptor 3	27.8	18.9	2	12.7	28.2	19.0	2	12.8
Receptor 4	22.1	18.1	2	12.2	22.2	18.2	2	12.3
Receptor 5	21.3	17.9	1	12.0	21.4	17.9	1	12.0
Receptor 6	20.8	17.8	1	11.9	21.0	17.8	1	11.9
Receptor 7	38.8	20.6	4	14.0	39.3	20.7	4	14.1
Receptor 8	26.4	19.9	3	12.9	26.6	19.9	3	12.9
Receptor 9	25.5	18.5	2	12.4	25.9	18.6	2	12.5
Receptor 10	23.5	19.6	3	12.7	23.9	19.7	3	12.7
Receptor 11	32.2	21.3	5	13.9	33.2	21.5	5	14.0
Receptor 12	32.5	21.4	5	14.0	33.5	21.5	6	14.1
Receptor 13	32.0	19.3	3	13.1	32.2	19.4	3	13.1
Receptor 14	32.8	19.4	3	13.1	33.0	19.5	3	13.2
Receptor 15	27.8	18.6	2	12.5	27.9	18.7	2	12.5
Receptor 16	28.3	18.9	2	12.7	28.4	18.9	2	12.7
Receptor 17	18.5	17.3	1	11.5	18.8	17.4	1	11.6
Receptor 18	18.2	17.3	1	11.5	18.3	17.3	1	11.5
Receptor 19	17.9	17.2	1	11.5	18.1	17.3	1	11.5
Receptor 20	19.7	17.6	1	11.9	19.8	17.7	1	11.9
Receptor 21	19.4	17.6	1	11.8	20.2	17.7	1	11.9
Receptor 22	18.2	17.4	1	11.7	18.6	17.5	1	11.7
Objectives	**40**	**40**	**35**	**25** [b]	**40**	**40**	**35**	**25** [b]

[a] The numbers of days with PM_{10} concentrations greater than 50$\mu g/m^3$ have been estimated from the relationship with the annual mean concentration described in Defra, 2009.

[b] There are no objectives for $PM_{2.5}$ that apply during 2012, however the European Union limit value of 25 $\mu g/m^3$ is to be met by 2015.

7.4.11 Predicted concentrations of all three pollutants remain below the objectives in 2012, whether the proposed scheme proceeds or not. Concentrations in 2012, with the scheme, also remain below existing (2010) levels set out in Tables 7.14 and 7.15.

7.4.12 The changes in annual mean concentrations and days with PM_{10} >50 $\mu g/m^3$ brought about by the scheme are shown in Table 7.17. The magnitude of changes in annual mean nitrogen dioxide concentrations range from imperceptible (<0.4 $\mu g/m^3$) to small at all receptors. The scheme makes an imperceptible difference to the annual mean concentrations of PM_{10} and $PM_{2.5}$, and the number of days with PM_{10} >50 $\mu g/m^3$. Using the criteria set out in Tables 7.8 and 7.9, the impacts are all described as negligible, apart from for nitrogen dioxide concentrations at Receptor 7, where the impact is slight adverse.

7.4.13 The overall air quality impact of additional traffic generated by the development upon local air quality is judged to be insignificant. This takes account of the factors described in Table 7.10. In particular, the majority of impacts are described at negligible, with no exceedences of the objectives identified.

Table 7.17: Change in Predicted Concentrations Between "With Scheme" and "Without Scheme" Conditions in 2012[a]

Location	NO_2	PM_{10}		$PM_{2.5}$
	Annual Mean ($\mu g/m^3$)	Annual Mean ($\mu g/m^3$)	No. Days >50 $\mu g/m^3$	Annual Mean ($\mu g/m^3$)
Receptor 1	<0.1	<0.1	<0.1	<0.1
Receptor 2	<0.1	<0.1	<0.1	<0.1
Receptor 3	0.4	0.1	0.1	0.1
Receptor 4	0.1	<0.1	<0.1	<0.1
Receptor 5	0.2	<0.1	<0.1	<0.1
Receptor 6	0.2	<0.1	<0.1	<0.1
Receptor 7	0.4	0.1	0.2	0.1
Receptor 8	0.2	<0.1	0.1	<0.1
Receptor 9	0.4	0.1	0.1	<0.1
Receptor 10	0.4	0.1	0.1	<0.1
Receptor 11	1.0	0.1	0.2	0.1
Receptor 12	1.0	0.1	0.2	0.1
Receptor 13	0.2	<0.1	<0.1	<0.1
Receptor 14	0.2	<0.1	<0.1	<0.1
Receptor 15	0.1	<0.1	<0.1	<0.1
Receptor 16	0.1	<0.1	<0.1	<0.1
Receptor 17	0.2	<0.1	<0.1	<0.1
Receptor 18	0.2	<0.1	<0.1	<0.1
Receptor 19	0.2	<0.1	<0.1	<0.1
Receptor 20	0.1	<0.1	<0.1	<0.1
Receptor 21	0.8	0.1	0.1	0.1
Receptor 22	0.4	0.1	<0.1	<0.1

[a] Based on un-rounded values

Impacts of Existing Sources on the Development

7.4.14 The impacts of the existing traffic sources on air quality conditions for residents occupying the new residential units in the proposed development can be assessed from the model results for Receptors 23 to 28 (Table 7.18). All the values are well below the objectives. Air quality for future residents within the development would thus be acceptable. The impacts of emissions from the surrounding sources on new exposure being introduced within the development are therefore judged to be insignificant.

Table 7.18: Predicted Concentrations of Nitrogen Dioxide (NO_2) and PM_{10} in 2012 for New Receptors in the Development Site

Location	2012 "With Scheme"			
	NO_2 (µg/m^3)	PM_{10} (µg/m^3) [a]		$PM_{2.5}$ (µg/m^3)
	Annual Mean	Annual Mean	No. Days >50 µg/m^3	Annual Mean
Receptor 23	17.6	18.5	2	11.9
Receptor 24	17.5	18.5	2	11.9
Receptor 25	17.5	18.5	2	11.9
Receptor 26	17.5	18.5	2	11.9
Receptor 27	17.5	18.5	2	11.9
Receptor 28	17.5	18.5	2	11.9
Objectives	40	40	35	25 [b]

[a] The numbers of days with PM_{10} concentrations greater than 50µg/m^3 have been estimated from the relationship with the annual mean concentration described in Defra, 2009.

[b] There are no objectives for $PM_{2.5}$ that apply during 2012, however the European Union limit value of 25 µg/m^3 is to be met by 2015.

Cumulative Impacts - Stambridge Mills, Brays Lane, Hall Road and Rectory Road, South Hawkwell

Road Traffic Impacts

7.4.15 Predicted annual mean concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$, as well as days with PM_{10} >50 µg/m^3, are set out in Table 7.19, for both the "Without Scheme" and "With Scheme Cumulative" scenarios, where the "With Scheme Cumulative" scenario considers the combined impacts of the Stambridge Mills, Brays Lane, Hall Road, and Rectory Road, South Hawkwell development proposals.

7.4.16 Predicted concentrations of all three pollutants remain below the objectives in 2012, whether all proposed schemes proceed or not.

7.4.17 The changes in annual mean concentrations and days with PM_{10} >50 µg/m^3 brought about by the proposed schemes are shown in Table 7.20. The magnitude of changes in annual mean nitrogen dioxide concentrations range from imperceptible (<0.4 µg/m^3) to small at all receptors. The scheme makes an imperceptible difference to the annual mean concentrations of PM_{10} and $PM_{2.5}$, and the number of days with PM_{10} >50 µg/m^3. Using the criteria set out in Tables 7.8 and 7.9, the impacts are all described as negligible, apart from for nitrogen dioxide concentrations at Receptor 7, where the impact is slight adverse.

7.4.18 The overall air quality impact of additional traffic generated by the development upon local air quality is judged to be insignificant. This takes account of the factors described in Table 7.10. In particular, the majority of impacts are described at negligible, with no exceedences of the objectives identified.

Table 7.19: Predicted Concentrations of Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$ in 2012 - Annual Mean ($\mu g/m^3$) and Number of Days with PM_{10} > 50 $\mu g/m^3$

Location	2012 "Without Scheme"				2012 "With Scheme Cumulative"			
	NO_2	PM_{10} [a]		$PM_{2.5}$	NO_2	PM_{10} [a]		$PM_{2.5}$
	Annual Mean	Annual Mean	Days	Annual Mean	Annual Mean	Annual Mean	Days	Annual Mean
Receptor 1	27.9	19.9	3	12.9	28.0	19.9	3	12.9
Receptor 2	22.2	19.1	2	12.3	22.2	19.2	2	12.3
Receptor 3	27.8	18.9	2	12.7	28.2	19.0	2	12.8
Receptor 4	22.1	18.1	2	12.2	22.2	18.2	2	12.3
Receptor 5	21.3	17.9	1	12.0	21.5	17.9	1	12.0
Receptor 6	20.8	17.8	1	11.9	21.0	17.8	1	11.9
Receptor 7	38.8	20.6	4	14.0	39.3	20.7	4	14.1
Receptor 8	26.4	19.9	3	12.9	26.6	19.9	3	12.9
Receptor 9	25.5	18.5	2	12.4	25.9	18.6	2	12.5
Receptor 10	23.5	19.6	3	12.7	24.0	19.7	3	12.7
Receptor 11	32.2	21.3	5	13.9	33.3	21.5	5	14.1
Receptor 12	32.5	21.4	5	14.0	33.6	21.5	6	14.1
Receptor 13	32.0	19.3	3	13.1	33.3	19.5	3	13.2
Receptor 14	32.8	19.4	3	13.1	34.0	19.6	3	13.3
Receptor 15	27.8	18.6	2	12.5	28.8	18.8	2	12.6
Receptor 16	28.3	18.9	2	12.7	29.4	19.0	2	12.8
Receptor 17	18.5	17.3	1	11.5	18.8	17.4	1	11.6
Receptor 18	18.2	17.3	1	11.5	18.4	17.3	1	11.5
Receptor 19	17.9	17.2	1	11.5	18.1	17.3	1	11.5
Receptor 20	19.7	17.6	1	11.9	19.8	17.7	1	11.9
Receptor 21	19.4	17.6	1	11.8	20.2	17.7	1	11.9
Receptor 22	18.2	17.4	1	11.7	18.6	17.5	1	11.7
Objectives	**40**	**40**	**35**	**25** [b]	**40**	**40**	**35**	**25** [b]

[a] The numbers of days with PM_{10} concentrations greater than 50$\mu g/m^3$ have been estimated from the relationship with the annual mean concentration described in Defra, 2009.

[b] There are no objectives for $PM_{2.5}$ that apply during 2012, however the European Union limit value of 25 $\mu g/m^3$ is to be met by 2015.

Table 7.20: Change in Predicted Concentrations Between "With Scheme" and "Without Scheme" Conditions in 2012[a]

Location	NO_2	PM_{10}		$PM_{2.5}$
	Annual Mean ($\mu g/m^3$)	Annual Mean ($\mu g/m^3$)	No. Days >50 $\mu g/m^3$	Annual Mean ($\mu g/m^3$)
Receptor 1	<0.1	<0.1	<0.1	<0.1
Receptor 2	0.1	<0.1	<0.1	<0.1
Receptor 3	0.4	0.1	0.1	0.1
Receptor 4	0.2	<0.1	<0.1	<0.1
Receptor 5	0.2	<0.1	<0.1	<0.1
Receptor 6	0.2	<0.1	<0.1	<0.1
Receptor 7	0.5	0.1	0.2	0.1
Receptor 8	0.2	0.1	0.1	<0.1
Receptor 9	0.4	0.1	0.1	0.1
Receptor 10	0.4	0.1	0.1	<0.1
Receptor 11	1.0	0.2	0.2	0.1
Receptor 12	1.1	0.2	0.2	0.1
Receptor 13	1.3	0.2	0.2	0.2
Receptor 14	1.1	0.2	0.2	0.1
Receptor 15	1.0	0.2	0.1	0.1
Receptor 16	1.1	0.2	0.2	0.1
Receptor 17	0.2	<0.1	<0.1	<0.1
Receptor 18	0.2	<0.1	<0.1	<0.1
Receptor 19	0.2	<0.1	<0.1	<0.1
Receptor 20	0.1	<0.1	<0.1	<0.1
Receptor 21	0.8	0.1	0.1	0.1
Receptor 22	0.4	0.1	<0.1	<0.1

[a] Based on un-rounded values

Impacts of Existing Sources on the Development

7.4.19 The impacts of the existing traffic sources on air quality conditions for residents occupying the new residential units in the proposed development can be assessed from the model results for Receptors 23 to 28 (Table 7.21). The Brays Lane, Hall Road and Rectory Road developments lie outside of the traffic study area, and therefore it has not been possible to predict concentrations within these developments. All the values are well below the objectives. Air quality for future residents within the development would thus be acceptable. The impacts of emissions from the surrounding sources on new receptors being introduced are therefore judged to be insignificant.

Table 7.21: Predicted Concentrations of Nitrogen Dioxide (NO_2) and PM_{10} in 2012 for New Receptors in the Development Site

Location	2012 "With Scheme Cumulative"			
	NO_2 (µg/m^3)	PM_{10} (µg/m^3) [a]		$PM_{2.5}$ (µg/m^3)
	Annual Mean	Annual Mean	No. Days >50 µg/m^3	Annual Mean
Receptor 23	17.6	18.5	2	11.9
Receptor 24	17.5	18.5	2	11.9
Receptor 25	17.5	18.5	2	11.9
Receptor 26	17.5	18.5	2	11.9
Receptor 27	17.5	18.5	2	11.9
Receptor 28	17.5	18.5	2	11.9
Objectives	**40**	**40**	**35**	**25** [b]

[a] The numbers of days with PM_{10} concentrations greater than 50µg/m^3 have been estimated from the relationship with the annual mean concentration described in Defra, 2009.

[b] There are no objectives for $PM_{2.5}$ that apply during 2012, however the European Union limit value of 25 µg/m^3 is to be met by 2015.

7.5 Mitigation and Enhancement

Construction Impacts

7.5.1 Measures to mitigate dust emissions would be required during the construction phase of the development in order to reduce impacts upon nearby residential properties, and minimise any potential effects on ecological receptors. Guidance is available from the Building Research Establishment on controlling dust from construction sites (BRE, 2003). This reflects best practice experience of dust controls and has been used, together with the professional experience of the consultant, to draw up the following set of measures that should, where practicable, be incorporated into the specification for the works. Mitigation should be straightforward, as most of the necessary measures are routinely employed as 'good practice' on construction sites. The measures are likely to include:

- Water-suppression to minimise dust during demolition activity;
- Phasing the development so that at any one time, construction activity is largely confined to relatively small portions of the site, away from occupied properties;
- Use of water-sprays to ensure that any unpaved routes across the site are maintained in a damp condition when in use;
- Use of consolidated surfaces close to residential areas;
- Imposition and enforcement of a 5 mph speed limit on unpaved ground;
- Hard surfacing of the proposed access roads at an early stage of the works;
- Minimising any dust generating activities on very dry or windy days;
- Sheeting of all lorries carrying materials on and off site;
- Locating and/or covering of stockpiles as far from sensitive locations as possible, and provision of appropriate hoardings;
- Wherever practicable, off-road plant to use Ultra-Low Sulphur Diesel and be equipped with exhaust after-treatment;

- Regular cleaning of all paved areas on-site;
- Use of a jet-spray vehicle and wheel wash for all vehicles leaving the site;
- Regular use of a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site; and
- Use of water suppression during any cutting of stone or concrete.

7.5.2 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

7.5.3 Even with these measures in place, there remains a risk that a small number of existing off-site properties might be affected by occasional dust-soiling impacts. Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. The overall impacts during the construction phase with mitigation measures in place are judged to be slight adverse.

Road Traffic Impacts

7.5.4 The assessment has demonstrated that the scheme would not cause any exceedences of the air quality objectives, and that air quality for future residents would be acceptable. Mitigation measures to reduce pollutant emissions from road traffic are principally being delivered by the introduction of more stringent emissions standards, largely via European legislation. It is not considered appropriate to propose further mitigation measures for this scheme.

7.6 Summary

7.6.1 The air quality impacts associated with the construction and operation of the proposed residential development at Stambridge Mills have been assessed. Existing monitoring within the study area shows good air quality, with measured concentrations all below the UK's air quality objectives.

7.6.2 The operational impacts of increased traffic emissions arising from the additional traffic on local roads, due to the development have been assessed. Concentrations have been modelled for twenty-two worst-case receptors, representing existing properties where impacts are expected to be greatest. In addition, the impacts of traffic from local roads on the air quality for future residents have been assessed at six locations within the new development itself.

7.6.3 It is concluded that concentrations of nitrogen dioxide and particulate matter (PM_{10} and $PM_{2.5}$) would remain below the objectives in 2012, whether the scheme is developed or not.

7.6.4 The proposed scheme would only increase traffic volumes on local roads by a small amount. Any increase in concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ would be imperceptible, and the impacts are judged to be insignificant.

7.6.5 The impacts of local traffic on the air quality for residents living in the proposed development have been shown to be acceptable at all locations within the proposed development site, with concentrations being below the air quality objectives. The impacts of emissions from the surrounding sources on new receptors being introduced within the development are therefore judged to be insignificant.

7.6.6 It is concluded that road traffic emissions do not provide any constraints to the proposed scheme.

7.6.7 In addition, the cumulative impact of increased traffic emissions from the Stambridge Mills, Brays Lane, Hall Road and Rectory Road, South Hawkwell development proposals on local roads have been assessed. Concentrations have been modelled for the same twenty-two worst-case receptors, representing existing properties where impacts are expected to be greatest. In addition, the impacts of traffic from local roads on the air quality for future residents have been assessed at the six locations within the Stambridge Mills development.

7.6.8 It is concluded that concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ would remain below the objectives in 2012 at all existing and future receptors, even if all four schemes are developed.

7.6.9 The increase in traffic volumes on local roads associated with these developments is predicted to bring about an imperceptible increase in concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ at the majority of receptors, with a slight adverse impact predicted at one receptor. The overall impacts are judged to be insignificant.

7.6.10 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. Even with these measures in place, there remains a risk that a small number of existing off-site properties might be affected by occasional dust-soiling impacts. Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. The overall impacts during the construction phase are judged to be slight adverse.

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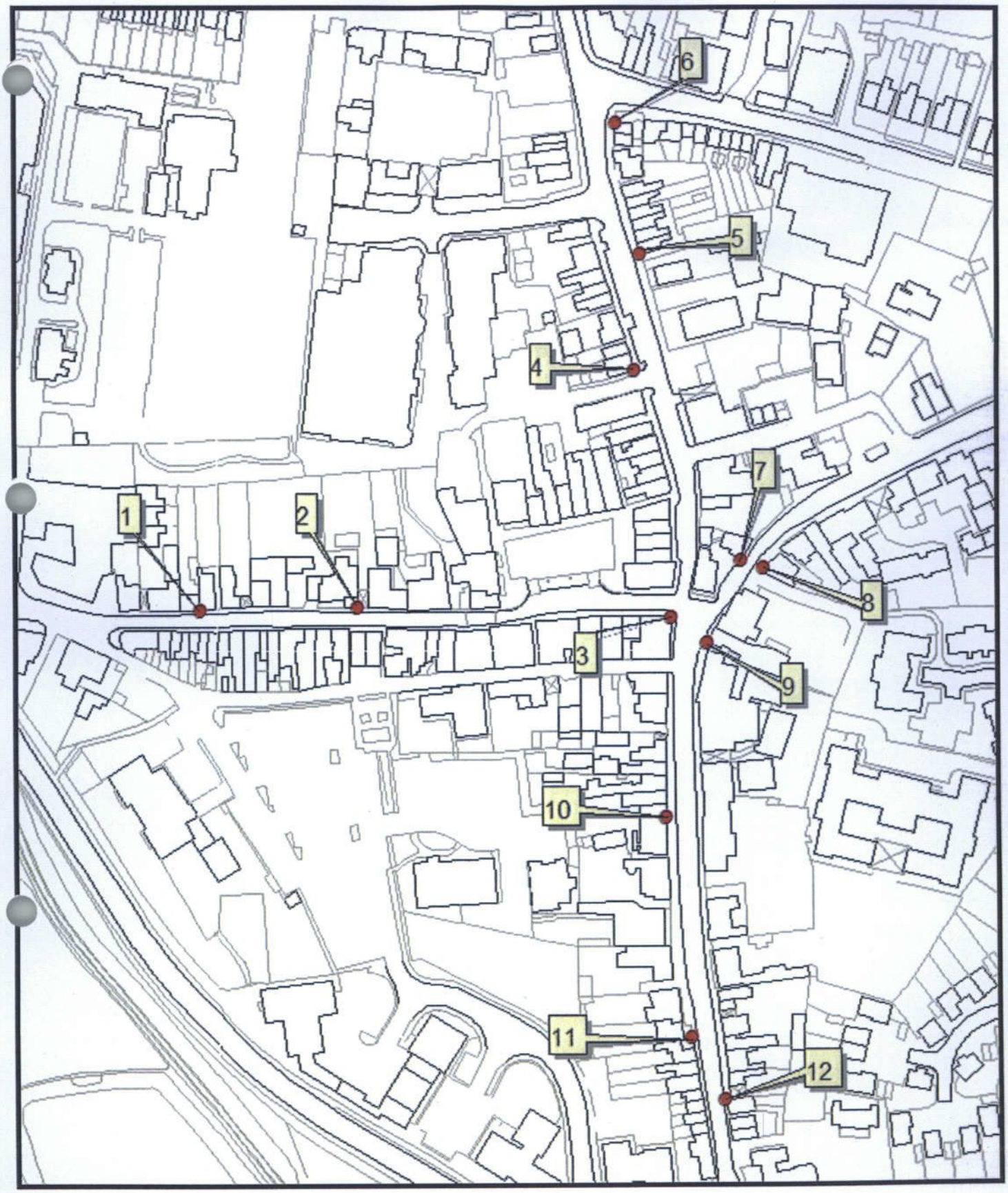
7.8 Glossary

Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.
Exceedence	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations.
AQMA	Air Quality Management Area
ADMS-Roads	Atmospheric Dispersion Modelling System
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.
$PM_{2.5}$	Small airborne particles less than 2.5 micrometers in aerodynamic diameter
NO_2	Nitrogen dioxide.
NO	Nitric oxide.
NOx	Nitrogen oxides (taken to be NO_2 + NO).
$\mu g/m^3$	Microgrammes per cubic metre.
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
LDV	Light Duty Vehicles (<3.5 tonnes)
TEA	Triethanolamine – used to absorb nitrogen dioxide
AADT	Annual Average Daily Traffic



7.1 | FIGURE

Rochford Town Centre Receptors | TITLE

NTS @ A3 | SCALE

I.0105_45-A | DWG. NO.

