SLOUGH MULTIFUEL EXTENSION PROJECT

Planning Inspectorate Ref: EN010129

The Slough Multifuel Extension Order

Land at 342 Edinburgh Avenue, Slough Trading Estate, Slough

Document Ref: 7.2 - 2014 ES Volume 1 - Main Report

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(q)

Applicant: SSE Slough Multifuel Limited

September 2022

Slough Multifuel Combined Heat and Power (CHP) facility

Environmental Statement
Volume I

Prepared for:
SSE Generation Limited
September 2014

Project Title: Slough Multifuel CHP Facility

Report Title: Environmental Statement, Volume 1

Project No: 47066339

Client Company Name: SSE Generation Ltd

Issued By: URS

Document Production / Approval Record

Issue No: 3	Name	Signature	Date	Position
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1. INTRODUCTION

1.1. The Applicant

1.1.1. SSE Generation Ltd ('the Applicant') is a subsidiary of SSE plc, one of the UK's leading energy companies with around 9 million energy and home services customers and around 14 gigawatts (GW) of electricity generation, including over 3GW of renewable generation amongst other assets.

1.2. Overview

1.2.1. The Applicant is seeking planning permission under the Town and Country Planning Act (1990) (Ref. 1-1) from Slough Borough Council (SBC) on a part of the Slough Heat and Power (SHP) site at 342 Edinburgh Avenue, SL1 4TU to undertake development of a multifuel combined heat and power (CHP) generating station of up to 50 megawatt (MW) gross electrical capacity, together with associated infrastructure (the *'Proposed Development'*). The Applicant currently operates the plant and services on the remainder of the SHP site.

1.2.2. The Proposed Development will convert waste derived fuel (WDF) into low carbon electricity and heat, and will be fully compliant with Chapter IV of the Industrial Emissions Directive (IED) (*Special Provisions for Waste Incineration Plants and Waste Co-Incineration Plants*) (2010/75/EU) (Ref. 1-2). The WDF will be made elsewhere from various sources of processed municipal solid waste (MSW), Commercial and Industrial (C&I) waste and waste wood. No WDF from any source will be accepted where it is classified as hazardous waste.

1.2.3. The site of the Proposed Development (the 'Site') is within the existing SHP site[1] on the Slough Trading Estate, grid reference SU 953 814, as shown in Figure 1-1. The boundary of the Site which will occupy an area of approximately 1.9 hectare (ha), and the wider SHP site, are illustrated in Figure 1-2.

1.2.4. In addition to the Proposed Development there is a requirement for a new central site services building, a water treatment plant and parking on the SHP site to serve both the Proposed Development and other generating facilities (hereafter referred to as *'Further Development'*). This will be the subject of a separate composite planning application to be submitted in parallel with the application for the Proposed Development, but will exclude works which are viewed as permitted development under the Town and Country Planning (General Permitted Development) Order 1995 as amended.

1.3. Requirement for EIA

1.3.1. The Proposed Development constitutes a "Schedule 1 development" as defined in the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (Ref. 1-3), (the 'EIA Regulations'). The requirements for a statutory EIA are discussed further in Chapter 2: Assessment Methodology of this Environmental Statement (ES).

1.3.2. URS has been commissioned by the Applicant to carry out a systematic assessment of the potential effects of the Proposed Development through an EIA process, the results of which are presented in this ES, which accompanies the planning application for the Proposed Development.

1.3.3. This ES describes the environmental and socio-economic effects of the Proposed Development during the demolition and construction phase, which includes site preparation and enabling works, together with the commissioning and operational phases of the development, as described in Chapter 5: The Proposed Development of this ES.

[1] The Proposed Development Site boundary includes visibility splays within the adjacent highway as illustrated in Figure 1-2.

Figure 1-1 Location of the Proposed Development Site

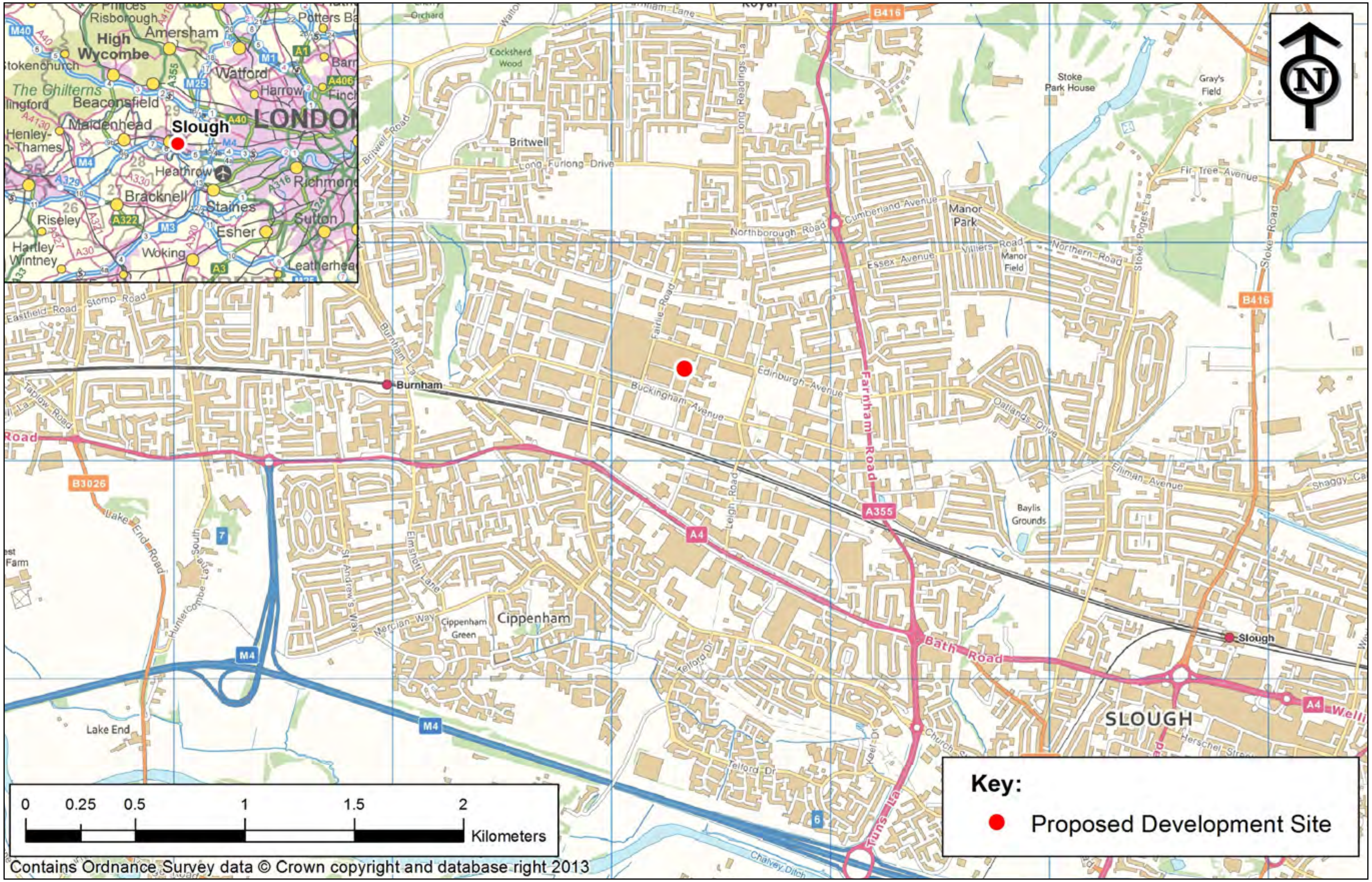
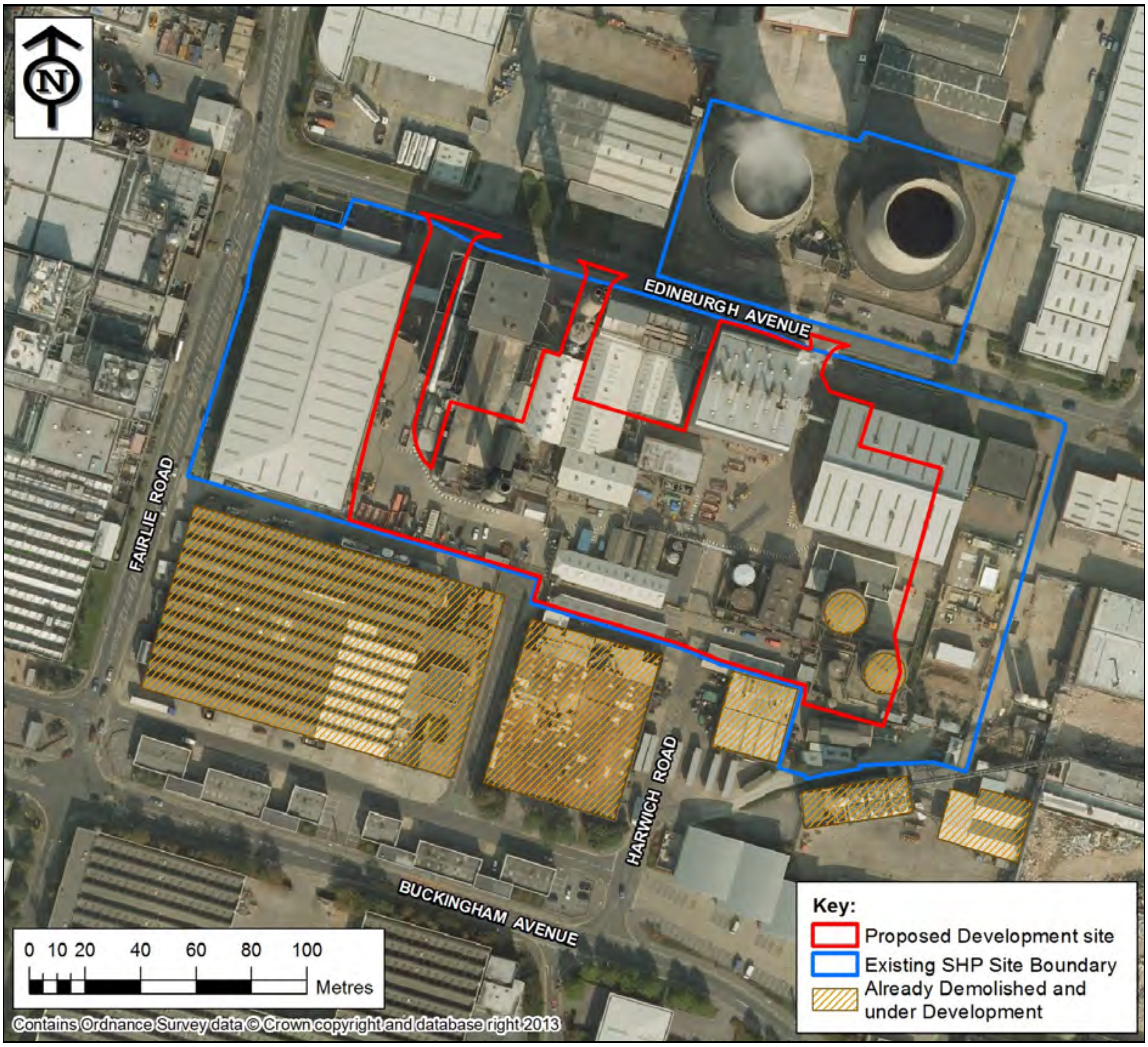


Figure 1-2 Site Boundary for the Proposed Development



1.4. Description of the Proposed Development Site

1.4.1. The Proposed Development is located within the existing SHP site and the Slough Trading Estate. The SHP site is mainly located on the south side of Edinburgh Avenue, with two associated natural draught cooling towers occupying an area immediately to the north of Edinburgh Avenue (see Figure 1-2). The SHP site is used for electricity and steam generation. It contains power station buildings and structures of varying ages, including boiler houses, turbine halls, fuel storage facilities, switchrooms, control rooms, offices and other ancillary plant associated with existing CHP units. SHP provides various services to the Slough Trading Estate, including electricity distribution and distribution and supply of heat and potable water. It also provides other ancillary services on the SHP site such as water treatment, operations and maintenance and cooling water.

1.4.2. The Site will occupy an area of approximately 1.9ha, most of which has been occupied by decommissioned plant, referred to as boilers 15 and 16, a gas turbine and associated

Waste Heat Recovery Boiler (WHRB) and two steam turbines (referred to as units 12 and 14). Furthermore, the circulating fluidised bed (CFB) boilers and fuel store have been taken out of commercial service and are discussed further in *Chapter 4: Site Description, Project Alternatives and Evolution* of this ES. The locations of the plant and buildings are shown in Figure 4-1.

1.4.3. A description of the enabling works required to facilitate construction of the Proposed Development is included in *Chapter 5: The Proposed Development* of this ES.

1.5. Brief Overview of the Proposed Development

1.5.1. The Proposed Development will comprise a multifuel generating plant that will convert WDF into low carbon electricity and heat, with a design capacity of up to 400,000 tonnes per annum of WDF, and a maximum capacity of 480,000 tonnes based on the lowest average calorific value fuels expected. The WDF will be sourced from offsite providers and will be delivered to the Proposed Development by road in enclosed Heavy Goods Vehicles (HGVs), entering the Site via the existing western SHP site access on Edinburgh Avenue and returning via the existing egress near the northeast boundary on Edinburgh Avenue.

1.5.2. The Proposed Development will be capable of supporting the production of low carbon energy through the use of WDF from various sources of processed MSW, C&I waste and waste wood. This will make a positive contribution toward addressing a number of challenges, namely:

- The UK Government's climate change commitments which necessitate achieving ambitious reductions in greenhouse gas emissions (principally carbon dioxide (CO_2));
- Security of national electricity supply through having a mix of energy generating technologies and a diverse range of fuel sources;
- Maximising energy recovery from WDF in the form of low carbon (non fossil fuel) electricity and heat that will supply businesses in the local area;
- Providing local authorities with an outlet for processed MSW in the form of WDF;
- Complementing recycling initiatives by accepting waste after these initiatives have been carried out, thereby forming part of an integrated waste management system;
- Positive diversion of waste materials that may otherwise be disposed of to landfill, achieving reductions in greenhouse gas emissions (including methane) that would otherwise be generated from the breakdown of the waste materials associated with landfill;
- Utilising a CHP network in line with the UK Government's commitment towards developing heating and cooling networks; and
- Forming part of the continued modernisation of the Slough Trading Estate and green energy credentials of the SHP site.

1.5.3. The Proposed Development will be designed to generate up to 50MW of gross electrical output and to export up to 20MW of heat to supply the existing Slough Trading Estate heat network. The existing natural draught cooling towers at the SHP site will be used for cooling water.

1.5.4. The Proposed Development will comprise of an enclosed tipping hall and fuel bunker, up to two furnaces where the WDF will be combusted and boiler unit(s) to raise steam, a turbine hall with a steam turbine to generate electricity, up to two Flue Gas Treatment (FGT) plants to clean the flue gas, and a new stack for discharge of cleaned flue gas (which would replace the existing south stack on the SHP site) or an extension to the existing south stack.

1.5.5. The maximum height of the Proposed Development will be 90 metres (m) above ground level (agl) if a replacement stack is required and 48m for the tallest building, which is the boiler house. Views from the north of the Site will be fragmented due to the screening effect of the existing cooling towers.

1.5.6. The Proposed Development will include a below ground electrical cable connected to Slough South substation which is located within the SHP site.

1.5.7. There is a requirement for Further Development on the SHP site, which will include a new central site services building, a water treatment plant and parking to serve both the Proposed Development and other generating facilities on the SHP site. This will therefore be the subject of a separate planning application to be submitted in parallel with the application for the Proposed Development, as described in *Chapter 2: Assessment Methodology* of this ES. The central site services building will include new stores, workshop and changing facilities and these have been assessed within the ES as a cumulative development and summarised in *Chapter 18: Cumulative Effects.*

1.5.8. A full description of the Proposed Development is provided in *Chapter 5: The Proposed Development* of this ES.

1.6. Planning Policy Context

1.6.1. As the Proposed Development will have a rated capacity of up to 50MW electrical output, a planning application will be submitted to SBC under the Town and Country Planning Act 1990 accompanied by this ES prepared in accordance with the EIA Regulations.

1.6.2. Planning policy is addressed in *Chapter 3: Planning Policy Context* of this ES. Each technical chapter within this ES comments on relevant policies which contribute to informing the EIA process.

1.7. Structure of this Environmental Statement

1.7.1. The following provides a summary of each document that forms the ES:

- **ES Volume I – Main ES:** This document is the main body of the ES, divided into a number of background and technical chapters supported with figures and tabular information for clarity of reading;
- **ES Volume II – Technical Appendices:** Comprises survey data, technical reports and background information supporting the assessments within the ES.
- **ES Non-Technical Summary (NTS):** This is a separate document providing a concise summary of the Proposed Development, alternative designs that were considered, environmental effects and mitigation measures in plain, non-technical language.

1.8. Location of Information within the Environmental Statement

1.8.1. The EIA Regulations (Regulation 2) interpret "Environmental Statement" as meaning a statement that includes such of the information referred to in Schedule 4 Part 1 that is *"…reasonably required to assess the environmental effects of the development and which the applicant can, having regard in particular to current knowledge and methods of* *assessment, reasonably be required to compile".* This information together with its location within the ES is presented below in Table 1-1.

Table 1-1 Location of Information within the Environmental Statement

	Specified Information (EIA Regulations)	Location Within ES
1.	Description of the development, including in particular:	
a)	A description of the physical characteristics of the whole development and the land use requirements during the construction and operational phases;	Chapter 5: The Proposed Development
b)	A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used; and	Chapter 5: The Proposed Development
c)	An estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc) resulting from the operation of the proposed development.	Chapters 6-15
2.	An outline of the main alternatives studied by the applicant and an indication of the main reasons for its choice, taking into account the environmental effects.	Chapter 4: Site Description, Project Alternatives and Evolution
3.	A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.	Chapters 6-15
4.	A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:	Chapters 6-15
a)	the existence of the development;	Chapters 6-15
b)	the use of natural resources; and	Chapters 6-15
c)	the emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the applicant or appellant of the forecasting methods used to assess the effects on the environment.	Chapter 5: The Proposed Development; Chapters 6-15
5.	A description of the measures envisaged to prevent, reduce and where possible, offset any significant adverse effects on the environment.	Chapters 6-15
6.	A non-technical summary of the information provided under paragraphs 1 to 5 of this Table.	Non Technical Summary
7.	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	Chapter 2: Assessment Methodology; and Chapters 6-15

1.9. Other Planning Application Documents

1.9.1. In addition to this ES, a number of other documents have been submitted to SBC as part of, or in support of, the planning application for the Proposed Development. These are set out within the covering letter accompanying the planning application and comprise (but are not limited to):

- Planning Application documents including covering letter, forms, schedules and notice;
- Planning Statement;
- Planning Application Drawings;
- Design and Access Statement; and
- Consultation Report.

1.9.2. A separate composite planning application will also be submitted to SBC in parallel with the application for the Proposed Development for Further Development on the SHP site, as mentioned above.

1.10. Project Team

1.10.1. This ES has been compiled by URS and presents the results of an EIA carried out by a number of designers, engineers, architects and consultants appointed by the Applicant. These designers, engineers and consultants are presented in Table 1-2, along with their respective disciplines and contribution to the EIA.

Table 1-2 EIA Project Team

Organisation	Expertise/EIA Input
URS	EIA Project Management and preparation of the ES including authoring the following Technical Chapters: • Introduction; • Assessment Methodology; • Site Description, Alternatives and Design Evolution; • Proposed Development; • Socio-Economics; • Traffic and Transportation; • Air Quality; • Noise and Vibration; • Ground Conditions; • Water Resources and Flood Risk; • Cultural Heritage and Archaeology; • Ecology; • Landscape and Visuals;

Organisation	Expertise/EIA Input
	• Sustainability and Climate Change; • Residual Effects; • Cumulative Issues; and • Non-technical Summary. Architects and lead author of the Design and Access Statement.
Tom Paxton (on behalf of URS)	Communications Consultant and author of the TV and Radio Interference ES chapter.
Dalton Warner Davis LLP	Planning Consultant and authors of the Planning Policy ES Chapter, Planning Statement and contributors to the Design and Access Statement.
Fichtner Consulting Engineers Ltd	Design and layout of the Proposed Development.

1.11. ES Availability

1.11.1. This ES is available for viewing by the general public during normal office hours at the offices of the Planning Department of SBC.

1.11.2. Comments on the planning application should be forwarded to the following address:

Planning Department
c/o Paul Stimpson
Slough Borough Council
St Martins Place
51 Bath Road
Slough
SL1 3UF

Email: Paul.Stimpson@slough.gov.uk

1.11.3. A copy is also available to view at the following address:

SSE Generation Ltd
Slough Heat and Power Ltd
6 Edinburgh Avenue
Slough
SL1 4TT

1.11.4. Further copies of all these reports, or further information on the Proposed Development, can be obtained from the Applicant's website at: *www.sse.com/sloughmultifuel*

1.11.5. Printed copies of the full ES and Technical Appendices can be purchased for £350 from:

Jayne Williams
Keadby Power Station
Trentside
Keadby
Scunthorpe
North Lincolnshire
DN17 3EF

Email: Jayne.Williams@sse.com

1.11.6. Electronic copies on CD are available free (or for a fee of £10 per CD if ordering more than 10 CDs).

1.12. References

Ref. 1-1 Town and Country Planning Act (1990).

Ref. 1-2 Directive 2010/75/EU (2010) Industrial Emissions Directive (IED), European Parliament, Council.

Ref. 1-3 Town and Country Planning (Environmental Impact Assessment) Regulations (2011).

2. ASSESSMENT METHODOLOGY

2.1. Introduction

2.1.1. This chapter of the ES sets out the overall approach to the EIA and, in particular, the statutory requirements as outlined in the EIA Regulations, along with the method for assessing environmental effects arising as a result of the Proposed Development.

2.1.2. This chapter also presents a review of the key issues raised by consultees during the Scoping stage and during pre-application consultation and indicates how and where these issues have been addressed within this ES.

2.2. The Requirements for an Environmental Impact Assessment

2.2.1. Applications for developments that are covered by the EIA Regulations are termed 'EIA applications'. The requirement for an EIA is based on the likelihood of significant environmental effects arising from the Proposed Development and is either mandatory or conditional depending on the classification of the development project. EIA applications are divided into Schedule 1 and Schedule 2 applications under the EIA Regulations.

2.2.2. The Proposed Development is considered to fall within the scope of Schedule 1, paragraph 10 of the EIA Regulations, "*Waste disposal installations for the incineration or chemical treatment (as defined in Annex IIA to Council Directive 75/442/EEC under the heading D9) of non-hazardous waste with a capacity exceeding 100 tonnes per day*" and therefore requires an EIA.

2.2.3. This ES documents the findings of the EIA carried out in accordance with the agreed scope. It has been drafted in a clear manner that allows SBC to assess the environmental effects of the application as well as assessing its cumulative effects, and has been carried out in accordance with the EIA Regulations.

2.3. Legislation and Guidance for EIA and Preparation of Environmental Statements

2.3.1. This ES has been prepared in accordance with applicable legislation, guidance, and case law for the preparation of such documents. In particular, the ES has been prepared with due consideration to:

- Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (Ref. 2-1);
- Department for Communities and Local Government (DCLG) 2006. Environmental Impact Assessment: A guide to good practice and procedures (Ref. 2-2);
- Institute of Environmental Management and Assessment (IEMA) 2006. Guidelines for Environmental Impact Assessment (Ref. 2-3); and
- Department for Communities and Local Government (DCLG) 2014, Planning Practice Guidance (Ref. 2-4).

2.4. EIA Methodology

2.4.1. The EIA has been undertaken taking into account or having had regard to:

- Consultation with statutory and non-statutory consultees to understand the environmental and socio-economic issues concerning the development of a multifuel CHP generating station of up to 50MW and associated development;

- EIA scoping;
- Local and national planning policies, guidelines and legislation relevant to the EIA;
- Definition of the baseline conditions;
- Effect of significance criteria;
- Identification of sensitive receptors;
- Design review and assessment of alternatives;
- Review of secondary information, previous environmental studies, and publicly-available information and databases;
- Expert opinion;
- Physical surveys and monitoring;
- Desk-top studies;
- Monitoring and modelling (for example of the noise, air quality and visual environments); and
- Reference to current best practice and guidance in relation to the sustainability of the Proposed Development.

Consultation

2.4.2. The EIA process is an iterative process in which consultation plays an important role. Views of key statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues, which require further investigation. Consultation is also an ongoing process, which enables mitigation measures to be incorporated into the project design, thereby limiting adverse effects and enhancing benefits.

2.4.3. Key consultees involved in the evolution of the design and preliminary assessment of environmental effects include:

- SBC;
- South Bucks District Council (SBDC);
- Royal Borough of Windsor and Maidenhead (RBWM);
- SEGRO (owners of Slough Trading Estate);
- Department of Energy and Climate Change (DECC);
- Environment Agency (EA);
- Natural England (NE);
- English Heritage (EH);
- Highways Agency (HA);
- Health and Safety Executive (HSE);

- Thames Water;
- Network Rail;
- First Great Western (no direct impact);
- Crossrail (no direct impact);
- Slough Primary Care Trust (PCT);
- Ofcom;
- Berkshire Design Panel;
- Civil Aviation Authority (CAA);
- Ministry of Defence;
- City of London Corporation (trustees of Burnham Beeches Special Area of Conservation);
- Berkshire Archaeology; and
- Members of the public.

2.4.4. Consultation with the wider public was undertaken during the pre-planning stage to understand what local issues may affect the Proposed Development at the SHP site. Feedback from this consultation is considered useful and relevant to this EIA.

2.4.5. In November 2012, a newsletter was circulated to 2,500 local residents inviting them to attend a series of public exhibitions to be held on 29 November 2012 in Queensmere Shopping Centre, Slough, and on 6 and 7 December 2012 at the SHP site in Edinburgh Avenue. Further to this, a dedicated project website was set up, whilst posters were circulated to local community hubs and adverts were printed in local newspapers to further advertise the three day event.

2.4.6. The first stage of public exhibitions provided the opportunity to discuss the proposed plans for a new multifuel CHP generating station at the SHP site and people were able to view information about what was proposed, learn about the technologies involved, and speak to members of the development team about the key issues that should be assessed as part of the EIA.

2.4.7. Residents were asked to complete a questionnaire at the exhibition, or later online, seeking their views on the proposals. Feedback received from 26 individuals over the three day period showed that 19 people (73%) either agreed or strongly agreed with the proposals, 5 people (19%) were neither for nor against the proposals and two (8%) did not answer.

2.4.8. Of the comments received during the exhibition, positive comments on the proposals included the potential for local investment, jobs and security of supply, whilst some concern was raised over the potential for traffic increase (particularly at Fairlie Road junction with Edinburgh Avenue), as well as air quality and odour, and noise effects.

2.4.9. Following updates to the layout of the Proposed Development and the completion of the draft EIA, a second stage of public exhibitions was held in November 2013. A newsletter was circulated to the same 2,500 local residents inviting them to attend a series of public exhibitions to be held on 22 November 2013 at the SHP site in Edinburgh Avenue, on 23 November 2013 at the Centre Conference Venue in Farnham Road, and on 28

November 2013 at the Queensmere Shopping Centre, Slough. The public exhibitions provided the opportunity to view and discuss the updated proposals for a new multifuel CHP generating station at the SHP site and people were able to speak to members of the development team about the key issues which have been assessed as part of the EIA.

2.4.10. All the information displayed at both the 2012 and 2013 exhibitions is available via the website: www.sse.com/sloughmultifuel.

2.4.11. A Consultation Report containing the comments and issues raised by residents has been submitted with the planning application.

EIA Scoping

2.4.12. Scoping forms the first stage of the EIA process and it provides an applicant with the opportunity to ask the Local Planning Authority (LPA), in this case SBC, under Regulation 13 of the EIA Regulations, to state in writing its opinion as to the information to be provided in the ES (a "scoping opinion"). By this means key stakeholder engagement and consultation can begin at an early stage in the process.

2.4.13. EIA scoping refers to the activity of identifying those environmental aspects that may be significantly affected by the Proposed Development, in addition to presenting any justification for the exclusion of those aspects that are considered to be unaffected. In doing so, the potential significance of effects associated with each environmental aspect becomes more clearly defined, resulting in the identification of a number of priority issues to be addressed in the EIA.

2.4.14. A Scoping Report (Ref. 2-5) setting out the proposed scope of the EIA was submitted to SBC on 16th November 2012. A Scoping Opinion was received from SBC on 7th February 2013 (Ref. 2-6). A copy of these documents is provided within *Appendix A-1, ES Volume II*.

2.4.15. Following changes to the design and layout of the Proposed Development in 2013, a second scoping request was submitted to SBC on 18 December 2013 (Ref. 2-7) presenting an overview of changes to EIA scoping requirements for the Proposed Development. A revised EIA Scoping Opinion was received from SBC on 21 January 2014 (Ref. 2-8) and a copy of these documents is provided within *Appendix A-2, ES Volume II*.

2.4.16. A summary of both Scoping Opinions is provided in Table 2-1. The right hand column of the table indicates where the issues raised in the Scoping Opinion have been addressed in the ES or in the associated planning application documents.

Table 2-1 Summary of the Formal Scoping Opinion

Consultee	Issues Raised	Response / Location in the ES
Slough Borough Council (SBC)	The ES should consider the implications of the following policy documents: National Planning Policy Framework (2012); National Policy Statement for Renewable Energy Infrastructure (2011); Saved Policies from Waste Local Plan for Berkshire (1998); Slough Local Development Framework, Core Strategy 2006-2026 (2008) incorporated into the Composite Local Plan for Slough (2013); Slough Local Transport Plan (2011).	Chapter 3: Planning Policy; Chapters 6 - 16
	The ES should include details of the site of the Proposed Development together with internal access areas up to the public highway.	Chapter 4: Site Description, Project Alternatives and Evolution

Consultee	Issues Raised	Response / Location in the ES
	Where any proposed construction area falls outside the application site, then any requirements of these operations should be included in the ES sufficiently to consider the effects.	Chapter 5: Proposed Development; Chapters 6 - 16
	The ES should include details about the site proposed for temporary construction laydown. It is noted that the construction laydown area/s may be liable to change and therefore should be assessed accordingly.	Chapter 5: Proposed Development
	The ES should provide details of the volume of the fuel bunker and waste residue storage together with an indication of the number of days of fuel reserves available onsite.	Chapter 5: Proposed Development
	Revisions to the Proposed Development include buildings and chimney heights slightly larger than the previous scheme. Their visual appearance and impact will be an important part of the assessment.	Chapter 14: Landscape and Visuals
	The ES should include a separate statement about any impact upon the designated Green Belt land outside of the urban envelope.	Chapter 14: Landscape and Visuals
	Provide details of the disposal of residual solid waste from the site.	Chapter 5: Proposed Development
	Environmental studies to incorporate two recently designated Air Quality Management Areas (AQMAs) at Tuns Lane and Slough Town Centre.	Chapter 8: Air Quality
	Identify air quality scenarios to determine fuel composition variances, different stack heights and plant operating at capacity and reduced load. Dispersion modelling should be undertaken to determine the stack height, which should also include the effects of dispersion of large buildings in the vicinity.	Chapter 8: Air Quality
	It will be necessary to undertake a Human Health Risk Assessment covering public health issues.	Chapter 8: Air Quality and Appendix B-2
	The quantity and type of operational traffic should be modelled in the light of other traffic movements, particularly to determine the impact upon the newly designated AQMAs.	Chapter 7: Traffic and Transport Chapter 8: Air Quality
	The following heritage assets should be considered in the ES, the closest being Leigh Road Railway Bridge. This includes three scheduled monuments, the nearest being Cippenham Court, and eighteen heritage assets within a 2km radius of the site.	Chapter 12: Cultural Heritage
	The following sites should be considered in the ES: Burnham Beeches Special Area of Conservation (SAC) (2.9km); Windsor Forest and Great Park SAC (6km); South London Waterbodies Special Protection Area (SPA) and Ramsar site (7.7km) and Chiltern Beechwoods (9.9km).	Chapter 8: Air Quality Chapter 13: Ecology
	A Phase 1 habitat survey should be undertaken; results of this will determine whether any further species surveys are required.	Chapter 13: Ecology
	The Applicant should have regard to the aims of the Berkshire Biodiversity Action Plan when designing avoidance, mitigation and enhancement measures for diversity.	Chapter 13: Ecology
	Where there are suitable alternative technologies capable of generating similar amounts of energy, it will be necessary to present evidence about these alternative(s). This can be used to assess the degree of impact from these energy generation options.	Chapter 4: Site Description, Project Alternatives and Evolution Chapter 16: Sustainability and Climate Change

Consultee	Issues Raised	Response / Location in the ES
	The ES should identify likely routes for the delivery of fuels and report on the potential for means of alternative transport of fuel for this proposal now and potentially at some future date.	Chapter 4: Site Description, Project Alternatives and Evolution Chapter 7: Traffic and Transport
	A waste management plan framework should be prepared covering all aspects of the development, including construction through to completion and ongoing use.	Chapter 5: Proposed Development
	A full transport assessment will be necessary, including information about existing lorry routing restrictions to and from this site and future proposals in and around Slough. Baseline traffic data should incorporate the existing situation going back five years to 2008.	Chapter 7: Traffic and Transport
	It will be necessary to demonstrate that this development can operate within the regulatory provisions in place or planned for. These cover a variety of environmental factors aimed at minimising environmental pollution to protect public health.	Chapters 6 - 16
	Further options should be assessed in the Design Evolution and Alternative assessment, namely: 1) housing a smaller boiler and fuel store; 2) Examining options that lessen the general bulk of the building by alternative design such as lowering the floor level; 3) necessary roof plant and any proposed measures for roof plant enclosure; 4) visual treatment(s) of exterior; 5) design for different technologies using waste derived fuels.	Chapter 4: Site Description, Project Alternatives and Evolution
Berkshire Archaeology	Depending upon the results of the archaeology desk-based assessment work, it may be necessary for further phases of field evaluation to be undertaken.	Chapter 12: Cultural Heritage
British Pipelines Agency (BPA)	This Proposal will not affect BPA pipeline responsibilities.	-
Civil Aviation Authority (CAA)	The opinion of the Ministry of Defence and relevant aerodrome licence holders/operators should be sought on the planning application.	-
Environment Agency	The Taplow Gravel Formation should be included as a potential Sensitive Receptor and be factored into the Conceptual Model for the site.	Chapter 10: Ground Conditions
	If the current concrete hard standing is to be removed then this needs to be clarified.	Chapter 10: Ground Conditions
	Archive information shows that solvents have been found in the soils of an adjacent building and therefore the potential for off-site sources of contamination must also be addressed in the EIA.	Chapter 10: Ground Conditions
	A surface water drainage strategy should be prepared for the site and included within the Flood Risk Assessment.	Chapter 11: Water Resource and Flood Risk
Ministry of Defence	No comment	-
English Heritage	No comment	-

Consultee	Issues Raised	Response / Location in the ES
South Bucks District Council	The EIA should include an assessment of the Proposed Development's impact on South Bucks District. The key EIA issues for South Bucks District include Air Quality and Odour, Ecology, Transportation and Access, and Landscape and Visual and should refer to relevant polices in the South Bucks Core Strategy 2011 and saved policies in the South Bucks District Local Plan 1999.	Chapters 6 - 16
	The following designated nature conservation sites should be considered as part of the EIA process: Burnham Beeches SAC, NNR, SSSI; Stoke Common and Farnham Common SSSI, as well as a Local Wildlife Site (Farnham Royal). Large areas of South Buckinghamshire are also designated as Biodiversity Opportunity Areas.	Chapter 13: Ecology Chapter 8: Air Quality
	Viewpoints from Stoke Park House and Huntercombe Manor, both Historic Parks, as well as Dorney Common, should be considered in the visual assessment.	Chapter 14: Landscape and Visuals
Department for Energy & Climate Change	No comment.	-
Health and Safety Executive	No comment.	-
Heathrow Airport Ltd	It is important that any future design of the Proposed Development is such that it does not go above the Outer Horizontal Surface (OHS) limit of 150m height.	Chapter 2: Assessment Methodology
Highways Agency	Recommends that measures are considered to encourage trips to and from the Proposed Development outside of peak hours to minimise any potential impacts to the M4 from the proposal.	Chapter 7: Traffic and Transport
Network Rail	The EIA process should demonstrate that the railway infrastructure will not be compromised and be adequately protected.	Chapter 7: Traffic and Transport
Thames Water	The developer needs to consider the net increase in water and waste water demand to serve the development and also any impact the development may have off site further down the network, if no/low water pressure and internal/external sewage flooding of property is to be avoided.	Chapter 11: Water Resource and Flood Risk
	Concerned that water mains and sewers immediately adjacent to the site may be affected by vibration as a result of piling, possibly leading to water main bursts and or sewer collapses. The EIA should include any piling methodology and consider whether it will adversely affect neighbouring utility services.	Chapter 9: Noise and Vibration Chapter 11: Water Resource and Flood Risk
	The surface water drainage requirements and flood risk of the development both on and off site should be considered.	Chapter 11: Water Resource and Flood Risk
Natural England	The following designated nature conservation sites should be considered as part of the EIA process: Burnham Beeches Site of Special Scientific Interest (SSSI); Windsor Forest and Great Park SSSI; Wraysbury No.1 Gravel Pit SSSI; Wraysbury & Hythe End Gravel Pits SSSI; Burnham Beeches SAC; Windsor Forest & Great Park SAC; South West London Waterbodies SPA/Ramsar.	Chapter 8: Air Quality Chapter 13: Ecology
	The EIA should consider impacts upon local wildlife and geological sites, as well as protected species.	Chapter 13: Ecology
	A Phase 1 Habitat survey should be carried out on the site. Protected species surveys should be carried out at appropriate times in the year, to identify whether any scarce or priority species are present.	Chapter 13: Ecology

Consultee	Issues Raised	Response / Location in the ES
	Advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principle Importance should be included in the ES, whilst consideration should also be given to those species and habitats included in the Local Biodiversity Action Plan (BAP).	Chapter 13: Ecology
	The EIA process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.	Chapter 4: Site Description, Project Alternatives and Evolution Chapter 14: Landscape and Visuals
	The landscape and visual assessment should refer to the relevant National Character Areas.	Chapter 14: Landscape and Visuals
	The EIA should consider the cumulative effect of the development with other relevant existing or proposed developments in the area, including other proposals currently at Scoping stage.	Chapter 18: Cumulative Impacts

2.5. Baseline Conditions

2.5.1. In order to assess the potential effect of the Proposed Development, it is first necessary to determine the baseline conditions. The baseline conditions are typically the current (at the time of writing the ES) environmental and socio-economic conditions of the site. In the context of the EIA for the Proposed Development, the existing baseline conditions at the Proposed Development Site ('the Site') consists of mainly impermeable hardstanding and existing buildings and structures.

2.5.2. Baseline conditions have been determined using the results of onsite surveys and investigations, desk based data searches, or a combination of these, as appropriate.

2.5.3. Existing operational facilities on the SHP site have been assessed as part of the EIA and the approach taken is discussed within each technical chapter.

Significance Criteria

2.5.4. The significance of effects is evaluated with reference to definitive standards, accepted criteria, and legislation where available. Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on expert knowledge and professional judgment. Where uncertainty exists, this has been noted in the relevant assessment chapter.

2.5.5. Specific significance criteria for each technical discipline have been developed, giving due regard to the following:

- Extent and magnitude of the effect;
- Duration of effect (whether short, medium or long-term);
- Nature of effect (whether direct or indirect, reversible or irreversible);
- Whether the effect occurs in isolation or is cumulative;
- Performance against any relevant environmental quality standards;

- Sensitivity of the receptor; and
- Compatibility with environmental policies.

2.5.6. In order to provide a consistent approach across the different technical disciplines addressed within the ES, the following terminology has been used throughout the ES to define residual effects (i.e. effect post the application of mitigation measures):

- **Adverse** - Detrimental or negative effects to an environmental/socio-economic resource or receptor; or
- **Negligible** - Imperceptible effects to an environmental/socio-economic resource or receptor; or
- **Beneficial** - Advantageous or positive effects to an environmental/socio-economic resource or receptor.

2.5.7. Where adverse or beneficial effects have been identified these have been assessed against the following scale:

- **Minor**;
- **Moderate**; and
- **Major**.

2.5.8. Each technical chapter of the ES provides further explanation and definition on the scale of effect significance, i.e. minor through to major.

2.5.9. For the avoidance of doubt, moderate and major effects are considered to be 'significant' in terms of EA Regulations.

2.5.10. Broadly, short to medium-term effects are considered to be those associated with the demolition and construction phase and long-term effects are those associated with the completed and operational Proposed Development. Local effects are those affecting the Site and neighbouring receptors, while effects upon receptors in SBC are considered to be at a district level. Effects affecting County-level are considered to be at a regional level, whilst effects which affect different parts of the country, or England as a whole, are considered at a national level. Beneficial and adverse, short and long-term (temporary and permanent), direct and indirect, and cumulative effects have been considered. Where there is no effect, this is also stated.

2.5.11. Where mitigation measures have been identified to either eliminate or reduce adverse effects, these have been incorporated into:

- The design of the Proposed Development;
- Demolition and construction commitments, which will be presented within:
  - A Demolition and Construction Method Statement (DCMS);
  - A Construction and Environmental Management Plan (CEMP); and
- Operational or managerial standards/procedures.

2.5.12. The ES highlights the 'residual' effects, which remain following the implementation of suitable mitigation measures, and classifies these in accordance with a standard set of significance criteria.

2.5.13. The EIA process will include the identification and assessment of all effects to potentially sensitive receptors resulting from the demolition, construction, operational and decommissioning phases of the Proposed Development, as well as cumulative effects.

Sensitive Receptors

2.5.14. The EIA process has included the identification and assessment of likely significant effects to potentially sensitive receptors resulting from the demolition and construction and operational phases of the Proposed Development. These receptors include local residents, designated ecological receptors, conservation areas and listed buildings, archaeological resources and the public transport network. Potential sensitive receptors are identified in Table 2-2.

Table 2-2 Sensitive Receptors

Category	Description of Receptor	Chapter Reference
Residential and Commercial Properties	Nearby residential properties (the closest dwelling to the Site is located approximately 200m to the north); Commercial properties, including industrial units (approximately 50m to the south) and a confectionary factory (approximately 100m to the west).	Chapters 6 – 15
Designated Habitat sites/ Conservation Areas / Sites of Special Scientific Interest	Kennedy Park; Haymill Valley Nature Reserve; Cocksherd Wood Nature Reserve; Boundary Copse Woodland Trust Reserve; Burnham Beeches SAC; Salt Hill Stream; Non-statutory nature conservation sites. Stoke Common and Farnham Common (5km) Farnham Royal Local Wildlife Site; Windsor Forest and Great Park SAC (6km); South West London Waterbodies SPA and Ramsar Site (7.7km) and Chiltern Beechwoods (9.9km).	Chapter 8: Air Quality Chapter 9: Noise Chapter 10: Ground Conditions Chapter 13: Ecology
Heritage Sites	Leigh Road Railway Bridge and Cippenham Court; There are three scheduled monuments and 18 heritage assets within 2km.	Chapter 12: Cultural Heritage; Chapter 14: Landscape and Visual Impact
Ground and Groundwater	Taplow Gravel Formation - (EA requested) Wraysbury No.1 Gravel Pit SSSI; Wraysbury & Hythe End Gravel Pits	Chapter 10: Ground Conditions Chapter 11: Water Resource and Flood Risk
Utilities	Sub-surface utilities and services. Licensed abstractions.	Chapter 10: Ground Conditions Chapter 11: Water Resource and Flood Risk
Pedestrians, Cyclists and Road Users	Existing users of the local transport network and pedestrians in the immediate vicinity of the site.	Chapter 7: Traffic and Transport
Protected Species	Vegetation and Habitats. Invertebrates. Bats. Birds. Other Mammals.	Chapter 13: Ecology

2.6. Structure of the Environmental Statement

2.6.1. As discussed within *Chapter 1: Introduction* of this ES, the ES consists of two volumes and a Non-Technical Summary (NTS).

2.6.2. **ES Volume I: Main Chapters** - this document forms the main body of the ES detailing the results of environmental investigations, potential effects arising, and the proposed mitigation measures. The ES also identifies opportunities for social and economic benefit and environmental enhancement. It is divided into a number of background and technical chapters supported with figures and tabular information. ES Volume I (this volume) considers the environmental effects associated with a number of topics.

2.6.3. Each topic has been assigned a separate technical chapter in the ES as follows:

- Socio-Economics;
- Traffic and Transport;
- Air Quality;
- Noise and Vibration;
- Ground Conditions;
- Water Resources, Drainage and Flood Risk;
- Cultural Heritage and Archaeology;
- Ecology;
- Landscape and Visual Effect Assessment;
- TV and Radio Interference; and
- Sustainability and Climate Change.

2.6.4. In addition to the above, the following chapters are provided as part of this ES:

- Introduction;
- Assessment Methodology;
- Planning Policy;
- Site Description, Alternatives and Design Evolution, including the 'Do Nothing Scenario', 'Alternative Sites' and Alternatives 'Designs';
- The Proposed Development;
- Residual Effects and Conclusions;
- Cumulative Effects; and
- Glossary of Terms.

2.6.5. **ES Volume II: Technical Appendices** - a complete set of appendices is provided for reference. These comprise background data, technical reports, tables, figures and surveys. The appendices provided are as follows:

- Appendix A-1: EIA Scoping and Scoping Opinions;
- Appendix A-2: EIA Comparison of Scoping Methodologies and Revised EIA Scoping Opinion
- Appendix B-1: Framework Construction and Environmental Management Plan;
- Appendix B-2: Human Health Risk Assessment;
- Appendix C-1: Transport Assessment;
- Appendix C-2: Framework Workplace Travel Plan
- Appendix D-1: Air Quality Technical Appendix;
- Appendix E-1: Noise Modelling Methodology;
- Appendix E-2: Demolition/Construction Noise and Operational Noise Contour Plots;
- Appendix F-1: Flood Risk Assessment;
- Appendix G-1: Gazetteer/Catalogue of Cultural Heritage Assets;
- Appendix G-2: Gazetteer of Conservation Areas
- Appendix H-1: Phase 1 Habitat Assessment;
- Appendix H-2: Bat Report;
- Appendix H-3: Breeding Bird and Peregrine Survey Report;
- Appendix I-1: Landscape Impact Assessment
- Appendix I-2: Visual Impact Assessment
- Appendix I-3: Landscape and Visual Cumulative Assessment
- Appendix I-4: Character Assessment of Green Belt
- Appendix J-1: WRATE Assessment;
- Appendix J-2: Climate Change Assessment; and
- Appendix J-3: Combined Heat and Power (CHP) Feasibility Assessment.

2.6.6. **ES Non-Technical Summary (NTS)** - this is presented as a separate document, providing a concise description of the Proposed Development, alternatives considered, potential environmental effects, and mitigation measures. The NTS is designed to give information on the Proposed Development to a wide and non-technical audience and to assist interested parties with their familiarisation of the project.

2.7. Non Key Issues

2.7.1. The following section provides a summary of issues which were considered during the scoping stage, but were not considered key to the EIA and were therefore not considered in detail in this ES. This approach was agreed with SBC and other key consultees through the Scoping process.

Waste Streams and Processed Residues

2.7.2. A description of the potential streams of demolition and construction waste and estimated volumes is described within Section 5.4 – Waste Generation and Treatment of *Chapter 5: The Proposed Development* of this ES.

2.7.3. A Construction and Environmental Management Plan (CEMP) will be produced following receipt of planning permission. The CEMP will set out how construction waste will be managed on site, whilst opportunities to recycle waste will also be explored. A framework CEMP is presented in *Appendix B-1, Volume II* of this ES, which demonstrates the likely structure and content of the CEMP.

2.7.4. Once operational, the plant will generate furnace bottom ash and flue gas treatment (FGT) residues, which will be sent off-site for recycling or disposal

2.7.5. Taking the above into account, it was deemed unnecessary that a separate waste chapter should be produced as part of this ES.

Aviation

2.7.6. Consultation with Heathrow Airport confirmed that the design of the Proposed Development should not go above the Outer Horizontal Surface (OHS) limit of 150m height as Heathrow Airport Ltd would not accept penetration of this surface.

2.7.7. As the height of the stack for the Proposed Development will be a maximum of 90m above ground level, which is less than the existing north stack (104m), and the expected temporary construction crainage will be below the OHS limit of 150m, it was considered that a detailed assessment of aviation effects would not be required as part of this ES.

2.7.8. The Ministry of Defence also confirmed that they had no safeguarding objections to the Proposed Development.

Daylight, Sunlight, Overshadowing and Light Pollution

2.7.9. Given the massing and location of proposed buildings (and of the existing buildings on the SHP site), and distance to the nearest sensitive receptor (the nearest commercial receptor is located approximately 50m away and the nearest residential receptor is located approximately 200m away) daylight, sunlight, overshadowing and light pollution effects were deemed unlikely to be significant.

2.7.10. The land around the SHP site has been designated within the Simplified Planning Zone Scheme (SPZ) for the Slough Trading Estate as a "*Power Station Sub-Zone, Constituting a special type of use which requires careful consideration*". It is therefore not considered sensitive to overshadowing issues and does not require further investigation.

Soils and Agriculture

2.7.11. Given the nature of the existing land use on the SHP site (the operational area of an existing power station), and the fact that the Proposed Development would not alter this, it was considered that this aspect could be scoped out of the EIA.

Accidental Events

2.7.12. Accidental events such as the potential for fuel spillages and abnormal air emissions, and how the risk of these events will be minimised has been discussed in the relevant chapters of the ES. The risk and potential effects of a fire onsite have been considered in the Human Health Risk Assessment (HHRA), which is presented in *Appendix B-2***,** *Volume II* of this ES.

2.7.13. Accidental events are covered by a brief risk assessment in *Chapter 5: The Proposed Development* of this ES, which will include reference to the Applicant's overarching principles of emergency management. The majority of emergency response plans and contingency measures will be dealt with in the Environmental Permit, which is regulated by the EA.

2.8. Structure of ES Technical Chapters

2.8.1. The technical ES chapters follow a consistent structure and format. Within each chapter the assessment has been structured in the following way:

Introduction

2.8.2. This section describes the format of the assessment presented within the chapter and identifies the author.

Legislation and Planning Policy Context

2.8.3. This section refers as necessary to legislation that is relevant to the technical discipline as well as applicable policies and plans (whether adopted or draft) at a national and local level.

Assessment Methodology and Significance Criteria

2.8.4. This section describes the approach taken to the assessment including the surveys/studies and research undertaken to determine the baseline conditions and the procedure followed to assess the effects of the Proposed Development. Topic-specific significance criteria and the standards/guidance from which they are derived are explained and definitions of minor, moderate, and major (adverse or beneficial) and negligible effects is presented.

Baseline Conditions

2.8.5. As discussed earlier in this chapter, the environmental conditions that currently exist on the Site (the ‘baseline conditions’) are considered and presented within this section of each technical chapter. For all issues, the EIA baseline has been taken as the current conditions on-site unless otherwise stated. Further reference is made to aspects of the baseline that may be sensitive to the Proposed Development, i.e. sensitive receptors.

Potential Effects and Mitigation Measures

2.8.6. This section identifies the potential effects resulting from the Proposed Development and considers effects during demolition and construction and once the Proposed Development is operational. The effects of the Proposed Development are defined against the existing baseline. This section also describes the mitigation measures that the Applicant will implement to reduce adverse effects and enhance beneficial effects relevant to the Proposed Development. The mitigation measures can relate to the demolition and construction phase and once the Proposed Development is complete and operational (i.e. in use).

Residual Effects and Conclusions

2.8.7. This section assigns significance to those effects of the Proposed Development which remain once mitigation measures are in place for both the demolition and construction phase and for the completed operational Proposed Development.

Cumulative Effects

2.8.8. In accordance with the EIA Regulations, the EIA has given consideration to 'cumulative effects'. By definition these are effects that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Development. For the cumulative assessment, two types of effect have been considered:

- The combination of individual effects arising as a result of the Proposed Development (in-combination), for example effects in relation to atmospheric emissions from the stacks and HGV deliveries affecting a single receptor. Where appropriate this is discussed in the 'Potential Effects and Mitigation Measures' section of the technical chapters; and
- The combined effects of the Proposed Development with several other nearby schemes, whether under construction at present or with reasonable prospects of being undertaken in the foreseeable future (i.e. either submitted for planning determination or with planning permission), which may, on an individual basis be insignificant but, cumulatively, have a likely significant effect.

2.8.9. The assessment of cumulative effects has been based upon the information available at the time of writing and currently available assessment techniques.

2.8.10. The schemes included within the cumulative effect assessment have been identified in consultation with SBC on the basis of a planning search within a 2km radius of the Site for major development projects / EIA scale projects. A list of major development schemes with planning permission or under construction or at pre-planning submission stage that have been included within the cumulative effect assessment is provided below. The locations of these cumulative schemes are illustrated in Figure 2-1.

1. **Leigh Road/Bath Road Central Core 1 and 2 Outline planning permission, Slough Trading Estate:**
   - **Leigh Road/Bath Road Central Core Outline planning permission (Ref: P/14515/000)** - SBC granted outline planning permission for the redevelopment of 21.9 hectares (ha) of land at Leigh Road/Bath Road on the 30th September 2010 to include commercial offices, hotel, retail, financial and leisure facilities etc. (LRCC1). The application proposes the development of total floorspace (gross internal) of 152,800 square metres (m^2), representing a net increase of 87,586m^2; or
   - **Leigh Road/Bath Road Central Core 2 Planning Application (Ref: P14515/3)** - Outline planning permission was granted on the 18th June 2012 for an alternative planning application for the redevelopment of the 21.9 ha of land at Leigh Road/Bath Road to include the mix of uses referred to in planning permission P/14515/000 (as above).
   - Only one of the two above mentioned developments will be developed;

2. **1 ha of land in the east / northwest of the SHP Site (“Further Development”)** - A separate planning application by the Applicant to SBC to include a central site services building and water treatment plant and associated car parking on land within the SHP site, formerly occupied by 3 large oil tanks, various buildings and car parking. This planning application will run in parallel with and be submitted at a similar time to the application for the Proposed Development; and

3. **Britwell Regeneration (P/15513/100)** – Full planning application submitted in May 2013 for the demolition and redevelopment of two linked development sites (site 2A Kennedy Park and 2B Wentworth Avenue shops/Marunden Green) to include mixed use residential, community and retail development. Site 2A comprises 171 residential units, 980m^2 of retail use (Use Classes A1, A2, A3, A5) and 411m^2 retail space, health centre or nursery (Use Classes A1, A2, A3, A5 and D1). Site 2b comprises 87 residential units and 195m^2 of retail use (Use Class A1). Surface car parking, cycle parking provision, amenity space, access and associated and ancillary development across both sites also form part of the application.

2.8.11. Other planning permissions exist within areas of regeneration close to the Site, however these are unlikely to produce any significant adverse effect in association with the Proposed Development and have been discounted from further consideration, in agreement with SBC.

2.8.12. These also include developments on the Slough Trading Estate which have been delivered under the Simplified Planning Zone (SPZ) for the Slough Trading Estate. The SPZ was produced and adopted by SBC in 1995, in partnership with SEGRO, and updated in 2005. The SPZ clarifies the types of development acceptable to SBC and providing a developer submits a proposal which accords to the SPZ scheme, detailed planning approval will not be required.

2.8.13. The current SPZ expires in 2014, although SBC (with SEGRO) has produced a new draft SPZ for the Trading Estate (under consultation), which would run for a further 10 year period to 2024. This SPZ grants advance planning permission for certain types of development such as data centres, warehouses and industrial buildings within a designated area in selected locations of the Trading Estate that meet the conditions set out in the document. Once the SPZ is adopted it effectively has planning permission and there is no opportunity to be consulted on the individual proposals.

2.8.14. Details of cumulative effects are provided in each of the technical chapters of the ES.

Figure 2-1 Location of Schemes Considered within the Cumulative Effects Assessment

2.9. Assumptions and Limitations

2.9.1. A number of general assumptions have been made during the EIA, which are set out below. Assumptions specific to certain environmental aspects are discussed in the relevant ES chapters:

- Information provided by third parties, including publicly available information and databases is correct at the time of publication;
- The demolition and construction programme and proposed design layout associated with the Proposed Development is indicative at this stage;
- Baseline conditions are accurate at the time of the physical surveys but, and due to the dynamic nature of the environment, conditions may change during the demolition and construction phase and on completion and operation of the Proposed Development.
- Further intrusive on site work may be required in respect of ground conditions, geotechnics and sub-surface archaeological remains following receipt of planning permission so as to fully evaluate and assess archaeological potential and to finalise substructure construction methods; and
- The assessment of cumulative effects has been reliant on the availability of information relating to all of the identified cumulative schemes (whether submitted for planning, consented or under construction).

2.10. References

Ref. 2-1 Department for Communities and Local Government (DCLG) (2011) Town and Country Planning (Environmental Impact Assessment) Regulations.

Ref. 2-2 Department for Communities and Local Government (DCLG) 2006. Environmental Impact Assessment: A guide to good practice and procedures.

Ref. 2-3 IEMA (2006) Guidelines for Environmental Impact Assessment.

Ref. 2-4 DCLG (2014) Planning Practice Guidance

Ref. 2-5 URS Infrastructure & Environment UK Limited on behalf of SSE Generation Ltd (2012); 'Slough Heat and Power: Proposed Multifuel CHP Facility EIA Scoping Report'.

Ref. 2-6 Slough Borough Council (2013); 'Formal Scoping Opinion regarding the Proposed Multifuel Power Station, Edinburgh Avenue, Slough'.

Ref. 2-7 URS Infrastructure & Environment UK Limited on behalf of SSE Generation Ltd (2013); 'Slough Heat and Power: Changes to EIA scoping requirements for Proposed Multifuel CHP Facility'

Ref. 2-8 Slough Borough Council (2014); 'Revised Scoping Opinion regarding the Proposed Multifuel Power Station, Edinburgh Avenue, Slough'.

3. PLANNING POLICY

3.1. Introduction

3.1.1. This chapter of the Environmental Statement (ES) refers briefly to the Site's planning history, the Simplified Planning Zone (SPZ) for the Slough Trading Estate, the legislative background to the Application, the development plan and other material policy considerations. The various ES technical chapters also comment on aspects of policy from this section which contribute to informing the Environmental Impact Assessment (EIA) process.

3.1.2. The Application is accompanied by a Planning Statement which assesses the Proposed Development against overall policy in the development plan as well as national planning, energy and waste policy.

3.1.3. This chapter has been written by Dalton Warner Davis LLP (DWD) planning consultants.

3.2. Planning History

3.2.1. The Slough Trading Estate was established in April 1920 when land was purchased from the War Office, which had been using the area for the repair and recycling of surplus army vehicles.

3.2.2. In 1925 the Slough Trading Company Act received Royal Assent, enabling development of the Estate's own power station, internal rail system and infrastructure necessary for the production of gas and electricity. During this time the Slough Heat and Power (SHP) Company was created to provide energy to tenants throughout the Estate. A legacy of the Estate's development over the years is the existence of utility service routes; these include a steam network from the SHP site and a high voltage electrical connection (Ref. 3-1) linked to the National Grid. Slough Estates Ltd (SEGRO) became the owner of the Slough Trading Estate in 1925.

3.2.3. As the Estate grew to meet the demands of its industrial customers, SHP expanded its operations by installing further infrastructure (electricity, steam, potable water, distribution of heat). Subsequently as the market for these products has changed, some infrastructure has been removed, with direct rail deliveries of coal and oil to the Site ceasing in 1969 and 1973 respectively and in 2007, the former railway siding (formerly used for oil deliveries) was surrendered to SEGRO. Correspondingly, the mix of tenants has evolved from its mainly industrial base to include knowledge based industries, warehousing, offices, business space and some retail, as well as energy production within the SHP site. In 2008 SHP was sold to SSE plc, which continues to provide power generation services to tenants on the Slough Trading Estate just as its predecessor did.

3.2.4. Over the years, power generation at the SHP site has evolved as markets have changed. New plant has generally been installed about every decade, with fuels varying between coal, oil and gas, while during the last twenty years fossil fuels have been gradually replaced with various low carbon products. By 2003 this had resulted in three main power generation boilers, being fired on waste wood, biomass and waste derived fuels (WDF). A gas fired package boiler is the latest plant to be installed (commissioned in 2011) to ensure a secure heat supply to the Trading Estate. The Proposed Development continues this process, by seeking planning permission to provide secure low carbon heat.

3.2.5. The Illustrative Masterplan Document commissioned by SEGRO, in Figure 5, illustrates the strategy for delivery of the vision. It shows the structure of existing elements within the Estate "*as well as newer elements forming part of the regeneration strategy, such as* *the external road network, the power station and the railway line and how the new elements are distributed around the Estate",* including gateways, boulevards and amenity cores. When describing the scale, massing and architecture of the Estate, it is noted that the "*existing power station currently presents the single largest building complex on the site and is a local landmark*". It suggests that in the long term, with developing technologies, the cooling towers will be replaced with smaller scale advanced energy production facilities, however that is not proposed in this Application.

3.2.6. Details of the overall SHP site, the present buildings and plant and the Proposed Development are described in *ES Chapter 4: Site Description, Project Alternatives and Evolution* and in *Chapter 5: The Proposed Development* of this ES.

3.2.7. The planning history of the SHP site is recorded on the Council's website www.sbcplanning.co.uk/search.php.

3.2.8. The SHP site has contained a number of separate generating plants, designed to operate independently, with access to ancillary services such as cooling water, potable water, firewater, gas and steam networks, foul and surface water drainage. Following a review of its thermal generation operations, SSE decided in March 2013 to decommission two ageing fluidised bed generating units and associated infrastructure, resulting in the cessation of those commercial operations by March 2014. The remaining steam turbines and boiler (installed in 2002 and 1998 respectively) are expected to continue operating normally; at the same time the Applicant is investing in increased output and efficiency of these units and broadening the fuel base. This leaves approximately half the SHP site available for construction of the Proposed Development, subject to the grant of planning permission by the Council.

3.2.9. As a continuation of the site history and from a planning perspective:

- The Proposed Development will provide a new stand alone power station within the SHP site;
- The main generation components of the Proposed Development will be contained within a separate new building;
- The Proposed Development will have dedicated fuel supplies and delivery point;
- The Proposed Development will have independent generating plant, not supporting or reliant on other generators on the SHP site and a dedicated metered electrical export connection;
- The generating station for the Proposed Development will not be defined by ancillary services; and
- Ancillary services will be metered and paid under separate commercial agreements.

3.2.10. The Proposed Development with a gross generating capacity of up to but not more than 50MW will operate independently; it will not be an extension of any other generating asset. It is agreed with the Council that the Proposed Development is to be the subject of an application for planning permission to the Council as the LPA.

3.3. SPZ Slough Trading Estate

3.3.1. There has been a simplified planning zone (SPZ) covering the majority of the Slough Trading Estate since adoption of the first scheme in January 1995. The current SPZ which was adopted in 2004 helps to facilitate the continued regeneration and development of the Estate. The Council and SEGRO have worked together to renew the

SPZ ahead of the present arrangements expiring in November 2014. The Council undertook public consultation on its Draft SPZ between 10 January and 21 February 2014, which was reported to Committee on 19 June, when it was resolved that Cabinet be recommended to adopt a new SPZ scheme with effect from 12 November 2014, for 10 years subject to conditions. On 14 July 2014 the Cabinet delegated adoption of the SPZ scheme to the planning policy lead officer, subject to the signing of a Section 106 legal agreement.

3.3.2. The 2004 SPZ (http://static.slough.gov.uk/downloads/planning-spz-Slough-Trading-Estate.pdf) describes the Trading Estate as comprising an area of approximately 197 hectares (ha), containing a wide variety of business, industrial and warehouse uses together with a growing number of service activities. The SPZ boundaries are designated on SPZ Plan 2. It should be noted that the 2004 SPZ pre-dates the sale of part of the Trading Estate, which now covers an area of approximately 156ha.

3.3.3. The SPZ grants planning permission for certain uses defined in the 1987 Use Classes Order (as amended) subject to the relevant conditions and provisions of the various sub-zones (Ref. 3-2). In the case of the Power Station Sub-Zone in Edinburgh Avenue, the SPZ states that this is a special type of use which requires careful consideration; planning control is therefore retained over all development within the sub-zone. Part 2 describes the legal basis for Slough's SPZ. It confirms that the SPZ provisions do not include the grant of planning permission for EIA development, to which The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (EIA Regulations) now apply (Ref. 3-3).

3.3.4. Within the SPZ, there are potential cumulative effects arising from other major development within the area, which are described in *Chapter 2: Assessment Methodology* and *Chapter 18: Cumulative Effects* of this ES.

3.4. Legislative Background

Introduction

3.4.1. This section refers to aspects of the legislative background relevant to the Proposed Development, namely the Planning and Compulsory Purchase Act 2004 (PCPA) (Ref. 3-4); the Town and Country Planning Act 1990 (TCPA) (Ref. 3-5); the Planning Act 2008 (PA) (Ref. 3-6); the Localism Act 2011 (Ref. 3-7); The Regional Strategy for the South East (Partial Revocation) Order 2013 (Ref. 3-8); the Revised Waste Framework Directive 2008/98/EC (Ref. 3-9); The Waste (England and Wales) Regulations 2011 (Ref. 3-10); The Waste (England and Wales) (Amendment) Regulations 2012 (Ref. 3-11).

Planning and Compulsory Purchase Act 2004

3.4.2. The PCPA 2004 (Ref. 3-4) introduced powers for there to be a regional strategy (RS) for each region in England and for the preparation of local development documents (LDD's) to replace local and unitary plans, for which the Secretary of State directed that specified policies in extant plans could be saved.

3.4.3. In deciding applications, the planning authority must have regard to section 38(6) of the PCPA 2004 which requires that proposals must be determined in accordance with the development plan unless material considerations indicate otherwise.

3.4.4. Section 38 (6) of the PCPA states: *"If regard is to be had to the development plan for the purpose of any determination to be made under the planning Acts, the determination must be made in accordance with the plan unless material considerations indicate otherwise".*

3.4.5. It will also be noted later in this section that current Government policy reaffirms that planning law requires applications for planning permission must be determined in accordance with the development plan unless material indications indicate otherwise.

Town and Country Planning Act 1990

3.4.6. Section 70 (2) of the TCPA 1990 (as amended by the Localism Act 2011) (Ref. 3-5) states*:*

(2) "In dealing with such an application the authority should have regard to -

(a) the provisions of the development plan, so far as material to the application,

(b) any local finance considerations, so far as material to the application, and

(c) any other material consideration."

3.4.7. The Courts are the arbiters of what constitutes a material consideration; among examples are Government statements of planning policy.

Planning Act 2008

3.4.8. The Planning Act 2008 (Ref. 3-6) lists among nationally significant infrastructure projects (NSIPs) "*the construction or extension of a generating station*" (section 14(1) (a)). The construction or extension of a generating station is within section 14(1)(a) if the generating station is (a) in England or Wales, (b) not offshore and (c) more than 50 MW (section, 15(2)). As the Proposed Development will have a generating capacity of not more than 50 MW, the application for the Proposed Development must be submitted to the Council under the TCPA accompanied by an ES prepared under the EIA Regulations 2011.

3.4.9. The Planning Act, Section 5, enables the Secretary of State to designate a statement as a national policy statement (NPS) if it is issued by the Secretary of State and sets out national policy in relation to one or more specified descriptions of development (see also section 3.6).

3.4.10. Although this application is not to be determined under the Planning Act 2008, NPS's may also be a material consideration to LPA's in making decisions on applications for energy infrastructure under the TCPA.

3.4.11. Section 3.6 below discusses national policy as a material consideration, both in respect of planning and energy.

Localism Act 2011

3.4.12. The Localism Act 2011 (Ref. 3-7) section 109 includes provision for the Secretary of State to revoke the whole or any part of a regional strategy under Part 5 of the Local Democracy, Economic Development and Construction Act 2009.

South East (Partial Revocation) Order 2013

3.4.13. The Regional Strategy (RS) for the South East (Partial Revocation) Order 2013 (Ref. 3-8) came into force on 25 March 2013 which means that the RS is not relevant to the determination of this Application.

EU Waste Framework Directive

3.4.14. The Directive 2008/98/EC (Ref. 3-9) on waste and repealing certain Directives states at (6): "*The first objective of any waste policy should be to minimise the negative effects of the generation and management of waste on human health and the environment. Waste policy should also aim at reducing the use of resources, and favour the practical application of the waste hierarchy".*

3.4.15. Article 3 (Definition) defines "recovery" as meaning "*any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery options*".

3.4.16. Article 4 (Waste hierarchy) states:

1. *"The following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:*

    (a) prevention;

    (b) preparing for re-use;

    (c) recycling;

    (d) other recovery e.g. energy recovery; and

    (e) disposal

2. *When applying the waste hierarchy Member states shall take measures to encourage options that deliver the best overall environmental outcome."*

3.4.17. Article 10 (Recovery) requires that:

"Member states shall take the necessary measures to ensure that waste undergoes recovery options in accordance with Articles 4 and 13..."

3.4.18. Article 13 (Protection of human health and the environment) requires that:

"Member states shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:

(a) without risk to water, air, soil, plant or animals;

(b) without causing a nuisance through noise or odours; and

(c) without adversely affecting the countryside or places of special interest.

3.4.19. *Annex* II (Recovery Operations) refers at item RI to:

"Use principally as a fuel or other means to generate energy" (*). The relevant footnote (*) explains:

"This includes incineration facilities dedicated to the processing of municipal solid waste only when their energy efficiency is equal to or above:

- *0.60 for installations in operation and permitted in accordance with applicable Community legislation before 1 January 2009,*
- *0.65 for installations permitted after 31 December 2008"*

The latter provision will be applicable to the Proposed Development based on the energy efficiency formula (also set out in the footnote) and thereby will contribute to delivery of the waste hierarchy by utilising waste as a resource (which will otherwise be destined for landfill).

The Waste (England and Wales) Regulations 2011

3.4.20. The Waste (England and Wales Regulations 2011 (Ref. 3-10) which came into force on 29 March 2011 implement the revised EU Waste Framework Directive 2008/98/EC. Part 5 (Duties in relation to waste management and improved use of waste as a resource) at Regulation 12 applies the following waste hierarchy as a priority order, namely:

(a) prevention;

(b) preparing for re-use;

(c) recycling;

(d) other recovery (for example energy recovery); and

(e) disposal.

3.4.21. Schedule 1 (Waste prevention programmes and waste management plans) defines the overall objective as being "*To protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use*".

The Waste (England and Wales) (Amendment) Regulations 2012

3.4.22. The Waste (England and Wales) (Amendment) Regulations 2012 (Ref. 3-11) came into force on 1 October 2012 and amends the 2011 Regulations. From 1 January 2015, waste collection authorities must separately collect waste paper, metal, plastics and glass. The duties apply where separate collection is "necessary" to ensure that waste undergoes recovery operations in accordance with the Directive and to facilitate or improve recovery; and where it is "technically, environmentally and economically practicable". The duties apply to waste from households and commercial and industrial waste (Explanatory, Memorandum to The Waste (England and Wales) (Amendment) Regulations 2012 No. 1889).

3.5. Development Plan

3.5.1. The development plan documents relevant to the Proposed Development are:

- Slough Local Development Framework Core Strategy 2006-26 Development Plan Document (December 2008) (Slough Core Strategy 2008) (Ref. 3-12);
- Slough Local Development Framework Site Allocations Development Plan Document (November 2010) (Slough Site Allocations DPD 2010) (Ref. 3-13);
- Slough Local Plan (March 2004) Saved Policies (September 2007) (Ref. 3-14); and
- Waste Local Plan for Berkshire (December 1998) Saved Policies (September 2007) (Ref. 3-15).