N

7.2	FIGURE
Southend Road/Sutton Road Receptors	TITLE
NTS @ A3	SCALE
I.0105_45-A	DWG. NO.

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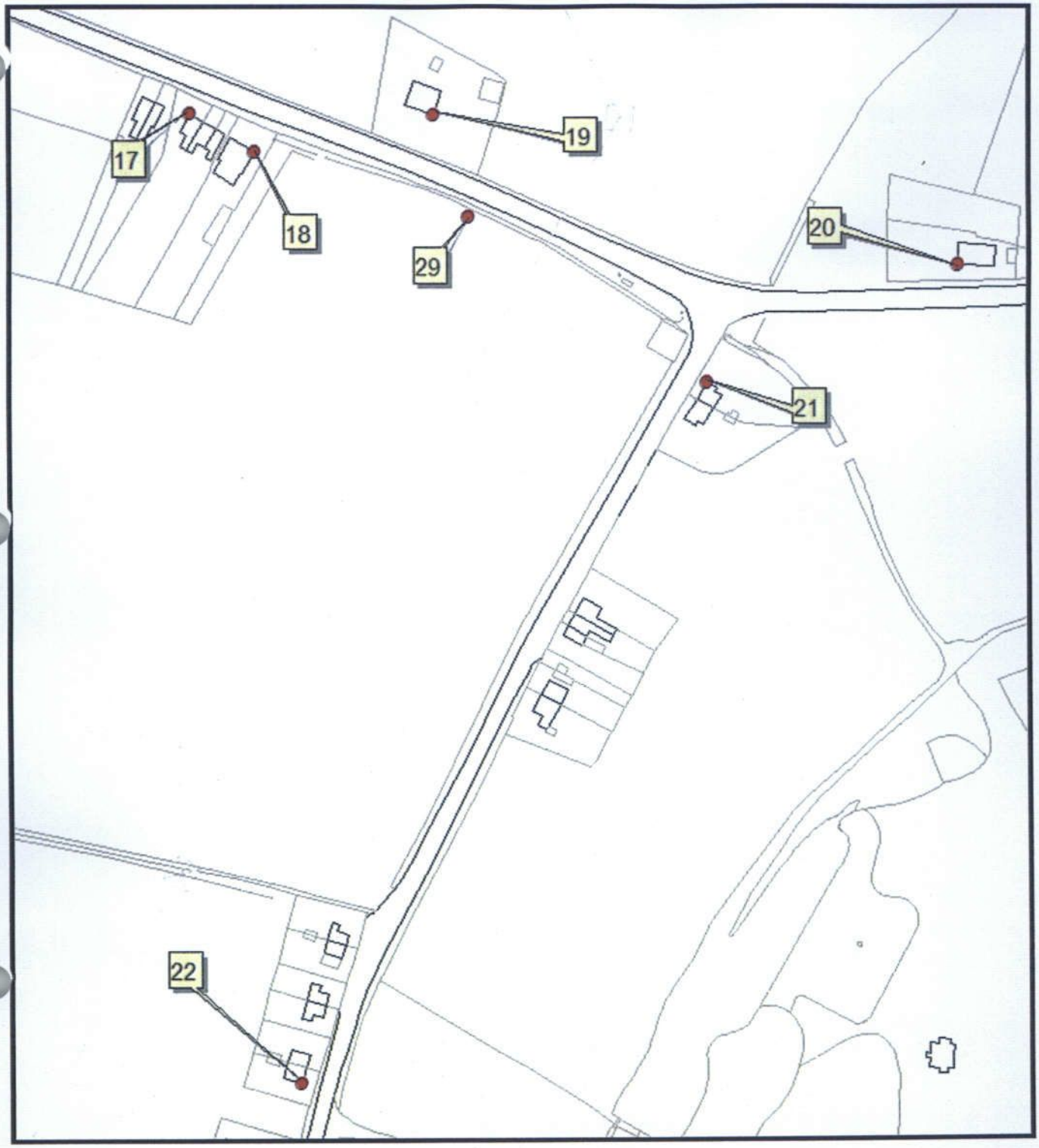

7.3	FIGURE
Stambridge Road/Mill Lane Receptors Receptors	TITLE
NTS @ A3	SCALE
I.0105_45-A	DWG. NO.

N

7.4	FIGURE
Development Receptors	TITLE
NTS @ A3	SCALE
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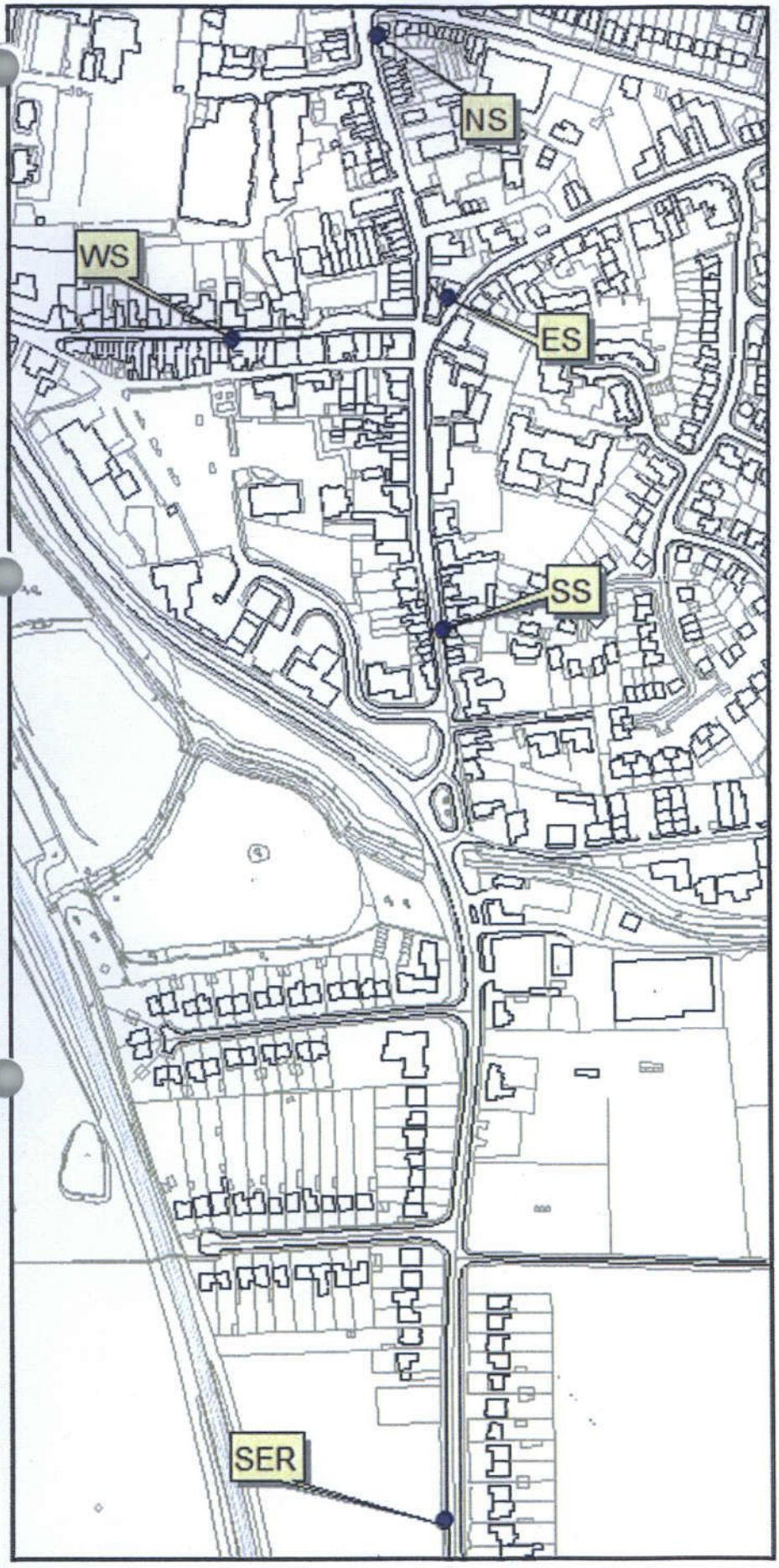
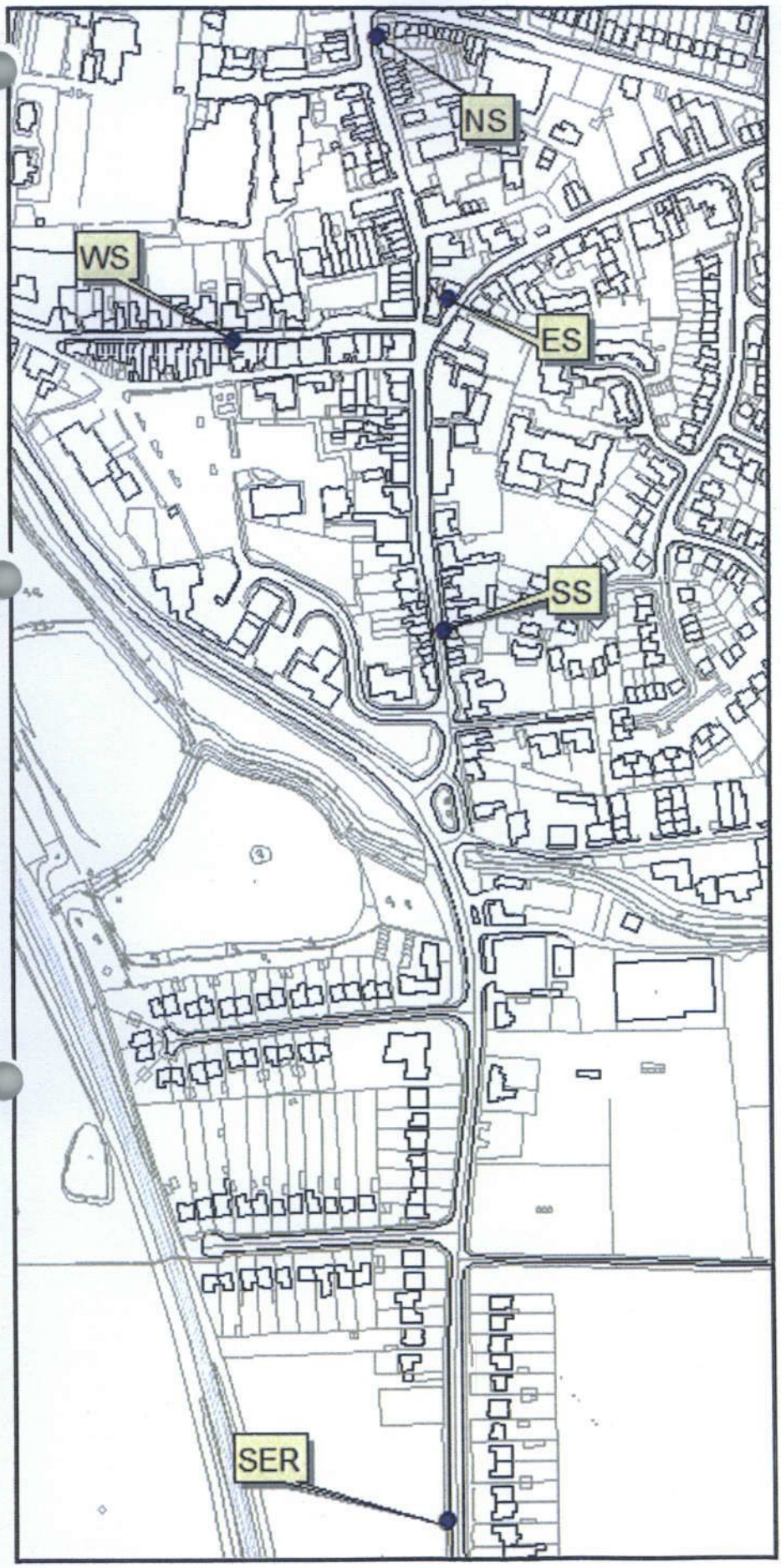


7.5 FIGURE

Diffusion Tube Locations TITLE

NTS @ A3 SCALE

I.0105_45-A DWG. NO.



7.5	FIGURE
Diffusion Tube Locations	TITLE
NTS @ A3	SCALE
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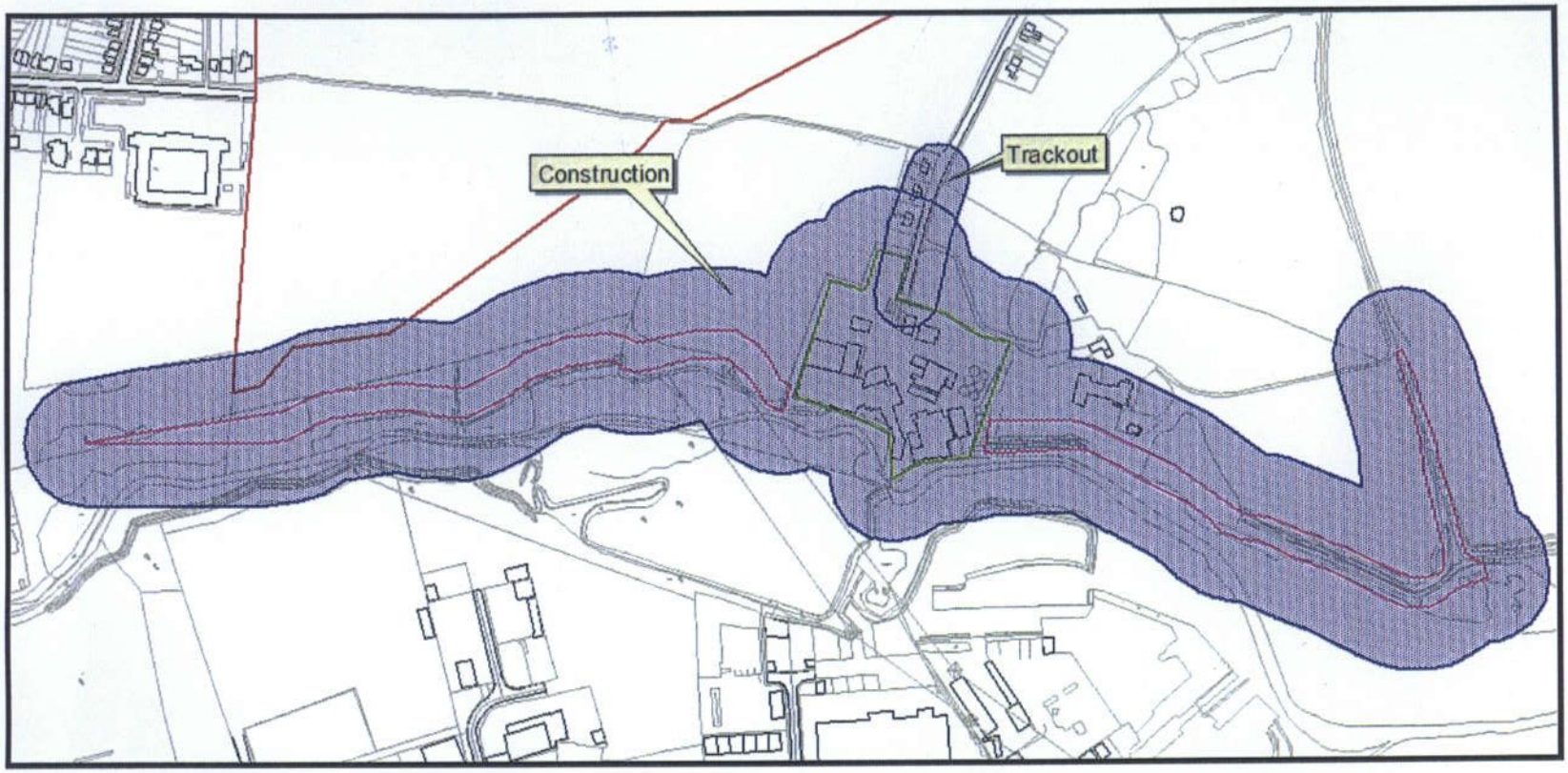
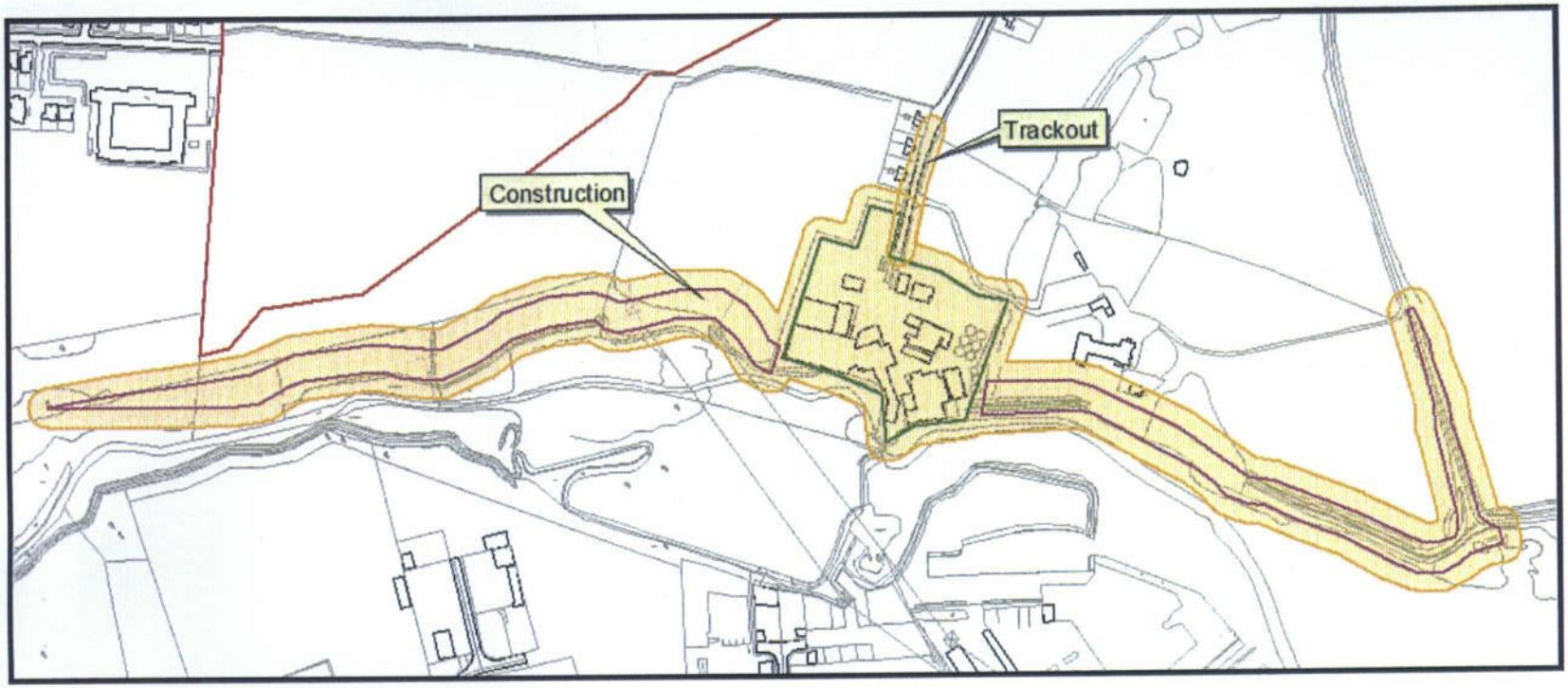


Areas Potentially Affected by Dust-soiling Impacts during the Construction Period. The green line indicates the Stambridge Mills site, whilst the pink line indicates the flood defence barrier location.

7.6	FIGURE
Areas Potentially Affected by Dust-soiling Impacts during Construction Period	TITLE
NTS @ A3	SCALE
I.0105_45-A	DWG. NO.

N



Areas Potentially Affected by Elevated PM_{10} Impacts during the Construction Period. The green line indicates the Stambridge Mills site, whilst the pink line indicates the flood defence barrier location.

7.7	FIGURE
Areas Potentially Affected by Elevated PM_{10} during the Construction Period	TITLE
NTS @ A3	SCALE
I.0105_45-A	DWG. NO.

N

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

8 NOISE AND VIBRATION

8.1 Introduction

8.1.1 This chapter assesses the likely significant effects of the proposed development with respect to noise and vibration. In particular, it considers the potential effects of noise principally associated with aircraft and the surrounding industrial estate on the occupants of the proposed dwellings. An assessment of the likely significant impacts and effects during the construction and future operation of the proposed development on surrounding noise-sensitive receptors is also made.

8.1.2 The chapter describes the methods used to assess the impacts and determines the baseline conditions currently existing at the site. The potentially affected noise and vibration sensitive receptors surrounding the site are identified, together with the potential direct and indirect impacts and effects arising from the proposed development. Mitigation measures are detailed, where required, to prevent, reduce or offset the impacts and effects and the residual effects.

8.1.3 This assessment comprises the following elements:

- identification of sensitive receptors;
- establishment of baseline conditions;
- establishment of design aims for new buildings;
- outline assessment of noise and vibration generated during the demolition and construction phase;
- assessment of noise levels in the operational phase of the Proposed Development (with reference to PPG24, BS 8233 and World Health Organisation guidelines); and
- where appropriate, proposals for mitigation.

8.1.4 This approach is standard practice for conducting an assessment of noise relating to development.

8.1.5 Data relating to the Noise and Vibration Assessment is contained within Appendix 8.1.

8.2 Assessment Methodology

8.2.1 A description of the noise units referred to is provided in Appendix 8.1.

Principal Standards and Guidance

Construction

8.2.2 BS 5228 Parts 1 and 2 [Ref 8.1, 8.2] provides guidance for assessing noise and vibration during the construction of the development. The standard describes procedures for estimating noise levels from construction activities and vibration attributable to piling activities. It also provides guidance on minimising potential impacts through the use of mitigation and the adoption of Best Practicable Means (BPM) or Best Available Techniques Not Entailing Excessive Cost (BATNEEC).

8.2.3 BPM or BATNEEC both seek to ensure that the contractors adopt best practice measures to reduce noise and vibration from site activities. The use of BPM to control emissions constitutes a ground of defence against charges that a nuisance is being caused under Part III of the Environmental Protection Act.

8.2.4 Whilst BS 5228 does not provide specific guidance with regards acceptable noise levels associated with construction activities, it provides guidance on limits adopted for a number of previous schemes, which were considered to provide satisfactory levels of noise for construction projects.

8.2.5 Based on this guidance, it is often appropriate to set noise Action Levels to provide an indication of the noise levels that can be generated from construction activities, which should minimise the potential for

complaints. A level of 10 dB(A) above the existing ambient (L_{Aeq}) noise level is often specified, subject to a minimum level of 70 dB L_{Aeq} for rural areas and 75 dB L_{Aeq} within urban areas. By adopting noise limits of this order of magnitude, contractors are generally seen to be adopting best practice to reducing construction noise levels to an acceptable standard.

8.2.6 With regards acceptable levels of vibration, BS 5228 advises that at a level of 0.3 mm/s vibration might just be perceptible within residential environments, with levels of 1.0 mm/s having the potential to cause complaint, but can be tolerated if prior warning is given to residents. At levels of 10 mm/s, the activity would be intolerable for any more than a brief exposure.

8.2.7 BS 7385 [8.3] defines criteria for two different types of building structure, brick-built residential and more heavily-built industrial. The standard advises that there is a minimal risk of cosmetic damage (i.e. the formation of hairline cracks on drywalls, plaster or in mortar joints) at the specific guidance levels.

8.2.8 For residential buildings the limit for cosmetic damage varies with frequency. A conservative level of 12.5 mm/s PPV defined in BS 7385, has been used in assessing potential cosmetic damage.

Operation of the Completed Development

Planning Policy Guidance PPG 24: 1994

8.2.9 Planning Policy Guidance Note (PPG) 24: Planning and Noise [Ref 8.4] is the principal guidance adopted in the UK for assessing the impact of noise on proposed developments. For residential development, the guidance is presented in terms of four Noise Exposure Categories (NEC's). For developments within NEC A, noise need not normally be considered in determining planning applications; for NEC B sites noise should be taken into account when determining planning applications and where appropriate conditions imposed to an adequate level of protection against noise; Planning permission should not normally be granted for land falling into NEC C, where it is considered that permission should be given, conditions should be imposed to ensure a commensurate level of protection against noise; planning permission should normally be refused on noise grounds for NEC D sites. A more detailed description of PPG 24 is presented in Appendix 8.1.

British Standard BS 8233: 1999 – Sound Insulation and Noise Reduction for Buildings

8.2.10 BS 8233 [Ref 8.5] is a Code of Practice providing guidelines for the control of noise within various types of buildings. The document recommends internal noise levels to provide both a 'Good' and 'Reasonable' acoustic environment within residential properties. A full summary of the BS 8233 guidance for residential properties is presented in Appendix 8.1.

World Health Organisation (WHO) – Guidelines for Community Noise: 2000

8.2.11 The WHO document [Ref 8.6] provides guidance of a similar nature to BS 8233, although the emphasis is more on health effects associated with noise. The document recommends internal and external noise levels to provide an acoustic environment conducive to un-interrupted speech and sleep. A full summary of the WHO guidance for residential properties is presented in Appendix 8.1.

British Standard BS 4142

8.2.12 The principal guidance for assessing noise from industrial noise sources can be found in BS 4142 [Ref 8.7]. BS 4142 provides an objective method for rating the likelihood of complaint from industrial and commercial operations and also provides a means of determining noise levels from fixed building services plant installations and prevailing background noise levels on, and around, industrial developments.

8.2.13 BS 4142 is a comparative standard in which the estimated noise levels from the industrial development are compared to the background noise level from other surrounding existing land uses. The Standard relates the likelihood of complaint to the difference between the Rating Level of the noise being assessed and the background noise level. The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed.

8.2.14 The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of a single 5 dB acoustic feature correction should the noise exhibit a marked impulsive and/or tonal component or should the noise be irregular enough in character to attract attention. During the daytime, the specified noise levels are determined over a reference time interval of 1 hour, with a reference time period of 5 minutes being adopted at night.

8.2.15 If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is a likelihood of complaint. A difference between background level and Rating Level of around 5 dB is described as being of marginal significance. A Rating Level of 10 dB below the background level is described as being a positive indication that there will be no complaints. This is because a sound 10 dB below background level, unless it has particularly noticeable characteristics, is likely to be inaudible.

Local Authority Guidance

8.2.16 The Rochford District Council Local Development Framework is presently in preparation. As an interim measure, the Secretary of State saved a number of policies from the Replacement Local Plan 2006, which will remain until superseded by new policies within the LDF.

8.2.17 The Replacement Local Plan, adopted 16th June 2006, defines local policies relating to noise and development. A single policy relating to noise was saved and is relevant to this Development. It is reproduced below:

> *Policy TP10 – Aviation and Noise:*
> *In dealing with applications for development in areas likely to be affected by noise from London Southend Airport, consideration will be given to imposing conditions requiring adequate sound insulation to buildings and in extreme cases planning permission may be refused.*

8.2.18 Further guidance is provided in Supplementary Planning Document 2 – Housing Design, published in January 2007. With regard to noise, the guidance seeks to ensure that the internal layout of the development is carefully arranged to prevent noise disturbance to adjoining properties.

Significance Criteria

Construction Phase

8.2.19 The applicant is likely to consider adopting a Code of Construction Practice under the national Considerate Constructors Scheme to minimise potential disturbance to local residents in the surrounding area during the demolition of the existing structures and construction of the Proposed Development.

8.2.20 For construction activities, it is common practice to define a Noise Action Level of 10 dB(A) above the existing ambient L_{Aeq} noise levels (subject to a minimum daytime level of 70 dB L_{Aeq} in rural areas) at noise-sensitive properties during the daytime, above which complaints may be expected to be received. Noise levels above this criterion can be considered as a minor adverse impact if the activity is for a short duration (up to a few weeks) or a moderate/substantial adverse impact if noise levels continue above this limit for a prolonged period.

8.2.21 BS 5228 provides guidance on acceptable levels of vibration associated with construction activities. Based on the information provided within the guidance, a significant adverse impact has been identified where levels of vibration regularly exceed 1 mm/s at vibration sensitive receptors.

Operational Phase

8.2.22 When assessing noise upon new residential developments, impact criteria are normally defined from absolute levels specified in the relevant national or local guidance and it is not normally appropriate to assess potential impacts upon new properties on the basis of a semantic scale of noise change. For the new properties, potential impacts have been assessed against national standards and guidelines, including PPG24, BS 4142, BS 8233 and WHO guidelines.

8.2.23 The design of the development would seek to ensure noise levels were commensurate with PPG 24 NEC A or B. A significant adverse impact would be identified where noise levels were anticipated to be within NEC C or D, with appropriate noise mitigation measures then identified to reduce noise levels to an acceptable standard.

8.2.24 Noise levels associated with the operation of the industrial estate have been assessed using the guidance contained within BS 4142. An adverse impact has been identified where the Rating Level of the noise is 5 dB(A) above the prevailing background noise levels, i.e. representing a level of marginal significance. Appropriate mitigation measures would be adopted where impacts are identified with a view of achieving the criteria below within new dwellings.

8.2.25 The proposed development would be designed to achieve a noise environment commensurate with regards to the requirements of BS 8233:

- 35 dB $L_{Aeq,T}$ within living rooms during the daytime;
- 30 dB $L_{Aeq,T}$ within bedrooms at night (with a maximum level of 45 dB $L_{Amax,F}$ not regularly exceeded); and
- 55 dB $L_{Aeq,T}$ on balconies and within garden areas.

Road Traffic

8.2.26 The assessment of potential impacts at existing noise-sensitive receptors associated with the changes in road traffic on the local road network has used the following seven level scale of significance:

- **High Beneficial:** less than –5dB $L_{Aeq,T}$;
- **Moderate Beneficial:** -5dB to –3dB $L_{Aeq,T}$;
- **Low Beneficial:** -3dB to –1dB $L_{Aeq,T}$;
- **Neutral:** -1dB to +1dB $L_{Aeq,T}$;
- **Low Adverse:** +1dB to +3dB $L_{Aeq,T}$;
- **Moderate Adverse:** +3dB to +5dB $L_{Aeq,T}$;
- **High Adverse:** more than +5dB $L_{Aeq,T}$.

8.3 Baseline Conditions

Site Description and Identification of Noise-Sensitive Receptors

8.3.1 As described in Chapter 1, the site lies to the east of Rochford.

8.3.2 Existing noise sensitive receptors, which are considered likely to be potentially affected by the construction and operation of the development have been identified as the dwellings located along Mill Lane and the Broomhills Care Home, which is situated to the east of the site.

8.3.3 Noise levels within the site are principally influenced by aircraft flying into London Southend Airport to the south west and industrial sources on Purdy's Industrial Estate to the south.

8.3.4 The industrial noise sources were identified during site visits carried out in 2008 and 2010. Two main sources were identified and observed to be audible within the site: the operation of the waste recycling facility located to the north of Purdeys Way which was observed to be less audible during recent site visits, as large stockpiles have built up around the site perimeter; and the Tarmac batching plant located off Rochehall Way, which was observed to operate up to 24 hours per day, depending upon demand.

8.3.5 Aircraft flying into the airport were also clearly audible when passing overhead on approach to the runway. It is understood from discussions with the airport operator that the principal movements into the airport occur during the daytime period, although they are operational 24 hours and there are occasional night-time movements. The length of the runway restricts the size of the aircraft which can use the airport, which at present can accommodate aircraft with up to approximately 120 seats. It is also understood that the majority of the aircraft take off to the south west, with landing aircraft predominantly passing over the site.

Operations at London Southend Airport

8.3.6 Planning permission was granted by Rochford District Council for a new terminal and runway extension at the airport in January 2010. The new terminal will allow additional passenger numbers, which would result in an increase in aircraft movements. The additional movements would be principally daytime passenger aircraft, with the potential for increasing peak hour passenger movements from 2 to 4 departures per hour. The runway extension will allow slightly larger aircraft to use the airport, typically an Airbus A319, with around 150 seats, which are anticipated to commence operation by Easyjet, in April 2012.

8.3.7 The Environmental Statement prepared to accompany the planning application for the airport development [Ref 8.8], presents an assessment of the existing and future noise levels at the airport.

8.3.8 With regards daytime airborne noise contours, the ES indicates present aircraft noise levels below the 54 dB $L_{Aeq,\ 16\ hour}$ contour at the Development site. The 2020 aircraft noise contours with the airport development proposals completed indicate that the daytime aircraft noise levels would increase marginally, with the 54 dB $L_{Aeq,\ 16\ hour}$ contour passing centrally through the site, although the contours indicate that the aircraft noise levels would remain below 57 dB $L_{Aeq,\ 16\ hour}$.

8.3.9 Night-time aircraft noise levels are not anticipated to change significantly within the proposed development, as the runway extension is proposed to the west. The night-time aircraft noise contours for the present and future indicate a small reduction in night-time noise levels. This is principally as a result of a commitment from the airport to restrict night-time aircraft movements, with a proposed restriction on night-time passenger movements between 23:00 – 06:30 hours.

Baseline Noise Monitoring

8.3.10 In order to ascertain the existing noise environment on the site, two comprehensive noise monitoring exercises have been carried out on the site. The measurement exercises, carried out between 21 – 28 January 2008 and 4 – 10 March 2010 each comprised unattended noise surveys at two locations, which were supplemented with attended sample measurements at a further 5 positions around the site. It was considered appropriate to carry out a second survey on the site during 2010, to ensure that there had been no substantial changes in the noise environment since the original baseline assessment, carried out in 2008.

8.3.11 The unattended monitoring locations were positioned one along the southern boundary of the site adjacent to the river, at a position where noise from the operation of the industrial estate and batching plant was audible, and the second located within the northern area of the site at a position closest to the flight path and where noise from the operation of the recycling facility was audible (although noise levels were observed to be lower from this operation during the second survey). The sample monitoring positions were chosen to enable the variation in noise levels around the site perimeter to be evaluated. A fuller description of the monitoring exercise is provided in Appendix 8.1, with the monitoring locations indicated in Figure 8.1.

8.3.12 The results of the monitoring exercise have been evaluated to ascertain the existing day and night-time noise levels within the site, which are presented in Table 8.1 below.

Table 8.1: Period Noise Levels

Monitoring Location	Period Free-field L_{Aeq} Noise Levels [dB]		Principal Noise Sources
	Daytime (2008 / 2010)	Night-time (2008 / 2010)	
U1 – North Western Site Boundary	55 / 54	48 / 44	Aircraft, recycling facility
U2 – Southern Boundary	51 / 57	46 / 48	Aircraft, Tarmac batching plant
S1 – South Western Boundary	56 / 55	49 / 46	Recycling facility, aircraft overhead
S2 – Eastern Boundary Adjacent to Broomhills	51 / 52	46 / 44	Aircraft, Tarmac batching plant
S3 – North Eastern Boundary	48 / 52	41 / 43	Aircraft, occasional vehicles accessing Broomhills
S4 – Northern Boundary Adjacent to Dwellings on Mill Lane	52 / 54	45 / 44	Aircraft, occasional vehicles accessing Broomhills
S5 – Western Site Boundary	53 / 54	46 / 45	Aircraft, recycling facility

8.3.13 The unattended noise monitoring results obtained in the north western corner of the site below the flight path indicated maximum noise levels principally associated with the aircraft flying overhead. Maximum levels associated with the majority of the propeller and occasional jet aircraft were of the order of 80 dB $L_{Amax,F}$, with an occasional aircraft during the daytime periods giving rise to higher levels. The results indicate that during the night-time period, there was an occasional aircraft using the airport, with typically 2 - 3 movements observed from the unattended noise surveys.

8.3.14 Maximum noise levels at the southern monitoring position, which was located away from the flight path were lower, with maximum noise levels generally below 75 dB $L_{Amax,F}$ associated with aircraft movements.

8.3.15 During the survey carried out during March 2010 adjacent to the river, there appeared to be ongoing works associated with the construction of new moorings, with the use of a JCB and excavator during the daytime period. It is considered during this period, that daytime noise levels were not typical of the noise environment at this location and consideration has therefore been given to the results of the 2008 survey in this regard.

8.3.16 The other main influences on the noise environment within the southern and western areas of the site were associated with the operation of the recycling facility and concrete batching plant, which operate during the daytime period. The survey carried out in March 2010 indicated that the batching plant was clearly audible and was observed to operate during part of the night-time periods, typically giving rise to noise levels of the order of 52 dB L_{Aeq} at the development boundary whilst operational.

8.4 Main Impacts and Likely Significant Effects

Identification of Potential Impacts

Demolition and Construction Phase

8.4.1 At this stage of the development, the final demolition and construction requirements are unknown, as this will be progressed during detailed design prior to construction commencing on site.

8.4.2 The existing structures and buildings on the site would be demolished, prior to the site levels being raised and the new apartments and houses constructed.

8.4.3 The main phases, identified as giving rise to the greatest potential for adverse impacts upon the residents along Mill Lane and at Broomhills are as follows:

- Demolition of the existing mill buildings;
- Construction of the new river wall and flood defences, which will be built along the northern river bank to the east and west of the Mills complex;
- Sheet piling associated with the construction of the wharfside;
- Importation of fill to increase the site levels;
- CFA or bored piling required for foundations of the apartments;
- General construction activities; and
- Vehicle movements.

Operational Phase

Proposed Dwellings

8.4.4 The main noise sources identified from the baseline assessment were associated with the aircraft movements into and out of London Southend Airport and the operation of units within Purdeys Industrial Estate, in particular the Tarmac batching plant.

8.4.5 Potential impacts upon future residents of the development have taken account of these noise sources.

Road Traffic

8.4.6 Traffic accessing the development has the potential to give rise to impacts at dwellings along Mill Lane and to a lesser extent through the village of Rochford.

Assessment of Construction Phase

8.4.7 The design of the development is seeking to reuse the existing building foundations where possible, which will seek to reduce the amount of heavy demolition and piling plant required on site during the main redevelopment works.

8.4.8 The main element of the work other than the redevelopment of the mill to be carried out on site is the construction of the flood defences. These will be principally formed of earthwork bunds on land either side of the mill, with some reinforcement of retained structures required alongside the wharfside of the Mills complex, which would require sheet piling.

8.4.9 At this stage, a construction program has not been developed and it has therefore not been possible to carry out a detailed assessment of the likely noise and vibration levels during the construction. However, a preliminary assessment of the construction phase has been undertaken and is presented in Table 8.2, which identifies the on site activities potentially most likely to give rise to potential adverse impacts.

Table 8.2: Construction Noise Assessment

Activity	Likely Plant Requirements	Typical Noise Level [dB $L_{Aeq,T}$]	Impact Assessment
Construction of the river defences and importation of fill to increase site levels	HGV Movements Excavators Vibratory Rollers	75 – 80 @10 metres	Potential minor impacts at Broomhills and along Mill Lane, which would be of marginal significance, whilst plant was working within 50 metres of the property.
Sheet piling of the wharfside	Excavator with hydraulic piling rig	80 @10 metres	No dwellings in close proximity, not significant
Demolition of existing buildings	HGV movements Excavators Cutting equipment Breakers (potentially required to remove concrete cases)	75 – 90 @ 10 metres	Use of larger plant (e.g. breakers) would have the potential to give rise to minor adverse impacts upon the occupants of Broomhills and the dwellings at the southern end of Mill Lane
Piling of new building foundations	CFA or Bored Piling Rig HGV Movements Excavator Service Crane	80 – 90 @ 10 metres	Operation of piling rigs would have the potential to give rise to minor adverse impacts upon the occupants of Broomhills and the dwellings at the southern end of Mill Lane
General construction	HGV movements Mobile cranes Concreting telehandlers	70 – 75 @10 metres	Activity unlikely to give rise to adverse effects

8.4.10 Vibration levels associated with the construction of the development are not anticipated to exceed a limit of 1 mm/s regularly at surrounding properties where appropriate best practice techniques are adopted to minimise vibration.

8.4.11 The use of a vibratory roller during the construction of the flood defences and compacting materials during the raising of the site levels and piling have been identified as the activities most likely to give rise to higher levels of vibration. Where piling is required within close proximity of surrounding dwellings, non driven or percussive techniques would be adopted, such as CFA piling. The use of vibratory rollers would also be controlled and the levels of vibration adjusted when working adjacent to Broomhills and the dwellings at the southern end of Mill Lane, which are the only properties identified where potential impacts could occur in this regard. Monitoring of the vibration levels would also be carried out at potentially affected properties during these phases of the works. With these measures implemented, no adverse vibration impacts have been identified.

8.4.12 Mitigation measures and a noise monitoring regime would be adopted where high noise levels were anticipated to minimise any potential impacts and these are discussed in the following section.

Assessment of Noise Levels within the Proposed Development

8.4.13 A PPG 24 assessment for the development has been carried out based upon the monitoring results and potential changes in future noise levels associated with the airport expansion. The future aircraft noise levels indicated daytime noise levels below 57 dB $L_{Aeq,\ 16\ hour}$ across the site.

8.4.14 The assessment indicates that the site falls within PPG 24 NEC A/B both during the day and night-time periods, which would be unlikely to change with the expansion plans of the airport implemented. In general, therefore, the site is suitable for residential development.

8.4.15 Consideration has been given to the maximum noise levels associated with the night-time movements into the airport. The noise monitoring carried out on the site over two separate periods indicated that there were only one or two movements during the night-time period, which generated high maximum noise levels. It is also understood that with the airport expansion plans implemented, they would commit to a reduction in night-time movements from the present cap of 915 per month to 120 per month. It is therefore unlikely that there would be any increase in the number of night-time movements compared to the existing situation monitored during the two survey periods.

8.4.16 Given the small number of night-time aircraft movements, it is unlikely that the movements would cause any disturbance to the residents. PPG 24 advises that there is a requirement for several events per hour during the night-time period to categorise the site into NEC C, where the site would be considered less suitable for development. Furthermore, guidance on sleep disturbance advises that there is a requirement for 10 – 15 events before appreciable awakenings would occur. As the development is close to the airport, however, consideration would be given during the detailed design to ensure that the glazing and ventilation strategy developed sought to ensure that noise levels were reduced internally to a satisfactory standard with regards to the guidance contained in BS 8233.

8.4.17 Noise levels at the river boundary of the site were influenced by noise associated with the operation of the industrial estate. The measurements and observations made on site indicated that the recycling facility operated during the daytime, with noise levels remaining below 50 dB L_{Aeq}. This noise source gave rise to considerably lower levels of noise than associated with the aircraft movements and is therefore considered to be acceptable.

8.4.18 The operation of the Tarmac batching plant was observed to operate 24 hours per day at times, with levels of the order of 52 dB L_{Aeq} observed both during day and night-time periods. An assessment against the BS 4142 guidance, taking account of the background noise levels monitored during periods when the plant was not operational (of the order of 45 dB L_{A90} daytime and 30 – 35 dB L_{A90} at night), would indicate that, without appropriate mitigation measures incorporated into the design of the development, complaints would be likely from the future residents of the development. This would represent a significant adverse effect. Appropriate noise mitigation measures would be implemented within the design, with the aim of ensuring any potential impacts were minimised, by ensuring a satisfactory noise environment internally with regards to the requirements of BS 8233. Outline mitigation measures are discussed below.

Assessment of Off Site Road Traffic

8.4.19 The operation of the development would give rise to increases in road traffic on the local road network. Consideration has also been given to the cumulative effects of the operation of this development and the Hall Lane development, which is proposed in the surrounding area.

8.4.20 Changes in the road traffic noise levels on the roads surrounding the development and hence potentially most affected by the increases, have been made upon calculations of the change in daytime and night-time $L_{Aeq,T}$ noise levels calculated at a distance of 10 metres from the kerb. The calculation methodology has been based upon the guidance contained in 'A Calculation of Road Traffic Noise' (CRTN) [Ref 8.9], supplemented with the recent TRL guidance [Ref 8.10], to calculate the period day and night-time L_{Aeq} noise levels. Noise levels along Mill Lane, where the traffic flows are low and therefore outside the scope of CRTN, the period noise levels have been calculated on the basis of individual vehicle passby noise levels rather than using the CRTN methodology.