3.5.2. The Planning Committee on 25 July 2013 received a report from the Head of Planning Policy and Projects "Results of the National Planning Policy Framework Self Assessment and Approval of the 'Composite' Local Plan for Slough". The report refers to the provision of a Composite Plan, bringing together all of Slough's current planning policies namely, the Slough Core Strategy 2008, the Slough Site Allocations DPD 2010, the Slough Local

Plan 2004 saved policies, the Replacement Minerals Plan for Berkshire 2001 (which is of no particular relevance to this Application) and the Waste Local Plan for Berkshire 1998 saved policies. The report recommended and the Committee resolved that (a) the comments received on conformity of Slough's planning policies with the NPPF be noted; (b) publication of the Composite Local Plan for Slough be agreed; (c) policy 10 (Outside Preferred Areas of the Replacement Minerals Plan for Berkshire will no longer be used for development control policies; (d) the existing Local Development Scheme be withdrawn and (e) the need to review the local plan for Slough in the future be monitored through the Annual Monitoring Report. The extant policies that form the Slough Local Development Plan are to be applied in conjunction with a statement of intent by the Council on the presumption in favour of sustainable development.

Slough Core Strategy 2008

3.5.3. The Slough Core Strategy (Ref. 3-12) was adopted by the Council on 16 December 2008 and forms part of the development plan for Slough. The Council's website (http://www.slough.gov.uk/council/strategies-plans-and-policies/core-strategy-dpd.aspx) states that along with other adopted documents (including saved Local Plan policies) it provides the framework for assessing planning applications.

3.5.4. Chapter 2 (Context) describes the location of Slough as being "*densely built up*" and surrounded by Green Belt to the west and north (in South Bucks), the south (Windsor and Maidenhead) and the east (Hillingdon). Green Belt within Slough is located south of the M4 and east of Langley in the Colnbrook and Poyle area (paragraph 2.2). Although physically constrained, Slough is a major provider of jobs (around 82,000); one of its strengths is the range of employment areas and that "*it is not over dependent upon individual firms or particular sectors*" (paragraph 2.10). The Core Strategy states that average household income is below both the national and South East average and significantly lower than the average pay for jobs in Slough; a factor which contributes to lower than average household income is the low skills level of Slough residents, indicating an urgent need to improve skills, to ensure a diverse range of employment opportunities and to ensure employment retention (paragraphs 2.12-14). One of the results of the mismatch between job types in Slough and residents' skills is that approximately 40,000 people travel into Slough to work, while 23,000 residents travel out (paragraph 2.15).

3.5.5. Any assessment of the quality of the environment in Slough is considered subjective and distorted by the boundary being tightly drawn around the urban area, furthermore it suffers from congestion, noise and poor air quality, made worse by the proximity of Heathrow airport and motorways (paragraph 2.16). There is a shortage of open space in Slough which cannot be increased nevertheless there are 11 wildlife heritage sites of which two are local nature reserves (paragraph 2.17). In terms of the built environment, "*Slough is not a particularly historic town*", however there are five conservation areas, two properties on the Historic Parks and Gardens Register (Herschel Park, Ditton Park) and two scheduled ancient monuments (Cippenham Moat, Montem Mound) (paragraph 2.19).

3.5.6. Chapter 3 (Impact of other policies and strategies) refers to the requirement to comply with national planning policies contained in planning policy statements (PPSs), planning policy guidance (PPGs) and draft regional policy in the South East Plan (the RS) (paragraphs 3.2-7). However, most of these policy documents are no longer applicable, having been replaced mainly by the NPPF 2012 including Annex 3 and the RS (Partial Revocation) Order 2013. Accordingly the NPPF (discussed in section 3.6 below) must be taken into account and is a material consideration in planning decisions. The main thrust of Slough's economic strategy is to promote business and entrepreneurship and to develop the skills of local people (paragraphs 3.19/20).

3.5.7. Chapter 5 (Key issues for Slough) refers to key issues that are distinctive to Slough; among which the following may be considered to be of particular relevance to major investment such as the Proposed Development, namely a shortage of land, skills mismatch, viability and vitality and the need to improve Slough's image and environment (paragraph 5.1).

3.5.8. Chapter 6 (Spatial Vision and Strategic Objectives for Slough) suggests that consolidating efforts by the Council and its partners can improve the town's environment, namely by encouraging redevelopment to fulfil the town's role and by selective regeneration of key areas. Existing business areas in Slough are considered to have an important role in "*maintaining a thriving local economy and providing a range of jobs for an increasingly skilled local workforce*" (paragraph 6.1 – Spatial Vision).

3.5.9. Building on the key issues identified in the Core Strategy and taking account of requirements in national and regional policies identified at the time of the plan's production, regard should be had to the strategic objectives which form a checklist to ensure environmental, social and economic impacts have been considered. The following are considered as being most relevant to the Proposed Development (paragraph 6.3 – Strategic Objectives):

- *"To focus development in the most accessible locations such as the town centre, district and neighbourhood centres and public transport hubs and make the best use of existing buildings, previously developed land and existing and proposed infrastructure (A)*
- *To ensure that the existing business areas continue to provide sufficient employment generating uses in order to maintain a sustainable, buoyant and diverse economy and ensure that Slough residents continue to have access to a wide range of job opportunities (D)*
- *To encourage investment and regeneration of employment areas….(E)*
- *To reduce the need to travel and create a transport system that encourages sustainable modes of travel such as walking, cycling and public transport" (I)* (paragraph 6.3 – Strategic Objectives)

The Slough Site Allocations DPD refers to the same relevant strategic objectives A, D, E, I in respect of the Slough Trading Estate discussed at paragraphs 3.5.34.

Spatial Strategy

3.5.10. Chapter 7 (Spatial Strategy and core strategic spatial policies) sets out a series of key "place shaping" policies, which provide the framework to guide future development in Slough. The overall Spatial Strategy is contained in Core Policy (CP) 1 which encourages development at an appropriate scale within selected key locations. The following Core Policies are also considered relevant to this Application, namely CP5 (Employment); CP7 (Transport); CP8 (Sustainability and the Environment); CP9 (Natural and Built Environment); CP10 (Infrastructure); and CP12 (Community Safety).

3.5.11. The preferred spatial strategy is introduced as one of "*concentrating development but spreading the benefits to help build local communities*" to which the Proposed Development contributes in the provision of a new multifuel CHP facility within the Slough Trading Estate (paragraph 7.6). The plan strategy of co-locating employment, shopping, leisure, transport and other facilities in one place where people can carry out more than one activity in a single journey is seen as contributing to cutting carbon emissions, not just by focussing development in accessible locations but also "*the potential for getting decentralised energy systems within major comprehensive mixed use developments*" (paragraph 7.7). Likewise an important part of the strategy of "*spreading the benefits*" is to achieve regeneration of selected areas outside of the town centre, for example parts of Britwell and the Slough Trading Estate, which would benefit from redevelopment in a properly planned and co-ordinated manner, subject to the accessibility of sites and the extent of environmental constraints (paragraph 7.12).

3.5.12. Core Policy 1 (Spatial Strategy) includes the following:

"All development will have to comply with the Spatial Strategy set out in this document.

All development will take place within the built up area, predominantly on previously developed land…

Proposals for the comprehensive regeneration of selected key locations within the Borough will also be encouraged at an appropriate scale. Some relaxation of the policies or standards in the Local Development Frameworks may be allowed where this can be justified by the overall environment, social and economic benefits that will be provided to the wider community.

Elsewhere the scale and density of development will be related to the site's current or proposed accessibility, character and surroundings. Significant intensification of use will not be allowed in locations that lack the necessary supporting infrastructure, facilities or services or where access by sustainable means of travel by public transport, cycling and walking are limited."

3.5.13. Core Policy 1 is to be implemented in conjunction with other policies in the plan, through the development control process, a combination of public and private initiatives, and the Council preparing a Site Allocations DPD, while developers are to be encouraged to prepare masterplans for areas such as the Slough Trading Estate, which has been undertaken by SEGRO (paragraph 7.18).

Employment

3.5.14. One of the main aims of the Core Strategy is to ensure that Slough continues to provide a competitive, sustainable and buoyant economy, while providing a diverse range of jobs for local people (paragraph 7.76). It is not considered that new land is required for employment but rather that employment growth can be accommodated by the redevelopment and intensification of use of existing sites (paragraph 7.78). The loss of traditional manufacturing alongside the emergence of knowledge-based industries has highlighted a skills gap among some of the resident workforce, necessitating better education and training (paragraph 7.80). It is recognised therefore that there will be a continuing need for a range of employment opportunities to meet local needs and to retain Existing Business Areas (includes Slough Trading Estate) to maintain a diverse economic base (paragraph 7.81, Appendix 4).

3.5.15. To ensure that the retention of the Existing Business Areas does not produce unacceptable levels of car commuting, a parking cap requires that there will be no increase in the numbers of car parking spaces as a result of redevelopment; , also initiatives will encourage a modal shift away from the use of the private car but not at the expense of regeneration of existing Business Areas, (paragraph 7.82). The Core Strategy emphasises that the Trading Estate is the largest Existing Business Area, providing around a quarter of all jobs in the Borough; it is of great importance to the local economy and the prosperity of the town as a whole and continues to attract inward investment and as a result, the Estate should be treated as a "special case" within the Core Strategy (paragraphs 7.85/86).

3.5.16. Core Policy 5 (Employment) includes the following:

"The location, scale and intensity of new employment development must reinforce the Spatial Strategy and transport strategy. This includes the application of a parking cap upon new developments unless additional parking is required for local road safety or operational reasons, and….

There will be no loss of the defined Existing Business Areas to non-employment generating uses, especially where this would reduce the range of jobs available…"

Note that Slough Trading Estate is defined as an Existing Business Area.

3.5.17. Implementation of Core Policy 5 will be through the determination of applications for commercial development (includes the site of the Proposed Development), the Site Allocations DPD, masterplans prepared by developers (such as that produced for the Trading Estate by SEGRO) and the replacement of the SPZ (paragraph 7.90). The main effects of the policy are to encourage major employment development to take place in the town centre, facilitate the regeneration of Slough Trading Estate and the gradual renewal of other Existing Business Areas, while delivering a significant improvement to overall environmental quality and image to comply with best practice in the design of sustainable buildings (paragraph 7.92).

Transport

3.5.18. Transport in Slough is an important consideration. The town is a compact area, which experiences significant in and out commuting, leading to congestion, particularly in peak hours (paragraph 7.121). The main objectives of the Council's transport policy are to reduce the need to travel and encourage more sustainable modes of transport through the application of the Spatial Strategy, whereby the scale of development is related to the site's accessibility and through the implementation of the Local Transport Plan, which overall seeks to "*reduce congestion, improve accessibility, create safer roads, improve air quality and mitigate the impact of the transport system on the environment and ensure that it contributes towards broader social and economic objectives*" (paragraphs 7.123/124). Such measures include making public transport, cycling and walking more attractive than the private car and with new development contributing where appropriate towards improvements in transport infrastructure. The Transport Plan recognises an increasing level of pollution in the town centre associated with traffic on Slough's roads and as indicated in Policy CP5, a parking cap will be applied to all new commercial development outside the town centre, with no increase in car spaces allowed, except for industrial or warehousing development, if a lack of parking would cause operational or road safety problems (paragraph 7.130/131).

3.5.19. The above measures are reflected in Core Policy 7 (Transport) which requires all new development to reinforce the principles of the transport strategy, ensuring new development is located in its most accessible locations and individually or collectively make appropriate provision for reducing the need to travel, widening travel choices by sustainable means, improving road safety, improving air quality, reducing the impact of travel on the environment, particularly climate change and contributing to improvements to named transport infrastructure.

3.5.20. Implementation of the policy will be in conjunction with other policies in the plan, through the determination of applications, the Site Allocations DPD, masterplans and supplementary planning documents and a requirement for all major trip generating developments to submit a Transport Assessment. Through various strategies in the Local Transport Plan development will be expected to contribute towards improvements in transportation; implementation will be through strategies for traffic management, buses, rail, cycling, walking, parking, travel plans, freight, road safety and air quality action plans (paragraphs 7.133/134).

Sustainability and the Environment

3.5.21. Improvement of the environment and Slough's image to make it a place that people will want to live, work and visit is integral to the Spatial Vision (paragraph 7.142). The plan refers to principles of sustainability, set out in PPS1 (paragraph 7.142) and although PPS1 has been withdrawn, the advice in the Core Strategy is compatible with the NPPF.

3.5.22. It is noted that climate change is a fundamental issue for Slough's future planning and that "*Development undertaken at a local level should not make worse the wider impacts of climate change resulting from carbon emissions";* accordingly new development should be constructed in such a way as to minimise its impact on the environment, involving sustainable design/construction techniques, minimising consumption and waste and incorporating renewable energy technology within development (paragraph 7.144). The need for sustainable development and to address climate change are identified as cross cutting issues addressed in various policies including accessibility and good design (paragraphs 7.145/6).

3.5.23. It is expected that in a densely populated area like Slough, the impact of development should be minimised and appropriate mitigation provided, taking into account cumulative impacts of development on the environment (paragraphs 7.150-151). The Spatial Strategy encourages the re-use of previously developed land after any residual contamination from previous activities has been treated (paragraph 7.152). Other pollution considerations include two Air Quality Management Areas, noise, dust and chemicals, measures to manage surface water and the role of sustainable drainage systems (SuDS) to attenuate surface water run off and where practical, to minimise the risk of future sewer flooding (paragraphs 7.153-155).

3.5.24. Core Policy 8 (Sustainability and the Environment) is broad ranging in its requirement that:

"All development in the Borough shall be sustainable, of a high quality design, improve the quality of the environment and address the impact of climate change.

1. Sustainable Design and Construction Principles

a) Minimise the consumption and unnecessary use of energy, particularly from non renewable sources;

b) Recycle waste;

c) Generate energy from renewable resources;

d) Reduce water consumption; and

e) Incorporate sustainable design and construction techniques, including the use of recycled and energy efficient building materials.

2. High Quality Design

All development will:

- *Be of a high quality design that is practical, attractive, safe, accessible and adaptable;*

- *Respect its location and surroundings;*
- *Provide appropriate public space, amenity space and landscaping as an integral part of the design; and*
- *Be in accordance with the Spatial Strategy in terms of its height, scale, massing and architectural style.*

The design of all development within the existing residential areas should respect the amenities of adjoining occupiers and reflect the street scene and the local distinctiveness of the area.

3. *Pollution*

Development shall not:

- *Give rise to unacceptable levels of pollution including air pollution, dust, odour, artificial lighting or noise;*
- *Cause contamination or a deterioration in land, soil or water quality; and*
- *Be located on polluted land, areas affected by air pollution or in noisy environments unless the development incorporates appropriate mitigation measures to limit the adverse effects on occupiers and other appropriate receptors.*

4. *Flooding*

- *Development will only be permitted where it is safe and it can be demonstrated that there is minimal risk of flooding to the property and it will not impede the flow of floodwaters, increase the risk of flooding elsewhere or reduce the capacity of a floodplain; and*
- *Development must manage surface water arising from the site in a sustainable manner which will also reduce the risk of flooding and improve water quality.*

3.5.25. Implementation of Core Policy 8 will be in conjunction with other policies in the plan, through the determination of applications, the Site Allocations DPD, supplementary planning documents, and the Council's High Level Environmental Strategy, which would expand on the advice in PPS10, also in PPS22 and PPS23 (which were repealed when issuing the NPPF). The plan expects that the provision of new waste recycling/disposal facilities would be addressed through the future Minerals and Waste Core Strategy, however the Joint Strategic Planning Unit previously working on behalf of the six Berkshire unitary authorities closed in September 2011 and therefore will be reliant on policies in the Waste Local Plan and national policy. All major developments will be expected to demonstrate that they have explored the feasibility of utilising renewable energy and low carbon technologies including CHP and shared renewable energy plant, either within the site or adjacent to it (paragraph 7.157).

3.5.26. Relevant planning applications must be accompanied by a Design and Access Statement, demonstrating how of the necessary design requirements have been met and taking into account the need to maximise energy efficiency; where appropriate, applications may require energy assessments (paragraph 7.158). Relevant applications should also be accompanied by noise, light pollution, odour studies etc demonstrating no unacceptable impacts on adjoining uses and carrying out air quality modelling to show that the activities will not worsen the position; details of land contamination and mitigation may be required (paragraphs 7.160/161). Detailed flood risk assessments will be required in areas defined as liable to flooding (paragraph 7.164).

Natural, Built and Historic Environment

3.5.27. The Spatial Strategy has concentrated development in the town centre and other selected key areas (including the Slough Trading Estate), which do not have much historical or environmental interest and so can accommodate the scale of redevelopment proposed without causing any significant harm to the natural built and historic environment (paragraph 7.168). The Appropriate Assessment to the Core Strategy concludes that policies/proposals will not have a significant impact on any designated Special Protection Areas (SPAs) or Special Areas of Conservation (SACs), however any major development with potential to impact on any site of European importance for nature conservation will be required to carry out an appropriate assessment in accordance with the Habitat Regulations (paragraph 7.169) Although there are no European sites within the Borough, others in the vicinity are the South West London Waterbodies SPA and Ramsar Site, Burnham Beeches SAC and Windsor Forest and Great Park SAC (paragraph 8.2). As noted earlier Slough is not a particularly historic town and there are no buildings of national significance but reference is made to listed/locally listed buildings and Residential Areas of Exceptional Character such as the Old Town Area (paragraph 7.170).

3.5.28. Core Policy 9 (Natural and Built Environment) notes that development will not be permitted unless it:

- *Enhances and protects the historic environment;*
- *Respects the character and distinctiveness of existing buildings, townscapes and landscapes and their local designations;*
- *Protects and enhances the water environment and its margins; and*
- *Enhances and preserves natural habitats and the biodiversity of the Borough, including corridors between biodiversity rich features.*

3.5.29. Implementation of the above policy will be in conjunction with other policies in the plan, the determination of applications, the Site Allocations DPD, supplementary planning documents and through measures such as the Berkshire Nature Conservation Strategy and the strategy for the Colne Valley Park in conjunction with adjoining Boroughs (paragraph 7.173).

Infrastructure

3.5.30. Infrastructure in the Spatial Strategy is largely associated with new development placing additional demands existing infrastructure, community and public services; for example where existing facilities are insufficient to accommodate development needs, which may be met by either contributing to cumulative funds or by conditions attached to a planning permission (paragraph 7.180/181). Core Policy 10 (Infrastructure) requires that *"Development will only be allowed where there is sufficient existing, planned or committed infrastructure. All new infrastructure must be sustainable…".*

3.5.31. The provision of 'essential' infrastructure will be secured through planning obligations or by conditions attached to a planning permission (paragraph 7.182).

Community Safety

3.5.32. Community safety is a consideration for all development (paragraph 7.204). Core Policy 12 (Community Safety) requires that: "*All new development should be laid out and designed to create safe and attractive environments in accordance with the recognised best practice for designing out crime*". The policy will be implemented in conjunction with other policies in the plan through the determination of applications, development control policies, the Site Allocations DPD and supplementary planning guidance and will be addressed through the submission of a Design and Access Statement demonstrating how the proposal has been designed to reduce the opportunity for crime (paragraph 7.207).

Slough Site Allocations DPD 2010

3.5.33. The main role of the Site Allocations DPD 2010 (Ref. 3-13) is to identify sites in Slough that can deliver the spatial vision, strategic objectives and policies of the Core Strategy; accordingly the inclusion of a site (a Site Specific Allocation) means that the Council will in principle support any development or use of land that is in accordance with the *"Site Planning Requirements"* (paragraph 1.5). Any application which conflicts with a Site Specific Allocation may be refused, although the omission of a site does not prevent it from coming forward via a planning application, which may be facilitated by the Site Allocations Companion document (paragraphs 1.5, 1.13). The Sites DPD was subject to a sustainability appraisal at each stage and the results have informed the plan preparation and decision making process (paragraph 1.16).

3.5.34. Chapter 2 (Development Plan Policy Context) lists the strategic objectives defined in the Core Strategy, among which four are relevant to the Proposed Development i.e. A, D, E, I (see paragraph 3.5.9 above). Paragraph 2.5 refers to Core Policy 1 (Spatial Strategy), summarised as one of "*concentrating development but spreading the benefits to help build local communities*"; encouraging development both in the town centre as well as the regeneration of other Selected Key Locations within the Borough, including the Slough Trading Estate (paragraphs 2.5-7).

3.5.35. Chapter 4 (Delivering the Spatial Strategy and Core Policies) refers to the sites identified as "*Selected Key Locations for Comprehensive Regeneration*" (paragraph 4.16), meaning that some relaxation of policy can be allowed in accordance with Core Policy 1 (Spatial Strategy). Outside of the town centre, the "*most significant regeneration proposal*" is for the Slough Trading Estate (SSA4), being promoted by SEGRO, where the intention is to "*accommodate modern business needs, continue to attract inward investment and provide a range of jobs available for local people*" (paragraph 4.20); these provisions are also applicable to the site of the Proposed Development. Nearby the Council is promoting comprehensive regeneration of the Britwell and Haymill regeneration area (SSA2) (paragraph 4.22).

3.5.36. Chapter 5 (Site Specific Allocations) sets out the Site Allocation Policy 1 which identifies those proposals the Council considers can bring most benefits to the Borough, helping implement the key aspects of the Core Strategy (paragraph 5.1). It states that proposals for development of the sites listed in Policy 1 "*which are in accordance with their Proposed Use and Site Planning Requirements will be considered acceptable in principle*". It is further stated that *"Site Specific proposals will need to be developed in accordance with policies in the development plan and national planning guidance unless material considerations determine otherwise".* Site Allocation Policy 1 includes Site SSA4 Slough Trading Estate (including Leigh Road Central Core Area) in which the proposed uses are defined as *"Mixed use: Offices, Research and Development, Light Industrial, General Industrial, Storage and Distribution, Residential, Retail, Food and Drink, Hotels, Conference Facilities, Educational Facilities, Recreation and Leisure Uses".*

3.5.37. Implementation of Policy 1 will be in conjunction with other policies in Slough's development plan, through the determination of applications, the Site Planning Requirements of the respective sites in the site schedules and where stated, masterplans will facilitate a comprehensive approach to development, bringing benefits to Slough's community (paragraph 5.3). Proposals will need to comply with policies in the development plan, including but not restricted to access, flood risk (including surface water and foul sewers) identified in the Council's current Strategic Flood Risk Assessment; sustainable design/construction, air pollution, land contamination, incorporation of energy from local zero or low carbon technology sources; preservation/enhancement of the historic environment and biodiversity across the Borough; provision of social/physical infrastructure; designing out crime (paragraphs 5.4/5).

3.5.38. The Site Allocations DPD contains a schedule for each site specific proposal, with supporting information, including the proposed use, relevant strategic objectives, zoning, current use/s, reason/s for the allocation, site planning requirements and background. Site SSA4 refers to the Slough Trading Estate. It contains the list of proposed uses (see paragraph 3.5.36 above) and whereas there is no express reference to the power station, reference is made to Flood Zone 1, Existing Business Area, Trading Estate Simplified Planning Zone (SPZ); the latter incorporates the Power Station Sub Zone, discussed earlier in section 3.3.

Slough Local Plan (2004) Saved Policies 2007

3.5.39. The Slough Local Plan (Ref. 3-14) was adopted in March 2004 from which a number of policies were confirmed as saved beyond September 2007; some policies were then superseded by policies in the Core Strategy (August 2009) and the Site Allocations DPD (September 2010). The resultant Slough Local Plan Saved Policies and Policies still in use at December 2010 are available on http://static.slough.gov.uk/downloads/Deleted-and-saved-LP-policies-list.pdf.

3.5.40. The following saved policies concerning business/employment, the environment and transport are considered relevant to this Application, namely EMP2 (Criteria for Business Developments); EMP7 (Slough Trading Estate); EN1 (Standard of Design); EN3 (Landscaping Requirements); EN5 (Design and Crime Prevention); EN6 (Interference with Telecommunications Systems); EN9 (Public Art); EN22 (Protection of Sites with Nature Conservation Interest); EN34 (Utility Infrastructure); T2 (Parking Restraint); T8 (Cycling Network and Facilities); T9 (Bus Network and Facilities).

Employment

3.5.41. The promotion of economic development within Slough is one of the key priorities of the Council.

3.5.42. Policy EMP2 (Criteria for Business Developments) is to be applied to all employment generating proposals to determine their suitability, with the proviso that existing firms are provided with the flexibility to meet their own changing space requirements in seeking to retain local jobs (paragraphs 3.34-35);. It is also important that the use of urban land is optimised, subject to this not being to the detriment of the environment or amenities of adjoining occupiers (paragraph 3.35). The policy requires compliance with various criteria including: high quality design, of a use and scale appropriate to the location; not significantly harming the physical/visual character of the surroundings, with no significant loss of amenity to neighbouring land uses from noise/activities/overlooking/ overbearing appearance; not causing additional highway congestion/road safety problems; providing appropriate servicing and lorry parking within the site; affording appropriate contributions to off-site highway works/transport improvements (pedestrian, cycle facilities) and incorporating an appropriate landscaping scheme.

3.5.43. The Slough Trading Estate's attractiveness to business is described partly as a function of its accessibility to the M4, M25, Heathrow, its critical mass in terms of business linkages and its employment base with many firms contributing to important economic clusters of similar industries (paragraph 3.60).

3.5.44. Policy EMP7 (Slough Trading Estate) confirms that within the Trading Estate, development for B1 business, B2 general industrial and B8 warehousing/distribution will be permitted with the proviso that major independent B1(a) office development is to be located on the Bath Road frontage and there being no overall increase in the number of car parking spaces within the Estate.

Environment

3.5.45. Policy EN1 (Standard of Design) requires a high standard of design, compatible with and/or to improve the surroundings in terms of scale; height; massing/bulk; layout; siting; building form/design; architectural style; materials; access/servicing; visual impact; relationship to nearby properties/ mature trees and water courses.

3.5.46. Policy EN3 (Landscaping Requirements) requires comprehensive landscaping schemes for all development proposals; in some cases off site provision may be required as part of a landscaping scheme, which may compensate for the loss of on site landscaping, or to enhance existing landscaping in the vicinity of the development. Landscaping should also have regard to impact on the street scene; the screening effect of the landscaping; the scope for hard/soft landscaping; varieties of appropriate species; landscaping as a means of enclosure; improvement of visual amenity; opportunities for new wildlife habitats.

3.5.47. Policy EN5 (Design and Crime Prevention) requires all schemes to reduce the potential for crime and anti-social behaviour, with the scheme, taking into account numbers of access points; provision for secure boundaries; lighting of external areas to facilitate natural surveillance, without potential hidden areas; use of suitably robust materials; defensive landscaping.

3.5.48. Policy EN6 (Interference with Telecommunications Signals) requires the design of large buildings/structures to reduce the potential for interference with television (TV) and telecommunications signals; where a problem is likely, a condition will be imposed requiring the developer to take appropriate measures to restore any loss of quality of reception. The potential for interference with TV signals is a material consideration which should be assessed and if there is a significant problem developers will be required to take remedial measures (paragraph 5.27/8).

3.5.49. Policy EN9 (Public Art) encourages public art either as part of a comprehensive development or "off-site", which may be in a temporary or permanent public art form upon the proposed development and/or surrounding area. Public art may contribute towards the enhancement of a town's image in a form that it may be enjoyed by the community (paragraph 5.32).

3.5.50. Policy EN22 (Protection of Sites with Nature Conservation Interests) requires ecological appraisals "*where proposed development is likely to threaten any nature conservation interest".* Nature conservation is an important element of the strategy for sustainable development, including the conservation and enhancement of a variety of species and habitats, while at the same time making provision for appropriate development and economic growth (paragraphs 5.73-5.75). It is recognised that Slough is a built up area with few places where a semi-natural habitat survives, so it is important to protect those areas where a significant presence of wildlife occurs in an urban context.

3.5.51. Policy EN34 (Utility Infrastructure) states that development which increases the demand for off-site service infrastructure such as water supply, surface water, foul water drainage or sewerage treatment will not be permitted unless capacity already exists or will be provided without harm to the environment.

Transport

3.5.52. Policy T2 (Parking Restraint) states that "*No increase in the total number of car parking spaces on-site will be permitted within commercial redevelopment schemes*". The plan's transport policy is to restrain the level of private non-residential parking at less than the demand, to reduce reliance on private car usage at peak times, particularly journeys to work. This will necessitate measures to encourage a greater number of journeys to be made on foot, by cycling and the use of bus or train services (paragraphs 8.46-49).

3.5.53. Policy T8 (Cycling Network and Facilities) states that development will not be permitted if it would prejudice the implementation of the proposed cycle network in Slough, or if proposals do not include suitable cycle access to and through the site; cycle racks and other facilities should be an integral part of the development. Where major development would result in increased demand for travel, the Council will seek a financial contribution toward improvements to the cycle network.

3.5.54. Policy T9 (Bus Network and Facilities) states that planning permission will not be granted for development which prejudices the free flow of buses along existing/proposed bus routes; development should be designed to provide improved access to and penetration through sites by buses; a financial contribution may be sought where major development, served by an existing/proposed bus route will experience increased travel demand.

Waste Local Plan for Berkshire 1998 Saved Policies 2007

3.5.55. The Waste Local Plan for Berkshire (Ref. 3-15) was adopted in 1998 from which a number of policies were saved beyond September 2007. A schedule of saved policies is available at:

http://static.slough.gov.uk/downloads/2007-direction-for-Saved-Waste-Policies-from-Secretary-of-State-for-CLG.pdf.

3.5.56. The Council acts as a minerals and waste authority for the Borough and is responsible for preparing and reviewing waste policies and associated development management and enforcement matters. This work was previously undertaken by the former Joint Strategic Planning Unit for Berkshire which closed in September 2011. The NPPF does not contain specific waste policies, but requires local authorities taking decisions on waste applications to have regard to policies in the NPPF, as far as relevant. The Council's view is that the Waste Local Plan will continue to be applied for development management, insofar as it is consistent with PPS10 Planning for Sustainable Waste Management (March 2011), or its successor, the NPPF and the presumption in favour of sustainable development.

3.5.57. The following saved policies concern guiding policy principles: facilities for managing waste and assessing planning applications for waste management development. The policies considered most relevant to the Proposed Development are WLP1 (Sustainable Development); WLP11 (Proposed preferred areas); WLP27 (Is development needed); WLP28 and WLP29 (Non identified sites for waste management); WLP30 (Assessing the impact of development proposals); WLP31 (Information to be provided with applications); WLP33 (Environmental improvements and wider benefits).

Guiding Policy Principles

3.5.58. Policy WLP1 (Sustainable Development) begins from the premise that in considering proposals for waste management development, LPAs will have regard to the extent to which the development is sustainable in form and location, while conserving natural resources, and the human/natural environment, minimising traffic congestion, travel distances, waste generation and pollution and adverse impacts on humans and the natural environment.

Facilities Required for Managing Waste

3.5.59. Policy WLP11 (Proposed Preferred Areas) refers to sites listed in the Table to the policy as "Preferred Areas and Preferred Areas of Search" for waste management uses. On sites identified as Preferred Areas, applications for waste management development of the types indicated in the policy will normally be permitted, provided that the requirements of specified policies WLP27, WLP29, WLP30, WLP31, WLP33 (note WLP32 is omitted as this is not a saved policy) and other relevant policies are satisfied; and that regard is had to the requirements, issues and constraints specified for each site in the Plan's Appendix 7 (Preferred Areas for Waste Management Uses). Appendix 7 Table 1 indicates potential waste management uses for Area 20 (Slough Trading Estate) as waste treatment plant (industrial reprocessing, composting, anaerobic digestion); waste derived fuel; major recycling – non inert waste; recycling of non inert waste; difficult and special waste; metal recovery. Appendix 7 also notes that waste management uses in Area 20 are outwith the scope of the SPZ and therefore subject to normal planning controls. It considers waste management uses could be accommodated on parts of the Area of Search within large vacant buildings and sites, or by the redevelopment of sites within the Trading Estate. It concludes that the whole area of the Estate has potential for waste management uses but sites adjacent to sensitive Estate boundaries and the service zone at the centre should be avoided.

Assessing Planning Applications for Waste Management Development

3.5.60. Policy WLP27 (Is development needed) states that planning applications for waste management development will only be permitted if the LPA is satisfied that there is a need for the development; that there are wider environmental benefits resulting from the development, that would outweigh advance effects; that the traffic associated within the development would not give rise to any unacceptable environmental impacts and that satisfactory arrangements are made to secure necessary infrastructure, services and amenities.

3.5.61. Policies WLP28 and WLP29 (Sites for waste management development) relate to sites which are not identified for waste management development and where need cannot be demonstrated and/or the proposal has adverse environmental impacts and/or conflicts with policies generally. Policy WLP28 states that development proposals which do not accord with the provisions of specified policies (including WLP11) will normally be refused. In considering whether to make an exception to this principle, LPAs are required to take account of the need to develop land outside the Preferred Areas or other areas defined in policies in order to meet the need for waste management facilities; whether the need could be more acceptably met elsewhere and whether the proposal could overcome all constraints specified in policies WLP27, WLP29, WLP30, WLP31 and WLP33 and all other relevant policies of the Plan.

3.5.62. Policy WLP29 states that in all cases outside the Preferred Areas (and notwithstanding the provisions of Policy WLP28), there will be a strong presumption against allowing waste management development, either within or adversely affecting land subject to certain statutory, planning and environmental designations.

3.5.63. Policy WLP30 (Assessing the impact of development proposals) states that within the framework provided by Policy WLP27, the merits of waste management development proposals are to be assessed having regard to all relevant considerations, and in particular the likely effects of the traffic-related impacts associated with the development; safeguarding of health and living conditions; likely effects on the surrounding population and the environment; landscape and visual impacts including effects on settlements; safeguarding of sites used for recreation and public rights of way; the natural and built environment; safeguarding of aviation interests, bird strike risks and safeguarding of public utilities; cumulative effects; disturbance from waste disposal operations and the need to ensure satisfactory restoration, after-care and management of sites for an acceptable after-use.

3.5.64. Policy WLP31 (Information to be provided with application) requires every application for waste management development to be accompanied by a written statement, drawings and plans describing existing conditions of the site and surroundings, details and reasoned justification for the proposals, analysis of implications and impact against relevant factors in Policies WLP27 to WLP30, mitigation of any adverse impacts and proposals for monitoring of impacts during construction and operation and following completion.

3.5.65. WLP33 (Environmental improvements and wider benefits) requires that when considering proposals for waste management development, the LPA should take the opportunity to seek environmental improvements and other public benefits both on the site and in the surrounding area where these are directly related to the proposed development and that suitable conditions will be imposed on all planning permissions.

3.6. Other Material Considerations

3.6.1. Material considerations referred to in this section relate to Government policy as represented in the National Planning Policy Framework (NPPF) and Planning Practice Guidance (NPPG); national policy statements (NPSs) for certain categories of energy infrastructure and national waste policy.

National Planning Policy Framework 2012

Introduction

3.6.2. The NPPF (Ref. 3-16) which came into effect on 27.3.12, sets out the Government's planning policies for England and how they are expected to be applied. The NPPF restates the legal position that planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise. The NPPF however must be taken into account in plan making and is a material consideration in planning decisions (paragraph 2). The NPPF does not contain specific policies for NSIPs: these are determined in accordance with the Planning Act 2008, and relevant NPSs for major infrastructure (as well as other matters considered both important and relevant). NPSs, which are referred to in the next section, form part of the overall framework of national planning policy and can be a material consideration in decisions on planning applications (paragraph 3). The NPPF does not contain specific waste policies; national waste planning policy will be published as part of the National Waste Management Plan for England, however the Council should have regard to policies in the NPPF so far as relevant (paragraph 5).

Achieving Sustainable Development

3.6.3. On the matter of achieving sustainable development, the NPPF states that "*policies in paragraphs 18 to 219, taken as a whole, constitute the Government's view of what sustainable development in England means in practice for the planning system*" (paragraph 6). The three dimensions to sustainable development are defined as *"economic, social and environmental".* The economic role refers to building a strong, responsive, competitive economy, including the provision of "infrastructure"; the social role includes the creation of a high quality built environment; the environmental role is about contributing to protecting/enhancing all natural/built/historic environments, improving biodiversity, using natural resources prudently, minimising waste/pollution and mitigating/adapting to climate change, including moving to a low carbon economy (paragraph 7). "*Renewable and low carbon energy: Includes energy for heating and cooling as well as generating electricity… Low carbon technologies are those that can help reduce emissions (compared to conventional use of fossil fuels)*" (Annex 2: Glossary). The respective roles above are mutually dependent and are to be sought jointly through the planning system, in guiding development to sustainable solutions and seeking positive improvements in the quality of the built, natural and historic environment and in peoples quality of life (paragraphs 8, 9).

Presumption in favour of Sustainable Development

3.6.4. The NPPF constitutes guidance for LPAs and decision takers both in respect of plan preparation and as a material consideration in determining applications; it draws attention to Section 19(2)(a) PCPA 2004 which requires policy makers to have regard to national policies and advice in guidance issued by the Secretary of State (paragraph 13 and footnote 8). There is a presumption in favour of sustainable development, which means LPA's approving development without delay where it accords with the development plan and in cases where the development plan is absent, silent or out of date, granting permission unless adverse impacts would significantly/demonstrably outweigh the benefits when assessed against NPPF policies taken as a whole, or if specific policies indicate development should be restricted, e.g. sites protected under the Habitats/Birds Directives, Sites of Special Scientific Interest (SSSI), Areas of Outstanding Natural Beauty etc (paragraph 14, footnote 9).

Core Planning Principles

3.6.5. Among twelve core planning principles, the following abridged comments (10 no.) are relevant to this Application (paragraph 17) namely:

- Development should be genuinely plan led, providing a practical framework/enabling decision making with predictability and efficiency;
- Not simply be about scrutiny; be creative in finding ways to enhance/improve places in which people live their lives;
- Proactively drive and support sustainable economic development to deliver, among others, "infrastructure" that the country needs;
- Always seek to secure high quality design and a good standard of amenity;
- Take account of the different roles and characters of different areas, while promoting vitality of the main urban areas;
- Support the transition to a low carbon future in a changing climate, encouraging the reuse of existing resources;
- Contribute to conserving and enhancing the natural environment and reducing pollution; allocations of land for development should prefer land of lesser environmental value;
- Encourage the effective use of land that has been previously developed;

- Conserve heritage assets appropriate to their significance; and
- Actively manage patterns of growth to make the fullest possible use of public transport/walking/cycling while focusing significant development in locations which are/can be made sustainable.

Building a Strong Competitive Economy

3.6.6. The Government is committed to building a strong competitive economy, to be achieved by the following including:

- Securing economic growth to create jobs/prosperity, building on inherent strengths and meeting the twin challenges of global competition and a low carbon future (paragraph 18);
- Ensuring the planning system does everything it can to support/encourage (not impede) sustainable economic growth, therefore significant weight should be placed on the need to support economic growth (paragraph 19);
- LPAs planning proactively to meet the development needs of business (paragraph 20); and
- Investment in business should not be overburdened by the combined requirements of planning policy expectations and policies should address barriers to investment, including any lack of infrastructure (paragraph 21).

Promoting Sustainable Transport

3.6.7. Among measures to promote sustainable transport, LPA's are directed to: support a pattern of development which, where reasonable, facilitates sustainable modes of transport (paragraph 30); work with neighbouring authorities and transport providers to develop strategies for the provision of viable infrastructure, necessary to support sustainable development (paragraph 31); ensure transport statements/assessments take account of sustainable transport modes, safe and sustainable access and undertaking of transport improvements that cost effectively limit significant impacts of the development; *"development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe"* (paragraph 32). Decisions should ensure that development generating significant movements is located where the need to travel will be minimised and the use of sustainable transport modes can be maximised (paragraph 34). Developments should be located and designed where practical to accommodate the efficient delivery of products, prioritise pedestrian/cycle movements and have access to high quality public transport facilities, consider disability requirements and provide a travel plan as a key tool to the above (paragraphs 35/36).

Telecommunications Infrastructure

3.6.8. On the matters of telecommunications development, as well as its effects on existing development, it is advised that LPAs should ensure that, among various considerations, they have considered the possibility of the construction of new buildings or other structures interfering with broadcast and telecommunication services (paragraph 44).

Requiring Good Design

3.6.9. Good design is a key aspect of sustainable development, indivisible from good planning and should contribute positively to making places better for people; also it is important to plan positively to achieve high quality and inclusive design (paragraphs 56, 57). Planning policies and decisions should not impose architectural styles through unsubstantiated requirements but should address connections between people and places and the integration of new development; LPA's should have local design review arrangements in place to provide assessment and support to ensure high standards of design and in assessing applications, have regard to recommendations from the design review panel (paragraphs 60 to 62).

3.6.10. LPAs *"should not refuse planning permission for buildings or infrastructure which promote high levels of sustainability because of concerns about incompatibility with an existing townscape, if those concerns have been mitigated by good design (unless the concern relates to a designated heritage asset and the impact would cause material harm to the asset or its setting which is not outweighed by the proposal's economic, social and environmental benefits)"* (paragraph 65). Applicants should work closely with those directly affected by their proposals to evolve designs (paragraph 66).

Protecting Green Belt

3.6.11. It is explained that the fundamental aim of Green Belt policy is to "*prevent urban sprawl by keeping land permanently open*; its essential characteristics being its "*openness and permanence* (paragraph 79)". Green belt has five purposes, namely:

- check the unrestricted sprawl of large built up areas;

- prevent neighbouring towns merging into one another;

- assist in safeguarding the countryside from encroachment;

- preserve the setting and special character of historic towns; and

- assist in urban regeneration by encouraging the recycling of derelict and other urban land (paragraph 80).

Meeting the Challenge of Climate Change

3.6.12. Among its many roles, planning is to support the delivery of *"renewable and low carbon energy and associated infrastructure",* which is *"central to the economic, social and environmental dimensions of sustainable development"* (paragraph 93). To help increase the use/supply of renewable and low carbon energy, LPA's should recognise responsibility on all communities to contribute to energy generation from renewable or low carbon sources, including identifying opportunities where development can draw energy from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers (paragraph 97). Furthermore, when determining applications, LPA's should *"<u>not</u> require applicants for energy development to demonstrate the overall need for renewable or low carbon energy…and approve the application if its impacts are (or can be made) acceptable unless material considerations indicate otherwise."* (paragraph 98, footnote 18).

3.6.13. New development should be planned to avoid increased vulnerability from climate change; in areas which are vulnerable, risks should be managed through suitable adaptation measures (paragraph 99). There is advice that *"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere"* (paragraph 100). It is explained that a Sequential Test should first be applied to steer new development to areas with the lowest probability of flooding (paragraph 101); If, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, to locate development in zones with a lower probability of flooding, the Exception Test can be applied if appropriate; for this to be passed, it must be demonstrated that the development will provide wider sustainability benefits to the community that outweigh flood risk, also a site specific flood risk assessment must demonstrate that the development will be safe for its lifetime (paragraph 102).

Conserving and Enhancing the Natural Environment

3.6.14. On the matter of preserving and enhancing the natural environment, the planning system is required to contribute to and enhance the natural and local environment. Correspondingly, in meeting development needs, the aim should be to, among others minimise pollution and other adverse effects on the local/natural environment, allocate land for development with the least environmental/amenity value, encourage the effective use of land by re-using that which has been previously developed and seek to protect wildlife and distinguish between the hierarchy of designated sites so that protection is commensurate with their status (paragraphs 109-113). When determining planning applications LPA should aim to conserve and enhance biodiversity (paragraph 118).

3.6.15. Planning policies and decisions should ensure that new development is appropriate for its location, including the effects of pollution on health, the natural environment or general amenity while planning authorities should focus on whether the development is itself an acceptable use of land assuming that the control of processes/emissions will be operated effectively (paragraphs 120-122). Decisions should avoid noise from giving rise to significant adverse impacts on health/quality of life, while recognising that development will often create some noise and that existing businesses wanting to develop should not have unreasonable restrictions put on them because of changes in nearby land uses, since the business use was established (paragraph 123). Policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of AQMAs and by encouraging good design, decisions should limit the impact of light pollution on local amenity, intrinsically dark landscapes and nature conservation (paragraphs 124/5).

Conserving and Enhancing the Historic Environment

3.6.16. Applicants should be required to describe *“the significance of any heritage assets affected, including any contribution made by their setting”* in which the level of detail should be proportionate to the asset’s importance, meaning that the more important an asset, the greater the weight should be, notably scheduled monuments, Grade I and II* listed buildings and registered parks/gardens etc; correspondingly, development producing less than substantial harm should be weighted against the public benefits of a proposal (paragraphs 128, 132, 134, footnote 29).

Planning Practice Guidance

3.6.17. On 6 March 2014 the Department for Communities and Local Government (DCLG) established its web based site http://planningguidance.planningportal.gov.uk which addresses a variety of topics by way of Planning Practice Guidance (PPGs). These documents include air quality; climate change; conserving and enhancing the historic environment; consultation and pre-decision matters; design; environmental impact assessment; flood risk and coastal change; health and wellbeing; land affected by contamination; land stability; light pollution; natural environment; noise; planning obligations; renewable and low carbon energy; travel plans, transport assessments and statements in decision making; use of planning conditions; water supply, wastewater and water quality. Some chapters of the ES refer to PPGs, where relevant but these are considered more fully in the Planning Statement.

Energy Policy - National Policy Statements

3.6.18. On 18 July 2011 Parliament approved six national policy statements (NPSs) for energy and on 19 July 2011 these were designated by the Secretary of State for Energy and Climate Change under the Planning Act 2008. There are two NPSs relevant to this Application:

- *Overarching National Policy Statement for Energy (EN-1)* (Ref. 3-17)*; and*
- *National Policy Statement for Renewable Energy Infrastructure (EN-3)* (Ref. 3-18).

3.6.19. EN-1 and EN-3 advise that they are both likely to be a material consideration (judged on a case by case basis) in decision making on relevant applications for planning permission.

EN-1

3.6.20. EN-1 sets out national policy for defined types of energy infrastructure, which includes electricity generating stations, generating more than 50MW onshore and has effect, in combination with the relevant technology specific NPS i.e. EN-3, as the primary basis for decisions under the Planning Act 2008 (EN-1, 1.1.1, EN-3, 1.2.1). It is further noted that in England and Wales, EN-1 and EN-3 are likely to be a material consideration in decision making on applications under the Town and Country Planning Act 1990 (as amended), to be judged on a case by case basis (EN-1, 1.2.1; EN-3, 1.2.3).

3.6.21. Part 2 (Government policy on energy and energy infrastructure development) states that *"energy is vital to economic prosperity and social well-being and so it is important to ensure the UK has secure and affordable energy"* and that producing the requisite energy and getting it to where it is need *"necessitates a significant amount of infrastructure, both large and small scale"* (paragraph 2.1.2). Not all aspects of Government energy and climate change policy will be relevant to decision making, however *"The role of the planning system is to provide a framework which permits the construction of whatever Government - and players in the market responding to rules, incentives or signals from Government - have identified as the types of infrastructure we need in the places where it is acceptable in planning terms",* while also taking account of the views of affected communities and the principles of sustainable development (paragraph 2.2.4). Reference is also made to the UK's present reliance on fossil fuels which are likely to play a significant role for some time to come, and it is recognised that there is a need to wean itself off such a high carbon energy mix, reduce greenhouse gas emissions and to achieve greater diversification (paragraphs 2.2.5/6). It is further noted that EN-1 sets out how the energy sector can help deliver the Government's climate change objectives withnew low carbon energy infrastructure contributing to climate change mitigation (paragraph 2.2.11).

3.6.22. Part 2 explains the relevance of the EU Emissions Trading System (EU ETS) to reducing greenhouse gas emissions from the power sector; the aim to make production of electricity from carbon intensive power stations less attractive; to incentivise investment in cleaner electricity generation and to ensure that developers deliver low carbon generation, both to decarbonise electricity production, and to reinforce energy security of supply (paragraphs 2.2.12-15). It is stated that it is critical the UK continues to have secure and reliable supplies of electricity in making the transition to a low carbon economy, for which it needs sufficient electricity capacity; reliable supply chains e.g. fuel for power stations; a diverse mix of technologies and fuels (including supply routes of fuels); effective price signals enabling market participants to react in a timely way (paragraph 2.2.20). The intention of the relevant NPSs is to provide a robust planning framework to facilitate private sector investment (paragraph 2.2.26). It is emphasised that the Government's wider objectives include contributing to the achievement of sustainable development and ensuring our energy infrastructure is safe (paragraphs 2.2.27/28).

3.6.23. Part 3 (The need for new nationally significant infrastructure projects) sets out the Government's position on need (paragraph 3.1):

- The UK needs all types of energy infrastructure covered by EN-1 to achieve energy security at the same time as dramatically reducing greenhouse gas emissions.
- It is for industry to propose new energy infrastructure projects within the strategic framework set by Government; it is not appropriate for planning policy to set targets for or limits on different technologies.
- All applications for the types of infrastructure for development consent covered by energy NPSs should be assessed on the basis that Government has demonstrated a need for those types of infrastructure with the scale/urgency as described in Part 3.
- Substantial weight should be given to the contribution that projects would make towards satisfying this need when considering applications.

3.6.24. Part 3 states that substantial weight should be given to "need", of which the weight attributed in any given case "*should be proportionate to the anticipated extent of a project's actual contribution*" (paragraph 3.2.3). In considering the need for new NSIPs, particularly in respect of meeting energy security and carbon reduction objectives, it is recognised that there are benefits in having a diverse mix of power generation, to avoid over dependency on one type or source of fuel or power; additionally the different types of generation have different characteristics which can complement each other. For example, fossil fuel generation is responsive at short notice to meeting varying levels of energy demand, however, until such time as this can operate with carbon capture and storage (CCS), such power stations will not be low carbon, and whereas renewables offer a low carbon and proven fuel source, technologies such as wind result in intermittent generation (EN-1, 3.3.4).

3.6.25. EN-1 recognises the need to replace closing electricity generation and consequently that with a combination of tightening environmental regulations and ageing power stations, there is a need for more electricity capacity to support increased energy supplies from renewables (which increasingly may include plant powered by the combustion of biomass and waste) (paragraphs 3.3.7/10). With more renewable generation, Government anticipates that additional back up capacity will be needed and separately it predicts that future increases in electricity demand may arise e.g. for heating and surface transport, requiring increased supplies of low carbon energy as demand switches from being powered by fossil fuels (paragraphs 3.3.11-14).

3.6.26. The UK's commitment to sourcing 15% of its total energy (transport, electricity and heat) from renewable sources by 2020 emphasises the need for new projects to continue to come forward urgently to ensure its target is met (paragraph 3.4.1). It is expected that future large scale renewable energy generation will be sourced from onshore and offshore wind, wave and tidal, biomass and energy from waste. The principal purpose of the combustion of waste is to reduce the quantity going to landfill (in accordance with the waste hierarchy) and to recover energy as electricity or heat; only waste that cannot be re-used or recycled with less environmental impact and would otherwise go to landfill, should be used for energy recovery (EN-1, 3.4.3). It is noted that biomass and energy from waste can be used to generate dispatchable power, providing peak load and base load on demand and that as more intermittent renewable electricity comes into the UK grid, the ability of biomass and energy from waste *"to deliver predictable, controlled* *electricity is increasingly important in ensuring the security of UK supplies"* (paragraph 3.4.4).

3.6.27. Part 4 (Assessment Principles) sets out certain general policies against which applications for energy infrastructure are to be decided, that do not relate only to the need for new energy infrastructure (Part 3) or to particular physical impacts arising from construction or operation (Part 5) and the relevant technology specific NPSs (paragraph 4.1.1). Reference is made to the presumption in favour of granting consent to applications for energy NSIPs, unless more specific and relevant NPS's clearly indicate to the contrary (paragraph 4.1.2). When considering any proposed development, the decision making process should take into account potential benefits, including meeting the need for energy infrastructure, job creation and any other long term or wider benefits and potential adverse impacts as well as measures to avoid, reduce or compensate for any adverse impacts (paragraph 4.13). Other factors to be taken into account are environmental, social and economic benefits and adverse impacts identified in EN-1 and other relevant technology specific NPSs, also development plan or other documents in the LDF (paragraphs 4.1.4/5)

3.6.28. The further individual assessment principles referred to in Part 4 are as follows: Environmental Statement (section 4.2); Habitats and Species Regulations (section 4.3); Alternatives (section 4.4); Criteria for good design for energy infrastructure (section 4.5); Consideration of Combined Heat and Power (CHP) (section 4.6); Carbon Capture and Storage (CCS) and Carbon Capture Readiness (CCR) (section 4.7); Climate change adaption (section 4.8); Grid connection (section 4.9); Pollution control and other environmental regulatory regimes (section 4.10); Safety (section 4.11); Hazardous substances (section 4.12); Health (section 4.13); Common law nuisance and statutory nuisance (section 4.14); Security considerations (section 4.15).

3.6.29. Part 5 (Generic Impacts) address Air quality and emissions (section 5.2); Biodiversity and geological conservation (section 5.3); Civil and military aviation and defence interests (section 5.4); Coastal change (section 5.5); Dust, odour, artificial light, smoke, steam and insect infestation (section 5.6); Flood risk (section 5.7); Historic environment (section 5.8); Landscape and visual (section 5.9); Land use including open space, green infrastructure and Green Belt (section 5.10); Noise and vibration (section 5.11); Socio-economic (section 5.12); Traffic and transport (section 5.13); Waste management (section 5.14); Water quality and resources (section 5.15).

EN-3

3.6.30. EN-3, together with EN-1, provides the primary basis for decisions on applications for NSIPs. EN-3 is also "*likely to be a material consideration in decision making on relevant applications that fall under the Town and Country Planning Act 1990 (as amended)*"; whether and to what extent it is a material consideration will be judged on a case by case basis (paragraphs 1.2.1/3). The infrastructure covered in EN-3 concerns the following types of renewable energy infrastructure (EN-3, 1.8.1):

- Energy from biomass and/or waste (> 50MW);
- Offshore wind (> 100MW); and
- Onshore wind (> 50MW).

3.6.31. Reference is made below to aspects of policy within EN-3 and also to EN-1 Sections 4 and 5. EN-3, Part 2 (Assessment and technology specific information) contains policies additional to those on generic impacts in EN-1; both EN-1 and EN-3 should be considered together. EN-1, 3.3 sets out the Government's conclusion, that there is a significant need for new major energy infrastructure, while EN-1, 3.4 refers to the role of new major renewable energy infrastructure (including energy from waste) and that in light of this, the need for infrastructure covered by EN-3 has been demonstrated (paragraph 2.1.2). In referring to factors influencing site selection for renewable energy generating stations, it is noted that these are *"not a statement of Government Policy"* but are to inform decision makers on the criteria considered by applicants in site selection; the criteria and weight will vary between projects as the choices made by energy companies reflect their assessment of how they perceive the decision maker will apply the general points in EN-1, 4.1 (paragraph 2.1.3).

3.6.32. Section 2.3 (Climate change adaption) notes that EN-1, 4.8 addresses generic considerations to be taken into account to help ensure that renewable energy infrastructure will be resilient to climate change (paragraph 2.3.1). It observes that whereas energy from waste generating stations may require significant water resources but are less likely to be proposed for coastal sites, proposals should consider (a) how plant will be resilient to increased risk of flooding, and (b) increased risk of drought affecting river flows (paragraph 2.3.3).

3.6.33. Section 2.4 (Criteria for "good design" for energy infrastructure) refers to EN-1, 4.5 setting out the principles of good design to be applied to energy infrastructure. It requires that *"Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology" (paragraph 2.4.2).*

3.6.34. Section 2.5 (Biomass and waste combustion) states: *"The recovery of energy from the combustion of waste, where in accordance with the waste hierarchy, will play an increasingly important role in meeting the UK's energy needs… Further the recovery of energy from the combustion of waste forms an important element of waste management strategies in both England and Wales"* (EN-3, 2.5.2; footnote 8 - Article 16 Waste Framework Directive 2008, EN-1, 5.14).

3.6.35. The combustion generating stations covered by EN-3 are those which generate electricity from *"using waste (possibly including non-renewable sources of waste) and/or biomass as a fuel…"* (paragraph 2.5.3). Waste and biomass combustion plant may include a range of different technologies (including grate combustion), however the decision maker should not be concerned about the type of technology used (paragraph 2.5.11). The fuel throughput capacity may vary widely and is a matter for the applicant, however increases in traffic volumes, changes in air quality and any adverse impacts resulting from increases in throughput, will be a consideration, to be "*balanced against the net benefits of the combustion of waste and biomass*" (paragraph 2.5.13).

3.6.36. Commercial issues are not likely to be an important matter for decision making; like any combustion generating station, operators secure fuel through contracts; this may be public or private sector waste treatment or a combination of both (paragraphs 2.5.17-19).

3.6.37. Factors influencing site selection by applicants are briefly as follows.

(a) Grid connection – Applications must include information on how the generating station is to be connected into the transmission network and whether there are any particular environmental issues likely to arise from the connection (EN-3, 2.5.22/23; EN-1 4.9).

(b) Transport infrastructure – Government encourages multi-model transport by water or rail routes where possible, however viability is likely to be determined by the economics of the scheme; any application should incorporate suitable access off the main highway network and those impacts should be acceptable (EN-3, 2.5.24/25; EN-1, 5.13).

(c) Combined heat and power (CHP) – Government strategy for CHP requires applicants either to include CHP or to present evidence that possibilities have been fully explored; it is stated in EN-1, 4.6.8 that "utilisation of useful heat" that displaces conventional heat generation from fossil fuel sources is more efficient and that substantial additional positive weight should be given to applications incorporating CHP (EN-3,2.5.26/27; EN-1, 4.6).

(d) Carbon capture readiness (CCR) – Government policy/criteria on CCR for new combustion generating stations is applicable to those with a generating capacity at or over 300MW and as such is not applicable to this Application (EN-3, 2.5.28/29; EN-1, 4.7).

3.6.38. When determining biomass/waste combustion plant applications, regard should be had to generic information on flexibility, set out in EN-1, 4.2 which states that in some instances, it may not be possible at the time of application, for all aspects of the proposal to have been settled. EN-3 states that in those circumstances, the applicant should explain which elements of the scheme have to be finalised and the reasons and assess the effects based on a "*maximum adverse case scenario*", which should be allowed for in the decision making (EN-3, 2.5.30; EN-1, 4.2.78).

3.6.39. The decision maker is directed to certain principles (listed below) when examining and determining applications for biomass and relevant EfW infrastructure in which it is pointed out that impacts identified in EN-1, Part 5 are not exhaustive and that consideration should be had to any impacts which are relevant and important (EN-3, 2.5.31/32)..

(a) National Designation – The policy is applicable to the effects of development on sites with nationally recognised designations e.g. SSSIs, where consent for renewable energy projects should only be granted where the objectives of the designation will be not compromised and any significant adverse effects are outweighed by the environmental, social and economic benefits (EN-3, 2.5.33, EN-1, 5.9). In considering the impacts on the historic environment, account should be taken of the positive role that large scale renewable projects play in the mitigation of climate change, the delivery of energy security, the urgency of meeting national targets and emissions reductions (EN-3, 2.5.34, EN-1, 5.8).

(b) Green Belts – The policy addresses energy infrastructure development in the Green Belt, and as such, is not applicable to this Application (EN-3, 2.5.35, EN-1, 5.10).

(c) Other Locational Considerations – Most renewable energy resources can only be developed where the resource exists (EN-3, 2.5.36).

(d) Air Quality and Emissions – Compliance with WID and the LCPD is enforced through the environmental permitting regime regulated by the EA. Where a proposed development meets requirements of WID (now IED) and will not exceed local air quality standards, the decision marker should not regard the development as having adverse impacts on health; the EA will determine if the proposed generating station is considered BAT. (EN-3, 2.5.37-45, EN-1, 4.10, 5.2).

(e) Landscape and Visual – The decision maker should be satisfied that the proposed design is of appropriate quality and minimises adverse effects on the landscape character/quality; takes into account that any waste combustion generating station will require a building able to host fuel reception/storage facilities, a combustion chamber and abatement units and possibly cooling towers; good design will go some way to mitigating adverse landscape/visual effects; mitigation will be achieved through design to minimise intrusion in the landscape as far as engineering requirements permit; landscaping should be used at a lower level to visually enclose sites (EN-3, 2.5.46-52, EN-1, 5.9.

(f) Noise and Vibration – The decision maker should consider the noise/vibration impacts and be satisfied that mitigation will be adequate through conditions, taking into account the extent to which operational noise will be controlled by the EA. The primary mitigation will be through good design to enclose plant/machinery in noise reducing buildings; noise from transportation of materials is unavoidable (EN-3, 2.5.53-58, EN-1, 5.11).

(g) Odour, Insect and Vermin Infestation – The applicant should assess the potential for insect infestation and emissions of odour with particular regard to the reception/handling/storage of waste for fuel; the decision maker should be satisfied that the proposal includes measures to minimise impacts on local amenity from odour, insect and vermin infestation; mitigation should minimise potential for infestation, the time between reception and combustion may be limited by condition (EN-3, 2.5.59-63; EN-1, 5.6).

(h) Waste Management – Waste combustion generating stations need not disadvantage reuse or recycling initiatives where the process accords with the waste hierarchy; the application should set out the extent to which the generating station and capacity will contribute to recovery targets set out in relevant strategies and plans (EN-3, 2.5.64-70).

(i) Residue Management – Combustion and fly ash residue must be disposed of separately under WID. The assessment should address production/disposal of residues; any proposals for recovery of ash and mitigation measures should be described, as well as consideration of accessible capacity in waste management sites. The decision maker should be satisfied that the management plans for residue disposal, minimise the amount that cannot be used for commercial purposes and substantial positive weight given to the realistic prospect of recovering residues. If the EA indicates there are no known barriers to issuing an environmental permit and agrees the management plan suitably minimises the wider impacts from ash disposal, any residual ash disposal impacts should have limited weight. The environmental burdens associated with the management of combustion residues can be mitigated through recovery of secondary products and the decision maker should give substantial positive weight to proposals that have a realistic prospect of recovering materials. The primary management route for fly ash is hazardous waste landfill; there may be opportunities to reuse this material; management of hazardous waste will be considered by the EA through the Environmental Permitting regime (EN-3, 2.5.71-83, EN-1.5.14).

(j) Water Quality and Resources – The decision maker should be notified that the applicant has demonstrated measures to minimise adverse impacts on water quality and resources (EN-3, 2.5.84-87, EN-1, 5.15).

Waste Policy

3.6.40. National waste policy is set out in a number of documents. The following have been identified as being relevant in determining proposals that involve waste:

- The Revised EU Waste Framework Directive (2008/98/EC) (Ref. 3-9); the Waste (England and Wales Regulations 2011 (as amended) (Ref. 3-10); the Waste (England and Wales) (Amendment) Regulation 2012 see Section 3.4;
- The Government Review of Waste Policy in England (2011) (Ref. 3-19);
- The Waste Management Plan for England (2013) (Ref. 3-20);

- Planning Policy Statement 10: Planning for Sustainable Waste Management (2011) (Ref. 3-21); and
- Updated 'National Waste Planning Policy: Planning for sustainable waste management' (July 2013) (Ref. 3- 22).

3.6.41. The Government Review of Waste Policy in England (June 2011), also referred to as the Waste Review 2011 (Ref 3-19) has been guided by the waste hierarchy in respect of sustainable waste management and as a legal requirement of the Revised Waste Framework Directive and the Waste (England and Wales) Regulation 2011. This confirms that landfill should be the last resort for most waste (paragraphs 23, 24). It is stated that the recovery of energy from waste makes an important contribution to the UK's renewable energy targets, minimising waste to landfill and helping to meet UK carbon budgets (paragraph 212). Also *"energy recovery is an excellent use of many wastes that cannot be recycled and could otherwise go to landfill It can contribute secure, renewable energy to UK demand…"(*paragraph 214).

3.6.42. The Waste Management Plan for England (published 12 December 2013) (Ref. 3-20) is a high level document, providing an analysis of the current waste management situation in England and evaluates how it will support implementation of the objectives and provisions of the revised WFD, including the mandatory requirements of Article 28 requiring competent authorities to establish a waste management plan/s for their territory (page 2). It further states that *"The Government supports efficient energy recovery from residual waste - of materials which cannot be reused as recycled - to deliver environmental benefits, reduce carbon impact and provide economic opportunities"* (page 13).

3.6.43. Until the National Waste Planning Policy is adopted, Planning for Sustainable Waste Management (PPS10) March 2011 (Ref. 3-21) will remain in place. The key planning objectives of PPS10, include helping to deliver sustainable development through driving waste management up the waste hierarchy, addressing waste as a resource and looking to disposal (i.e. landfill) as the last option; helping to secure the recovery or disposal of waste without endangering human health or harming the environment and enabling waste to be disposed of in one of the nearest appropriate installations (paragraph 3). When identifying suitable sites/areas for waste management, authorities should assess their suitability against a range of criteria, including physical/environmental constraints, existing, proposed, neighbouring land uses and capacity of transport infrastructure to support the sustainable movement of waste and products arising from resource recovery (paragraph 20, 21 and Annex E). The same broad considerations apply to determining applications.

3.6.44. Updated 'national waste planning policy: Planning for sustainable waste management' (July 2013) (Ref 2-22) was published for consultation by the DCLG between 29.7.13 and 23.9.13. The updated policy is intended to replace existing national waste planning policy contained in PPS10. The updated policy encourages the use of heat as an energy source where energy from waste development is being considered (paragraph 22). It is explained that lack of heat customers, means that plants operate in the less efficient electricity only mode (paragraph 3). There is also encouragement to consider siting energy from waste in areas which allow for the use of heat as an alternative energy source to electricity i.e. CHP (paragraph 24).

3.6.45. 'Energy from waste – A guide to the debate, February 2014 (revised edition)' has been developed by Government (DEFRA, BIS, HMT, DfT and DCLG) and other stakeholders including the EA, WRAP, Public Health England, the Road Standards Agency, the waste management and renewable industries and non-Govenmental organisations. The 2014 revised guidance contains an additional chapter (Chapter 5) which considers the future policy direction for energy from waste and identifies underlying principles that are likely to continue as key considerations for both Government and the sector in the future (Page

1). The principles that underpin Government policy regarding energy from waste are (paragraph 219):

- *"Energy from waste must support the management of waste in line with the waste hierarchy;*
- *Energy from waste should seek to reduce or mitigate the environmental impacts of waste management and then seek to maximise the benefits of energy generation;*
- *Government support for energy from waste should provide value for money and make a cost effective contribution to UK environmental objectives in the context of overall waste management and energy goals; and*
- *Government will remain technology neutral except where there is a clear market failure preventing a technology competing on a level footing".*

3.6.46. It is stated that the Government sees a long term role for energy from waste that at least constitutes recovery not disposal, meeting the requirements set out in the WFD, for example through the attainment of RI status (paragraph 266).

3.7. References

Ref. 3-1 Slough Trading Estate, Illustrative Masterplan Document, 4.4.10

Ref. 3-2 Simplified Planning Zone Scheme for the Slough Trading Estate 2004

Ref. 3-3 The Town and Country Planning (Environmental Impact Assessment) Regulations 2011, Regulations 27 and 28

Ref. 3-4 Planning and Compulsory Purchase Act 2004 (PCPA 2004)

Ref. 3-5 Town and Country Planning Act 1990 (TCPA) (1990)

Ref. 3-6 Planning Act 2008 (PA 2008)

Ref. 3-7 Localism Act 2011

Ref. 3-8 The Regional Strategy for the South East (Partial Revocation) Order 2013

Ref. 3-9 Revised Waste Framework Directive 2008/98/EC

Ref. 3-10 The Waste (England and Wales) Regulations 2011

Ref. 3-11 The Waste (England and Wales) (Amendment) Regulations 2012

Ref. 3-12 Slough Local Development Framework Core Strategy 2006-26 Development Plan Document (December 2008)

Ref. 3-13 Slough Local Development Framework Site Allocations Development Plan Document (November 2010)

Ref. 3-14 Slough Local Plan (March 2004) Saved Policies (September 2007)

Ref. 3-15 Waste Local Plan for Berkshire (December 1998) Saved Policies (September 2007)

Ref. 3-16 The National Planning Policy Framework 2012

Ref. 3-17 Overarching National Policy Statement for Energy EN-1, 1.2.1

Ref. 3-18 National Policy Statement for Renewable Energy Infrastructure (EN-3)

Ref. 3-19 The Government Review of Waste Policy in England (2011)

Ref. 3-20 The Waste Management Plan for England (2013)

Ref. 3-21 Planning Policy Statement 10: Planning for Sustainable Waste Management (2011)

Ref. 3-22 Updated 'National Waste Planning Policy: Planning for sustainable waste management' (July 2013)

4. SITE DESCRIPTION, PROJECT ALTERNATIVES AND EVOLUTION

4.1 Introduction

4.1.1. This chapter of the ES provides an overview of the Proposed Development Site (the 'Site') and surrounding area, outlines the alternatives considered, and describes how the design has evolved through consultation with SBC and other consultees (listed within *Chapter 2: Assessment Methodology* of this ES).

4.2 Site Description

Overview

4.2.1. The Site occupies a total area of approximately 1.9ha and is located on land within the existing SHP site which has a history of power generation on the Slough Trading Estate (342 Edinburgh Avenue, Slough, SL1 4TU). The National Grid Reference of the centre of the Site is SU 953 814.

4.2.2. The Site lies within the Thames Valley, approximately 4km north of the River Thames and is surrounded by the conurbation of Slough; Windsor is approximately 5km south of the Site and Maidenhead is approximately 7km west of the Site.