8.4.21 The calculation details are presented in Appendix 8.1 and have been summarised in Table 8.3 below.

Table 8.3: Calculated Changes in Road Traffic Noise Levels

Location	Increase in Period L_{Aeq} Noise Levels [dB]					
	2016 Baseline – 2011 Existing		2016 With Stambridge Mills – 2011 Baseline		2016 With Stambridge Mills and Hall Lane – 2011 Baseline	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
Stambridge Road (East of Mill Lane Junction)	0.2	0.1	0.3	0.2	0.3	0.2
Stambridge Road (West of Mill Lane Junction)	0.3	0.1	0.8	0.5	0.8	0.5
Mill Lane (South of Stambridge Road Junction)	0.2	0.1	0.4	0.2	0.4	0.2
North Street (north of town centre junction)	0.3	0.3	4.5	4.6	4.5	4.6
East Street (east of town centre junction)	0.2	0.1	0.4	0.2	0.4	0.2
South Street (south of town centre junction)	0.2	0.1	0.4	0.2	0.4	0.2
West Street (west of town centre junction)	0.2	0.1	0.2	0.1	0.2	0.1
Southend Road (north of Sutton Road junction)	0.2	0.1	0.3	0.2	0.6	0.3
Sutton Road (east of Southend Road junction)	0.2	0.2	0.2	0.2	0.3	0.2
Southend Road (South of Sutton Road Junction)	0.2	0.1	0.3	0.2	0.7	0.4
Stambridge Road (East of Mill Lane Junction)	0.2	0.1	0.3	0.2	0.3	0.2

8.4.22 The table indicates that remote from the development considering both the Stambridge Development alone and the cumulative assessment with the Hall Lane development, changes in road traffic noise levels would be low and less than a 1 dB(A) change calculated for the local road network which are remote from the development, even taking account of the cumulative effects of the two other developments which have been considered within the assessment.

8.4.23 Larger increases in noise levels would be anticipated at the dwellings along Mill Lane, which is the main access into the proposed development. The assessment indicates that the additional development traffic would give rise to a moderate adverse impact during the daytime and night-time periods. The increase in traffic noise levels is, however, likely to be lower than that associated with the HGV traffic using the mill whilst it was operational.

8.4.24 In evaluating the significance of the additional road traffic, consideration has also been given to the absolute noise levels along Mill Lane. The calculations indicate that the development traffic would give rise to noise levels of 48 dB $L_{Aeq,\ 16\ hour}$ and 46 dB $L_{Aeq,\ 8\ hour}$ at a distance of 10 metres. These levels of noise are low and would remain commensurate with a PPG 24 assessment of NEC A (upper) / B (lower), where noise is not considered an issue in terms of planning. Furthermore, the traffic noise levels would be either below or equivalent to the levels of noise associated with the aircraft flying overhead, which were observed to be o

the order of 54 dB $L_{Aeq,\ 16\ hour}$ and 44-48 dB $L_{Aeq,\ 8\ hour}$. It is therefore considered that the additional development traffic would not result in a significant adverse effect to the occupants of the dwellings along Mill Lane.

8.5 Mitigation and Enhancements

Construction Phase

8.5.1 Adverse impacts are anticipated when activities are carried out in close proximity to existing noise sensitive receptors. Mitigation measures will be implemented to ensure that any potential impacts are minimised, which include:

- Entering the Considerate Contractors Scheme;
- Adopting the principle of Best Practicable Means to reduce noise levels during the construction work;
- Selection of the most appropriate plant to minimize noise and vibration levels;
- The use of localised site hoardings where the noise levels are likely to be above acceptable limits;
- Monitoring of noise (and vibration) levels at noise-sensitive properties during certain periods of the construction;
- Regular liaison with local residents to inform them of periods where noise levels are likely to be higher; and
- Restriction of working hours for particularly noisy activities, particularly when carried out in close proximity to Broomhills.

Proposed Dwellings

8.5.2 The PPG 24 assessment indicated noise levels on the site associated with the aircraft movements within NEC A/B. No specific mitigation measures are therefore considered to be required to protect future occupants of the development against aircraft noise, particularly as the commitments from the airport in relation to their expansion plans seek to restrict night-time movements.

8.5.3 Consideration would, however, be given during the detail design to ensure that the glazing and ventilation strategy sought to ensure that the requirements of BS 8233 were achieved. In particular, the glazing would be selected with a good performance to reduce noise from aircraft.

8.5.4 The southern facades of the development, which face onto the river and industrial estate, are affected by noise from the operation of the industrial units, in particular the Tarmac batching plant, which was observed to operate 24 hours at times. The provision of standard thermal double glazing would be sufficient to ensure a good standard of noise internally. However, consideration would also be given to providing assisted acoustically treated ventilation for habitable rooms on this facade, which would allow sufficient background ventilation with windows closed, should the occupants choose.

8.5.5 Any balconies facing onto the river would also be fully glazed to a height of at least 1.1 metres. This measure would provide protection against the industrial noise sources for residents sitting outside and would also seek to reduce noise levels at the facade of the apartments, thus seeking to ensure that an acceptable standard of noise was maintained should the occupants open the balcony doors.

Off Site Road Traffic

8.5.6 Adverse road traffic noise impacts have been identified at properties along Mill Lane. However, the levels of noise associated with the development traffic would remain low in comparison to the noise from other noise sources, in particular aircraft flying into the airport and the previous use of the mill. The impacts

were not considered to constitute a significant effect and no additional noise mitigation measures have therefore been identified.

8.5.7 With appropriate mitigation measures implemented within the final design, which could be secured through an appropriate planning condition, noise levels within the development would be acceptable, with no adverse residual impacts identified.

8.6 Summary

Introduction

8.6.1 A noise and vibration impact assessment has been carried out for the proposed development to assess the suitability of the site for residential development.

8.6.2 The assessment has taken account of potential impacts on existing receptors during the construction of the development and associated with the operation of the completed development.

Baseline Conditions

8.6.3 Noise surveys have been carried out to determine the existing noise environment within the proposed development.

8.6.4 Noise levels within the development and surrounding area were found to be principally associated with aircraft flying into London Southend Airport and the industrial uses on Purdey's Industrial Estate to the south.

8.6.5 Noise levels were monitored on the site on two occasions, which indicated that period day and night-time noise levels remained relatively low. It is not anticipated that the noise environment would change significantly at this location with the proposals for the airport expansion.

Likely Effects

8.6.6 The redevelopment of the site and construction of the improved flood defences has the potential to give rise to impacts at Broomhills care home and other properties on Mill Lane close to the development, particularly during the construction of the flood defences, raising of the site levels, the onsite demolition works and piling activities. Noise and vibration levels would be controlled through best practice measures on site and the reuse of existing mill buildings and foundations where possible.

8.6.7 Aircraft flying over the development into the airport have the potential to cause disturbance to future occupants of the development, in particular during the night-time period. The impact assessment concluded that the noise levels would be acceptable, as the assessment indicated that the site was within Planning Policy Guidance 24 Noise Exposure Category A/B, which is suitable for residential development. Consideration of the aircraft movements, would however, be taken into account during the detail design and appropriate measures incorporated into the design to minimise any potential impacts.

8.6.8 The operation of the industrial estate has also been identified to have the potential to give rise to adverse impacts upon occupants of the development. Again, measures would be taken during the detail design to ensure any potential impacts were minimised.

8.6.9 Traffic accessing the development has the potential to give rise to adverse impacts upon existing noise sensitive receptors. The assessment indicated that there would be moderate adverse impact at dwellings along Mill Lane due to the change in noise levels experienced. However, the impacts were not considered to be significant, as the overall noise levels associated with the traffic would be low, either equivalent to or below the noise levels associated with the aircraft flying overhead and anticipated to be lower than those associated with the HGV traffic which previously accessed the mill whilst operational.

Mitigation

8.6.10 During the construction phase, the contractors would be required to adopt best practice measures during the works to minimise potential impacts, which would include careful plant selection, control of working hours and monitoring of levels whilst working close to potentially affected receptors. With appropriate measures adopted, potential adverse impacts would be minimised.

8.6.11 Appropriate noise mitigation measures would be incorporated into the design of the development to protect future occupants against noise from aircraft flying overhead and the operation of the industrial estate. With appropriate measures implemented in the design, which could be secured through a suitable planning condition, potential impacts would be minimised.

Conclusions

8.6.12 In summary, with appropriate mitigation and control measures adopted during the construction and design of the development, potential noise and vibration impacts would be minimised, thus ensuring the site was suitable for residential development.

8.7 References

8.1 British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. BS 5228: 2009.

8.2 British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration. BS 5228: 2009.

8.3 British Standards Institute. Evaluation and Measurement for Vibration in Buildings. Part 2. Guide to Damage Levels from Groundborne Vibration. BS 7385: Part 2. 1993.

8.4 Department for Communities and Local Government. Planning Policy Guidance PPG 24, Planning and Noise. 1994.

8.5 British Standards Institute. Sound Insulation and Noise Reduction in Buildings – Code of Practice. BS 8233: 1999.

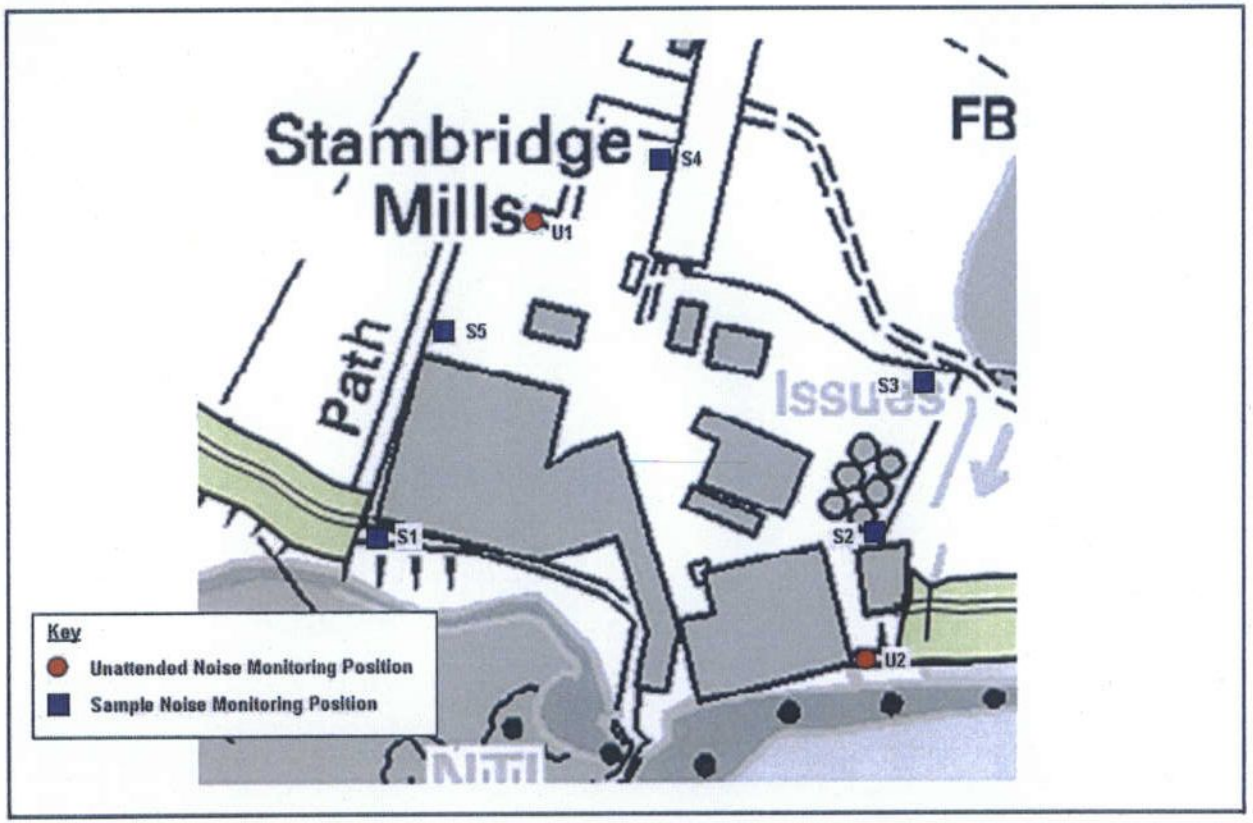
8.6 World Health Organisation. Guidelines for Community Noise. 1999. WHO Geneva.

8.7 British Standards Institute. Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas. BS 4142. 1997.

8.8 London Southend Airport. Southend Airport Runway Extension and Associated Development. Environmental Statement. October 2009. Jacobs.

8.9 Department of Transport. The Calculation of Road Traffic Noise. The Stationary Office. 1988.

8.10 Defra. Method for Converting the UK Road Traffic Noise Index LA10,18h to The EU Noise Indices for Road Noise Mapping. TRL / Casella Stanger. Ref. st/05/91/AGG04442. January 2006.



8.1 **FIGURE**

Noise Monitoring Locations **TITLE**

NTS @ A3 **SCALE**

I.0107 **DWG. NO.**

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

9 HYDROLOGY, FLOOD RISK AND SURFACE WATER DRAINAGE

9.1 Introduction

9.1.1 This chapter has been prepared to consider the effect of the proposed development on the existing hydrology and flood risk and to consider how any potentially adverse effects might be mitigated.

9.1.2 This chapter sets out an assessment of the baseline conditions with respect to hydrology and surface water drainage within the vicinity of the proposed development site. It then considers what potential effects the proposed development may have upon these baseline conditions and evaluates these impacts. A range of measures that are proposed to mitigate these effects are provided as are a summary of any residual effects.

9.2 Assessment Approach

Methodology

9.2.1 The potential effects on the water environment as a result of the proposed development have been considered during the construction and operational phases. The significance level attributed to each effect has been assessed based on the following criteria:

Magnitude of the effect, including geographic significance (local, district, or regional level)

Duration of the effect (long, medium and short term)

Nature of the effect (beneficial, negligible or adverse)

9.2.2 The significance of effects upon the identified receptors is evaluated in relation to the Environmental Impact Scale presented in Table 9.1.

Table 9.1 – Environmental Impact Scale

Scale	Impact
+3	**Major positive impact** - Impacts are large in scale (global/national) and/or have a high environmental benefit
+2	**Moderate positive impact** – Impact on a regional scale and/or represent a medium level environmental benefit
+1	**Minor positive impact** - Impacts are small scale (localised) and/or are a low environmental benefit with no measurable impact
0	*Neutral – **No measurable impact is expected to occur as a result of considering the impact***
-1	**Minor negative impact** - Impacts are small scale (localised) and/or are a low environmental hazard with no measurable impact
-2	**Moderate negative impact** - Impact on a regional scale and/or represent a medium level environmental hazard
-3	**Major negative impact** - Impacts are large in scale (global/national) and/or have a high environmental hazard

Policy Framework

European Legislation

9.2.3 Directives of the European Parliament set legal obligations which are enacted into the legislation of each of the member states. The Water Framework Directive (2000/60/EC) sets objectives for integrated management of water quality and quantity in surface and groundwater bodies. These objectives must be achieved to a specified schedule via characterisation and monitoring of waterbodies, and preparation and implementation of River Basin Management Plans. Legislation for the Water Framework Directive is covered by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.

National Legislation

9.2.4 The Water Resources Act 1991 sets out the main regulatory framework that provides protection to the water environment through controls on abstractions, impoundment and discharges. The Act also identifies, among other things, conservation, water quality and drought provisions.

9.2.5 The Environment Act which sets out powers for enhanced environmental protection, including for prevention and remediation of water pollution. The Land Drainage Act 1991 which includes powers and duties relating to environmental conservation and recreation. The Water Industry Act 1991 which covers the supply of water and sewerage services. The Environmental Protection Act 1990 which provides for integrated pollution control.

9.2.6 Regulations introduced under the above primary legislation including:

- Water Resources (Environmental Impact Assessment) (England and Wales) Regulations 2003;
- The Groundwater Regulations 1988
- The Urban Wastewater Treatment (England and Wales) Regulations 1994
- The Anti-Pollution Works Regulations 1999
- The Building Regulations 2002, introduced under the Building Act 1984, notably Part H, Drainage and Waste Disposal, which includes requirements for the disposal of surface water and wastewater.

National Planning Policy

- *Planning Policy Statement 1 (PPS1) : Delivering Sustainable Development*
- *Planning Policy Statement 23 (PPS23) : Planning and Pollution Control*
- *PPS23 sets out policies for pollution control to be followed at all stages of planning including Regional Spatial Strategies (RSSs) and Local Development Documents (LDDs)*
- *Planning Policy Statement 25 (PPS25): Development and Flood Risk*

9.2.7 PPS25 seeks to ensure that flood risk is taken into account at all stages of the planning process and aims to avoid inappropriate development in areas at risk of flooding. Furthermore it provides guidance on the assessment of flood risk for developers with the aim of ensuring that any development:

- is safe for the life time of the development;
- does not increase flood risk elsewhere; and
- where possible it is possible reduces flood risk overall.

9.2.8 In addition to PPS25, practical guidance has been issued (December 2009) by the Department of Communities and Local Government titled Development and Flood Risk: A Practice Guide Companion to PPS25. This document outlines the practical application of PPS25 together with further guidance and is referred to throughout the Flood Risk Assessment provided at Appendix 9.1.

Regional Planning Policy

9.2.9 Policy CC2: Climate Change seeks to promote measures to mitigate and adapt to current and forecast effects of climate change. In particular in relation to flooding this is to be achived through:

- guiding strategic development to locations offering greater protection from impacts such as flooding, erosion, storms, water shortages and subsidence;
- ensuring new and existing building stock is more resilient to climate change impacts;
- incorporating sustainable drainage measures and high standards of water efficiency in new and existing building stock;
- increasing flood storage capacity and developing sustainable new water resources;
- ensuring that opportunities and options for sustainable flood management; and
- migration of habitats and species are actively promoted.

9.2.10 Policy NRM1: Sustainable Water Resources and Groundwater Quality seeks to ensure that water supply and ground water will be maintained and enhanced through avoiding adverse effects of development on the water environment. In relation to ground water quality this is to be promoted by:

- achieving the objectives of the Water Framework Directive by delivering appropriate actions set out in River Basin Management plans;
- Identifying circumstances under which sustainable drainage solutions should be incorporated into new development; and
- Encouraging practices which reduce summer abstraction, diffuse pollution and runoff, increase flood storage capacity and benefit wildlife and recreation.

9.2.11 Policy NRM2: Water Quality seeks to ensure that water quality will be maintained and enhanced through avoiding adverse effects of development on the water environment. This will be achieved by:

- taking account of water cycle studies, groundwater vulnerability maps, groundwater source protection zone maps and asset management plans as prepared by the Environment Agency, water and sewerage companies, and local authorities;
- iensuring that the environmental water quality standards and objectives as required by European Directives are met;
- ensuring that the rate and location of development does not breach either relevant 'no deterioration' objectives or environmental quality standards; and
- not permitting development that presents a risk of pollution or where satisfactory pollution prevention measures are not provided in areas of high groundwater vulnerability (in consultation with the Environment Agency and Natural England).
- ensuring that Sustainable Drainage Systems are incorporated in a manner to reduce diffuse pollution.

9.2.12 Policy NRM4: Sustainable Flood Risk Management requires that the sequential approach to development in flood risk areas set out in PPS25 must be followed. Inappropriate development should not be allocated or permitted in flood zones 2 and 3, areas at risk of surface water flooding (critical drainage areas) or areas with a history of groundwater flooding, or where it would increase flood risk elsewhere, unless there is over-riding need and absence of suitable alternatives. The policy also advises that where development is permitted in appropriately defended floodplains it must

- be designed to be resilient to flooding to minimise potential damage and to allow for the future maintenance realignment or management of the defences to be undertaken;
- incorporate Sustainable Drainage Systems (SuDS) or other water retention and flood storage measures to minimise direct surface run–off unless there are practical or environmental reasons for not doing so; and
- take account of increased surface water drainage on sewage effluent flows on fluvial flood risk..

Local Planning Policy

9.2.13 Policy NR11 of the Rochford Local Plan, adopted in 2006, states that any planning application relating to development within a flood risk area, must be accompanied with a flood risk assessment. This is to enable the local authority to properly consider the level of flood risk posed to the proposed development throughout its lifetime and the effectiveness of flood mitigation and management measures.

9.2.14 Policy NR12 details requirements for surface water drainage and states that details of sustainable drainage systems (SUDs) must be incorporated in the development to ensure that any flood risk is not increased by surface water runoff arising from the new development.

Scoping Criteria

9.2.15 As part of the scoping exercise Rochford District Council provided a scoping response after consultation with both the Environment Agency and Anglian Water. The following issues were highlighted with regard to hydrology and flood risk:

Environment Agency

- The Environmental Assessment should include a flood risk assessment, a breach analysis needs to be conducted, that residual risks are acceptable, that flood risk will not be increased elsewhere and that surface water runoff from the site must not be increased;

- The proposed development site is 350m away from the boundary of the Crouch and Roach Estuaries SSSI/SPA/SAC and Ramsar site. The sites proximity to this internationally important designated site means that the demolition of the existing derelict mill buildings and the construction of 288 apartment units on this site as reduction in water quality in the Crouch estuary from uncontrolled surface water run off from the proposed development;

- Any future planning application should be supported by an assessment of the impact that the development could have on the quality of controlled waters. This should include a desk study, conceptual model and risk assessment. These must appraise the site geology and hydrogeology, past site uses and nearby potential sources of contamination, and nearby receptors;

- An initial overview of the site area indicates that it is situated within 150m of an historical landfill to the south, and within 1km of two other former landfill sites to the north west; there are three discharge consents registered with the Environment Agency (two on the site, one to the south); the site is adjacent to the River Roach estuary which is a potential receptor.

Anglian Water

- Anglian Water stated that there are no public sewers in the vicinity of the site and therefore an alternative means of surface water disposal must be used. Anglian Water also need to assess the impact on the existing sewerage system and therefore development proposals should be discussed with Anglian Water.

9.2.16 A copy of the consultation documents from the Environment Agency and from Anglian Water are enclosed within Appendix 1.2.

9.2.17 The scoping criteria and the assessment methodology for the hydrological and flood risk appraisal of the proposed development is as follows:

- Establish a baseline hydrological and drainage environment involving desk study, liaison with interested parties and review of existing information;
- Identify potential impacts on the existing hydrological and drainage environments arising from the proposed development and its construction; and
- Identify measures to mitigate any potentially adverse impact that may arise from the proposed development or construction of the proposed development.

Limitations to the assessment

9.2.18 There are no limitations to the assessment of hydrology and flood risk in relation to the site.

9.3 Baseline Conditions

Site description and context

9.3.1 The River Roach and its tributaries flow east from the town of Rochford, to join the River Crouch at Wallasea Island, east of Burnham-on-Crouch. The tidal limit of the River Roach is Rochford. The River Crouch joins the North Sea at Foulness Point.