4.2.3. The topography at the Site is predominantly flat and approximately 32m above ordnance datum (AOD).

4.3 Proposed Development Site

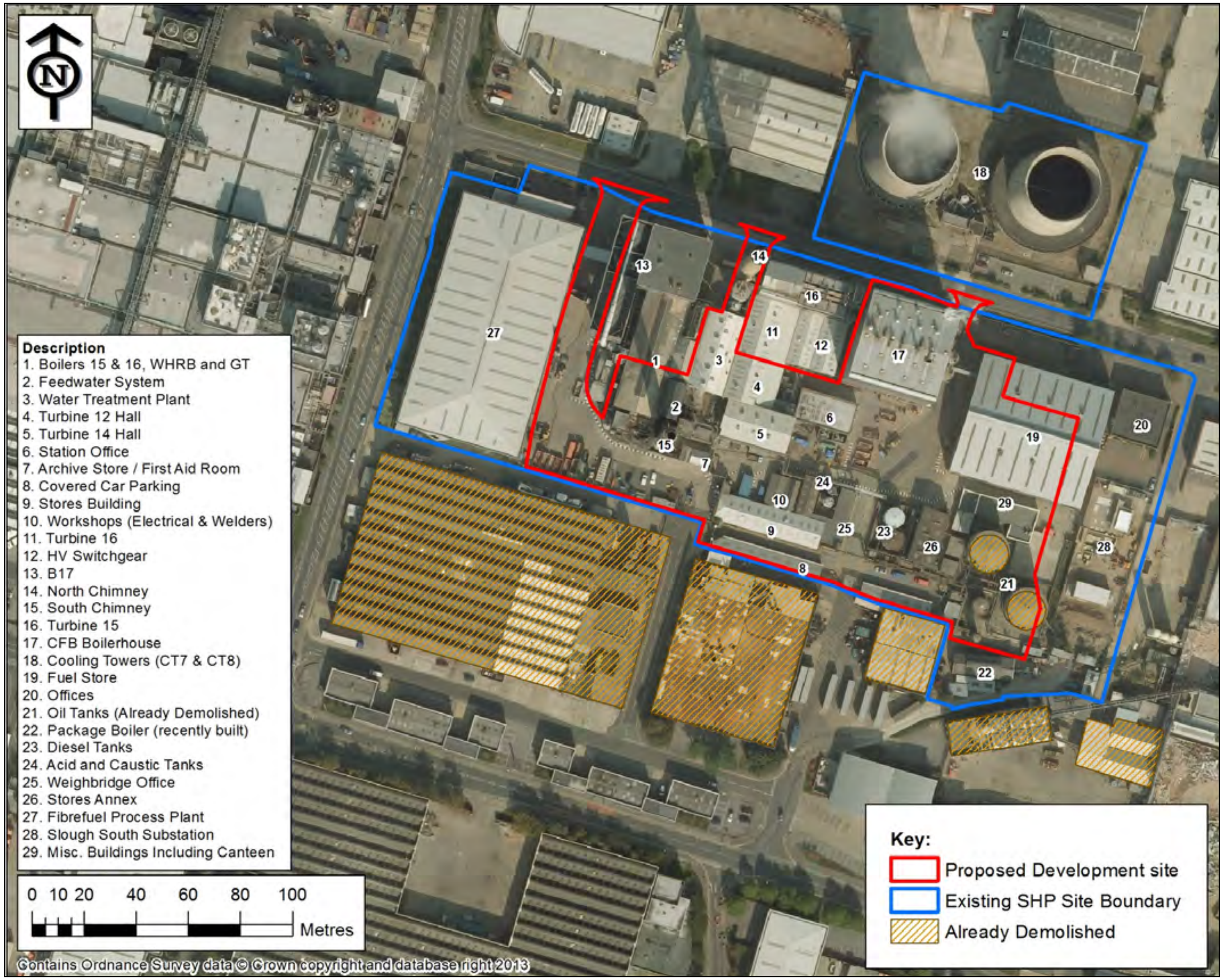
4.3.1. The Proposed Development Site is located within the existing SHP site boundary, which in turn is within the Slough Trading Estate, a major employment area within Slough. The majority of the SHP site is located on the south side of Edinburgh Avenue, with two associated natural draught cooling towers occupying an area immediately to the north of this road. The SHP site is predominately surfaced with impermeable hardstanding; it contains numerous buildings and structures of varying age, including boiler houses, turbine halls, fuel storage facilities, switchrooms, control rooms, offices and various other ancillary plant associated with power generation.

4.3.2. SHP provides various services to businesses on the Slough Trading Estate, including electricity distribution and distribution and supply of heat and potable water.

4.3.3. SHP also provides other ancillary services for the SHP site such as water treatment, operations and maintenance and cooling water.

4.3.4. Most of the 1.9ha Site has been occupied by decommissioned plant, as shown in Figure 4-1, including boilers 15 and 16, a gas turbine and associated waste heat recovery boiler (WHRB), and two steam turbines (referred to as units 12 and 14). The circulating fluidised bed (CFB) boilers and fuel store have also been taken out of commercial service and are discussed further in Section 4.8: Project Evolution.

Figure 4-1 Existing Site Plan



4.3.5. The SHP site contains generating plant which shares some common services such as water treatment plant, cooling and operations and maintenance facilities. The existing generators onsite comprise:

- A grate boiler (Boiler 17) that uses either wood waste or WDF to deliver low carbon energy through a dedicated steam turbine (Turbine 17). This boiler normally operates in CHP mode and can also operate in tandem with a low pressure steam turbine (Turbine 16); and
- A small gas fired package boiler recently installed to ensure security of supply of process steam and heat to the Trading Estate.

4.3.6. The low carbon generation plant within the SHP site is designed, operated and permitted in accordance with the Waste Incineration Directive (WID), now transposed into the Industrial Emissions Directive (IED) (*Special Provisions for Waste Incineration Plants and Waste Co-Incineration Plants*) (2010/75/EU) (Ref. 4-1), and operates independently with a separate fuel store and deliveries.

4.3.7. Together with the Proposed Development, these facilities will continue to retain separately metered output and discrete points of connection to the local electricity network. The Proposed Development will not support, or be reliant on, the existing generating stations on the SHP site and is considered to be a separate installation.

4.3.8. The main structures within the SHP site currently comprise the CFB boilerhouse, which is 43m high (plus approximately 3m for roof furniture) within the Proposed Development Site, and the Boiler 17 boilerhouse, which is 30m high. The two cooling towers to the north of Edinburgh Avenue are approximately 49m high and are visible from some of the nearest residential areas to the north of the Site. The two most dominant features in the current SHP site skyline comprise the existing 82m high south stack and 104m north stack, the latter of which is located adjacent to Edinburgh Avenue.

4.3.9. Existing vehicular access to the SHP site is via 8 principal points of access/egress; these are shown in Figure 4-1 and can be described as follows:

a) an access point in the northwest of the Site adjacent to the Fibre Fuel building (Building 27 in Figure 4-1) which has lockable gates and a barrier operated by security;

b) car access off Greenock Road, to the south of the Site and immediately to the west of Building 9;

c) HGV access from Harwich Road (for biomass, wood waste and coal for the CFB boilers) via a sliding gate activated by security; there is no exit from this route currently;

d) car access off Harwich Road located immediately to the south of the package boiler (Building 22) in the southeast corner of the SHP site;

e) car access via 342 Edinburgh Avenue to the staff car park next to Building 20 in Figure 4-1;

f) HGV exit for CFB deliveries to Edinburgh Avenue in the northeast of the Site, adjacent to the CFB boilers (Building 17 on Figure 4-1). This has an auto-activated sliding gate;

g) a manually operated gate to access the Cooling Tower compound for either small lorries or pedestrians located mid-point between the two towers along Edinburgh Avenue; and

h) a manually activated roller shutter door used to enter the enclosure beneath the existing north stack from Edinburgh Avenue (Building 14 on Figure 4-1).

4.3.10. There are further access/egress points, including pedestrian access, on the SHP site, however these are not relevant to the Proposed Development and hence are not discussed further.

4.3.11. Figures 4-2 to 4-9 present a series of photographs of the baseline Proposed Development Site and its surroundings.

Figure 4-2 View of the SHP site facing East along Edinburgh Avenue along the Northern boundary of the SHP site and showing the 'Fibre Fuel' entrance (Date taken: 23 July 2013)

Figure 4-3 View of the SHP site from Cambridge Avenue facing north along Greenock Road (Date taken: 27 Feb 2014)

Figure 4-4 View of the SHP site facing northeast from the corner of Buckingham Avenue and Falmouth Road (Date taken: 27 Feb 2014)

Figure 4-5 View of the SHP site from Buckingham Avenue facing North along Harwich Road (Date taken: 27 Feb 2014)

Figure 4-6 View of the SHP site from Belmont Road facing south along Greenside Road (Date taken: 23 July 2013)

Figure 4-7 View of the SHP site from Long Furlong Drive facing southeast across Kennedy Park (Date taken: 23 July 2013)

Figure 4-8 Aerial View of the SHP site from the Southeast looking in a Northwest Direction (Date taken: 19 September 2013)

Figure 4-9 Aerial View of the SHP site from the Northwest looking in a Southeast Direction (Date taken: 19 September 2013)

4.4 Surrounding Area and Environmental Constraints

4.4.1. The area surrounding the SHP site is occupied by various industrial, warehouse and retail businesses, both large and small, typical of much of the Slough Trading Estate, which covers an area of approximately 158ha. The nearest of these commercial receptors is an industrial warehouse unit, located approximately 50m south of the SHP site boundary, and a confectionary factory, which is located directly across Fairlie Road approximately 8m west of the SHP site boundary and 100m west of the Proposed Development Site (with the Fibrefuel Building in between, see Figure 4-1).

4.4.2. Edinburgh Avenue forms the northern boundary of the Site; to the north are the SHP cooling towers and a potable water pumping station. To the south of the Site is an area known as the Former Metal Colours site which is now cleared and redeveloped (see Figure 4-3); to the east of the SHP site is a row of mixed use industrial and warehousing buildings.

4.4.3. The nearest residential properties are located approximately 200m north of the Site on Bodmin Avenue, with the nearest park and green space area, Kennedy Park, situated approximately 400m northwest of the Site (see Figure 4-7).

4.4.4. There are no Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Site of Special Scientific Interest (SSSIs) or National Nature Reserves (NNR) within a 2km radius of the Site. Two statutory designated nature sites lie within 2km of the Site; these are Haymill Valley Local Nature Reserves (LNR), located 800m west of the Site, and Cocksherd Wood, located approximately 1.4km northwest of the

Site. In addition, Boundary Copse Woodland Trust Reserve, which is a non statutory site, is located 1.3km north of the Site.

4.4.5. The closest European Protected Site is Burnham Beeches SAC located approximately 2.9km north of the Site. Also located within 10km of the Site are Windsor Forest and Great Park SAC, approximately 6km south of the Site, South West London Waterbodies SPA and Ramsar site located approximately 7.7km southeast of the Site, and Chilterns Beechwoods SAC located approximately 9.9km to the northwest of the Site.

4.4.6. The River Thames is the closest principal watercourse and is located approximately 4km south of the Site, flowing in an easterly direction.

4.4.7. The nearest designated heritage asset is a railway bridge, approximately 500m to the southeast of the Site. There are also three scheduled monuments within 2km of the Proposed Development, the nearest being the moated site at Cippenham Court which is approximately 1.5km to the south. Thirty three listed buildings and two registered parks exist within 2km of the Site. Stoke Park English Heritage registered park and garden is located approximately 1.5km to the northeast and Huntercombe Manor registered park and garden is approximately 2.2km to the southwest. The Grade 1 listed Windsor Castle is located approximately 5km to the southeast.

4.4.8. Other potential sensitive receptors have been identified within 2km of the Site based on a review of available maps, aerial photographs, initial studies, site visits and consultations. These include:

- Non-statutory nature conservation sites;
- Protected species (specifically bats and breeding birds);
- Pedestrians, cyclists and road users; and
- Key short, medium and long-distance views into the Site.

4.5 Site History

4.5.1. The Slough Trading Estate was established in April 1920 when the land was purchased from the War Office which had been using it for the repair and recycling of ex War Department Vehicles. At this point there was a small coal fired power station and approximately 30 buildings on the Estate. Over the subsequent decade the area was transformed into the Trading Estate and was largely occupied by industrial tenants. As the Estate grew so did the power station and its associated electricity/steam/potable water distribution infrastructure. Some infrastructure has been removed over the years with direct rail deliveries of coal and oil to the power station ceasing in 1969 and 1973 respectively and the railway siding used for oil deliveries post 1973, via an underground pipeline, surrendered in 2007. This prevents the ability to bring in any fuel by rail for the Proposed Development.

4.5.2. A utility body was eventually set up as a separate business called Slough Heat and Power (SHP), but still owned by the Slough Trading Estate. Since this time the Estate has continued to evolve and the mix of tenants has changed over time and now includes knowledge based industries, warehouses and retail whilst the Estate still retains some manufacturing tenants. Over the years, the demand for energy has also constantly evolved as the customer base has changed.

4.5.3. The SHP site has, therefore, been used for power and heat generation purposes for about ninety years. Power generation and the associated infrastructure were originally permitted under an Act of Parliament in 1925 for the Slough Trading Estate development.

More recently, in 2008 SHP was sold to SSE plc which continues to provide the same power generation services to the Trading Estate as its predecessor. Over the years, power generation at the site has evolved as markets have changed. New plant has been generally installed about every 10 years, with fuels varying from coal, oil and gas. However, in the last twenty years fossil fuels have been gradually replaced with newly available low carbon fuels. This evolution reached the stage where the three main power generation boilers that were in service were fired on waste wood, biomass and WDF. The biomass/waste wood boilers were fully closed in March 2014. A gas fired Package Boiler is the latest energy plant to be installed within the complex; it was commissioned in 2011 to ensure a secure heat supply to the Trading Estate. The Proposed Development will continue this evolution including further provision for providing secure low carbon heat to the Trading Estate.

4.5.4. The Proposed Development will be in an area that has been occupied by a number of decommissioned gas fired units which have all reached the end of their operational life, as well as the CFB boilers and fuel store which have recently been taken out of commercial service. Boiler 15 and Turbine 12 were constructed in 1966, and Boiler 16 and Turbine 14 were constructed in 1968; the gas turbine and Waste Heat Recovery Boiler (WHRB) were installed in 1980, whilst the CFB boilers and fuel store were installed in 1990. These boilers and turbines have now all been decommissioned with the loss of 48MW of electrical generation from the site. The closure of the CFB boilers has resulted in a further loss of 30MW electrical generation.

4.6 The Need for the Proposed Development

4.6.1. The Applicant's wider strategy is to ensure reliable energy supplies to its customers, by providing energy from diverse sources including gas, coal, hydro, wind farms and other forms of low carbon generation. The Proposed Development is an important constituent of this strategy and will provide new low carbon electricity generation and heat.

4.6.2. The Proposed Development will be fuelled using a diverse range of WDF made from various sources of processed MSW, commercial and industrial (C&I) waste and waste wood. It will utilise non hazardous materials diverted from landfill in accordance with the Waste (England and Wales) Regulations 2011 (Ref. 4-2) derived from the Waste Framework Directive 2006, 2008 (Ref. 4-3) and the Waste Strategy for England 2007 (Ref. 4-4). This will divert waste from landfill and reduce the associated methane emissions, whilst providing low carbon 'green' electricity (in accordance with the Energy White Paper 2007 (Ref. 4-5), the UK Renewable Energy Strategy (2009) (Ref. 4-6), and National Policy Statements for Energy (2011) (Ref. 4-7). Government and EU policies to reduce the quantity of waste sent to landfill promote the alternative use of material currently sent to landfill and the use of WDF is a viable diversion.

4.6.3. The Proposed Development will deliver a similar amount of electricity generation as the CFB boilers, which have recently been taken out of commercial service. It will also have the potential to deliver up to 20MW of space heating and process steam to neighbouring properties on the Slough Trading Estate through the use of CHP. Further detail is included in the CHP Feasibility Assessment presented in *Appendix J-3, Volume II* of this ES.

4.6.4. The SHP site is particularly suitable for the Proposed Development because of the historic land use, the existing infrastructure available onsite (such as the cooling towers, and electricity and heat network), the existing workforce and skill-sets onsite and the availability of WDF in the region.

4.6.5. In summary, the Proposed Development will help to address the following:

- The UK Government's climate change commitments, which necessitate achieving ambitious reductions in greenhouse gas emissions (principally CO_2);
- Security of national electricity supply through having a mix of energy generating technologies and a diverse range of fuel sources;
- Maximising energy recovery from WDF in the form of low carbon (non fossil fuel) electricity and heat that will supply businesses in the local area;
- Providing local authorities with an outlet for processed MSW in the form of WDF;
- Complementing recycling initiatives by accepting waste after these initiatives have been carried out, thereby forming part of an integrated waste management system;
- Positive diversion of waste materials that may otherwise be disposed of to landfill, achieving reductions in greenhouse gas emissions (including methane) that would otherwise be generated from the breakdown of the waste materials associated with landfill;
- Utilising a CHP network in line with the UK Government's commitment towards developing heating and cooling networks; and
- The continued modernisation of the Slough Trading Estate and investment in the green energy credentials of the SHP site.

4.7 Alternatives

4.7.1. Under the EIA Regulations (Ref. 4-8) an ES is required to provide "*an outline of the main alternatives studied by the applicant… and an indication of the main reasons for decisions made, taking into account the environmental effects*". Under the EIA Regulations there is no requirement to assess alternatives, only a requirement to provide information regarding the alternatives that have actually been considered. NPS EN-1 (Ref 4-9) paragraph 4.4.1 states that "*This NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option. However, applicants are obliged to include in their ES.., information about the main alternatives they have studied".* In accordance with this requirement, the sections that follow present those alternatives to the Proposed Development which have been considered by the Applicant.

Do Nothing Alternative

4.7.2. The 'do nothing' alternative refers to the option of withholding (indefinitely) any plans for redevelopment of the Site and leaving it in its current state.

4.7.3. The Site currently contains redundant boiler houses, turbine halls, fuel storage facilities, switchrooms, control rooms, offices and various other ancillary plant for the existing and decommissioned SHP Plant. If no development were to take place, this area of land would remain in its current state pending a decision on whether to undertake development. A large proportion of the Site might therefore be vacant and underutilised in the middle of an otherwise vibrant location within the Slough Trading Estate, whilst reducing the amount of electricity generation undertaken locally.

4.7.4. Considering the ground conditions of the Site (with concrete slabs and disturbed soil at ground level), and its industrial heritage and surroundings, there is little likelihood of it regenerating or improving in condition over time without civil and/or remediation works in some form. Hence, the 'do nothing' option will not improve the nature and condition of the Site, or its value as a resource for generating electricity and heat.

4.7.5. The key disadvantages of the ‘do nothing’ option relate to opportunity costs, such as:

- The missed opportunity to make a significant investment in the local Slough economy and to create and retain skilled jobs in the area;
- The missed opportunity to generate low carbon electricity and heat through the efficient use of WDF. The Proposed Development represents an opportunity to help the UK achieve renewable energy targets, with lower greenhouse gas emissions than many existing energy technologies (such as coal and gas), and maintains the option to attract new heat users to the area; and
- The WDF would likely otherwise be transferred to landfill.

4.7.6. *Chapter 3: Planning Policy Context* outlines the support given in the NPSs and NPPF for this type of development due to the strong need for energy generation. Paragraph 3.6.4 of this ES states *“there is a presumption in favour of sustainable development…granting permission unless adverse impacts would significantly/demonstrably outweigh the benefits when assessed against NPPF policies taken as a whole or if specific policies indicate development should be restricted...”*.

4.7.7. The ‘No Development’ alternative has therefore not been considered further.

Alternative Sites

4.7.8. The Applicant continuously considers potential sites for new power generation development.

4.7.9. A range of factors are considered in the prioritisation and selection of power station development sites, many of which relate to the commercial viability of development. These include:

- Availability and suitability of sufficient land, preferably already within the ownership of the Applicant;
- Site sensitivity in terms of proximity to sensitive receptors such as residential areas or designated ecological receptors;
- The current and historical use of a site for power generation;
- Site constraints including topography and ground conditions;
- Distance to electricity grid connection and fuel supply and location on the grid network;
- Option for heat supply to adjacent heat offtakes;
- Cost associated with electricity grid connection and fuel supply; and
- Accessibility, including transportation.

4.7.10. Locating the proposed facility within the existing SHP site has a number of significant advantages including:

- The infrastructure for gas, potable/cooling water and electricity export is already present;
- The Site can provide CHP output into the Estate, maximising the beneficial use of the WDF;

- The infrastructure for delivery of solid fuels, including WDF, is already present;
- Knowledge and experience of handling and using WDF safely is already present;
- There are excellent links to existing road infrastructure;
- There is a pool of existing skilled labour available for operation and maintenance of the Proposed Development, as well as further opportunities for new staff;
- The SHP site is within the Slough Trading Estate where it is intended that regeneration will be encouraged; and
- The Applicant has established local knowledge and relationships.

Alternative Project Options

Alternative Power Generation

4.7.11. The Applicant did not consider large scale power generation from gas or coal at the site as the scale of such development is totally disproportionate to the site and would have a major visual impact. The Proposed Development Site has insufficient space or local infrastructure to gain the economies of scale required for these types of technology, including no rail access, grid connection limitations, cooling and high pressure gas connection. These forms of power generation were not considered further.

4.7.12. A new biomass combustion facility was considered initially but was not developed further as an option due to the uncertainties in securing sufficient fuel combined with the changing regulatory regime that supports biomass combustion. In addition, to gain the economies of scale the Applicant believes are necessary for biomass combustion it would require a plant in excess of 100MWe which would again not be readily supported by the local infrastructure, and the scale of the plant would be such that the height of the boilerhouse would be expected to be significantly taller at approximately 55 to 60m and the stack being around 120m. This was considered to be an unacceptable scale for the Proposed Development Site. This option was not developed further from this as a basic concept.

4.7.13. The multifuel concept was the one selected to develop further because it best met the requirements of the site as set out in Section 4.6.

Alternative Waste to Energy Technologies

4.7.14. The Applicant has chosen to develop a direct combustion plant. Direct combustion was selected because it is considered to be the most proven technology and is able to process a wide range of WDFs. Other combustion technologies that were considered include gasification, pyrolysis and anaerobic digestion.

4.7.15. Like direct combustion, pyrolysis and gasification are thermal processes that use high temperatures to break down wastes into energy-rich fuels by heating the waste under controlled conditions. Direct combustion fully converts the input waste into energy and ash, whereas pyrolysis and gasification deliberately limit the conversion so that combustion does not take place directly. There are relatively few operating plants of this type in the UK and most of these operate on a small scale (<5MWe) with low availability and overall net output.

4.7.16. The Applicant did not select these technologies because it was considered that they are unable to meet the requirements of a plant of the required capacity, availability (a critical consideration for CHP operations) and efficiency, and cannot process a wide range of fuels. Moreover, pyrolysis and gasification are unproven technologies at the scale required by the Applicant.

4.7.17. Anaerobic digestion was not considered a viable option because it can only process non-woody, organic material. It is therefore unsuitable for the Applicant's requirements.

Alternative Transport Options

4.7.18. Due to site constraints, alternative transport options to road transportation have not been considered.

4.7.19. The option for delivery of fuels by rail is not feasible as the rail infrastructure to the SHP site was removed over 40 years ago and a railway siding approximately 1.5km southeast from the site was surrendered and removed in 2007.

4.8 Project Evolution

4.8.1. The following sections describe how the project development studies and site layout evolved, as well as how the conceptual ideas for the Proposed Development were compared against the design specifications and refined accordingly. This section also explains how parameters such as environmental constraints, characteristics and opportunities have influenced the process.

The Proposed Development

Initial Project Concept

4.8.2. The project concept for the Proposed Development was to produce a high quality facility that would optimise the balance between technical, economical, social and aesthetic considerations whilst incorporating the scheme within the context and tight constraints of the existing SHP site.

4.8.3. A design feasibility assessment was undertaken in 2011 to identify the opportunities and constraints that existed on the SHP site, which is presented in Figure 4-10. This was valid at the time of the original project concept work and informed the EIA Scoping Report submitted to SBC in 2012.

4.8.4. Analysis of the feasibility assessment led to the following project brief for the Proposed Development:

- Incorporation and reuse of the existing stacks if possible to prevent any additional stacks on site;
- Masterplan to remove and improve the sprawl of the existing buildings to the rear of the site;
- To reuse and successfully deliver a new facility on a brownfield site;
- Improve the visual appearance of the site from distant and surrounding views from the south; and
- Incorporate the Proposed Development with the existing facilities to provide an efficient and well structured facility.

4.8.5. In March 2013 the Applicant announced the results of a review of thermal generating operations which affected several of the company's power stations including Slough. The primary focus was to ensure that all generation assets contributed to the Company's performance by safely delivering required levels of availability, efficiency, cost effectiveness and sustainable commercial viability. It was stated that the operations at Slough would be loss-making in 2012/13 and similarly in 2013/14 and that the CFB boilers were becoming increasingly uneconomic. It was therefore decided that the CFB boilers and fuel store would be decommissioned on a phased basis ceasing generation completely in 2013. It was noted that decommissioning of the CFB boilers would have the effect of making that land within the SHP site available for alternative use and consequently that this would almost double the area of land available for development.

SHP Multifuel Designs

4.8.6. A series of designs were considered as part of this review for the larger development area:

- A multifuel plant smaller than 40MW was not considered as this would not give the economies of scale or efficiency benefits achieved with a larger plant;
- A design with a single large boiler and single small boiler was ruled out for being a non-standard configuration and due to challenges associated with trying to physically fit the facility within the Site;
- A design with two large boilers (up to 80MWe) was also ruled out for being too large for the Site, making it high risk from a constructability perspective, as well as the potential difficulties with sourcing cooling water on-site for such a facility. It would also have led to an increase in traffic over historical levels, which is recognised as a key issue.

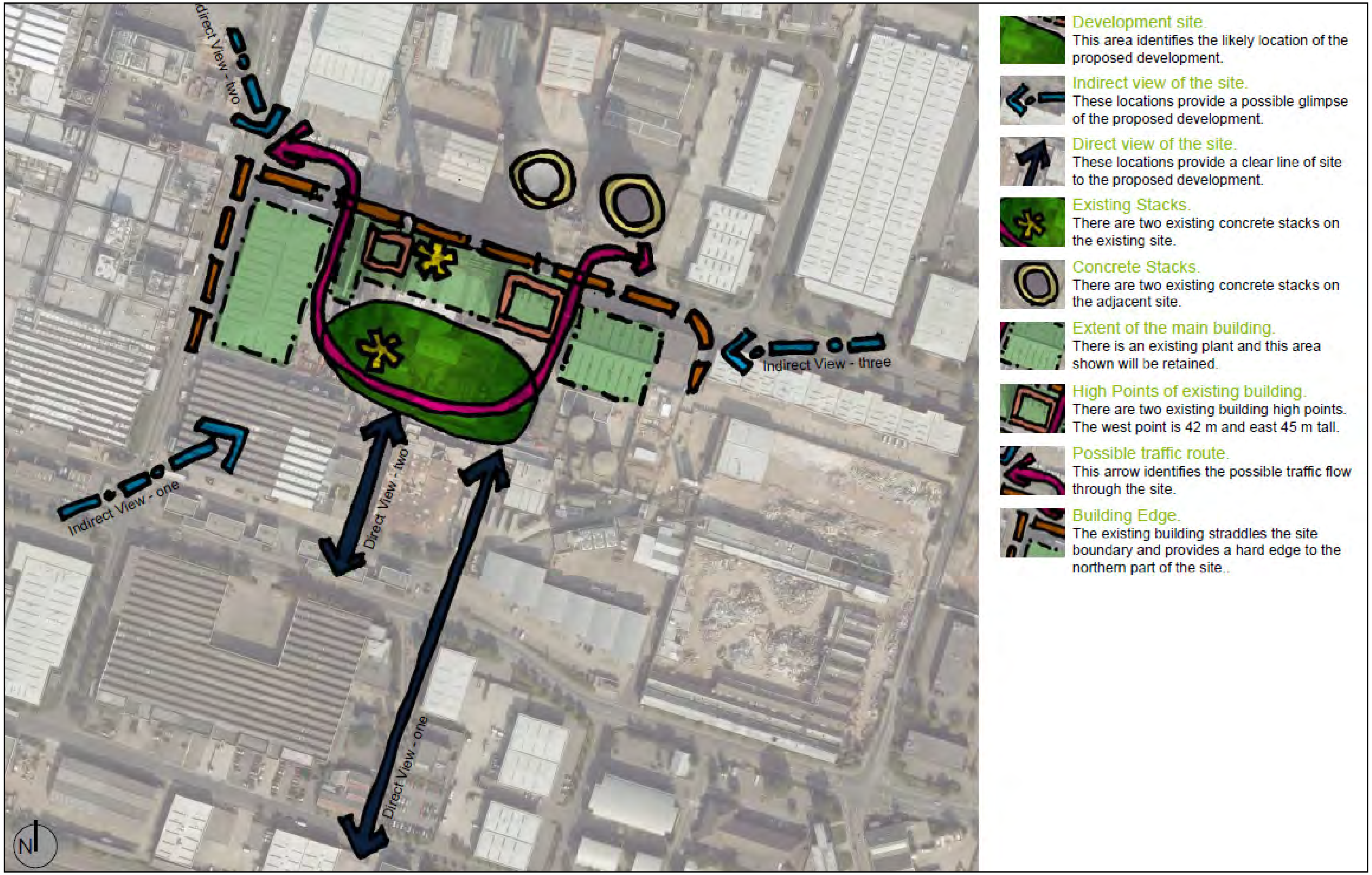
4.8.7. The selected design is for a generating capacity of up to 50MWe utilising up to 480,000 tonnes of WDF and comprising one large or two smaller multifuel boilers and a single turbine. Depending on the final choice, the selected design may require a new stack for discharge of cleaned flue gas (which would replace the existing south stack on the SHP site) or a small extension to the existing south stack. The selected design will require less HGV deliveries than was proposed at the original scoping stage in 2012 at which point the two wood fired CFB boilers and Boiler 17 were expected to remain in service together with a new single multifuel plant of up to 40MWe.

4.8.8. The maximum parameters for the individual buildings presented in *Chapter 5: The Proposed Development* present a combination of the maximum heights and massing for each individual building that would be required to deliver the project and in order to present a conservative assessment of worst case effects associated with the Proposed Development.

4.8.9. In early dialogue with a number of consultees minimising the proposed boilerhouse (and associated roof furniture) and fuel store height, so as to minimise visual effects, was considered important. This feedback was taken into account and the maximum height of any proposed new buildings (including roof furniture) onsite has been limited to 48m, less than the 49m height of the cooling towers, with the exception of a new stack, if required, which would be at a height of up to 90m.

4.8.10. The proposed 48m height of the boilerhouse is based on the maximum design parameters of the internal equipment required for the Proposed Development as offered by a series of tender bids for the project. A reduction in the massing of the building was therefore not feasible at this stage, although the height of the boilerhouse may yet be reduced at the detailed design stage when evaluation of the design bids has been completed.

Figure 4-10 Opportunities and Constraints Mapping for the SHP site undertaken in 2011



Design Iterations

4.8.11. During the project development process, a series of design iterations have occurred, which have led to key changes to the design specifications of the Proposed Development. The main development iterations are discussed below and comprise:

- Preliminary site layout and design for the EIA Scoping Report, dated November 2012 (Figure 4-11 and Figure 4-12);
- Iteration 1 - Fichtner Drawing, August 2013 (Figure 4-13); and
- Iteration 2 and Final Indicative Design - The Proposed Development, September 2013 (which is shown in Figure 5-1, *Chapter 5: The Proposed Development* of this ES).

4.8.12. Figure 4-11 and 4-12 illustrate the preliminary illustration and site layout drawing used to inform the EIA Scoping Report, dated November 2012. This was a preliminary evaluation developed by the Applicant and its design engineer based on previous experience of similar sites in the UK. The Site was approximately 1ha and did not include the CFB boilers or fuel store which are in the eastern half of the SHP site (shown in Figure 4-1), and which were operational facilities at the time. As a consequence the layout represented a single boiler unit (a 'single line') of approximately 40MW gross electrical capacity, which was limited in size by the 1ha site.

4.8.13. The preliminary layout incorporated an enclosed fuel tipping hall with the lorry manoeuvring yard shared with the fuel store in the eastern part of the Site. To the west of the tipping hall was an enclosed fuel bunker with the boiler, flue gas treatment building and the existing stack located in the western side of the Site. This general layout has not changed considerably during the evolution of the Proposed Development.

4.8.14. Following the EIA Scoping process, the Applicant announced the closure of the CFB boilers in March 2013, which were becoming increasingly uneconomic and therefore would be decommissioned. This had the effect of making land within the SHP site available for alternative use and consequently meant that additional land was available for development. This provided an opportunity to increase the Proposed Development Site area, which in turn allowed a greater number of options and layouts to be considered.

4.8.15. The Applicant invited a number of industry leading contractors to provide their initial concepts for the Proposed Development. An amended layout drawing was subsequently created in August 2013 which incorporated the maximum footprints and heights from the responses. This is shown in Figure 4-13. The general layout is similar to the preliminary design, albeit with more detail on the internal roads and utilising the additional space that became available following the closure of the CFB boilers. The amended layout also includes an enclosed tipping hall and lorry manoeuvring area.

Figure 4-11 Preliminary Illustration of the Proposed Development

Figure 4-12 Preliminary Masterplan included in the EIA Scoping Report, November 2012

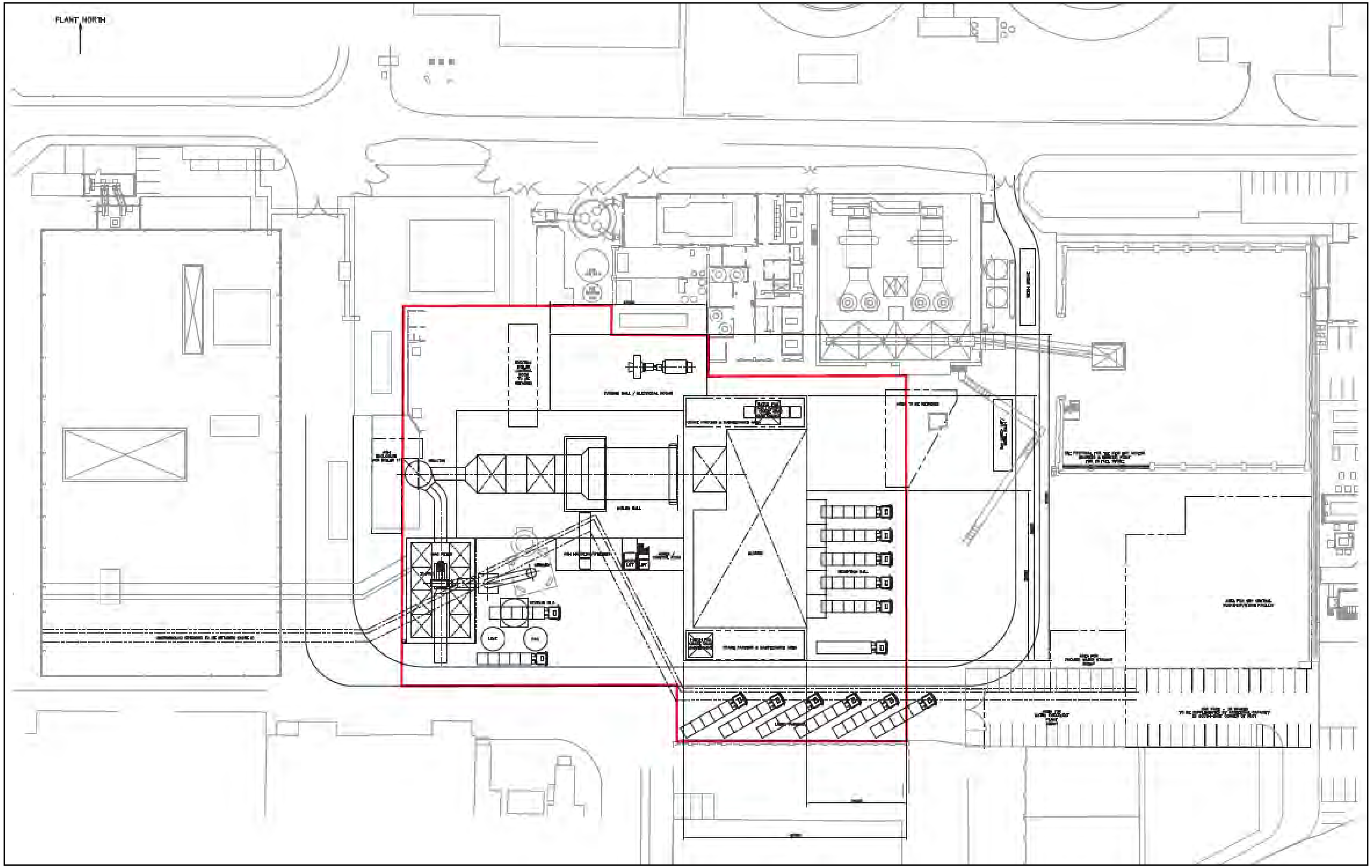
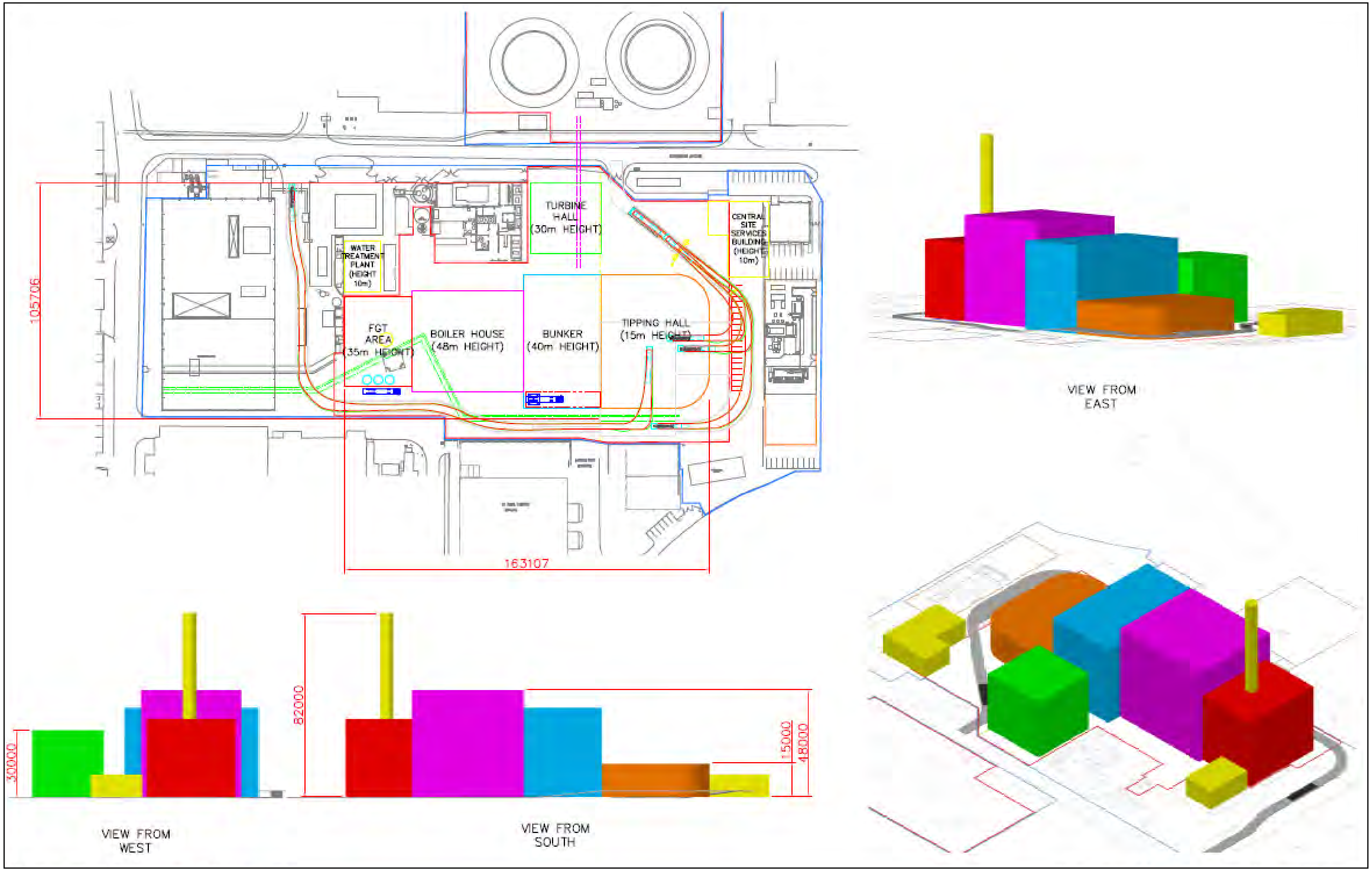


Figure 4-13 Iteration 1 - Masterplan based on Contractor Concept Drawings, August 2013



4.8.16. *Chapter 5: The Proposed Development* presents the proposed design for the purpose of the Planning Application on which the technical assessments have been based. It is similar to the August 2013 layout, but with a slightly different ramp and internal road configuration, and amended Site boundary to reflect more recent discussions with SBC.

4.8.17. The Proposed Development will comprise an enclosed tipping hall and fuel bunker, up to two furnaces where the WDF will be combusted and boiler unit(s) to raise steam, a turbine hall with a steam turbine to generate electricity, up to two Flue Gas Treatment (FGT) plants to clean the flue gas, and a new stack for discharge of cleaned flue gas (which would replace the existing south stack on the SHP site) or an extension to the existing south stack.

4.8.18. The building design has evolved during the EIA process, whilst maintaining the planning envelope shown in Figure 4-13, i.e. no change in building footprints, heights and massing. The resultant design is presented in the planning application drawing pack and the Design and Access Statement, together with a Design Code. The Design Code sets out the principles of the detailed building design (including colours, textures etc.) which will be provided by the appointed contractor and submitted to SBC for approval prior to commencement of construction at the Site. The ES visualisations in *Chapter 5: The Proposed Development* and the photomontages in *Chapter 14: Landscape and Visual* are consistent with the planning envelope. The building design evolution has not affected the baseline conditions, predicted impacts and mitigation measures, or conclusions of the ES.

4.8.19. As stated above, within the building envelope parameters set by the planning application, detailed process plant design will be required following the identification of a supplier and contractor. This will include minimising the footprint, building mass and building height relative to the existing site ground level (32m AOD) by considering a range of measures which might include:

- Lowering some or all of the floor level of the boilerhouse by up to 4m below the existing site ground level of 32m AOD;
- Selecting a single loading crane track in the bunker building which may reduce the bunker building height by up to 5m compared to the site ground level;
- Optimising the boiler layout which may reduce height relative to the site ground level but increase length; and
- Optimising the FGT plant layout and access for maintenance requirements.

4.8.20. Further design evolution and the final design of the Proposed Development will be within the parameters set out by the planning application (this EIA, the Design and Access Statement and the Design Code) and will be undertaken in consultation, and agreed with SBC post-consent.

4.9 Conclusions

4.9.1. Over the course of the design process, the Proposed Development has developed through careful appraisal of potential environmental effects, infrastructure requirements, commercial considerations, transport methods and routes, options for mitigation of effects and layout.

4.9.2. The announcement in March 2013 that the biomass/waste wood CFB boilers would be closed had the effect of making land within the SHP site surplus to requirements. It consequently meant that additional land was available for development and provided the opportunity for additional space onsite to develop the design for the Proposed Development and increase the maximum electrical capacity from 40MW to 50MW.

4.9.3. The project design process was an iterative process whereby analysis of alternatives was interpreted and proposals made in order to address the feedback of stakeholders (as shown in Table 2-1, *Chapter 2: Assessment Methodology* of this ES) and mitigate potentially adverse effects. Whilst the site strategy has remained in line with the development brief, the detailed design has evolved throughout the design and consultation process.

4.9.4. This process ultimately led to the present use, scale and form of the Proposed Development, which is described further in *Chapter 5: The Proposed Development*.

4.9.5. Within the parameters set by the planning permission, further design and evolution work will be required following the identification of a supplier and contractor.

4.10 References

Ref. 4-1 Industrial Emissions Directive (2010) Special Provisions for Waste Incineration Plants and Waste Co-Incineration Plants (2010/75/EU)

Ref. 4-2 HMSO (2011) Waste (England and Wales) Regulations 2011

Ref. 4-3 EC (2006) Waste Framework Directive 2006/12/EC, European Commission

Ref. 4-4 Defra (2007) Waste Strategy for England 2007, HMSO

Ref. 4-5 DECC (2007) Energy White Paper, Department for Energy and Climate Change, HMSO.

Ref. 4-6 HMSO (2009) UK Renewable Energy Strategy

Ref. 4-7 DECC (2011) National Policy Statements for Energy, 2011, Department for Energy and Climate Change, HMSO.

Ref. 4-8 Town and Country Planning (Environmental Impact Assessment) Regulations 2011, HMSO.

Ref. 4-9 Overarching National Policy Statement for Energy EN-1

5. THE PROPOSED DEVELOPMENT

5.1. Introduction

5.1.1. This chapter of the ES presents a description of the Proposed Development, as follows:

- Section 5.2 – Overview. This provides a brief introduction to the Proposed Development.
- Section 5.3 - Demolition and Construction Works. This summarises the key activities and processes during the enabling, demolition/construction and commissioning of the Proposed Development.
- Section 5.4 - Description of the Proposed Development and its ancillary infrastructure.
- Section 5.5 – Decommissioning of Plant. This summarises the likely activities that will be carried out during the eventual decommissioning of the Proposed Development.

5.2. Overview

5.2.1. The Applicant is seeking planning permission under the Town and Country Planning Act 1990 (Ref. 5-1) from SBC on a part of the SHP site at 342 Edinburgh Avenue, SL1 4TU to undertake development of a multifuel CHP generating station of up to 50MW gross electrical capacity, together with associated infrastructure (the *'Proposed Development'*). The Applicant is the current operator of the SHP site.

5.2.2. The Proposed Development Site ('the Site') is approximately 1.9ha and is located within the existing SHP site[1]. As discussed in *Chapter 4: Site Description, Project Alternatives and Evolution* of this ES, the Site currently contains a number of buildings and structures of varying ages, including boiler houses, turbine halls, fuel storage facilities, switchrooms, control rooms, offices and various other ancillary plant. The Site is mainly impermeable hardstanding and buildings which will require clearance in order to release the space for the Proposed Development.

5.2.3. The Proposed Development will comprise: an enclosed tipping hall and fuel bunker; up to two furnaces where the WDF will be combusted and boiler unit(s) to raise steam; a turbine hall with a steam turbine to generate electricity; up to two flue gas treatment (FGT) plants to clean the flue gas; and a new stack for discharge of cleaned flue gas, which would replace the existing south stack on the SHP site, or a small extension to the south stack. The indicative layout of the Proposed Development is presented in Figure 5-1.

5.2.4. The Proposed Development will be designed to use a range of WDF, with a design fuel throughput of approximately 400,000 tonnes per year, and a maximum capacity of 480,000 tonnes at the lowest average calorific value (CV) fuels expected. Around 100,000 tonnes per annum of reagents and residues will be transported to and from the Site. The WDF for the Proposed Development will be delivered by road. Combustion of hazardous material, processing of waste at the SHP site and use of unprocessed black bag waste as a fuel will not be permitted.

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[1] The Proposed Development Site boundary includes visibility splays within the adjacent highway as illustrated in Figure 5-1.

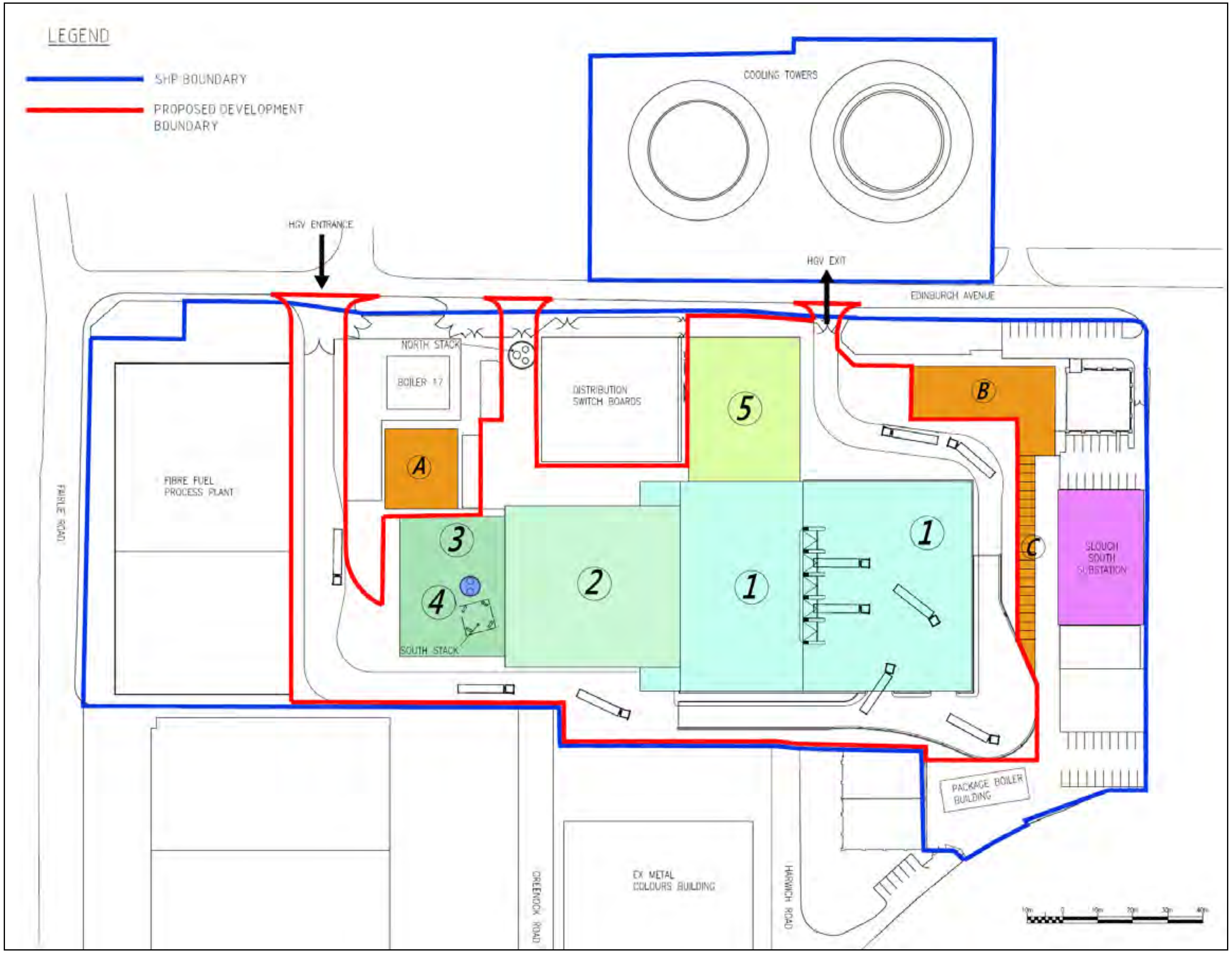
5.2.5. The Proposed Development will include a below ground electrical connection to Slough South substation, which is located within the SHP site (see location on Figure 5-1), under permitted development rights on the SHP site.

5.2.6. To ensure that competing suppliers of multifuel process plant can be accommodated within the building envelope, the Applicant has defined parameters upon which to base this EIA, to ensure that the likely significant effects of the development have been robustly assessed. The design parameters provide a 'worst-case scenario' for the Proposed Development, including footprint, mass, height and colour / tone. The Applicant has included a Design and Access Statement, together with a Design Code that sets out the design details. Further building design evolution and the final design of the Proposed Development will be within the parameters of the planning application, this ES, the Design and Access Statement and the Design Code, and will be agreed with SBC post-consent.

5.2.7. In addition to the Proposed Development there is a requirement for Further Development on the SHP site, which will include a new central site services building, a water treatment plant and parking to serve both the Proposed Development and other generating facilities (see items A-C on Figure 5-1). This will be the subject of a separate planning application to be submitted in parallel with the application for the Proposed Development, as described in *Chapter 2: Assessment Methodology.*

5.2.8. The following sections of this chapter describe the expected approach to demolition/ construction and operation of the Proposed Development in further detail.

Figure 5-1 Proposed Development Site Layout



Main Layout Features of the Proposed Development:

1 – Enclosed tipping hall and fuel bunker

2 – Boiler house

3 – Flue Gas Treatment (FGT) plant

4 – Possible new stack to replace the existing south stack

5 – Turbine Hall

Main Layout Features of the Further Development:

A – Water Treatment Plant

B – Central Site Service Building

C – Car Parking

5.3. Demolition and Construction Works

5.3.1. Plans for demolition, site preparation and construction are necessarily broad at this stage and may be subject to modification during any future detailed construction planning. For this reason, the following assessment is based on reasonable assumptions in the construction programme and the collective experience of the EIA and Engineering Design Team with similar projects, particularly in relation to the phasing and timing of the Proposed Development.

5.3.2. This section of the chapter presents a description of the demolition, site preparation and construction works for the Proposed Development, including details of the:

- Enabling Works;
- Ancillary Works as Permitted Development Rights;
- Programme of Works;
- Types of Plant and Equipment;
- Potential Construction Laydown and Contractors Compound;
- Construction Hours of Work;
- Access and Traffic Management;
- Construction Workforce;
- Demolition Works;
- Demolition and Construction Method Statement (DCMS); and
- Construction and Environmental Management Plan (CEMP).

5.3.3. Potential environmental effects identified within this chapter are discussed in more detail in each of the corresponding technical chapters of this ES (i.e. Chapters 6 to 16).

Enabling Works

5.3.4. The Site has been occupied by decommissioned SHP plant, referred to as boilers 15 and 16, a gas turbine and associated WHRB and two steam turbines (referred to as units 12 and 14), as well as the CFB boilers and fuel store which have been taken out of commercial service. The locations of these buildings are shown in Figure 4-1 of *Chapter 4: Site Description, Project Alternatives and Evolution* of this ES.

5.3.5. Much of the decommissioned plant and equipment was removed from within these structures in 2013, leaving only the physical structure of the building remaining which will be removed as part of the enabling and demolition works for the Proposed Development. This includes the removal of any identified asbestos containing materials. Prior to any demolition works, a full asbestos survey will be commissioned and any remaining asbestos identified within these structures will be removed by a specialist contractor to a suitably licensed facility and notification will be issued to the Health and Safety Executive (HSE).

5.3.6. Enabling works will include the demolition or removal of the remaining features listed above, along with a number of associated buildings (both temporary and permanent) as discussed in *Section 5.3 – Demolition,* paragraph 5.3.34.

5.3.7. An existing underground steam duct crosses the Site (east to west), which may require removal or repositioning within the SHP site as part of the enabling works for the Proposed Development. There are also underground high voltage (HV) cables that emanate from the HV switchrooms on the SHP site, as well as potable water mains, the exact positions of which will need to be identified through survey work and then either avoided or diverted as part of the enabling works.

5.3.8. A new water treatment plant will be installed in parallel with the enabling works to the north of the proposed FGT plant for the Proposed Development as part of the Further Development, as shown on Figure 5-1. Similarly, a new central site services block and associated car parking will be installed in the north east corner of the SHP site as part of this Further Development. These facilities will be located outside of the Site and will be subject to a separate planning application that will be submitted simultaneously to the Proposed Development.

Ancillary Works under Permitted Development Rights

5.3.9. Ancillary work is required in the form of electrical connection to the adjacent Slough South substation located within the SHP site (as shown in Figure 5-1), and immediately east of the Site. The work would constitute underground cables and an additional switch to be installed in a vacant bay at the substation. The work is internal to the SHP site and would therefore be carried out under existing permitted development rights

5.3.10. In addition to the above, some further work to the underground cooling water pipes may also be required. These pipes that pass under Edinburgh Avenue and connect the cooling towers north of Edinburgh Avenue with the power generating stations south of this road. The need for any upgrade or maintenance work would be determined at the detailed design stage and, if required, would be addressed under existing permitted development rights rather than a separate planning application to SBC. The work is likely to be carried out over a few weeks and is unlikely to require the closing of Edinburgh Avenue to reline the pipes. If a road closure were required every effort would be made to keep Edinburgh Avenue open at peak hour times. SBC would be notified in advance of temporary works affecting Edinburgh Avenue to ensure appropriate permissions are in place.

Programme of Works

5.3.11. The current expectation is that demolition, construction and commissioning of the Proposed Development would take approximately 48 months.

5.3.12. Allowing sufficient time to receive planning permission and to discharge expected planning conditions, it is anticipated that the earliest that demolition and enabling works for the Proposed Development would start is in mid-2015, with an expected operational start date of mid-2019. This is the current best estimate, it is intended that the planning permission will allow construction works to start anytime up to 5 years from the date of consent; the start of enabling works could therefore be theoretically delayed until late 2019 / early 2020 (depending on the date of consent).

5.3.13. A Principal Contractor will be appointed by the Applicant for the works, who will in turn develop and implement a Demolition and Construction Method Statement (DCMS) and Construction Environmental Management Plan (CEMP), through which compliance with The Construction (Design and Management) Regulations (2007) (CDM) (Ref. 5-2) will be achieved and any required construction mitigation measures will be managed. A framework CEMP is presented in *Appendix B-1, Volume II* of this ES.

5.3.14. The main activities proposed to be undertaken through this consent application and the approximate duration of the works are indicatively outlined in Table 5-1; however the actual programme will be subject to contractor requirements.

Table 5-1 Indicative Demolition, Construction and Commissioning Activities and Approximate Duration

Year	2015		2016				2017				2018				2019	
Quarter	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**
Design and Procurement																
Demolition Works																
Site Enabling																
Construction Phase																
Main Civil Works																
Mechanical and Process Installation																
Commissioning Phase																

Plant and Equipment

5.3.15. Consideration has been given to the types of mobile plant that are likely to be used on-site during the demolition, site preparation and construction phase of the Proposed Development; they are set out in Table 5-2 together with an estimate of the number of each plant type on site at any one time during certain phases of the work.

Table 5-2 Estimated Plant Type and Equipment during Demolition, Enabling and Construction

Plant	Expected Maximum Number of Plant on Site at any One Time
360 Excavator	5
Dump Truck	6
Cranes	6
Cherry Pickers	8
Hoists	3
Fork Lift Trucks	4
Concrete Delivery Trucks (peak per day)	25
Concrete Pumps	3
Heavy Goods Vehicles (HGVs) (delivering and collecting peak per day)	10
Piling Rigs	4
Generators	5
Pumps	2
Compressors	6

Laydown and Contractors Compound

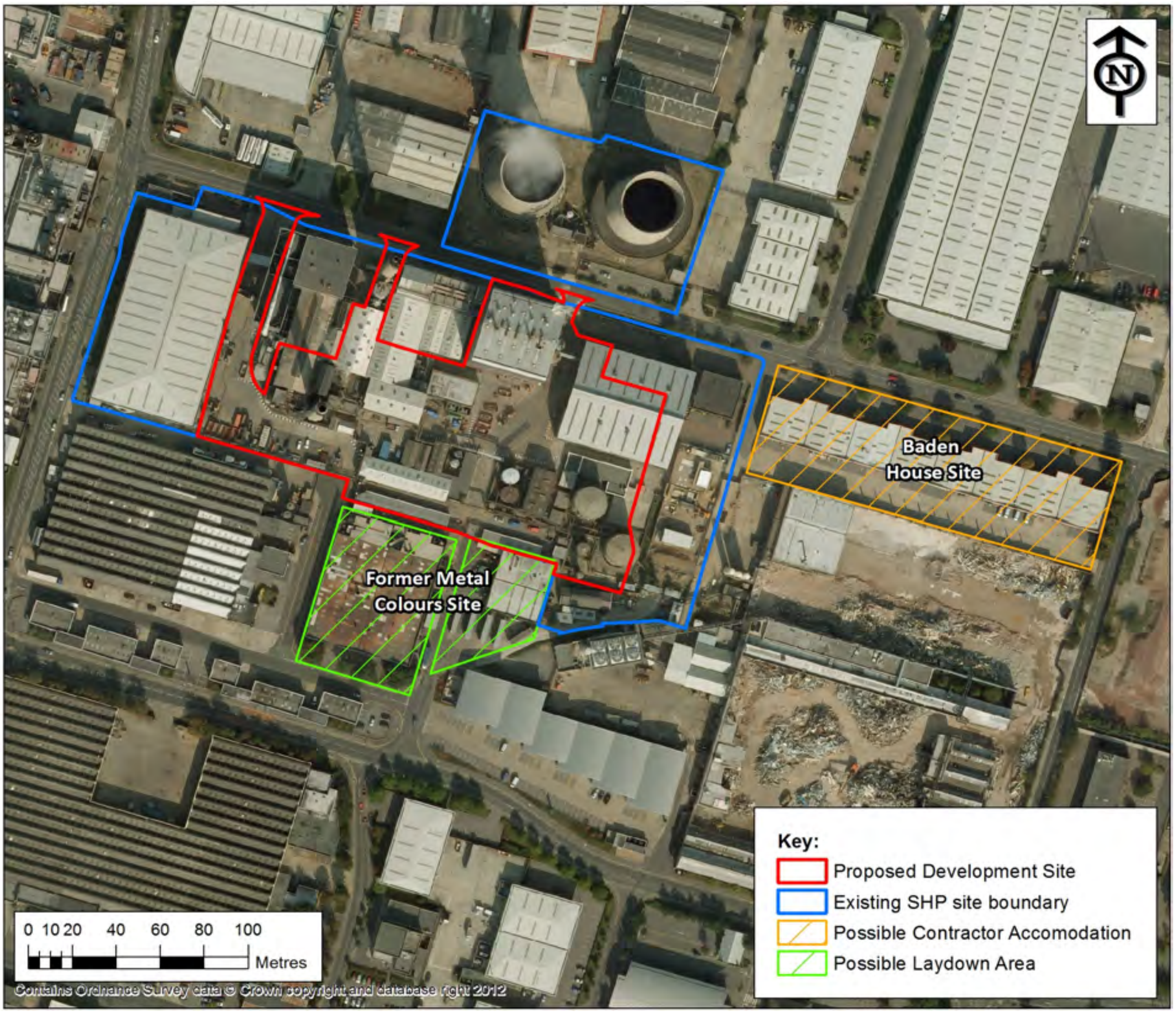
5.3.16. Use of land for temporary laydown areas and a contractor's compound will be required. These may be accommodated onsite within the SHP site, although the contractor may also need to use offsite locations within the Slough Trading Estate if land is available. This may assist management of the logistics around the enabling and construction works. Potential use of offsite laydown or contractor's compound locations within the Trading Estate have been discussed with the Slough Trading Estate landowner, SEGRO. For example, the vacant building immediately east of the SHP site, Baden House (Buildings 343-350), along Edinburgh Avenue may be available for use as contractor accommodation, and the Former Metal Colours site could potentially be used for laydown during construction, subject to availability and agreement of commercial terms. Planning permission will not be required for any offsite areas that might be used for laydown or contractor accommodation as no enabling works such as earth moving will be required.

5.3.17. Alternative sites on the Slough Trading Estate would be considered and the need for, and location of these sites will be agreed with SBC and SEGRO following the selection of the preferred contractor. Alternative locations would be recently demolished sites or vacated buildings and therefore similar in sensitivity to the Former Metals Colours site and Baden House sites. The laydown area and Contractor Compound have not therefore been included within the Proposed Development Site.

5.3.18. The locations of these possible temporary sites are shown in Figure 5-2, which has formed the basis of assessing offsite laydown and contractor accommodation areas in the technical assessments of this ES. SBC will be advised of any changes to the effects at the time the final sites (if any) are secured.

5.3.19. The effect on local traffic flows should an alternative location be found for the temporary laydown areas and a contractor's compound within the Trading Estate is discussed in *Chapter 7: Traffic and Transport* of this ES. Given that no enabling works or permanent structures would be required for these sites, it is not considered that an alternative site in the Trading Estate would affect the other environmental assessments.

Figure 5-2 Possible Temporary Locations of the Laydown Areas and Contractor Accommodation



Construction Hours of Work

5.3.20. It is anticipated that demolition and construction works would be 24 hours a day, 7 days a week.

5.3.21. Noisier activities such as demolition and piling will be limited to daytime and evening hours and avoiding Sundays and Bank Holidays. It is likely that construction activities will be reduced during evenings and night-time; although, the exact nature of construction activities that will be carried out at night are unknown at this stage of the assessment.

5.3.22. The hours relating to the noisier activities may be subject to variation by agreement with the local planning authority. Further details are discussed in Cha*pter 9: Noise and Vibrations* of this ES.

Access and Traffic Management

5.3.23. For the purposes of this assessment is has been assumed that during the demolition and construction phase of the Proposed Development, vehicular access and egress to the

Site for demolition/construction vehicles will be via Harwich Road (the existing HGV access points to the SHP site from Buckingham Avenue to the south of the Site), as shown on Figure 4-1 of *Chapter 4: Site Description, Project Alternatives and Evolution*. Depending on the construction sequence it may be necessary to use other HGV access and egress routes available on site. This could include the Greenock Road entrance or, on occasions, the Edinburgh Avenue HGV entrances. Cars will continue to enter the SHP Site from the existing access points in the northeast (main office) and southeast corners of the SHP site from Harwich Road, thereby keeping these vehicles separate from each other, as well as from the existing HGV deliveries for Boiler 17 arriving/departing by Edinburgh Avenue.

5.3.24. Estimated numbers of demolition and construction related vehicle journeys for the 48 month construction period have been calculated based on volumes of construction material. This includes demolition material. A full impact assessment of the construction vehicle movements on the surrounding road network is presented within *Chapter 7: Traffic and Transport* of this ES.

5.3.25. Onsite parking for construction workers at the SHP site will be restricted to an absolute minimum, which will be approximately 20 bays. No new parking spaces will be provided onsite at the SHP site during construction. The Contractor will be required to demonstrate in the CEMP that they have made adequate provision for parking elsewhere which may include their agreed laydown site.

5.3.26. Unapproved parking on the public roads will not be allowed and the site labour force will be encouraged to use public transport. Any local traffic management measures for site access will be agreed in advance of site works commencing with SBC.

5.3.27. A secure construction compound will be developed in advance of site works, possibly located offsite of the SHP site elsewhere within the Trading Estate, as described in the previous sub-section. This would include car parking and site welfare for operatives. Pedestrian, site and traffic management plans will be produced prior to site works and clear routes established so that vehicle routes to and from and within the Site are clear.

5.3.28. The estimated number of construction vehicles and construction routes is discussed in detail in *Chapter 7: Traffic and Transport* of this ES.

Transportation of Abnormal Loads

5.3.29. Major plant equipment (abnormal loads) including, for example parts of the boiler and steelwork, will be delivered to site via routes identified in *Chapter 7: Traffic and Transport* of this ES.

5.3.30. It is not possible at this stage to identify the exact number and size of any abnormal loads, as these will be dependent on the supplier of the plant, which is yet to be determined. Typically no more than 24 abnormal deliveries are required for a project of this nature. Such loads will be identified in advance to the local authorities, and suitable routes and delivery times agreed to minimise any potential disruption. It is not envisaged that any deliveries will require any modifications to the highways network and all deliveries will comply with UK road regulations.

Construction Workforce

5.3.31. Construction at its peak will employ up to 500 workers on site over an expected 3 shift periods per day (of 8 hours each). This is the equivalent to 166 workers on site at any one time.

5.3.32. On average, there will be around 300 workers on site throughout the commissioning and construction and commissioning periods, working in 3 shift periods per day of 8 hours each. The number of workers during enabling works will be less, with an estimated 100 workers.

5.3.33. The Applicant will encourage the sourcing of local labour through active supply chain engagement. A 'meet the buyer' day will be held where the Engineering, Procurement and Construction (EPC) contractor will liaise with local businesses and suppliers.

5.3.34. The Applicant has also created the Open4Business (O4B) initiative which provides a dedicated web portal offering visibility of business and contractual opportunities to the local community and suppliers. The Applicant would continue with such an initiative at the time the main contracts are let.

Demolition

5.3.35. Redundant plant and ancillary infrastructure that currently occupies the Site will be demolished as part of the Proposed Development. Much of the internal plant and equipment was removed from within these structures in 2013 leaving only the physical structure of the building remaining which will be removed as part of the enabling and demolition works for the Proposed Development. Table 5-3 indicates the plant and infrastructure that will be demolished as part of the Proposed Development and Figure 5-3 illustrates the location of each item of plant.

Table 5-3 SHP Site Areas to be demolished as part of Proposed Development

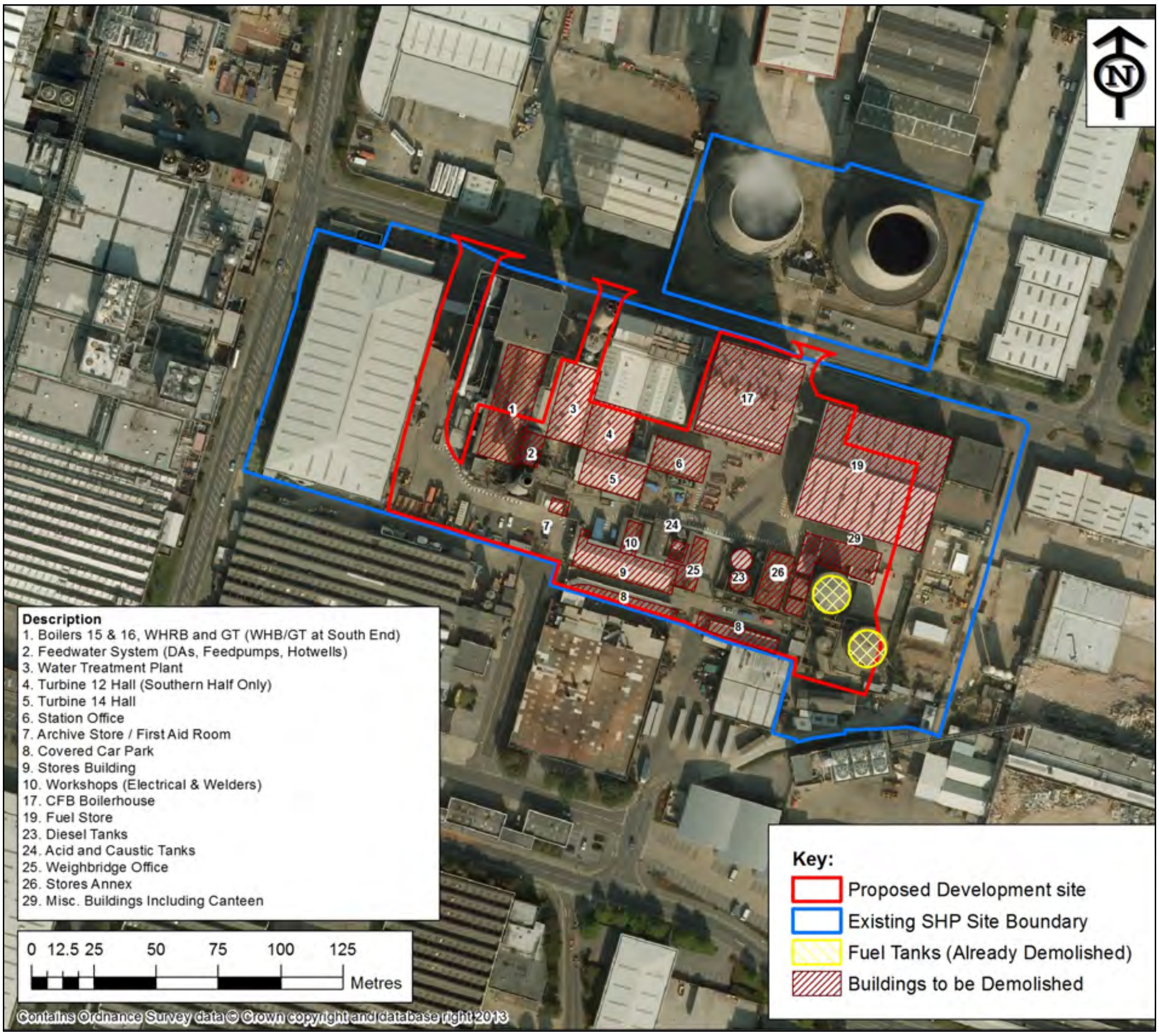
Building Number referred to, as shown in Figure 5-3)	SHP Site Areas to be demolished
1	Buildings containing Boilers 15,16, Waste Heat Recovery Boiler (WHRB) and Gas Turbine (GT)
2	Feedwater system (feed pumps, hotwells)
3	Water treatment plant area
4	Turbine 12 hall
5	Turbine 14 hall
6	Power Station Office / Workshop
7	Archive store/first aid room
8	Covered car parking area
9	Stores buildings
10	Electrical workshop and welders workshop
17	CFB boilerhouse (including boilers)
19	Fuel Store (wood, coal etc.)
23	Diesel tanks*
24	Above ground acid and caustic tanks
25	Weighbridge office
26	Stores annex
29	Miscellaneous buildings including canteen

*Note: *The two oil tanks located in the south east corner of the site have already been demolished.*

5.3.36. Prior to any demolition works, the SHP site asbestos records will be updated and any remaining asbestos identified within these structures will be removed by a specialist contractor to a suitably licensed facility and notification will be issued to Health and Safety

Executive (HSE). A DCMS will be prepared by the Principal Contractor prior to commencing works; this will identify all best practice environmental and health and safety procedures to be adhered to throughout the demolition and construction process. A framework for the DCMS is presented below. Where practicable, recovered materials will be processed and re-used onsite.