9.3.2 The River Roach and River Crouch provide the main pathways for tidal flooding in the Rochford District. However, drainage channels provide pathways in the event of a breach or overtopping event. A number of such drainage channels exist within the vicinity of the site.

9.3.3 The Mills site is located 350m away from boundary of the Crouch and Roach SSSI/SPA/SAC and Ramsar site.

Desk Study

9.3.4 A desk study has been undertaken to establish the hydrology, geology and hydrogeology of the site. The following information has been reviewed for developing the baseline hydrological and drainage environment included:

- Topographic information for the proposed development site obtained from a topographic survey completed by Messrs Global Surveys Limited, dated 23 August 2007.

- Geological information obtained from the 1:50,000 scale geological map Sheet 258 'Southend and Foulness' (Solid and Drift Edition) published by the British Geological Survey (BGS);

- Environment Agency information (January 2008) www.environment-agency.gov.uk

- Environment Agency (February 2007): The Combined Essex (North and South Essex) Catchment Abstraction Management Strategy (CAMS)

- Environment Agency (2004): South Essex Catchment Abstraction Management Strategy (CAMS)

- Bureau Veritas UK Limited, Flood Risk Assessment (August 2011) Stambridge Mills, Rochford, enclosed within Appendix 9.1.

- *Site Visits*

9.3.5 Two site visits were completed on 25th September 2007 and 17th January 2008 to visually assess the current flood defence structures and the principal surface water drainage features in the vicinity of the proposed development site.

- *Consultation*

9.3.6 Consultations have been made with the following with regard to hydrology and drainage issues:

- The Ipswich Area Office of the Environment Agency to seek baseline data and to discuss preliminary mitigation strategies;

- Anglian Water to confirm foul sewage connections

- On-going consultations with the Environment Agency to discuss appropriate parameters to assess the flood risk to the developed site.

Baseline survey information

- *Topography*

9.3.7 The site is at an elevation of approximately 4m Above Ordnance Datum (AOD). There is a slight fall in elevation from Stambridge Road at an elevation of 5m AOD to 3.5m AOD adjacent to the River Roach.

- *Geology*

9.3.8 The 1:50,000 map for this area (sheet 258) published by the British Geological Survey indicates that the site is founded on sand and gravel and successively underlain by London Clay and Upper Chalk.

- *Hydrogeology*

9.3.9 Key influences on the hydrology and drainage are the permeability of the sands and gravels underlying the site at a shallow depth, which are likely to be hydraulic continuity with the River Roach. Near surface groundwater levels could therefore be expected to follow the tidal river levels albeit lagged and attenuated by the permeability of these deposits.

9.3.10 Abstractions for public supply in the vicinity are recorded by the Environment Agency. The site is shown on the Environment Agency website as not lying near any groundwater source protection zones.

9.3.11 The River Roach is covered by the Combined Essex (North and South Essex, 2007) Catchment Management Strategy (CAMs). These strategies set out how the EA manages water resources within the catchment, principally detailing the management of water abstractions and maintaining the availability of water for future abstractions.

9.3.12 The Roach catchment is drained by a number of watercourses, which respond rapidly to rainfall during the winter period due to the impermeability of the London Clay underlying much of the area, especially when the soil moisture deficit is low. This, in combination with the very small volumes of baseflow provided by the shallow sand and gravel aquifers, contribute to extremely low river flows during the summer months. The chalk is the principle underlying aquifer in the area. Rainfall percolates into the aquifer and recharges it over the autumn and winter months. The impermeable London Clay, however, precludes infiltration of rainfall over large areas of the chalk aquifer, thereby restricting its use for water resource development.

9.3.13 .The Combined Essex CAMs provides details on resource availability and therefore the level of abstraction that can be undertaken. The Combined Essex CAMS covers the Upper Roach and currently has a status of 'Water available'. However, the target status for 2012 is 'No water available'. There is an option for further abstraction whilst facilitating the sustainable resource allocation between the needs of the environment and abstractors. The target status of 'No water available' will result in amendments to new discharge consents and the renewal of existing discharge consents in the vicinity of the Mills site..

- *Hydrology*

9.3.14 The River Roach and its tributaries flow east from the town of Rochford, to join the River Crouch at Wallasea Island, east of Burnham-on-Crouch. The River Crouch joins the North Sea at Foulness Point. The tidal limit of the River Roach is Rochford. The River Roach forms the entire southern boundary of the site.

9.3.15 An 'Ordinary' watercourse adjacent to the eastern boundary discharges into the River Roach. This is culverted underneath the existing embankment and discharges via a tidal flap immediately to the east of the site. The culvert has a 1 metre diameter with an upstream downstream invert level of 0.8m AOD. Visual observations of the watercourse adjacent to the eastern boundary show that the channel is relatively overgrown comprising a variety of water-based flora. The watercourse discharges from a small fishing pond located to the north east of the site.

9.3.16 A number of drainage channels are located to the west of the site which also discharge to the River Roach via tidal flaps. These are likely to be pathways for flood waters during a tidal event. However, these are not located in the immediate vicinity of the site and are therefore are not likely to influence the hydrology in relation to the site.

9.3.17 A Flood Risk Assessment has been undertaken and is included in Appendix 9.1. The Environment Agency has confirmed that the site is located within Zone 3a High Probability area. Where the risk of flooding is from a tidal source, a Zone 3a High Probability is defined as where the annual probability of flooding is 0.5% or greater. This is referred to as the 1 in 200 year event.

- *Surface Water*

9.3.18 A formal system of drainage is thought to be on site with runoff from the existing buildings and hardstanding discharging directly to the River Roach via tidal flap valves.

9.3.19 Details of the runoff from the existing site and the proposed development are set out at Appendix E to the Flood Risk Assessment.

- *Surface Water Quality*

9.3.20 The EA's General Quality Assessment (GQA) scheme provides a consistent method for classifying and comparing water quality in rivers and canals across the UK. The scheme uses for main parameters of measurement which include:

- Chemical content;
- Biological Content;
- Nutrient Content; and
- Aesthetics.

9.3.21 A water quality monitoring site is located at Stambridge Mills. In addition to the GQA scheme river target data published by the Environment Agency, the River Ecosystems (RE) Scheme for the site is enclosed within Appendix 9.2. The chemical water quality is compliant with the required standards and therefore would support cyprinid fisheries in a natural ecosystem. However, the biology results indicate that the watercourse in this location is restricted to pollution tolerant species and levels of nitrates and phosphates are very high and excessively high respectively.

- *Licensed Discharges*

9.3.22 License discharge consents registered with the Environment Agency have been identified, two of which are located on the site and one to the south, which relates to the discharge of surface water to the River Roach from Purdey's Industrial Estate. The discharge consents located on the site are a result of the former Mill workings and relate to the discharge of trade waste and the discharge of treated sewage effluent.

9.3.23 A further licensed discharge consent relates to the discharge of process effluent to the estuary from Anglian Water's Rochford/Stambridge Sewage Treatment Works, some 5km west from the development site at Blackedge Point.

- *Landfill Sites*

9.3.24 An initial overview of the site area indicates that it is situated within 150m of an historical landfill to the south, and within 1km of two other former landfill sites to the north west. No special waste exists in the site located to the south, which comprises inert, industrial and household waste. The last waste to be received at this site was on the 31 December 1976. The last waste to be received to the site in the north west was 31 December 1963; it only comprised inert and household waste.

- *Pollution Incidents*

9.3.25 The only significant impact to occur in close proximity to the site (some 750m west of the site) occurred on the 19th June 2002 and related to specific waste materials (oils and fuels). The impact relates only to land. This incident had no impact on the nearby watercourse.

- *Designated Nature Conservation Sites*

9.3.26 The Crouch and Roach Estuary is an integral component of the phased Mid-Essex Coast SPA. The estuaries are also designated as SACs and Ramsar sites under the EC Directive on the Conservation of Wild Birds (Directive 79/409/EEC) and the Habitats Directive (Directive 92/43/EEC).

9.3.27 Part of the estuarine area is designated as a SSSI. The western extremity of the designated SSSI lies approximately 0.2km to the east of the site, along the River Roach. The Crouch and Roach Estuaries SSSI is contiguous with both the Dengie SSSI and the Foulness SSSI. These sites run from the mouth of the River Crouch, the Dengie SSSI to the north, and the Foulness SSSI running southwards including the south bank of the River Crouch downstream.

9.3.28 Bird species found in internationally important numbers include Grey Plover, Knot, Dark Bellied Brent Geese, Oystercatchers and Redshank. Further details relating to ecology is set out in the Ecology chapter of the ES.

9.4 Key Impacts and Likely Significant Effects

Impact Identification

9.4.1 A number of sensitive receptors associated with the local water resources have been identified with regards to the site. These are:

- River Roach- considered to be a medium sensitivity receptor given the risk of tidal flooding and the need to deliver improved flood defences comprising landscaped bunds, sea wall & sheet pile wharf edge.

- SPA, SAC, Ramsar, SSSI site- considered to be a high sensitivity receptor given that it is a European protected site.

- Groundwater Resources- considered to be a low sensitivity receptor on the basis that there are no groundwater abstractions within the locality of the site.

Construction Phase

9.4.2 Activities such as earthworks and construction plant use, together with erosion from unprotected temporary surfaces or haul routes, may potentially lead to a significant silt load in surface water run off, which may be deposited in the River Roach or the ordinary watercourse to the east of the site. This will be to the detriment of the prevailing ecological or hydromorphological regime. The potential effects of erosion and resultant silt load are assessed as moderate negative effects (-2).

9.4.3 Work adjoining the ordinary watercourse to the east of the site may cause bank degradation. The potential effects of bank degradation are assessed as minor negative effect (-1).

9.4.4 Severing of land drains may lead to changes in soil moisture and drainage conditions, which could result in a moderate negative effect (-2).

9.4.5 The presence of heavy plant and other vehicles on the site introduces the potential for spillages of organic contaminants, for example diesel and hydraulic fluids, to enter and contaminate the sub-soils and watercourses via infiltration or surface water run-off. Spillages of construction materials, for example wet concrete, construction chemicals, washdown wastes, may also lead to contamination via infiltration or runoff. The contaminants have the potential to enter sub-soils may also be transported into the ordinary watercourse and the River Roach via sub-surface lateral flow. The potential effects of accidental spillages within runoff are assessed as moderate negative effects (-2).

9.4.6 Installation of deep foundations, including piles, or penetrative ground improvement, could cause pollution of groundwater by cementitious materials or superficial contaminants. The potential effect on groundwater is assessed as minor negative effect (-1).

9.4.7 Compaction of surfaces by trafficking and the construction of impermeable surfaces may lead to an increase in the volume of runoff into the ditches and potentially to an increased risk of downstream flooding. The potential effect on surface water runoff is assessed as moderate negative effect (-1)

9.4.8 Wastewaters from site welfare facilities may be a source of pollution of surface waters if inappropriately discharged. The potential effects of discharge of wastewaters are assessed as moderate negative effects (-2).

Operational Phase

9.4.9 The proposed improved flood defences will be to extend the existing earth embankment defences to the east and west of the site, and to construct a new reinforced concrete flood wall to the south of the site to provide a continuous line of defence. The newly-constructed earth embankments will be fully-engineered structures designed and constructed to a standard acceptable to the Environment Agency and which will provide assurance against a breach in the defences. This will provide increased flood protection to the residents of the adjacent Broomhills nursing home and properties along Mill Lane. This will therefore result in a major positive effect (+3).

9.4.10 The site is presently occupied by a disused mill and associated hardstandings and therefore the construction of the proposed buildings will reduce the percentage of impermeable surfaces within the site. It is therefore expected that runoff from the site will be reduced and that there will not be an increase in risk of flooding downstream of the proposed development. This will therefore result in a moderate positive effect (+2).

9.4.11 Hydrocarbons and suspended solids within runoff from roads and hardstandings could lead to pollution of the watercourses, which could result in a minor negative effect (-1).

9.4.12 Installation of deep foundations, including piles, or penetrative ground improvement, could cause alteration of the groundwater recharge regime or introduce pathways for pollution by superficial contaminants. This could result in a moderate negative effect (-2).

9.4.13 Organic matter, nutrients and other contaminants within wastewater from buildings, including sewage and kitchen wastes, could lead to pollution of the ditches and watercourses or groundwater. In addition, organic matter, nutrients, fertilisers, pesticides or herbicides from management of the landscaped areas or paving could lead to pollution of the ditches and watercourses or groundwater. These pollutants may enter watercourses via spray-drift or runoff, which could result in a minor negative effect (-1).

9.4.14 Unauthorised disposal of contaminating wastes by occupiers or the spillage of stored chemicals, for example, could lead to pollution of the ditches and watercourses or groundwater and result in a minor negative effect (-1).

9.4.15 Firewater runoff in the event of a site emergency may lead to pollution of the ditches and watercourses or groundwater resulting in a minor negative effect (-1).

9.4.16 If land drains are severed and not reinstated or diverted, this may lead to changes in soil moisture and drainage conditions locally and therefore a minor negative effect (-1).

9.4.17 Local groundwater abstractions could potentially be affected if patterns of groundwater recharge were to be significantly altered by the development of the site, which would result in a moderate negative effect (-2).

Assessment of significance

9.4.18 The significance of any potential effects is determined by a combination of factors, including the sensitivity of the watercourses affected and the magnitude of change that will occur. In terms of the receiving watercourses, the key determinants of significance relate to water quality and quantity and therefore changes to water quality and flow. The assessment of significance of the effect of each of the impacts described above is summarised in Table 9.2.

9.5 Mitigation and Enhancement

Construction Phase

9.5.1 It is proposed that construction-related impacts would be mitigated by adopting site management controls in accordance with recognised industry good practice, notably following EA Pollution Prevention Guidelines No 6 (PPG 6) 'Working at Construction or Demolition Sites'.

9.5.2 The control of silt load in discharges to the River Roach would be achieved by suitable timing and sequences of earthmoving operations, using buffer strips/toe-raising where necessary, containment of runoff, the provision of settlement facilities or silt traps where appropriate prior to discharge. The spread of soil materials onto surrounding roads may be controlled by the use of wheelwash facilities and roadsweepers.

9.5.3 The potential impacts on groundwater of the installation of deep foundations or penetrative ground improvement would be controlled by appropriate design.

9.5.4 Spillages of fuels and chemicals would be controlled by provision of secure bunded storage areas and containment at refuelling and maintenance facilities in accordance with EA Pollution Prevention Guidelines No 6 (PPG 6) 'Working at Construction or Demolition Sites'.

9.5.5 Spillages of construction materials would be controlled by ensuring containment of runoff and provision of decontamination facilities where appropriate prior to discharge.

9.5.6 It is proposed that wastewaters from site welfare facilities would be discharged via temporary connections to the public sewer, subject to consent.

9.5.7 Control of increased runoff volume due to compaction of surfaces would be achieved by suitable timing and sequence of earthmoving operations, together with suitable plant use, and the provision of containment and attenuation of runoff where needed.

9.5.8 The control of effects arising from discharges to the public surface water drainage will be achieved by the adoption of industry-standard environmental good practice, as outlined in the CIRIA Report C650 'Environmental Good Practice on Site and in accordance with the necessary consent from Anglian Water.

Operational Phase

9.5.9 Specific measures will be required to mitigate any increase in runoff rate or volume as a result of the development. The Flood Risk Assessment report included at Appendix 9.1 refers to the measures required. Discharge of surface water by infiltration will be the preferred method if it is shown by ground investigations to be feasible. The alternative method of discharge to adjacent watercourses is also considered below, as a worst-case to cater for the eventuality that infiltration discharge proves not to be feasible. Both are described in the Drainage Strategy Statement included in Appendix E of the FRA.

9.5.10 It is proposed that wastewaters from the development will be discharged to the public sewer.

9.5.11 Impacts from the application of organic matter, nutrients, fertilisers, pesticides or herbicides in landscaped areas would be mitigated by adopting land management controls in accordance with recognised industry good practice. These include provision of untreated buffer strips and locating mowings and composting materials away from watercourses.

9.5.12 Accidental spillages of stored chemicals would be mitigated by the provision of secure bunded storage and by adopting land management controls such as ensuring containment of runoff and provision of decontamination facilities where appropriate prior to discharge.

9.5.13 Valves or similar means of containment should be provided as appropriate to enable isolation of surface water contaminated by accidental spillages or firewater runoff in accordance with PPG18 (2000) Managing Firewater and Major Spillages.

9.5.14 There will be additional demand for potable water which will be mitigated by the adoption of low water demand facilities; this will include low water-demand sanitary fittings, metered supply and low demand irrigation of landscape elements.

Residual Effects

Construction phase

9.5.15 With the adoption of industry-standard good site practice as described above a minor negative residual effect on the water environment has been assessed resulting from discharge of silt and the control of runoff (-1). With the adoption of industry-standard good site practice as described above a minor negative residual impact (-1) has been assessed arising from spilled hydrocarbons or construction material in runoff from the site. The impact on groundwater of the installation of deep foundations or penetrative ground improvement would be controlled by appropriate design and is described as a minor negative effect (-1). With formal means of disposal of site wastewaters as described above, a neutral residual effect (0) has been assessed. Each of the residual effects is presented in Table 9.2.

Operational Phase

9.5.16 The delivery of improved flood defences as described above will result in reduced flood risk to the local area and therefore a major positive effect (+3). In addition, the proposed drainage strategy will result in a net reduction in surface water discharge and a minor positive residual effect (+1) has been assessed in relation to the effects of runoff flows. Installation of silt traps and oil interceptors will be such that the effects of discharges of hydrocarbons and suspended solids will have a neutral residual effect. With suitable control of the application of de-icing materials and herbicides as described above the residual effects are assessed to be neutral (0). With suitable maintenance and incident management procedures as described above the residual effects of accidental spillages is assessed to be neutral (0). A minor negative residual effect (-1) has been assessed from additional demand upon potable water supplies.

9.6 Summary

This chapter has set out the effect of the proposed development on the existing hydrology and flood risk and to consider how any potentially adverse effects might be mitigated.

9.6.1 The Mills site is located on the River Roach which flows east from the town of Rochford, to join the River Crouch at Wallasea Island, east of Burnham-on-Crouch. Key influences on the hydrology and drainage are the permeability of the sands and gravels underlying the site at a shallow depth, which are likely to be hydraulic continuity with the River Roach. In addition, the Environment Agency has confirmed that the site is located within Zone 3a High Probability area. Where the risk of flooding is from a tidal source, a Zone 3a High Probability is defined as where the annual probability of flooding is 0.5% or greater. This is referred to as the 1 in 200 year event.

9.6.2 The chemical water quality is compliant with the required standards, however, the biology results indicate that the watercourse in this location is restricted to pollution tolerant species and levels of nitrates and phosphates are very high and excessively high respectively. There are two license discharge consents on the site and one to the south. The discharge consents located on the site are a result of the former Mill workings and relate to the discharge of trade waste and the discharge of treated sewage effluent.

9.6.3 The Crouch and Roach Estuary is an integral component of the phased Mid-Essex Coast SPA. The estuaries are also designated as SACs and Ramsar sites under the EC Directive on the Conservation of Wild Birds (Directive 79/409/EEC) and the Habitats Directive (Directive 92/43/EEC).

9.6.4 Potential effects on hydrology and flood risk have been identified, and these are shown in Table 9.2.Effects on the water environment during site clearance and construction of the development, include potential discharges of silt or contaminants to the public sewers. These effects are assessed to be no more adverse than minor negative effects (-1) provided industry-standard environmental good practice is followed.

9.6.5 Effects on the water environment during the lifetime of the development are assessed to be no more adverse than minor negative effects (-1). The effect of the development upon the risk of flooding to adjacent properties, including the nursing home, is assessed to be a major positive effect (+3) through the delivery of the improved flood defences. The residual effects are summarised in Table 9.2.

9.6.6 Mitigation measures have been recommended for both the construction and operation stages. During the construction stage impacts would be mitigated by adopting site management controls in accordance with recognised industry good practice. During the operation stage the control of runoff will be the key issue, with the preferred method for discharge being infiltration to the ground. Full details are provided in the Flood Risk Assessment.

9.6.7 Overall the redevelopment of the Mills site will have no more than minor negative effects in relation to hydrology, flood risk and surface water drainage. The effect of the development upon the risk of flooding to adjacent properties, including the nursing home is considered a major positive effect and therefore of high environmental benefit. The proposed mitigation measures will ensure that residual effects are minimised during both the construction and operation of the proposed development.

Table 9.2: Summary of Significant Effects and Residual Impacts, Hydrology and Drainage,

Receptor / Environmental Resource	Brief Description of Impact	Direct (D) / Indirect (I)	Temp. (T)/ Permanent (P)	Short (S)/ Medium (M) / Long (L)	Significance of Impact	Mitigation Measures	Residual Significance
Construction Phase							
River Roach	Increase in suspended solids due to silt load in runoff affecting habitat and hydromorphology	D	T	S	- 2	Site management including timing and sequence of earthmoving. Containment of runoff and provision of settlement facilities. Installation of toe-rail is recommended along base of site boundary nearest to sensitive areas.	- 1
River Roach	Spillages of contaminated land from existing hardstanding during crushing (heightened flow path of water reaching groundwater) affecting habitat	D	T	S	-2	Contaminated land investigation prior to excavation and crushing of existing hardstanding to determine presence of any contamination. Installation of a protective toe-rail nearest to River to prevent spillages. Crusher will be installed in accordance with appropriate guidance documentation.	-1

River Roach	Spillages of fuels and chemicals causing pollution	D	T	S	- 2	Site management including secure bunded storage areas and containment at refuelling and maintenance facilities. All plant and associated apparatus to stored in designated areas. All equipment supplied with emergency response spill-kit. All plant and machinery stored away from watercourse to prevent impact from potential vandalism (fuel ciphering etc).	- 1
River Roach	Spillages of construction materials causing pollution	D	T	S	- 2	Site management including containment of runoff and provision of decontamination facilities. All plant and machinery to remain within correct haulage routes.	- 1
River Roach	Discharge of wastewaters from site welfare facilities causing pollution	D	T	M	-2	Disposal of wastewaters to the public sewer or to a licensed off-site treatment works.	0
River Roach	Increased runoff volume due to compaction of surfaces causing increased flows and flooding downstream	D	T	S	- 2	Site management including timing and sequence of earthmoving, suitable plant use. Containment of runoff and provision of attenuation.	- 1
SPA	All of the above	"	"	"	"	All of the above	"

Receptor / Environmental Resource	Brief Description of Impact	Direct (D) / Indirect (I)	Temp. (T)/ Permanent (P)	Short (S)/ Medium (M) / Long (L)	Significance of Impact	Mitigation Measures	Residual Significance
Operational Phase							
Properties at risk of flooding	Reduced flood risk due to the delivery of improved flood defences	D	P	L	+3	Improved flood protection to Broomhills nursing home and properties along Mill Lane.	+3
River Roach	Increase in impermeable surfaces, leading to increased runoff rates and risk of flooding downstream	I	P	L	-2	Avoidance of runoff using preferred infiltration discharge; alternatively, attenuation of stormwater runoff rates using underground tank storage with discharge rate controls to watercourses.	+1
River Roach	Increase in impermeable surfaces, leading to increased runoff volumes and risk of flooding downstream	D	P	L	-2	Source control methods (SUDS) where practicable.	-1
River Roach and/or groundwater	Contaminated runoff from roads and paved areas, including from spillages or firewater, leading to pollution.	D	P	L	-2	Discharge via silt-traps and oil interceptors, and valve containment systems where appropriate.	-1

River Roach and groundwater	Discharge of wastewaters including sewage, leading to pollution.	D	P	L	-2	All wastewater discharges to be directed to the public sewer	-1
River Roach and groundwater	Discharge of organic matter, nutrients, fertilisers, pesticides or herbicides leading to pollution	D	P	L	-2	Adopting land management controls; provision of untreated buffer strips; locating mowings and composting materials away from watercourses	-1
River Roach and groundwater	Spillages of stored chemicals or overflow of firewater, leading to pollution	D	P	L	-2	Adopting land management controls; containment of runoff including valve containment systems, and provision of decontamination facilities	-1
Potable Water	Increased demand on potable water supply	D	P	L	-2	Delivery of low water demand sanitary fittings, metered supply and low demand irrigation of landscape elements.	