Figure 5-3 Structures to be Demolished as part of the Proposed Development



Demolition and Construction Method Statement (DCMS)

5.3.37. The Principal Contractor will be appointed by the Applicant to develop and implement a DCMS through which compliance with The CDM Regulations (2007) (Ref. 5-2) will be achieved and any required construction mitigation measures will be managed.

5.3.38. The DCMS will outline the different procedures to be followed for the various works. Individual sub-contracts will incorporate requirements for environmental and health and safety control, based on good working practice, such as careful programming, resource conservation and adhering to health and safety regulations and quality procedures. In this way, those involved with the construction phase, including sub-contractors and site management, will be committed to adopting the agreed best practice and environmentally sound methods.

5.3.39. The DCMS will be prepared in consultation with SBC at least 28 days prior to the commencement of on-site works.

5.3.40. The DCMS will include the following items:

- The updated demolition and construction programme;
- A broad plan of the construction works, highlighting the various stages and their context within the project, including a schedule of materials and manpower resources, as well as plant and equipment schedules;
- Detailed site layout arrangements (including requirements for temporary works), plans for storage, accommodation, vehicular movements, delivery and access;
- Prohibited or restricted activities (locations, hours, etc.);
- Details of activities that may cause disturbance, with an indication of the expected duration of each phase with key dates, including a procedure for prior notification of SBC and relevant statutory and non-statutory (including neighbours) parties so that local arrangements can be agreed;
- Site working hours including expected periods of specific 24 hour operations;
- A procedure to ensure communication is maintained with SBC and the local community to provide information on any operations that may cause disturbance (e.g. through meetings and newsletters);
- Provisions for affected parties to register complaints and the procedures for responding to complaints;
- Provisions for reporting to the Applicant and SBC; and
- Details of access and egress and proposed routes for HGVs.

5.3.41. Records will be kept and updated regularly ensuring that all waste transferred or disposed of has been correctly processed with evidence of signed Waste Transfer Notes (WTNs) that will be kept on-site for inspection whenever requested.

5.3.42. All demolition and construction works will adhere to the CDM Regulations (2007) through the DCMS.

Construction and Environmental Management Plan (CEMP)

5.3.43. The commitments made within the DCMS and ES will be incorporated into a CEMP, which will include roles and responsibilities, detail on control measures and activities to be undertaken to minimise environmental impact, and monitoring and record-keeping requirements. The CEMP will describe the specific mitigation measures to be followed to reduce nuisance impacts from:

- Use of land for temporary laydown areas, accommodation, etc.;
- Demolition and construction traffic (including parking and access requirements);
- Changes to access and temporary road or footpath closure (if required);

- Noise and vibration;
- Utilities diversion;
- Dust generation;
- Soil or spoil removal;
- Local land remediation;
- Waste generation, segregation and disposal in accordance with the waste hierarchy; and
- Working hours and a procedure for consenting exceptions.

5.3.44. A commitment will be made to periodically review the CEMP and undertake regular audits of its implementation during the construction phase of the Proposed Development.

5.3.45. A framework CEMP is presented in *Appendix B-1, Volume II* of this ES to illustrate the likely structure and content of the CEMP, which would be produced and agreed with SBC following receipt of planning permission.

5.4. Description of the Proposed Development

Proposed Development Site Design and Layout

5.4.1. The Proposed Development layout is presented in Figure 5-1. It comprises an enclosed tipping hall and fuel storage bunker, turbine hall, boiler house, FGT plant, ash handling facilities and a replacement stack, which would replace the existing south stack on the SHP site, or a small extension to the south stack.

5.4.2. Separately, there is a requirement for Further Development on the SHP site, which will include a new central site services building, a new water treatment plant and parking to serve both the Proposed Development and other generating facilities. This will be the subject of a separate composite planning application to be submitted in parallel with the application for the Proposed Development, as described in *Chapter 2: Assessment Methodology* of this ES. The Further Development has been assessed within the ES as a cumulative development and summarised in *Chapter 18: Cumulative Effects.*

5.4.3. The enclosed fuel tipping hall and storage bunker is proposed to be located on the eastern side of the Site. The tipping hall building will be a maximum of 15m above ground level (agl). This area contains the fuel delivery vehicle access point, enclosed tipping hall with approximately 5 tipping bays and fuel bunker and blending facility. The fuel bunker and blended fuel store have the capacity to store approximately 4 days supply of WDF for the multifuel plant when in continuous operation. The tipping hall floor is expected to have a height of approximately 3m above the existing ground level and the base of the bunker slab will be a maximum depth of 4m below ground level (bgl). This will provide the required bunker capacity and should avoid penetrating the ground water, therefore avoiding the need for dewatering the excavated area.

5.4.4. A weighbridge in the 'Fibre Fuel' yard to the west of the Site will be used for weighing vehicles arriving on Site, and a further weighbridge will be required for weighing lorries prior to exiting the Site.

5.4.5. The main multifuel plant will be located mainly to the west of the enclosed tipping hall and fuel bunker. This includes the boiler house and FGT systems. The boiler house will accommodate either a single or twin line system, each comprising a grate and boiler with auxiliary equipment. The boiler(s) will each be connected to a dedicated FGT plant, which will be located to the west of the boiler house. Part of the boilerhouse may also include an underground component, e.g. for storing bottom ash, which would be constructed to a maximum depth of 4m bgl and thus constructed above the groundwater level (see *Chapter 11: Water Resources, Hydrology and Flood Risk* of this ES). The Proposed Development will include a new stack for discharge of cleaned flue gas (which would replace the existing south stack on the SHP site) or an extension to the existing south stack.

5.4.6. Steam generated in the boiler(s) will be passed to a steam turbine to generate electricity for export from the Proposed Development. The turbine will be located in a dedicated building immediately to the north of the bunker.

5.4.7. The electrical connection is expected to be at the Slough South substation which is located within the SHP site (Building 28, as shown in Figure 4-1 of *Chapter 4: Site Description, Project Alternatives and Evolution* of this ES), immediately to the south of the existing Offices (Building 20).

5.4.8. The main structures associated with the Proposed Development are listed in Table 5-4 together with the maximum dimensions and area. These main structures may be subdivided into separate parts such as switchrooms, the control room etc. The proposed layout of these structures is shown in Figure 5-1.

Table 5-4 Main Structures Associated with the Proposed Development

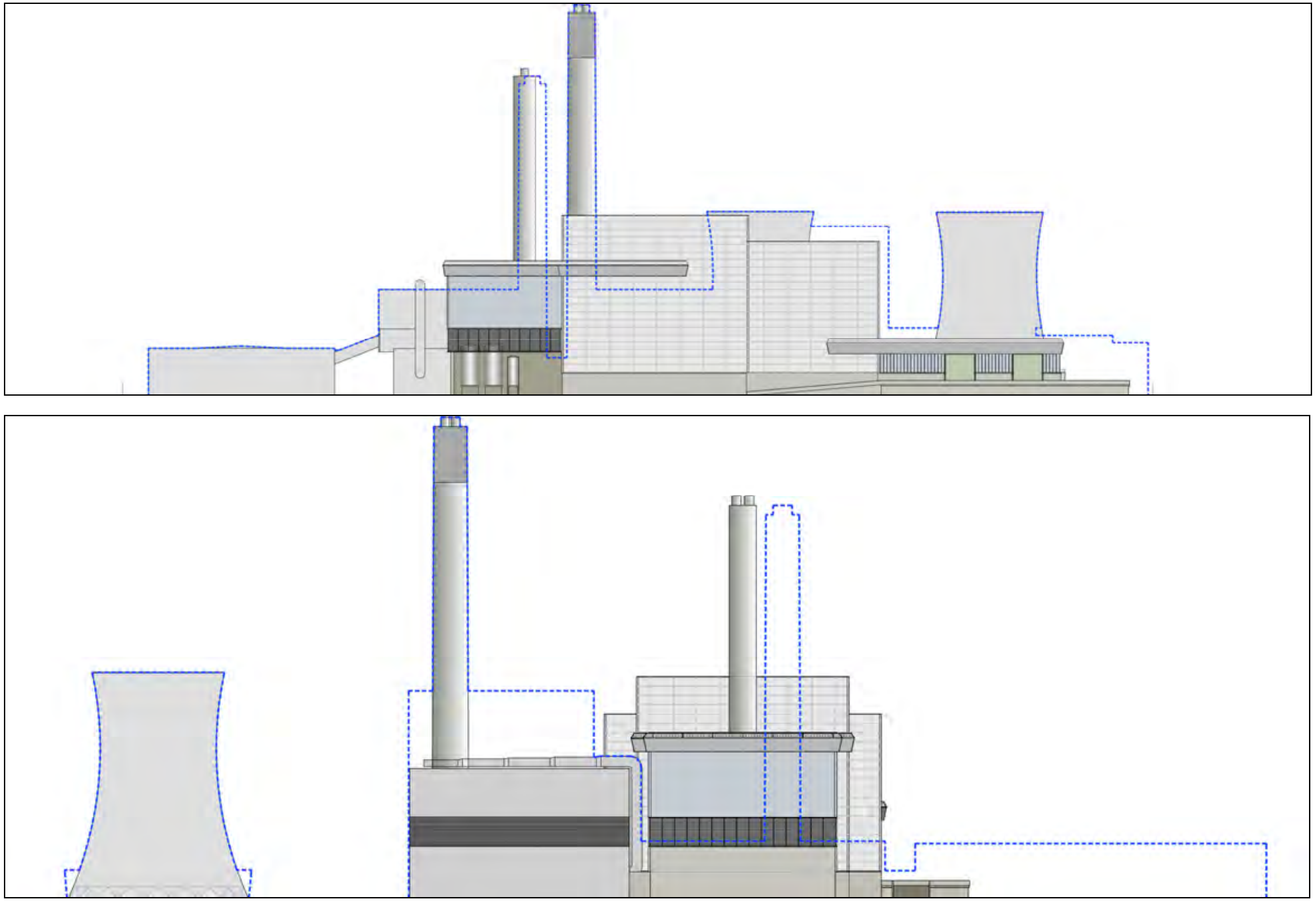
Structure	Description	Maximum Height (m) (agl)	Maximum Dimensions (m)	Maximum Footprint - Gross External Area (GEA) (m^2)
Tipping hall/ offloading area	Receives WDF and directs into approximately 5 tipping bays	15	60 x 48	2880
Fuel storage facility/ Bunker	Holds and blends WDF (approximately 5,000 tonne capacity)	40	60 x 35	2100
Boiler house	Combustion grates and boilers, auxiliary equipment	48	50 x 45	2250
Turbine Hall	Steam turbine	30	40 x 32	1280
FGT/ Abatement system	Stack gas emission control equipment	35	40 x 30	1200
Stack	Emission of residual treated gases	90	7m (diameter)	40
			Approximate Total	**9750m²**

5.4.9. The Proposed Development will lead to an increase in the general bulk and massing of buildings compared with the current structures onsite, mainly in the southern part of the SHP site. The Proposed Development will also increase the total SHP site footprint by around 8% compared with the current structures onsite, with the increase largely occurring in the central and southern parts of the SHP site. The massing was however, limited by the restrictions outlined in *Chapter 4: Site Description, Project Alternatives and*

Evolution, namely limiting the boiler house to 48m (1m less than the cooling towers) and the tipping hall to a maximum height of 15m. The effect of massing on landscape and visual amenity is discussed in *Chapter 14: Landscape and Visual* of this ES.

5.4.10. Figures 5-4 to 5-6 illustrate what the Proposed Development could look like based on the maximum parameters in Table 5-4 above and a 90m replacement stack. By way of comparison a dotted line is shown in Figure 5-4a and Figure 5-4b outlining the existing structures including the existing cooling towers and two main chimney stacks.

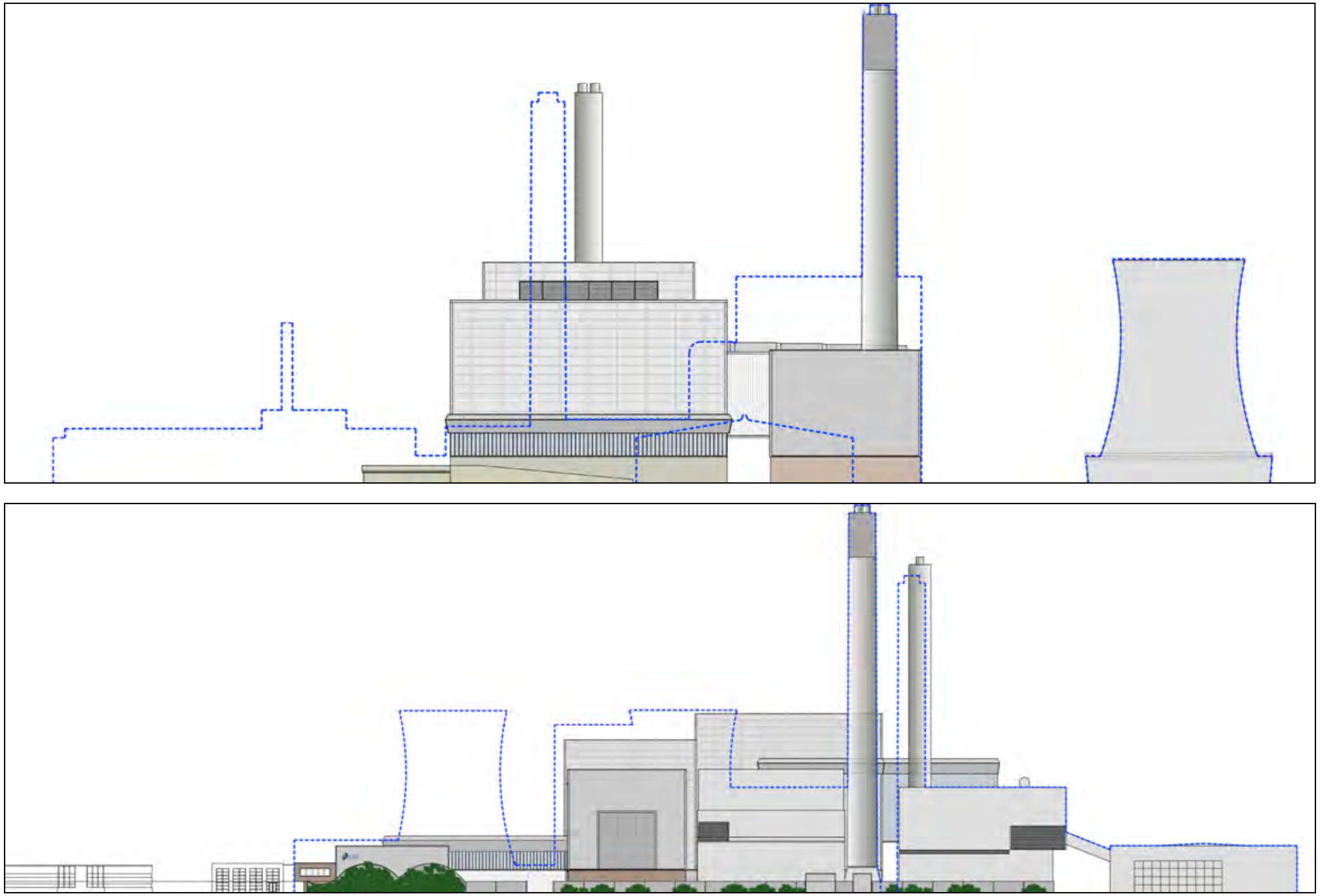
Figure 5-4a Illustrative Drawing of the Proposed Development



Note: Top drawing looking from the south. Bottom drawing looking from the west in an east direction.

Note: a dotted line is shown outlining the existing structures including the existing cooling towers and two main chimney stacks.

Figure 5-4b Illustrative Drawing of the Proposed Development



Note: Top drawing looking from the east in a west direction. Bottom drawing looking from the north.

Note: a dotted line is shown outlining the existing structures including the existing cooling towers and two main chimney stacks.

Figure 5-5 Illustrative Aerial Photomontage of the Proposed Development, viewed from the Southeast looking Northwest

Figure 5-6 Illustrative Aerial Photomontage of the Proposed Development, viewed from the Northwest looking Southeast

Industrial Emissions Directive

5.4.11. The Proposed Development will comply with the Chapter IV of the Industrial Emissions Directive (IED) (2010/75/EU) (Ref. 5-3) so that the impact of emissions to air, soil, surface and ground water, to the environment and human health will be minimised. The IED supersedes the Waste Incineration Directive (WID) (2000/76/EC) but adopts similar requirements, in particular:

- Under all conditions when WID-classified fuel is being fired, gas residence times will exceed two seconds at a temperature of 850°C, measured from the last point of injection of secondary air to the point where the flue gas temperature falls below 850°C; and
- The boiler will be automatically controlled to activate auxiliary fuel burners to maintain 850°C if the temperature falls below this and will prevent the feeding of WID-classified fuel if the flue gas temperature is less than 850°C.

Compliance with these and further IED requirements will be demonstrated under an Environmental Permit application for the multifuel power station, to be submitted to the EA for determination and approval prior to operation of the power station.

Employment

5.4.12. It is estimated the Proposed Development will provide approximately 20 new permanent full time employment positions, as summarised in Table 5-5. Given the nature of the industry, it is likely that some of the employees will be working in shift patterns, with approximately 2 employees per shift (depending on fuelling operations) and the remainder of employees in daytime roles.

5.4.13. In addition, the equivalent of 41 full time employees at SHP are expected to be retained for the operation of the remaining assets on the SHP site.

Table 5-5 Estimated Provision of Employment During Operation

Position	Additional Positions	Existing Positions to be retained	Skill Level
Shift Operative	10	20	Level of expertise comparable to existing boiler/turbine operators
Engineers / Management	2	7	Degree qualified mechanical engineer
Maintenance Technician	4	6	Craftsman level
Day Operatives (Office)	4	8	Manual/Administrative position
Total Full Time Equivalent Posts	**20**	**41**	

5.4.14. In addition, approximately 11 full time equivalent roles are based at the SHP site covering support services such as security, catering and cleaning, as well as SSE employees currently based onsite fulfilling national roles. Other contract staff are also used for the maintenance of plant and equipment.

5.4.15. When fully operational, the Applicant estimates there will be around 72 full-time equivalent posts.

Plant Process

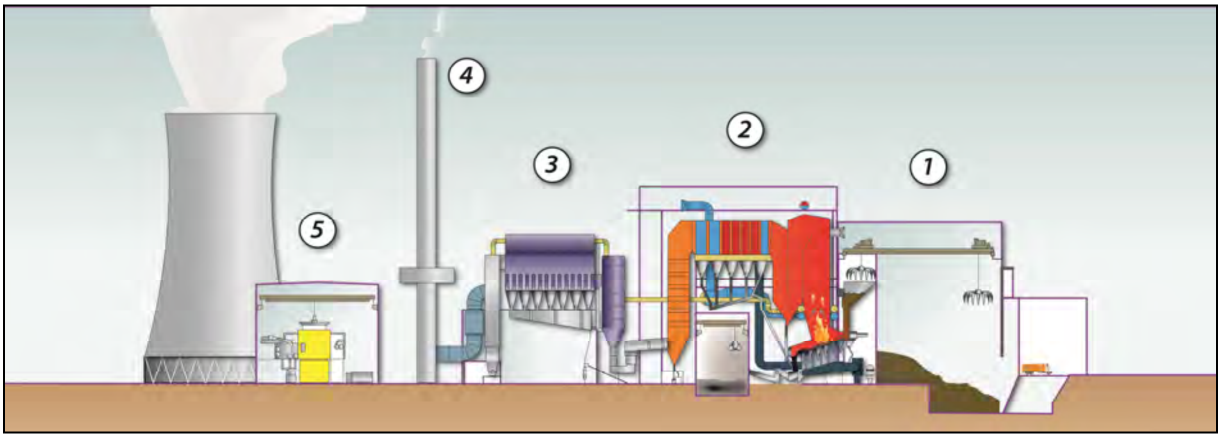
Overview

5.4.16. The Proposed Development will generate up to 50MW electricity and have the potential to supply up to 20MW of low grade heat, although the provision of heat will reduce the electrical output (see *Appendix J-3: CHP Feasibility Assessment* for further details). It is envisaged that plant operation will be a continuous process, operating twenty-four hours per day, seven days per week with periodic offline periods for maintenance on each line. The Proposed Development is anticipated to be operational for at least 8,000 hours per year as an average, equivalent to an overall availability of 91%. It is intended however that the Environmental Permit will allow up to 100% utilisation, which therefore forms the basis of this EIA.

5.4.17. Figure 5-7 provides a schematic cross section through the multifuel power station and includes a graphical representation of the main layout features of the Proposed Development, as shown on Figure 5-1, including:

- 1. Enclosed tipping hall and fuel bunker;
- 2. Boiler house;
- 3. Flue gas treatment (FGT) plant;
- 4. New stack to replace the existing south stack; and
- 5. Turbine Hall.

Figure 5-7 Schematic Overview of the Multifuel Facility



5.4.18. The Proposed Development will utilise WDF derived from waste materials from a variety of sources. The waste materials will be collected, sorted and processed by third parties offsite of both the Proposed Development Site and SHP site with the WDF then delivered to the Proposed Development Site on a scheduled basis in enclosed HGV's.

5.4.19. The existing steam connection from the SHP site to the Slough Trading Estate will be used to export heat and steam to offsite users. The Proposed Development will be able to export heat as either steam or hot water, depending on the requirements of the consumer.

5.4.20. The combustion process will use a grate type boiler. This is proven technology at the scale of the plant proposed for this development and provides inbuilt flexibility to facilitate adequate combustion for a range of fuels within an agreed specification.

Fuels

5.4.21. The Proposed Development will use a range of WDFs that will be delivered to the site ready to use.

5.4.22. The Proposed Development has been designed to operate with fuel flexibility in order to be able to receive a range of WDF within an agreed specification. The WDF will be made elsewhere from various sources of processed MSW, C&I waste and waste wood. Only WDF that has been processed elsewhere to meet a pre-determined fuel composition range will be sourced for the Proposed Development.

5.4.23. The Proposed Development will have a design capacity of 400,000 tonnes per annum (tpa) of WDF, and a maximum capacity of 480,000 tpa at the lowest average calorific value fuels expected. Approximately 4 days fuel storage capacity will be provided in a dedicated concrete bunker onsite. No waste processing will take place on the Site.

5.4.24. The plant will also be capable of using biomass materials such as waste wood, which could be used to substitute for the main fuel sources listed above.

5.4.25. Materials classified as hazardous waste by the Environment Agency will not be accepted for combustion.

5.4.26. The design basis of the facility is based on a net calorific value (NCV) of 12MJ/kg. The plant will also be designed to be able to accept WDF within an NCV design range of circa 8.5-16MJ/kg and therefore fluctuations in the delivered WDF NCV may vary the annual waste throughput. This will not exceed 480,000 tpa of WDF, which is the maximum capacity of the facility.

WDF Delivery and Handling

5.4.27. All WDF will be delivered to the Site by road. The Site is accessed via Edinburgh Avenue to the north of the Site.

5.4.28. WDF will be delivered to the Site in enclosed HGV lorries with circa 110m^3 walking floor or ejector trailers capable of delivering approximately 22 tonnes per vehicle (of any fuel type). WDF deliveries are expected to average approximately 65 per day (at maximum fuel throughput) and will be received 24 hours a day and 7 days a week, although no more than 8 deliveries per hour will take place during the hours 23:00 to 07:00 (a combined maximum of 64 total deliveries at night), in accordance with the proposed restrictions to the operation on the SHP site (see *Chapter 9: Noise and Vibration* of this ES for further details).

5.4.29. The existing entrance weighbridge to the west of the Site was designed to handle high volumes of traffic and has the capacity to accommodate the additional traffic generated by the Proposed Development.

5.4.30. WDF will enter the Site at the northwest corner of the site from Edinburgh Avenue, at what is currently the Fibrefuel Edinburgh Avenue entrance, and proceed to the entrance weighbridge. Only authorised vehicles will then be allowed to discharge into the tipping bays in the enclosed fuel tipping hall and storage area before leaving the Site via a new exit weighbridge, back into Edinburgh Avenue in what is currently the CFB fuel exit immediately to the west of the existing gas compound.

5.4.31. Scheduling deliveries will optimise lorry turn-around times and eliminate queuing as far as practicable, as well as minimising deliveries during peak congestion times on the public roads.

5.4.32. The WDF arriving on Site will already have been processed to prevent non-conforming fuel from being delivered to the Site. However, a rigorous inspection regime will also be put in place that will include review of waste classification codes and Control of Substances Hazardous to Health (COSHH) data, undertaking Duty of Care audits at source, use of a weighbridge system, inspection of loads on delivery (visual and odour inspections), rejection of non-compliant waste (observed oversize, metal or stones) and fuel sampling and testing including that required for regulatory compliance.

5.4.33. The various WDFs will be stored in the fuel bunker (Figure 5-1). It will be operated in a similar manner to a warehouse where the WDF will be mixed and blended either automatically or by site operators using overhead cranes as required. Cranes will transport the WDFs directly from the storage bunker to boiler feed hoppers in the boilerhouse. The hoppers hold about 3 hours of fuel at full load to ensure smooth fuel flows into the combustion process.

WDF Storage

5.4.34. The proposed combustion plant will operate continuously, 24 hours a day, seven days a week. Fuel storage for approximately 4 days of full load operation will be provided to act as a buffer in the event of disruptions in WDF supply or unplanned outages of the plant. All fuels require indoor storage to keep them dry prior to combustion.

5.4.35. The storage bunker will be located to the east of the boiler house. The building will have a storage capacity of approximately 5,000 tonnes and WDF will be stacked by the overhead crane. The depth of the storage bunker will be a maximum of 4m bgl to avoid penetrating the groundwater. The bunker lies partly within the groundwater level and, as requested by the EA, will be constructed "*with a coarse gravel drainage layer (at least 300mm thick) around and beneath the part of the construction which is below the water table to ensure the minimum impact on groundwater levels"*. This is discussed further in *Chapter 11: Water Resource and Flood Risk*.

5.4.36. The fuel storage building will be kept under negative pressure and the air from this contained area will be extracted to provide combustion air to the boiler process to minimise offsite odour, The proposed odour abatement technology will include odour modification and, if confirmed to be required following detailed design, the provision of carbon filtration with a vent positioned approximately 1m above the fuel tipping hall and located in the southeast corner. This is discussed further in *Chapter 8: Air Quality* of this ES.

5.4.37. Extensive fire protection will be included in the design and management of the storage facilities; these measures will be agreed with the Fire Authority prior to construction of the plant.

Consumable Materials Handling and Storage

5.4.38. The plant uses a variety of raw materials during the combustion of WDF. Table 5-6 illustrates the materials to be used and the typical annual usage of each.

5.4.39. Hydrated lime, ammonium hydroxide and activated carbon will be delivered to the Site in HGVs (approximately 22 tonnes per vehicle). A minimum of 7 days storage will be provided for hydrated lime (silo) and ammonium hydroxide (tank) and a minimum of 30 days storage (silo) for activated carbon.

5.4.40. Demineralised water will be provided to a dedicated buffer tank from the SHP site water treatment plant to be installed at the SHP site as part of the central site services development. The water will be supplied from the existing SHP boreholes and reservoirs at Kennedy Park, to the northwest of the Slough Trading Estate.

5.4.41. The following additional consumables will be utilised for operation and maintenance of the plant:

- Hydraulic oils and silicone based oils; and
- Boiler water dosing chemicals.

5.4.42. All chemicals will be stored in fully bunded controlled areas, with each bund having a volume of 110% of the stored capacity of the single largest tank.

5.4.43. Natural gas from the gas distribution network (i.e. no storage on the Site) will be used for start up burners to reach the 850℃ temperature required for combustion of waste. There will be a small diesel generator with its own small diesel tank for emergency standby should the power fail. Diesel will also be kept on site in a portable bowser for use in mobile plant. Spill control measures are discussed in *Chapter 10: Ground* Conditions of this ES.

Table 5-6 Raw Material Usage

Raw Material	Process	Typical Annual Usage	Approximate No. of Annual Deliveries by Road	No. of Weekly Deliveries
Hydrated Lime ($Ca(OH)_2$)	Flue gas treatment – acid gas scrubbing	6,500 tonnes	300	7
Ammonium Hydroxide (NH_4OH) 25% solution	Flue gas treatment – NOx reduction	1,500 tonnes	70	1.5
Activated carbon	Flue gas treatment – removal of dioxins/ heavy metal	200 tonnes	10	<1
Natural Gas	System start-up and combustion controls	300,000 therms	-	-
Borehole Water	Maintain water level in boiler and cooling water systems	200m^3/ hour	-	-

Boiler and Combustion Plant

5.4.44. The combustion unit will use a conventional high efficiency grate system in order to provide reliability and flexibility in fuel type usage, and is likely to include water cooling of the grate to enable low ash waste fuels such as wood waste to be used. Given the range of fuel types expected and the scale of plant, this is considered by the Applicant to be the most appropriate technology choice; a Best Available Technique (BAT) justification for the process technology will be presented to the EA as part of the Environmental Permit application.

5.4.45. WDF is transported onto the grate at a controlled rate. Primary air will be fed to the underside of the grate by fans and secondary air will be fed above the grate. This creates a turbulence to ensure complete combustion while minimising formation of oxides of nitrogen (NO_X).

5.4.46. The WDF feed rate, the grate control and the primary airflows are automatically controlled to minimise non-combusted material in the ash. The ash falls into a removal system, is cooled and transported to the ash handling system.

5.4.47. Combustion gases flow upward into the combustion chamber where additional secondary air is added at a controlled rate to ensure that combustible gases are burnt.

5.4.48. A combustion control system will regulate the gas temperatures, oxygen content and gas flow. The speed of the grate, the addition rate of WDF and the various airflows are also controlled from these measurements. The process is fully automated with safety interlocks. If a problem is detected, the plant will be stopped automatically.

Flue Gas Treatment (FGT)

5.4.49. The design of the FGT system will ensure the plant operates within the requirements of the EU IED requirements for the combustion of WDFs. Site specific limits will be set by the EA in the Environmental Permit to which the plant will conform. Compliance with air pollution legislative requirements is discussed in *Chapter 8: Air Quality* of this ES.

5.4.50. The FGT system consists of Selective Non Catalytic Reduction (SNCR), activated carbon injection, hydrated lime scrubbing, and fabric filters. Nitrogen oxides within the flue gas are predominantly controlled by primary means, through balancing the air fuel ratio in combustion and minimising the flame temperature. However, in the event that IED limits would not be achieved by primary measures alone, the plant will also be installed with SNCR to abate residual nitrogen oxides within the flue gas. SNCR involves injecting 25% ammonium hydroxide or urea into the boiler to react with the nitrogen oxides formed in the combustion process. The resulting products of the chemical reaction are nitrogen (N_2), carbon dioxide (CO_2), and water (H_2O).

5.4.51. A dry scrubbing system that uses hydrated lime as a reagent will remove sulphur dioxide and acid gases produced during combustion. This may include some conditioning through the injection of water. The spent lime is then recovered in the bag filters and a proportion of this may be re-circulated to improve the gas clean up and reduce the amount of fresh hydrated lime used. Activated carbon is also injected to minimise emissions to air of Persistent Organic Pollutants (POPs), mercury and other heavy metals.

5.4.52. After flowing through the dry scrubber, gases are passed through a fabric bag filter to remove particulates (including the injected lime and activated carbon). The treated gas will then pass through an induced draught fan, into the stack for release.

5.4.53. The following list provides a summary of the proposed measures, over and above the hydrated lime FGT system put in place on the boiler to ensure compliance with the IED:

- An automated combustion control system will regulate the volume of primary and secondary air fed into the grate and general combustion conditions (thereby reducing the levels of pollutants and particulates in the flue gas before flue treatment);

- The furnaces will be fitted with auxiliary burners, fired on natural gas to maintain the temperature above 850°C. This ensures adequate destruction of dioxins, furans and other combustion products for the types of fuel to be used in the power station;
- The combustion chambers, casing and ducts and ancillary equipment will be maintained under negative pressure, to minimise fugitive release of gases;
- Use of adequate fuel blending and quality controlled fuel selection to minimise emissions by primary means;
- The combustion chamber temperature will be continuously monitored and recorded during operation;
- Rapid cooling of flue gases by raising steam to minimise the reforming of persistent organic pollutants; and
- SNCR will be fitted to control emissions of NO_X after the use of primary measures.

Emissions Monitoring

5.4.54. Sampling and analysis of all pollutants, including dioxins and furans, will be carried out to appropriate standards (e.g. ISO, national, or international standards) as agreed with the EA. Stack emission levels for each boiler will be monitored by a Continuous Emissions Monitoring System (CEMS) as required by the EA environmental permit.

5.4.55. A dust monitor and differential pressure sensor will be installed on the bag filter outlet that will detect increased dust levels immediately, such as may occur in the event of a burst filter bag. If this should happen, the area of the fabric filter that is leaking will be isolated and the leaking bag replaced. The plant is designed to remain in operation throughout any such maintenance operation, through provision of sufficient redundancy in the availability of different filters.

5.4.56. To ensure IED compliance, emissions monitoring equipment will be maintained in good working order, and repaired within the specified period.

5.4.57. Continuous monitoring of the following process variables will be carried out as required by IED:

- Fuel throughput will be recorded (hourly and annually) to compare with the design throughput;
- Flue gas temperature following secondary air injection;
- Oxygen content of flue gases exiting the boiler;
- Differential pressure across fabric filters;
- Reagent feed rates;
- Upstream hydrogen chloride (HCl) concentration (to optimise performance of emissions abatement equipment); and
- Ammonia concentrations in flue gas (to optimise performance of SNCR system).

5.4.58. Operation of the plant and ongoing compliance with emission limits and environmental regulations will be regulated by the EA through an Environmental Permit for the installation that will be applied for separately to this application.

Stack

5.4.59. Treated flue gases will be emitted to the atmosphere via a dedicated stack. The existing 82m high south stack is expected to be extended to 85m and used for this purpose if the Proposed Development is built as a single line facility with one boiler. Such a plant would have a lower electrical output capacity than a two line system. For a multifuel power station to generate up to 50MW electrical output a twin line facility would be installed and the south stack would need to be demolished and a new twin-flue stack rebuilt in a similar location. The new stack would be 90m in height, based on dispersion modelling results and the assessment of potential environmental impact of predicted emissions from the Proposed Development. This is discussed in more detail in *Chapter 8: Air Quality* of this ES.

Steam Cycle and Cooling

5.4.60. A condensing steam turbine set will be located in the turbine hall adjacent to the boilers (see Figure 5-1). Hot gases from the combustion chamber will pass to the boiler where the energy will be converted into steam.

5.4.61. The high-pressure steam from the boiler will pass to the steam turbine inlet with nominal steam inlet conditions around 420-440°C. The steam is then expanded through the steam turbine to generate electricity. If the turbine is not available, the Proposed Development has the ability for turbine bypass. Steam not extracted in the process is then passed through a condensing heat exchanger, with condensate recovered back into the feedwater system.

5.4.62. The electrical connection for the Proposed Development will be at Slough South substation which is located within the existing SHP site in Building 28 (see Figure 4-1 of *Chapter 4: Site Description, Project Alternatives and Evolution* of this ES), immediately to the south of the SSE Offices (Building 20).

5.4.63. Cooling water from the existing SHP cooling towers to the north of Edinburgh Avenue will be used to condense the steam; the warm cooling water will then be returned to the cooling towers for evaporative cooling.

5.4.64. Approximately 200m^3 per hour of water will be required which will be supplied from SHP's existing groundwater boreholes at Kennedy Park for cooling and boiler feedwater make-up. High quality boiler feedwater will be provided from the new SHP site water treatment plant (which is part of the Further Development discussed above).

5.4.65. Supplemental cooling within the Proposed Development is not expected to be necessary.

Generation Efficiency

5.4.66. Given the type of WDF envisaged to be used and the plant design, a net electrical efficiency of around 27% (Net CV basis) in condensing mode is assumed as the design case for the Proposed Development. This is comparable with other new-build plants of this type and is regarded as the level of efficiency achievable through the use of BAT for a stand-alone plant. However, as discussed below, the use of recovered heat will be used where possible, which would increase the thermal efficiency of the plant.

5.4.67. The overall efficiency of the Proposed Development will be optimised and, as a minimum, will achieve an "R1" value greater than 0.65. The reference to R1 is a method of calculating plant efficiency as set out by Annex II of the Waste Framework Directive 2008 to demonstrate that the plant is a Recovery process.

Heat Export

5.4.68. Recovered heat can be supplied to the heat customers in the form of steam and/or hot water by three methods - from the condenser, the steam turbine and the flue gas). The most appropriate and flexible method of heat provision from the Proposed Development is by extracting steam from the steam turbine. By this method, steam extracted from the steam turbine can be supplied as steam or used to generate hot water for the end user. The steam can be extracted from the turbine at low pressure to maximise the power generated. Due care would be taken by the Applicant to avoid any contamination being carried in the returned condensate back to the boiler.

5.4.69. Heat recovery from this process is capable of providing a significant amount of heat, in this case up to 20MW, which can be supplied to end users in the form of steam or hot water via buried insulated steel pipework.

5.4.70. The Applicant is investigating potential end-users for the heat generated by the Proposed Development, likely to be the Slough Trading Estate (including existing customers), and has conducted a CHP Feasibility Assessment to assess current supply to existing heat customers and to investigate new opportunities. The CHP Feasibility Assessment is attached in *Appendix J-3, volume II* of this ES.

Waste Generation and Treatment

Enabling Phase

5.4.71. The initial demolition and enabling works are expected to last a period of 18 months prior to construction of the power station. Generation of waste during the enabling phase is anticipated to be minimal, as it is the intention of the Applicant to encourage re-use of materials on-site. Table 5-7 provides an indicative schedule of the waste streams likely to be generated during site enabling and how that waste stream is likely to be managed.

Table 5-7 Indicative Site Preparation Waste Produced

Waste Component	Anticipated Management Practice
Brick blockwork from demolition of existing buildings	High potential for re-use on site but no specific use identified at this stage.
Asbestos containing materials	Disposal to a registered treatment facility offsite
Steel from boiler and building structures	Following decontamination, steel will be recycled offsite.
Concrete / brick foundations from demolition of existing buildings	Re-used on site or recycled offsite.

5.4.72. The majority of foundations for the buildings to be demolished and relocated are concrete, and will therefore be recycled offsite of both the Proposed Development Site and the SHP site for use as aggregate material. Crushing and screening of materials will occur on the Site where practicable. It is anticipated that disposal to landfill will be minimal.

5.4.73. At this time, the exact amount of asbestos in the existing plant buildings is unknown although a detailed asbestos register is in place. Any asbestos identified will be handled in due regard to the Control of Asbestos Regulations 2006 (Ref 5-4) and therefore removed and disposed of by a licensed contractor to a registered hazardous waste facility.

Construction Phase

5.4.74. Construction of the Proposed Development is envisaged to take approximately a further 24 months.

5.4.75. Excavated material will be reused on the Site wherever possible. Any contaminated material will be disposed of to an appropriate facility as required.

5.4.76. It is not envisaged that there will be significant amounts of additional waste material to be removed from the Site. Much of the equipment delivered to the Site will be packaged, and the construction contractors will be responsible for removing and recycling/disposing of all packaging and other waste materials that arise during the construction and commissioning of the Proposed Development. The Applicant will seek to minimise the generation of any waste materials, and encourage the re-use and recycling of any residual waste materials generated.

5.4.77. It is not anticipated that waste soils and aggregate will be imported onto the Site for the construction of the Proposed Development.

Operational Phase

5.4.78. The Proposed Development will be designed with a design fuel throughput of approximately 400,000 tonnes of WDF per year, and a maximum capacity of 480,000 tonnes at the lowest average calorific value fuels expected. In this way, material can be diverted for low carbon energy generation that would otherwise have been disposed of to landfill.

5.4.79. The plant will produce two types of by-product streams; a FGT residue, which is a by-product of meeting the air emission limits set by the IED, and a wet bottom ash. The Proposed Development will have separate handling and storage facilities for the two by-product streams within the Site.

5.4.80. Table 5-8 provides a breakdown of the residual waste likely to be generated on an annual basis by the Proposed Development, along with the anticipated management practice to be adopted.

Table 5-8 Indicative Operational Production of By-products

By-product	Approximate Quantities (tpa)	Anticipated Management Practice
Bottom Ash	80,000 (wet)	Stored in controlled area on-site. Exported by road to be recycled as aggregate where feasible. A landfill facility will be identified as a back-up option should recycling be unavailable.
FGT Residue	15,000	Stored in sealed silos on site. Classified as Hazardous Waste. Currently envisaged to be sent to landfill, however alternative options for recycling through the use of new technology are being considered by the Applicant.
Ferrous Material (removed from bottom ash)	800 (assuming 1% of bottom ash)	Recovered and recycled.

5.4.81. Bottom ash generated in the boiler consists of the non-combustible fraction of the various WDFs, including predominantly paper fillers, residual grits, glass and metal. It is envisaged that there will be approximately 80,000 tonnes (wet) bottom ash produced per year.

5.4.82. Bottom ash will be quenched in a water trough before being discharged into a controlled area where it will be temporarily stored awaiting final disposal. The bottom ash will be stored in a below ground component of the boilerhouse which will be constructed to a maximum depth of 4m bgl to avoid penetrating the groundwater and with a coarse gravel drainage layer (at least 300mm thick) around and beneath the part of the construction which is below the water table to ensure the minimum impact on groundwater levels, as requested by the EA. This is discussed further in *Chapter 11: Water Resource and Flood Risk* of this ES.

5.4.83. At this stage, the bottom ash residue is considered inert and where possible will be recycled, for example as Alternative Raw Material (ARM) in cement kilns, for block making or in general low-grade aggregate use. At this early stage of the project development a number of existing ash re-processors for energy from waste plants have been identified around the Region with some capacity, including a number of aggregate companies who would have the infrastructure for a bottom ash reprocessing plant. It would be the Applicant’s intention to procure ash recycling services through a competitive tender process. Where recycling is not possible, a suitably licensed back-up landfill site will be used for disposal of bottom ash.

5.4.84. WDF may be processed offsite of both the Proposed Development Site and the SHP site to remove ferrous metals prior to use as fuel, so quantities of ferrous metals within the feedstocks are expected to be low. It is estimated that this will amount to less than 1% of the bottom ash tonnage.

5.4.85. The bottom ash discharge system will be fitted with an overband magnet to remove any residual ferrous metal after combustion where practical. The ferrous material removed from the bottom ash will be discharged to a storage pit and recycled.

5.4.86. FGT residues contain residual fuel ash from the boiler together with reagents and reaction products from the hydrated lime scrubber. It will be stored in a sealed silo adjacent to the FGT facility. It is anticipated that approximately 15,000 tonnes of FGT residue will be generated each year.

5.4.87. FGT residue is designated as hazardous waste (due to its alkaline nature) and therefore will be sent by road tanker for offsite treatment prior to recycling (if and when this becomes available) and/or disposal.

5.4.88. Wastewater will be relatively minor from the Proposed Development and will be recirculated within the power station where possible, typically through the ash quench system. It is likely to consist of boiler blowdown. Any that is generated and can’t be recirculated would be discharged to the foul sewer as is currently the case on the SHP site. It is a requirement of the IED that any potentially contaminative water is retained on site for appropriate treatment prior to disposal. The potential for cooling tower blowdown already exists on the SHP site, and therefore this is not considered part of the Proposed Development.

5.4.89. Domestic effluent will be discharged to the existing foul sewer system, whilst surface water runoff will be discharged to soakaways onsite or a culvert running along the northern edge of Edinburgh Avenue, as is currently the situation.

Access and Traffic Management

5.4.90. As there is no rail connection or waterway in close proximity to the Site, all WDF, reagents, bottom ash and FGT residues will be transported to and from the Proposed Development Site by road.

5.4.91. HGV access and egress to the operational Proposed Development will be via two existing points of access/egress along the northern boundary of the Site on Edinburgh Avenue. This includes the existing Fibrefuel entrance to the northwest of the Site, where WDF delivery lorries will enter, and the existing CFB (biomass) fuel delivery exit to the northeast of the Site where they will exit.

5.4.92. Access to the two offices at 6 and 342 Edinburgh Avenue will also be retained, as well as the residue offloading enclosure under the north stack, which is also accessed from Edinburgh Avenue (and is situated between the entrance and exit described above), and an entrance/exit for light vehicles in the southeast of the SHP site off Harwich Road.

5.4.93. No substantive upgrade works are expected to be required along the proposed access roads within the SHP site and the effect of all vehicular movements has been assessed as part of this EIA. Further details can be found in Chapter 7: Traffic and Transport.

5.4.94. WDF deliveries are expected to average approximately 65 per day (at maximum fuel throughput) and will be received 24 hours a day and 7 days a week, although no more than 8 deliveries per hour will take place during the hours 23:00 to 07:00 (a combined maximum of 64 total deliveries at night), in accordance with the proposed restrictions to the operation on the SHP site as described in Chapter 9: Noise and Vibration of this ES.

5.4.95. The Proposed Development is expected to generate on average 67-80 HGV deliveries per day. This number of deliveries includes the supply of WDF and reagents for the plant as well as vehicles to remove bottom ash and FGT residue following combustion. A breakdown of the daily average deliveries expected during operation of the Proposed Development is presented in Table 5-9 based on the lowest CV fuel, i.e. the worst case scenario.

Table 5-9 Daily Average HGV Deliveries for the Operational Phase of the Proposed Development

Material	Description	Approximate Annual Quantities (tonnes per annum)	Approximate Average Daily Deliveries
Fuel	WDF	480,000 (maximum capacity)	65
		400,000 (design capacity)	54
	Gas	-	Pipeline
Reagents	Hydrated Lime	6,500	1
	Activated Carbon	200	<1
	Ammonia	1500	<1
Residues	Bottom Ash	80,000 (maximum capacity)	11
		67,000 (design capacity)	9
	Flue Gas Treatment	15,000	2
Water	Raw Water	1,600,000	Pipeline
Total Daily Average Road Deliveries (Maximum Fuel)			**80**
Total Daily Average Road Deliveries (Design Fuel)			**67**

5.4.96. In addition to the 67-80 HGV deliveries per day a further 20 deliveries per day will continue to arrive for other operational plant on the SHP site. Therefore for the SHP site the daily average will be around 87-100 deliveries per day but increasing up to a maximum of 126 deliveries on any one day.

5.4.97. WDF will be delivered to the Site, entering the northwest entrance by the Fibrefuel building and following an anti-clockwise one-way internal road system via a weighbridge. The vehicles will ascend up a circa 3m high ramp (gradient circa 1:12) and enter the enclosed fuel tipping hall and storage area to the southeast of the Site before exiting the tipping hall and descending down a separate ramp. Lorries will then pass over a second weighbridge and exit from the northeast of the Site onto Edinburgh Avenue using what is currently the CFB fuel exit.

5.4.98. At the main access point on Edinburgh Avenue (by the Fibrefuel building), the entrance barrier will be relocated further into the Site to avoid queuing on the road due to HGVs protruding, and the access and the exit on Edinburgh Avenue will become yellow box junctions as part of the Proposed Development to prevent vehicle blocking or queuing at these junctions.

5.4.99. Operations staff will enter via the existing access route in the southeast of the SHP site from Harwich Road and utilise the parking facilities to the east of the SHP site, which are anticipated to be adequate. Some replacement parking areas will be included in a separate composite planning application (as part of the Further Development on the SHP site) which will also include the new central site services building and water treatment plant. Emergency access will also be retained along the southern boundary of the SHP site.

Security Provisions

5.4.100. The perimeter of the SHP site will be fenced and fully secure with closed circuit television (CCTV), gatehouse reception and manned 24-hours per day with constant site patrols, and controlled access to buildings.

Utility Usage

5.4.101. The following utilities are expected to be required for plant use:

- Boiler feed water;
- Cooling water; and
- Fire water.

5.4.102. It is anticipated that the facility will utilise existing SHP site services, such as cooling water, which will be supplied from SHP's existing cooling towers, using water from groundwater boreholes under an existing consent for the SHP site.

5.4.103. The estimated quantities are provided in Table 5-10. The Proposed Development will generate its own electricity when operational.

Table 5-10 Utility Usage

Utility	Consumption
Electrical Demand (supplied from the plant itself when operational, otherwise from the SHP site supply)	Approximately 5MWe (Twin Line) (or 4MWe for Single Line)
Water	Approximately 200m^3 per hour supplied from SHP's existing groundwater boreholes of which up to 50m^3 per hour will be treated in a water treatment plant on the SHP site to generate high quality boiler feedwater

Operational Maintenance and Accident Avoidance

5.4.104. The Proposed Development is expected to be operated by the existing SHP Operations and Maintenance teams and will utilise external expertise from the equipment vendors and specialist advisors when required.

5.4.105. Over the lifetime of the plant, the following maintenance regime will typically be carried out:

- Annual shutdown for major inspection, including tube thickness checks, grate cleaning and repairs, refractory repairs, oil changes, materials handling and FGT inspection/cleaning;
- Superheater changes expected every four years combined with pressure part insurance inspections;
- Bag filter change approximately every four years;
- Turbine intermediate overhaul and internal inspection approximately every five years; and
- Major turbine overhaul approximately every 100,000 hours of operation (every 12 to 13 years).

5.4.106. The Applicant has an existing Emergency Planning and Response Management Plan for SHP site such that emergency planning and response control measures are implemented to:

- Mitigate the potential effects to persons, environment, assets or company reputation;
- Respond to catastrophic plant and process incidents such as fires, explosions, release of hazardous substances or large releases of energy;
- Respond to external incidents which have the potential to cause incidents described above e.g. nearby facility emergency, flood, malevolent actions, earthquake or aircraft crash; and
- Communicate with stakeholders such as neighbours, media or regulators.

5.4.107. The Emergency Planning and Response Management Plan will be updated as required to include the Proposed Development. This procedure applies at all operational SSE sites and includes any site specific requirements.

Firewater and Fire Protection

5.4.108. The fire protection strategy for the Proposed Development will be developed to comply with the functional requirement of the Building Regulations (Ref 5-5). Appropriate standards will also be referenced to provide the necessary fire safety design. Additional fire protection will be provided with reference to British Standards and insurance recommendation for the property and business protection purposes.

Environmental Management

5.4.109. The Applicant already operates an ISO 14001:2004 accredited Environmental Management System (EMS) on the SHP site and this will be updated to include the Proposed Development.

5.4.110. A site-specific management plan will be established to cover all aspects of the works through demolition, construction, commissioning and operation. The plans will identify risk and outline procedures to minimise or eliminate risk, incorporating best practice and guidance.

Nuisance Control

5.4.111. Lighting of the site is required for security and safety purposes and will meet the reasonable requirements of the local authority to avoid impacts upon local residents and road users. This is discussed further in *Chapter 14: Landscape and Visual* of this ES.

5.4.112. Noise levels will be regulated as defined in Section 72 of the Control of Pollution Act 1974 (amended 1989) (Ref. 5-6) and conform to British Standard ISO 140-4 (1998) and those detailed within the Planning Conditions. An annual noise survey will be carried out on site and any noise complaint will be investigated immediately and dealt with. This is discussed in more detail in *Chapter 9: Noise and Vibration* of this ES.

5.4.113. The control of vermin and other pests (flies and insects) in the facility will involve:

- Enclosing all WDF handling activities;
- Storing WDF for the minimum period possible within defined storage areas;
- Use of enclosed storage containers, silos and transfer techniques where possible;
- Inspection and pest control management by subcontractors; and
- The use of approved chemical pesticides as required.

5.4.114. Any litter on site may attract vermin or be blown into neighbouring properties. Delivery vehicles will be covered or enclosed to minimise the potential to cause windblown dust, and cleaned before leaving the Site. The fuel tipping area will be regularly cleaned. Regular inspections of the Site, boundary fence, gates and access road in the immediate vicinity of the facility entrance will be carried out and will be determined as required. Staff will be encouraged to correctly dispose of litter as part of the site rules and site induction.

5.4.115. On-site liquid storage (e.g. oil and ammonium hydroxide solution if used) will be in sealed vessels and appropriately bunded to minimise the risk and impact of spillages. The facility will be designed such that contaminated surface water run-off will be prevented by means of bunds, kerbing and interceptor drains. Washdown liquids will be drained in a controlled manner to the ash pit, so that liquid can be treated and discharged to the foul water drains or tankered away for disposal where possible.

5.4.116. In order to mitigate potential dust nuisance, potential measures that could be applied include:

- Use of enclosed lorries or covering/ sheeting of lorries leaving the site;
- Road sweeper cleaning of hard-standing areas and roads;
- Enforcement of site speed limit; and
- Use of a water quench for the bottom ash.

5.4.117. Odour generation will be minimised by ensuring that the flow of WDF through the Site from receipt to combustion is continuous where possible. Buildings will be kept at a slight negative pressure to stop odour release into the environment. The fuel store will have odour modification and the air will be extracted and ducted into the combustion plant to be used as primary combustion air when the plant is operational. The remainder of the process buildings may have air extraction or air treatment equipment installed if identified as necessary through an Odour Management Plan to be prepared for the Proposed Development following receipt of planning consent. If necessary the odour would be discharged from a vent on the roof of the tipping hall through an activated carbon filter. Odour levels will be monitored around the Site boundary by Site management daily to assess the effectiveness of the installed odour control measures. This is discussed in more detail in *Chapter 8: Air Quality* of this ES.

5.4.118. A Traffic Management Plan will be prepared by the Applicant for the on site movement of vehicles during operation of the Proposed Development. It will establish ways in which traffic nuisance such as speeding is controlled. Deliveries of WDF will be coordinated by the fuel and management team working with suppliers to minimise queuing and waiting times.

5.5. Decommissioning of Plant

5.5.1. The Proposed Development is expected to have a design life of at least 30 years with the possibility of extending this to 50 years. At the end of operation (likely to be at the time of the second turbine overhaul) it would be expected that the plant will have some residual life remaining and an investment decision would then be made based on the market conditions prevailing at that time.

5.5.2. At the end of its operating life, the most likely scenario is that the plant and all equipment will be shutdown and removed from the Site. Prior to removing the plant and equipment, all residues and operating chemicals would be cleaned out from the plant and disposed of in an appropriate manner. The amount of such chemicals will be restricted to the normal plant residues and any remaining operating chemicals such as hydrated lime, activated carbon, boiler water treatment chemicals or ammonia solution. The bulk of the plant and equipment is likely to have some limited residual value as scrap or recyclable materials.

5.5.3. Any area of the Proposed Development containing chemicals will be fitted with sealed bunds and integral hardstanding that would be maintained over the life of the Environmental Permit through the site preventative maintenance regime. The fuel tipping area will also be a sealed area to contain any leaks or spillages.

5.5.4. It is therefore considered highly unlikely that the Proposed Development will create any new areas of ground contamination. Once the plant and equipment have been removed to ground level, it is expected that the hardstanding and sealed concrete areas will be left in place. Any areas of the plant which are below ground level are likely to be backfilled to ground level to leave a levelled area.

5.5.5. The decommissioning and demolition of the Proposed Development would be considered at the detailed design stage as required by the CDM Regulations, 2007 (Ref. 5-2).

5.5.6. A Decommissioning Plan will be produced as part of the Permitting process.

5.6. References

Ref. 5-1 Town and Country Planning Act 1990

Ref. 5-2 HMSO (2007) The Construction (Design and Management) Regulations

Ref. 5-3 Industrial Emissions Directive (IED) (2010/75/EU)

Ref. 5-4 Control of Asbestos Regulations (2006)

Ref. 5-5 Building Regulations and Fire Safety Procedural Guidelines (2007) CLG

Ref. 5-6 Control of Pollution Act 1974 (amended 1989) HMSO, London

6. SOCIO-ECONOMICS

6.1. Introduction

6.1.1. This chapter of the ES provides an assessment of the potential effects of the Proposed Development on socio-economics. The assessment comprises:

- A review of relevant planning policy framework;
- An economic assessment, including employment impacts on the labour market during the demolition/construction and operation phase; and
- A review of other relevant socio-economic effects.

6.1.2. This chapter describes the national and local policy context; assessment methods used; baseline conditions; potential direct, indirect and induced effects during the demolition/construction and operational phases of the Proposed Development; wider development socio-economic effects; mitigation measures and relevant residual effects; and cumulative effects.

6.2. Legislation and Planning Policy Context

6.2.1. This assessment has been undertaken with reference to relevant legislation and guidance set out in national and local planning policy.

National Policy

6.2.2. The NPPF (Ref. 6-1) sets out the Government's economic, environmental and social planning policies for England. With respect to economic development, it lists a number of requirements for local planning authorities, including ensuring that they set out a clear economic vision and strategy that will encourage sustainable economic growth, supporting existing business sectors and planning for new/emerging business opportunities. This is discussed further in *Chapter 3: Planning Policy Context*.

Local Policy

6.2.3. The SBC Core Strategy (Ref. 6-2) aims to concentrate development in the most accessible locations such as the town centre as well as other selected key areas, make the best use of existing/proposed infrastructure, encourage investment/regeneration of employment areas and reduce the need to travel. It also recognises the importance of *"spreading the benefits"* beyond the town centre into other areas, particularly the Slough Trading Estate.

6.2.4. The Slough Trading Estate provides a mix of employment uses. It is envisaged in the Site Allocations Development Plan Document that as traditional manufacturing continues to contract, future demand will increasingly be from *"knowledge-based sectors requiring high quality office, hi-tech and modern industrial premises"*. The Core Strategy anticipates that the regeneration of the Estate will create around 3,600 new jobs; a master plan for the Slough Trading Estate recently produced by SEGRO puts that figure at 4,000 (Ref. 6-3).

6.2.5. *Chapter 3: Planning Policy Context* of this ES presents further information on local planning policy.

6.3. Assessment Methodology and Significance Criteria

6.3.1. The following assessment seeks to establish the potential economic and social effects of the Proposed Development and assess these effects against the current baseline. The effects of the Proposed Development are considered at defined spatial levels according to the nature of the effect considered. This approach is consistent with the Department for Business Innovation and Skills (BIS) publication 'Research to Improve the Assessment of Additionality' (Ref. 6-4).

Assessment Methodology

6.3.2. A range of data sources, including the Office for National Statistics and Annual Business Inquiry (ABI), have been used to establish the baseline. Other secondary sources have also been used and guidance taken from HM Treasury's Green Book.

6.3.3. Socio-economic effects are generally and primarily considered in relation to their principal labour market catchments area. These are commonly known as Travel to Work Areas (TTWA) and incorporate the population that may reasonably be expected to travel to and benefit from the Proposed Development.

6.3.4. The Office for National Statistics (ONS) has applied a complex allocation process to define a set of TTWAs for the whole of the UK. The current criteria for defining TTWAs is that at least 75% of an area's workforce also live in the area.

6.3.5. The Proposed Development falls within the Wycombe and Slough TTWA. However, as illustrated in Figure 6-1, Slough sits on the border of this TTWA and is in close proximity to the Reading & Bracknell, Guildford & Aldershot, and Greater London TTWAs. Further analysis of the labour profile and the commuting patterns of people working in Slough reveals that a significant proportion of workers in this TTWA actually live in the surrounding TTWAs. Therefore, it was deemed appropriate to define a specific TTWA for Slough, hereinafter referred to as the Slough TTWA. This uses the same approach and definition as adopted by ONS.

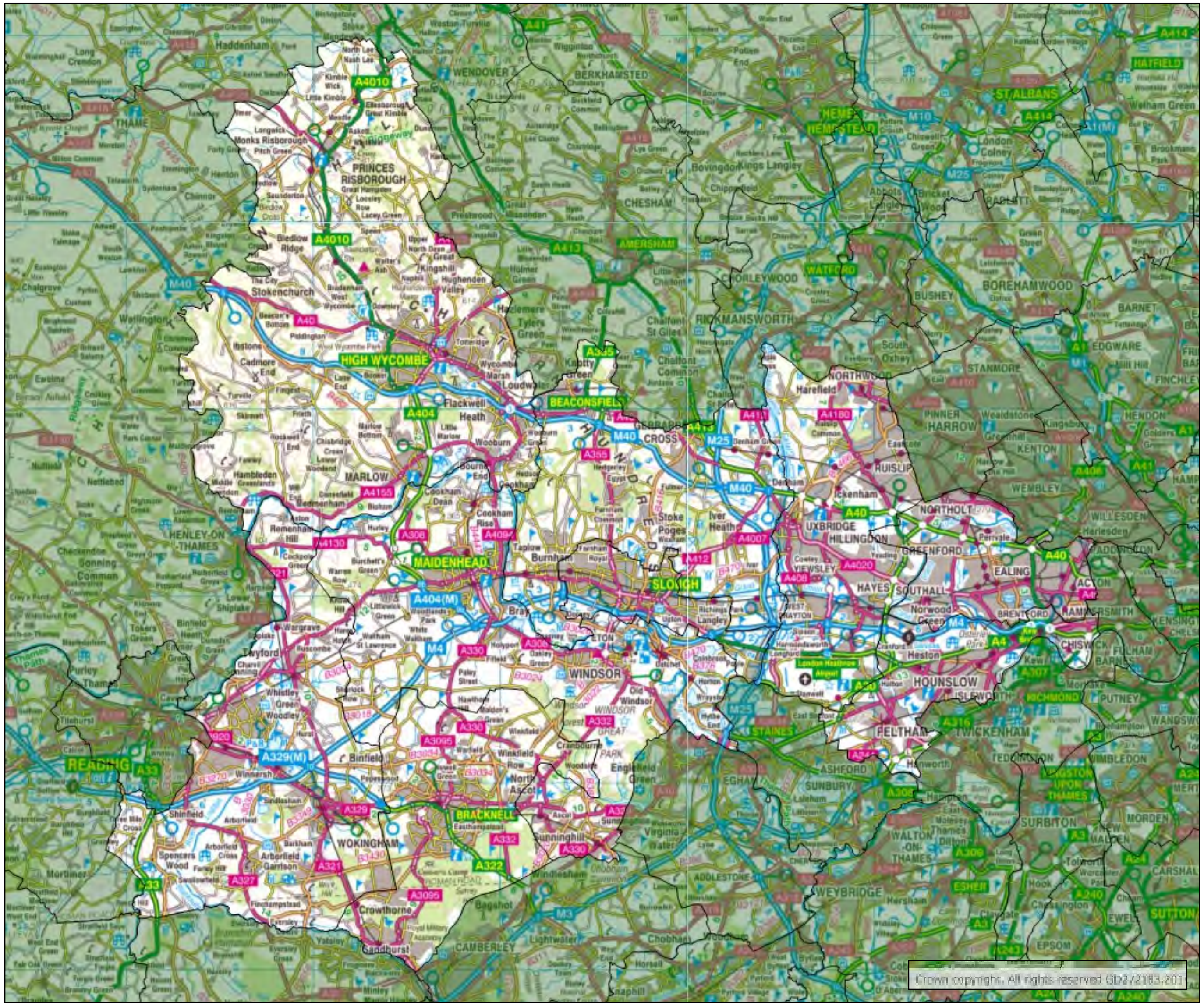
6.3.6. The newly defined Slough TTWA (for the purpose of this report) is demonstrated in Figure 6-2 and shows Slough located more centrally than in the Wycombe and Slough TTWA. Wherever possible the baseline is presented for the Slough TTWA (where this is not possible it is presented for the local authority area of Slough, which is much smaller) and comparisons are made to the South East of England and the United Kingdom (or, where UK-wide data is not available, Great Britain).

Assumptions

6.3.7. It should be noted that the appointment of the main contractor for the construction of the Proposed Development will be subject to a competitive bidding process. The main plant providers are all based outside the UK, and may partner with a UK or overseas civils contractor. The figures regarding potential for local employment generation provided in this chapter are based on construction industry averages, but the figures achieved will be dependent on the selected contractor's procurement strategy.

Figure 6-1: Location of the Wycombe and Slough Travel to Work Area

Figure 6-2: The Newly Defined Slough Travel to Work Area (TTWA) for the Purpose of this Assessment



Significance Criteria

6.3.8. Policy thresholds and best practice have been used to assess the scale of significance of the effects. In the absence of specific guidance on assigning significance, professional judgement has been used to assess the effect of the Proposed Development on the socio-economic baseline. The assessment aims to be objective and quantify impacts and their effects as far as possible; however some effects can only be evaluated on a qualitative basis.

6.3.9. In line with *Chapter 2: Assessment Methodology* of this ES effects are classified as follows:

- **Beneficial** - an advantageous or beneficial change, which may be minor, moderate, or major in effect;
- **Negligible** - imperceptible changes, due either to the low sensitivity of the receptor or small magnitude of change; and
- **Adverse** - a disadvantageous or adverse change, which may be minor, moderate or major in effect.

6.3.10. Moderate or major effects are considered significant.

6.3.11. Temporary to short-term effects are considered to be those associated with the demolition and construction phase. Medium to long-term effects are those associated with the completed development.

6.4. Baseline Conditions

6.4.1. This section establishes the current socio-economic conditions in the following topics:

- Slough TTWA economy and labour market; and
- Population and deprivation in the Slough TTWA.

Slough TTWA Economy and Labour Market

Economy and Output

6.4.2. The economic performance and output of an area needs to be considered when assessing the effect of a development. This provides a context and scale for the effects of a development relative to the study area.

6.4.3. Gross Value Added (GVA) per head is a key metric for measuring economic output and performance. Data is unavailable for the Slough TTWA but Berkshire (which includes Slough) is amongst the UK's largest economic areas; in 2011 the county's GVA was £29 billion, the third largest contribution in the UK outside of London. The county's current GVA per head of £32,798 remains markedly higher than the national average of £21,368 and is over £10,000 per head greater than the average for the South East of England (£22,369) (Ref. 6-5).

Travel to Work

6.4.4. The TTWA reflects the population that may reasonably be expected to travel to and benefit from the Proposed Development, as defined by the ONS.

6.4.5. According to the 2001 Census (at the time of writing this data was unavailable from the 2011 Census) the Slough TTWA is an exporter of labour with a net outflow of just over 31,850 people. In other words more people live in the TTWA and work outside it than live outside the TTWA and work inside it. A substantial number of people live in the Slough TTWA and work in nearby areas including: London, Spelthorne, Richmond-upon-Thames, Harrow, Reading, Brent, Chiltern, and South Oxfordshire (Ref. 6-6).

Employment and Economic Activity

6.4.6. The size and composition of the existing workforce needs to be considered to understand the effect that the Proposed Development may have on employment opportunities and economic activity.

6.4.7. There are over 855,300 people employed in the Slough TTWA. Particular strengths as compared to the region and nationally are in transport & storage, information & communication, and business administration. Employment in agriculture, manufacturing, financial & insurance, education, and health is below both the regional and national averages (Ref. 6-7). More detail is set out in Table 6-1.

Table 6-1 Employee Job Types in the Slough TTWA

Employee Job Type	Slough TTWA	South East England	Great Britain
Agriculture, forestry & mining	1.0%	2.5%	3.0%
Manufacturing	5.1%	6.5%	8.4%
Construction	4.1%	4.8%	4.6%
Wholesale, motor trades & retail	17.0%	17.4%	16.0%
Transport & storage (inc postal)	11.3%	4.3%	4.5%
Accommodation & food services	6.4%	6.6%	6.8%
Information & communication	9.2%	5.7%	3.8%
Financial & insurance	1.4%	3.1%	3.8%
Property	1.6%	1.8%	1.8%
Professional, scientific & technical	9.8%	8.7%	7.7%
Business admin & support services	10.4%	8.1%	8.1%
Public administration & defence	3.0%	3.6%	4.8%
Education	7.7%	9.8%	9.1%
Health	7.9%	12.3%	13.1%
Arts, entertainment, recreation & other services	4.0%	4.9%	4.5%

Source: ONS, Business Register and Employment Survey, 2012

6.4.8. The economic activity rate in the Slough TTWA is 79.7%, which is above the national rate (77.2%), but marginally below the figure for the South East of England (79.9%). Levels of enterprise, as measured by the rate of self-employment, follow a similar pattern: in the Slough TTWA 11.1% of the working age population is self-employed, compared to 10.9% in the South East and 9.5% nationally (Ref. 6-8).

6.4.9. The occupational profile of employment (as presented in Table 6-2) in the Slough TTWA is similar to that of the South East. As compared to the UK, the Slough TTWA has a greater proportion of residents employed in 'managerial and senior official', 'professional', and 'associate professional and technical' occupations. Employment in 'skilled trades', 'personal service', 'process, plant and machine operatives' and 'elementary' occupations is lower than the national (Ref. 6-8).

Table 6-2 Employment by Occupation in the Slough TTWA

Occupation	Slough TTWA	South East	United Kingdom
Managers and senior officials	11.4%	11.4%	10.1%
Professional occupations	21.7%	21.0%	19.7%
Associate prof & tech occupations	16.1%	15.5%	13.9%
Administrative & secretarial occupations	10.6%	10.9%	10.9%
Skilled trades occupations	9.6%	9.7%	10.6%
Personal service occupations	8.3%	9.2%	9.1%
Sales and customer service occupations	7.3%	7.3%	7.9%
Process, plant and machine operatives	5.1%	4.7%	6.4%
Elementary occupations	9.3%	9.9%	10.8%
Other professions	0.6%	0.4%	0.6%

Source: ONS, Annual Population Survey, September 2013

Unemployment

6.4.10. Unemployment rates are important for considering the likely employment opportunities that the Proposed Development may offer. The availability of employment opportunities is important to tackle employment gaps and deprivation.

6.4.11. The most reliable source of information at a local level for measuring unemployment is the claimant count, i.e. the number of people claiming Job Seekers' Allowance (JSA). This is typically less than the actual rate of unemployment; however unemployment information is based on local survey data and smaller sample sizes and is therefore considered less accurate

6.4.12. The JSA rate in the Slough TTWA (2.2%) is marginally above the regional rate (1.8%), but below the national rate (3.0%). The impact of the recession is clearly evident when comparing JSA rates over the six years. The JSA rate in 2008 was 1.4% in the Slough TTWA and peaked at 3.2% in 2010 and has been falling steadily since then. However, the JSA rate is currently 51.7% higher than it was pre-recession. This increase is just above the region (49.4%) and national figures (49.7%) (Ref. 6-9).

Qualifications and Skills

6.4.13. Skills are an increasingly important factor in determining an individual's ability to access employment. Similarly, companies will look at skills within the local labour supply when considering investment decisions to locate in a specific area.

6.4.14. The working age population in the Slough TTWA are more likely to have NVQ level 4 and above (degree level or equivalent) qualifications than across the region and nationally. Conversely, the TTWA has a slightly higher proportion of residents with no qualifications than the region, although the rate is still notably lower than the UK average. This is demonstrated in Table 6-3 (Ref 6-7).

Table 6-3 NVQ Equivalent Qualifications of Working Age Population

	Slough TTWA	South East England	United Kingdom
NVQ4+	42.0%	36.8%	34.2%
NVQ3 only	15.3%	18.1%	17.1%
Trade apprenticeships	2.5%	3.3%	3.7%
NVQ2 only	14.4%	17.2%	16.8%
NVQ1 only	10.4%	12.3%	12.1%
Other qualifications	7.5%	5.4%	6.3%
No qualifications	7.9%	6.9%	9.9%

Source: ONS Annual Population Survey, December 2012

Existing Employment at Slough Trading Estate

6.4.15. Any existing employment at the site should be assessed to determine what effect the Proposed Development may have and whether any existing employment would be displaced.

6.4.16. The Proposed Development is sited within Slough Trading Estate, the largest of its kind in Europe. The estate incorporates 400 occupiers, providing over 17,000 jobs in a range of industries. According to the Slough Local Development Framework Site Allocations Development Plan, employment on the estate accounts for around a quarter of all the jobs in the Borough of Slough and its regeneration is therefore considered central to the future prosperity of the town (Ref. 6-2).

Population and Deprivation in the Slough TTWA

6.4.17. It is important to understand the effects of the Proposed Development on the existing population and what effects it may have on deprivation.