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

10 CONTAMINATED LAND AND GEOTECHNICAL ISSUES

10.1 Introduction

10.1.1 This chapter has been prepared by Environmental Scientifics Group (formerly the GTS division of Bureau Veritas UK Limited) to consider the potential environmental impacts relating to the condition of the land at the proposed Stambridge Mills development site. Consideration of impacts associated with potentially contaminated soils, geology and groundwater have been made in the context of the existing site baseline conditions during both the construction and operational phases of the proposed development.

10.1.2 Historical land use activities can give rise to contamination of land and water on a site. Such contamination may present ongoing risks to health and the environment, long after the activities that caused the contamination have ceased. Assessment of the human health and environmental risks that may be associated with land contamination is therefore an integral part of planning and preparation for the redevelopment of any land.

10.2 Assessment Methodology

Legislation and Guidance

10.2.1 Land contamination and its risk to human health and environmental receptors is a material consideration under UK planning and development control regulations. An environmental assessment of the condition of the site must consider the relevant guidance and legislation that applies to the site and its immediate surroundings; provide information that is fit for purpose, and be in accordance with UK good practice.

Part 2A of the Environmental Protection Act

10.2.2 Part 2A legislation places a duty on Local Authorities across the UK to examine periodically their areas for the presence of land which, in its current use, presents unacceptable risks to human health or the environment. The detailed technical criteria for the determination of such land as "contaminated land" under Part 2A are currently set out in the associated Statutory Guidance (currently DEFRA Circular 01/2006). Although Part 2A legislation is intended to deal with land in the context of its existing use (rather than a change of use requiring consent under the planning regime), any assessment of land undergoing a change of use must carefully consider the potential for the land to be determined as "contaminated land" at some point in the future. Planning Policy Statement 23 is quite clear that, as a minimum, land that is assessed as fit for use under the planning regime should not be capable of subsequent determination as "contaminated land".

Publication CLR11 "Model Procedures for the Management of Land Contamination"

10.2.3 The UK approach to the assessment and management of land contamination is set out in Publication CLR-11 "Model procedures for the management of land affected by contamination" (2004). This specifies a risk-based approach, taking into account the land use and environmental setting of the site.

British Standard BS10175 "Investigation of Potentially Contaminated Sites – Code of Practice"

10.2.4 The technical approach to land contamination assessment is given in the British Standard BS10175 "Assessment of potentially contaminated sites – code of practice" (2001), together with other technical best-practice guidance on the conduct of specific aspects of site investigation and risk assessment. Notwithstanding this, considerable emphasis is placed on the professional judgement of the experienced assessor in the qualitative evaluation of risk.

10.2.5 National guidance specifies a phased approach to the site assessment, with the first phase (a Preliminary Risk Assessment) comprising a review of relevant documents and information through a desk study and walkover inspection of the site and surrounding land. Based on the information obtained, an initial

"conceptual model" for the site, in the context of the proposed land use and environmental setting, can be developed.

10.2.6 The initial Conceptual Model identifies potential contaminants that may reasonably be present on the site; the various receptors that will be present (possibly at different times during and after re-development of the site), and the relevant pathways by which contact between the two may be established. The outcome of the conceptual model should be to identify potential "pollutant linkages" that may exist in relation to the land, whereby a potential receptor may be harmed by the presence of a potential contaminant.

10.2.7 Given that the initial conceptual model is based on documentary review and visual inspection only, the assessor must necessarily take a conservative view of the potential risks that may exist. In order to quantitatively assess whether the identified pollutant linkages are likely to exist in reality, it is normally necessary to undertake intrusive investigation of the land, with sampling and testing of soils, waters and gases (as appropriate) to obtain information and data on the actual ground conditions and presence of contaminants, and the likelihood of potential pathways existing in reality.

10.2.8 In the first instance, appropriate and authoritative generic assessment criteria are used to assess the significance of identified contamination to the relevant receptors, and hence the relevance (or otherwise) of the pollutant linkage. Generic assessment criteria are based on exposure assumptions that are generic to the land-use in question. They necessarily represent a conservative threshold of risk, and where appropriately applied to a robust set of data, can be used to inform professional judgement on whether a particular pollutant linkage is reasonably possible, or likely to exist in reality.

10.2.9 In the context of this chapter, it is possible to identify, on the basis of these judgements, key effects (pollutant linkages) that may reasonably result from the proposed development and the magnitude / sensitivity of these effects.

10.2.10 A Preliminary Risk Assessment (PRA), leading to development of an initial conceptual model, has been carried out for the site of the proposed development. This technical report is included at Appendix 10.1 and presents in full the documentary sources consulted and the observations of the Site walkover conducted by Bureau Veritas on 13th August 2007, and therefore only summary information is presented in this chapter.

10.2.11 A report describing the Phase II site investigation completed to inform on potential pollutant linkages identified in the PRA is enclosed at Appendix 10.2. As for the PRA only a summary of the findings are presented here and reference should be made to the report for full details.

Assessment Approach

10.2.12 The methodology for assessment of the impacts of the proposed development is as follows:

- Establish a baseline environmental setting including geology, groundwater and contaminated land involving a desk study and review of published information.
- Identification and evaluation of potential impacts on receptors in the geology, groundwater and contaminated land arising from the proposed development.
- Identification of measures to mitigate potentially significant adverse impacts that may arise from construction or operation of the proposed development, and evaluation of the residual impact with those measures in place.

10.2.13 The significance of effects upon the identified receptors is evaluated qualitatively in relation to the Environmental Effect Scale presented in Table 10.1 below.

Table 10.1: Effect Scale

Scale	Scale	Effect
Substantial positive effects	+3	Effects are large in scale (global/national) and/or have a high environmental benefit
Moderate positive effects	+2	Effects on a regional scale and/or represent a medium level environmental benefit
Minor positive effects	+1	Effects are small scale (localised) and/or are a low environmental benefit with no measurable impact
Neutral	0	No measurable effect is expected to occur as a result of the development
Minor negative effects	-1	Effects are small scale (localised) and/or are a low environmental hazard with no measurable impact
Moderate negative effects	-2	Effects on a regional scale and/or represent a medium level environmental hazard
Substantial negative effects	-3	Effects are large in scale (global/national) and/or have a high environmental hazard

Study Limitations

10.2.14 All reasonable efforts have been made to access archive material and comments and conclusions are based on the information obtained.

10.2.15 It has been assumed that the information and data provided by others are reliable and cannot accept responsibility for errors or omissions in data that are outside the applicant's immediate control.

10.2.16 It should be noted that the risk assessment has been carried out on the basis that the site is to be redeveloped to a residential end use, as per the application proposals. If this changes, then the assessment and its conclusions should be reviewed.

10.2.17 It should also be noted that the opinions expressed are based on experience and professional judgment about the risks that may be present as indicated by the information sources reviewed during the study. It is possible that some or all of the potential pollutant linkages that have been identified may not exist in reality, or that pollutant linkages other than those identified may exist. A suitably qualified solicitor should be consulted for advice on the potential legal liabilities that may be associated with the development of potentially contaminated sites.

10.2.18 Whilst every effort has been made to ensure the accuracy of the data supplied and any analysis derived from it, the possibility exists of variations in ground and water conditions around and beyond the exploratory positions. No liability can be accepted for any such variations in these conditions. Any recommendations are specific to the development as detailed in this report and no liability will be accepted should they be used for the design of alternative schemes without prior consultation with Bureau Veritas UK Ltd.

10.3 Baseline Conditions

Information Reviewed

10.3.1 The information reviewed for developing the baseline geological environment has included the following:

- Land Contamination Preliminary Risk Assessment of Stambridge Mills, Mill Lane Rochford. Reference LMAX0237. Bureau Veritas UK Ltd. September 2007.
- Phase II Environmental Assessment at Stambridge Mills, Mill Lane, Rochford. Reference LMAX0237. Bureau Veritas UK Ltd. November 2007.
- British Geological Survey (BGS) 1:50,000 scale geological map (Sheet 258/259, Southend) which give information on both solid and drift geology; and
- Reference has been made, as appropriate, to the Pollution Protection Guidelines published by the Environment Agency for assessment of mitigation measures.
- Reference has been made to Envirocheck data, published by Landmark, regarding the current and historical land uses, groundwater vulnerability and locations of waste and hazardous substances.

10.3.2 The potential contaminants, land uses, geology and hydrogeology are detailed in the PRA report enclosed at Appendix 10.1 and are summarised below.

Site Walkover

10.3.3 A site walkover survey was completed on 13th August 2007 to visually assess the principal surface features in the vicinity of the proposed development site.

Current Land Use

10.3.4 At the time of the walkover the site was dominated by hardstanding and large brick and metal clad industrial units associated with a former flour mill. These comprised:

- an office/reception building, located centrally on the northern part of the site;
- a workshop building, located on the eastern part of the site;
- a group of six silos, located along the eastern boundary of the site;
- a grinding unit and warehouses, located on the southern part of the site;
- garages and a bunded vehicle wash area, located on the north western part of the site;
- driveways and parking spaces, located on the northern section of the site;
- a DERV (Diesel Engine Road Vehicle) tank of approximately 20 cubic metres placed within a bunded area, located to the north of the site in vicinity of the main access gate; and
- a boiler building with connected water tank, both located on the south eastern part of the site.

10.3.5 Buildings and facilities were constructed in a combination of brickwork and corrugated metal sheeting. All buildings had entrances and windows sealed. Access into the commercial buildings was not possible. Anecdotal evidence suggests that the flour stores were rat infested. A large part of industrial pipe work was still in place.

10.3.6 Three oil tanks, two of approximately 2 cubic metres and one of approximately 1 cubic metre, were located to the back of the garage unit. These were situated within a bunded area. A gas canister was also located within the same bunded area.

10.3.7 A possible former tank location was identified to be adjacent the boiler building, although the tank itself was not present at time of the walkover.

10.3.8 An electrical substation was located within a bunded area in the southern part of the site adjacent to the grinding unit.

10.3.9 The site was noted to be covered in hardstanding that was generally in a reasonable condition, with some areas showing evidence of disrepair.

10.3.10 A drainage system was identified to be installed all around the site. At the time of the walkover, this was found in reasonable condition and no damage was evident.

10.3.11 Towards the southern boundary, a loading wharf was evident. Several waste items, such as metal sheets, wood board, wires, and plastic bags, were observed all around the site.

10.3.12 The site was bounded by a metallic fence except for the wharfing area to the south of the site.

Surrounding Land Uses

10.3.13 The site, apart from the southern edge, is surrounded by agricultural land. To the south of the site is the River Roach. Marshland is present between the river and site for a stretch of the southern boundary. A number of residential properties are located along Mill Lane to the north of the site.

10.3.14 The Envirocheck report identifies 29 active trade directory entries within a 0.5km radius of the site, two of which are within 0.25km radius. All of these are located within the Purdeys Industrial Estate and the closest to the site refers to waste transportation services, which are situated about 0.23km to the south of the site.

10.3.15 No active fuel station entries are identified by the Envirocheck report within a 1km radius of the site.

Historical Land Uses

10.3.16 The earliest OS map dated 1874 shows a windmill and a steam mill along with related structures. A coal storage depot was also located in vicinity of the steam mill to the southern east part of the site. A wharfing area was located on the southern boundary of the site. Although few buildings were present to the north and to the east of the site, the surroundings did not show any significant residential development within a radius of 1km.

10.3.17 By 1897 additional buildings were present in the southern part of the site. Rochford sewage works were built 0.7km to the west of the site by 1923. By the same date a number of clay pits had been dug immediately across the river.

10.3.18 By 1938 the mill structures changed. This might suggest a change of milling technology. The ordnance map dated 1955 shows that an electrical substation was placed onsite. The clay pits were covered by vegetation. In addition, a tank was positioned on the south eastern boundary and two ponds were evident centrally and to the east of the site.

10.3.19 By 1975 the pits appeared no longer evident and the buildings onsite were more structured, integrating the electric substation. The first pond was backfilled and a building was placed at its location.

10.3.20 By 1986 the second pond was backfilled and 6 silos were placed at its location. Since 1993, across the river, a works area appears evident. This is likely to be linked with the buildings referring to the industrial estate still in place today.

Geology

10.3.21 The relevant British Geological Survey map (Sheet 258/259, Southend) indicates the site to be situated on a geological boundary (drift deposits). The northern part of the site is mapped as being underlain by First Terrace Sand and Gravel whereas the southern part is mapped as Marine/Estuarine Alluvium. Both drift deposits are underlain by London Clay.

10.3.22 The geological memoir describes Marine/Estuarine Alluvium as clay or undifferentiated deposits which occur in the flood plains of the larger rivers and can be up to 35m thick. First Terrace Sand and Gravel refer to river deposits.

10.3.23 An extract from the geological map 258 is presented as Figure 3 of Appendix 2 of the PRA report enclosed at Appendix 10.1.

Hydrogeology

10.3.24 The Environment Agency Groundwater Vulnerability map relevant to the subject site (Sheet 40, Thames Estuary) shows the site to overlie both a Non Aquifer, which refers to the London Clay, and a Minor Aquifer which relates to the Alluvium and the Sand and Gravel.

10.3.25 Environment Agency records provided in the Envirocheck report indicate that the site is not located within any Source Protection Zone. No Source Protection Zones are identified within a radius of 1km.

10.3.26 The Envirocheck report identifies the nearest active groundwater abstraction point to be approximately 1.2km north-west of the site. This is for "General Agriculture: Spray Irrigation – Direct". No groundwater abstractions for potable supply are listed within a 2km radius of the site.

Hydrology

10.3.27 The nearest surface water body to the site is the River Roach lying immediately to the south of the site.

10.3.28 The Envirocheck data indicates that there are 11 discharge consents within a 1 km radius of the site which may still be active. The nearest one is listed 0.12km south east of the site classified as "discharge of other matter – surface water".

10.3.29 Fourteen pollution incidents to controlled waters have been recorded by the Envirocheck report within a 1km of the site. One "Category 2 – Significant Incident" is listed 0.88km south west of the site. The remaining entries are classed as "Category 3 – Minor Incidents" the nearest being on the immediate vicinity of the southern boundary of the site.

Waste Management Activities

10.3.30 The Envirocheck report identifies two historical landfill sites within a 1km radius of the site. The nearest is approximately 0.1km south of the site and is specified as "Industrial and Household Waste" last active in 1976. The other is 0.75km to north-west of the site.

10.3.31 The Envirocheck report identifies seven active licensed waste management facilities within a 1km radius of the site. The nearest entry is approximately 0.26km south west of the site and is classified as "Household, Commercial, and Industrial Transfer Station".

10.3.32 Two operational registered waste transfer sites are identified within a 1km radius of site. The nearest entry is listed some 0.56km south west of the site and authorised wastes include "General waste" and "Waste very slowly degrades".

10.3.33 Two disposal sites are identified within a 1km radius of site. The nearest is located 0.32km south west of the site.

Pollution Controls and Authorisations

Hazardous Installations

10.3.34 No hazardous substance installations are listed in the Envirocheck report.

Radon Hazards

10.3.35 The Envirocheck report indicates that the site is located in an area where less than 1% of homes encounter radon concentrations greater than the specified action level. As such the Envirocheck Reports state that no radon protection measures are judged to be necessary in the construction of new homes or extensions at the site.

Phase II Site Investigation

10.3.36 Based upon the desk-based assessment a Conceptual Model was developed for the site based on commercial/residential end use. Potential sources of on-site contaminants identified in the CM include contaminants associated with oil tanks, electrical substation and repair and servicing garage as well as potential Made Ground across the site.

10.3.37 Sensitive receptors included construction / utility workers and future site users. The River Roach was also identified as a surface water receptor. Potential complete pollutant linkages were therefore identified.

10.3.38 Subsequently an intrusive investigation was undertaken to verify the existence and significance of the identified potential pollutant linkages. The findings are reported in the Phase II report given in Appendix 10.2 and are summarised below.

10.3.39 The intrusive site investigation was carried out between 13th August and 5th September 2007.

10.3.40 The primary focus of the site investigation was to determine ground conditions across the site and to obtain samples for environmental analysis.

Observed Ground Conditions

10.3.41 Made Ground was encountered in all exploratory positions, to a maximum depth of 2.4m below ground level (bgl), although generally present across the site to depths of less than 1.0m. The Made Ground generally comprised 0.3m thickness of reinforced concrete over sandy gravely clay to clayey slightly sandy gravel. The gravel comprised flint, brick and concrete.

10.3.42 Beneath the Made Ground, River Brickearth was encountered in the northern area of the site. This stratum comprised firm slightly sandy clay with occasional gravel. The boundary of the River Brickearth is indicated, on the geological map of the area, as being located to the north of the site boundary with no such deposit indicated as being present below the subject site. This material is therefore considered to represent localised "outliers" of the deposit.

10.3.43 Underlying the Made Ground over the majority of the site, River Terrace Deposits were encountered. This stratum comprised clayey gravely sand to clayey sandy gravel. This stratum was proven to 3.8m bgl in the north and west of the site reducing to 3.1m bgl towards the south of the site and 1.5m bgl on the eastern site boundary.

10.3.44 In the southern area of the site, adjacent to the River Roach, Alluvial Deposits were encountered directly below the Made Ground. This stratum comprised soft slightly sandy clay, becoming firm and then stiff at depth. This stratum was proven to a depth of 3.9m bgl in the southeast corner of the site, but was not proven below 4.0m bgl near to the existing weir structure.

10.3.45 Head Deposits were encountered underlying the Alluvial Deposits within BH6 at a depth of 1.5m bgl. This strata comprised clay to sandy gravely clay, and was proven to a depth of 3.3m bgl at this position.

10.3.46 The London Clay Formation was encountered within all cable percussion boreholes, and within the trial pit and window sample undertaken in the north-east corner of the site. The depth to the London Clay Formation varied from 3.1m bgl on the east of the site to 3.8m on the western boundary. A weathered horizon at the top of the London Clay Formation was encountered over the majority of the site, with the exception of BH6 where it is considered likely that the adjacent river eroded this material, before the subsequent deposition of Head and Alluvial Deposits.

Contamination Status

Soils

10.3.47 The interpretation of the laboratory results for soil samples was based on Site Specific Assessment Criteria (SSACs) generated by CLEA UK. In order to provide a conservative approach to risk assessment the most sensitive potential end use of residential housing with plant uptake was selected.

10.3.48 The recorded concentrations of all determinands were generally less than their respective SSACs. However, a single elevated nickel concentration was recorded in WS1 at 0.6m. Elevated concentrations of petroleum hydrocarbons from the aromatic and aliphatic C8 to C35 range were recorded in samples recovered from the vicinity of the former above ground fuel storage installations. These concentrations were deemed to have the potential to impact human health via the direct contact, ingestion and volatilisation pathways.

10.3.49 Since Bureau Veritas' 2007 report was produced there have been a number of developments in UK risk assessment methodology resulting in the publication of updated Soil Guideline Values (SGVs)1 and LQM/CIEH Generic Assessment Criteria (GACs)2 (note that for lead no new values have yet been derived and reference is made to the former SGV3 for this metal). Note that, in general, up-dated and former SGVs, and the revised LQM/CIEH values, are derived using Health Criteria Values (HCVs) corresponding to 'tolerable' or 'minimal' risk. It should also be noted that the selected land use is the most sensitive end use and can therefore be considered to provide conservative initial screening values for the possible end use of the site as public open space.

10.3.50 None of the reported metal concentrations exceed the most stringent CLEA/LQM/CIEH guidance values. However, there remain marginal exceedences of LQM/CIEH GACs for aliphatic hydrocarbons in the C8 to C12 range and aromatic hydrocarbons in the C10 to C12 range in one sample from TP4.

10.3.51 The asbestos screening undertaken on five samples of Made Ground did not detect asbestos fibres in any instance. Furthermore, no suspected asbestos containing materials (ACMs) were noted during the site works.

Controlled Waters

10.3.52 With the exception of nickel, ammonia and chloride the concentrations of all other organic and inorganic determinands tested for in groundwater were less than their respective laboratory detection limits. The results indicated that a relatively low risk is posed to controlled waters. However, the report suggested that a more detailed assessment of the hydrocarbon impacted soils identified at the site should be conducted to ascertain whether they have the potential to impact controlled waters.

Ground Gases

10.3.53 CIRIA document C659 entitled "Assessing risks posed by hazardous ground gases" and NHBC guidance4 was used to interpret the results of the soil gas monitoring. Based on the most sensitive potential end use of low rise housing a 'Green' classification was determined. Based on this classification it is judged that the soil gas regime is considered negligible and gas protection measures may not be necessary. It should be noted that since the issue of the 2007 report, the CIRIA Guidance has been updated by CIRIA Report 665, "Assessing risks posed by hazardous ground gases to buildings". However, reference to the new guidance does not change the classification of the site.

10.3.54 The site investigation recommended further intrusive works to fully quantify the potential risks posed to sensitive receptors: these recommendations are detailed in the section 10.5.

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1 Environment Agency, up-dated SGVs, 2009 (i.e. those developed using CLEA 1.04)

2 LQM/CIEH, Generic assessment criteria for human health risk assessment, (2nd Edition) LQM 2009

3 Defra/Environment Agency, R&D Publications SGV series, 2002 [lead only]

4 Boyle & Witherington, NHBC

10.4 Potential Effects

10.4.1 Potential effects in relation to ground conditions are wide ranging and can include ground instability, ground contamination, the alteration of groundwater levels and flow and the physical alteration of geological features.

10.4.2 Demolition works will precede the redevelopment of the site. These operations will comprise:

- demolition of above ground structures;
- breaking and removal of over-site concrete and tarmac hardstanding;
- grubbing out of existing services and process pipe work where present;
- crushing of concrete derived from demolition and excavation;
- excavation/treatment of soils that may be found to be contaminated with unacceptable concentrations of hydrocarbons, or other as yet undiscovered contaminants; and
- removal from site of excess materials.

10.4.3 Construction works are likely to be undertaken in parallel with demolition works on different phases of the development. It has been assumed that the construction phase will generally comprise:

- construction of temporary access and haul roads;
- construction of roads;
- construction of foundations, buildings and the podium;
- installation of services; and
- Installation of below ground drainage.

10.4.4 Many construction activities have the potential to adversely affect both soils and groundwater for example through contamination and compaction. This can include the potential for buried waste to be present and the potential for wind blown dusts to be generated.

10.4.5 The operational stages constitute the normal day-to-day use of the buildings and roads associated with the proposed scheme.

10.4.6 Potential risks to the ground and soil environment include accidental spillages of chemicals, oils or fuels stored on the site or used in cleaning or maintenance, which could migrate into the ground and cause widespread pollution.

10.4.7 Hydrocarbons and suspended solids within runoff from roads and parking areas could lead to pollution of the soils and underlying geology adjacent to roads and areas used for parking. De-icing materials or herbicides from management of roads and paved areas as well as open spaces could lead to pollution of the soils via runoff.

10.5 Assessment of Impacts

Soil, Water and Contamination Effects – Demolition and Construction Phases

10.5.1 The site contains no geological features of significance. However, the site overlies a Minor Aquifer which relates to the Alluvium and the Sand and Gravel. The groundwater within this aquifer is likely to be in hydraulic continuity with the River Roach, which runs immediately to the south of the site. Both of these would be vulnerable to contaminants present on the site. The likelihood of impact would increase significantly during the demolition/construction phases of the development when the site surfaces will be open and disturbed. It is also possible that the importation of materials to construct flood defences may

introduce potentially contaminated materials to site. Wharfside reconstruction activities may provide the possibility of potentially contaminated surface waters flowing directly into the river.

10.5.2 From the conceptual model set out in the PRA enclosed at Appendix 10.1 and for each of the demolition, construction and operation phases of the site, key impacts have been identified and assessed in terms of their likely magnitude, significance and effect. Mitigation measures, where warranted, are discussed below in Section 10.6.

10.5.3 The conceptual model of potential pollutant linkages for the site has identified potential contaminants, pathways and receptors, which together form potential pollutant linkages. The PRA has identified that there were potential pollutant linkages involving contaminants, pathways and receptors as summarised in Table 10.2 below. The complete CM is presented in the PRA.

Table 10.2: Summary of Initial Site Conceptual Model

Source (contaminants)	Pathway (s)	Receptor (s)
PAHs, TPH's, heavy metals and asbestos associated with historical site use.	Inhalation of dust, leaching from shallow soils.	On-site humans (construction workers), off-site humans and controlled waters.
Petroleum hydrocarbons, BTEX and PAH's leaking from on-site fuel tanks. PCBs and hydrocarbons from electrical substation.	Direct contact and ingestion, leaching from shallow soils, volatilisation and subsequent inhalation.	On-site humans (construction workers), buried services, controlled waters, future site residents and workers.
Ground gases from decomposition of organic matter in alluvium and former off-site landfill.	Migration into excavations and confined spaces (explosion and asphyxiation risks).	Construction and utility workers, future site occupants.

10.5.4 A Phase II Environmental Assessment completed to provide preliminary information on the contamination status of the site enclosed at Appendix 10.2 has indicated that in general contaminant concentrations are of a low order and are unlikely to have significant implications for the health and safety of construction workers on the site, future occupants or the wider environment. There was no evidence to indicate that significant pollution of groundwater had occurred. Areas of uncertainty remain in the vicinity of on-site oil storage facilities and in areas of the site which were inaccessible at the time of the investigation e.g. under building footprints. It is therefore recommended that, based on the findings of the initial phase of intrusive investigation, the following additional works are likely to be required to further quantify the potential risks posed to sensitive receptors.

- Further exploratory holes should be excavated beneath the footprints of the existing buildings once they have been decommissioned to enable the recovery of additional samples for chemical testing.
- Once the final site layout has been determined it would be prudent to revisit the site to conduct further targeted intrusive works in potentially sensitive areas i.e. in any proposed garden or landscaped areas where the direct contact and ingestion exposure pathways could be applicable.
- A potentially significant source of hydrocarbon contamination was identified in the vicinity of the former fuel storage installation present at the site. Further works should be conducted in these specific areas to delineate the extent of this contamination and its potential to impact both human health and controlled waters.

10.5.5 Additional gas monitoring should be undertaken to confirm the 'Green' classification determined on the basis of the monitoring results obtained thus far.

10.5.6 There is a potential risk to the ground and groundwater from the temporary storage of construction plant and materials on site throughout the demolition and construction works. The storage of fuels and oils is a well documented potential contaminant source, but other construction materials, including paints and solvents, also constitute a potential risk. If fuels, oils or other potentially hazardous liquids are spilt or leak onto the ground, or migrate into the ground via the new service trenches or soakaways, then there is a potential for contamination of significant volumes of soil and groundwater with hydrocarbons, with a direct, long term, moderate adverse effect. The likelihood of such an event occurring is unlikely assuming normal good practice during construction is followed.

10.5.7 The possibility of encountering previously unidentified contamination cannot be entirely ruled out and therefore this is the potential for a direct, short term, moderate adverse effect on groundwater. Vigilance must be maintained during groundwork operations.

10.5.8 There may be a requirement to dispose of water that accumulates in the base of excavations due to rainfall. If not suitably controlled, the discharge (pumping) of accumulated water may give rise to significant sedimentation in local drainage ditches. Additionally, discharge to drainage ditches of accumulated water which has been in contact with cement-based materials could lead to a reduction in surface water quality, particularly by increasing the pH (making it more alkaline).

10.5.9 Overall the low risk associated with the current land use and the standard construction mitigation measures proposed in Section 10.6 will ensure that no significant effects will occur.

Soil, water and Contamination Effects – Operational Phase

10.5.10 The operational stages constitute the normal day-to-day operation of the completed buildings on the Site.

10.5.11 There are no potential risks to the ground and groundwater environment from the operational phase, following completion of construction, other than from the inappropriate storage of potentially hazardous liquids, i.e. fuels. However, as the site is to be used for residential purposes only, it is unlikely that the storage of fuel and oil will be a significant issue.

Cumulative Impacts

10.5.12 It is possible that the site will be redeveloped contemporaneously with the proposed developments described within Chapter One, no significant cumulative impacts are anticipated with respect to ground conditions.

10.6 Mitigation Measures

Demolition Phase

10.6.1 Any areas of contamination not identified during the intrusive investigation, but found during redevelopment works (around former fuel tanks etc.) will be dealt with as appropriate during demolition and construction phases.

10.6.2 All on-site storage of fuels and oils will be in suitably locked and bunded tanks, and refuelling of the site plant and vehicles will be in designated areas only and the process carefully managed. Reference will be made to the appropriate regulations and guidance that exists on this subject, including that produced by the Environment Agency and CIRIA; in particular reference should be made to the various Pollution Prevention Guidelines (PPG) relevant to the construction industry such as PPG 1 General guide to the prevention of pollution, PPG 6 Working at construction and demolition sites, PPG 7 Refuelling facilities, PPG 13 Vehicle washing and cleaning and PPG 21 Pollution incident response planning.

Construction Phase

10.6.3 As for the demolition works, all on-site storage of fuels and oils will be in suitably locked and bunded tanks, and refuelling of the site plant and vehicles will be in designated areas only and the process carefully managed. Reference will be made to the appropriate regulations and guidance that exists on this subject, including that produced by the Environment Agency and CIRIA as detailed above.

10.6.4 All construction personnel will observe appropriate health and safety precautions, in accordance with normal good working practice, including provision of on-site washing facilities to allow for basic hygiene, such as washing hands at the end of each working period. In areas of significant contamination, appropriate RPE and PPE will be adopted and will, if necessary, include showers and changing facilities. All other site visitors will observe similar personal protection on site. Reference will be made to the appropriate CDM and Health and Safety Regulations and to the Site Management Plan.

10.6.5 Measures will be put in place to control dust generation during groundworks. These will include wetting-down of access haul roads and areas of exposed ground (whether contaminated or not), especially in prolonged dry weather. Stockpiling of 'soil' materials will be kept to a minimum and covered if necessary.

10.6.6 Wheel washing facilities will be used at the exit(s) from the site to minimise the transfer of soils onto surrounding roads. All lorry loads of soil or rubble will be sheeted appropriately before leaving site. An appropriate scale of road sweeping will be carried out to prevent unreasonable deposition of mud.

10.6.7 Systems will be adopted to record and monitor the excavation, stockpiling and disposal of soils to ensure that they are disposed of correctly. The intrusive investigation will identify areas of contamination and systems will be in place for 'hot spot' areas encountered during groundworks. Systems will be adopted to sample waste material before it leaves site, and ideally sufficiently in advance of excavation to allow analysis to be completed (hazard assessment and Waste Acceptance Criteria, WAC, testing) to ensure the correct method of disposal is adopted. The use of registered waste hauliers, suitably licensed waste facilities and appropriate waste transfer notes or hazardous waste consignment notes will be used as necessary.

10.6.8 Groundwater from dewatering operations will be disposed of via sump pumps to the sewerage system (with appropriate licence). If areas of high contamination are found to be present during site works, water will be taken off site by tanker for treatment and/or disposal. Site personnel will wear appropriate RPE and PPE if significant areas of contaminants, such as fuels, are encountered.

10.6.9 Although piles will all be founded within the London Clay, it is important that there are no preferential migration pathways formed which will allow vertical migration of contaminants from the Made Ground (if such are identified during the groundwork phase) which will remain in-situ. Reference should be made to the Environment Agency's Guidance on piling in potentially contaminated land.

10.6.10 The base of the piles will be within the body of the London Clay strata, and therefore the underlying Major Aquifer will be protected from the potential migration of contaminants by a significant thickness of clay.

10.6.11 Material imported for the construction of flood bunds and soils imported for landscaping/garden use will be sampled and tested for contaminants prior to importation, and inspected on arrival for any obvious signs of contamination.

Operational Phase

10.6.12 Given that the site is to be used for residential purposes, it is unlikely that the storage of fuel and oil will be a significant issue. However, should the storage of any such materials be required, reference should be made to the relevant regulations and guidance documents on fuel and oil storage, such as that produced by the Environment Agency, for appropriate operation and management of such facilities.

10.6.13 Removal of any potential contaminants identified during the demolition and construction phases will have a long-term beneficial effect for the operational phase by elimination of potential sources of soil and groundwater contamination which currently exist.

10.6.14 Silt traps and oil interceptors will be included at appropriate points in the surface water drainage system, to prevent contamination of ditches and soils etc and migration to the underlying geology. The mitigation of runoff from roads and paved surfaces is discussed in Chapter 9.

10.6.15 Wastewaters from welfare facilities will be contained for disposal to a licensed reception facility off-site, and none will be discharged to the ground or to watercourses.

10.6.16 A summary of likely significant effects, mitigation measures and enhancement are provided in Table 10.3 below using the effect scale given in Table 10.1.

Table 10.3: Summary of Significant Effects and Residual Impacts

Demolition Phase

Receptor / Environmental Resource	Brief Description of Impact	Direct (D) / Indirect (I)	Temp. (T)/ Permanent (P)	Short (S)/ Medium (M) / Long (L)	Significance of Impact	Mitigation Measures	Residual Significance
Soil	Spills and leaks of fuels and oils, which may contaminate soil.	D	P	L	- 2	Store fuels and oils in locked and bunded areas in accordance with existing regulations and guidance. Refuelling of plant and vehicles in designated areas that are carefully managed.	0
Groundwater	Spills and leaks of fuels and oils, which may contaminate water.	D	P	L	- 2	Store fuels and oils in locked and bunded areas in accordance with existing regulations and guidance. Refuelling of plant and vehicles in designated areas that are carefully managed.	0
Humans (local residents, neighbours)	Deposition of soils during movement of vehicles from site	D	T	S	-1	Wheel wash facility at the vehicle exit to the site. Road sweeping. Dust suppression in dry weather – particularly where Made Ground has been exposed.	0

Construction Phase

Receptor / Environmental Resource	Brief Description of Impact	Direct (D) / Indirect (I)	Temp. (T)/ Permanent (P)	Short (S)/ Medium (M) / Long (L)	Significance of Impact	Mitigation Measures	Residual Significance
Soil	Spills or leaks of fuels and oils, which may contaminate soil	D	P	L	-2	Store fuels and oils in locked and bunded areas in accordance with existing regulations and guidance. Refuelling of plant and vehicles in designated areas that are carefully managed.	0
Groundwater	Spills or leaks of fuels and oils, which may contaminate water	D	P	L	-2	Store fuels and oils in locked and bunded areas in accordance with existing regulations and guidance. Refuelling of plant and vehicles in designated areas that are carefully managed.	0
Humans (local residents, neighbours)	Dispersion of soils via wind in dry periods during groundworks	D	T	S	-1	Dust suppression in dry weather – particularly where Made Ground has been exposed. Keep any stock piled contaminated soils to a minimum and covered if necessary.	0
Neighbouring land	Dispersion of soils via wind in dry periods during groundworks	D	T	S	-1	Dust suppression in dry weather – particularly where Made Ground has been exposed. Keep any stock piled contaminated soils to a minimum and covered if necessary.	0
Animals (domestic pets)	Dispersion of soils via wind in dry periods during groundworks	D	T	S	-1	Dust suppression in dry weather – particularly where Made Ground has been exposed. Keep any stock piled contaminated soils to a minimum and covered if necessary.	0
Plants (food crops)	Dispersion of soils via wind in dry periods during groundworks	D	T	S	-1	Dust suppression in dry weather – particularly where Made Ground has been exposed. Keep any stock piled contaminated soils to a minimum and covered if necessary.	0
Humans (local residents, neighbours)	Deposition of soils during movement of vehicles from site	D	T	S	-1	Wheel wash facility at the vehicle exit to the site. Road sweeping. Dust suppression in dry weather – particularly where Made Ground has been exposed.	0
Neighbouring land	Deposition of soils during movement of vehicles from site	D	T	S	-1	Wheel wash facility at the vehicle exit to the site. Road sweeping. Dust suppression in dry weather – particularly where Made Ground has been exposed.	0

Construction Phase - Continued

Receptor / Environmental Resource	Brief Description of Impact	Direct (D) / Indirect (I)	Temp. (T)/ Permanent (P)	Short (S)/ Medium (M) / Long (L)	Significance of Impact	Mitigation Measures	Residual Significance
Animals (domestic pets)	Deposition and/or washing by accumulated water in excavations	D	T	S	-1	Sump pumps to discharge accumulated water directly to foul sewerage system or taken off site if highly contaminated. Site personnel to wear RPE and PPE as appropriate.	0
Plants (food crops)	Deposition and/or washing by accumulated water in excavations	D	T	S	-1	Sump pumps to discharge accumulated water directly to foul sewerage system or taken off site if highly contaminated. Site personnel to wear RPE and PPE as appropriate.	0
Shallow groundwater (in Alluvium – Minor Aquifer)	Creation of pathways for the preferential migration of contaminants by excavations and piling	I	P	L	-2	Use piles that are formed in-situ in accordance with the Environment Agency guidance. Monitoring of groundwater before and after construction if necessary.	0
Surface water	Spills or leaks of fuels and oils, which may run off directly into surface waters	D	P	L	- 2	Store fuels and oils in locked and bunded areas in accordance with existing regulations and guidance. Refuelling of plant and vehicles in designated areas that are carefully managed.	0

Construction Phase - Continued

Receptor / Environmental Resource	Brief Description of Impact	Direct (D) / Indirect (I)	Temp. (T)/ Permanent (P)	Short (S)/ Medium (M) / Long (L)	Significance of Impact	Mitigation Measures	Residual Significance
Soil	Spills or leaks of paints and solvents, which may contaminate soil	D	P	L	-2	Store paints and solvents in locked and bunded areas in accordance with existing regulations and guidance.	0
Groundwater	Spills or leaks of paints and solvents, which may contaminate water.	D	P	L	-2	Store paints and solvents in locked and bunded areas in accordance with existing regulations and guidance.	0
Soil	Importing of contaminated fill materials	D	P	L	-2	Fill materials to be inspected, sampled and tested prior to importing.	0
Groundwater	Importing of contaminated fill materials	D	P	L	-2	Fill materials to be inspected, sampled and tested prior to importing.	0
Site occupants	Importing of contaminated fill materials	D	P	L	-2	Fill materials to be inspected, sampled and tested prior to importing.	0
Animals (domestic pets)	Importing of contaminated fill materials	D	P	L	-2	Fill materials to be inspected, sampled and tested prior to importing.	0
Plants (food crops)	Importing of contaminated fill materials	D	P	L	-2	Fill materials to be inspected, sampled and tested prior to importing.	0

10.7 Summary

Introduction

10.7.1 Potential effects from contamination on receptors in the soil, geological and hydrological environments have been identified and mitigation measures recommended.

Baseline Conditions

10.7.2 It has been identified that with the exceptions of the Minor Aquifer within the Alluvium under the site and the nearby tidal estuary of the River Roach there are no sensitive ecological receptors on the vicinity of the site. Human receptors in the vicinity include residents of houses located along Mill Lane to the north of the site, which is the only vehicular access to the site.

10.7.3 Intrusive investigation of the site has not detected significantly elevated concentrations of contaminants either in the site soils or the underlying groundwater, although it should be noted that additional investigation of previously inaccessible areas and further investigation of fuel storage areas has been recommended.

Likely Effects

10.7.4 Potential effects in relation to ground conditions are wide ranging and can include ground instability, ground contamination, the alteration of groundwater levels and flow and the physical alteration of geological features.

10.7.5 Many construction activities have the potential to adversely affect both soils and groundwater for example through contamination and compaction. This can include the potential for buried waste to be present and the potential for wind blown dusts to be generated.

10.7.6 Potential risks to the ground and soil environment include accidental spillages of chemicals, oils or fuels stored on the site or used in cleaning or maintenance, which could migrate into the ground and cause widespread pollution.

10.7.7 Demolition and construction works along the wharfside, adjacent to the River Roach may provide the potential for the direct run-off of contaminants into surface waters.

10.7.8 The operational stages constitute the normal day-to-day use of the buildings and roads associated with the proposed scheme.

Mitigation

10.7.9 Effects on the ground environment during site clearance, construction and operational phases of the development have been considered. Through the implementation of appropriate mitigation measures including proper storage of potential contaminants, adoption of best practice construction methods, monitoring of water quality, and inspection of any fill material brought to site, these effects are assessed to be neutral.

Conclusions

10.7.10 The site is considered to be of relatively low environmental sensitivity in terms of land contamination. Provided that the further environmental investigations recommended are undertaken and the outcomes acted upon, and the mitigation measures described above are implemented then it is not anticipated that the proposed development will have any significant adverse environmental impacts. Impacts may possibly be positive in the long term, in as much as potentially contaminating material, if detected by further investigation and during the demolition and construction phases, will be remediated as part of the development.

1 Introduction

2 Planning Policy Context

3 Socio-Economic Issues

4 Landscape and Visual Issues

5 Ecology and Nature Conservation

6 Transport

7 Air Quality

8 Noise and Vibration

9 Hydrology, Flood Risk and Surface Water Drainage

10 Contaminated Land and Geotechnical Issues

11 Summary

11 SUMMARY

11.1 Introduction

11.1.1 This chapter summarises the findings of an ES which accompanies an outline planning application for the redevelopment of Stambridge Mills, Rochford, Essex, submitted on behalf of the Inner London Group. The development proposals comprise 96 residential units set within a landscaped framework, together with associated open space, parking, infrastructure, and includes land for building improved flood defences. The new development would be accessed via the existing site entrance off Mill Lane.

11.1.2 As the proposed development is likely to have some effects upon the environment, an EIA has been undertaken in accordance with relevant Regulations and guidance. A wide range of specialist studies have been undertaken to consider the various aspects of the environment which could be affected by the development proposals.

11.1.3 For each of the environmental subjects examined in the ES, the likely significant effects resulting from the development proposals have been identified and assessed, followed by an explanation as to how the proposals have been developed to ensure that no harm would result. The detailed descriptions and analysis of the impact assessments that have been undertaken are described in the ES and its appendices.

11.1.4 The application site lies to the east of Rochford town, adjacent to the northern bank of the River Roach. It consists of the disused complex at Stambridge Mills and some adjacent strips of land to the immediate east and west of the site which extend along the frontage of the River Roach estuary, to accommodate proposed flood defence improvements. In total, the site extends to 4 hectares. Between the site and the built edge of Rochford to the west lies pasture and playing fields associated with the nearby college. To the east of the site lies the Broomhills residential care home and grounds and to the northeast lies a cricket ground. The Mills complex is surrounded by the Essex Green Belt. A small section of the northern part of the site and the land where the flood defence improvements are proposed is within the Green Belt.

11.1.5 The Mill complex itself currently consists of disused industrial buildings and silos, as well as large areas of hardstanding, a weigh bridge and a residential dwelling. Fuel and oil tanks in enclosed storage areas also remain. Little vegetation currently exists at the Mills complex and is confined to the boundaries.

11.1.6 The Crouch and Roach Estuaries Site of Special Scientific Interest (SSSI) lies approximately 350m to the south-east of the Mills complex and adjacent to the furthest eastern extent of the proposed flood defence improvements, which is also designated as a Special Area of Conservation (SAC) and a Special Protection Area (SPA) due to the saltmarsh and grazing marsh habitats present and the internationally and nationally important species of wildfowl and waders this supports.