6.4.18. The population in the Slough TTWA has expanded from 1,510,900 in 2002 to 1,681,600 in 2012, representing an 11.3% increase over the time period. This is higher than in comparator areas: South East England (8.4%), and the UK (7.3%). The working age population (people aged 16 to 64) in the Slough TTWA (65.9%) is higher than the region (63.1%) and nationally (64.2%) (Ref. 6-10).

6.4.19. The Slough TTWA comprises the local authority areas of Slough, Windsor and Maidenhead, South Bucks, Wycombe, Hillingdon, Wokingham, Bracknell Forest, Hounslow and Ealing. According to the Index of Multiple Deprivation 2010, Slough is the 56th (out of 354, where 1 is the most deprived) most deprived borough in England. Wokingham is 325th, Windsor and Maidenhead is 303rd, Bracknell Forest is 291st, South Bucks is 290th, Wycombe is 258th, Wycombe is 258th, Hillingdon is 130th, Hounslow is 92nd and Ealing is 61st (Ref. 6-11).

6.4.20. Average earnings data is not available for the Slough TTWA and as such is presented for the local authority area of Slough. Residents of Slough earn, on average, approximately £457.50 per week (gross) compared to £450.00 across the South East and £416.50 nationally (Ref. 6-12).

6.4.21. People who work in Slough earn more than those who live there. Average workplace earnings within Slough are £552.50 per week compared to £457.50 for residents. This indicates that commuters who work in the borough are raising the average income (Ref. 6-13).

6.5. Potential Effects and Mitigation Measures

6.5.1. The effects of the Proposed Development during demolition/construction and operation are primarily assessed by establishing the gross and net jobs that are expected to be generated. The gross jobs records the jobs generated by the Proposed Development without considering factors such as deadweight, displacement and multiplier effects which alters the actual number of jobs generated. The net jobs are the actual jobs that would be generated by the Proposed Development having considered factors such as deadweight, displacement and multiplier effects.

Demolition and Construction Phase

6.5.2. The following section provides details of the number of gross demolition/construction employees and proceeds to assess the net effect of the Proposed Development in terms of construction jobs on the local economy.

Demolition and Construction Employment

Direct Demolition and Construction Employment

6.5.3. The demolition activities on the Site and subsequent construction of the Proposed Development will create new jobs. The estimated enabling works and demolition/construction period is 48 months. Although these jobs are short-term, they represent a positive economic effect that can be estimated as a function of the scale and type of demolition and construction. The direct expenditure involved in the demolition/construction phase will lead to increased output generated in the UK economy.

6.5.4. Demolition and construction at its peak will employ up to 500 workers on site over 3 shift periods per day (assuming 24 hour activity onsite), which is equivalent to 166 workers on site at any one time.

6.5.5. An estimated 100 workers would be employed during initial enabling works, equivalent to an estimated 33 workers on site at any one time, and on average, there will be around 300 workers (gross) employed throughout the 48 month demolition, construction and commissioning phase. The net impact is set out below.

6.5.6. Details of vehicle trip generation during the demolition and construction phase of the Proposed Development are discussed in *Chapter 7: Traffic and Transport* of this ES.

Leakage

6.5.7. Leakage effects benefit those outside the impact area. Analysis carried out on Census 2001 data, which is the most recent available, indicates that 19% of people working in the Slough TTWA live outside the TTWA. This corresponds to a low level of leakage as set out by English Partnerships and Business, Innovation and Skills (BIS) Guidance, and implies that a reasonably high proportion of benefits will go to those within the target area (Ref. 6-4).

6.5.8. A 19% discount was applied to the average 300 jobs created throughout the demolition/construction and commissioning phases (48 months). It is thus estimated that, on average, 57 persons from outside the Slough TTWA and 243 persons from within the TTWA will be working at the Proposed Development during this period.

6.5.9. Based on the local census data, which does not always fully represent specialist developments, a 19% discount was applied to the average 300 jobs created throughout the demolition/construction and commissioning phases. It is thus estimated that, on average, 57 persons from outside the Slough TTWA and 243 persons from within the TTWA will be working at the Proposed Development during this period. The actual number will depend on the chosen Contractor and whether specialist labour is brought in from outside the area including from abroad to construct the Proposed Development.

6.5.10. To maximise the beneficial impacts for the residents of the district, where it is within the control of the Applicant, there is an aim to source local labour where practicable (dependant on skills being available locally). It would be appropriate for SBC to work in collaboration with Job Centre Plus and the Applicant to identify opportunities for local recruitment.

Displacement

6.5.11. Displacement measures the extent to which the benefits of a project are offset by reductions of output or employment elsewhere. Any additional demand for labour cannot simply be treated as a net benefit - it removes workers from other posts and the net benefit is reduced to the extent that this occurs. This consideration is referred to as displacement.

6.5.12. There are 23,598 people out of work and claiming Job Seekers' Allowance in the Slough TTWA of which there are a minimum of 1,200 people seeking employment in construction trades (Ref. 6-14).

6.5.13. There are also 35,410 private sector construction workers in the Slough TTWA and the expected average number of construction workers on-site at the Proposed Development during the demolition and construction phase represents 2% of this workforce. Construction workers also typically move between construction projects especially when delays occur or to help the workforce meet particular construction deadlines.

6.5.14. Overall it is assumed that due to the numbers seeking employment in this sector, the flexibility of the labour market, and the fact that demolition and construction workers at the Proposed Development represent a relatively small proportion of the Slough TTWA labour force, displacement impacts of the direct construction employment will be low. Following the English Partnerships / BIS Additionality Guide, a 'ready reckoner' for low displacement of 25% has therefore been assumed for the Proposed Development.

Multiplier Effect

6.5.15. In addition to the direct demolition and construction employment generated by the project itself, there will be an increase in local employment arising from indirect and induced effects of the demolition/construction activity. Employment growth will arise locally in supply chain firms within the demolition and construction process (indirect or supply linkage multipliers). Additionally, part of the income of the demolition/construction workers and supply chain employment will be spent in the Slough TTWA, generating further employment (induced or income multipliers).

6.5.16. The effect of the multiplier depends on the size of the geographical area that is being considered, the local supply linkages and income leakage from the area. English

Partnerships and BIS Additionality Guide provides a 'ready reckoner' of composite multipliers – the combined effect of indirect and induced multipliers.

6.5.17. The Slough TTWA has a strong local economy, with high levels of GVA, high average earnings, low unemployment and deprivation, and low leakage. Based on the strength of its economy, and applying the BIS and English Partnerships Guidance, a ready reckoner of 1.3 has been applied to the Slough TTWA.

Table 6-4 Demolition and Construction Related Employment Estimates

	Slough TTWA (average commissioning and demolition/construction employment)	Beyond Slough TTWA (average commissioning and demolition/construction employment)	Total (average commissioning and demolition/construction employment)
Gross Direct Employment	243	57	300
Displacement	61	14	75
Net Direct Employment	182	43	225
Net Indirect and induced Employment	55	13	68
Total Net Employment	**237**	**56**	**293**

Source: URS calculations 2013. Note that figures do not always add up due to rounding.

6.5.18. The direct, indirect and induced employment and expenditure created by the demolition and construction phase of the Proposed Development is likely to have a **minor beneficial** short-term effect on the Slough TTWA economy, expected to create 293 **net** temporary demolition and construction related jobs on average through direct, indirect and induced effects following displacement effects. 237 of these jobs might be expected to remain within the Slough TTWA.

6.5.19. The 57 jobs that are expected to be "leaked" from the Slough TTWA would be taken up by individuals in the wider economy, creating further indirect and induced employment impacts.

Construction Mitigation Measures

6.5.20. No adverse effects have been identified and as such no mitigation measures are required. Saying this, the Applicant will still encourage the sourcing of local labour through active supply chain engagement. A 'meet the buyer' day will be held where the Engineering, Procurement and Construction (EPC) contractor will liaise with local businesses and suppliers. The Applicant has also created an Open4Business (O4B) initiative at other operational sites which provides a dedicated web portal offering visibility of business opportunities to the local community and suppliers, and allows the Applicant to advertise contractual opportunities on the portal. The Open4business initiative, or a similar scheme, is expected to be used for the Proposed Development.

6.5.21. The Applicant, through its parent company SSE plc, currently operates a National apprenticeship scheme with up to 100 apprentices being recruited in 2014 to service its current business across the UK. At present the following apprenticeship courses are provided locally:

- Contracting: 4 year apprenticeship in Electrical Installation;
- Power Distribution: 3 year apprenticeship in Jointing, Fitting or Over Head Lines; and
- Home Services: 2 year apprenticeship in Domestic Gas Installation and Maintenance.

6.5.22. Table 6-5 summarises the number of apprenticeships currently supported by SSE, as of December 2013, both within Slough and up to a 50km radius of Slough.

Table 6-5 Number of Apprenticeships supported by the Applicant within a 50km radius of Slough

Depot	Contracting	Power Distribution	Home Services
Slough	7	10	1
Reading	6	17	5
Others	3	19	0
Total	**16**	**46**	**6**

6.5.23. The Applicant will facilitate a number of apprenticeship opportunities specific to the Proposed Development during the construction phase. This will form part of the engineering, procurement and construction contract for the Proposed Development including the site enabling works.

Operational Phase

Operational Employment

Gross Operational Employment

6.5.24. The SHP site currently employs 41 people, generally in managerial and highly skilled roles, plus there are an additional 11 full time equivalent employees at the SHP site covering support services such as security, catering and cleaning, as well as SSE employees currently based onsite fulfilling national roles. This makes a total of 52 full-time equivalent posts currently on the SHP site.

6.5.25. It is anticipated that the Proposed Development will create approximately 20 new jobs, including the following roles: Shift Operators, Maintenance Technicians, Day Operatives, Engineers and Management, as summarised in Table 6-6.

Table 6-6 Estimated Provision of Employment During Operation.

Position	Additional Roles	Existing Roles to be retained	Skill Level
Shift Operative	10	20	Level of expertise comparable to existing boiler/turbine operators
Engineers / Management	2	7	Degree qualified mechanical engineer
Maintenance Technician	4	6	Craftsman level
Day Operatives (Office)	4	8	Manual/Administrative position
Total Full Time Equivalent Posts	**20**	**41**	

6.5.26. When fully operational, the Applicant estimates there will be 72 full-time equivalent posts, which include the additional 11 full time equivalent SSE employees at the SHP site covering support services and/or fulfilling national roles.

Net Operational Employment

6.5.27. The remaining net benefit calculations are consistent with those set out for demolition and construction employment. In other words, leakage is set at 19%, displacement at 25% and a composite multiplier of 1.3 is applied. This is summarised in Table 6-7 below.

Table 6-7 Operational Employment

Impact level	Slough TTWA	Beyond Slough TTWA	Total
Gross Direct Employment	58	14	72
Displacement	14.5	3.5	18
Net Direct Employment	43.5	10	53.5
Net Indirect and induced employment	13	3	16
Net Employment of Existing Site	42	10	52
Total Net Employment	**15**	**3.5**	**18**

Source: URS calculations 2013. Note that figures do not always add up due to rounding.

6.5.28. The direct, indirect and induced employment created by the operational phase of the Proposed Development is likely to have a positive, but **negligible** effect on the Slough TTWA with 18 net additional full-time equivalent jobs being created through direct, indirect and induced effects following displacement, 15 of which are predicted to be taken by people living in the Slough TTWA. There will also be periodic work associated with plant maintenance as well as jobs associated with the production of WDF and its transportation to site. These will arise both within the Slough TTWA and in surrounding regions.

Operational Mitigation Measures

6.5.29. No adverse effects have been identified and as such no mitigation measures are required.

6.6. Residual Effects and Conclusions

6.6.1. This chapter has assessed the socio-economic effects of the Proposed Development. No mitigation measures have been identified, although a number of enhancement measures were provided, and Table 6-8 summarises the residual effects associated with the Proposed Development.

6.6.2. The Proposed Development is anticipated to have a beneficial effect on the local economy, through employment opportunities and supply chain benefits to local businesses, and encouraging further inward investment through higher private sector confidence in the economy.

Table 6-8 Summary of Residual Socio-Economic Effects

Measure	Significance	Explanation
Demolition and Construction employment	**Minor beneficial** effect – short-term	The total net additional employment created within the Slough TTWA is estimated to be an average of 237 jobs per year, and 293 jobs per year in total.
Operational employment	**Negligible, but beneficial** effect – long-term	It is anticipated that there will be 15 net jobs created in the TTWA and an additional 3 in the wider economy.

6.7. Cumulative Effects

6.7.1. This section considers the cumulative effect of the Proposed Development along with other consented schemes within the vicinity. These schemes are described in more detail within *Chapter 2: Assessment Methodology* of this ES.

6.7.2. There are a number of schemes in the vicinity of the Proposed Development currently submitted for planning, consented, or under construction, which are likely to result in cumulative effects with regards to the economy, the labour market and social infrastructure. The below assesses those where employment use are known.

6.7.3. The Britwell Regeneration comprises 258 new residential units. This will be a substantial contribution to housing provision within the Slough TTWA, providing a range of apartments, family homes and types of tenure for new residents (Ref. 6-15).

6.7.4. If the Britwell and updated Leigh Road/Bath Road schemes are to be realised there will also be substantial new commercial, retail, and leisure space created that will help meet the needs of the new population and surrounding neighbourhoods.

6.7.5. The new employment space will provide job opportunities for existing residents. Using employment densities from the Homes and community Agency (Ref. 6-16) and assuming that 70% of the 219,000m^2 land allocated for development is split evenly between retail, commercial and office provision, this cumulative scheme would provide several thousand new jobs.

6.7.6. The total of 1,586m^2 of retail space proposed at Britwell will provide approximately 83 new jobs according to its planning application supporting information.

6.7.7. If the above mentioned cumulative schemes are approved and developed alongside the Proposed Development, they are likely to have a **major beneficial** effect on the local economy. There is expected to be an adequate supply of labour to cover the construction and operation of all the cumulative schemes within the Slough TTWA, even in the unlikely event that they all occur simultaneously.

6.8. References

Ref. 6-1 Department of Communities and Local Government (March 2012) National Planning Policy Framework

Ref. 6-2 Slough Borough Council (2008) Local Development Framework – Core Strategy 2006-2026 Development Plan

Ref. 6-3 SEGRO Slough Trading Estate Masterplan, accessed 29 August 2013 http://www.segro.com/Slough/About/Masterplan

Ref. 6-4 English Partnership (2008) Additionality Guide: A Standard Approach to Assessing the Additional Impact of Projects, 3rd Edition, London: English Partnership; Department for Business, Innovation and Skills (BIS) (2009) Research to Improve the Assessment of Additionality

Ref. 6-5 Office for National Statistics (2011) Gross Value Added Sub Regional Accounts

Ref. 6-6 Office for National Statistics (2001) Census 2001 – UK Travel Flows

Ref. 6-7 Office for National Statistics (2012) Business Register and Employment Survey

Ref. 6-8 Office for National Statistics (2013) Annual Population Survey

Ref. 6-9 Office for National Statistics (2014) Claimant Count

Ref. 6-10 Office for National Statistics (2002 and 2012) Mid-Year Population Estimates

Ref. 6-11 Department for Communities and Local Government (2010) Index of Multiple Deprivation

Ref. 6-12 Office for National Statistics (2013) Annual Survey of Hours and Earnings – Resident Analysis

Ref. 6-13 Office for National Statistics (2013) Annual Survey of Hours and Earnings – Workplace Analysis

Ref. 6-14 Office for National Statistics (2013) Job Centre Plus Vacancies

Ref. 6-15 Slough Borough Council (2011) Britwell Regeneration News

Ref. 6-16 Homes and Communities Agency (HCA) (2010) Employment Densities Guide, Second Edition

7. TRAFFIC AND TRANSPORT

7.1. Introduction

7.1.1. This chapter of the ES describes an assessment of the potential effects of the Proposed Development on the surrounding highway network, public transport and local pedestrian and cyclist amenity. It is based on an assessment of the interaction between future development related movements and existing patterns of vehicular movements.

7.1.2. It sets out relevant Government policy at national and local level, which has been considered in respect of the Proposed Development. A description of the baseline conditions is provided, along with details of the assessment methodology and significance criteria that have been used to assess the potential effects. Effects are assessed during the demolition and construction phase, and once the Proposed Development is operational. Mitigation measures are detailed as necessary.

7.1.3. The potential effects of the Proposed Development have been assessed using the maximum parameters proposed that are outlined in Chapter 5: The Proposed Development of this ES. This approach is considered to provide a worst case assessment of the likely significant effects associated with the Proposed Development.

7.1.4. This chapter and the Transport Assessment (TA) (Ref. 7-1) located in Appendix C-1, Volume II of this ES, have been written by URS.

7.2. Legislation and Planning Policy Context

National Planning Policy

7.2.1. The NPPF (Ref. 7-2) states among its core planning principles, developments should "actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable". It requires that all developments generating significant vehicle movements should be supported by a Transport Assessment in which it takes into account all opportunities for sustainable transport modes, safe access to the site and whether there is a need to undertake transport movements which would cost effectively limit significant impacts.

Local Planning Policy

7.2.2. Local Development Documents collectively make up SBC's LDF (Ref. 7-3). The Core Strategy (Ref. 7-4) notes that Slough experiences significant in and out-commuting which leads to congestion, particularly in peak hours. Core policy 5 applies a parking cap to all new commercial development, with no increase in car parking development allowed, except in very special circumstances.

7.2.3. Core Policy 5 applies a parking cap to all new commercial developments, with no increase in car parking allowed accept for industrial/warehousing development if a lack of car parking would cause operational or road safety problems.

7.2.4. Core Policy 7 (Transport) states that all new development should reinforce the principles of the council's Local Transport Plan 2006 - 2011 (Doc.14) (Ref. 7-5). The vision for Slough's transport system aims to tackle problems such as congestion, air quality and make the transport structure more sustainable in the future. The three key themes for the vision are:

- A more balanced local transport system;

- An effective public transport hub serving both local and regional journeys and interchange; and
- Better public transport connectivity to and from Heathrow Airport and west London.

7.2.5. The Local Plan for Slough (Ref. 7-6) does not provide any notable additional advice relevant to transport.

Simplified Planning Zone

7.2.6. There has been a Simplified Planning Zone (SPZ) covering the majority of the Slough Trading Estate since 1995. The current scheme, adopted on 12 November 2004, provides the framework for regeneration and development on the Trading Estate until 2014.

7.2.7. The SPZ is implemented in partnership with SEGRO. A key addition in the current scheme is an integrated transport strategy, which helps ensure more sustainable travel to, from and within the estate. The power station, located on Edinburgh Avenue, constitutes a special type of use, which requires careful consideration. Existing planning control is therefore retained over the power station and all developments within its curtilage as defined by the sub-zone, where the provisions of the SPZ will not apply.

7.2.8. The current SPZ expires in November 2014, although SBC (with SEGRO) has produced a new draft SPZ for the Trading Estate (under consultation), which would run for a further 10 year period to 2024.

7.3. Assessment Methodology and Significance Criteria

Assessment Methodology

7.3.1. This chapter aims to assess the main transportation effects of the Proposed Development. The scale and extent of the assessment have been defined in accordance with Institute of Environmental Management and Assessment (IEMA) guidelines (Ref. 7-7).

7.3.2. The following categories of receptors that may be sensitive to changes in numbers of people movements (sensitive receptors) have been identified:

- Pedestrians and cyclists on the roads and footways leading to the Site;
- Motorised users on the local highway network; and
- Public transport facilities around the Site.

7.3.3. The IEMA guidelines recommend a detailed assessment for highway links where:

- Traffic flows will increase by more than 30% of the baseline (or the number of heavy goods vehicles (HGVs) will increase by more than 30%); or
- Specific environmental problems may occur (for example, where sensitive areas are affected by traffic increases of at least 10% volume flow, unless there are significant changes in the composition of traffic. It should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental effect).

7.3.4. Based on these guidelines and discussions held with SBC, the geographical extent of the assessment is identified as incorporating:

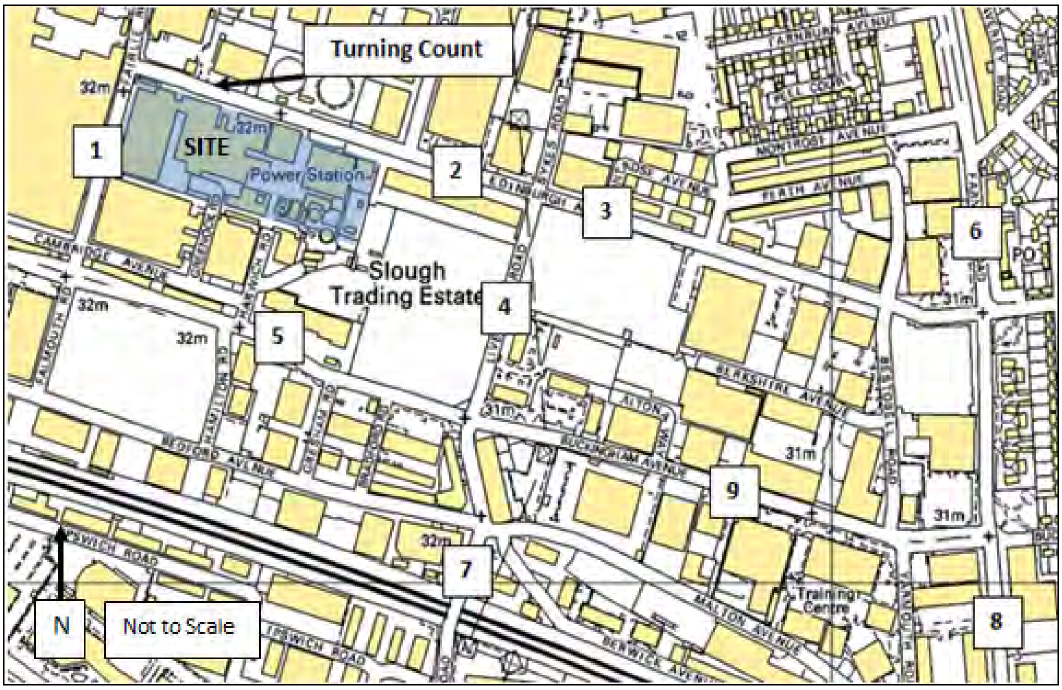
- The access/egress points on Edinburgh Avenue;
- The access/egress to the south of the Site (from Harwich Road) during demolition and construction;
- The surrounding highway network including:
  - i) Fairlie Road;
  - ii) Edinburgh Avenue (west of Liverpool Road junction);
  - iii) Edinburgh Avenue (east of Liverpool Road junction);
  - iv) Liverpool Road;
  - v) Buckingham Avenue (west of Liverpool Road junction);
  - vi) A355 Farnham Road (north of Edinburgh Avenue junction);
  - vii) Leigh Road;
  - viii) A355 Farnham Road (south of Buckingham Avenue junction); and
  - ix) Buckingham Avenue (east of Liverpool Road junction).

7.3.5. In order to establish existing traffic volumes on the local network, a series of Automatic Traffic Counts (ATCs) were carried out for a period of one week commencing on 08 June 2013 at the following nine locations:

1. Fairlie Road
2. Edinburgh Avenue (west of Liverpool Road junction);
3. Edinburgh Avenue (east of Liverpool Road junction);
4. Liverpool Road;
5. Buckingham Avenue (west of Liverpool Road junction);
6. A355 Farnham Road (north of Edinburgh Avenue junction);
7. Leigh Road;
8. A355 Farnham Road (south of Buckingham Avenue junction); and
9. Buckingham Avenue (east of Liverpool Road junction).

7.3.6. From the results of the surveys the AM and PM peak hours were identified as 08:00-09:00 and 17:00-18:00 respectively. The locations of the ATCs are shown in Figure 7-1.

Figure 7-1 Traffic Count Location Plan



7.3.7. In order to establish the current contribution of the SHP site on existing flows, a manual turning count was also undertaken at the main site access on Edinburgh Avenue. This survey was conducted over three 24-hour periods: Monday 10th; Wednesday 12th; and Friday 14th June 2013.

7.3.8. Information gathered during site visits has been used to establish baseline conditions in terms of the highway network, accessibility and public transport facilities. This information has been supplemented by information obtained from maps and documents published by various authorities, including transport providers and SBC.

7.3.9. In order to quantify the effect of the Proposed Development, estimates of trip generation have been calculated for both the demolition/construction and operational phases. Details of the methods used to determine trip generation are contained in the Transport Assessment located in Appendix C-1, Volume II of this ES.

7.3.10. As agreed with SBC and in line with DfT Circular 02/2007, 'Planning and the Strategic Road Network' (Ref. 7-8), an assessment of the predicted increase in traffic across the network has been undertaken for the year the Site becomes fully operational. Accordingly assessments have been undertaken for predicted traffic flows in 2019. This network assessment therefore includes the peak hour and daily scenarios for 2019 flows plus the average Proposed Development traffic flows. A separate assessment of the effect of the maximum proposed development traffic flows on the 2019 base scenarios has also been undertaken. It is noted that the maximum Proposed Development operational traffic flows combined with the operational traffic flows for the plant remaining on the SHP site would not exceed the current permitted traffic flows for the site. A Sensitivity Test has been conducted to assess both a worst case scenario at each ATC location and the potential effect of new restrictions at the site (outlined later in this document). The effect of demolition and construction traffic has also been assessed for the expected peak year of 2017.

7.3.11. In order to factor the traffic flows obtained from the traffic survey up to 2017 and 2019 flows, TEMPRO v.6.2 growth factors have been used. The growth rates are presented in the TA located in Appendix C-1, Volume II of this ES.

7.3.12. Additionally, the new Leigh Road Bridge is currently under construction and is expected to be completed in 2015. This will be delivered via a separate planning application and by an independent developer and is discussed further in the Cumulative Effect assessment, later in this chapter. An additional one third (33.3%) of the trip generation associated with the Proposed Development was routed south down Liverpool Road and Leigh Road for the operational flows to account for this development.

Significance Criteria

7.3.13. Guidance provided by the IEMA (Ref. 7-5) and the Department for Transport (Ref. 7-9) have been consulted in order to identify significance criteria applicable to the current assessment. For a number of effects, there are no readily available thresholds of significance, in which case there has been a need for interpretation and judgement based on knowledge of the site and/or quantitative data where available.

7.3.14. After taking into consideration mitigation, residual effects have been identified as either:

- Adverse – meaning that they produce negative effects in terms of transportation and access;
- Negligible – meaning that there is no measurable effect; or
- Beneficial – meaning that they produce benefits in terms of transportation and access.

7.3.15. Where adverse or beneficial effects have been identified these have been assessed against the following scale:

- Minor – slight, very short or highly localised effect of no significant consequence;
- Moderate – limited effect (by extent, duration or magnitude) which may be considered significant; and
- Major – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

7.3.16. Table 7-1 shows the thresholds of significance used to determine the level of significance for various effects. The Slough Trading Estate, that the Site lies within, is not considered to be a sensitive area in the IEMA and DfT guidance for transport due to the fact that it is in an existing industrial estate, hence the thresholds for ‘sensitive areas’ has been omitted from the table.

Table 7-1 Thresholds of Significance

Effect	Level of Significance			
	Negligible	**Minor**	**Moderate**	**Major**
Change in driver journey time	Change of less than 2 minutes	Change of 2 to 5 minutes	Change of 5 to 20 minutes	Change of more than 20 minutes
Change in driver delay	Change of less than 30 seconds	Change of 30 to 60 seconds	Change of 1 to 3 minutes	Change of more than 3 minutes
Change in pedestrian & cyclist journey time	Change of less than 2 minutes	Change of 2 to 5 minutes	Change of 5 to 10 minutes	Change of more than 10 minutes
Change in pedestrian & cyclist delay	Change of less than 30 seconds	Change of 30 to 60 seconds	Change of 1 to 3 minutes	Change of more than 3 minutes
Change in level of accessibility for pedestrians & cyclists	Change of less than 2 minutes in journey time	Change of 2 to 5 minutes in journey time; need to cross quiet road	Change of 5 to 10 minutes in journey time; need to cross busy road; closure of one or more points of access to a location	Change of more than 10 minutes in journey time; need to cross busy major road; closure of all points of access to a location
Change in pedestrian & cyclist amenity	Change in traffic or HGVs of less than 30%	Change in traffic or HGVs of 30% to 49%, subject to a minimum change of 300 vehicles or 30 HGVS per hour; slight change in width of footway/ cycleway.	Change in traffic or HGVs of 50-99%, subject to a minimum change of 600 vehicles or 60 HGVS per hour; large change in width of footway/ cycleway; closure or opening of short stretch (<100m) of footway/ cycleway.	Change in traffic or HGVs of 100% or more, subject to a minimum change of 1,200 vehicles or 120 HGVS per hour; closure or opening of long stretch (>100m) of footway/ cycleway.

7.4. Baseline Conditions

Local Road Network

7.4.1. The local roads mentioned in this section are shown in Figure 7-2 and Figure 7-3, as well as in the Site Location Plan in Annex A of the Transport Assessment (Appendix C-1, Volume II).

7.4.2. The Proposed Development Site is located within the SHP site, which is in turn within the Slough Trading Estate in the northwest of Slough. Greenock Road and Harwich Road provide access to the southern boundary of the Site. Cambridge Avenue runs from east to west through the industrial estate to the south of the Site and serves other units in the area.

7.4.3. The northern boundary of the Site is formed by Edinburgh Avenue, which runs from west to east between Fairlie Road and the A355 Farnham Road.

7.4.4. To the east of the SHP site is another industrial unit and Liverpool Road is located east of this. Liverpool Road runs from Edinburgh Avenue in the north to the crossroads with Buckingham Avenue/Leigh Road in the south. Leigh Road continues south to the A4 Bath Road but currently narrows to a single lane subject to traffic signals over the railway line.

7.4.5. Beyond the southern boundary of the Site is Buckingham Avenue and this runs between Burnham Lane in the west and the A355 Farnham Road in the east.

7.4.6. Fairlie Road lies immediately west of the SHP site and runs from Buckingham Avenue in the south to the roundabout junction with Pevensey Road, where it becomes Chaffield, in the north. Chaffield then continues north, where a right turn can be taken on to Northborough Road, which also leads to the A355.

7.4.7. Edinburgh Avenue, Buckingham Avenue, Fairlie Road and Liverpool Road are all local distributor roads within the Slough Trading Estate and are wide enough to accommodate HGVs. They are all subject to a 30mph speed limit.

7.4.8. The A355 runs from north to south, approximately 700m east of the Proposed Development. Within the vicinity of the Site it is called Farnham Road. This road terminates at Junction 6 of the M4, approximately 3km southeast of the Site. The A355 continues north to Junction 2 of the M40 (located 9.3km north of the Site) and then on to Amersham. There is a section of bus lane to the south of the junction with Buckingham Avenue on Farnham Road and this is expected to be extended in the near future.

7.4.9. The A4 runs from east to west approximately 500m to the south of the Site. The road starts in Avonmouth, to the west of Bristol, and continues past Bristol, Bath, Marlborough, Reading, Maidenhead and Slough, before terminating in Central London. The A4 provides a link road onto the M4 at Junction 7, 3.5km southwest of the Proposed Development Site.

7.4.10. The M4 starts in London and travels west past Slough, Reading, Swindon, Bristol, Newport, Cardiff and Swansea. Additionally, the M40 links London to High Wycombe, Oxford, Banbury, Royal Leamington Spa and finally Birmingham. The close proximity of these key roads to the site means that the Proposed Development Site is well placed in a location near to the capital. It should also be noted that London Heathrow Airport is approximately an 18km drive to the east of the Site via the M4.

Current Routes and Night-Time Restrictions

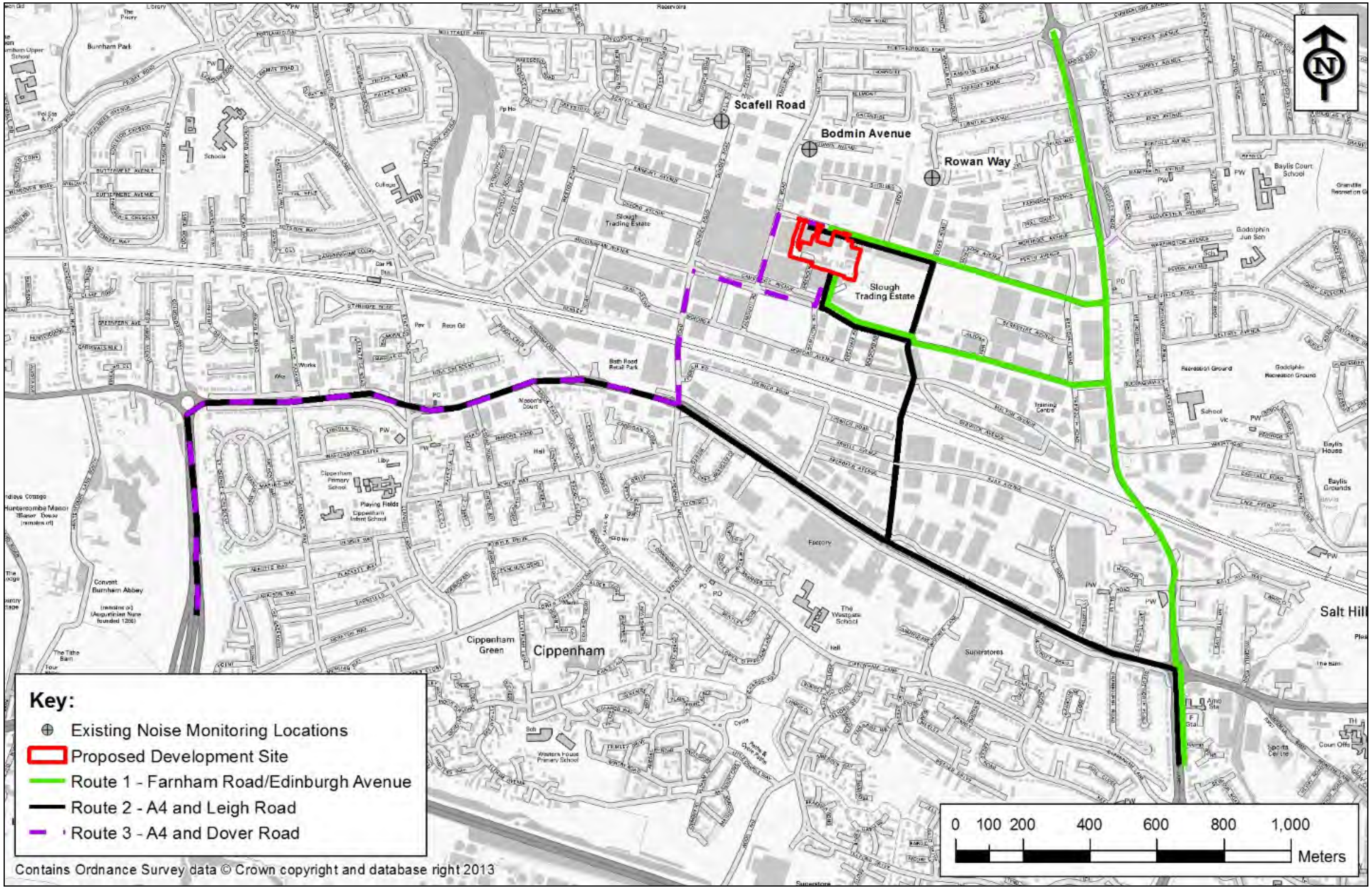
7.4.11. Existing planning conditions for the SHP site allow three delivery routes to be used for HGV vehicles (as illustrated in Figure 7-3), which are:

- Route 1 – Farnham Road from either the M40 or Junction 6 of the M4, then arriving via Edinburgh Avenue or Buckingham Avenue.
- Route 2 – Junction 6 of the M4, using Tuns Lane and Leigh Road (via Bath Road), then either Edinburgh Avenue (via Liverpool Road) or Buckingham Avenue; or Junction 7 of the M4 using the A4 Bath Road, then Leigh Road, and either Edinburgh Avenue (via Liverpool Road) or Buckingham Avenue.
- Route 3 – Junction 7 of the M4, using the A4 Bath Road, then Dover Road and either Buckingham Avenue or Edinburgh Avenue (via Fairlie Road).

7.4.12. Night-time deliveries are currently restricted by SBC to a maximum of 3 HGV deliveries per hour at the SHP site, with no HGV traffic using Junction 7 of the M4 (i.e. Route 3 and part of Route 2, west of Dover Road) during these hours (23:00 to 07:00).

Figure 7-2 Map of Local Road Network

Figure 7-3 Map of Permitted Routes to and from the Site



National Rail Services

7.4.13. Slough Rail Station is located approximately 3.2km to the east of the Site and is operated by First Great Western. The station provides a direct link to destinations including London, Windsor, Reading and Oxford.

7.4.14. The Transport Assessment, located in Appendix C-1, Volume II of this ES, presents the frequency of rail services operating at Slough Rail Station. In summary, there are three trains per hour from Slough to London Paddington on a weekday morning peak, while in the evening peak hour there are 5 return services (one of which is a fast service). There are also regular services to Reading, Oxford and Windsor and Eton Central in both the AM and PM peak weekday hours and at weekends. This offers an attractive opportunity for Slough Rail Station to be utilised as a mode of travel for part of the journey to and from the Proposed Development Site.

7.4.15. Burnham rail station is also a popular alternative, as it avoids local traffic in the centre of Slough. This station is located 1.9km to the west of the Site and is on the same line as Slough station. Services operate to Slough, Reading and Paddington from this station.

Bus Services

7.4.16. The nearest bus stops to the Proposed Development Site are located on Buckingham Avenue, immediately south of the Site. These bus stops are located approximately 250m from the Site via Liverpool Road and approximately 550m away from the centre of the Site utilising the access point nearest to Fairlie Road on Edinburgh Avenue. Both are sheltered and have seating.

7.4.17. There is a regular bus services in the vicinity of the Site, as described in the Transport Assessment, located in Appendix C-1, Volume II of this ES, lists the services operating at these bus stops and the frequencies

Pedestrian Facilities

7.4.18. The local road network generally has good pedestrian facilities, as described in the Transport Assessment, located in Appendix C-1, Volume II of this ES.

7.4.19. There is a continuous network of footways all the way to the Slough rail station located 3.2km to the east of the Site via several possible routes. The bus stops on Buckingham Avenue can be easily reached on foot. The nearest crossing point to access the bus stop on the south side of Buckingham Avenue for westbound services is located at the junction with Buckingham Avenue/Fairlie Road/Falmouth Road. This is a signalised crossing located approximately 120m west of the stops.

7.4.20. An average walking speed of approximately 1.4 m/s is generally assumed for pedestrians at new developments. This equates to approximately 400m in five minutes or three miles per hour. With this in mind the Slough rail station could be reached in less than 40 minutes, Burnham station in less than 24 minutes and the bus stops on Buckingham Avenue could be reached in between 3 and 6.5 minutes from the Site, depending on the exit used. It is generally considered that journeys of 2km or less provide the best opportunity to encourage employees to travel to work by foot. Within this distance there are a number of residential areas.

Cycle Facilities

7.4.21. Buckingham Avenue, Fairlie Road, Chaffield, Northborough Road and Dover Road all have cycle lanes or bus/cycle lanes on them. The A355 Farnham Road has a shared pedestrian/cycle path adjacent to the carriageway between the junction with Buckingham

Avenue and the A4 Bath Road. The A4 Bath Road also has a shared pedestrian/cycle path adjacent to the carriageway between Dover Road to the west and the town centre in the east. A continuous cycle route is available to the Slough rail station from the Site (this is with the exception of Edinburgh Avenue).

7.4.22. The cycle facilities within the vicinity of the Site link into the surrounding network to provide an opportunity to promote cycling as a viable mode of transport to the Site. The Site is a little over 10 minutes cycle from the town centre and the rail station would be within a 10 minute cycle. Cycling could therefore form part of a wider journey utilising multiple modes.

7.4.23. It is generally considered that distances of less than 5km provide the best opportunities to replace single occupancy car journeys with cycle trips. With this in mind, the majority of Slough, Windsor, Burnham and some smaller villages are within 5km of the Site.

Existing Road Traffic

7.4.24. Peak hour and daily two-way traffic flows are presented in Table 7-2 below, for all ATC locations.

Table 7-2 2013 ATC Peak Hour and Daily Two-Way Traffic Flows

ATC Location	AM Peak		PM Peak		Daily	
	Total Vehicles	HGV	Total Vehicles	HGV	Total Vehicles	HGV
Fairlie Rd	1068	13	1268	12	17542	253
Edinburgh Ave (west of Liverpool Road jctn.)	317	2	398	0	5533	57
Edinburgh Ave (east of Liverpool Road jctn.)	758	5	827	1	11792	90
Liverpool Rd	363	2	435	2	5236	44
Buckingham Ave (west of Liverpool Road jctn.)	739	12	665	7	10921	234
Farnham Rd (north of Edinburgh Ave jctn.)	1110	22	1263	19	21679	391
Leigh Rd	705	4	801	4	9393	86
Farnham Rd (south of Buckingham Ave jctn.)	1429	27	1378	22	25111	449
Buckingham Ave (east of Liverpool Road jctn.)	567	12	494	7	8625	182

7.4.25. Table 7-3 below shows the average number of HGVs entering and exiting the existing SHP site over a 24 hour period on Monday 10th, Wednesday 12th and Friday 14th June 2013 based on a manual traffic count.

7.4.26. To provide a comparison, historic data from 2007 has also been presented as this is representative of the level of trips to the Site in recent years when all plant was in operation. The SHP site was fully operational at this time and traffic to/from the site was at a much higher volume. The data has been presented as daily average traffic for arrivals and departures. It should be noted that the access operated well at this higher level of activity.

7.4.27. In addition, the following restrictions are currently imposed on the SHP site by SBC under the planning conditions relating to HGVs for the existing facility:

- A maximum combined total of 126 two-way deliveries per day (for the SHP site as a whole);
- Night-time deliveries shall be restricted to no more than 3 deliveries per hour at the SHP site in the hours between 23:00 and 07:00 using either Route 1 (between the M40 and Edinburgh Avenue) and/or Routes 1 and 2 (between M4 Junction 6 and either the Farnham Road or Leigh Road), with no night-time deliveries allowed via Route 3 (between M4 Junction 7 and Dover Road) or part of Route 2, west of Dover Road, as described in Appendix C-1, Volume II of this ES and illustrated in Figure 7-2; and
- All commercial vehicles need to be routed down Farnham Road/Edinburgh Avenue, A4 and Dover Road or A4 and Leigh Road, using one of three routes as shown in Figure 7-2. Lorries have historically accessed the site from Buckingham Avenue then into the site via Harwich Road

Table 7-3 Comparison of Current Development Traffic with Historical Development Traffic

Location	Daily HGV traffic 2013		Max daily HGV traffic 2007	
	Arrivals	Departures	Arrivals	Departures
Edinburgh Avenue - Main Site Access	14	14	86	86

7.4.28. The above suggests that there is significant scope for additional capacity at the Site beyond current levels, since the closure of plant has resulted in a substantial decrease in HGV traffic to the wider SHP site since 2007.

7.5. Potential Effects and Mitigation Measures

Demolition and Construction Phase

7.5.1. This section considers the scale and potential effect of the traffic that is anticipated during the demolition of the existing assets and construction of the Proposed Development.

7.5.2. During the demolition and construction period, there is expected to be an estimated 24 abnormal load deliveries and an average of approximately 300 additional staff onsite (though this will increase to nearly 500 in the peak month), spread across 3 working shifts throughout a 24 hour working day.

7.5.3. Despite the fact that demolition and construction traffic will largely arrive at the Site outside of the peak hours, peak hour flows have been used to assess the effect of the Proposed Development. It is considered that this approach offers the most robust assessment possible. It is therefore likely to overestimate the effect of the Proposed Development.

7.5.4. The exact location of the site laydown/accommodation area has not yet been determined, although it is likely to be within close proximity to the SHP site. For the purpose of this assessment it has been assumed that access/egress for HGVs will be via the south access/exit onto Harwich Road and then Buckingham Avenue during demolition/construction. Depending on the construction sequence it may be necessary to use other HGV access and egress routes available on site. This could include the Greenock Road entrance or, on occasions, the Edinburgh Avenue HGV entrances. Worker vehicles will arrive using the existing entrances/exit point in the southeast corner of the SHP site, off Harwich Road.

7.5.5. If the site laydown/accommodation area is located elsewhere in the Slough Trading Estate there would be some additional trips on the network as materials are moved between the laydown area and the site. However, these movements would be minimised in order to avoid double-handling where possible, and would be timed to avoid peak hours. As noted above, a robust approach has been used for the assessment of effects and it is considered that the additional vehicle movements associated with alternative site laydown/accommodation locations would not be significant.

Effect on Local Highway Network

7.5.6. HGV trip generation and distribution on the local network has been estimated and the daily and peak hour trip generation for '2017 with Demolition/Construction Traffic' is summarised in Table 7-4. A detailed description of the methodology used for trip generation and distribution is presented in the Transport Assessment (Appendix C-1, Volume II of this ES).

7.5.7. A breakdown of the traffic expected at the site is provided in the table below. This is based on the peak month, which is expected to occur in 2017. The annual average trip generation is expected to be substantially less than this and hence the assessment is likely to overestimate the effect of road trips during demolition/construction.

Table 7-4 Breakdown of the Estimated Demolition and Construction Traffic from the Proposed Development

Vehicle Type	Arrivals and Departures Per Day	Arrivals and Departures Per Peak Hour
HGV	30	3
Car	500	167

7.5.8. Table 7-5 presents the 2017 Baseline and 2017 With Construction two-way flows at each ATC location. Table 7-6 shows the percentage effect at each location by traffic associated with demolition and construction. Total Vehicles and HGVs are assessed in the AM Peak, PM Peak and Daily Average scenarios.

Table 7-5 2017 Peak AM/PM Hourly and Daily Average Demolition and Construction two-way Traffic flows

ATC Location	2017 Baseline						2017 with Demolition/Construction					
	Total Vehicles			HGV			Total Vehicles			HGV		
	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Fairlie Rd	1118	1327	18382	13	12	265	1118	1327	18382	13	12	265
Edinburgh Ave (west of Liverpool Road jctn.)	337	421	5852	2	0	60	337	421	5852	2	0	60
Edinburgh Ave (east of Liverpool Road jctn.)	896	951	13461	5	1	94	896	951	13461	5	1	94
Liverpool Rd	550	609	7392	2	2	46	550	609	7392	2	2	46
Buckingham Ave (west of Liverpool Road jctn.)	915	813	12962	12	7	244	1183	1081	13800	16	11	292
Farnham Rd (north of Edinburgh Avenue jctn.)	1350	1503	24884	23	19	409	1475	1628	25274	25	21	432
Leigh Rd	1454	1422	17486	4	4	90	1454	1422	17486	4	4	90
Farnham Rd (south of Buckingham Avenue jctn)	1712	1630	28678	28	23	469	1855	1773	29126	30	25	494
Buckingham Ave (east of Liverpool Road jctn.)	836	715	11624	12	7	191	1104	983	12462	16	11	239

Table 7-6 Percentage Increase in Vehicles due to the 2017 Peak Demolition and Construction two-way Traffic flows

ATC Location	Percentage Increase					
	Total Vehicles			HGV		
	AM	PM	Daily	AM	PM	Daily
Fairlie Rd	0%	0%	0%	0%	0%	0%
Edinburgh Ave (west of Liverpool Road jctn.)	0%	0%	0%	0%	0%	0%
Edinburgh Ave (east of Liverpool Road jctn.)	0%	0%	0%	0%	0%	0%
Liverpool Rd	0%	0%	0%	0%	0%	0%
Buckingham Ave (west of Liverpool Road jctn.)	29.3%	33.0%	6.5%	33.3%	57.1%	19.7%
Farnham Rd (north of Edinburgh Ave jctn.)	9.3%	8.3%	1.6%	8.7%	10.5%	5.6%
Leigh Rd	0%	0%	0%	0%	0%	0%
Farnham Rd (south of Buckingham Ave jctn.)	8.4%	8.8%	1.6%	7.1%	8.7%	5.3%
Buckingham Ave (east of Liverpool Road jctn.)	32.1%	37.5%	7.2%	33.3%	57.1%	25.1%

7.5.9. The table above demonstrates that the greatest effect of the traffic associated with the demolition/construction phase is expected to be on Buckingham Avenue.

7.5.10. There is a similar pattern of effect during both peak hours. The impact on the daily traffic flow is generally less than in the peak hours at all locations.

7.5.11. Buckingham Avenue (east of Liverpool Road junction) is expected to experience an increase of 37.5% in total vehicles during the PM peak, which equates to 268 vehicle movements. The overall effect on Farnham Road is much less than on Buckingham Avenue, with the largest increase of 9.3% in total vehicles at Farnham Road (north of Edinburgh Avenue junction) in the AM peak hour, which equates to 125 vehicle movements. The AM and PM peak are discussed because these are considered the peak hours worst-affected.

7.5.12. There is not expected to be any increase along Fairlie Road, Edinburgh Avenue, Liverpool Road or Leigh Road.

7.5.13. There are expected to be an additional 24 abnormal loads during the entire period of construction. These have not been modelled within the assessment due to the infrequency of arrivals/departures. These additional deliveries are not expected to cause any capacity issues on the network. The existing access arrangements are considered sufficient to accommodate these deliveries.

7.5.14. In summary, the impact on total traffic levels on local roads will be less than the 30% above which the IEMA guidelines recommend a detailed assessment of highway links, with the exception of Buckingham Avenue. On Buckingham Avenue, the flows are expected to increase by more than 30% in the peak hours, with much lower increases in overall daily flows; the absolute number of vehicles is less than 300 vehicles or 30 HGVS per hour, which is the criterion for a minor adverse impact. Even with the construction traffic the peak hour flows on Buckingham Avenue are lower than on other similar standard roads in the area. Therefore the effect on the local highway network is expected to be negligible.

7.5.15. Demolition and construction shift changeover will be scheduled to avoid the peak hours (07:30 to 09:30 and 16:30 to 18:30) to avoid the worst affected hours and this will be enforced through the CEMP. HGV deliveries will also be scheduled to avoid the weekday peak hours (07:30 to 09:30 and 16:30 to 18:30), and the effects presented above are therefore likely to be an overestimate of the actual effect on local road traffic.

Effect on Public Transport

7.5.16. The potential effects on the bus and rail network of additional patronage could be:

- Crowding on buses and trains;
- Congestion at bus stops and stations; and
- Congestion on footpaths on routes to bus stops and stations.

7.5.17. The current level of bus service provides a convenient means of commuting to and from the Site for demolition/construction staff. It is not expected that the majority of demolition/construction staff will access the Site by bus, however, due to the likely shift patterns that will be in effect.

7.5.18. No noticeable effect is anticipated on local rail services as a result of the demolition and construction phase of the Proposed Development.

7.5.19. A Workplace Travel Plan has been produced for the current operation on site. This will be revised to cover both the demolition and construction (and operational) phases. This document will be written in consultation with SBC and will promote measures at the Site that increase the use of sustainable modes of transport by staff.

7.5.20. There is considered to be sufficient levels of public transport within the vicinity of the site to deal with an increase in usage by staff at the site. The effect of the construction and demolition phase on public transport is expected to be negligible.

Effect on Pedestrians and Cyclists

7.5.21. Based on the significance criteria set out in Table 7-1, no roads are anticipated to experience increases in traffic of 300 vehicles per hour or 30 HGVs per hour and therefore the impact of the demolition/construction traffic on pedestrian and cycle amenity is expected to be negligible. Any effects will be further reduced through measures within the Travel Plan.

Operational Phase

7.5.22. This section considers the scale and potential effect of the additional traffic that would be generated after completion of the Proposed Development.

7.5.23. Staff levels will increase by approximately 20 personnel compared with existing levels once the Site becomes operational. This will bring numbers part way back up to the staffing levels onsite in early 2013 when the CFB boilers were operational. Taking this into account and the relatively low numbers of additional traffic expected from worker trips, light vehicle movements have not been considered further in this assessment.

7.5.24. During operation there will be a one-way system entering the Site from Edinburgh Avenue in the northwest of the Site and exiting in the northeast corner of the Site back onto this road. Flue Gas Treatment residue may also be collected using a third exit/egress point, which is under the north stack, between the two other access points. This would enable the occasional HGV to back in and collect, then drive onto Edinburgh Avenue and into the site for weighing and then out again at the northeast exit point.

7.5.25. At the main access point on Edinburgh Avenue, the entrance barrier will be relocated further into the Site to avoid queuing on the road due to HGVs protruding into the carriageway, and the access and the exit on Edinburgh Avenue will become yellow box junctions as part of the Proposed Development. This is in recognition of the fact that queuing sometimes occurs on Edinburgh Avenue. Using this box junction approach would prevent HGVs from being blocked while accessing/egressing the site and would therefore prevent further queuing at these junctions. Visibility at the exit junction has also been assessed so as to check the safety of vehicles leaving the Site. This was checked as outlined in DfT's Design Manual for Roads and Bridges (DMRB), at a position of 2.4m back from the stop line. The assessment shows clear visibility to at least 90m in either direction from the exit junction.

7.5.26. Access/egress to the two offices at 6 and 342 Edinburgh Avenue (within the SHP site) will also be retained. No upgrade works are anticipated along these access roads, although the effect of all vehicular movements on these roads has been assessed as part of this report.

7.5.27. In addition to the Proposed Development there is a requirement for a new central site services building, a water treatment plant and parking on the SHP site to serve both the Proposed Development and other generating facilities (the "*Further Development*"). This will be the subject of a separate composite planning application to be submitted in parallel with the application for the Proposed Development, but will exclude works which are viewed as permitted development under the Town and Country Planning (General Permitted Development) Order 1995 as amended.

7.5.28. There will be car and light vehicle access/egress via Harwich Road to the new car parking in the southeast and east part of the SHP site, which forms part of the Further Development on the SHP site. This car and light vehicle access/egress via Harwich Road will also provide access to the new central site services building. Despite the fact that operational traffic will be scheduled to arrive at the Site outside of the peak hours, peak hour flows have been used to assess the effect of the Proposed Development in order to provide the most robust assessment of the effects.

7.5.29. All HGV and car trips generated at the site will have to use one of three routes to access/egress the site. This information will be made clear to all HGV operators using the site as is the current practice. The SHP site also uses a three-strike system to enforce the permitted routing. Any HGV driver seen to not be following the designated routes shown in Figure 7-2 will be warned. On the third warning the driver will be banned from site. This would also be implemented for the Proposed Development.

Effect on Local Highway Network

7.5.30. HGV trip generation and distribution on the local network has been estimated and the daily trip generation for 2019 with Proposed Development traffic and 2019 with Maximum Permitted Traffic is summarised in Table 7-7. There will be some variation in daily flows during operation, with an estimated maximum average 100 deliveries per day from the SHP site when taking into account the existing flows, but increasing to up to a maximum 126 deliveries on certain days. As discussed in *Chapter 5: The Proposed Development* of this ES, a breakdown of the daily average deliveries expected during operation of the Proposed Development is presented in Table 7-8. The Proposed Development is expected to contribute a maximum average 80 deliveries per day, whilst the existing Boiler 17 will contribute an additional 20 per day. The figure for Boiler 17 was calculated from an average 14 deliveries per day measured in early 2013 whilst the boiler was running at 65% load, therefore approximately 20 deliveries per day is envisaged at full load.

7.5.31. The trip generation has been estimated based on the maximum fuel capacity of the Proposed Development, which is 20% higher than the design capacity, which is likely to lead to an overestimate of the number of arrivals/departures.

Table 7-7 2019 Weekday Average - Arrivals and Departures

Location	2013 Base		2019 With Proposed Development and SHP site		2019 With Maximum Permitted Traffic from SHP	
	HGV Arr	HGV Dep	HGV Arr	HGV Dep	HGV Arr	HGV Dep
Edinburgh Avenue - Main Site Access	14	14	100	100	126	126

Table 7-8 Daily Average HGV Deliveries for the Operational Phase of the Proposed Development

Material	Description	Approximate Annual Quantities (tonnes per annum)	Approximate Average Daily Deliveries
Fuel	WDF	480,000 (maximum)	65
		400,000 (design)	54
	Gas	-	Pipeline
Reagents	Hydrated Lime	6,500	1
	Activated Carbon	200	<1
	Ammonia	1,500	<1
Residues	Bottom Ash	80,000 (maximum)	11
		67,000 (design)	9
	Flue Gas Treatment	15,000	2
Water	Raw Water	1,600,000	Pipeline
Total Approximate Average Road Deliveries (assuming 22 tonne payload)			**80 (Maximum)**
			67 (Design)

7.5.32. Peak hour trip generation is presented in Table 7-9. A detailed description of the methodology used for trip generation and distribution is presented in the Transport Assessment (Appendix C-1, Volume II of this ES).

Table 7-9 2019 Peak Hour Arrivals and Departures

	2019 AM Proposed Development Traffic		2019 PM Proposed Development Traffic		2019 AM Maximum Permitted Development Traffic		2019 PM Maximum Permitted Development Traffic	
Location	**HGV Arr**	**HGV Dep**	**HGV Arr**	**HGV Dep**	**HGV Arr**	**HGV Dep**	**HGV Arr**	**HGV Dep**
Edinburgh Avenue - Main Site Access	4	4	4	4	5	5	5	5

7.5.33. Tables 7-10, 7-11 and 7-12 present the two-way flows for the 2019 Base, 2019 With Proposed Development Traffic, and 2019 with Maximum Permitted Traffic from SHP at each ATC location. They show flows for both Total Vehicles and HGVs in the AM Peak, PM Peak and Daily Average scenarios respectively. In each table the percentage increase from 2019 Base traffic is displayed.

7.5.34. These flows have been generated by a traffic model, which distributes the predicted trip generation across the current permitted delivery routes for the Proposed Development (illustrated in Figure 7-2), taking into account the data from the manual turning count. It has been assumed that 79% of deliveries will arrive/depart to and from Farnham Road to the east, with the remaining 21% to and from Fairlie Road to the west.

7.5.35. In addition a further one third (33%) of traffic from the Proposed Development has been added to the road network along Route 2, using Liverpool Road and Leigh Road. Hence, the total flows shown in Tables 7-10, 7-11 and 7-12 are greater than would be expected based on the trip generation in Table 7-9. The reason for this is to avoid underestimating the effects along either Route 1 or 2, as vehicles arriving from or leaving to the east of the Site have the ability to continue to Farnham Road along Edinburgh Avenue or turn down Liverpool Road and onto Leigh Road. This is especially important because more traffic to/from Site may choose to use Route 2 once the Leigh Road Bridge has been completed (currently under construction as part of one of the cumulative schemes discussed in Section 7-7).

Table 7-10 2019 AM Peak Hour Two-Way Traffic Flows Increase

ATC Location	2019 Base Traffic		2019 With Proposed Development Traffic				2019 With Maximum Permitted Flows for the SHP Site			
	Total Flows	HGV Flows	Total Flows	% Increase in total flows	HGV Flows	% Increase in HGVs	Total Flows	% Increase in total flows	HGV Flows	% Increase in HGVs
Fairlie Rd	1164	14	1166	0.2%	16	14.3%	1166	0.2%	16	14.3%
Edinburgh Ave (west of Liverpool Rd jnct.)	349	2	355	1.7%	8	300%	357	2.3%	10	400%
Edinburgh Ave (east of Liverpool Rd jnct.)	927	5	933	0.7%	11	120%	935	0.9%	13	160%
Liverpool Rd	566	2	568	0.4%	4	100%	568	0.4%	4	100%
Buckingham Ave (west of Liverpool Road jnct.)	946	13	946	0%	13	0%	946	0%	13	0%
Farnham Rd (north of Edinburgh Ave jnct.)	1397	24	1400	0.2%	27	12.5%	1400	0.2%	27	12.5%
Leigh Rd	1484	4	1486	0.1%	6	50%	1486	0.1%	6	50%
Farnham Rd (south of Buckingham Ave jnct.)	1771	30	1774	0.2%	33	10%	1776	0.3%	35	16.7%
Buckingham Ave (east of Liverpool Road jnct.)	859	13	859	0.0%	13	0%	859	0%	13	0%

7.5.36. The table above shows that with the Proposed Development, local roads will experience an increase in total traffic of less than 1% during the AM peak, with the exception of Edinburgh Avenue (west of Liverpool Road junction), which is closest to the Site access. This is predicted to experience an increase in total traffic of 1.7%. This increases to just 2.3% with the Maximum Permitted flows for the SHP site. The other locations remain below a 1% impact with the maximum operational flows. This is a negligible effect on the AM peak.

7.5.37. There are large percentage increases in HGVs at some locations, with the largest increase being 300% along Edinburgh Avenue (west of Liverpool Road junction) with the Proposed Development traffic and 400% with the Maximum Permitted traffic. However, this only represents an increase of six and eight HGVs respectively in the morning peak hour at this location. Therefore it is considered that the AM peak impact would be negligible when taking into account that a minimum change of 300 vehicles or 30 HGVS per hour is required to create a minor impact.

7.5.38. It should be noted that no HGV deliveries will be scheduled between the peak hours (07:30-09:30 and 16:30-18:30). These HGVs have been assessed against the peak hour however in order to form a worst-case scenario. Therefore, the traffic flows presented will be an overestimate of the actual impacts.

7.5.39. In terms of trip distribution, Table 7-10 shows that 37.5% of trips are expected to use Route 1, via Farnham Road to/from the M4, 37.5% are expected to go via Farnham Road to/from the M40 (also Route 1), and the final 25% will go via Fairlie Road, onto Dover Road and thereafter to Junction 7 of the M4, which is Route 3. As discussed above, a further 33% of Eastbound trips have been added to the road network along Route 2, via Liverpool Road, Leigh Road and then to either Junction 6 or 7 of the M4.

Table 7-11 2019 PM Peak Hour Two-Way Traffic Flows Increase

ATC Location	2019 Base Traffic		2019 With Proposed Development Traffic				2019 With Maximum Permitted Flows for the SHP Site			
	Total Flows	HGV Flows	Total Flows	% increase in total flows	HGV Flows	% increase in HGVs	Total Flows	% increase in total flows	HGV Flows	% increase in HGVs
Fairlie Rd	1372	12	1374	0.2%	14	16.7%	1374	0.2%	14	16.7%
Edinburgh Ave (west of Liverpool Road jnct.)	436	0	442	1.4%	6	100%	444	1.8%	8	100%
Edinburgh Ave (east of Liverpool Road jnct.)	980	1	986	0.6%	7	600%	988	0.8%	9	800%
Liverpool Rd	625	2	627	0.3%	4	100%	627	0.3%	4	100%
Buckingham Ave (west of Liverpool Road jnct.)	836	7	836	0%	7	0%	836	0%	7	0%
Farnham Rd (north of Edinburgh Ave jnct.)	1549	21	1552	0.2%	24	14.3%	1552	0.2%	24	14.3%
Leigh Rd	1450	4	1452	0.1%	6	50%	1452	0.1%	6	50%
Farnham Rd (south of Buckingham Ave jnct.)	1679	24	1682	0.2%	27	12.5%	1684	0.3%	29	20.8%
Buckingham Ave (east of Liverpool Road jnct.)	733	7	733	0%	7	0%	733	0%	7	0%

7.5.40. The table above shows that with the Proposed Development, local roads will experience an increase of less than 1% in the PM Peak Hour, with the exception of Edinburgh

Avenue (west of Liverpool Road junction), which is expected to experience an increase of 1.4%.

7.5.41. The Maximum Permitted flows also show only one of the nine locations increasing by more than 1%. Edinburgh Avenue (west of Liverpool Road junction) remains the largest increase with a 1.8% rise. This represents a total of less than eight vehicles per minute at this location and an increase of just eight vehicles per hour from the 2019 base flows. The impact on total flows in the PM peak is therefore considered negligible.

7.5.42. Once again, the rise in the percentage of HGVs at some locations is attributable to the fact that at these locations existing HGV flows were low, meaning that a single vehicle can make a large impact in the percentage difference. The largest increase was of 800% at Edinburgh Avenue (east of Liverpool Road junction) for the Maximum Permitted development flows, representing just an additional eight vehicles. This is a negligible increase.

7.5.43. As with the AM peak hour, trip distribution for the PM peak hour is expected to be the same and therefore this is a negligible effect on the PM peak. As mentioned above, no HGV deliveries will be scheduled between the peak hours (07:30-09:30 and 16:30-18:30) and the effect on the afternoon peak is therefore expected to be less than presented above.

Table 7-12 2019 Daily Average - Two-Way Traffic Flows Increase

ATC Location	2019 Base Traffic		2019 With Proposed Development Traffic				2019 With Maximum Permitted Flows for the SHP Site			
	Total Flows	HGV Flows	Total Flows	% Increase in total flows	HGV Flows	% increase in HGVs	Total Flows	% Increase in total flows	HGV Flows	% increase in HGVs
Fairlie Rd	19012	274	19054	0.2%	316	15.3%	19064	0.3%	326	19.0%
Edinburgh Ave (west of Liverpool Road jnct.)	6050	62	6208	2.6%	220	254%	6250	3.3%	262	322%
Edinburgh Ave (east of Liverpool Road jnct.)	13885	97	14043	1.1%	255	163%	14085	1.4%	297	206%
Liverpool Rd	7580	47	7632	0.7%	99	111%	7646	0.9%	113	140%
Buckingham Ave (west of Liverpool Road jnct.)	13354	253	13354	0.0%	253	0%	13354	0.0%	253	0.0%
Farnham Rd (north of Edinburgh Ave jnct.)	25662	423	25735	0.3%	496	17.3%	25756	0.4%	517	22.2%
Leigh Rd	17823	93	17875	0.3%	145	56%	17890	0.4%	159	71.0%
Farnham Rd (south of Buckingham Ave jcnt.)	29580	485	29665	0.3%	570	17.5%	29686	0.4%	591	21.9%
Buckingham Ave (east of Liverpool Road jnct.)	11933	197	11933	0.0%	197	0%	11933	0%	197	0%

7.5.44. Table 7-12 above shows that with the Proposed Development, for the full daily average the majority of locations will be impacted by an increase of less than 1%, with the exceptions of Edinburgh Avenue (west of Liverpool Road junction) and Edinburgh Avenue (east of Liverpool Road junction). These will see a daily increase of 2.6% and 1.1% respectively in total vehicles. Even with the Maximum Permitted Development flows for the existing SHP site, only these same two locations will increase by more than 1% for total vehicles throughout the day. Edinburgh Avenue (west of Liverpool Road junction) remains the largest increase of 3.3%, but this is still only 200 additional vehicles daily, and the impacts are considered negligible.

7.5.45. The relatively low number of HGVs operating on certain roads around the local highway network means that the addition of just a few vehicles can result in a large percentage change. Edinburgh Avenue will see a marked percentage increase in HGV flows as a result of the development, but this will still only rise to 297 movements per day. This will mean a small impact overall due to the low traffic flows along this road. The daily effect of HGVs is therefore anticipated to be negligible.

7.5.46. In summary, the Proposed Development flows are lower than the current Permitted Maximum flows for the SHP site during the AM, PM and Daily Average periods. Increases in driver delay and journey times are not assessed to be significant. Operational phase traffic is therefore expected to have a negligible effect on the local highway network.

7.5.47. In terms of trip distribution, the traffic model predicts that for the daily average, 42.5% of trips will use Route 1 travelling along Farnham Road to/from the M4), with 36.5% of trips heading north along Farnham Road to/from the M40 on Route 1. A further 21% of the trips are expected to travel along Fairlie Road, continuing onto Dover Road and thereafter to Junction 7 of the M4, which is Route 3.

7.5.48. As discussed above, an additional one third of trips have been added to the road network and are shown to utilise Route 2, via Liverpool Road, Leigh Road and then to either junction 6 or 7 of the M4. This is an unrealistic overestimate as it results in more trips on the road network than expected, but it avoids underestimating the potential effect on either routes.

7.5.49. The distribution differs slightly to the AM and PM peak hours because of the change in suitability of these roads during different times of day, with some roads predicted to be a quicker route to Site during peak hours than others for example.

Impact on A355 Farnham Road/A4 Bath Road Junction

7.5.50. The A355 Farnham Road/A4 Bath Road signalised junction is located to the southeast of the Site and has been identified by SBC as being sensitive to increases in traffic flows.

7.5.51. With the Maximum Permitted traffic, the Site will generate a daily total of 106 two way movements at the northern arm of this junction, representing an increase of just 0.4%.

7.5.52. These flows would then split across the other three arms at this junction, and therefore the impact on the traffic flows on these roads would be even lower. It is therefore considered that the development would have a negligible impact on the operation of this junction.

Effect on Public Transport

7.5.53. It has been assumed that the Proposed Development will generate no additional bus trips throughout the day due to the relatively small increase in staffing levels on site during operation. Staffing levels will not significantly increase onsite and, as a result, the impact of the development on bus services will not be significant.

7.5.54. The Proposed Development is expected to have a negligible effect on public transport.

Effect on Pedestrians and Cyclists

7.5.55. It has been assumed that the Proposed Development will generate no additional pedestrian or cycle trips throughout the day associated with the 20 additional staff needed to operate the Proposed Development. Even if a few more people were to access/egress the site by foot/cycle as a result of Travel Plan measures, the local facilities for these modes are considered to have the capacity to cope with this.

7.5.56. The overall effect of the Proposed Development on pedestrians and cyclists offsite is considered to be negligible.

Sensitivity Test

7.5.57. The Operational east/west trip distribution is currently predicted to be 79%:21%. A sensitivity test was undertaken assuming that 100% of traffic will arrive and depart to/from the east and 50% to/from the west. The additional one third of traffic routed to/from the east has again been routed down Liverpool Road and Leigh Road.

7.5.58. The full results of the sensitivity test for the Proposed Development can be found in the Transport Assessment (Appendix C-1). The results show that for the AM Peak, all roads will be impacted by an increase of less than 2%, with the exceptions of Edinburgh Avenue (west of Liverpool Road junction). This will see an increase of 2.9% in total vehicles. The increase in the percentage impact on HGV flows can once again be explained by the low number of vehicles involved. No location has more than ten additional HGVs in the peak hour.

7.5.59. For the PM Peak the sensitivity test traffic flows show that all roads will be impacted by an increase of 1% or less, with the exception of Edinburgh Avenue (west of Liverpool Road junction), which will see an increase of 2.3% in total vehicles. The increase in the percentage impact for HGV flows can be explained by the low number of vehicles involved. As in the AM peak, no location has more than ten additional HGVs in the peak hour.

7.5.60. For the daily sensitivity test traffic flows, all roads will be impacted by an increase of less than 2%, with the exceptions of Edinburgh Avenue (west of Liverpool Road junction). This will see an increase of 4.2% in total vehicles. The increase in the percentage impact on HGV flows can once again be explained by the low number of vehicles involved. No location has more than 252 additional HGVs throughout the day.

7.5.61. Based on the findings in Chapter 9: Noise and Vibration of this ES, and with the overall aim of reducing congestion during daytime peak periods, it is proposed that the current 8 hour period night-time restrictions (outlined in paragraph 5.1.8 of this report) are replaced with the following:

- A maximum of 126 deliveries per day, with an expected total of 100 deliveries per day;
- A maximum 64 total deliveries at night, with a maximum of 3 per hour from M40 Junction 2, and a maximum 8 per hour in total;
- HGVs arriving from the west or Midlands will only access the site via M4 Junction 7;
- HGVs arriving from elsewhere (excluding nights) will arrive via M4 Junctions 6 or 7; and

- No HGVs will be scheduled to arrive at site between 07:30 to 09:30 and 16:30 and 18:30 from Monday to Friday.

7.5.62. The above restrictions would apply to both the demolition/construction phase and operational phase of the Proposed Development.

7.5.63. This revised condition would allow an additional 40 night-time deliveries (an increase from 24 currently to 64), and therefore provides the Applicant with a greater scope to avoid deliveries during the peak hour, day time period. As mentioned above, no HGV deliveries will be scheduled to arrive at site between 07:30 to 09:30 and 16:30 and 18:30 during the morning and evening commuter weekday peak periods. The trip generation associated with the Proposed Development has been assessed against peak hours, hence will have overestimated the effect of the Proposed Development on the local road network. Despite this, no significant effects were identified.

7.5.64. The new restrictions state that HGVs will not be allowed to arrive (except at night) via the A355 Farnham Road (north) and this has been taken into account in the Sensitivity Test. Due to the fact that most of these vehicles will be arriving at the site from the M40 west of the Proposed Development, the most likely alternative route that these vehicles would take is via Fairlie Road and south to the A4. Should they distribute across other routes, the sensitivity test adds a far higher proportion of trips to each of the ATC locations than is expected to occur. The trips have also been left on the A355 Farnham Road (north) so as to show what would happen at this location should the restrictions not be implemented. It is therefore considered that this test provides the most robust assessment possible of the Proposed Development on the surrounding highway network.

7.5.65. In summary, this Sensitivity Test shows that throughout the day the maximum permitted traffic flows would still have a negligible effect on the surrounding network, even if on certain days the trip distribution was markedly different from that predicted to occur and the proposed restrictions were in place. The effect of the Proposed Development on the surrounding highway network continues to be negligible even with the Sensitivity Test distribution.

Mitigation Measures

Demolition and Construction Phase

7.5.66. A Construction Environmental Management Plan (CEMP) will be prepared by the contractor and submitted to SBC for approval prior to the commencement of any demolition or construction work on site. All travel to site by staff will be managed through the CEMP, including management of parking, provision of minibuses and a car share scheme. The CEMP will include designated construction traffic routes and other measures to minimise the effect of traffic, including proposed restrictions on start/finish times. A framework CEMP is presented in Appendix B-1, Volume II of this ES, which demonstrates the likely structure and content of the CEMP.

7.5.67. The access and egress of demolition/construction traffic will be carefully planned to minimise effects on the surrounding highway and local road users, including any employees still occupying parts of the Site that will be developed during later stages of the works. The increase in demolition/construction traffic flows will be managed to minimise the effect on the surrounding highways and all local road users, and no HGVs will be scheduled to arrive at site between 07:30 to 09:30 and 16:30 and 18:30 from Monday to Friday during the morning and evening commuter peak periods. Discussions will be held with SBC to agree a safe site access strategy in advance of site works commencing, and prior to each phase of the works. Deliveries will also be phased on a ‘just in time’ basis where possible. This will minimise travel time and potential congestion around the Site.

7.5.68. Demolition and construction staff will be encouraged to travel to and from the Site by sustainable means. In particular, emphasis will be given to car sharing and the use of minivans. Parking within the Site and for local laydown areas for demolition/construction staff will be managed in order to prevent overspill parking on the surrounding side roads. A Workplace Travel Plan has been produced for the current operation on site (See Appendix C-2). This will be revised to cover both the demolition/ construction and operational phases. This document will be written in consultation with SBC and will promote measures at the Site that increase the use of sustainable modes by staff. The Workplace Travel Plan will include measures such as promoting use of public transport, incentives to cycle to work, car sharing, meet-points and utilisation of minibus services to site.

7.5.69. Pedestrian access to the Site will be segregated from vehicular traffic at all times, with clear signage to maintain the safety of the site and the general public. This will be enhanced through a separate application by the Applicant for the SHP site, as discussed later in this chapter.

7.5.70. In order to further increase the safety of vulnerable road users, HGV operators will be encouraged to fit safety equipment such as sidebars, blind spot cameras, audible 'turning left' warnings and reversing beeps to all HGVs accessing the site.

7.5.71. A traffic profile has been produced for demolition and construction traffic, which is to be used in the CEMP as a guide as to the times to be avoided by demolition and construction vehicles. The full results of this exercise are presented in the Transport Assessment (Appendix C-1). To minimise the effect of this phase of works, the demolition and construction shift changeover will be scheduled to avoid the weekday peak hours (07:30 to 09:30 and 16:30 to 18:30). Similarly, no demolition and construction HGVs will be scheduled to arrive at site between the weekday peak hours (07:30 to 09:30 and 16:30 to 18:30). The effects presented in the Transport Assessment are therefore likely to be an overestimate of the actual effects on local road traffic.

Operational Phase

7.5.72. An updated Workplace Travel Plan will be prepared to incorporate the Proposed Development prior to the commencement of the demolition and construction phase. The Travel Plan will identify measures that will be incorporated into the design of the development to encourage more sustainable means of transport for workers and to maximise the utilisation of HGVs (e.g. payloads and backloads), and will include targets for modal change and measures to monitor progress towards achieving these goals.

7.5.73. The current traffic planning condition at SHP allows lorry deliveries to the SHP site 24/7 and an overall total of 126 deliveries per day (using Routes 1, 2 or 3). There also is a night-time period (23.00 to 07.00) restriction of 3 deliveries to site per hour using either Route 1 (between the M40 and Edinburgh Avenue) and/or Route 2 (between M4 Junction 6 and Farnham Road South), and with no deliveries allowed via Route 3 (between M4 Junction 7 and Dover Road) (see Figure 7-2). Based on the findings in *Chapter 9: Noise and Vibration* of this ES, and with the overall aim of reducing congestion during daytime peak periods, it is proposed that the current 8 hour period night-time restrictions are replaced with the following:

- A maximum of 126 deliveries per day, with an expected total of 100 deliveries per day;
- A maximum 64 total deliveries at night, with a maximum of 3 per hour from M40 Junction 2, and a maximum 8 per hour in total;
- HGVs arriving from the west or Midlands will only access the site via M4 Junction 7;

- HGVs arriving from elsewhere (excluding nights) will arrive via M4 Junctions 6 or 7; and
- No HGVs will be scheduled to arrive at site between 07:30 to 09:30 and 16:30 and 18:30 from Monday to Friday.

7.5.74. At the main access point on Edinburgh Avenue, the entrance barrier will be relocated further into the Site to avoid queuing on the road due to HGVs protruding onto the carriageway and the access and the exit on Edinburgh Avenue will become yellow box junctions as part of the Proposed Development. This is in recognition of the fact that queuing sometimes occurs on Edinburgh Avenue. Using this box junction approach would prevent HGVs from being blocked while accessing/egressing the Site and would therefore prevent further queuing at these junctions.

7.5.75. The Leigh Road rail crossing will remain a designated access route to the SHP site.

7.5.76. The restriction on going north to the M40 during weekday daytime periods is to protect vulnerable users and the expected congestion that will likely increase with the bus lanes being constructed on Farnham Road.

7.5.77. This revised condition would allow an additional 40 night-time deliveries (an increase from 24 currently to 64), and therefore provides the Applicant with a greater scope to avoid deliveries during the peak day time periods. As mentioned above, no HGV deliveries will be scheduled to arrive at site between 07:30 to 09:30 and 16:30 and 18:30 during the morning and evening commuter weekday peak periods, however the fuel suppliers would also inherently aim to avoid the busiest times of day, to minimise delivery time.

7.5.78. This revised condition has not been incorporated into the traffic modelling within the Sensitivity Test, which currently presents a worst-case assessment on the basis of deliveries occurring during peak hour traffic. The assessment is therefore likely to overestimate the actual effect on local traffic and this enhancement measure is expected to further reduce the predicted effects by encouraging the Applicant to increase the number of deliveries outside of the busier times of day.

7.5.79. In order to further increase the safety of vulnerable road users, HGV operators will be encouraged to fit safety equipment such as sidebars, blind spot cameras, audible 'turning left' warnings and reversing beeps to all HGVs accessing the site.

7.6. Residual Effects and Conclusions

Demolition and Construction Phase

7.6.1. The introduction of a CEMP including an access strategy for the site will help to minimise the effect of demolition and construction on all modes of transport. The residual effect significance on the local highway network is predicted to be negligible.

7.6.2. Effects on pedestrian and cyclist amenity will be minimised through the CEMP, and the residual effect is considered to be of negligible significance.

Operational Phase

7.6.3. HGV movements on Edinburgh Avenue will be managed to ensure that disruption to existing businesses served by the road will be kept to a minimum; the access gate will be operated by SSE security to allow deliveries to queue onsite to prevent offsite queuing along Edinburgh Avenue. The residual effect significance on the local highway network is predicted to be negligible.

7.6.4. Residual effects on public transport users, cyclists and pedestrians are considered to be negligible.

7.6.5. Table 7-13 presents a summary of residual effects.

Table 7-13 Summary of Residual Effects

Description	Nature of Effect	Geographic Scale	Significance
Demolition and Construction Phase			
Driver delay during demolition and construction	Delays due to traffic management on local highway network	Local	Negligible
Pedestrian/cyclist amenity during demolition and construction	Increase in HGV movements on local highway network	Local	Negligible
Impact on Public Transport during demolition and construction	Increase in HGV movements on local highway network	Local	Negligible
Operational Phase			
Delays on local highway network associated with the operational development	Increase in traffic movements on local highway network	Local	Negligible

7.7. Cumulative Effects

7.7.1. Of the committed developments outlined in Chapter 2: Assessment Methodology of this ES, there are two that have the potential to have an effect on the local transport network that warrant further investigation in this assessment. The committed developments that have been included in this cumulative effects assessment are as follows:

- Leigh Road/Bath Road Central Core 1 & 2 Planning Application - Slough Trading Estate, 0.5km south east of SHP (P/14515/000).
- Britwell Regeneration - mixed residential, community and retail use, 0.7km north west of SHP (application ref: P/15513/000).

7.7.2. The Leigh Road/Bath Road Central Core development is located to the southeast of the Site under study in this report. Flows for this site have been taken from the Transport Assessment prepared by Peter Bretts Associates LLP. The Britwell Regeneration site is located to the northwest and traffic flows have been taken from the 2013 Transport Assessment prepared by Amey.

7.7.3. These flows have been added to all construction and opening year flows within this report, so as to provide a robust assessment of the local network.

7.7.4. As the Transport Assessments for the committed developments in question only displayed AM and PM peak hour flows, a factor has been applied to the combined peak hour flows so as to give the daily number of vehicles expected. This factor was calculated using TRICS data for Land Use 02- Employment/D- Industrial Estate.

7.7.5. The combined two-way committed development traffic flows are presented in Table 7-14 below for the peak hours and the daily scenarios.

Table 7-14 Combined Two-Way Committed Development Flows Generated at Each ATC Location

ATC Location	Total Vehicles		
	AM	PM	Daily Average
Fairlie Rd	6	0	35
Edinburgh Ave (west of Liverpool Road jnct.)	6	5	65
Edinburgh Ave (east of Liverpool Road jnct.)	106	86	1,128
Liverpool Rd	172	154	1,916
Buckingham Ave (west of Liverpool Road jnct.)	145	117	1,540
Farnham Rd (north of Edinburgh Ave jnct.)	194	182	2,209
Leigh Rd	720	584	7,662
Farnham Rd (south of Buckingham Ave jnct.)	223	188	2,415
Buckingham Ave (east of Liverpool Road jnct.)	245	198	2,603

7.7.6. It should be noted that in addition to the Proposed Development there is a requirement for Further Development, which will include a new central site services building, a water treatment plant and parking on the SHP site to serve both the Proposed Development and other generating facilities. This will be the subject of a separate composite planning application to be submitted in parallel with the application for the Proposed Development. The Further Development will reduce the number of parking spaces on the SHP site from 107 to approximately 95 (including 3 existing disabled car-parking spaces), which is sufficient for the number of staff expected onsite (see Chapter 5: The Proposed Development). It is therefore expected to have a negligible, but beneficial effect on operational traffic from the SHP site.

7.7.7. The construction of the Further Development is expected to generate in the order of 2 deliveries per week for a period of 3 months, with an additional 10 deliveries expected for the construction of the water treatment plant. The number of deliveries is therefore expected to be imperceptible in comparison to the number associated with the Proposed Development and it is not expected to generate a cumulative effect.

7.7.8. This simultaneous application for Further Development by SSE on the SHP site includes new shower facilities and a cycle rack for workers to use as part of the central site services building. The central site services building will also provide a central location for visitors and staff, which will be separate to the HGV access/exit, providing safe refuge and passage into and out of the site for pedestrians.

7.7.9. An additional one third of the trip generation associated with the Proposed Development was routed south down Liverpool Road and Leigh Road for the operational flows to account for the improvements at the Leigh Road Bridge (due to be completed in 2015).

7.7.10. Traffic generated by schemes considered in the cumulative effect assessment will result in an increase in total daily traffic on the surrounding highway network. Table 7-15 below displays the percentage increase as a result of the cumulative schemes at each location. The daily flows with the proposed development show the 2019 baseline plus the proposed development. The daily flows plus development and cumulative schemes shows the increase once the cumulative schemes have been added to those flows.

Table 7-15 Percentage Increase at Each ATC Location Due to Committed Developments

ATC Location	2019 Total Daily Vehicle Flows Plus Development	2019 Total Daily Vehicle Flows Plus Development and Cumulative Schemes	Percentage Increase with Cumulative Schemes
Fairlie Rd	19009	19044	0.2%
Edinburgh Ave (west of Liverpool Road jnct.)	6107	6172	1.1%
Edinburgh Ave (east of Liverpool Road jnct.)	12879	14007	8.1%
Liverpool Rd	5704	7620	25.1%
Buckingham Ave (west of Liverpool Road jnct.)	11814	13354	11.5%
Farnham Rd (north of Edinburgh Avenue jnct.)	23510	25719	8.6%
Leigh Rd	10201	17863	42.9%
Farnham Rd (south of Buckingham Avenue jnct.)	27230	29645	8.1%
Buckingham Ave (east of Liverpool Road jnct.)	9330	11933	21.8%

7.7.11. On Farnham Road there are plans to create a bus Lane between Buckingham Avenue and A4 Bath Road. The main features of the scheme shown are:

- Construction of a bus lane from the junction of Buckingham Avenue East to No 102 Farnham Road and then from No 82 Farnham Road to its junction with Bath Road;
- Completion of cycle facilities from No 90 Farnham Road to Bath Road;
- New all-round pedestrian crossing at junction of Farnham Road and Buckingham Avenue;

- Redesigning of the junction layout of Farnham Road and its junction with Whitby Road including pedestrian crossings;
- Removal of islands outside 42 to 62 Farnham Road;
- Relocation of controlled pedestrian crossing at 59 Farnham Road to the junction of Farnham Road and Pitts Road;
- Replacement of barriers outside 64 to 82 Farnham Road with high kerbing;
- Alterations to access/ exit at the junction of Farnham Road and Salt Hill Drive;
- Improvement works at the junction of Farnham Road and Bath Road; and
- Improvement works to the Farnham Road/ Bath Road Junction (Tun's Junction).

7.7.12. This bus lane development may result in a slight displacement of traffic arriving/departing the site to/from Farnham Road to the south, as the bus lane will reduce the capacity of the A355. This traffic is considered most likely to re-distribute to utilise the Leigh Road/Liverpool Road route once construction of the new Leigh Road Bridge is complete (due to be completed in 2015). At the time of writing, there was no information available regarding the effect of this bus lane. The additional one third of eastern traffic added to Liverpool Road and Leigh Road in the Proposed Development traffic flows (as part of the sensitivity analysis) is believed to provide a robust assessment of the potential effect on this route.

7.7.13. The Simplified Planning Zone has been taken into account in this cumulative impact assessment. Additionally, it has been noted that there are plans for the Trading Estate to add new jobs to those currently available. To help local people access these employment opportunities, SEGRO has created Slough Aspire, a dedicated skills and training centre which will deliver a range of training programmes and career advice services. The continued growth of the Trading Estate, including the redevelopment of warehouse units immediately to the south of the Proposed Development, is taken into account through the growth factors applied to the baseline flows.

7.7.14. Increases in driver delay and journey times as a result of the cumulative developments will be most significant on Leigh Road where it represents a 42.9% increase in traffic. This equates to an additional 7,662 vehicles as a result of the cumulative developments. This increase is additional to that generated by the development and cumulative scheme traffic is therefore expected to have a minor adverse effect on Leigh Road. It should be noted that the Proposed Development only makes up 0.3% of the total predicted traffic flows in 2019 at this location. The Applicant will engage with the other developers at the time of works to agree traffic routes. The effect on all other ATC locations will be negligible as a result of the cumulative schemes.

7.8. References

Ref. 7-1 URS (2013) Transport Assessment (TA), URS Infrastructure and Environment UK Limited (September 2013)

Ref. 7-2 DCLG (2012) The National Planning Policy Framework, Communities and Local Government (March 2012)

Ref. 7-3 SBC (2008) Local Development Framework, Slough Borough Council

Ref. 7-4 SBC (2008) Slough Local Development Framework, Core Strategy Development Plan Document, Slough Borough Council

Ref. 7-5	Slough Local Transport Plan, Slough Borough Council (2006 – 2011)
Ref. 7-6	SBC (2004) The Local Plan for Slough, Slough Borough Council
Ref. 7-7	IEMA (1994) Guidelines for Environmental Assessment of Road Traffic, Institute of Environment Management and Assessments
Ref. 7-8	DfT (2007) 'Planning and the Strategic Road Network' Circular, Department for Transport (02/2007)
Ref. 7-9	DfT (2007) Guidance on Transport Assessment, Department for Transport

8. AIR QUALITY

8.1. Introduction

8.1.1. This chapter of the ES provides an assessment of the potential effects to local air quality arising from emissions to air from the Proposed Development.

8.1.2. In particular, it assesses the effects associated with:

- Dust generation during demolition and construction works;
- Combustion emissions generated from construction plant onsite;
- Combustion emissions from road traffic attributed to demolition and construction activities;
- Combustion emissions from road traffic attributed to operation of the Proposed Development;
- Combustion emissions from the proposed operational power plant at the Proposed Development; and
- The potential for nuisance to be associated with the operation of the Proposed Development (e.g. dust, visible plumes and odour).

8.1.3. The existing Environmental Permit for the SHP site contains conditions requiring the existing atmospheric emissions to comply with predetermined emission limits and undergo continuous monitoring. It also requires the emissions to avoid odour at a level which could cause annoyance outside the site, unless appropriate control measures have been used or where it is not possible to prevent or practical to minimise the odour. This has been taken into account in this assessment.

8.1.4. The findings of this air quality impact assessment have been used to inform a separate Human Health Risk Assessment, which is presented in *Appendix B-2, Volume II* of this ES.

8.2. Legislation and Planning Policy Context

National Legislation

8.2.1. The Environment Act 1995 (Ref. 8-1) requires the UK Government to produce a national Air Quality Strategy (AQS), last reviewed in 2007 (Ref. 8-2). The Strategy contains standards, objectives and measures for improving ambient air quality. These objectives apply to outdoor locations where people are regularly present, and do not apply to occupational, indoor, or in-vehicle exposure.

8.2.2. It also requires that Local Authorities undertake an assessment of air quality within their district, in order to establish compliance, or non-compliance, with the standards established in the AQS. Where the standards are at risk of being exceeded, the Local Authorities must designate an Air Quality Management Area (AQMA) and develop an Action Plan to outline measures to assist in achieving the objectives.

8.2.3. The Governmental Department for Food and Rural Affairs (Defra) has responsibility for coordinating assessments and air quality action plans for the UK as a whole.

8.2.4. The Air Quality Standards (England and Wales) Regulations 2010 (Ref. 8-3) comprise the principal air quality legislation and transpose the requirements of a number of European Union Directives into national legislation.

8.2.5. The current assessment criteria applicable to the protection of human health and local air quality management, as detailed in the AQS and the Air Quality Standards Regulations are presented in Table 8-1. Concentrations are presented in micrograms pollutant per cubic metre of air (µg/m^3).

Table 8-1 Air Quality Strategy Objectives – Protection of Human Health

Pollutant	Objective (µg/m^3) [1]	Averaging Period	Percentile
Nitrogen Dioxide (NO_2)	200	1-hour	99.8th (18 exceedances/year)
	40	Annual	Mean
Sulphur Dioxide (SO_2)	266	15-minute	99.9th (35 exceedances/year)
	350	1-hour	99.7th (24 exceedances/year)
	125	24-hour	99.2nd (3 exceedances/year)
Particulate Matter (PM_{10}) [2]	50	24-hour	98th (7 exceedances/year)
	40	Annual	Mean
Particulate Matter ($PM_{2.5}$) [3]	20	Annual	Mean (by 2020)
Carbon Monoxide (CO)	10,000	8-hour	100th (0 exceedances/year)
Lead (Pb)	0.25	Annual	Mean
1,3 butadiene	2.25	Annual	Mean
Benzene	5.0	Annual	Mean
Polycyclic Aromatic Hydrocarbons (PAH)	0.25ng/m^3 [4]	Annual	Mean

[1] µg/m^3 = micrograms per cubic metre – a microgram is a millionth of a gram.
[2] PM_{10} = Particulate matter with an aerodynamic diameter of less than 10 microns (µm).
[3] $PM_{2.5}$ = Particulate matter with an aerodynamic diameter of less than 2.5µm.
[4] ng/m^3 = nanograms per cubic metre – a nanogram is a billionth of a gram.

8.2.6. The national AQS does not contain objectives for heavy metals (other than lead) and local authorities have currently no statutory obligation to review and assess air quality against them, however, the Air Quality Standards Regulations 2010 include annual mean target values for arsenic (6ng/m^3), cadmium (5ng/m^3) and nickel (20ng/m^3). The target values only apply to the content of the relevant pollutant in the PM_{10} fraction, in the ambient air. The target values are intended to be attained "in so far as is possible" and are derived from the Fourth EU Air Quality Directive (Ref. 8-4) which states that these values will not require any control measures entailing disproportionate costs. For industrial installations, this would not involve measures beyond the application of Best Available Techniques (BAT). In particular, the Directive states that these target values are not to be considered as environmental quality standards.

8.2.7. In addition, the Air Quality Standards Regulations detail a number of critical levels that have been developed for the protection of vegetation and ecosystems (CLPVEs); these are presented in Table 8-2.

Table 8-2 Critical Levels for the Protection of Vegetation and Ecosystems (CLPVE)

Pollutant	Objective ($\mu g/m^3$)	Averaging Period	Percentile
Nitrogen Oxides (NO_x)	30	Annual	Mean
	75	24-hour	Mean
Sulphur Dioxide (SO_2)	10	Annual	Mean (for lichens and bryophytes)
	20	Annual	Mean (for all higher plants)

Industrial Emissions Directive

8.2.8. The EU Industrial Emissions Directive (IED) (Ref. 8-5) replaces seven separate EU directives, including those for Large Combustion Plant (LCP) (Ref. 8-6), Integrated Pollution Prevention and Control (IPPC) (Ref. 8-7) and the Waste Incineration Directive (WID) (Ref. 8-8).

8.2.9. The operational power plant at the Proposed Development will fall under the waste incineration requirements (Chapter IV) of the IED, since it will use a fuel derived from waste materials. The IED provides operational limits and controls to which such plant must comply, including residence time and temperatures for combustion, and Emission Limit Values (ELVs) for pollutant releases to air, typically with a set averaging period (half-hour or daily average). Whilst the ELVs provided in the IED are applicable to both non-hazardous and hazardous waste fuel types, the Proposed Development will only use non-hazardous waste-derived fuels.

8.2.10. In addition a BAT reference document (BREF) is published for each industrial sector, which details Achievable Emission Limits (BAT-AELs), although the Large Combustion Plant BREF (Ref. 8-9) is currently undergoing review following the introduction of the IED. It is therefore considered that the use of the ELVs detailed in the IED for waste incineration activities will enable a robust assessment to be carried out.

8.2.11. The IED identifies the potential for additional pollutants, other than typical combustion emissions (oxides of nitrogen (NO_x), SO_2, CO and particulates), to be emitted from the burning of waste-derived fuels and sets ELVs for the following pollutants:

- Cadmium (Cd) and Thallium (Tl);
- Mercury (Hg);
- Other heavy metals (including Antimony (Sb), Arsenic (As), Lead (Pb), Chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni) and Vanadium (V);
- Hydrogen Chloride (HCl);
- Hydrogen Fluoride (HF);
- Volatile Organic Compounds (VOCs); and,
- Persistent Organic Pollutants (including dioxins and furans and other Polychlorinated Biphenyls (PCBs)).

8.2.12. These study species have been included in the assessment in order to assess the Proposed Development against the requirements of the IED. The assessment of impacts of Persistent Organic Pollutants has been provided in a separate Human Health Risk Assessment, presented in *Appendix B-2, Volume II* of this ES.

8.2.13. In addition to the study species identified above, ammonia (NH_3) may be emitted from the operational Proposed Development, due to the use of Selective Non-Catalytic Reduction (SNCR) abatement, which may be applied to the plant to reduce NO_x emissions, if additional control beyond the use of primary means is required to achieve the IED ELVs. NH_3 emissions have therefore been assessed from the operational Proposed Development, conservatively assuming continuous use of SNCR. A suitable ELV for NH_3 has been derived from the current version of the Large Combustion Plant BREF, by assuming emissions are at the lower (more rigorous) concentration of the ELV range provided of 5 – 10mg/m^3. If required, SNCR plant will be operated to ensure emissions are within the assumed ELV of 5mg/m^3.

8.2.14. The Environmental Permitting (England and Wales) (Amended) Regulations 2010 (EPR) (Ref. 8-10) transpose the requirements of the IED and are applicable to all new installations from January 2013. Under the IED and EPR, the operator of an installation is required to employ BAT to ensure a high level of protection of the environment as a whole.

8.2.15. Where AQS objectives are not specified for the study species identified as having the potential to be emitted from the Proposed Development, Environmental Assessment Levels (EALs), published in the Environment Agency's EPR Horizontal Guidance Note Environmental Risk Assessment H1 Annex F (Ref. 8-11) have been used to assess the human health effects and environmental effect.

8.2.16. The EALs used in the assessment are detailed in Table 8-3 below, which should be read in conjunction with Tables 8-1 and 8-2.

Table 8-3 Environmental Assessment Levels for Other Study Species

Pollutant	EAL (µg/m^3)	Averaging period
Cadmium (Cd) and Thallium (Tl) (Cd used as worst-case)	0.005	Annual
Mercury (Hg)	7.5	1 hour
	0.25	Annual
Antinomy (Sb)	150	1 Hour
	5	Annual
Arsenic	0.003 (in PM_{10} fraction)	Annual
Chromium (Cr II and III)	150	1 Hour
	5	Annual
Chromium (Cr VI)	0.0002 (in PM_{10} fraction)	Annual
Copper (Cu)	200	1 Hour
	10	Annual
Cobalt (Co)	No current EALs	
Manganese (Mn)	1500	1 Hour

Pollutant	EAL (µg/m^3)	Averaging period
	0.15[1]	Annual
Nickel (Ni)	No current EALs	
Vanadium (V)	1	1 Hour
	5	Annual
Hydrogen Chloride (HCl)	750	1 hour
Hydrogen Fluoride (HF)	160	1 hour
	16	Annual
	5 [v]	24 hour
Ammonia (NH_3)	2,500	1 hour
	180	Annual Mean
	1 [v]	Annual Mean (sensitive lichens and bryophytes)
	3 [v]	Annual Mean (all higher plants)

[1] Heavy metals have been assessed against the EALs for Mn and V for long and short term impacts respectively, as these species have the most stringent objectives (including the AQS for Lead) therefore their use allows a conservative assessment to be carried out.

[v] = For the protection of vegetation and ecosystems.

8.2.17. It is not possible to fully identify the specific proportions of heavy metals within the release from the Proposed Development at the planning stage, as the exact fuel and combustion conditions will only be known after the commencement of operations. In particular, the proportion of total chromium in a heavy metals release and the proportion of chromium (VI) within that are both unknowns, as they are for any plant prior to construction and commissioning. Until actual emissions monitoring can be undertaken, the situation is further complicated by the unknown split between particulate and vapour phase releases.

8.2.18. In light of the above, and the non-statutory nature of the Air Quality Standards Regulations 2010 guideline levels, as detailed in section 8.2.6, this chapter has therefore conservatively assessed the releases of total metals at IED emission limits against the most stringent published individual metal EAL or AQS objective (which are the EALs for manganese and vanadium as outlined in Table 8-3). Given the conservative assumptions made in the assessment of heavy metals, such as the continuous release of metals at the IED limit and all as one species, it is considered that this approach will lead to an over-estimate of expected effects.

National Planning Policy

8.2.19. Paragraph 109 of the NPPF (Ref. 8-12) states that: *"The planning system should contribute to, and enhance, the natural and local environment by…. preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability".* Planning policies should "*sustain compliance with and contribute towards EU limit values or national objectives for pollutants*", taking into account AQMAs; planning decisions should ensure that any new development in AQMAs is consistent with the local air quality plan (paragraph 124).

8.2.20. Annex 2 of the NPPF defines "Pollution" as *"anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light.*"

8.2.21. The NPS for Renewable Energy Infrastructure (EN-3) (Ref, 8-13) states that: *"Where a proposed waste combustion generating station meets the requirements of WID and will not exceed the local air quality standards, the [determining authority] should not regard the proposed waste generating station as having adverse impacts on health"*.

Local Planning Policy

8.2.22. The Core Strategy 2006-2026 was adopted by SBC in 2008 (Ref. 8-14) and forms part of the development plan for Slough. The strategy recognises that Slough suffers from problems of congestion, noise and poor air quality, which are all made worse by external factors such as the proximity of Heathrow airport and the motorways.

8.2.23. SBC has declared four AQMAs within their area, the closest being approximately 1.4km southeast of the Proposed Development Site ('the Site').

8.2.24. The vision for Slough's transport system aims to tackle problems such as congestion, air quality and make the transport structure more sustainable in the future.

8.2.25. Core Policy 7 (Transport) emphasises that new development should be sustainable and situated in the most accessible locations; it sets a target for the annual mean NO_2 air quality levels to be 35µg/m^3 by 2021.

8.2.26. Further information on the National and Local Planning Policy is provided in *Chapter 3: Planning Policy Context* of this ES.

8.3. Assessment Methodology and Significance Criteria

8.3.1. There is a number of potential air quality effects associated with the Proposed Development, as outlined in paragraph 8.1.2.

8.3.2. The potential emissions for each project phase have been determined or estimated, and key local receptors have been identified, together with the current local ambient air quality. Where possible, the potential ground level concentrations resulting from the projected emissions arising from the Proposed Development have been predicted using atmospheric dispersion modelling techniques, which has enabled the assessment of the effects associated with the Proposed Development on the existing local ambient air quality and in particular on the identified sensitive receptors.

8.3.3. The assessment methodology for each type of emission is detailed below.

Assessment of Emissions Generated from Construction Site Plant

8.3.4. The demolition and construction phase is expected to last a total of 48 months, and is currently anticipated to be completed in 2019, which has therefore been assumed to be the first year of operation of the Proposed Development.

Dust Emissions during Demolition and Construction Works

8.3.5. The movement and handling of soils and spoil during the demolition and construction activities is anticipated to lead to the generation of some additional short-term airborne dust, over that generated by current activities. The concurrence and significance of dust generated by earth moving operations is difficult to estimate, and depends heavily upon the meteorological and ground conditions at the time and location of the work, and the nature of the actual activity being carried out. This has therefore been assessed qualitatively later in the chapter.

Assessment of Emissions from Demolition and Construction Site Plant

8.3.6. Emissions to air of NO_2 and PM_{10} during demolition and construction activities will be associated with on-site construction vehicles and plant. The screening criterion in the Department for Transport's (DfT) Design Manual for Roads and Bridges (DMRB) (Ref. 8-15) states that only properties and habitat sites within 200m of roads should be considered in traffic assessments and this has been applied to determine the potential for effects from the Proposed Development construction plant on sensitive receptors.

Assessment of Road Traffic Emissions (Construction and Operational)

8.3.7. The assessment of effects of NO_2 and PM_{10} road traffic emissions follows the methodology laid out in the Environment Protection UK (EPUK) Development Control publication (Ref. 8-16) and further in the DMRB document.

8.3.8. The criteria used to identify changes in traffic volumes (two way flows) with the potential to affect air quality are reproduced below. The first criteria for identifying roads with a significant traffic change is defined in the EPUK document as: *"A change in annual average daily traffic (AADT) flows of more than 5% or 10% (depending on local circumstances) on a road with more than 10,000 AADT".* In this instance the lower 5% threshold has been considered, due to the proximity of a designated AQMA to the Site.

8.3.9. In addition the EPUK guidance also states that, proposals that may alter the traffic composition on local roads, such as increasing HGV movements by 200 or more a day, are also likely to affect air quality.

8.3.10. The second set of criteria are taken from DMRB:

- *"Road alignment will change by 5m or more; or*
- *Daily traffic flows will change by 1,000 AADT or more; or*
- *Heavy Goods Vehicle (HGV) flows will change by 200 AADT or more; or*
- *Daily average speed will change by 10 kilometres per hour (km/hr) or more; or*
- *Peak hour speed will change by 20km/hr or more."*

8.3.11. In the assessment, a conservative approach has been utilised and traffic changes for both demolition/construction and operational phases have been screened against both sets of criteria; if a link triggers any of the criteria it has been assessed further using detailed dispersion modelling using ADMS-Roads version 3.2 (Ref. 8-17), as appropriate.

8.3.12. Irrespective of the change in vehicle movements in relation to the criteria above, detailed dispersion modelling has been undertaken to quantify the impact of the demolition/construction and operation of the proposed scheme on local air quality, within the Tuns Lane AQMA.

Assessment of Process Emissions from the Operational Power Plant

8.3.13. Process emissions from the Proposed Development have been assessed through detailed dispersion modelling using the atmospheric dispersion model ADMS5 (Ref. 8-18). Dispersion modelling calculates the predicted ground level concentrations arising from the emissions to atmosphere, based on Gaussian approximation techniques. The model employed has been developed for UK regulatory use and its use in such assessments is approved by the EA and Local Authorities.

8.3.14. The assessment has been based on the operational design parameters for the Proposed Development, and therefore two potential operating configurations have been assessed, as discussed in *Chapter 5: Proposed Development* of this ES:

- 40MWe Single Line – venting via dedicated abatement plant to the existing south stack, following a 3m extension (from 82m to 85m); and
- 50MWe Twin Line - two operational lines venting via dedicated abatement plant to dedicated flues within a single newly constructed windshield (i.e. a new 90m high replacement stack).

8.3.15. The two alternative stack configurations were designed to deliver satisfactory air quality impacts and provide similar air quality impacts at local receptors. The single line option has been presented to show that the existing stack could, in theory, be reused.

8.3.16. The proposed stack heights were determined through a preliminary detailed dispersion modelling assessment, and compared to AQS objectives to ensure no significant impacts were predicted. This approach was deemed more appropriate than the use of the HMIP Technical Guidance Note on Dispersion D1 dated 1993 (Ref 8-19), which has now largely been replaced with dispersion modelling.

8.3.17. The twin line configuration was shown to require a greater stack height than was feasible through simply extending the existing south stack. The effects from the two configurations are typically within 1% of each other and do not affect the overall outcome of the effects described in this chapter, as shown later in this assessment.

8.3.18. The assessment of the process emissions has been based on anticipated maximum emission flow rates and minimum temperatures at this design stage for both potential future operating scenarios, as shown in Table 8-4 below, together with IED ELVs. The ELVs used in the assessment are presented in Table 8-5 below, together with the mass release rates from the operational Proposed Development. The ELVs are provided for daily average and half-hourly averaging periods. For the determination of long term (annual) impacts, the daily average ELVs have been used. Short term impacts have been based on the half-hourly ELVs, and it is considered that this represents a conservative assessment as most of the short term impacts are assessed against hourly, rather than half-hourly averaging periods. It is also very unlikely that such peak emissions would occur during the worst case hourly meteorological conditions.

Table 8-4 Stack Release Parameters

Parameter	Single Line	Twin Line
Number of Stacks	1	1
Approximate Stack Location	495271, 181446	495262, 181460
Stack Height (m)	85	90
Efflux Velocity (m/s)	17.9 [1]	18.0 [1]

Parameter	Single Line	Twin Line
Emission Temperature (°C)	140	140
Actual Volumetric Flow (Am^3/hr)	309,550	445,948
Moisture content (%) [2]	18.09	19.24
Oxygen content (%)	7.0	7.0
Normalised Volumetric Flow (Nm^3/hr) [3]	234,982	333,784
Effective Combined Flue Diameter at Release	2.47	2.96

[1] The velocity has been calculated from a volumetric flow rate which has led to small differences in velocity due to rounding of numbers

[2] The different moisture content reflects the different plant efficiency expected between the single line and twin line

[3] Normalised to 0ºC, 101kPa, Dry at 11% oxygen

Table 8-5 IED Emission Limit Values and Release Rates

Pollutant	Daily Average ELV (mg/Nm^3)	Half Hourly Average ELV (mg/Nm^3)	Single Line Release Rates (g/s)		Twin Line Release Rates (g/s)	
			Annual Average[4]	Peak[5]	Annual Average[4]	Peak[5]
NO_x	200	400	13.05	26.11	18.54	37.09
SO_2	50	200	3.26	13.05	4.64	18.54
Total Particulate Matter (TPM)	10	30	0.65	1.96	0.93	2.78
CO	50	100	3.26	6.53	4.64	9.27
HCl	10	60	0.65	3.92	0.93	5.56
HF	1	4	0.065	0.26	0.093	0.37
VOC [1]	10	20	0.65	1.31	0.93	1.85
Cd, Tl	0.05	-	0.0033	-	0.0046	-
Hg	0.05	-	0.0033	-	0.0046	-
Other metals[2]	0.5	-	0.033	-	0.046	-
NH_3[3]	5	-	0.33	-	0.46	-

1. VOCs conservatively assumed to be 100% benzene
2. Includes Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V
3. ELV for ammonia is a proposed ELV, at the lower end of the range stipulated in the Combustion BREF.
4. Used for the assessment of annual average impacts
5. Used for the assessment of short term impacts.

8.3.19. The dispersion modelling of process emissions has taken into consideration the sensitivity of predicted results to model input variables, and to ultimately identify a series of robust results for inclusion in the assessment. These variables include:

- Meteorological data for which 6-years data (2008-2013) from a representative meteorological station (Heathrow Airport) has been used. Normally, it is recommended that 5 years data is used, however as this study was carried during 2013-2014, new meteorological data for 2013 became available during the course of the assessment. It was therefore considered pertinent, in this case, to check 2013 data did not result in a worsening of predicted impacts. This was found not to be the case; and

- Buildings and structures that could affect dispersion from the source.

8.3.20. The full model input variables and sensitivities are described in the Air Quality Technical Appendix as presented in *Appendix D-1, Volume II* of this ES.

8.3.21. An assessment of the potential effects on local sensitive receptors from emissions from the Proposed Development has been carried out by aggregating predicted emissions with the future baseline concentrations in order to determine the overall predicted environmental concentrations. This has then been compared to the AQS or EAL objectives and used to determine the change in predicted environmental concentrations, compared to the significance criteria defined for the assessment. This assessment does not take into account any reduction in baseline concentrations as a result of the cessation of operations of the CFB boilers on the SHP site.

8.3.22. Of the sensitive receptors identified, those experiencing the highest maximum predicted concentrations vary with pollutant for the Human Health receptors (due to the different averaging periods in each case), however, as the maximum concentration predicted by the model generally occurs in areas of human habitation the maximum predicted value obtained from the model output has been reported, rather than results at individual receptors.

8.3.23. An assessment of nutrient enrichment has been undertaken by applying published deposition velocities to the predicted annual average NO_2 and NH_3 concentrations at the identified Statutory Habitat sites within 10km of the Proposed Development. These deposition rates have then been compared to the critical loads for nitrogen available for the Habitat sites. The deposition rates have been taken from EA guidance document AQTAG06 (Ref. 8-20) and have been selected for the most sensitive species at each habitat receptor (grassland/woodland). The EA insignificance criterion of 1% of the long term objective has been applied, as a guide, in the absence of specific deposition guidance.

8.3.24. Increases in acidity from deposition contributions of SO_2 and NO_2 from the process contribution have also been considered. In this assessment, the values of nitrogen deposition (kg/N/ha/yr) and sulphur deposition (kg/S/ha/yr) have been determined from long term deposition concentrations (µg/m^2/s) using standard conversion factors (molar equivalents). These deposition rates have been used to derive kiloequivalents/ha/yr (keq/ha/yr), which are the units in which acidity critical loads are described. The conversion has been undertaken using standard conversion units of 1/14 for nitrogen and 1/16 for sulphur. The acidity deposition rates and background deposition rates have been used within the UK Air Pollution Information Service's (APIS) Critical Load Function Tool (Ref. 8-21) to determine whether the contribution will result in exceedance of the defined critical levels for the identified Habitat sites. The EA's insignificance criterion of 1% of the long term objective has again been applied in the absence of specific guidance.

8.3.25. Non-statutory habitat sites have not been assessed as the sensitive species present at these receptors and their associated critical loads for nutrient and acid deposition are not on public records and no critical levels are available.

8.3.26. A Human Health Risk Assessment has been carried out in order to determine the impact associated with dioxin emissions from the Proposed Development. This is presented in *Appendix B-2, Volume II* of this ES.

Assessment of Visible Plumes from the Operational Power Plant

8.3.27. There is the potential for visible plumes to occur from the operational power station stack as a result of the water content and temperature of the flue gas. The European Waste Incineration BREF Note (Ref. 8-22) states that plume visibility can be greatly reduced by maintaining stack release temperatures above 140°C. The current design intention for the operational power plant is a minimum of 140°C.

8.3.28. The potential for the formation for visible plumes from point sources can be modelled using ADMS5. The visibility of a water vapour plume is determined by the initial water content and temperature of the release and the humidity and temperature of the ambient receiving air. A plume is defined as visible in the model at a particular downstream distance if the liquid water content of the plume at the centreline exceeds 10^{-5} kg/kg.

8.3.29. The ADMS model calculates the water content and plume visibility for each hour of a year of meteorological data, and the output from the model shows the length of each visible plume; the frequency of visible plumes throughout the year; and whether any visible or invisible plume groundings are predicted to occur.

8.3.30. Visible plume effects have been assessed using the stack release parameters for the operational Proposed Development, however in order to assess the visible plume the water content of the release is also entered into the model; this has been predicted to be 0.133kg/kg based on engineering data for the plant and the moisture content of the fuel.

8.3.31. The original version of the EA's IPPC H1 Environmental Assessment Guidance Note (Ref. 8-23) included assessment criteria for assessing the magnitude of the effect created by a visible plume from a stack. These criteria are presented in Table 8-6 below.

Table 8-6 Magnitude of Effect from Visible Plumes

Quantitative description	Effect
• No visible effects resulting from the operation of the process	Zero
• Regular small effect from the operation of the process • Plume length exceeds boundary <5% of daylight hours per year • No local sensitive receptors	Insignificant
• Regular small effect from the operation of the process • Plume length exceeds boundary <5% of daylight hours per year • Sensitive local receptors	Low
• Regular large effect from the operation of the process • Plume length exceeds boundary >5% of daylight hours per year • Sensitive local receptors	Medium
• Continuous large effect from the operation of the process • Plume length exceeds boundary >25% of daylight hours per year with obscuration • Sensitive local receptors	High

8.3.32. The guidance states that the average distance to the site boundary should be used to assess whether the visible plume exceeds the Site boundary. On the basis of the layout of the Proposed Development, the average distance to the Site boundary has been estimated to be 50m.

8.3.33. As stated in the ADMS technical specification, the model predicts visible plumes by averaging the liquid water content across the idealised plume, however the actual plume centreline liquid content is likely to be higher than the average value, and therefore visible plumes are likely to be longer than those predicted by the model.

8.3.34. The H1 guidance also states that where conditions result in medium or low effects, the visual effect of a plume can be considered to be acceptable, but where plumes are predicted to have a high effect, further control measures are likely to be needed to reduce the effects.

8.3.35. It has not been considered necessary to model the visible plume from the SHP cooling towers or the north stack, which are considered part of the baseline situation associated with the SHP site and are not expected to be changed by the future operation of the Proposed Development.

Assessment of Odours from the Operational Power Plant

8.3.36. During routine operation, excess air for the combustion process will be drawn from the bunker and waste reception hall, resulting in a slight negative pressure which will minimise potentially odorous air from the waste reception hall escaping fugitively, and directing any potential odours from the hall into the furnace to be used in the combustion process. It is therefore not foreseen that odorous emissions will result from the storage and handling of fuel during normal operational activities.

8.3.37. An individual process line is expected to be operational for around 90% of the year, during which time the air from the fuel storage and handling areas will be directed through the combustion system in this way. A twin line plant would be managed with the intention that at least one line was always operational and therefore would be unlikely to need further odour controls. Selection of a single line or twin line design may therefore affect the need for additional odour controls.

8.3.38. In any event, when maintenance activities are planned, the potential for odours to occur will be minimised by managing fuel storage levels and reducing deliveries, in order to empty the storage areas prior to planned plant shut downs, minimising the potential for odour generation.

8.3.39. During planned or unplanned maintenance activities, when the combustion plant is not operational, an alternative method of odour control may be required. Various alternatives have been considered as part of a BAT assessment for the control of odour from the installation. The final decision on whether any additional controls are required – and what form they will take – will be made as part of the application to the EA for an Environmental Permit for the operation of the Proposed Development. Preliminary findings indicate that if additional secondary abatement is required on the fuel storage bunker and potentially the tipping hall, carbon filter abatement plant may represent BAT for the Proposed Development. However, it is recognised that there are alternative technologies that could be used to adequately mitigate any odour and the final choice of technology (if required) would be agreed through a BAT justification in liaison with the EA, as part of the Environmental Permit application.

8.3.40. While the need for any additional odour control has not been decided, nevertheless the potential emissions of odour from a hypothetical proposed carbon filter abatement system on the fuel reception hall have been modelled using ADMS5 to determine the potential for odour nuisance to occur from such an emission and to show it could be satisfactorily mitigated.

8.3.41. The EA Horizontal Guidance for Odour, H4 (Ref. 8-24) ranks different odours as less, moderately or most offensive, depending on the type of odour concerned and each relative category has an associated indicative benchmark level of the odour units that has the potential to give rise to annoyance in a sample of the general public. An odour unit is the measure of the concentration of a mixture of odorous compounds and is determined through olfactometry: 1 ou_E/m^3 represents the point of detection.

8.3.42. The benchmark acceptability levels outlined in H4 are based on the 98th percentile of hourly average concentrations of odour modelled over a year, and are detailed below:

- 1.5 ou_E – for most offensive odours;
- 3 ou_E – for moderately offensive odours; and
- 6 ou_E – for less offensive odours.

8.3.43. Any modelled results that show concentrations above the benchmark levels at sensitive receptors indicate there may be reasonable cause for annoyance and the degree of that annoyance. These acceptability criteria have been used by the EA to bring consistency to the approach to regulation of odorous emissions by the EA under the Environmental Permitting regime.

8.3.44. The H4 guidance identifies the most offensive odours as being associated with processes such as those involving decaying animals or fish remains, effluent and landfills. Moderately offensive odours are associated with processes such as intensive livestock rearing, fat frying and green waste composting, whereas the less offensive odours include activities like brewing, confectionery manufacture, coffee roasting and baking.

8.3.45. Although the Proposed Development will be fuelled on processed waste, rather than Municipal Solid Waste (MSW), the odour threshold for the latter has been applied to this study in order to deliver a robust assessment of odour emissions. MSW is considered to give rise to odours falling within the "most offensive" category, and while the fuel to be used is processed off-site and may therefore not fall into this same category, the use of the 1.5ou_E benchmark value is considered a robust approach to the assessment.

8.3.46. Nuisance odour impacts are frequently short-term (less than 15 minute) fluctuations that are not adequately represented by the standard dispersion modelling approach. The 98th percentile of hourly average concentrations is recommended by the EA in regulatory assessments as this has been found to best represent the likelihood of complaints received in practice and in previous case studies. Comparison of the 100th percentile of hourly averages with benchmark levels has also been made in this indicative assessment due to the proximity of the identified sensitive receptors.

8.3.47. Based on current plant design data and experience from other comparable developments, any proposed odour abatement technology may be required to handle approximately 168,000 m^3/hour of extraction air (based on two air changes per hour of the total waste reception hall volume), with an estimated unabated average odour concentration of 5,000ou_E/m^3 from the fuel as very much a worst-case scenario. The normal levels are expected to be lower than this in practice. For this assessment it has been assumed, based on typical performance data, that were a carbon filter abatement system to be installed, it would reduce odour concentrations in the air by 90%. The resultant emission has been assumed to be discharged to atmosphere via a short 1m high vent on the south eastern corner of the waste reception hall.

8.3.48. The model parameters for the assessment of potential odour emissions are summarised in Table 8-7.

Table 8-7 Assumed Carbon Filter Plant Emissions Parameters

Parameter at Release Point	Possible Carbon filter
Operating hours	Continuous
Approximate Stack Location	495420, 181371
Stack Height (above ground) (m)	16
Emission Temperature (°C)	15
Volumetric flow rate, Actual (Am^3/hr)	168,000
Flue Diameter at Release (m)	2.0
Efflux Velocity (m/s)	15
Temperature of flue gas (ºC)	15
Abated emission concentration (ou_E/m^3), average	500
Abated emission rate (ou_E/s), average	23,350

Significance Criteria

8.3.49. The assessment of potential effects and their significance has been based on the criteria outlined in the EPUK Development Control publication. There are three aspects of effect that must be taken into account when assessing the significance of the effect at individual receptors, these are:

- The magnitude of the change caused by the Proposed Development;
- The absolute predicted environmental concentration in relation to the air quality objectives; and
- Whether people are likely to be present at these locations to be affected by the associated effects (for example, the AQS objectives and EALs do not apply to places of work).

8.3.50. Particular significance should be given to a change that takes the predicted environmental concentration (i.e. the contribution from the Proposed Development, plus the background concentration) from below to above the AQS objective or EAL, or vice versa because of the importance ascribed to the AQS objective/EAL in assessing local air quality. The descriptors also allow for a very small change in concentration to be more significant when the absolute concentration is above the AQS objective/EAL than for an absolute concentration below the AQS objective/EAL.

8.3.51. Table 8-8 presents the EPUK criteria for the determination of the "*magnitude of change*", based on the percentage increase in pollutant concentrations due to a development. Table 8-9 presents the significance of such effects, taking into account the magnitude of change and the predicted environmental concentration in relation to the AQS objective/ EAL. The latter has been amended slightly using the terms 'Major', 'Moderate' and 'Minor', in accordance with the definitions set out in *Chapter 2: Assessment Methodology* of this ES.

8.3.52. In the absence of short term significance criteria within the EPUK approach, changes in short term baseline concentrations as a result of the operational emissions from the Proposed Development have been assessed based on criterion derived from the EA's EPR H1 Guidance, which states that process contributions (not including background concentrations) less than 10% of the short term AQS objective or EAL can be considered insignificant (taken to correspond with negligible and minor adverse effects), and similarly that process contributions less than 1% of the long term AQS objective can also be considered to be insignificant.

Table 8-8 Determination of Magnitude of Change

Magnitude of change	Annual Mean Concentration	Days PM_{10} >50µg/m^3	Hourly/ Daily Average Concentration
Large	Increase/decrease >10%	Increase/decrease >4 days	Increase/decrease >20%
Medium	Increase/decrease 5-10%	Increase/decrease 2-4 days	Increase/decrease <10-20%
Small	Increase/decrease 1-5%	Increase/decrease 1-2 days	Increase/decrease 5-10%
Imperceptible	Increase/decrease <1%	Increase/decrease <1 day	Increase/decrease <5%

Table 8-9 Significance of Effects

Absolute Concentration in Relation to Annual Mean AQS objective/ EAL	Change in Concentration			
	Imperceptible	**Small**	**Medium**	**Large**
Increase with Scheme				
Above AQS objective/ EAL With Scheme (>100% of AQS/ EAL)	Negligible	Minor Adverse	Moderate Adverse	Major Adverse
Just Below AQS objective/ EAL With Scheme (90-100% of AQS/ EAL)	Negligible	Minor Adverse	Moderate Adverse	Moderate Adverse
Below AQS objective/ EAL With Scheme (75-90% of AQS/ EAL)	Negligible	Negligible	Minor Adverse	Minor Adverse
Well Below AQS objective/ EAL With Scheme (<75% of AQS/ EAL)	Negligible	Negligible	Negligible	Minor Adverse
Decrease with Scheme				
Above AQS objective/ EAL Without Scheme (>100% of AQS/ EAL)	Negligible	Minor Beneficial	Moderate Beneficial	Major Beneficial
Just Below AQS objective/ EAL Without Scheme (90-100% of AQS/ EAL)	Negligible	Minor Beneficial	Moderate Beneficial	Moderate Beneficial
Below AQS objective/ EAL Without Scheme (75-90% of AQS/ EAL)	Negligible	Negligible	Minor Beneficial	Minor Beneficial
Well Below AQS objective/ EAL Without Scheme (<75% of AQS/ EAL)	Negligible	Negligible	Negligible	Minor Beneficial

8.3.53. Tables 8-8 and 8-9 provide a mechanism for categorising magnitude of change and significance of effect at individual receptors. The descriptions of effect and significance from individual receptors should be utilised together with the following considerations to derive an overall judgement of significance of effect:

- The number of properties affected by minor, moderate or major air quality effects and a judgement on the overall balance;

- Whether or not an exceedance of an objective or limit value is predicted to arise in the study area where none existed before or the size of an exceedance area is substantially increased;
- Whether or not the study area exceeds an objective or limit value and this exceedance is removed or the exceedance area is reduced in size; and
- Uncertainty, including the extent to which worst-case or conservative assumptions have been made in the assessment.

Sensitive Receptors

8.3.54. Sensitive receptors have been identified through desk study and consultation with SBC, and are described below.

Human Health Receptors

8.3.55. Sensitive human health receptors identified in the vicinity of the Proposed Development are detailed in Table 8-10, however initial model runs indicated that the maximum predicted impacts would occur in residential areas, and therefore the maximum values obtained from the dispersion model for both long term and short term impacts have been used in the assessment. This will ensure that the potential impacts in areas with short term exposure, such as local shops and parks not identified as specific receptors, have been accounted for in the assessment.

8.3.56. The statutory review and assessment of local air quality within the area covered by SBC resulted in the designation of four AQMAs under the Local Air Quality Management (LAQM) regime, for potential exceedances in the annual NO_2 AQS objective. The nearest AQMA is located approximately 1.4km southeast of the Proposed Development along Tuns Lane, which constitutes the A355 Tuns Lane from Junction 6 of the M4 motorway in a northerly direction to just past its junction with the A4 Bath Road and A355 Farnham Road, known as the Three Tuns. This AQMA is to be extended eastwards up to and including the block of flats at 30 Bath Road. A second AQMA designated for NO_2 is located approximately 1.7km south of the Proposed Development along a stretch of the M4 motorway. The third closest AQMA is 2km to the southeast of the Proposed Development, and covers an area of Slough Town Centre along the A4 stretching from William Street roundabout to the Uxbridge roundabout. The final AQMA, Brands Hill, is over 5km from the Proposed Development and therefore has not been considered in the assessment below.

8.3.57. The receptors for the Proposed Development have been selected as those residential areas most likely to be affected, including dwellings within the Tuns Lane AQMA.

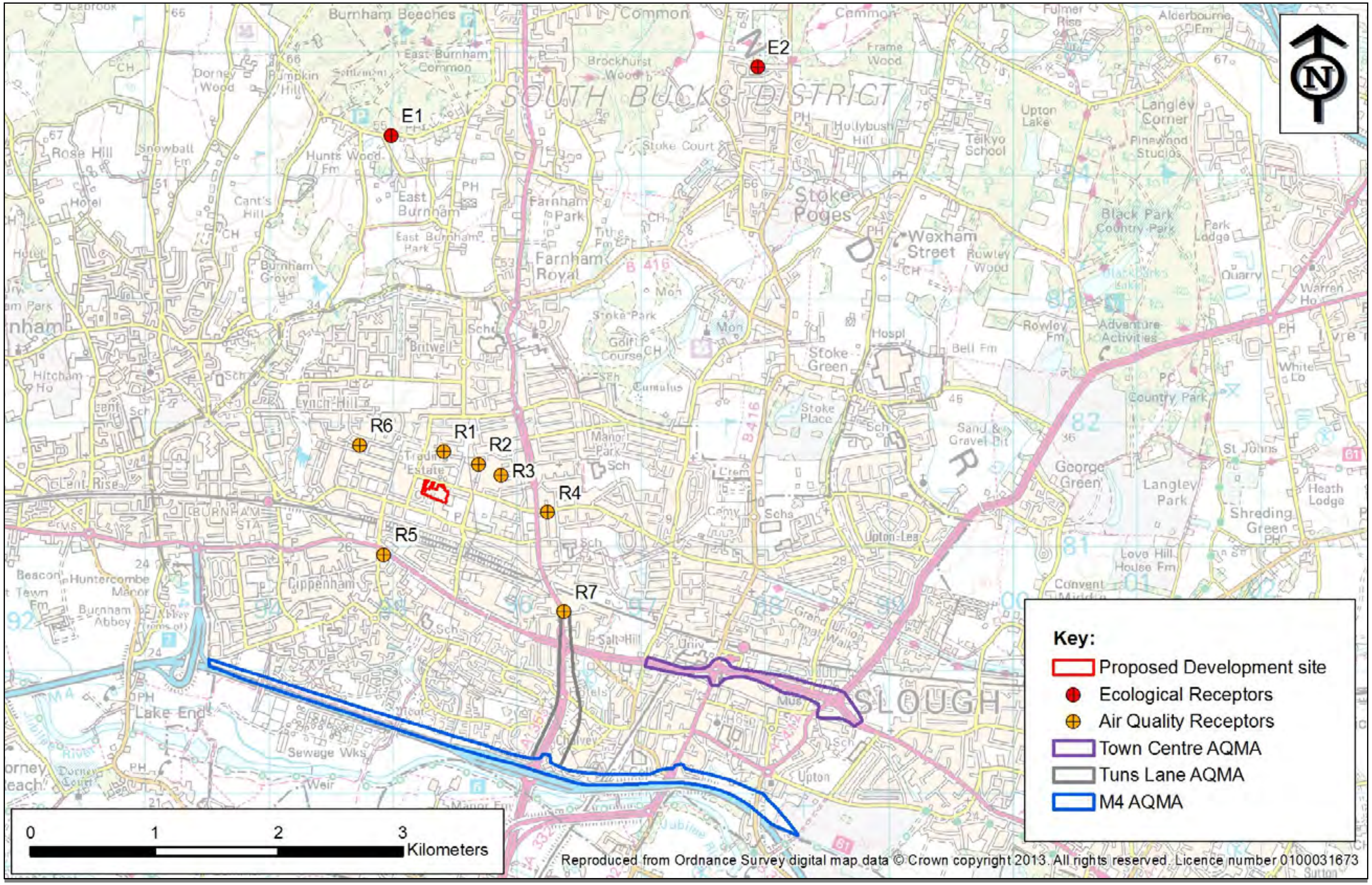
Table 8-10 Sensitive Human Receptors

Receptor Number	Sensitive Receptor	Type of Receptor	Grid Reference	Approximate Location from Plant
R1	Bodmin Avenue	Residences	495403, 181759	0.2km North
R2	Birch Grove	Residences	495672, 181655	0.5km Northeast
R3	Farnburn Avenue	Residences	495868, 181578	0.6km Northeast
R4	Melbourne Avenue	Residences	496253, 181282	1km East
R5	Cippenham Lane	Residences	494923, 180924	0.6km Southwest

Receptor Number	Sensitive Receptor	Type of Receptor	Grid Reference	Approximate Location from Plant
R6	Greystoke Road	Residences	494630, 181847	0.8km Northwest
R7	Tuns Lane	AQMA	496365, 180459	1.4km Southeast

Figure 8-1 shows the locations of sensitive human health receptors, the AQMAs and the closest ecological receptors (as listed in Table 8-11), in relation to the Proposed Development.

Figure 8-1 Locations of Human Health Receptors and the closest Ecological Receptors



Ecological Receptors

8.3.58. Sensitive ecological receptors, including statutory Habitat sites within 10km of the Proposed Development, have been identified through desk study using the Government's Magic map website (Ref. 8-25) and consultation with Natural England. The ecological receptors have been assessed quantitatively for process contributions from the operational Proposed Development stack only, as these locations are all greater than 200m from the road traffic study area. These are presented in Table 8-11. There are no internationally or nationally designated Habitats sites within 2km of the Site.

Table 8-11 Sensitive Ecological Receptors

Receptor Number	Sensitive Receptor	Type of Receptor[1]	Grid Reference[2]	Location from Plant
E1	Burnham Beeches	SSSI, SAC	495052, 184315	2.9km North
E2	Stoke Common	SSSI	497931, 184870	4.3km North
E3	South Lodge Pit	SSSI	490599, 181914	4.7km West
E4	Bray Pennyroyal Field	SSSI	491562, 178312	4.9km Southwest
E5	Littleworth Common	SSSI	493460, 185994	4.8km Northwest
E6	Bray Meadows	SSSI	489823, 180293	5.6km West
E7	Windsor Forest and Great Park	SSSI, SAC	495519, 175402	6.0km Southwest
E8	Black Park	SSSI	500878, 184093	6.2km Northeast
E9	Cannoncourt Farm Pit	SSSI	487860, 183012	7.6km Northwest
E10	Wraysbury No. 1 Gravel Pit	SSSI	500253, 175441	7.8km Southeast
E11	Cock Marsh	SSSI	488881, 186537	8.2km Northwest
E12	Kingcup Meadows and Oldhouse Wood	SSSI	502544, 185219	8.2km Northeast
E13	Great Thrift Wood	SSSI	487346, 178447	8.5km Southwest
E14	South West London Waterbodies	Ramsar	502302, 175599	8.5km Southeast
E15	Wraysbury and Hythe End Gravel Pits	SSSI	500720, 174113	9.1km South
E16	Chawridge Bourne	SSSI	489406, 174090	9.4km Southwest
E17	Bisham Woods and Chiltern Beechwoods	SSSI, SAC	486474, 185335	9.6km Northwest
E18	Old Rectory Meadows	SSSI	503056, 187358	9.8km Northeast

[1]SSSI = Site of Special Scientific Interest, SAC = Special Area of Conservation, Ramsar = The Convention on Wetlands (Ramsar, Iran, 1971) - an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands.

[2]Taken as the nearest point to the Proposed Development

8.3.59. It is recognised that there are two Local Nature Reserves (Haymill Valley and Cocksherd Wood) within 2km of the Proposed Development and three non-statutory sites (Haymill Valley, Cocksherd Wood and Boundary Copse) within 0.8km – 3km. These sites are located to the west/ northwest of the Site and are therefore considered not to be downwind of the Site. Based on the results obtained in the assessment for Statutory sites, it is considered that these sites would experience negligible effects and therefore have not been included in the assessment.

8.4. Baseline Conditions

8.4.1. Baseline conditions in the vicinity of the Proposed Development have been investigated through a review of local air quality management reports and consultation with SBC, and also a review of data held on the Defra UK Air Information Resource website (Ref. 8-26).

Ambient Air Monitoring for NO_2 and PM_{10}

8.4.2. SBC has a number of monitoring stations for measuring ambient concentrations of AQS pollutants at background sites and also sites representative of exposure for sensitive receptors. This includes a number of continuous monitoring stations and a network of NO_2 diffusion tubes. SBC was contacted to obtain details of the monitoring stations in the Slough area, and a summary of the data available is presented below.

8.4.3. The diffusion tube locations identified within 2km of the Site are presented below in Table 8-12. There are no designated background locations, with all monitoring sites representing intermediate locations (i.e. more than 5m from a major road with air quality still being affected by it). The average NO_2 concentration at these monitoring locations for 2013 was 36.3µg/m^3, which is below the annual average air quality objective of 40µg/m^3 for human health receptors. Up until 2011 there had been one diffusion tube monitoring site at a background location (Kent Avenue, 1.2km from the Site), however this has now been discontinued. In 2011 NO_2 concentrations at this background location were measured at 27.1µg/m^3.

Table 8-12 SBC Annual Average NO_2 Diffusion Tube Results, 2013

Location	Grid Ref	Site Type	Annual Average NO_2 (µg/m^3) bias adjusted	Distance to Proposed Development (km)
Essex Avenue	496200, 181900	Intermediate	35.7	1.0
Tuns Lane	496416, 180126	Intermediate	40.7	1.8
Salt Hill	496599, 180156	Intermediate	34.3	1.9
Farnham Road	496397, 180341	Intermediate	41.7	1.6
Windmill Care Home	496533, 180175	Intermediate	44.5	1.8
Walpole Road	493493, 181378	Roadside	29.0	1.7
Sandringham Court	493960, 181355	Roadside	27.9	1.3

Note: Site types and bias corrected results determined by SBC.

8.4.4. Diffusion tubes provide a low cost method of monitoring air quality at a large number of sites and can also be used to verify model predictions from road traffic air quality modelling. However, automatic or continuous air quality monitoring data is preferable to describe background concentrations compared to diffusion tubes, as continuous monitoring stations typically utilise reference quality techniques (e.g. NO_2 Chemiluminescent Analysers) and rigorous quality assurance procedures. A number of the continuous monitoring stations in the vicinity of the Site also measure particulates (PM_{10}). A summary of the nearby continuous monitoring stations operated by SBC, and measured concentrations in 2013, are presented in Table 8-13.

Table 8-13 SBC Continuous Monitoring Results, 2013

Location	Grid Ref	Pollutant	Site Types Description	NO_2 annual average (µg/m^3)	PM_{10} annual average (µg/m^3)	Distance to Proposed Development (km)
Salt Hill, A4	496599, 180156	NO_x, NO_2, PM_{10}	Intermediate (residential)	35.8	21.6	1.9
Chalvey, M4 (in AQMA)	496562, 179109	NO_x, NO_2	Intermediate - motorway (residential)	37.6	-	2.7
Colnbrook	503542, 176827	NO_x, NO_2, PM_{10}, $PM_{2.5}$, PM_1,	Urban Background (residential)	29.6	29.4	9.5

8.4.5. Whilst an urban background monitoring location would ideally be used to represent background concentrations of pollutant concentrations at sensitive receptor locations, the nearest urban background site (Colnbrook) is more than 9km from the Site and therefore is unlikely to be representative of actual background conditions near to the Site.

8.4.6. The closest continuous monitoring station is Salt Hill, which is an Intermediate site 1.9km from the Site. The monitoring site is located within 150m of the Tuns Lane AQMA and therefore it is considered to be appropriate to describe worst-case pollutant concentrations at the nearby sensitive receptors to the Proposed Development. The annual average NO_2 concentration at this monitor in 2013 was 35.8µg/m^3 and therefore within the air quality objective for human health receptors.

8.4.7. This value has been compared against the background concentration from the newly published Defra 2011 background maps projected for 2013 which gives a value of 28.3µg/m^3 at Grid Reference 496500, 180500 (i.e. the location of the Salt Hill monitor). This is lower than the measured concentration at the Salt Hill monitor. It is therefore considered that the Salt Hill monitoring location is likely to result in an overestimate of background concentrations for the majority of the study area, however its use as the basis for the NO_2 background concentration in the assessment of emissions from the operational Proposed Development below is anticipated to be a robust and conservative assumption.

8.4.8. The annual average PM_{10} concentration at Salt Hill was 21.6µg/m^3, well below the air quality objective of 40µg/m^3. The 2013 Defra background map provides a value of 21.0µg/m^3 at Grid Reference 496500, 180500, which is slightly lower than that measured at the Salt Hill monitor. It is therefore considered appropriate to use the Salt Hill monitor value in order to represent a reasonable worst-case background concentration at sensitive receptor locations, and the appropriate reduction factor has been applied from the Defra background maps for 2019.

Other Study Species

8.4.9. Estimates for other study species have been obtained through the Defra UK Air Information Resource, which provides data for various UK Monitoring Networks. Ammonia background data has been taken from the National Ammonia Monitoring Network (NAMN). HCl background data has been taken from the Acid Gas and Aerosol Network (AGANET) and heavy metals data from the Heavy Metals Monitoring Network (Centre for Ecology and Hydrology (CEH)) (Ref. 8-27). Further information on the source of the background data and the concentrations used in the assessment are provided in Table 8-14.

8.4.10. Additional data for background NH_3 concentrations at the Burnham Beeches habitat site have been provided by Natural England, which suggest that average concentrations between 2009 and 2010 were 3.4µg/m^3, higher than that provided by the CEH of 1.74µg/m^3. The higher concentration measured by Natural England has therefore been used to assess impacts at the Burnham Beeches and the Stoke Common receptors (due to their proximity) to enable a robust assessment.

Projecting Background Concentrations for 2019

8.4.11. Where appropriate, projections of background concentrations of NO_2, PM_{10}, $PM_{2.5}$ and CO to the future operational year of 2019 have been applied using the methodology detailed in the Defra Local Air Quality Management 2009 LAQM.TG(09) Guidance – as updated in June 2014 (Ref. 8-28) and accompanying User Guide for Air Pollution Background Maps (Ref. 8-29).

8.4.12. As it is considered that using the 2013 background concentration from the Salt Hill monitor for the assessment of effects from the Proposed Development may result in an overestimation of background concentrations, the 2013 concentration has been projected to the future operational year of 2019 using the projections from the Defra background maps data, in accordance with the methodology setup on the Defra UK Air Information Resource.

8.4.13. NO_x concentrations for the Habitat sites have not been projected forwards to 2019 concentrations, as background concentrations at these sites are less likely to be influenced by road traffic sources, therefore maintaining concentrations at 2013 values for the assessment is considered to be a conservative assumption. NO_x concentrations at these sites have been derived from the Defra NO_x background maps, which adheres with the methodology setup on the Defra UK Air Information Resource. There are no major developments proposed in the local area which could affect the Defra projections.

Table 8-14 Summary of Baseline Concentrations for use in the Assessment

Pollutant	Data Source	Location	2013 Baseline Concentration ($\mu g/m^3$)	2019 Concentration ($\mu g/m^3$)
NO_2	Automatic Monitor	Salt Hill	35.8	31.0
NO_x	Defra UK Air Information Resource 2013	Burnham Beeches	25.4	25.4
	Defra UK Air Information Resource 2013	Stoke Common	27.0	27.0
PM_{10}	Automatic Monitor	Salt Hill	21.6	20.2
SO_2	Defra UK Air Information Resource 2001	Proposed Development Site[1]	3.9	3.9
		Stoke Common	3.6	3.6
$PM_{2.5}$	Defra UK Air Information Resource	Proposed Development Site	14.2	13.1
CO	Defra UK Air Information Resource 2001	Proposed Development Site	447 (in 2001)	196
NH_3	Natural England Annual Average 2009-2010	Burnham Beeches	3.4	3.4
	NAMN 2010	London Cromwell Road	1.7	1.7
Benzene	Defra UK Air Information Resource 2001	Proposed Development Site	0.51 (2010)	0.51
HCl	AGANET	London Cromwell Road	0.35 (in 2010)	0.35
HF	EP AQS report (Ref. 8-30)	Average for UK	1.2	1.2
Metals (as Mn)	Defra Urban Metals Network (CEH)	London Cromwell Road	0.0085	0.0085
Metals (as V)			0.0029	0.0029
Hg			0.0020	0.0020
Cd			0.00014	0.00014
As			0.00071	0.00071
Cr			0.0053	0.0053
Ni			0.0016	0.0016

[1] Site National Grid Reference SU 953 814

Further Considerations

8.4.14. It has been assumed that the background concentration derived for the assessment includes contributions from the existing SHP operational plant, i.e. the Package Boiler and Boiler 17. These units will continue to operate when the Proposed Development is commissioned.

8.4.15. It should also be noted that, in the assessment of effects from the operational phase of the Proposed Development, effects of the main combustion emissions (NO_2, SO_2, CO and PM_{10}) will be offset to some extent by the loss of the CFB boilers onsite, which ceased commercial operation in March 2013 and had ceased operation altogether by March 2014.