11.2 Development Proposals

11.2.1 The proposed redevelopment will entail the demolition of the existing structures, the construction of new residential dwellings and implementing areas of open space and landscape. To the east and west of the area where built form is proposed, improved flood defences in the form of new bunds are to be constructed along the river banks on the footprint of the existing but inadequate bunds, and the existing wharfside which forms the southern boundary of the site is to be replaced with a new sheet piled edge. Within the Mills complex, as a continuation of the defence provided by the new bunds a flood wall will be constructed along the southern portion of the site, set back from the water's edge.

11.2.2 The proposed redevelopment comprises the construction of 96 residential units comprising 17 one bedroom and 34 two bedroom apartments and 17 two bedroom 23 three bedroom and 5 four bedroom houses.

11.2.3 In addition to the redevelopment proposals, part of the scheme involves improvements to the flood defences along the estuary banks to the east and west of the Mills complex. Although earth bunding does currently exist in these locations, this is considered insufficient in height to adequately protect against tidal

flooding from the estuary. The proposed improvements will involve the resiting and reforming of these mounds to a crest height of 6.3m AOD along the bankside. It is proposed to reuse some of the demolition material from the Mills complex for the core of these structures.

11.2.4 Landscaping proposals for the site include the retention of the vegetation along the boundaries of the site wherever possible, bolstered by additional native planting across the site to provide an attractive living space for new residents.

11.2.5 It is proposed that vehicular access to serve the proposed development would be from the existing entrance at the southern end of Mill Lane.

11.2.6 Links with the existing public rights of way in the vicinity of the site are proposed to provide sustainable access to Rochford town and amenity open space in the locality. In addition the exiting Bridleway to the west of the site will be retained and diverted over the bund via 1:20 ramp.

11.3 Socio-Economic Issues

11.3.1 The socio-economic impacts arising from the proposed development have been considered based upon an examination of population, employment and socio-economic characteristics. Impacts to health services, education provision, leisure services, open space, community facilities and social inclusion were assessed, both in the immediate locality and the town of Rochford and the wider District.

Likely Effects of the Proposed Development

11.3.2 The development proposes areas links to the existing footpath network to provide improved access to areas such as the new Cherry Orchard Jubilee Country Park for informal recreation opportunities.

11.3.3 Although the proposals would lead to slight loss of potential land for employment development within the District, this is not considered to be significant and new jobs will be provided for the area during the construction phase. New residents may also create additional demand for the existing facilities of the town centre, increasing viability of the existing services by providing additional footfall, and an increased local customer base with additional available expenditure. In turn, this may encourage new investors to the town and lead to a regeneration of the area's services.

11.3.4 It is anticipated that there is likely to be a positive local effect at both primary and secondary education levels arising from the surplus school capacity present in the District being utilised by new pupils arising from this proposed development, increasing the efficiency of the education resource in the district. There is sufficient surplus capacity forecast by 2015 to also accommodate predicted pupils numbers should the Brays Lane, Rectory Road and Halls Road developments all proceed.

11.3.5 It is anticipated that there is likely to be a neutral local effect in respect of primary health care services arising from the surplus GP capacity present in the area being utilised by new patients arising from this proposed development, increasing the efficiency of the health provision resource in the district. There is sufficient surplus GP capacity to also accommodate predicted patient numbers should the Brays Lane, Rectory Road and Halls Road developments all proceed.

11.3.6 Should the need for further community facilities, emergency services, library services, youth services or social services be demonstrated by the Local Authority once the Council has undertaken its assessment of the application, these can potentially be funded via developer contributions if justified by a sound evidence base.

New Situation

11.3.7 It is considered that the proposed development will have a beneficial effect on the socio-economic circumstances at the site and surrounding area, providing a range of housing contributing towards social inclusion; contributions to open space for future residents; and positive effects at both primary and

secondary education levels through the utilisation of existing surpluses. If justified, developer contributions towards the provision of off-site services such as health and community facilities will offset increase in demand resulting from the proposed development and will improve these facilities for all users.

11.4 Landscape and Visual Issues

Method of Assessment

11.4.1 A comprehensive landscape and visual assessment has been conducted to establish how the visual amenity of the settlement and the surrounding landscape of Rochford would be affected by the development proposals. The assessment considers how the landscape infrastructure of the study area would be altered in terms of character and appearance.

Existing Situation

11.4.2 The study area has an open and expansive landscape to the north and east beyond the application area, with settlement to the west at Rochford, and industrial development to the south beyond the River Roach. The site currently comprises a disused brownfield site, formerly used as a Mill, and sections of farmland accommodating existing flood defences.

11.4.3 The majority of views within the study area are limited to close and medium range view points from within 500 metres to 1.5 kilometres of the site, with few longer distance views available due to the flat topography and lack of elevated viewpoints.

Potential Effects of Proposed Development

11.4.4 Visually, the proposals to develop the site for residential use would relate well to the existing settlement pattern, and would provide an enhancement of the site through the reduction of the built form's scale and massing within the site, and the use of vernacular building materials to improve the aesthetics of the structures at the site. The north-western portion of the site which falls within the Green Belt would be retained and related planting would be enhanced between the surrounding Green Belt and the new development.

11.4.5 The use of good design and high quality materials would bring about a positive enhancement of the site and the local area, with the addition of landscape features such as tree and hedgerow planting, which would lead to a beneficial effect upon the character of the site and surrounding area.

Mitigation Measures

11.4.6 The proposals do not aim to totally screen the development from view by dense planting, as this would be at variance with the local character of the landscape. The design strategy looks to improve the appearance of the area with partial filtering and softening of the development edge, thereby providing an attractive setting for those who currently reside in the area, and improving the existing views of the derelict industrial site.

11.4.7 It is considered that the good design and use of high quality building materials would form an enhancement and improvement at the site from the existing situation.

Conclusion

11.4.8 The assessment on character, landscape features and visual amenity of the site and surrounding area concludes that the site is well situated to accommodate the proposed development without detriment to the local area and with beneficial effects on the views of the site compared to the existing scenario.

11.5 Ecology and Nature Conservation

11.5.1 Overall, it is considered that the majority of the Site is of low ecological value, although part includes a LoWS and a very small section of the SPA/SAC/Ramsar. The new flood defences proposed provide the opportunity to enhance the ecological interest of the existing bunds (including areas within the designations) through creation of flower-rich grasslands and appropriate management.

11.5.2 The integrity of the SPA/SAC will remain unaffected by implementing appropriate mitigation to avoid disturbing activities during the more sensitive winter months in terms of noise and visual disturbance and standard measures to avoid air quality, light pollution and hydrological impacts. Significant adverse recreational impacts are considered unlikely due to a number of factors outlined including the predominance of flats within the scheme, the presence of alternative recreational resources in the vicinity, provision of interpretation boards to highlight sensitivities of the SPA/SAC and encourage recreational enjoyment at other locations and the circuitous nature of the existing link with the SPA/SAC.

11.5.3 All works for the proposed flood defences will be undertaken from the landward side to avoid direct adverse impacts on the LoWS habitats adjacent with measures to avoid indirect effects (e.g. air quality etc) on the SPA/SAC also serving to protect this receptor. Further, existing adverse pressures on the LoWS, such as horse overgrazing, would be removed following the development proposals. As such, overall it is considered there would be net gains in ecological terms for the LoWS.

11.5.4 The loss of habitats such as trees and hedgerows would be offset by compensatory planting with that being retained protected from accidental damage during construction such that following development the value of planting to wildlife would be enhanced.

11.5.5 No bat roosts are present within the site and only very limited foraging activity has been recorded within the site. The inclusion of an appropriate lighting scheme should avoid any adverse impacts with regard to foraging bats, although species recorded are relatively tolerant to lighting. The provision of new landscape features and provision of bat boxes would provide enhanced opportunities (roosting and foraging) for this group.

11.5.6 Badgers are known from the vicinity and licensing may be required for the flood defence construction activities due to presence of a main sett. Conversion of hardstanding areas to soft landscaping and incorporation of fruiting and other beneficial species in the landscape planting scheme should enhance foraging resources for this species.

11.5.7 Measures have been put forward to avoid impacts on nesting birds and to enhance foraging and nesting opportunities post –development whilst having regard to potential birdstrike risk.

11.5.8 Presence of Slow-worms on the existing flood bunds and Common Lizard in the adjacent Coombes Farm site would require appropriate strategy of mitigation to avoid killing or injury during site clearance and construction.

11.5.9 With the mitigation proposed, the proposed development would not result in any adverse residual impact on habitats or species of any significance and there will be no net loss of features of ecological importance.

11.5.10 Where it is considered that there is a reduction in potential habitat for protected species, the proposed development will ensure that these are compensated for by replacement habitat of either equal size or greater quality.

11.5.11 Following mitigation and enhancement measures, the overall impacts are considered to be positive at the local to county level and of minor - moderate significance and insignificant at the International level. The measures will ensure no net loss in Biodiversity terms.

11.6 Transport

Introduction

11.6.1 Although the development proposals will generate a number of trips to and from Stambridge Mills, the environmental effects of these trips will be minimal, other than the environmental effects arising from their mode of travel. In the main, people will travel by car, but facilities for sustainable modes of travel including travel by public transport, walking and cycling will be enhanced to encourage these modes and this is reflected within the Travel Plan (TP) document, also submitted as part of this application. Several mitigation measures are also proposed within a transport assessment which will enhance the existing transport facilities to promote the accessibility of the site by all modes, with a view to reducing (single-occupancy) car travel. As such this ES has focused on assessing the environmental effects of the motorised vehicle.

Baseline Conditions

11.6.2 The local road network generally consists of semi-rural and urban roads. The key roads surrounding the site and Rochford town centre are:

- Mill Lane;
- Stambridge Road;
- East Street;
- North Street;
- South Street;
- West Street;
- Southend Road; and
- Sutton Road.

11.6.3 Vehicles can access the site through Mill Lane, which connects the proposed development site to Stambridge Road and which provides links to Rochford town centre.

11.6.4 The site is bounded by Mill Lane to the North, a care home to the east, the River Roach to the south and agricultural land to the west.

11.6.5 The main access to the west is via the A127 Southend Arterial Road south of Rochford. The A127 provides links to the wider Essex area via the A130 and the A13 and a direct connection to the M25 (Greater London).

11.6.6 A series of Manual Classified Counts (MCCs) and Automatic Traffic Counts (ATCs) were undertaken to determine current traffic levels. The AM and PM peak hour traffic flows have been used to determine the baseline conditions of the local highway network against which the future scenarios are assessed.

11.6.7 Rochford railway station is approximately 1.6 km west of the development site. Rochford station is accessed via Bradley Way. Southend is situated approximately 7km to the south of the site. Train services from Rochford are operated by National Express East Anglia, providing links to Southend, the wider Essex area and London. Bus services in the local area are provided by Arriva and Stephensons of Essex. The nearest bus stop to the site is situated in Stambridge Road, at the junction with Mill Lane, approximately 380m from the site. This stop is served by route 60 which travels between Rochford to Southend and Paglesham via Rochford.

11.6.8 Stambridge Road has a dedicated footway, is subject to the national speed limit and connects the site with Rochford Town Centre approximately 1.4 km to the west. Mill Lane has an adjoining footpath to the west providing a direct link via Rocheway to the town.

11.6.9 To the south of the site is a footbridge over the River Roach, which links via a footpath to the Purdeys Industrial Estate.

11.6.10 There are two cycle routes in the area: 1) Shoebury Circular Route and 2) the Ashingdon to Hanningfield Reservoir cycle route. Both cycle routes pass through Rochford.

Likely Effects and Mitigation

11.6.11 The assessment shows that the impact of changing traffic volumes and patterns associated with the Stambridge Mills development would typically not result in an impact greater than slight/minor. However, this excludes an analysis of accidents, although the small increase in vehicular flows and their residentially related nature would mean there would likely be little difference to the base.

11.6.12 Impacts in terms of severance, driver delay, pedestrian amenity, and fear and intimidation are mainly negligible to minor throughout, with the exception of severance and pedestrian amenity on Mill Lane, largely as a result of the low existing vehicular flows. However, with the introduction of a shared foot/cycleway on Mill Lane the residual impact on Mill Lane would be reduced to moderate.

Conclusion

11.6.13 Due to mitigation measures, none of the impacts are considered to result in a long term significant environmental effect.

11.7 Air Quality

11.7.1 The air quality impacts associated with the construction and operation of the proposed residential development at Stambridge Mills have been assessed. Existing monitoring within the study area shows good air quality, with measured concentrations all below the UK's air quality objectives.

11.7.2 The operational impacts of increased traffic emissions arising from the additional traffic on local roads, due to the development have been assessed. Concentrations have been modelled for twenty-two worst-case receptors, representing existing properties where impacts are expected to be greatest. In addition, the impacts of traffic from local roads on the air quality for future residents have been assessed at six locations within the new development itself.

11.7.3 It is concluded that concentrations of nitrogen dioxide and particulate matter (PM_{10} and $PM_{2.5}$) would remain below the objectives in 2012, whether the scheme is developed or not.

11.7.4 The proposed scheme would only increase traffic volumes on local roads by a small amount. Any increase in concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ would be imperceptible, and the impacts are judged to be insignificant.

11.7.5 The impacts of local traffic on the air quality for residents living in the proposed development have been shown to be acceptable at all locations within the proposed development site, with concentrations being below the air quality objectives. The impacts of emissions from the surrounding sources on new receptors being introduced within the development are therefore judged to be insignificant.

11.7.6 It is concluded that road traffic emissions do not provide any constraints to the proposed scheme.

11.7.7 In addition, the cumulative impact of increased traffic emissions from the Stambridge Mills, Brays Lane, Hall Road and Rectory Road, South Hawkwell development proposals on local roads have been assessed. Concentrations have been modelled for the same twenty-two worst-case receptors, representing existing properties where impacts are expected to be greatest. In addition, the impacts of traffic from local roads on the air quality for future residents have been assessed at the six locations within the Stambridge Mills development.

11.7.8 It is concluded that concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ would remain below the objectives in 2012 at all existing and future receptors, even if all four schemes are developed.

11.7.9 The increase in traffic volumes on local roads associated with these developments is predicted to bring about an imperceptible increase in concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ at the majority of receptors, with a slight adverse impact predicted at one receptor. The overall impacts are judged to be insignificant.

11.7.10 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. Even with these measures in place, there remains a risk that a small number of existing off-site properties might be affected by occasional dust-soiling impacts. Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. The overall impacts during the construction phase are judged to be slight adverse.

11.8 Noise and Vibration

Introduction

11.8.1 A noise and vibration impact assessment has been carried out for the proposed development to assess the suitability of the site for residential development.

11.8.2 The assessment has taken account of potential impacts on existing receptors during the construction of the development and associated with the operation of the completed development.

Baseline Conditions

11.8.3 Noise surveys have been carried out to determine the existing noise environment within the proposed development.

11.8.4 Noise levels within the development and surrounding area were found to be principally associated with aircraft flying into London Southend Airport and the industrial uses on Purdey's Industrial Estate to the south.

11.8.5 Noise levels were monitored on the site on two occasions, which indicated that period day and night-time noise levels remained relatively low. It is not anticipated that the noise environment would change significantly at this location with the proposals for the airport expansion.

Likely Effects

11.8.6 The redevelopment of the site and construction of the improved flood defences has the potential to give rise to impacts at Broomhills care home and other properties on Mill Lane close to the development, particularly during the construction of the flood defences, raising of the site levels, the onsite demolition works and piling activities. Noise and vibration levels would be controlled through best practice measures on site and the reuse of existing mill buildings and foundations where possible.

11.8.7 Aircraft flying over the development into the airport have the potential to cause disturbance to future occupants of the development, in particular during the night-time period. The impact assessment concluded that the noise levels would be acceptable, as the assessment indicated that the site was within Planning Policy Guidance 24 Noise Exposure Category A/B, which is suitable for residential development. Consideration of the aircraft movements, would however, be taken into account during the detail design and appropriate measures incorporated into the design to minimise any potential impacts.

11.8.8 The operation of the industrial estate has also been identified to have the potential to give rise to adverse impacts upon occupants of the development. Again, measures would be taken during the detail design to ensure any potential impacts were minimised.

11.8.9 Traffic accessing the development has the potential to give rise to adverse impacts upon existing noise sensitive receptors. The assessment indicated that there would be moderate adverse impact at dwellings along Mill Lane due to the change in noise levels experienced. However, the impacts were not considered to be significant, as the overall noise levels associated with the traffic would be low, either equivalent to or below the noise levels associated with the aircraft flying overhead and anticipated to be lower than those associated with the HGV traffic which previously accessed the mill whilst operational.

Mitigation

11.8.10 During the construction phase, the contractors would be required to adopt best practice measures during the works to minimise potential impacts, which would include careful plant selection, control of working hours and monitoring of levels whilst working close to potentially affected receptors. With appropriate measures adopted, potential adverse impacts would be minimised.

11.8.11 Appropriate noise mitigation measures would be incorporated into the design of the development to protect future occupants against noise from aircraft flying overhead and the operation of the industrial estate. With appropriate measures implemented in the design, which could be secured through a suitable planning condition, potential impacts would be minimised.

Conclusions

11.8.12 In summary, with appropriate mitigation and control measures adopted during the construction and design of the development, potential noise and vibration impacts would be minimised, thus ensuring the site was suitable for residential development.

11.9 Hydrology, Flood Risk and Surface Water Drainage

11.9.1 The Mills site is located on the River Roach which flows east from the town of Rochford, to join the River Crouch at Wallasea Island, east of Burnham-on-Crouch. Key influences on the hydrology and drainage are the permeability of the sands and gravels underlying the site at a shallow depth, which are likely to be hydraulic continuity with the River Roach. In addition, the Environment Agency has confirmed that the site is located within Zone 3a High Probability area. Where the risk of flooding is from a tidal source, a Zone 3a High Probability is defined as where the annual probability of flooding is 0.5% or greater. This is referred to as the 1 in 200 year event.

11.9.2 The chemical water quality is compliant with the required standards, however, the biology results indicate that the watercourse in this location is restricted to pollution tolerant species and levels of nitrates and phosphates are very high and excessively high respectively. There are two license discharge consents on the site and one to the south. The discharge consents located on the site are a result of the former Mill workings and relate to the discharge of trade waste and the discharge of treated sewage effluent.

11.9.3 The Crouch and Roach Estuary is an integral component of the phased Mid-Essex Coast SPA. The estuaries are also designated as SACs and Ramsar sites under the EC Directive on the Conservation of Wild Birds (Directive 79/409/EEC) and the Habitats Directive (Directive 92/43/EEC).

11.9.4 Potential effects on hydrology and flood risk have been identified, and these are shown in Table 9.2.Effects on the water environment during site clearance and construction of the development, include potential discharges of silt or contaminants to the public sewers. These effects are assessed to be no more adverse than minor negative effects provided industry-standard environmental good practice is followed.

11.9.5 Effects on the water environment during the lifetime of the development are assessed to be no more adverse than minor negative effects. The effect of the development upon the risk of flooding to adjacent properties, including the nursing home, is assessed to be a major positive effect through the delivery of the improved flood defences.

11.9.6 Mitigation measures have been recommended for both the construction and operation stages. During the construction stage impacts would be mitigated by adopting site management controls in accordance with recognised industry good practice. During the operation stage the control of runoff will be the key issue, with the preferred method for discharge being infiltration to the ground. Full details are provided in the Flood Risk Assessment.

11.9.7 Overall the redevelopment of the Mills site will have no more than minor negative effects in relation to hydrology, flood risk and surface water drainage. The effect of the development upon the risk of flooding to adjacent properties, including the nursing home is considered a major positive effect and therefore of high

environmental benefit. The proposed mitigation measures will ensure that residual effects are minimised during both the construction and operation of the proposed development.

11.10 Contaminated Land and Geotechnical Issues

Introduction

11.10.1 Potential effects from contamination on receptors in the soil, geological and hydrological environments have been identified and mitigation measures recommended.

Baseline Conditions

11.10.2 It has been identified that with the exceptions of the Minor Aquifer within the Alluvium under the site and the nearby tidal estuary of the River Roach there are no sensitive ecological receptors on the vicinity of the site. Human receptors in the vicinity include residents of houses located along Mill Lane to the north of the site, which is the only vehicular access to the site.

11.10.3 Intrusive investigation of the site has not detected significantly elevated concentrations of contaminants either in the site soils or the underlying groundwater, although it should be noted that additional investigation of previously inaccessible areas and further investigation of fuel storage areas has been recommended.

Likely Effects

11.10.4 Potential effects in relation to ground conditions are wide ranging and can include ground instability, ground contamination, the alteration of groundwater levels and flow and the physical alteration of geological features.

11.10.5 Many construction activities have the potential to adversely affect both soils and groundwater for example through contamination and compaction. This can include the potential for buried waste to be present and the potential for wind blown dusts to be generated.

11.10.6 Potential risks to the ground and soil environment include accidental spillages of chemicals, oils or fuels stored on the site or used in cleaning or maintenance, which could migrate into the ground and cause widespread pollution.

11.10.7 Demolition and construction works along the wharfside, adjacent to the River Roach may provide the potential for the direct run-off of contaminants into surface waters.

11.10.8 The operational stages constitute the normal day-to-day use of the buildings and roads associated with the proposed scheme.

Mitigation

11.10.9 Effects on the ground environment during site clearance, construction and operational phases of the development have been considered. Through the implementation of appropriate mitigation measures including proper storage of potential contaminants, adoption of best practice construction methods, monitoring of water quality, and inspection of any fill material brought to site, these effects are assessed to be neutral.

Conclusions

11.10.10 The site is considered to be of relatively low environmental sensitivity in terms of land contamination. Provided that the further environmental investigations recommended are undertaken and the outcomes acted upon, and the mitigation measures described above are implemented then it is not anticipated that the proposed development will have any significant adverse environmental impacts. Impacts may possibly be positive in the long term, in as much as potentially contaminating material, if

detected by further investigation and during the demolition and construction phases, will be remediated as part of the development.

11.11 Conclusions

11.11.1 The ES demonstrates that there are no overriding environmental constraints or planning policies which would preclude the development of the application site. All aspects of the design have taken full account of the likely significant environmental issues and, where necessary, mitigation measures form an integral part of the proposals to ensure that the environment is suitably protected. This comprehensive assessment demonstrates how the proposed scheme would bring about significant benefits to the local environment, whilst providing much needed housing for the town of Rochford in a sustainable location.