8.4.16. In order to quantify the level of effect associated with these boilers the modelled process contributions from the CFB boilers' Environmental Permit application air quality assessment, submitted in 2006 (Ref. 8-31) have been obtained and are presented in Table 8-15 below. The assessment of the Proposed Development does not take into account any reduction in baseline concentrations as a result of the cessation of operations of the CFB boilers on the SHP site; however it has been used to compare the predicted impacts from the two schemes in the Effects Section below.

Table 8-15 Effects Associated with the SHP Fluidised Bed Boilers

Pollutant	Measured as	AQS [1] ($\mu g/m^3$)	PC [2] ($\mu g/m^3$)	PC / EAL
NO_2	Annual Mean	40	3.2	8%
	Hourly Mean (99.8th %ile)	200	84.6	42%
SO_2	24-Hour Mean (99.2nd %ile)	125	49.2	39%
	Hourly Mean (99.7th %ile)	350	138.8	40%
	15-Minute- Mean (99.9th %%ile)	266	162.4	61%
PM_{10}	Annual Mean	40	0.4	1%
	Hourly Mean (98.1st %ile)	50	2.8	6%

[1] AQS = National Air Quality Objective
[2] PC = Process Contribution

8.5. Potential Effects and Mitigation Measures

Demolition and Construction Phase

Dust Emissions

8.5.1. To assess the impact of dust emissions, the Building Research Establishment (BRE) (Ref. 8-32) undertook six months of continuous PM_{10} sampling at three locations within 200m of a demolition and construction site (of an area of 0.65 hectare (ha)). The site was a former chemical works and required demolition of existing buildings, excavation of soil to a depth of 1m across the site, and subsequent erection of apartments. On average, throughout the 6 month period, PM_{10} levels within 1m of the study site boundary increased by approximately 11µg/m^3 during demolition, 3µg/m^3 during site preparation and 5µg/m^3 during piling and earth working. PM_{10} levels about 150m from the construction site were indistinguishable from background levels.

8.5.2. The boundary of the Site is approximately 200m from the nearest residential receptors (R1 – Bodmin Avenue) and greater than 2km from the nearest ecological receptor, therefore greater than the distance construction dust effects are expected to have quantifiable effects on receptors. It is therefore considered that construction dust effects will be **negligible** at all residential and ecological receptors.

8.5.3. It is noted that a further potential sensitive receptor is a confectionary manufacturing site, located 100m west of the Site. It is again considered that the majority of construction activities will be carried out at a distance greater than 150m from this receptor and also that the Fibre Fuel Process building to the west of the Site, which will continue to operate separately to the Proposed Development, will offer some degree of protection from construction dust impacts, therefore it is considered that construction dust effects will be **negligible** at this receptor. The newly constructed industrial unit to the south of the Site is slightly nearer, approximately 50m, but is currently used for distribution and is therefore less sensitive than the confectionary manufacturing site and less likely to be affected by dust nuisance.

8.5.4. The Institute of Air Quality Management (IAQM) Guidance for Assessment of Construction Dust (Ref. 8-33) concurs with this conclusion. This guidance provides a matrix system to determine the sensitivity of a study area and the risk of dust/PM_{10} emissions from a demolition/construction site. According to this guidance, the area surrounding the Proposed Development Site is considered 'Low' sensitivity, due to it being an industrial area with no dwellings within 20m of the Site. Based on this classification the effect of PM_{10} and dust guidance to be **negligible** by the guidance, with or without any mitigation measures and regardless of the risk of dust/PM_{10} emissions. Nevertheless, a series of comprehensive mitigation measures will be implemented to mitigate dust emissions in recognition of its classification as a 'High Risk Site' for dust/PM_{10} emissions due to the scale of demolition onsite. These mitigation measures are outlined below.

8.5.5. The demolition and construction phase will last approximately 48 months, however soil and spoil movement will represent only a small portion of this phase and therefore any effects are considered short term, temporary and reversible. A Construction Environmental Management Plan (CEMP) will be employed to ensure that best practice for dust mitigation and monitoring is in place.

Demolition/Construction Mobile Plant

8.5.6. As detailed in Section 8.3, the DMRB screening criterion states that only properties and habitat sites within 200m of roads should be considered in traffic assessments, and therefore it is also considered that sensitive receptors greater than 200m from the construction site are unlikely to be significantly affected by mobile construction plant emissions. It is considered likely that relatively few construction plant vehicles will be present on the Site at any one time, and therefore it is unlikely that effects at sensitive receptors 200m from the Site will be distinguishable from background levels. It is therefore considered that the effect of demolition and construction mobile plant will be **negligible** at all sensitive receptors including the residential, ecological and the confectionary manufacturing site.

8.5.7. Again, due to the short duration of the demolition and construction phase any effects are considered short term, temporary and reversible. The CEMP will require adherence to suitable emissions standards for mobile and non-mobile machinery.

Demolition/Construction Traffic

8.5.8. As advocated in the documents EPUK Guidance and the DMRB Manual, a staged approach has been adopted. This has involved an initial review of baseline conditions in the vicinity of the Site and predicted increases in traffic flows during the demolition/construction phase. This allows a determination of whether an air quality assessment is required, and if so, whether road traffic screening (using the DMRB screening methodology), or full dispersion modelling (utilising ADMS-Roads Dispersion Model), is required.

8.5.9. Baseline and predicted traffic flows for the demolition and construction phase of the Proposed Development are presented in Table 8-16, and have been provided by URS's Transport Consultants. Data is shown for the baseline year of 2017, as this is currently expected to be the year of peak traffic flows for the main demolition and construction activities. The 'With Construction' flows assume that the expected trip generation in the peak month of activity will extend for an entire calendar year, which is likely to be an overestimate of the annual traffic flows during this phase of the Proposed Development.

Table 8-16 Demolition/Construction AADT Traffic Flows (Two Way Flows)

Road [1]	Total 24-Hour AADT 2017 Peak Construction		Increase
	Baseline Without Development	With Construction Traffic for the Proposed Development	
Edinburgh Ave (east of Liverpool Road jctn.)	13,461 (94)	13,461 (94)	0.0%
Edinburgh Ave (west of Liverpool Road jctn.)	5,852 (60)	5,852 (60)	0.0%
Liverpool Rd	7,392 (46)	7,392 (46)	0.0%
Fairlie Rd	18,382 (265)	18,382 (265)	0.0%
Buckingham Ave (east of Liverpool Road jctn.)	11,624 (191)	12,462 (239)	6.7% (20.1%)
Buckingham Ave (west of Liverpool Road jctn.)	12,962 (244)	13,800 (292)	6.1% (16.4%)
Leigh Rd	17,486 (90)	17,486 (90)	0.0%
Farnham Rd (north of Edinburgh Avenue jctn.)	24,884 (409)	25,274 (432)	1.5% (5.3%)
Farnham Rd (south of Buckingham Avenue jctn.)	28,678 (469)	29,126 (494)	1.5% (5.1%)

Note: Figures in brackets indicate the number of HGVs.

[1] See figure 7-1, *Chapter 7: Traffic and Transport* of this ES, for location of traffic counts.

8.5.10. The majority of roads in the vicinity of the Site have an AADT greater than 10,000 vehicles and therefore according to the EPUK criteria may affect local air quality. During the peak construction phase in 2017, only Buckingham Avenue is predicted to have traffic increases over the 5% threshold for requiring more detailed assessment, which has therefore been undertaken as outlined below.

8.5.11. Due to the absence of residential properties along Buckingham Avenue and the presence of the Tuns Lane AQMA on the southern end of Farnham Road (Farnham Road becomes

Tuns Lane to the south), the further assessment of air quality effects associated with the demolition/construction phase has also included the traffic increases predicted to occur on Farnham Road.

8.5.12. The assessment of air quality effects has been carried out using the DMRB screening tool for Buckingham Avenue, with a generic receptor assumed at a distance of 10m from the centre of the road. For Farnham Road the detailed dispersion model ADMS-Roads has been used so that the street canyon effects and precise location of the nearest residential property from this road edge could be more accurately modelled. The detailed methodology and outcomes of this ADMS-Roads assessment are provided in the Air Quality Technical Appendix*, Appendix D-1, Volume II* of this ES.

8.5.13. The NO_x output from these models was entered into the Defra NO_x to NO_2 calculator (Ref. 8-34). The road increment pollutant concentrations from construction traffic are summarised in Table 8-17.

Table 8-17 Demolition/Construction Road Traffic Pollutant Increments

Road	Baseline Without Development 2017 (µg/m^3)		With Peak Construction 2017 (µg/m^3)		Predicted Increase (µg/m^3)	
	NO_2	PM_{10}	NO_2	PM_{10}	NO_2	PM_{10}
Buckingham Avenue East	2.9	0.8	3.2	0.8	0.3	0.1
Buckingham Avenue West	3.2	0.9	3.4	0.9	0.2	0.1
Farnham Road	16.8	3.2	17.1	3.2	0.3	<0.1

8.5.14. The largest increase in predicted NO_2 concentrations attributable to demolition and construction traffic occurs on Buckingham Avenue, with a 0.3µg/m^3 increase being predicted in the annual average. This represents a less than 1% increase in relation to the AQS NO_2 annual objective and can therefore be considered to represent an 'imperceptible' magnitude of change. This represents a change of **negligible** significance, which will be temporary. As this magnitude of effect is associated with peak predicted construction traffic flows, which will not be sustained for the entire calendar year, and crucially there are no residential properties located along this road to be subject to this change, it is considered that construction traffic effects along this road will be **negligible**.

8.5.15. The worst affected property along Farnham Road, which is located approximately 12m east of the kerbside, is predicted to experience an increase of 0.3µg/m^3. This represents less than 1% of the AQS and can be considered **negligible**. The predicted effect within this AQMA is therefore also expected to be immeasurable and of negligible significance.

8.5.16. The modelling assessment also showed that baseline conditions along Farnham Road (using the Farnham Road diffusion tube site) are only currently 4% over the mean annual NO_2 AQS (41.7µg/m^3) based on 2013 data. The monitoring site is set further from the road edge than the housing, and therefore concentrations at sensitive receptors could be slightly above this. The increase of less than 0.3µg/m^3 is expected to lead to a **negligible** effect on air quality at the housing along Farnham Road.

8.5.17. In addition, LAQM.TG(09) states that exceedances of the 1-hour mean objective are considered unlikely where the annual mean is below 60µg/m^3. Demolition and construction traffic associated with the Proposed Development is therefore not expected to lead to an exceedance of the hourly AQS NO_2 objective.

8.5.18. The greatest increase in predicted PM_{10} concentrations attributable to construction traffic occurs on Buckingham Avenue, with less than a 0.1µg/m^3 increase being predicted. This can therefore be considered to be **negligible**.

Operational Phase

Operational Traffic

8.5.19. Baseline and predicted traffic flows for the operational phase of the Proposed Development are presented in Table 8-18, and have been taken from the traffic data provided in *Chapter 7: Traffic and Transport* of this ES provided by the Transport Consultant. The number of HGV's is shown in brackets. The HGV movements have been based on the maximum HGV movements, which is 20% higher than the design, and on a conservative payload (the carrying capacity measured in weight) (>10% below expected).

Table 8-18 Two-way Operational AADT Traffic Flows

Road	Total 24- Hour AADT 2019 Operational Flows		Increase
	Baseline Without Development	With Proposed Development	
Edinburgh Ave (east of Liverpool Road jctn.)	13,885 (97)	14,043 (255)	1.1% (163%)
Edinburgh Ave (west of Liverpool Road jctn.)	6,050 (62)	6,208 (220)	2.6% (254%)
Liverpool Rd	7,580 (47)	7,632 (99)	0.7% (111%)
Fairlie Rd	19,012 (274)	19,054 (316)	0.2% (15.3%)
Buckingham Ave (east of Liverpool Road jctn.)	11,933 (197)	11,933 (197)	0%
Buckingham Ave (west of Liverpool Road jctn.)	13,354 (253)	13,354 (253)	0%
Leigh Rd	17,823 (93)	17,875 (145)	0.3% (56%)
Farnham Rd (north of Edinburgh Avenue jctn.)	25,662 (423)	25,735 (496)	0.3% (17.3%)
Farnham Rd (south of Buckingham Avenue jctn.)	29,580 (485)	29,665 (570)	0.3% (17.5%)

Note: Figures in brackets indicate the number of HGVs.

8.5.20. It can be seen from Table 8-18 above that all total AADT increases are at or below 3%, which is below the DMRB screening criteria applied for the assessment of 5%, and therefore it is considered that effects from operational traffic do not require detailed air quality modelling and will be **negligible**. However, due to the sensitivity of the receptors within the Tuns Lane AQMA, on Farnham Road an ADMS-Roads assessment has again been carried out, in order to enable a more accurate assessment of these effects. The detailed methodology and outcomes of this ADMS-Roads assessment are provided in the Air Quality Technical Appendix*, Appendix D-1, Volume II* of this ES.

8.5.21. The worst affected residential receptor has been assumed at a distance of 12m from the centre of the road, as mentioned above. The results from the ADMS-Roads dispersion model were entered into the Defra NO_x to NO_2 calculator and the road increment pollutant concentrations are summarised in Table 8-19.

Table 8-19 Operational Road Traffic Pollutant Increments

Road	Baseline Without Development 2019 (µg/m^3)		With Proposed Development Operational Traffic 2019 (µg/m^3)		Increase (µg/m^3)	
	NO_2	PM_{10}	NO_2	PM_{10}	NO_2	PM_{10}
Farnham Road	14.7	3.1	15.0	3.2	0.3	0.1

8.5.22. The predicted increase in NO_2 and PM_{10} concentrations attributable to operational traffic resulting from the Proposed Development on Farnham Road both represent less than a 1% magnitude of change in the AQS and the effect can therefore be considered to be **negligible**.

8.5.23. It should be noted that SHP records show HGVs delivering to the SHP are generally 2-3 years old (72% of the HGVs delivered to the SHP site between April-Sept 2013 were registered in 2010 or later) and will therefore have lower emission concentrations than the average fleet composition assumed within the ADMS-Roads model (typically 6-7 years old). It has also being confirmed by the operator that by the year of operation (2019) they will commit to all operational HGVs delivering WDF to the site being EURO VI compliant, offering over a 75% reduction (in g/kWh) on Euro V standard HGVs and about a 90% reduction (in g/kWh) on Euro IV standard HGVs. This commitment has not been taken into account within the modelling, and hence the ADMS model is therefore likely to be overestimating the actual impact on this receptor by this order of magnitude, despite already showing that there is expected to be an imperceptible change of negligible significance within the AQMA.

8.5.24. As the annual mean NO_2 concentration is below 60µg/m^3, it can be considered unlikely that the operational traffic associated with the Proposed Development would lead to an exceedance of the hourly AQS NO_2 objective.

8.5.25. The current traffic planning condition at SHP allows lorry deliveries to the SHP site 24 hours per day 7 days per week, and an overall total of 126 deliveries per day (using Routes 1, 2 or 3 (see Figure 7-2, *Chapter 7: Traffic and Transport* of this ES)). A night-time period restriction (23.00 to 07.00) of 3 deliveries to site per hour using either Route 1 (between the M40 and Edinburgh Avenue) and/or Route 2 (between M4 Junction 6 and Edinburgh Avenue), and with no deliveries allowed via Route 3 also applies to the site. Based on the findings in *Chapter 9: Noise and Vibration* of this ES, and with the overall aim of reducing congestion during daytime peak periods, it is proposed that the current **night-time restrictions** are replaced with the following:

- HGV deliveries to the SHP site will be restricted to a maximum of 8 deliveries in any one hour combined over any route (except Route 1 from Junction 2 of the M40 which is restricted to 3 per hour maximum) to the SHP site during the night-time period 2300 to 0700 (a combined maximum of 64 total deliveries at night).

8.5.26. This revised condition would allow an additional 40 night-time deliveries (an increase from 24 currently to 64), and therefore provides the Applicant with a greater flexibility to minimise deliveries during the peak hour, day time period. The fuel suppliers would inherently aim to avoid the busiest times of day, to minimise delivery times and the

Applicant has agreed not to schedule HGV deliveries during the weekday peak hour, day time period of 0730 to 0930 and 1630 to 1830. The assessment undertaken is therefore considered likely to overestimate the actual impact from the additional road traffic, as the ADMS-Roads model assumes an equal split in additional roads trips over the 24 hour day (i.e. 5.25 deliveries in peak hour).

8.5.27. Although this proposed change in delivery restrictions cannot be easily quantified by ADMS-Roads, the proposed restrictions support the Council's Air Quality Action Plan to minimise traffic flows during the busier times of day through the Three Tuns AQMA.

Operational Dust

8.5.28. Lorries exiting the existing the Proposed Development plant will be cleaned with brooms or compressed air, as per current operations on site. In addition, the Applicant operates a road sweeper along Edinburgh Avenue when required to control dust emissions from site operations.

Assessment of the Proposed Development when Operational

Human Health Receptors

8.5.29. The results for the worse of the two potential operating configurations are presented below (for the single line with 85m stack), with the results for the twin line assessment presented in *Appendix D-1, Volume II* of this ES for comparison. The effects from the two configurations are typically within 1% of each other and do not affect the overall outcome of the effects described in this chapter.

8.5.30. An overall summary of the results at human health receptors are presented in Table 8-20. The following terms are used within the table:

- AQS = Taken to be National Air Quality Standard or Environmental Assessment Level, as appropriate
- PC = Process Contribution. This is the change in concentrations attributed to the Proposed Development;
- BC = Background Concentration. This is the 2019 concentrations presented in Table 8-14; and
- PEC = Predicted Environmental Concentration. This is the actual predicted concentration at the receptor and is the sum of the process contribution and background concentration.

Table 8-20 Predicted Concentrations from the Proposed Development at the Worst Affected Sensitive Human Receptors

Pollutant	Measured as	AQS µg/m^3	PC µg/m^3	PC / AQS %	Magnitude of Change (see Table 8-8)	BC (µg/m^3)	PEC (µg/m^3)	PEC / AQS %	Significance
NO_2	Annual Mean	40	1.6	4.1%	Small	31.0	32.6	81.5%	Minor Adverse
	Hourly Mean (99.8th percentile)	200	18.3	9.2%	Small	62.0	80.3	40.2%	Negligible
SO_2	24-Hour Mean (99.2nd percentile)	125	16.5	13.2%	Medium	7.8	24.3	19.5%	Negligible
	Hourly Mean (99.7th percentile)	350	25.8	7.4%	Small	7.8	33.6	9.6%	Negligible
	15-Minute Mean (99.9th percentile)	266	28.9	10.9%	Medium	7.8	36.8	13.8%	Negligible
PM_{10}	Annual Mean	40	0.1	0.3%	Imperceptible	20.2	20.3	50.8%	Negligible
	24-Hour Mean (90.4th percentile)	50	1.2	2.4%	Imperceptible	40.4	41.6	83.2%	Negligible
$PM_{2.5}$	Annual Mean	20	0.1	0.6%	Imperceptible	13.1	13.2	66.0%	Negligible
CO	8-Hour Rolling Annual Mean	10,000	15.6	0.2%	Imperceptible	196.2	211.8	2.1%	Negligible
NH_3	Annual Mean	180	0.07	0.0%	Imperceptible	1.7	1.8	1.0%	Negligible
	Maximum Hourly Mean	2,500	0.9	0.0%	Imperceptible	3.5	4.3	0.2%	Negligible
VOC	Annual mean	5	0.12	2.3%	Small	0.51	0.63	12.6%	Negligible
HCl	Hourly mean- 100th percentile	750	10.3	1.4%	Imperceptible	0.7	11.0	1.5%	Negligible
HF	Annual Mean	16	0.01	0.1%	Imperceptible	1.2	1.2	7.6%	Negligible
	Hourly mean- 100th percentile	160	0.7	0.4%	Imperceptible	2.4	3.1	1.9%	Negligible
Mercury	Annual Mean	0.25	0.0006	0.2%	Imperceptible	0.002	0.003	1.0%	Negligible
	Hourly mean- 100th percentile	7.5	0.009	0.1%	Imperceptible	0.004	0.01	0.2%	Negligible
Cd and Tl	Annual Mean	0.005	0.0006	11.7%	Large	0.0001	0.0007	14.6%	Minor Adverse
Heavy Metals	Annual Mean (as Mn)	0.15	0.006	3.9%	Small	0.009	0.01	9.6%	Negligible
	Hourly mean- 100th percentile (as V)	1	0.09	8.7%	Small	0.003	0.09	9.0%	Negligible

Oxides of Nitrogen as (NO_2)

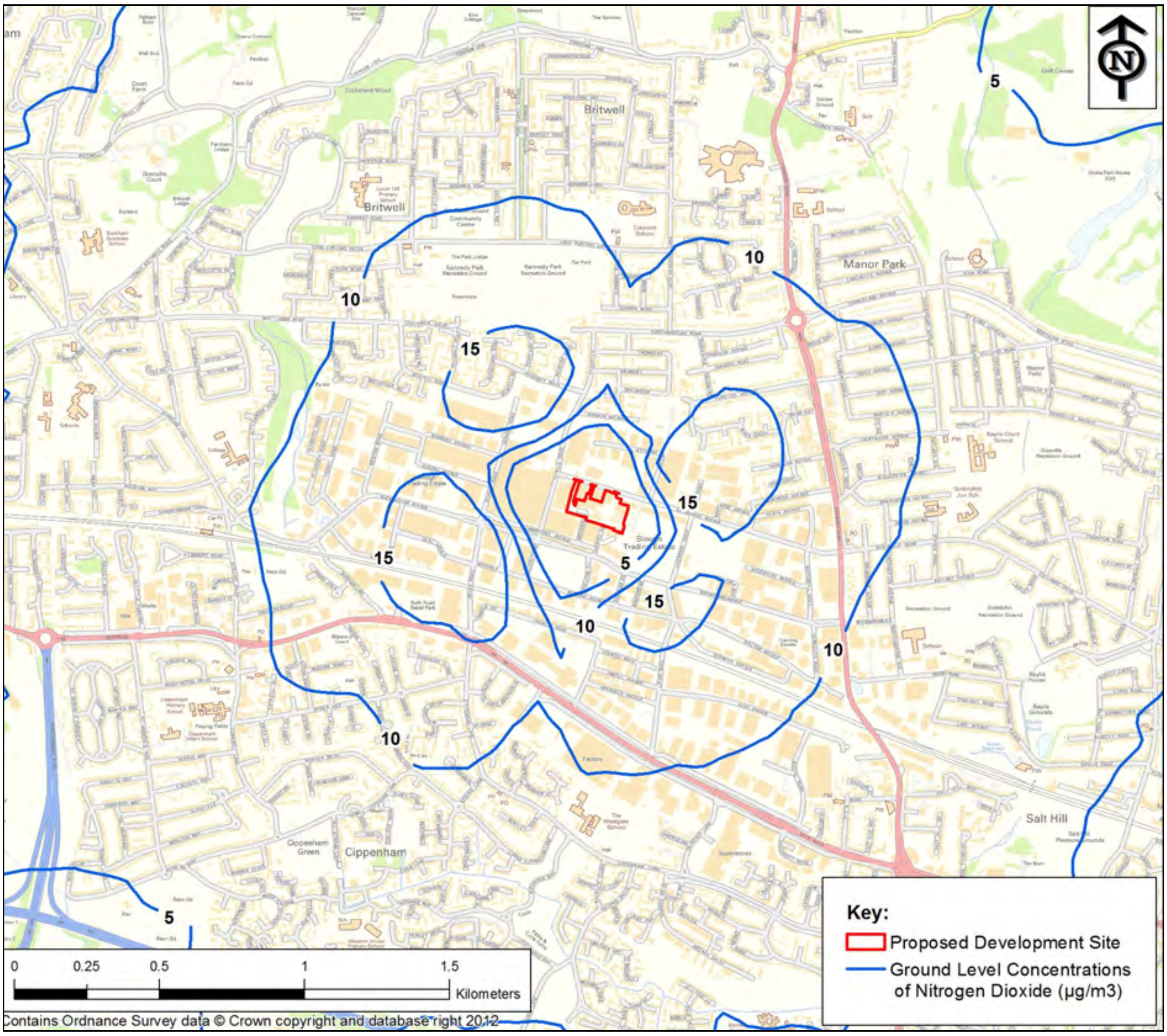
8.5.31. Emissions of oxides of nitrogen (NO_x) from combustion point sources are typically dominated by nitric oxide (NO), with emissions typically in the ratio of NO to NO_2 of 9:1. However, it is NO_2 that has specified AQS objectives due to its potential effect on human health. In the ambient air, NO is oxidised to NO_2 by the ozone (O_3) present, and the rate of oxidation is dependent on the relative concentrations of NO_x and O_3 in the ambient air. For the purposes of detailed modelling, and in accordance with EA Guidance (Ref. 8-35) it is assumed that 35% of the emitted NO is converted to NO_2 in the local vicinity of the Site in the short-term, and a 70% conversion is assumed for long-term effects.

8.5.32. The Proposed Development has a predicted hourly maximum off-site process contribution (as the 99.8th percentile) of 18.3µg/m^3, constituting 9.2% of the AQS objective. This can be considered to be insignificant according to the EA H1 criteria and represents a 'small' magnitude of change according to the significance criteria applied to this assessment. When combined with the background concentration of 62.0µg/m^3 (double the annual average concentration for short-term effects, in accordance with EA modelling guidance), this gives a predicted environmental concentration of 80.3µg/m^3 or 40.2% of the AQS objective. As the predicted environmental concentration is well below the objective, the significance of this effect is considered **negligible**.

8.5.33. In line with an SBC request at the consultation stage, the dispersion models have been run to determine the 100th percentiles of hourly averages and it was found that the results easily complied with the AQS objective, even when background concentrations were taken into account. Considering that the assessment was based on emissions at the half-hourly ELV, and that this is being compared to an hourly average objective, it is considered highly unlikely that the Proposed Development would lead to a breach of the hourly NO_2 AQS objective.

8.5.34. A contour map showing the pattern of dispersion of hourly NO_2 concentrations from the Proposed Development is shown in Figure 8-3.

Figure 8-2 Predicted Hourly Ground Level Concentrations of NO_2 from the Proposed Development ($\mu g/m^3$ as the 99.8th Percentile)

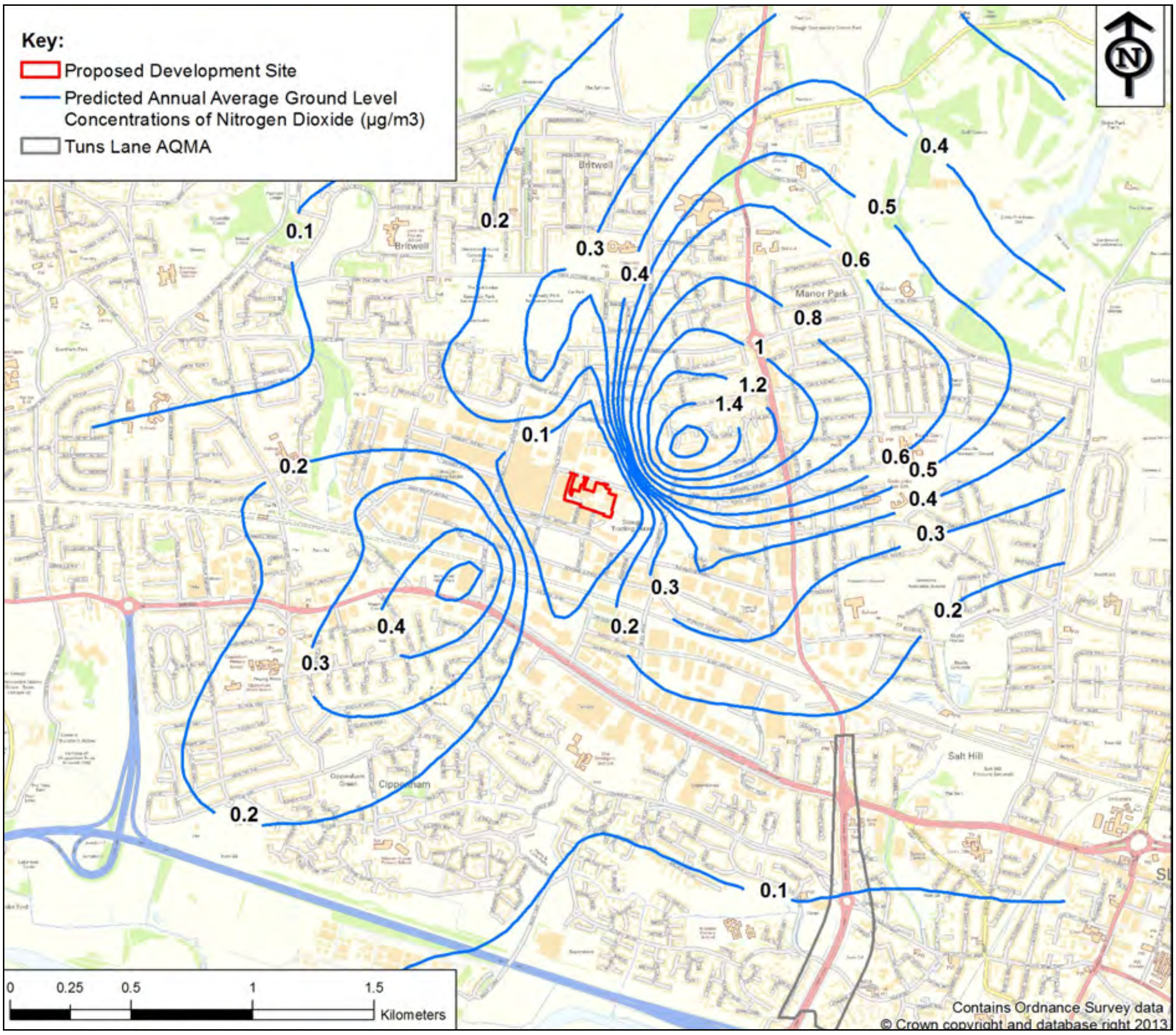


8.5.35. The predicted maximum off-site annual average process contribution is $1.6\mu g/m^3$, constituting 4.1% of the AQS objective, representing a 'small' magnitude of change. The predicted environmental concentration is $32.6\mu g/m^3$, due to the high background concentration, and constitutes 81.5% of the AQS. The effect is therefore considered **minor adverse**.

8.5.36. Table 8-15 shows that predicted effects associated with the CFB boilers that have ceased operation used to contribute more than this, at 8% of the annual average NO_2 AQS; the Proposed Development is therefore expected to increase mean annual NO_2 concentrations to a level that will be less than when the CFB boilers were in commercial operation up to March 2013.

8.5.37. A contour map showing the pattern of dispersion of annual average NO_2 concentrations from the Proposed Development is shown in Figure 8-4.

Figure 8-3 Predicted Annual Average Ground Level Concentrations of NO_2 from the Proposed Development ($\mu g/m^3$)



8.5.38. At the Tuns Lane AQMA the annual average process contribution of NO_2 reduces to 0.2µg/m^3, constituting less than 1% of the AQS objective, representing an 'imperceptible' magnitude of change and the effect is considered **negligible**.

8.5.39. When the road traffic contribution is also taken into consideration, the overall increase at the worst affected receptors within the AQMA is 0.4µg/m^3, however this is still considered to be an 'imperceptible' magnitude of change of **negligible** significance.

Sulphur Dioxide

8.5.40. For the Proposed Development maximum short-term off-site process contributions are predicted to be 10.9%, 7.4% and 13.2% respectively of the relevant AQS objectives (see Table 8-20), representing 'medium' and 'small' magnitudes of change. However the effect is considered **negligible**, due to the predicted environmental concentrations being well below the relevant AQS objectives.

8.5.41. Again, the dispersion models have been run to determine the 100th percentiles of the various SO_2 averaging periods, and it was found that all the results easily complied with the relevant AQS objectives, even when background concentrations were taken into account.

Particulates (as PM_{10})

8.5.42. It is not possible to predict the actual PM_{10} fraction of the total particulate emissions from the Proposed Development during operation therefore it has been separately assumed that the whole particulate release will be at the IED particulate emission limit as PM_{10} and as $PM_{2.5}$. This is likely to overestimate PM_{10} and $PM_{2.5}$ impacts and is considered conservative.

8.5.43. The maximum off-site 24-hourly average process contribution (as the 90.41th percentile) from the Proposed Development is 1.2µg/m^3, comprising 2.4% of the PM_{10} AQS objective. This is 'insignificant' according to the EA's guidance for short term effects and represents an 'imperceptible' magnitude of change. When combined with the background concentration of 40.4µg/m^3, the predicted environmental concentration is 41.6µg/m^3, which constitutes 83.2% of the objective. As this is below the objective the effect is considered to be **negligible**.

8.5.44. The dispersion model was again used to determine the 100th percentile and it was found to easily comply with the relevant AQS objective, even when background concentrations were taken into account

8.5.45. The maximum off-site annual average PM_{10} process contribution is 0.1µg/m^3, or 0.3% of the objective. This represents an 'imperceptible' magnitude of change over background concentrations of **negligible** significance.

8.5.46. Given the conservative assumptions used in the assessment of the Proposed Development's emissions, such as the assumption that particulate emissions occur at the IED limits, (which is considered unlikely) and that they are all released as PM_{10}, it is anticipated that the actual effects as a result of PM_{10} releases will be less than those indicated above. It is considered very unlikely that emissions from the Development would lead to an exceedance of any of the relevant PM_{10} objectives.

Particulates (as $PM_{2.5}$)

8.5.47. As with the PM_{10} assessment, there is no information available for the predicted actual $PM_{2.5}$ emissions from the Proposed Development, so for the purposes of this assessment it has been conservatively assumed that the entire particulate release is at the IED emission limit as $PM_{2.5}$.

8.5.48. On this basis, the predicted increase in the annual average $PM_{2.5}$ process contribution is 0.1µg/m^3. This leads to an increase in the annual average predicted environmental concentration of 0.6% of the $PM_{2.5}$ objective, considered as insignificant in accordance with the EA H1 guidance and an 'imperceptible' magnitude of change. As the future predicted environment concentration is predicted to be 66.0% of the AQS objective (i.e. well below the standard), the effect of $PM_{2.5}$ from the Proposed Development is predicted to be **negligible**.

Carbon Monoxide

8.5.49. The maximum predicted process contribution of CO from the Proposed Development represents 0.2% of the AQS 8-hour running mean objective, representing an 'imperceptible' magnitude of change. As the predicted future environmental concentration represents less than 1% of the AQS objective, it is considered to be insignificant in accordance with the EA's H1 guidance, and **negligible** with regards to the defined significance criteria.

Ammonia (NH_3)

8.5.50. The maximum off-site hourly average process contribution of ammonia from the Proposed Development is 0.9µg/m^3, comprising less than 0.1% of the EAL. This is considered to be insignificant under the EA H1 guidance and an 'imperceptible' magnitude of change. When combined with the background concentration of 3.5µg/m^3, the predicted environmental concentration is well below the EAL, therefore the effect is considered to be **negligible**.

8.5.51. The maximum annual average process contribution of ammonia is 0.07µg/m^3. Again these effects are considered **negligible**.

Volatile Organic Compounds (VOC)

8.5.52. The maximum annual average concentration of VOCs is predicted to increase by only 2.3%, resulting in a 'small' magnitude of change. The predicted environmental concentration for the future operating scenario is 12.6% of the AQS for benzene (used as a conservative surrogate assessment species) and is well below the objective. The effect is therefore considered **negligible**.

Acid Gases (Hydrogen Chloride and Hydrogen Fluoride)

8.5.53. The hourly average process contribution of HCl is predicted to increase by 1.4% and the effect is therefore considered to be **negligible**.

8.5.54. The maximum hourly average process contribution of hydrogen fluoride is 0.4% of the short-term EAL and therefore would be screened as being insignificant in accordance with Environment Agency H1 guidance, and the effect is considered to be **negligible**.

8.5.55. The maximum annual average process contribution of hydrogen fluoride is predicted to increase by 0.1%, resulting in an 'imperceptible' magnitude of change. The predicted environmental concentration for the future operating scenario is only 7.6% of the EAL, and is therefore well below the standard, resulting in a **negligible** effect.

Mercury

8.5.56. The maximum hourly average process is 0.1% of the short term EAL and therefore would be screened as being 'insignificant' in accordance with Environment Agency H1 guidance and the effect is therefore considered to be **negligible**.

8.5.57. The maximum annual average process contribution of mercury is predicted to increase by 0.2% resulting in an 'imperceptible' magnitude of change. The predicted environmental concentration for the future operating scenario is 1% of the EAL, and is therefore well below the standard, resulting in an increase of **negligible** significance.

Cadmium and Thallium

8.5.58. Based on conservative assumptions, including assuming the emissions are at the IED ELV, and assessed against the lower cadmium EAL, the maximum annual average process contribution is predicted to be 11.7% of the EAL. In reality the annual average emission would not occur at the IED ELV, being well below this value, and therefore predicted concentrations are likely to be lower than assessed here.

8.5.59. With the significance criteria applied, the 11.7% increase represents a 'large' magnitude of change, although, as stated above, in practice it is not expected that the Proposed Development would emit Cd at this level.

8.5.60. Due to the low background Cd concentrations, when added to the background concentration, the predicted environmental concentration is well below the standard, representing only 14.6% of the EAL, meaning that despite the worst-case assumption the EAL is easily complied with and the additional contribution from the Proposed Development would only result in an effect of **minor adverse** significance.

8.5.61. The maximum concentration predicted by the model occurs over a small area, and the majority of sensitive receptors will experience predicted concentrations that are lower than the reported value. In addition, due to the conservative assumptions used in the assessment, such as the choice of meteorological data and the use of the IED ELV, it is considered that the assessment provides an overestimate of predicted effects. It is therefore considered that actual concentrations at the majority of receptors will likely represent at worst a 'medium' magnitude of change, and therefore can be considered **negligible**.

8.5.62. The Human Health Risk Assessment, which is presented in Appendix 2-B, Volume II of this ES, supports this conclusion and states that the Cd concentrations are well within the considered acceptable annual risk for UK industrial operations stating *"This assessment of the health effects from metals and organic substances has shown that there is not a significant risk to human health associated with emissions from the Proposed Development via the inhalation and ingestion exposure pathway. The annual carcinogenic risks at the most sensitive receptor locations are predicted to achieve the UK industry acceptable annual risk of 1 in 1,000,000. The total non-carcinogenic risks for all chemicals of potential concern (COPCs) via all exposure pathways predicted concentrations significantly below the reference dose and reference concentrations, at which there is an appreciable risk of health effects occurring."*

Metals (incl. Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V)

8.5.63. Assuming the total metals release is one species, the hourly average process contribution resulting from the Proposed Development is less than 8.7% of the short term EAL for vanadium, which is the lowest of all the metal EALs, and therefore used in the assessment as a worst case. This would be screened as being 'insignificant' in accordance with Environment Agency H1 guidance and the effect is therefore considered to be **negligible**.

8.5.64. The maximum annual average process contribution of total metals is less than 3.9% of the long term EAL for manganese (the metal with the most stringent annual average EAL), equating to an 'imperceptible' magnitude of change.

8.5.65. A further screening assessment of the potential impacts of arsenic, nickel and chromium (VI) has been conducted against their more stringent PM_{10} EALs, using the EA methodology "*Impact Assessment for Group 3 Metals Stack Releases*" (Ref. 8-36). However, as stated earlier, it should be noted that at the pre-construction stage it is not possible to fully speciate heavy metal releases from the Proposed Development as although an overall fuel specification is available, the exact fuel and combustion conditions are not yet finalised. In particular, the proportion of total chromium in a heavy metals release and the proportion of chromium (VI) within that are both unknowns at this stage, as they are for any plant prior to construction and commissioning. Until actual emissions monitoring can be undertaken, the situation is further complicated by the unknown split between particulate and vapour phase releases. Therefore no detailed assessment against specific individual metals guideline values can reliably be made at this stage, and therefore the assessment presented below is indicative only. The emissions of heavy metals have been assessed based on emissions at the IED Emission Limit Value of 0.5mg/m^3. It should be noted that this limit is set for gaseous and the vapour forms of the relevant heavy metal emissions as well as their compounds and not the PM_{10} particulate phase of heavy metals, which is likely to be lower than the IED ELV, and therefore it is considered that assessing emissions at the IED limit against particulate phase standards represents a very conservative assessment.

8.5.66. The EA's guidance identifies three assessment steps:

- **Step 1** – Assumes each metal is emitted at 100% of the IED ELV. Where the impact falls within the following parameters it can be concluded that there is no risk of exceeding the EAL:
  - Long-term process contributions (PCs) of <1%, or long-term predicted environmental concentration (PEC) <100% of EAL. The results of this assessment are provided in Table 8-21.

Table 8-21 Step 1 Metals Impact Assessment – Annual Average Impacts

Pollutant	EAL (µg/m^3)	PC (µg/m^3)	PC/EAL %	BC (µg/m^3)	PEC (µg/m^3)	PEC/EAL %	Screening Against EA Criteria
Arsenic	0.003	0.006	196%	0.0007	0.007	219%	Not Screened
Cr(VI)	0.0002	0.006	2,937%	0.001[1]	0.007	3,487%	Not Screened
Ni	0.02	0.006	29%	0.002	0.008	37%	Screened

[1]Cr(VI) has been assumed to be 20% of the total ambient concentration obtained for Cr (Table 8-14), as described in the EA's methodology.

- **Step 2** – Based on monitoring data from currently operating plant, it is predicted that each metal comprises 11% of the total heavy metal release of 0.5mg/m^3; the modelling results have been pro-rated accordingly. The results of this step are provided in Table 8-22 below.

Table 8-22 Step 2 Metals Impact Assessment – Annual Average Impacts

Pollutant	EAL (µg/m^3)	PC (µg/m^3)	PC/EAL %	BC (µg/m^3)	PEC (µg/m^3)	PEC/EAL %	Screening Against EA Criteria
Arsenic	0.003	0.0007	22%	0.0007	0.001	45%	Screened
Cr(VI)	0.0002	0.0007	323%	0.001	0.002	873%	Not Screened

8.5.67. Step 2 of the assessment identified that emissions of Arsenic are unlikely to exceed the EAL and therefore impacts of Arsenic require no further assessment.

- **Step 3** – Enables justification of the use of percentages lower than 11% of the IED ELV in the assessment. This is considered appropriate for assessing Cr(VI) emissions in this case, since the IED Emission Limit Value of 0.5mg/m^3 is defined for the gaseous component of metals and not the PM_{10} component. Its use therefore represents an overly conservative assessment.

8.5.68. Appendix B of the EA's metal guidance details effective Cr(VI) emission concentrations, based on the proportion of chromium (VI) in the particulates collected in abatement equipment from example plants. Using data from Appendix B it can be determined that the maximum concentration of Cr(VI) in the particulate fraction represents an effective emission concentration of 1.3e-4mg/m^3, or 0.03% of the metal ELV.

8.5.69. The results have been prorated accordingly to represent emissions of Cr(VI) and the results shown below in Table 8-23.

Table 8-23 Step 3 Metals Impact Assessment – Annual Average Impacts

Pollutant	EAL (µg/m^3)	PC (µg/m^3)	PC/EAL %	BC (µg/m^3)	PEC (µg/m^3)	PEC/EAL %	Screening Against EA Criteria
Cr(VI)	0.0002	1.5E-6	1%	0.001	0.001	551%	Screened

8.5.70. Cr(VI) has been screened at Step 3, as the PC is less than 1% of the EAL. In addition, very conservative assumptions have been used in the assessment, i.e. the reporting of worst case off site predicted concentrations and use of conservative modelling assumptions, the releases of heavy metals at an emission limit derived for the gaseous phase against EALs set for particulate phase impacts, and the high background value. It is therefore considered that the above predicted results will significantly overestimate the impacts of heavy metal emissions arising from the operation of the Installation. Nevertheless, Table 8-23 shows that the PC is 1% of the EAL, at the 1% threshold for insignificance, and therefore considered to be negligible.

8.5.71. However, in order to demonstrate this, it is proposed that speciated heavy metals monitoring of plant emissions during commissioning will be carried out and the impact assessment will be revised at that time. This could be addressed through the Environmental Permit for the Installation.

Habitat Receptors

8.5.72. An overall summary of the results at the worst case habitat receptor are presented in Table 8-24. For all annual average impacts, the worst affected habitat site was Stoke Common, however for the 24-hour 100th percentile of NO_x values, predicted concentrations were worst at Burnham Beeches habitat site.

8.5.73. The following terms are used within the table:

- CLPVE = Critical Level for the Protection of Vegetation and Ecosystems

- PC = Process Contribution. This is the change in concentrations attributed to the Proposed Development;
- BC = Background Concentration. This is the 2019 concentrations presented in Table 8-14; and
- PEC = Predicted Environmental Concentration. This is the actual predicted concentration at the receptor and is the sum of the process contribution and background concentration.

Table 8-24 Predicted Concentrations from the Proposed Development at the Worst Affected Sensitive Habitat Receptors

Pollutant	Measured as	CLPVE µg/m³	PC µg/m³	PC / CLPVE %	Magnitude of Change	BC µg/m³	PEC µg/m³	PEC / CLPVE %	Significance
NOx	Annual Mean	30	0.3	0.9%	Imperceptible	27.0	27.3	91.0%	Negligible
	24-hour 100th percentile	75	5.6	7.5%	Small	50.7	56.3	75.1%	Negligible
SO_2	Annual Mean (Higher Plants)	20	0.07	0.3%	Imperceptible	3.6	3.7	18.3%	Negligible
	Annual Mean (Lichens)	10	0.07	0.7%	Imperceptible	3.6	3.7	36.6%	Negligible
NH_3	Annual Mean (Higher Plants)	3	0.007	0.2%	Imperceptible	3.4	3.4	113.6%	Negligible
	Annual Mean (Lichens)	1	0.007	0.7%	Imperceptible	3.40	3.4	340.7%	Negligible
HF	Annual Mean	5	0.001	0.0%	Imperceptible	1.2	1.2	24.0%	Negligible

Oxides of Nitrogen

8.5.74. The annual average NO_x process contribution arising from the operational phase of the Proposed Development at the worst affected ecological receptor (E2: Stoke Common) is predicted to be 0.3µg/m³ (0.26µg/m³ has been rounded up to 0.3µg/m³). This results in a 0.9% increase in the overall predicted environmental concentration from the baseline scenario. It represents an 'insignificant' change in accordance with EA guidance and an 'imperceptible' magnitude of change according to the EPUK criteria. Although the future predicted environmental concentration is 91.0% of the CLPVE objective, the impacts due to the Proposed Development are considered to be 'negligible' in accordance with the defined significance criteria. These effects have been detailed at the ecological receptor experiencing the greatest increase in predicted concentrations as a result of the Proposed Development. Effects at all other ecological receptors have been shown through modelling to be lower than the reported levels above, and therefore effects are deemed to be **negligible** at all identified ecological receptors.

8.5.75. The predicted 24-hour average NO_x process contribution at the worst affected ecological receptor (E1: Burnham Beeches) is predicted to be 5.6µg/m^3. This results in a 7.5% increase, which represents a 'small' magnitude of change. The predicted environmental concentration, i.e. when combined with the background concentration of 50.7µg/m^3 (twice the mean annual background concentration), is 56.3µg/m^3. This represents 75.1% of the CLPVE.

8.5.76. It is therefore considered that the effects at the E1 receptor are **negligible**. Effects at all other ecological receptors have been shown through modelling to be lower than the reported levels above, and therefore effects are deemed to be **negligible** at all identified ecological receptors.

Sulphur Dioxide

8.5.77. The annual average SO_2 process contribution at the worst affected ecological receptor E2 – Stoke Common is predicted to increase by a total of 0.07µg/m^3 over background levels, resulting in a 0.3% increase of the CLPVE for higher plants (see Table 8-2) and 0.7% increase of the CLPVE for sensitive lichens and bryophytes plants. This can be considered 'insignificant' according to the EA's guidance and represents an 'imperceptible' magnitude of change. As the predicted environmental concentration is only 18.3% of the CLPVE for higher plants and 36.6% of the CLPVE for more sensitive species, the significance of the increase in the SO_2 emissions from operational plant are considered to be **negligible**, in accordance with the defined significance criteria.

Ammonia

8.5.78. At the worst affected habitat receptor (E2 - Stoke Common) the annual average process contribution is 0.007µg/m^3, representing 0.2% of the CLPVE for higher plants and 0.7% of the CLPVE for sensitive lichens and bryophytes, and is therefore considered to be **negligible**.

Hydrogen Fluoride

8.5.79. The annual average process contribution of hydrogen fluoride at the worst affected habitats site (E2 - Stoke Common) is predicted to increase by less than 1%, resulting in an 'imperceptible' magnitude of change at this location. The predicted environmental concentration for the future operating scenario is 24% of the CLPVE, and is therefore well below the standard, resulting in an increase of **negligible** significance.

Depositional Impacts at Habitat Receptors

Nutrient Nitrogen Deposition

8.5.80. An assessment of nutrient enrichment has been undertaken by applying the most relevant published deposition velocities for the identified habitat type to the predicted annual average process contributions of NO_2 and NH_3 concentrations at the identified Statutory Habitat sites within 10km of the Proposed Development.

8.5.81. These predicted deposition rates have then been compared to the relevant nitrogen critical loads for the most sensitive habitat types at each identified Habitat sites, and the background nutrient nitrogen deposition rates for each site has also been obtained. This data has all been obtained from the APIS website (Ref. 8-37). Critical loads are set under the Convention on Long-Range Transboundary Air Pollution. They are based on observations from experiments and gradient studies and are assigned to habitat classes of the European Nature Information System (EUNIS) to enable consistency of habitat terminology and understanding across Europe. Critical loads are given as ranges which reflect the variation in ecosystem response across Europe.

8.5.82. The predicted rate of nitrogen (N)-deposition at each of the identified ecological receptors is detailed in Table 8-25.

Table 8-25 Nitrogen Deposition at Identified Ecological Receptors

Ref.	Receptors	Nitrogen Critical Load Class	Critical Load Range kg N/ha/y	Background N-Deposition kg N/ha/y	Dry Deposition	
					Predicted Increase in N-Deposition kg N/ha/yr	Predicted Increase as % of Critical Load Range
E1	Burnham Beeches	Deciduous Woodland	10-20	33.2	0.1	0.5 – 1.0%
E2	Stoke Common	Lowland Heath	10-20	17.3	0.07	0.4 – 0.7%
E3	South Lodge Pit	No features for assessment provided in the APIS database				
E4	Bray Pennyroyal Field	Low and medium altitude hay meadows	20-30	18.6	0.04	0.1 - 0.2%
E5	Littleworth Common	Coniferous Woodland	5-15	32.1	0.04	0.2 - 0.7%
E6	Bray Meadows	Low and medium altitude hay meadows	20-30	17.2	0.02	0.1 - 0.1%
E7	Windsor Forest and Great Park	Upland Oakwood	10-15	31.5	0.03	0.2 - 0.3%
E8	Black Park	Coniferous Woodland	5-15	34.2	0.07	0.4 - 1.3%
E9	Cannoncourt Farm Pit	No features for assessment provided in the APIS database				
E10	Wraysbury No. 1 Pit	No features for assessment provided in the APIS database				
E11	Cock Marsh	Lowland Calcareous Grassland	15-25	18.2	0.01	0.0 - 0.1%
E12	Kingcup Meadows	Coniferous Woodland	5-15	40.5	0.04	0.3 - 0.9%
E13	Great Thrift Wood	Coniferous Woodland	5-15	32.3	0.02	0.2 - 0.5%
E14	Southwest London Waterbodies	No features for assessment provided in the APIS database				

Ref.	Receptors	Nitrogen Critical Load Class	Critical Load Range kg N/ha/y	Background N-Deposition kg N/ha/y	Dry Deposition	
					Predicted Increase in N-Deposition kg N/ha/yr	Predicted Increase as % of Critical Load Range
E15	Wraysbury and Hythe End Gravel Pits	Low and medium altitude hay meadows	20-30	17.6	0.01	0.0 - 0.1%
E16	Chawridge Bourne	Coniferous Woodland	5-15	36.8	0.04	0.2 - 0.7%
E17	Bisham Woods	Coniferous Woodland	5-15	33.8	0.01	0.1 - 0.3%
E18	Old Rectory Meadows	Low and medium altitude hay meadows	20-30	21.8	0.02	0.1 - 0.1%

Deposition velocities applied = NO_2 on grassland = 0.0015m/s, woodland = 0.003m/s. Ammonia on grassland = 0.02m/s, woodland 0.03m/s.

8.5.83. The effects of N-deposition from the Proposed Development at all but two of the ecological receptors results in less than a 1% increase of the lowest critical loads, and can therefore can be considered ‘insignificant’ at these sites according to the EA’s H1 criteria. As mentioned in paragraph 8.3.23, 1% is the threshold used by the EA to determine ‘insignificant’ effects on human health. It has been applied to ecological receptors in the absence of specific deposition guidance; it is not a limit however and does not imply the effect is significant if it is more than 1%.

8.5.84. The Burnham Beeches site is at the level of insignificance at 1% and the Black Park site is only very slightly over the threshold for insignificance, and can be considered to represent only ‘small’ magnitudes of change. These are also based on the lowest critical loads. When compared against the higher value of the critical load range the Black Park site also represents a less than 1% increase, and therefore it can be considered that effects are **negligible** at all ecological sites.

8.5.85. It should also be noted that the background deposition at the Burnham Beeches site already exceeds the lowest critical load value by 332%. The increase in N-deposition as a result of the Proposed Development is less than 1% of the current background deposition.

8.5.86. The predicted impacts above are likely to be overestimates, given the series of conservative assumptions built into the model, not least that the facility will be operating continuously at ELVs and with ammonia slippage at its own limit, which is unlikely. There is also no consideration of the reduction of effects from the cessation of the CFB boilers, i.e. the potential reduction in the background N-Deposition, it is considered unlikely that the effects of the Proposed Development would be significant taking all these factors into account.

8.5.87. The Applicant is committing to a NH_3 ELV of 5mg/m^3, which is at the lower end of the range of achievable emissions stated within the Large Combustion Plant BREF (5 – 10mg/m^3), in order to ensure that impacts on the habitats were minimised. Without this commitment, depositional impacts at Habitat sites would increase by, on average, an additional 0.3%, i.e. for Burnham Beeches the impact would be 0.7% - 1.4% of the Critical Load (from proposed 0.5 – 1.0%).

Acid Deposition

8.5.88. The predicted rate of Acid-deposition at each of the identified ecological receptors has been determined using the Critical Load function tool on the APIS website and is detailed in Table 8-26.

8.5.89. The values of nitrogen deposition (kg/N/ha/yr) provided in Table 8-22 above have been used to derive kiloequivalents/ha/yr (keq/ha/yr), using standard conversion factors (molar equivalents).

Table 8-26 Acid Deposition at Identified Ecological Receptors

Ref	Receptors	Background Acid Deposition (keq/ha/yr)	Predicted Dry Deposition		Predicted Increase as % of Critical Load Function
			keq S/ha/yr	keq N/ha/yr	
E1	Burnham Beeches	N: 2.56 S: 0.32	0.01	0.007	0.7%
E2	Stoke Common	N: 1.31 S: 0.26	0.008	0.005	0.6%
E3	South Lodge Pit	No features for assessment provided in the APIS database			
E4	Bray Pennyroyal Field	N: 2.52 S: 0.34	0.004	0.003	0.2%
E5	Littleworth Common	N: 2.52 S: 0.34	0.004	0.003	0.4%
E6	Bray Meadows	N: 1.27 S: 0.26	0.002	0.002	0.0%
E7	Windsor Forest and Great Park	N: 1.32 S: 0.29	0.004	0.002	0.5%
E8	Black Park	N: 1.31 S: 0.25	0.008	0.005	0.6%
E9	Cannoncourt Farm Pit	No features for assessment provided in the APIS database			
E10	Wraysbury No. 1 Gravel Pit	No features for assessment provided in the APIS database			
E11	Cock Marsh	N: 1.34 S: 0.30	0.001	0.0008	0.0%
E12	Kingcup Meadows and Oldhouse Wood	N: 2.96 S: 0.31	0.005	0.003	0.5%
E13	Great Thrift Wood	N: 2.56 S: 0.31	0.003	0.002	0.0%
E14	South West London Waterbodies	No features for assessment provided in the APIS database			
E15	Wraysbury and Hythe End Gravel Pits	N: 1.40 S: 0.29	0.001	0.0008	0.0%

Ref	Receptors	Background Acid Deposition (keq/ha/yr)	Predicted Dry Deposition		Predicted Increase as % of Critical Load Function
			keq S/ha/yr	keq N/ha/yr	
E16	Chawridge Bourne	N: 2.49 S: 0.31	0.005	0.003	0.4%
E17	Bisham Woods and Chiltern Beechwoods	N: 2.54 S: 0.34	0.002	0.0009	0.0%
E18	Old Rectory Meadows	N: 1.52 S: 0.26	0.002	0.002	0.0%

Deposition velocities applied = NO_2 on grassland = 0.0015m/s, woodland = 0.003m/s. Ammonia on grassland = 0.02m/s, woodland 0.03m/s. SO_2 on grassland 0.012m/s, woodland 0.024m/s.

8.5.90. The worst affected ecological receptor for acid deposition is E1: Burnham Beeches with a predicted increase of 0.7% of the critical load function as a result of the operational Proposed Development. Again, given that no consideration has been taken into account of the reduction in background acid deposition concentrations due to the cessation of the CFB boilers, it is considered unlikely that the Proposed Development will have significant effects on the worst affected habitat receptor. It is therefore considered that acid deposition effects can be considered to be 'insignificant' according to the EA's guidance and of an 'imperceptible' magnitude of change with **negligible** significance according to the assessment significance criteria.

Cumulative Effects of Stack Emissions and Traffic emissions

8.5.91. The potential for the effects of NO_2 and PM_{10} emissions from operational traffic and operational power station emissions to be combined has been considered, and are shown in Table 8-27. Cumulative effects have been assessed at the Tuns Lane AQMA, as this is where the traffic effects are predicted to be largest.

Table 8-27 Cumulative Effect of Traffic and Power Station Emissions

Pollutant	Operational Traffic Increment ($\mu g/m^3$)	Operational Power Station Increment at AQMA ($\mu g/m^3$)	Total Increase ($\mu g/m^3$)	Increase as % of annual AQS	Overall Effect
NO_2	0.2	0.2	0.4	<1%	Imperceptible
PM_{10}	<0.1	0.01	<0.1	<1%	Imperceptible

8.5.92. The cumulative effects of operational traffic and power plant emissions would lead to an 'imperceptible' magnitude of change in annual mean concentrations of NO_2. This represents a **negligible** effect. Such an effect is not considered to be significant.

Visible Plumes from the Proposed Development (South Stack Only)

8.5.93. Plume visibility results for the operational Proposed Development are presented in Table 8-28, with a range shown for the five years of meteorological data used in the assessment. This assessment does not model the visible plume from the SHP cooling towers or the north stack, which are considered part of the baseline situation associated with the SHP site and are not expected to be affected by the future operation of the Proposed Development.

Table 8-28 Plume Visibility Results

Parameter	Units	2008	2009	2010	2011	2012	2013
No. of visible plume groundings	-	1	0	0	1	0	0
Percentage of visible plumes (all hours)	%	57	52	56	50	60	56
Percentage of visible plumes (daylight hours*)	%	51	45	46	43	53	52
Maximum visible plume length (daylight hours)	m	2,374	2,793	2,756	2,721	2,317	2,587
Number of visible plumes over 1,000m	hour	25	21	33	24	23	33
Number of visible plumes over 500m	hour	61	67	64	54	54	63
Average visible plume length (daylight hours)	m	162	180	176	158	151	162
% Plumes Exceeding an av. 50m Site Boundary (daylight hours only)	%	28	25	30	25	28	29

*Daylight hours have been assumed to occur between 07.00 – 19.00 throughout the whole year, i.e. for 12 hours per day.

8.5.94. Based on the model results presented in Table 8-28, it is considered that the predicted visible plume effects from the Proposed Development and its associated south stack is 'medium', based on the criteria outlined in Table 8-6. As outlined in the EA guidance, this level of effect is considered to be acceptable. This conclusion is based on the following factors:

- Although the number of plumes exceeding the average distance to the Site boundary of 50m occur during daylight hours is a maximum of 30%, predicted for 2010, and above the 25% threshold criteria for effects to be considered to be of a large magnitude, the use of the 50m measurement to the Site boundary is considered very conservative. It only considers the northern, western and southern Site boundaries, with the eastern Site boundary being much further. The prevailing wind direction at the site is south westerly and therefore it is a reasonable assumption that a large proportion of the plumes included in the assessment above will travel towards to longer eastern boundary;

- The longest predicted plumes for each year of meteorological data occur for only 1 hour of that year. The average plume length significantly shorter; and

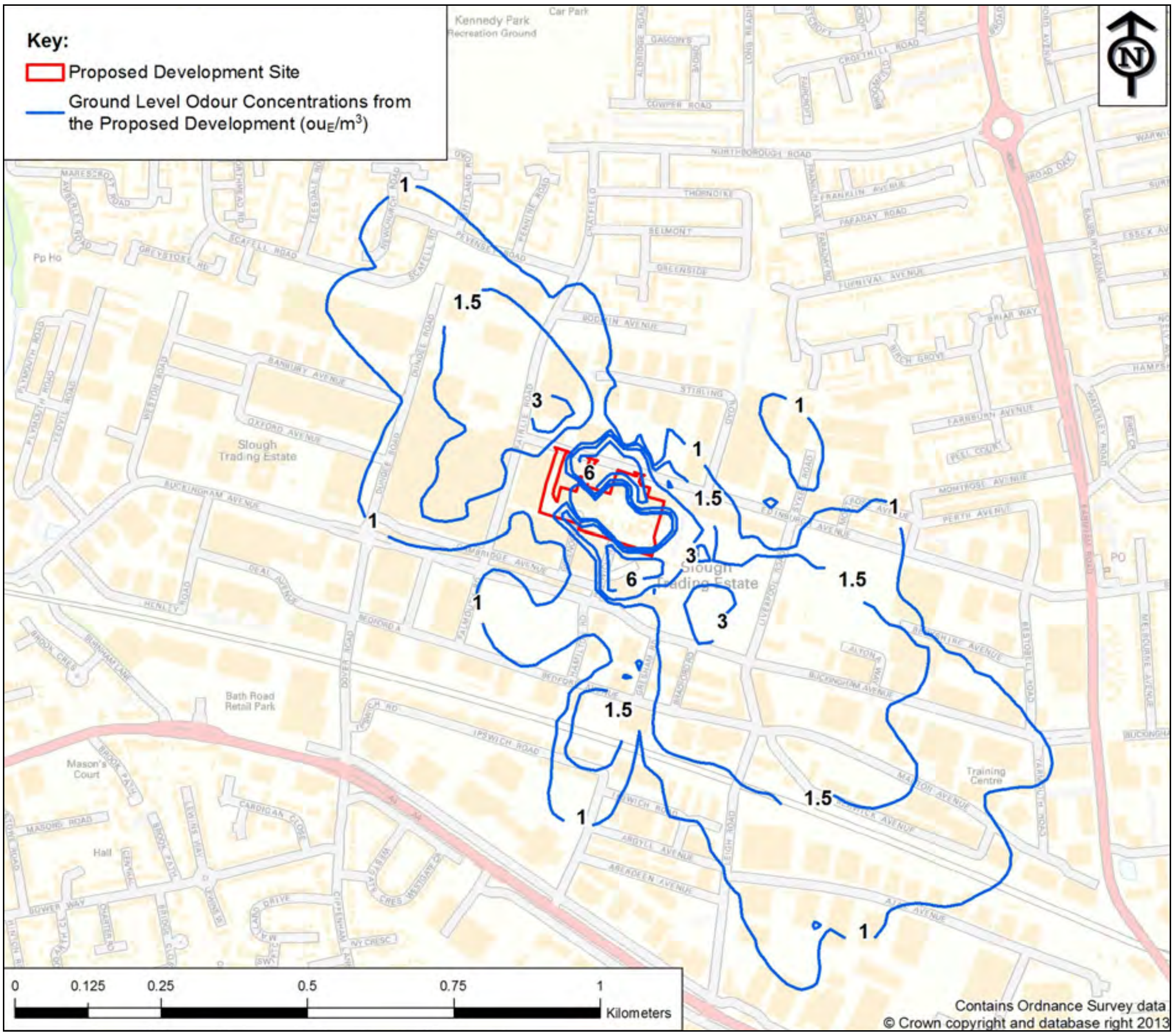
- There are very few plumes predicted to be over 1,000m for each of the meteorological years used in the model.

Assessment of Odorous Emissions

8.5.95. The modelled odour release scenario resulted in a maximum predicted 98th percentile of hourly averages of below 1.3ou$_E$ at any offsite location, which is below the threshold of 1.5ou$_E$ applied to the assessment. The maximum 100th percentile of hourly averages at the nearest sensitive receptor (taken to be the confectionary factory located on Dundee Road, approximately 300m west of the waste reception hall, and residential receptors 300m north and 300m east of the waste reception hall) was predicted to be 1.5ou$_E$.

8.5.96. A contour map showing the pattern of dispersion of the maximum 100th percentile of hourly averages odour concentrations from the Proposed Development is shown in Figure 8-5.

Figure 8-4 Predicted Ground Level Odour Concentrations as the 100th percentile from the Proposed Development (ou$_E$/m^3)



8.5.97. This means that the highest predicted hourly odour concentration at the nearest sensitive receptor is at the acceptability threshold, assuming continuous release from the vent all year round under the conditions presented in Table 8-7. As discussed in Section 8.3, in practice emissions are only expected from any such vent for 10% of the year or less.

8.5.98. Due to the conservative assumptions used in this assessment therefore, particularly that the odour emission occurs continuously throughout the year, when it is only expected to be associated with combustion plant downtime (estimated to be 10% of the year or less), it is considered that the findings represent a **negligible** risk of complaints resulting from nuisance odour should a carbon filter be installed and operated in accordance with the design outlined in Table 8-7.

8.5.99. The need for carbon filter abatement will depend on the final plant design, fuel specification and other plant management arrangements. The final decision on whether any additional controls are required, and what form they will take, will be made as part of the application to the EA for an Environmental Permit for the operation of the Proposed Development.

8.6. Residual Effects and Conclusions

8.6.1. This section discusses the anticipated level of effect following implementation of the aforementioned mitigation measures to control emissions to meet the IED emissions limit values, such as SNCR, bag filters and other measures mentioned in *Chapter 5: The Proposed Development* of this ES.

8.6.2. The demolition/construction and operational phases of the Proposed Development are expected to lead to slight increases in traffic flows, resulting in an 'imperceptible' change with **negligible** effect on local air quality. As discussed in *Chapter 7: Traffic and Transport* of this ES, the SHP site has a previously consented traffic allowance and the predicted traffic flows for the future operation of the SHP site including traffic serving the Proposed Development are below this consented level and comparable to historical trip generation from the SHP site. The Applicant has confirmed that by the year of operation (2019) they will commit to all HGVs delivering WDF to the site being EURO VI compliant, offering over a 75% reduction (in g/kWh) on Euro V standard HGVs and about a 90% reduction (in g/kWh) on Euro IV standard HGVs. In addition, HGV deliveries will not be scheduled during the weekday peak hours.

8.6.3. The residual effect associated with exhaust emissions from construction plant and equipment during demolition and construction, as well as dust generating activities, is predicted to be 'imperceptible' and of **negligible** significance at nearby sensitive receptors, given the distance from the Site.

8.6.4. Operational effects of the Proposed Development have been assessed through dispersion modelling and results indicate that all of the pollutant species emitted from the operational power plant will have **negligible** effects on either human health or ecological receptors, except for NO_x and cadmium and thallium, which are conservatively predicted to lead to a **minor adverse** effect. This is largely due to the number of conservative assumptions used in the assessment, such as:

- Releases occurring continuously at the IED emission limit values, when annual average emissions will be below these values;
- Operational hours for 100% of the year, when there will be times when the plant is not operational, due to maintenance activities;
- Use of the worst of six years of meteorological data;

- Maximum off-site values predicted to occur at all sensitive receptors, when the majority of receptors will experience lower effects;
- Flow rates based on a calorific value (CV) that is less than the design value CVs, when actual CVs are likely to be higher, and therefore flow rates lower, resulting in lower mass emissions; and
- The conversion of NO_x to NO_2 for operational emissions was based on 35% for hourly effects and 70% for long term effects. This was based on the EA's recommendations for worst-case assessments as actual conversion levels are likely to be lower.

8.6.5. The full cessation of operation of the CFB boilers on the Site in 2014 may also lead to a reduction in background concentrations of combustion emissions, and this has not been taken into account in the assessment carried out above. Table 8-15 shows that predicted effects associated with these boilers contributed around 8% of the annual average NO_2 AQS, whereas the effects of the Proposed Development are predicted to contribute only 4%. Predicted short term hourly average effects are predicted to be similar for both plants. The Proposed Development is therefore expected to contribute less NO_2 (or similar in the case of short-term emissions) to the local air quality than the redundant CFB boilers

8.6.6. It is predicted that the emissions from the Proposed Development will not lead to an exceedance of any of the air quality objectives or EALs at any of the sensitive receptors identified.

8.6.7. The residual effect associated with each aspect that has been assessed is summarised in Table 8-29.

Table 8-29 Summary of Residual Effects to Air Quality

Description	Nature of Effect	Geographic Scale	Significance
Demolition and Construction Phase			
Demolition/ construction plant emissions	Adverse, Temporary	Local	Negligible
Fugitive dust emissions	Adverse, Temporary	Local	Negligible
Traffic emissions associated with construction	Adverse, Temporary	Local, Regional	Negligible
Operational Phase			
Traffic emissions associated with operation	Adverse, Permanent	Local, Regional	Negligible
Power plant emissions	Adverse, Permanent	Local, Regional	Minor adverse
Odour	Adverse, Permanent	Local	Negligible

8.7. Cumulative Effects

8.7.1. A number of cumulative developments have also been considered, as detailed in *Chapter 2: Assessment Methodology* of this ES.

8.7.2. It is not considered that any of these cumulative developments have point source combustion emissions that will result in a cumulative effect with the point source emissions from the Proposed Development. The main potential for cumulative effects is therefore considered to arise through emissions from construction and operational traffic.

8.7.3. The Britwell redevelopment is located to the north of the Proposed Development and a review of the traffic effects has been carried out. None of the roads detailed in the planning submission for the Britwell development correspond to the roads considered for the Proposed Development, and therefore no cumulative assessment has been made.

8.7.4. The air quality assessment for the Leigh Road development predicts that this cumulative scheme will create a maximum NO_2 traffic effects in 2018 of 0.1µg/m^3 on Farnham Road and less than 0.1µg/m^3 for PM_{10}. In combination with the effects stated above for the Proposed Development, the effects from additional traffic remain as 'imperceptible' and therefore of **negligible** significance.

8.8. References

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Ref. 8-6 European Parliament and Council (2001) Directive 2001/80/EC on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants. Brussels, Belgium.

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Ref. 8-26 Defra: UK Air Information Resource http://uk-air.defra.gov.uk/data/laqm-background-home

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Ref. 8-30 Defra, Scottish Executive, National Assembly of Wales and Department of the Environment in Northern Ireland. Guidelines for halogens and hydrogen halides in ambient air for protecting human health against acute irritancy effects.

Ref. 8-31 Fichtner (2006) Slough Heat and Power Plant Air Quality Assessment.

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Ref. 8-33 IAQM (2014) Guidance on the assessment of dust from demolition and construction.

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9. NOISE AND VIBRATION

9.1. Introduction

9.1.1. This chapter of the ES assesses the potential effects of the Proposed Development with respect to noise and vibration.

9.1.2. Described within this chapter are:

- The methods used to identify the noise and vibration effects and determine the significance of the resulting effects associated with the Proposed Development;
- The baseline conditions currently existing at the Proposed Development Site and in the surrounding area;
- The mitigation measures required to prevent, reduce or offset any significant adverse noise and vibration effects; and
- The likely residual effects after these measures have been adopted.

9.1.3. Potential effects are considered during the demolition and construction phase and on completion and operation of the Proposed Development. In particular, the chapter considers potential effects on identified receptors, in terms of:

- Predicted noise and vibration levels from the demolition and construction works;
- Noise resulting from operation of the Proposed Development; and
- Change in noise level associated with changes to road traffic attributed to the Proposed Development.

9.2. Legislation and Planning Policy Context

National Planning Policy

9.2.1. The NPPF (Ref. 9-1) states that planning policies and decisions should avoid noise from giving rise to significant adverse effects on health and quality of life, including through the use of conditions. It should be recognised that development will often create some noise.

9.2.2. The Environmental Permitting Regulations 2010 (Ref. 9-2) require the application of Best Available Techniques (BAT) to activities performed within installations regulated by the EA that are covered by this legislation, in order to manage and minimise the effect of these operations on the surrounding environment.

9.2.3. Under a heading of “Indicative BAT requirements” (page 9), paragraph 2 of EA Horizontal Technical Guidance Note H3 Part 1 states:

- *“The Operator should also employ other noise control techniques to ensure that the noise from the installation does not give rise to reasonable cause for annoyance, in the view of the Regulator. In particular, the Operator should justify where Rating Levels (as defined in BS4142: 1997) from the installation exceed the numerical value of the Background Noise Level ($L_{A90,T}$) at the noise-sensitive receptors. Reasons why these levels may be exceeded in certain circumstances are given in Section 2.5.6 of this document.”*

9.2.4. Section 2.5.6 of H3 discusses numerical limits and states*: "it is suggested that the starting point for numerical levels should be a free-field rating level ($L_{Ar,Tr}$) of 50 dB by day and a façade rating level of 45 dB by night".* However, evidence suggests that the setting of absolute levels can lead to difficulties. Consequently, the setting of levels linked to the background, with an overriding safeguard of absolute levels to ensure a baseline of good practice, is considered to be most appropriate.

9.2.5. To be sure that there is no reasonable cause for annoyance, the Rating Level ($L_{Ar,Tr}$) of the noise from the installation should be the same as the Background Noise Level ($L_{A90,T}$).

Local Planning Policy

9.2.6. Local planning policies relating to noise are discussed in Ch*apter 3: Planning Policy Context* of this ES.

9.2.7. The Slough Core Strategy (2008), policy 8 (Sustainability and the Environment) (Ref. 9-3) states that development should not give rise to unacceptable levels of pollution, including noise and that where appropriate applications should be accompanied by a noise study

Other Guidance

9.2.8. The following guidance documents are also relevant to this chapter:

- British Standard 6472-1 'Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting' (Ref. 9-4 presents recommended frequency weighted vibration spectra (for continuous vibration) and vibration dose values (VDV) (for intermittent vibration) above which an adverse effect is likely to occur in residential and commercial properties;
- British Standard 5228 'Noise and Vibration Control on Construction and Open sites' (Ref. 9-5) provides a 'best practice' guide for noise and vibration control, and includes sound power level (SWL) data for individual plant as well as a calculation method for noise from construction activities. Example criteria for the assessment of the significance of noise effects are also provided;
- British Standard 7385 'Evaluation and measurement for vibration in buildings' (Ref. 9-6) presents guide values or limits for transient vibration, above which there is a likelihood of cosmetic damage;
- British Standard 4142 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas' (Ref. 9-7) can be used for assessing the effect of noise from mechanical services plant. The method compares the 'rating level' of the new noise, with the 'background level' at the receptor position;
- The Control of Pollution Act 1974 (CoPA) (Ref. 9-8) requires that 'Best Practicable Means' (as defined in Section 72 of the CoPA) be adopted for construction noise on any given site. CoPA makes reference to BS5228 as best practicable means;
- Currently there are no national standards that provide noise limits for construction sites. The Environmental Advisory Leaflet 72 'Noise Control on Building Sites' (AL72) (Ref. 9-9), published in 1976, provides some guidance on acceptable construction noise levels;
- Department of Transport/Welsh Office Memorandum 'Calculation of Road Traffic Noise (CRTN) (1998) (Ref. 9-10) describes procedures for traffic noise calculation,

and is suitable for environmental assessments of schemes where road traffic noise may have an effect; and

- The Highways Agency 'Design Manual for Road and Bridges Volume 11 Section 3 Part 7-Traffic Noise and Vibration' (DMRB) (Ref. 9-11) provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration effects arising from all road projects, including new construction, improvements and maintenance.

9.3. Assessment Methodology and Significance Criteria

9.3.1. The following terminology has been used to define effects:

- **Adverse** – detrimental or negative effects to an environmental resource or receptor;
- **Negligible** – imperceptible effects to an environmental resource or receptor; or
- **Beneficial** – advantageous or positive effect to an environmental resource or receptor.

9.3.2. Where adverse or beneficial effects have been identified, these have been assessed against the following scale:

- **Minor** – slight, very short or highly localised effect of no significant consequence;
- **Moderate** – limited effect (by extent, duration or magnitude), which may be considered significant; or
- **Major** – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

9.3.3. Effects classed from negligible to minor adverse are considered to be insignificant, whereas effects classed from moderate adverse to major adverse are considered to be significant.

9.3.4. Table 9-1 provides a matrix showing the significance of effects depending on the sensitivity of receptors. Noise sensitive receptors (e.g. residential properties, schools, hospitals etc.) are considered to be of high sensitivity. All other receptors (e.g. offices, warehouses, industrial units, etc.) are considered to be of low sensitivity.

Table 9-1 Matrix Illustrating the Significance of Effects (relating magnitude of effect and sensitivity of receptor)

Magnitude of Change	Sensitivity of Receptor			
	High	Medium	Low	Negligible
Major	Major	Major / Moderate	Moderate / Minor	Minor / Negligible
Moderate	Major / Moderate	Moderate	Minor / Negligible	Negligible
Minor	Moderate / Minor	Minor / Negligible	Negligible	Negligible
Negligible /No change	Negligible	Negligible	Negligible	Negligible

Construction and Demolition Noise

9.3.5. BS 5228 provides practical information on demolition and construction noise and vibration reduction measures, and promotes a 'Best Practice Means' approach to control noise and vibration. The calculation method provided in BS 5228 is based on the number and types of equipment operating, their associated Sound Power Level (SWL), and the distance to receptors, together with the effects of any screening. The types and numbers of demolition and construction plant are estimated based on the information within *Chapter 5: Proposed Development* of this ES.

9.3.6. BS 5228 provides guidance on acceptable levels of construction noise and provides example criteria for the assessment of significance of construction noise effects. One of the potential suggested criteria within BS 5228 refers to the Department of the Environment (DoE) Leaflet AL72: Noise Control on Building Sites from 1976.

9.3.7. A methodology for assessing the significance of demolition and construction noise effects in relation to the ambient noise levels, known as the 'ABC' method, is contained within the British Standard BS 5228:2009 '*Control of Noise and Vibration from Construction and Open Sites'*. The assessment criteria are presented in Table 9-2.

Table 9-2 Construction and Demolition Noise Criteria

Assessment Category	Threshold Value (dB)		
	Category A	Category B	Category C
Night-time (23:00 – 07:00)	45	50	55
Evenings and Weekends	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

NOTE 1: A significant effect has been deemed to occur if the construction noise LAeq exceeds the threshold value for the category appropriate to the ambient noise level.

NOTE 2: If the ambient noise level exceeds the threshold values given in the table, then a significant effect is deemed to occur if the total noise level for the period increases by more than 3 dB due to construction activity.

NOTE 3: Applies to residential receptors only.

Category A: Ambient noise levels (when rounded to the nearest 5 dB) are less than the threshold value stated. In other words, before rounding to the nearest 5 dB, the noise levels are: at Night-time <43dB; in Evening and Weekends <53dB; and for Daytime and Saturdays <63dB.

Category B: Ambient noise levels (when rounded to the nearest 5 dB) are the same as the Category A threshold value. In other words, before rounding to the nearest 5 dB, the noise levels are: at Night-time 43-47 dB; in Evening and Weekends 53-57dB; and for Daytime and Saturdays 63-67dB.

Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values. In other words, before rounding to the nearest 5 dB, the noise levels are: at Night-time >48dB; in Evening and Weekends >58dB; and for Daytime and Saturdays >63dB.

9.3.8. For the appropriate period (night, evening / weekend, day), the ambient noise level is determined and rounded to the nearest 5 dB. The appropriate Threshold Value is then determined. The construction noise level is then compared with this Threshold Value. If the construction noise level exceeds the Threshold Value, then a significant effect is deemed to occur.

9.3.9. Significance criteria for demolition and construction noise have been derived from the BS 5228 guidance. A semantic scale for description of the noise effects is shown in Table 9-3.

Table 9-3 Semantic Scale for Description of Construction and Demolition Noise Effects at Residential receptors

Description of Effect	Significance of Effect
Combined ambient and construction noise level is not greater than the noise threshold	Negligible
Combined ambient and construction noise level exceeds the noise threshold by no greater than 5 dB	Minor Adverse
Combined ambient and construction noise level exceeds the noise threshold by between 5 dB and 10 dB	Moderate Adverse
Combined ambient and construction noise level exceeds the noise threshold by greater than 10 dB	Major Adverse

9.3.10. Works will be 24 hours a day, 7 days a week, although the nosier activities such as demolition and sheet piling will be restricted to day time and evening hours and avoiding Sunday or Bank Holidays.

Construction Vibration – Human Receptors

9.3.11. BS 5228 Part 2 provides further guidance on the perception of vibration within occupied buildings. This provides a simple method of determining annoyance alongside evaluation of cosmetic damage associated with vibration.

9.3.12. Table 9-4 details peak particle velocity (PPV) levels and their potential effect on humans, and provides a semantic scale for description of construction and demolition vibration effects on human receptors.

Table 9-4 Guidance on Human Effects of Vibration Levels (PPV)

Vibration Level	Description of Effect	Significance of Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible
0.3 mm/s	Vibration might be just perceptible in residential environments.	Minor Adverse
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	Moderate Adverse
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Major Adverse

Underground Services

9.3.13. BS 5228 Part 2 contains information on vibration levels that are considered to be the limits of tolerability for underground services. The following noise PPV vibration limits are recommended in BS 5228:

- Maximum PPV for intermittent or transient vibrations 30 mms^{-1}; and
- Maximum PPV for continuous vibrations 15 mms^{-1}.

9.3.14. Criteria should be applied at the nearest point to the source or activity.

9.3.15. In the event of encountering elderly and dilapidated brickwork sewers, the base data should be reduced by 20% to 50%. For most metal and reinforced concrete service pipes, however, the values are expected to be quite tolerable.

Road Traffic Noise

9.3.16. Construction and operational traffic noise has been assessed by considering the changes in traffic flows arising from the Proposed Development, following the principles of CRTN and DMRB.

9.3.17. The criteria for the assessment of traffic noise changes arising from the Proposed Development in the short term have been taken from Table 3.1 of DMRB and are provided in Table 9-5.

Table 9-5 Traffic Noise Assessment Criteria

Increase in Road Traffic Noise Level	Significance of Effect
0 dB(A)	No change
0.1 – 0.9 dB(A)	Negligible
1 – 2.9 dB(A)	Minor Adverse
3 – 4.9 dB(A)	Moderate Adverse
5 dB(A) or more	Major Adverse

9.3.18. In addition to the above, DMRB advises that a change in level of 1 dB from road traffic equates to a change in traffic flow of less than 25% where the traffic speed and composition remain constant. Changes in traffic flow of less than 25% are assumed to represent a negligible noise effect.

9.3.19. Road traffic flows used in noise calculations are for the period from 06:00 hours to 24:00 hours, given in terms of the 18 hour Average Annual Weekday Traffic (AAWT) flow, percentage of HGVs, and vehicle speeds. The CRTN contains the following equation for the calculation of the Basic Noise Level (BNL) from a road in terms of the 18-hour traffic flow from 06:00 to 24:00:

BNL $L_{A10,18hour} = 29.1 + 10\log(Q)$ dB

- Where Q is the traffic flow in 18 hour;

9.3.20. The CRTN also contains a calculation methodology for calculating the LA10,1h based on hourly road traffic flows:

BNL $L_{A10,1hour}$ = 42.2 + 10log(Q) dB

9.3.21. A correction is applied to the calculated BNL noise levels to take into account traffic speeds and percentage of HGVs.

Correction = 33log(V+40+500/V) + 10log(1+5p/V) – 68.8; and

- Where V is the mean traffic speed in km/hour; and p is the percentage heavy vehicles.

9.3.22. This methodology has been used to calculate road traffic noise levels in this chapter.

Operational Plant Noise

9.3.23. The existing SHP site is subject to an existing noise planning condition which states that the external noise level at 1.2m above ground level and 3.6m from the external walls should not exceed a noise level of 60dB(A) (Ref. 9-12). The SHP site's existing environmental permit also requires noise and vibration levels to be below levels likely to cause annoyance outside the site, unless appropriate measures have been used and it is not practical to minimise the noise and vibration.

9.3.24. BS 4142 – 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas' provides guidance on the assessment of the likelihood of complaints relating to noise from operational plant and equipment. The standard presents a method of rating noise levels by comparing the noise level of the new source (the Rating Level) with the existing background noise level in the area in the absence of the plant and equipment noise (the Background Noise Level). Table 9-6 details the criteria to assess the likelihood of complaints due to plant noise.

Table 9-6 BS 4142 Noise Rating

Difference between Rating Level [1] and Background Level [2]	BS 4142 Rating
-10 dB(A) or less	Positive indication that complaints are unlikely.
+5 dB(A)	Marginal significance.
+10 dB(A) or more	Indicates complaints are likely.

1 - The Rating Level is the noise level attributable to the new source(s), plus a 5 dB(A) penalty if the new source has tonal or intermittent characteristics;

2 - The Background Level is taken as the L_{A90}; this is the noise level in the absence of the source which is exceeded for 90% of the time.

9.3.25. The effects of industrial noise stated within BS 4142 can be interpreted differently due to the 15 dB difference in noise that is considered to be of 'marginal significance' and noise levels at which there is a 'positive indication that complaints are unlikely'. Environmental permitting guidance states that operational noise should be the same as the background noise level to be sure there is no reasonable cause for annoyance (see Paragraph 9.2.5 above).

9.3.26. A table of significance of noise effects has been derived based on guidance within BS 4142, and noise criteria defined by the Environmental Permitting Regulations (Ref. 9-2) is presented in Table 9-7.

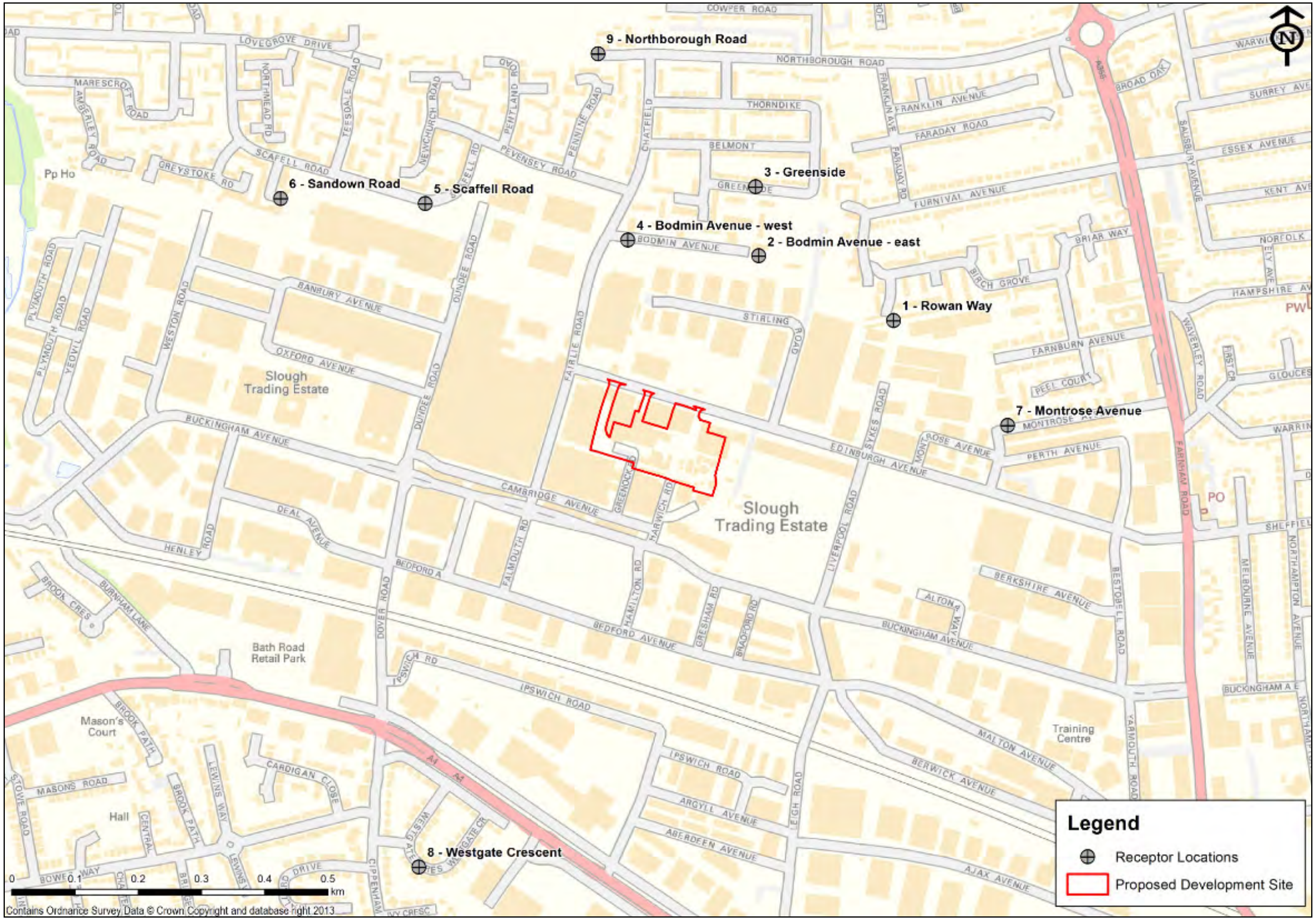
Table 9-7 Significance of Operational Noise Effects

Description of Effect	Significance of Effect
Greater than 10 dB below background noise level	Negligible
Between 0 and 10 dB below background noise level	Minor adverse
Between 0 and 10 dB above background noise level	Moderate adverse
Greater than 10 dB above background noise level	Major adverse

Receptors

9.3.27. The locations of noise sensitive receptors selected for the assessment are presented in Figure 9-1. These receptor locations were considered to be representative of the nearest noise sensitive receptors to the Proposed Development Site in each direction. In the case of Northborough Road (Receptor 9), receptors are located at higher ground levels than the Proposed Development. Consequently, these receptors represent locations at which worst case noise effects are likely to occur.

Figure 9-1 Noise Sensitive Receptors



9.4. Baseline Conditions

Existing Baseline Conditions

9.4.1. A noise survey was undertaken by URS from 20 May 2013 to 21 May 2013 to derive background noise levels at sensitive receptors in the vicinity of the Site. The days selected for noise monitoring were chosen as the existing plant was operating under normal conditions so background noise measurements would be representative of typical working conditions. A summary of the noise measurements results are presented in Table 9-8.

Table 9-8 Noise Survey Results

Receptor	Daytime (07:00 – 23:00 hrs)		Night-time (23:00 – 07:00 hrs)	
	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)
1 – Rowan Way	49	43	41	36
2 – Bodmin Avenue East	53	47	47	45
3 - Greenside	56	43	41	39
4 – Bodmin Avenue West	58	50	54	46
5 – Scaffell Road	62	43	46	39
6 – Sandown Road	54	40	35	32
7 - Montrose Avenue	64	52	54	53
8 – Westgate Crescent	56	45	45	37
9 – Northborough Road	54	45	36	32

9.4.2. It should be noted that at Receptor 7 there was a generator operating temporary traffic lights at a nearby construction site which dominated both daytime and night-time noise measurements. Consequently, it is considered reasonable to use a proxy location to provide noise data for Receptor 7.

9.4.3. The nearest equivalent location to Receptor 7 is Receptor 1, which is located on a quiet cul-de-sac, and which has been assumed to be representative of conditions at Receptor 7 for the purpose of this assessment.

9.5. Potential Effects and Mitigation Measures

Demolition and Construction Noise

Potential Effects

9.5.1. The assessment of construction noise involves the summation of ambient measured noise levels and the predicted construction noise level. This summed value is then compared to the noise limit (derived from guidance within Table 9-2) to derive the significance of the effect.

9.5.2. As no evening ambient noise levels were logged, it is considered appropriate to use the night-time noise levels as equivalent. Although the evening noise levels are likely to be higher than the night-time noise levels, using the night-time noise levels ensures that noise limits can be applied to represent a worse case scenario.

9.5.3. A summary of measured $L_{Aeq,T}$ noise levels at receptors and the associated Category ABC noise criteria (as per Table 9-2) are presented in Table 9-9.

Table 9-9 Measured $L_{Aeq,T}$ Noise Levels and Associated ABC Category

Receptor	Day		Evening		Night	
	$L_{Aeq,T}$ dB	ABC Category	$L_{Aeq,T}$ dB	ABC Category	$L_{Aeq,T}$ dB	ABC Category
1 – Rowan Way	49	A	41	A	41	A
2 – Bodmin Avenue East	53	A	47	A	47	B
3 - Greenside	56	A	41	A	41	A
4 – Bodmin Avenue West	58	A	54	A	54	C
5 – Scaffell Road	62	A	46	A	46	B
6 – Sandown Road	54	A	35	A	35	A
7 - Montrose Avenue	49	A	41	A	41	A
8 – Westgate Crescent	56	A	45	A	45	B
9 – Northborough Road	54	A	36	A	36	A

9.5.4. Although certain construction activities may be required on a 24 hour basis, the exact nature of those activities that will be carried out at night are unknown at this stage of the assessment and therefore quantitative assessment has not been undertaken. Demolition works and sheet piling will be avoided during night-time hours however. Consequently, noise limits have been derived for each receptor location which, when adhered to, should ensure that there will not be a significant noise effect.

9.5.5. Demolition and construction noise limits in Table 9-10 have been derived using the BS 5228 ABC methodology (Table 9-2) and ABC categories have been assigned to each receptor (see Table 9-9) for each of the day, evening and night-time periods.

Table 9-10 Derived Demolition and Construction Noise Limits

Receptor	Demolition/Construction Noise Limit $L_{Aeq,1h}$ dB		
	Daytime (07:00-19:00)	Evening (19:00-23:00)	Night-time (23:00-07:00)
1 – Rowan Way	65	55	45
2 – Bodmin Avenue East	65	55	50
3 - Greenside	65	55	45
4 – Bodmin Avenue West	65	55	55
5 – Scaffell Road	65	55	50
6 – Sandown Road	65	55	45
7 - Montrose Avenue	65	55	45

Receptor	Demolition/Construction Noise Limit $L_{Aeq,1h}$ dB		
	Daytime (07:00-19:00)	Evening (19:00-23:00)	Night-time (23:00-07:00)
8 – Westgate Crescent	65	55	50
9 – Northborough Road	65	55	45

9.5.6. The demolition and construction programme for the Proposed Development is described in *Chapter 5: The Proposed Development* of this ES. Noise predictions of demolition and construction activities have been carried out accordingly.

9.5.7. Construction and demolition predictions due to daytime activities have been carried out using noise data for plant and calculation methodologies from BS 5228. Noise predictions have been carried out using Cadna-A noise modelling software. Full details on the noise modelling methodology, including a full list of construction plant and associated sound power levels for each demolition and construction phase, are presented in *Appendix E-1, Volume II* of this ES. Noise contour plots showing the propagation of noise due to construction activities are presented in Figures 1 to 3 of *Appendix E-2, Volume II* of this ES

9.5.8. A summary of noise predictions at key receptor locations is presented in Table 9-11.

Table 9-11 Daytime Demolition and Construction Noise Predictions

Receptor	Predicted Façade Noise Level for Construction Activity $L_{Aeq,1h}$ dB		
	Demolition	Piling and Foundation	Building
1 – Rowan Way	61	63	62
2 – Bodmin Avenue East	64	67	66
3 - Greenside	62	65	64
4 – Bodmin Avenue West	58	60	59
5 – Scaffell Road	64	66	65
6 – Sandown Road	59	61	60
7 - Montrose Avenue	62	65	64
8 – Westgate Crescent	58	60	59
9 – Northborough Road	59	62	61

9.5.9. The significance of effect of demolition and construction noise during the daytime period has been derived using semantic descriptors in Table 9-3. Noise effects at each receptor location are presented in Table 9-12.

Table 9-12 Daytime Demolition and Construction Noise Effects

Receptor	Noise Criteria LAeq,1h dB	Demolition	Piling and Foundation	Building
1 – Rowan Way	65	Negligible	Negligible	Negligible
2 – Bodmin Avenue East	65	Negligible	Minor Adverse	Minor Adverse
3 - Greenside	65	Negligible	Negligible	Negligible
4 – Bodmin Avenue West	65	Negligible	Negligible	Negligible
5 – Scaffell Road	65	Negligible	Minor Adverse	Negligible
6 – Sandown Road	65	Negligible	Negligible	Negligible
7 - Montrose Avenue	65	Negligible	Negligible	Minor Adverse
8 – Westgate Crescent	65	Negligible	Negligible	Negligible
9 – Northborough Road	65	Negligible	Negligible	Negligible

9.5.10. At worst, **minor adverse** demolition and construction noise effects are predicted during the daytime period. Consequently, demolition and construction noise levels during the daytime period are not considered to be significant.

9.5.11. To allow for 24 hour working, additional noise mitigation measures have been proposed to ensure that noise disturbances during the night-time period at nearby receptors will be minimised. Noise mitigation measures include the following practices for working at night:

- Either construction vehicles should be fitted with broadband reversing alarms wherever possible or the use of reversing alarms would be prohibited and additional banksman would be employed;
- Unnecessary revving of engines will be prohibited;
- The following plant/activities will be restricted to daytime period only:
  - demolition works;
  - impact wrenches;
  - sheet piling (auger piling would be acceptable);
  - concrete scabbling; and
  - concrete jack hammering.
- Concrete batching plant will be located to gain the maximum benefit from separation distance to receptors and screening from existing buildings or landforms; and
- Silent running generators will be used for the duration of night shifts.

9.5.12. In addition to specific controls for night time activities, it is best practice during construction to implement measures to minimise noise disturbance. Outline construction mitigation measures have been identified below, which will be applied wherever practicable to ensure noise effects are minimised. The final measures adopted will depend on the final design and will be determined by the contractor selected.

9.5.13. The preferred approach for controlling demolition/construction noise is to reduce levels where possible, but with due regard to practicality. Sometimes a greater noise level may be acceptable if the overall demolition/construction time and therefore length of disruption is reduced.

9.5.14. BS 5228 gives detailed advice on methods for minimising nuisance from demolition and construction noise. This can take the form of a reduction in the source's noise level, control of noise spread and, in areas of very high noise levels, insulation at receptors. In order to comply with specified noise criteria, it is likely to be a requirement of any demolition/construction contract that the contractors comply with the recommendations in BS 5228. Demolition and construction noise mitigation measures which will be adopted include:

- Hydraulic techniques for breaking to be used in preference to percussive techniques where practical;
- Off-site pre-fabrication to be used, where practical;
- All plant and equipment to be used for the works to be properly maintained, silenced where appropriate, and operated to prevent excessive noise and switched off when not in use where practicable;
- Plant to be certified to meet relevant current legislation as defined by BS 5228 standards;
- All Trade Contractors to be made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2) which will form a prerequisite of their appointment;
- Loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials around the site will be conducted in such a manner as to minimise noise generation and where practical to be conducted away from noise sensitive areas;
- Deviation from approved method statements to be permitted only with prior approval from the lead Contractor and other relevant parties. This will be facilitated by formal review before any deviation is undertaken;
- Noise complaints, or exceedances of action levels to be reported to the Contractor and immediately investigated;
- Wherever possible, plant and equipment to be switched off when not in use and engine idling avoided; and
- Noisy construction activities to be carried out during normal working hours whenever possible, as outlined earlier in this chapter.

9.5.15. Implementation of noise limits (see Table 9-10) at nearby noise sensitive receptors will be agreed with SBC, particularly for construction activities outside of normal working hours.

9.5.16. Good public relations and consultation with SBC and SEGRO will help minimise the perceived effect of construction work. In particular, local residents and adjacent businesses will need to be advised that any higher levels of noise will only be for a short period of time and that publicised works schedules will be adhered to. A dedicated contact number will be made available for local residents and local businesses to phone should they have any queries or complaints. A log will be kept of all complaints, along with the actions taken to resolve these.

9.5.17. A DCMS and CEMP will be prepared and put in place to ensure good practicable means are adopted. The CEMP will highlight when the potentially noisy activities are likely to take place and the appropriate mitigation measures that will be undertaken to minimise noise effects. This will therefore, in accordance with best practice, ensure that any potential noise effects relating to construction activities are minimised. A framework CEMP is presented in *Appendix B-1*.

9.5.18. In addition, a demolition and construction noise monitoring strategy will be put in place and agreed with SBC in advance of starting work onsite.

Construction Vibration

9.5.19. BS 5228 indicates that construction activities (particularly piling) usually only generate significant vibration effects when they are located within 20m of sensitive locations. The magnitude of effect depends on the type of piling, ground conditions, and receptor distance.

9.5.20. Table 9-13 provides examples of PPV levels for auger piling activities at various distances sourced from BS 5228 Part 2.

Table 9-13 Example Piling Vibration Levels

BS 5228 Reference No.	Soil Conditions	Piling Mode	Plan Distance (m)	PPV (mm/s)
101	Fill / dense ballast / London Clay	Augering	20	0.05
		Auger hitting base of hole	20	0.23
103	Fill clay	Augering	20	0.30
		Dollying casing	20	0.55
		Spinning off	20	0.44
104	Fill / sand / clay	Augering	15	0.10
		Auger hitting base of hole	14	0.30
		Mudding in	14	0.20
		Dollying casing	14	0.80

9.5.21. The nearest sensitive receptors (Bodmin Avenue) are located approximately 200m north of the Proposed Development Site. Based on the separation distance between source and receptor and the example vibration levels in Table 9-13, potential vibration levels from piling affecting nearby sensitive receptors are considered to be limited to effects of **negligible** significance.

9.5.22. The likelihood of vibration resulting in cosmetic building damage to existing surrounding buildings would require levels of vibration in excess of vibration levels that may result in complaints. Consequently, the likelihood of cosmetic building damage due to piling vibration is of **negligible** significance.

9.5.23. There are SHP underground facilities on-site which may be sensitive to high levels of vibration. Although it is unlikely that piling will result in high enough levels of vibration to damage pipework (see Paragraph 9.3.13), due care will be taken by the contractors if pipework is located in close proximity to piling activities.

9.5.24. No specific mitigation measures, other than best practicable means, are considered necessary to further minimise the effect of construction vibration. The need for vibration monitoring will be discussed with SBC post-consent and, if required, addressed within a demolition and construction noise monitoring strategy.

Demolition and Construction Traffic

9.5.25. Information on existing traffic flows on surrounding roads is provided in *Chapter 7: Traffic and Transport* of this ES. Based on information in *Chapter 5: The Proposed Development* of this ES, the estimated daily number of vehicles accessing the Proposed Development Site during the demolition and construction works is presented in Table 9-14.

9.5.26. Based on the current programme demolition and construction of the Proposed Development is scheduled to commence in 2015, with the year of peak construction occurring in 2017. Consequently, potential noise effects due to construction traffic have been assessed using predicted 2017 future baseline traffic flows for the local road network.

9.5.27. The basic noise level (BNL) (as described in Paragraph 9.3.19) for each road link has been calculated for the baseline scenario and corresponding 'baseline with construction traffic' scenario. The results of BNL calculations are presented in Table 9-15. The difference in calculated BNL between the two scenarios allows the significance of construction traffic noise effects to be derived (see Table 9-5).

Table 9-14 Predicted Demolition/Construction Traffic Flows in 2017

Road Link	Speed (km/h)	2017 Baseline Road Traffic		2017 With Demolition/ Construction	
		AAWT	HGV %	AAWT	HGV %
Fairlie Road	48	15908	1%	15908	1%
Edinburgh Ave (west of Liverpool Road jctn.)	48	5412	1%	5412	1%
Edinburgh Ave (east of Liverpool Road jctn.)	48	11659	1%	11659	1%
Farnham Rd (north of Edinburgh Ave jctn.)	48	22571	1%	23049	2%
Farnham Rd (south of Buckingham Ave jctn.)	48	25509	1%	26059	2%
Buckingham Ave (west of Liverpool Road jctn.)	48	10910	2%	11020	3%
Buckingham Ave (east of Liverpool Road jctn.)	48	9992	1%	11938	3%
Liverpool Road	48	6265	1%	6265	1%
Leigh Road	48	15356	0%	15356	0%

Table 9-15 Demolition/Construction Traffic Noise Calculations

Road Link	Baseline BNL (dB)	With Construction BNL (dB)	Difference (dB)	Significance
Fairlie Road	68.1	68.1	0.0	Negligible
Edinburgh Ave (west of Liverpool Road jctn.)	63.4	63.4	0.0	Negligible
Edinburgh Ave (east of Liverpool Road jctn.)	66.8	66.8	0.0	Negligible
Farnham Rd (north of Edinburgh Ave jctn.)	69.6	69.7	+0.1	Negligible
Farnham Rd (south of Buckingham Ave jctn.)	70.2	70.3	+0.1	Negligible
Buckingham Ave (west of Liverpool Road jctn.)	66.5	66.5	0.0	Negligible
Buckingham Ave (east of Liverpool Road jctn.)	66.1	66.9	+0.8	Negligible
Liverpool Road	64.1	64.1	0.0	Negligible
Leigh Road	68.0	68.0	0.0	Negligible

9.5.28. The highest predicted change in noise level due to construction traffic is approximately 0.8 dB $L_{A10,18hr}$. A change of this magnitude is considered to be of **negligible** significance.

9.5.29. The trips presented in Table 9-14 and Table 9-15 demonstrate the effect on the local road network prior to the revised commitments suggested in Section 7.5, Chapter 7: Traffic and Transport. This assessment therefore presents an unrealistic worst-case situation for traffic flows along the section of Farnham Road north of Edinburgh Avenue, in the unlikely case that SBC declines the suggested amendments to the traffic conditions. Should the revised conditions be accepted, the change in flows along this part of Farnham Road would be less than shown, which would reduce the predicted effect on noise from that described above. Flows would be predicted to increase slightly along Fairlie Road, as shown by the Sensitivity Testing in Section 7.5, Chapter 7: Traffic and Transport, however there are not currently any sensitive residential properties along this road that would require further consideration.

9.5.30. No mitigation is therefore considered necessary to minimise the effect of construction road traffic noise.

9.5.31. Although negligible noise effects have been identified for construction traffic movements, the use of reversing alarms on construction vehicles may result in adverse noise effects.

9.5.32. To control this potential noise effect, construction vehicles should be fitted with broadband reversing alarms wherever possible. Additionally, vehicle movements on-site during construction activities should be managed to avoid excessive reversing movements and associate vehicle alarms whenever possible, by optimising the site layout and working methodologies. As is common practice for large scale schemes, such measures can form part of the CEMP.

Operational Development

Operational Development Effects

9.5.33. Noise predictions have been carried out to quantify the potential noise effect due to the proposed operational facility. Noise predictions at nearby sensitive receptors have been carried out using Cadna-A noise modelling software. Noise source data for buildings and plant used in the noise model are presented in Table 9-16. Full details on the noise modelling methodology are presented in *Appendix E-2, Volume II* of this ES.

Table 9-16 Noise Effect of Operational Facility

Source	Sound Power Level dB(A)	Source Type
Stack	96	Point
Deliveries	103	Line
Boiler House	85*	Area
Turbine Building	85*	Area
FGT Area	85*	Area
Fuel Delivery Door	85**	Area

*indoor sound pressure level with assumed building attenuation of 25 dB
**indoor sound pressure level with assumed building attenuation of 10 dB

9.5.34. The results of operational site noise predictions and the significance of noise effects are presented in Table 9-17. A noise contour plot showing the predicted propagation of noise from the new plant and HGV movements on the operational site is presented in Figure 4 of *Appendix E-2, Volume II* of this ES.

9.5.35. HGV noise has been assessed using a noise source that represents a high revving HGV at all points on the access route including the 3m high access ramp to the fuel tipping hall. This approach has been taken as it represents a reasonable worst case assumption, which is likely to overestimate noise emissions.

9.5.36. The background noise levels used to assess operational site noise have been taken to be the lowest measured during the night-time period so effects identified can be considered as worst case based upon the data collected.

9.5.37. During noise monitoring the existing plant at the SHP site was operating under normal conditions so noise levels measured at receptor locations can be considered as typical. Noise associated with existing plant at the SHP site is considered to be part of the existing baseline noise climate.

Table 9-17 Noise Effect of Operational Facility

Receptor	Measured Background Noise Level LA90,T dB	Predicted Operational Noise Level LAeq,T dB	Difference - dB	Significance of Effect
1 – Rowan Way	36	30	-6	Minor Adverse
2 – Bodmin Avenue East	45	35	-10	Negligible
3 - Greenside	39	34	-5	Minor Adverse
4 – Bodmin Avenue West	46	34	-12	Negligible
5 – Scaffell Road	39	33	-6	Minor Adverse
6 – Sandown Road	32	29	-3	Minor Adverse
7 - Montrose Avenue	36	31	-5	Minor Adverse
8 – Westgate Crescent	37	28	-9	Minor Adverse
9 – Northborough Road	32	30	-2	Minor Adverse

9.5.38. Noise predictions indicate that there may be, at worst, **minor adverse** effects at nearby noise sensitive receptors. However, as the predicted noise levels of the operational facilities do not exceed the lowest measured background noise levels, a minor adverse effect is not considered to be significant.

9.5.39. The SHP site is currently limited through planning conditions set by SBC to not exceeding 60 dB(A) at a height of 1.2m and a distance of 3.6m from the building facades to protect local amenity. The noise contour plot presented in Figure 5 of *Appendix E-2* presents the noise predictions for the SHP site, showing the propagation of noise from both the existing plant and the Proposed Development (excluding traffic noise). To maintain the current noise limits imposed on the SHP site the predicted noise levels associated with the operational development are predicted to reduce slightly below the 60dB noise limit at 3.6m from the building façade (and at approximately the Site boundary) and the Proposed Development is therefore expected to comply with this existing SHP site noise condition.

9.5.40. No mitigation is considered necessary to minimise the noise effect due to the operational facility, including use of the access ramp to the fuel tipping hall. However, it should be noted that noise predictions have been carried out based on the building envelope attenuating the transmission of noise from inside to outside by 25 dB(A) (considered to be a very conservative estimation of building envelope sound reduction performance) and the fuel delivery doors attenuating noise by 10 dB(A). Care should be taken to ensure weak points on the building envelope (e.g. ventilation) are designed to be capable of attenuating internal noise by 25 dB, which will be considered at the detailed building design stage. Further details are presented in Appendix E-1.

9.5.41. A 5 dB correction (as stated in BS 4142) has not been applied to take into account any impulsive or tonal features of operational noise as it is assumed that operational noise will not contain any impulsive or spectral characteristics. To ensure that the likelihood of complaints is not increased, plant should be designed to have no tonal or impulsive characteristics.

9.5.42. Circumstances may occur when noise limits are exceeded during the operation of safety mechanisms, e.g. safety valves and emergency sirens. The need for ensuring that these events are clearly audible to site staff are fundamental to ensuring a safe working environment. As such, noise events due to safety procedures should be considered as exempt from consideration as an effect due to their necessity, and also their abnormal and short-term nature. However, it should be ensured that safety noise events should not be excessive in the volume or their duration to ensure that any disturbance is kept to a minimum.

Operational Traffic

9.5.43. Information on existing traffic flows and future predicted traffic flows due to the operational site on surrounding road links is provided in *Chapter 7: Traffic and Transport* of this ES. In order to provide a reasonable worst-case assessment of operational traffic, the baseline road traffic flows have been compared to the maximum permitted road traffic flows for the SHP site and are presented in Table 9-18. This is higher than the actual estimated number of trips during operation of the Proposed Development, as discussed in *Chapter 7: Traffic and Transport*, but provides a worst case scenario of potential road effects from the SHP site as a whole.

9.5.44. The Proposed Development is currently scheduled to be operational in 2019. Consequently, potential noise effects due to operational road traffic associated with the completed development have been assessed using predicted 2019 future baseline road traffic flows for the local road network.

9.5.45. The BNL for each road link has again been calculated for the ‘baseline’ scenario and the ‘baseline with maximum consented operational traffic for the SHP site’ scenario. The results of BNL calculations are presented in Table 9-19. The difference in calculated BNL between the two scenarios allows the significance of operational traffic noise effects to be derived (see Table 9-5).

Table 9-18 Predicted Operational Traffic Flows in 2019

Road Link	Speed (km/h)	2019 Baseline Road Traffic		2019 Baseline with Maximum Consented Operational Road Traffic	
		AAWT	HGV %	AAWT	HGV %
Fairlie Road	48	17012	1%	17064	1%
Edinburgh Ave (west of Liverpool Road jctn.)	48	5784	1%	5984	4%
Edinburgh Ave (east of Liverpool Road jctn.)	48	12391	1%	12791	2%
Farnham Rd (north of Edinburgh Ave jctn.)	48	23988	1%	24082	2%
Farnham Rd (south of Buckingham Ave jctn.)	48	27116	1%	27222	2%
Buckingham Ave (west of Liverpool Road jctn.)	48	11562	2%	11562	2%
Buckingham Ave (east of Liverpool Road jctn.)	48	10507	1%	10507	1%
Liverpool Road	48	6568	1%	6634	2%
Leigh Road	48	15897	0%	15963	1%

Table 9-19 Operational Traffic Noise Calculations

Road Link	2019 Baseline BNL (dB)	2019 Baseline BNL with Maximum Consented HGV Movements (dB)	Difference	Significance
Fairlie Road	68.4	68.4	0.0	Negligible
Edinburgh Ave (west of Liverpool Road jctn.)	63.7	63.9	+0.2	Negligible
Edinburgh Ave (east of Liverpool Road jctn.)	67.0	67.2	+0.1	Negligible
Farnham Rd (north of Edinburgh Ave jctn.)	69.9	69.9	0.0	Negligible
Farnham Rd (south of Buckingham Ave jctn.)	70.4	70.5	0.0	Negligible
Buckingham Ave (west of Liverpool Road jctn.)	66.7	66.7	0.0	Negligible
Buckingham Ave (east of Liverpool Road jctn.)	66.3	66.3	0.0	Negligible
Liverpool Road	64.3	64.3	0.0	Negligible
Leigh Road	68.1	68.1	0.0	Negligible

9.5.46. The worst case predicted change in noise level due to operational traffic is approximately 0.2 dB $L_{A10,18hr}$. A change of this magnitude is considered to be of **negligible** significance.

9.5.47. The trips presented in Table 9-18 and Table 9-19 demonstrate the effect on the local road network prior to the revised commitments suggested in Section 7.5, Chapter 7: Traffic and Transport. As with the demolition and construction flows (see paragraph 9.2.29 above), this assessment presents an unrealistic worst-case situation for operational flows along the section of Farnham Road north of Edinburgh Avenue, in the unlikely case that SBC declines the suggested amendments to the traffic conditions. Should the revised conditions be accepted, the change in flows along this part of Farnham Road would be less than shown, which would reduce the predicted effect on noise from that described above. Flows would be predicted to increase slightly along Fairlie Road, as shown by the Sensitivity Testing in Section 7.5, Chapter 7: Traffic and Transport, however as discussed above there are not currently any sensitive residential properties along this road that would require further consideration.

9.5.48. No mitigation is therefore considered necessary to minimise the effect of operational road traffic noise during the day-time.

9.5.49. Deliveries during night-time (23:00 to 07:00) are also scheduled. Planning conditions for the SHP site allow three delivery routes to be used for HGV vehicles (as illustrated in Figure 7-2, Chapter 7: Traffic and Transport of this ES), which are:

- Route 1 – Farnham Road from either the M40 or Junction 6 of the M4, then arriving via Edinburgh Avenue or Buckingham Avenue.

- Route 2 – Junction 6 of the M4, using Tuns Lane and Leigh Road (via Bath Road), then either Edinburgh Avenue (via Liverpool Road) or Buckingham Avenue; or Junction 7 of the M4 using the A4 Bath Road, then Leigh Road, and either Edinburgh Avenue (via Liverpool Road) or Buckingham Avenue.
- Route 3 – Junction 7 of the M4, using the A4 Bath Road, then Dover Road and either Buckingham Avenue or Edinburgh Avenue (via Fairlie Road).

9.5.50. Night-time deliveries are currently restricted by SBC to a maximum of 3 HGV deliveries per hour at the SHP site, with no HGV traffic using Junction 7 of the M4 (i.e. Route 3 and part of Route 2, west of Dover Road) during these hours (23:00 to 07:00). This is a result of a 2005 Noise Assessment for the SHP site (Ref. 9-13), which concluded that greater delivery numbers could cause adverse noise effects on local residents.

9.5.51. Table 9-20 presents the baseline night-time (23:00 to 07:00) average hourly road traffic flows on road links that will be affected by HGV delivery traffic, along with the corresponding LA10,1h noise levels (calculated using equation hourly BNL calculation methodology from CRTN (Ref. 9-10)). The road traffic flows for each road link have been averaged using road traffic data logged by a series of Automatic Traffic Counts (ATCs) carried out from 06 December 2013 to 12 December 2013 at the following locations:

1. Farnham Road, just north of the roundabout with Northborough Road;
2. Bath Road, between Cippenham Lane and Elmshott Lane;
3. Tuns Lane, between Bath Road and Junction 6 of the M4.

9.5.52. Additional road traffic data was collected at a fourth location to support this assessment, and was collected as part of the baseline road traffic flow data used for the transport assessment in *Chapter 7: Traffic and Transport* of this ES. The road traffic flows were collected over a period of one week commencing on 8th June 2013 at the following location:

4. Farnham Road, just south of Buckingham Avenue junction.

Table 9-20 Baseline Night-time Road Traffic Noise

Road Link and Location of ATCs	Baseline Night-time (23:00 to 07:00)		dB LA10,1h
	Average Hourly Traffic Flow	HGV%	
Farnham Road (north of the roundabout with Northborough Road)	153	13.7%	64.9
Farnham Road South (south of junction with Buckingham Avenue)	376	1.83%	65.7
A4 Bath Road (between Cippenham Lane and Elmshott Lane)	171	12.9%	65.2
Tuns Lane (between Bath Road and Junction 6, M4)	635	12.9%	70.9

9.5.53. A negligible noise effect is considered to occur when the noise level increases by no greater than 1 dB(A) and a significant noise effect (i.e. moderate adverse or worse) is considered to occur when the noise level increases by greater than 3 dB(A).

9.5.54. The number of HGVs travelling along the affected road links will increase as a result of the Proposed Development. Table 9-21 presents the maximum number of HGV movements per hour along each road link that are predicted to result in negligible and minor adverse changes in noise level along these roads, as determined using the BNL calculation methodology.

Table 9-21 Thresholds for Negligible and Minor Effects during Night-time Deliveries

Road Link	Maximum Number of HGV Two-Way Movements per Hour for Negligible Noise Effect	Maximum Number of HGV Two-Way Movements per Hour for Minor Adverse Noise Effect
Farnham Road (north of the roundabout with Northborough Road)	8	31
Farnham Road South (south of junction with Buckingham Avenue)	16	40
A4 Bath Road	8	34
Tuns Lane	30	127

9.5.55. The two sections of Farnham Road (north and south of the Buckingham Avenue junction) are linked and so may be expected to have similar night-time hourly average road traffic flows. However, the difference in road traffic flows indicates how the hourly average flows may change during different nights. This may bring a degree of uncertainty into the assessment so, to ensure a robust assessment methodology is applied, the lowest number of HGV movements that result in significant changes in noise level on Farnham Road have been considered.

9.5.56. The lowest threshold of 31 HGV movements per hour (identified on Farnham Road north) should be used to limit HGV movements from/towards Junction 6 of the M4, to ensure that the noise effect of additional HGV movements is not significant. As each HGV will use the road twice (arriving and leaving), the number of deliveries from the Proposed Development along Farnham Road should be restricted to 15 per hour during night-time hours, which will result in a total of 30 two-way HGV movements per hour.

9.5.57. The 2005 noise assessment identified Routes 2 and 3 (west of Dover Road to/from Junction 7 of the M4) as not being suitable for night-time deliveries due to potential noise effects at noise sensitive receptors along the A4 Bath Road and the road connecting the A4 and Junction 7 of the M4. Road traffic surveys have indicated that there are higher road traffic flows on the Route 2 and 3 road links currently than on Farnham Road (Route 1). Hence, the implementation of a 15 HGV per hour limit across the local road network is expected to avoid significant noise effects, and would result in an effect of, at worst, minor adverse significance.

9.5.58. This amends the findings of the 2005 noise assessment for the SHP site, which concluded that no night-time HGV deliveries should be allowed to travel west of Dover Road to/from Junction 7 of the M4; this is primarily due to the updated methodology used, more recent baseline traffic flows, and amended criterion for assessing road traffic.

9.5.59. Based on these findings the Applicant proposes that, for the 8 hour night-time period (23:00 to 07:00), HGV deliveries to the SHP site will be restricted to a maximum of 8 deliveries in any one hour on any designated route (except Route 1 from Junction 2 of the M40 which remains restricted to 3 per hour maximum) to the SHP site. The effect of the above can be summarised as follows:

- A maximum of 8 deliveries per hour combined over all routes to the SHP site during the night-time period. This is expected to create a minor adverse effect on routes 2 and 3 during any night time hours when the average number of deliveries exceeds 4. However, it complies with the threshold for moderate adverse effects and is therefore not expected to lead to a significant effect at any residential dwellings;
- A maximum of 3 HGV deliveries per hour arriving from the M40 using Route 1, maintaining the current limit along this route, and achieving a negligible effect on noise levels at receptors in proximity to this road link; and
- The HGV deliveries to the SHP site will be restricted to a combined maximum night-time delivery limit to the SHP site of 64 HGVs which is predicted to lead to a negligible effect on average along these road links.

9.5.60. The maximum HGV deliveries of 8 per hour over the night-time period 23:00 to 07:00 is substantially less than the maximum 15 per hour deliveries (rounded down from 31 two-way movements per hour on Farnham Road) that are suggested by the road traffic noise predictions as being acceptable and not causing a significant effect on noise conditions at residential properties along the Farnham Road and Bath Road (Routes 1 and 2).

9.5.1. Minor adverse noise effects are predicted to occur on Bath Road and Farnham Road when the number of deliveries exceeds 4 per hour. However, this level of traffic flow is unlikely to be sustained over prolonged periods and is not considered significant in terms of the EIA regulations.

9.5.2. Any minor increase in current noise effects are also expected to be offset by the benefits to local air quality identified in *Chapter 8: Air Quality* of this ES, which strives to reduce peak hour travel in the Three Tuns Air Quality Management Area by encouraging more deliveries to occur during the quieter and night-time periods. Thus the maximum limit of 8 HGV deliveries per hour would allow fuel suppliers greater flexibility to maximise night-time deliveries.

9.5.3. It is therefore considered that night-time noise effects from delivery traffic would be **negligible**, potentially increasing to **minor adverse** at some residential properties during the busier night-time periods.

9.6. Residual Effects and Conclusions

9.6.1. Table 9-22 summarises the identified residual effects, which range from negligible to minor adverse during the demolition/construction period and operational phase of the Proposed Development.

9.6.2. Noise effects during the demolition/construction phase differ from the operational phase of the Proposed Development due to demolition/construction noise and operational noise having differing permissible noise emission limits, primarily due to the temporary nature of construction activities. Higher noise limits are applied to activities that are temporary such as demolition and construction.

Table 9-22 Summary of Residual Effects

Description	Nature of Effect	Geographic Scale	Significance
Demolition and Construction Phase			
Demolition/ construction Noise	Under typical operating scenarios, effects ranging from negligible to minor adverse are predicted at nearby noise sensitive receptors; mitigation measures advised to employ “best practicable means” to ensure that noise effects are minimised.	Local	Negligible to Minor Adverse, Short-Term
Demolition/ construction Vibration	Under typical operating scenarios negligible effects are predicted at nearby sensitive receptors.	Local	Negligible, Short-Term
Demolition/ construction Traffic Noise	Demolition/ construction traffic noise is predicted to have a negligible effect.	Local, District	Negligible, Short-Term
Operational Phase			
Daytime Operational Traffic noise	Operational traffic noise is predicted to have a negligible effect.	Local, District	Negligible, Permanent
Night-time Operational Traffic noise	HGV deliveries restricted to 8 per hour at night.	Local, District	Negligible to Minor-Adverse, Permanent
Operational Noise	A suitable noise limit is defined to control noise to within acceptable criteria (see paragraph 9.5.39).	Local	Minor Adverse, Permanent

9.7. Cumulative Effects

9.7.1. This section summarises the effect of the Proposed Development in addition to that of other nearby developments that may have a cumulative effect on the surrounding area. The following schemes identified in *Chapter 2: Assessment Methodology* are in proximity to the Proposed Development and have the potential to lead to cumulative noise effects at the identified sensitive receptors:

- Leigh Road/Bath Road, Slough Trading Estate – redevelopment of Leigh Road/Bath Road.
- 1 ha of land in the southeast / northwest of the SHP Site - a separate planning application by the Applicant to SBC for Further Development, to include a Central Services Control Building and Water Treatment Plant. It is anticipated that this planning application will run in parallel with, and be submitted at a similar time to, the application for the Proposed Development.
- Britwell Regeneration – mixed use development at 2A Kennedy park and 2B Wentworth Avenue/Marunden Green.

9.7.2. It is considered that the demolition and construction phase of the Proposed Development will have the greatest potential to contribute to cumulative noise effects with the other potential developments.

9.7.3. Additional noise effects may result at the identified receptors should demolition and construction works take place simultaneously at both the Proposed Development and the developments identified above. The precise scale of additional noise effects will be dependent on the exact works taking place at each location; however the introduction of site hoardings and compliance with the mitigation measures detailed within this chapter, and any further measures identified during preparation of the CEMP will help to reduce these effects as far as possible. It has been assumed that the other developments will also incorporate best available mitigation measures during their demolition and construction phases which will also assist in reducing the cumulative effects from concurrent construction of the developments.

9.7.4. It is not unusual for demolition and construction to take place on more than one site in close proximity to each other, and the contractor will undertake regular liaison meetings and reviews with neighbouring sites to plan works so that they do not cause unnecessary/excessive disruption. The contractors will also liaise with SBC in order to establish working guidelines in order to reduce the effects of cumulative demolition and construction works noise, as well as to establish a traffic management plan with SEGRO in order to reduce the effects of cumulative construction traffic noise along surrounding roads.

9.7.5. It is expected that noise from plant and building services at each of the developments will be designed to achieve operational noise limits at the nearest noise sensitive receptor to each development. This is relevant for developments that have different noise sensitive receptors to the Proposed Development (Leigh Road/Bath Road and Britwell Regeneration) and developments that share noise sensitive receptors with the Proposed Development (land in south-east and north-west of SHP site). Additional care should be taken for developments that share noise sensitive receptors with the Proposed Development to prevent background noise levels increasing due to cumulative developments.

9.7.6. Changes in road traffic flows due to the Proposed Development are predicted to result in a negligible increase in road traffic. For road traffic effects to increase to minor adverse, road traffic flows would have to increase by an AAWT of 1500 (equivalent to an increase of 25% on Edinburgh Avenue for example, and a corresponding increase in noise of 1 dB). It is considered that cumulative developments are not of sufficient scale to result in such increase in road traffic. Consequently, cumulative road traffic effects are predicted to be **negligible**.

9.7.7. The new Leigh Road Bridge (due for completion in 2015) may lead to SHP deliveries approaching from the M4 preferring to use Bath Road and Leigh Road to approach the site rather than Farnham Road (north of the Three Tuns junction), resulting in a beneficial change in noise level at receptors on Farnham Road. Given the current traffic flows along Bath Road and predicted traffic generation associated with the Proposed Development, which is easily less than 1500 AAWT, it is not expected that this would cause a minor adverse effect on noise levels at residential properties along this road.

9.8. References

Ref. 9-1 Department for Communities and Local Government (DCLG), 2012; National Planning Policy Framework.

Ref. 9-2 The Environmental Agency, 2010; Environmental Permitting Regulations 2010 (PPC Regulations)

Ref. 9-3 Slough Borough Council, 2008, Slough Local Development Framework, Core Strategy 2006-2026, Development Plan Document

Ref. 9-4 BSI, 2008; BS 6472 - Guide to Evaluation of Human Exposure to Vibration in Buildings, BSi, London.

Ref. 9-5 BSI, 2009; BS 5228 - Noise and Vibration Control on Construction and Open Proposed Developments, BSi, London.

Ref. 9-6 BSI, 1990; BS 7385 - Evaluation and Measurement from Vibration in Buildings, BSi, London.

Ref. 9-7 British Standards Institution (BSI), 1997; B4142 - Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas, BSi, London.

Ref. 9-8 Her Majesty's Stationery Office (HMSO), 1974; Section 72 of the Control of Pollution Act.

Ref. 9-9 Department of the Environment (DoE), 1976; Noise control on building sites. Advisory Leaflet 72, 3rd Edition. London: HMSO, 1976. ISBN 0 11 670664 3.

Ref. 9-10 Department of Transport/Welsh Office, (1998); Calculation of Road Traffic Noise.

Ref. 9-11 The Highways Agency 'Design Manual for Road and Bridges Volume 11 Section 3 Part 7-Traffic Noise and Vibration' (DMRB)

Ref. 9-12 Slough Borough Council Application No. P/00987/013.

Ref. 9-13 Peter Brett Associates (2005) Slough Heat and Power, Noise Assessment Report

10. GROUND CONDITIONS

10.1. Introduction

10.1.1. This chapter of the ES addresses the potential effects of the Proposed Development on the existing ground conditions and hydrogeology of the Proposed Development Site and surrounding area. Consideration of effects associated with potentially contaminated soils and groundwater is made in the context of existing site conditions, construction works, and following completion of the Proposed Development. The need for mitigation measures is discussed and potential residual effects identified.

10.1.2. A Landmark Envirocheck® Report (Ref. 10-1) was commissioned to evaluate the regional presence of water abstractions and potentially contaminative land uses. In addition, a variety of data sources were consulted, such as published maps, reference materials and historical Ordnance Survey (OS) maps, as well as historical reports relating to site ground conditions, namely:

- Ground Explorations Limited (February 1998) Slough Heat and Power Limited CHP Energy Recovery Project, Section 12, Appendix 1, Geo-Technical Report; and
- WSP Environmental (2012) SSE Silo – Slough Heat and Power, Intrusive Site Investigation and Geotechnical Assessment.

10.1.3. All data sources are referenced as relevant in the following sections.

10.2. Legislation and Planning Policy Context

10.2.1. Redevelopment of brownfield land must take into account the regulatory context of the work, provide information that is appropriate for development, and be in accordance with UK good practice. An environmental assessment of the condition of the Site must not only consider the potential receptors of human health and controlled waters, but also include a review of the relevant legislation and planning policy that applies to the Site and its immediate environs.

10.2.2. There are three key legislative drivers for dealing with the risks posed to human health and the environment associated with historic land contamination, namely:

- Part IIA of the Environmental Protection Act, 1990 (the 'contaminated land' regime) (Part IIA) (Ref. 10-2);
- The Water Resources Act, 1991 (Ref. 10-3); and
- The Town and Country Planning Act, 1990 (Ref. 10-4).

10.2.3. In the UK, Part IIA of the Environmental Protection Act, as introduced by Section 57 of the Environment Act 1995 (Ref. 10-5), provides the legislative framework within which site data is to be assessed. Under Part IIA, sites are identified as 'contaminated land' if they are causing significant harm, or if there is a significant possibility of harm to people or the environment, or if the site is causing, or could cause, pollution of protected waters (Controlled Waters). Part IIA powers will not typically be used in an instance where remediation will be achieved through alternate means, including land development.

10.2.4. Under the Water Resources Act, Controlled Waters are defined as including both surface waters and groundwater. Once a site is classified as 'contaminated land' then remediation is required to render significant pollutant linkages (i.e. the source-pathway-receptor relationships that are associated with significant harm and/or pollution of Controlled Waters) insignificant, subject to a test of reasonableness.

10.2.5. The Building Act, 1984 (Ref. 10-6) is supported by the Building Regulations (2000) (Ref. 10-7), which contain detailed information regarding the preparation of a site for redevelopment and resistance to contaminants.

National Planning Policy and Guidance

10.2.6. The National Planning Policy Framework (NPPF) (Ref. 10-10) identifies land contamination as a material consideration in the planning process and notes that decisions by Local Planning Authorities should ensure the site is suitable for its intended use and adequate baseline information is provided.

10.2.7. To prevent unacceptable risks from pollution (and land instability), where a site is affected by contamination, responsibility for securing a safe development rests with the developer and/or landowner. When making a planning decision, the site should be suitable for its new use. Local planning authorities should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes.

10.2.8. The Environment Agency (EA) provides generic guidance on the management of land contamination in document '*GPLC1 – Guiding Principles for Land Contamination'* (Ref. 10-11). The EA also acts as a statutory consultee to developments requiring an EIA. The EAs primary concern in the management of contaminated land through the planning regime is in respect of the protection of the water environment.

Local Planning Policy

10.2.9. Core Policy 8 (Sustainability and the Environment) of the SBC's Core Strategy Document (Ref. 10-12) states that development shall not "*cause contamination or deterioration in land, soil or water quality"* nor shall development occur on polluted land unless appropriate mitigation measures are employed.

10.2.10. Further information on planning policy is presented in *Chapter 3: Planning Policy Context*.

10.3. Assessment Methodology and Significance Criteria

10.3.1. A qualitative assessment of potential effects has been carried out using the significance criteria outlined in Table 10-1.

Table 10-1 Effect Significance Criteria

Category	Scale
Effect	Beneficial, Negligible or Adverse
Significance	Minor, Moderate or Major
Time-scale	Short-term, Medium-term or Long-term
Permanence	Reversible or Permanent
Receptor Level	Local, District, Regional, National, International

10.3.2. These definitions of effect significance take into account the large body of technical guidance that has been produced in the UK for the assessment of ground conditions by the Department of Environment, Food and Rural Affairs (DEFRA and its predecessor departments) and agencies such as the EA. The following documents are considered to be central to the classification of effect significance:

- Part IIA of the Environmental Protection Act 1990;
- Town and Country Planning Act (1990); and
- Contaminated Land Report (CLR) 11 (Ref. 10-14).

10.3.3. In summary, the guidance provides for staged and risk-based data interpretation. This commences with the application of generic risk assessment criteria (which are conservative in nature) and may proceed to development (i.e. calculation) of site-specific criteria. The former are set to ensure that, if they are not exceeded, it is extremely unlikely that relevant receptors will be exposed to significant levels of risk. In cases where they are exceeded, it is appropriate to undertake further assessment, which may include additional data collection and site-specific risk assessment, to determine the need for further action.

10.3.4. An assessment of the significance of the Proposed Development on ground conditions has been made by comparing the existing ground (and groundwater) conditions with the condition of these media post-construction. The definition of **minor**, **moderate** and **major** significance is subjective for effects to ground conditions; however, comment is made in the context of the guidance and legislation described above. The following definitions have been adhered to throughout this assessment:

- **Major**: A major effect is defined as an identified significant effect at the point of exposure for a specific receptor (i.e. significant harm is being caused, or there is a high risk of significant harm being caused to a specific receptor);
- **Moderate**: A moderate effect is defined as one that results in the condition of the soil and/or groundwater being changed resulting in a medium risk to an identified receptor as defined under Part IIA; and
- **Minor**: A minor effect is defined as a degree of change to the condition of soil and/or groundwater that does not inflict risk to a specific receptor.

10.3.5. In addition, the above significance definitions can be **Adverse** or **Beneficial**. Effects are also described as being **negligible** in nature where the change is expected to be imperceptible.

10.3.6. Baseline information has been obtained in order to assess the likelihood of finding contamination and its potential nature and extent; to evaluate the environmental setting of the Proposed Development Site and identify sensitive receptors; and to identify likely contaminant-pathway-receptor relationships.

10.3.7. This has been undertaken through documentary research of the site history, geology, hydrogeology and hydrology, and review of a commercially available regulatory database. The assessment has involved a review of the following data sources:

- Historical and recent Ordnance Survey maps (provided in the Landmark Envirocheck® Report); and
- The Landmark Envirocheck® Report.

10.3.8. This information has then been used to formulate a Conceptual Site Model to allow an assessment of potential environmental risks.

10.3.9. The above information has been synthesised, in order to characterise the baseline conditions of the Proposed Development Site.

10.4. Baseline Conditions

10.4.1. The Proposed Development Site is approximately 1.9ha and is located within the Slough Heat and Power (SHP) site. Further details of the existing features of the Proposed Development Site are provided in *Chapter 4: Site Description, Alternatives and Design Evolution* of this ES.

Geology

10.4.2. A review of the Envirocheck Geology report for the area was used to assess the likely nature of the geological sequence beneath the Site. Publicly available geological records indicate that the following material is present beneath the Site. No Made Ground is indicated to be present beneath the Site on published geological records:

- The superficial geology of the Site consists of The Langley Silt member which comprises of silts of Devensian in age;
- The Langley Silt overlies clays, sands and gravels of the Palaeocene age Lambeth group;
- The bedrock in the area is indicated to comprise Chalk of the Seaford Chalk Formation and Newhaven Chalk Formation, comprising chalk with flints and discrete marl seams, nodular chalk, sponge-rich and with flint seams throughout.

10.4.3. Publicly available borehole records were accessed via the British Geological Survey (BGS) online borehole viewer. Three boreholes were listed:

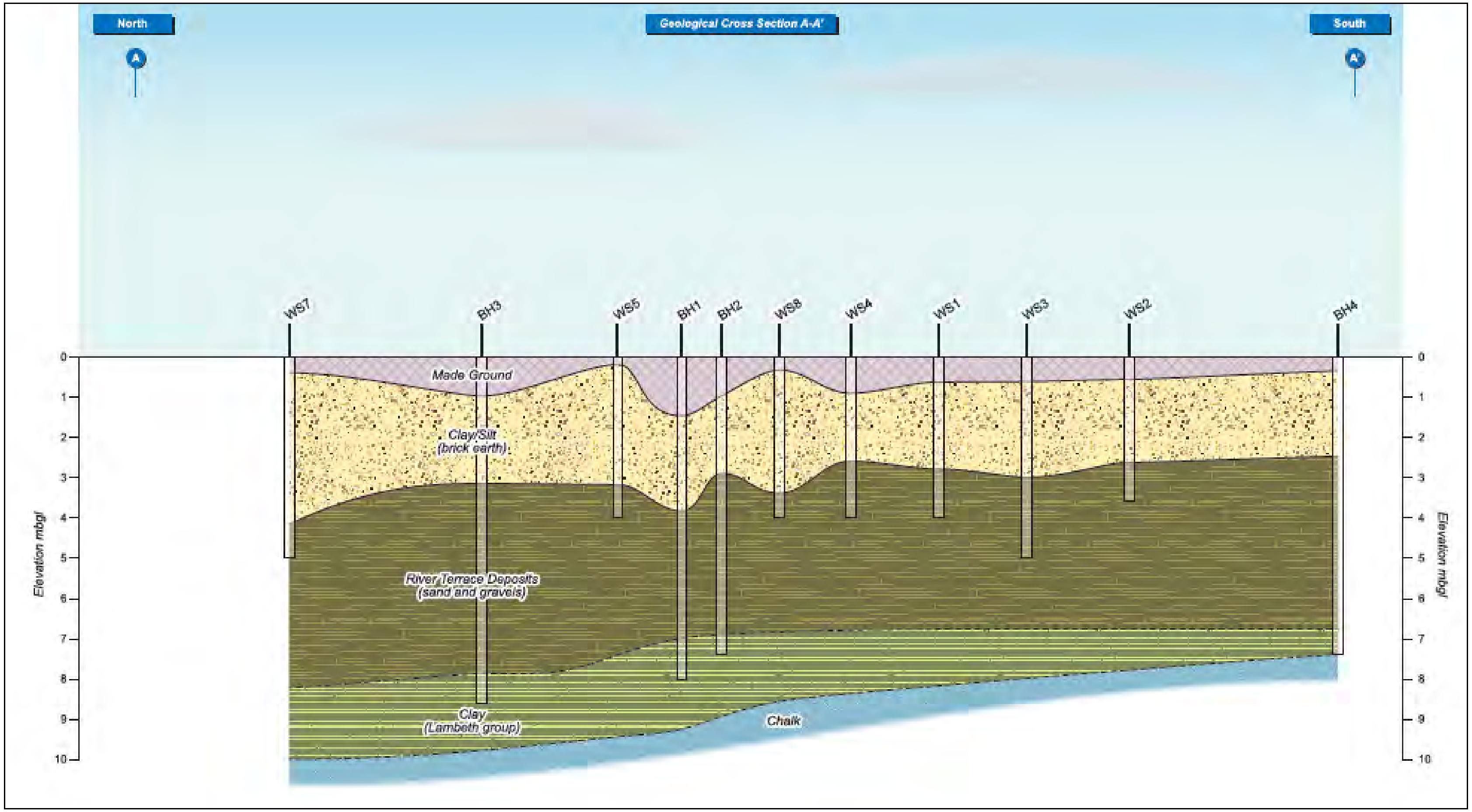
- Reference SU98SE57: located close to Greenock Road and in the southern part of the Site;
- Reference SU98SE56 located close to the southeastern perimeter of the Site; and
- Reference SU98SE53 located approximately centrally in the portion of the Site located south of Edinburgh Avenue.

10.4.4. All three boreholes are likely to have been constructed as abstraction wells or in support of the development of a groundwater abstraction. These onsite boreholes are no longer in use at the SHP site.

10.4.5. The available logs indicate the superficial deposits in the vicinity of the Proposed Development largely comprise interbedded Clay, Sand and Gravel of Flint. These deposits are recorded on the borehole logs as '*drift and Reading Beds*', a unit of the Lambeth Group. Chalk bedrock, where encountered, is indicated to be present at between 7.7m and 8.84m below ground level (bgl). The base of the Chalk has been proven in one hole in the southern portion of the Site at a depth of 220m bgl, overlying units of Marl, Sandstone, Gault and Greensand.

10.4.6. Figure 10-1 to Figure 10-3 present generalised cross-sections of the geology and soils in the area surrounding the Proposed Development Site, based on publically available information and records of previous site investigation works available to URS at the time of writing. The figures below show that locally there are variations in the geology and soils that surround the Proposed Development Site and this can be seen where the chalk depth varies. A discussion of potential pollution pathways from the Proposed Development is discussed in Section 10.5 of this chapter.

Figure 10-1 A Cross Section of Local Ground Conditions near the Proposed Development Site



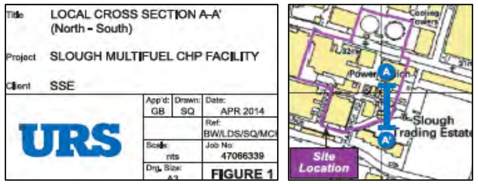


Figure 10-2 A Cross Section of Local Ground Conditions near the Proposed Development Site

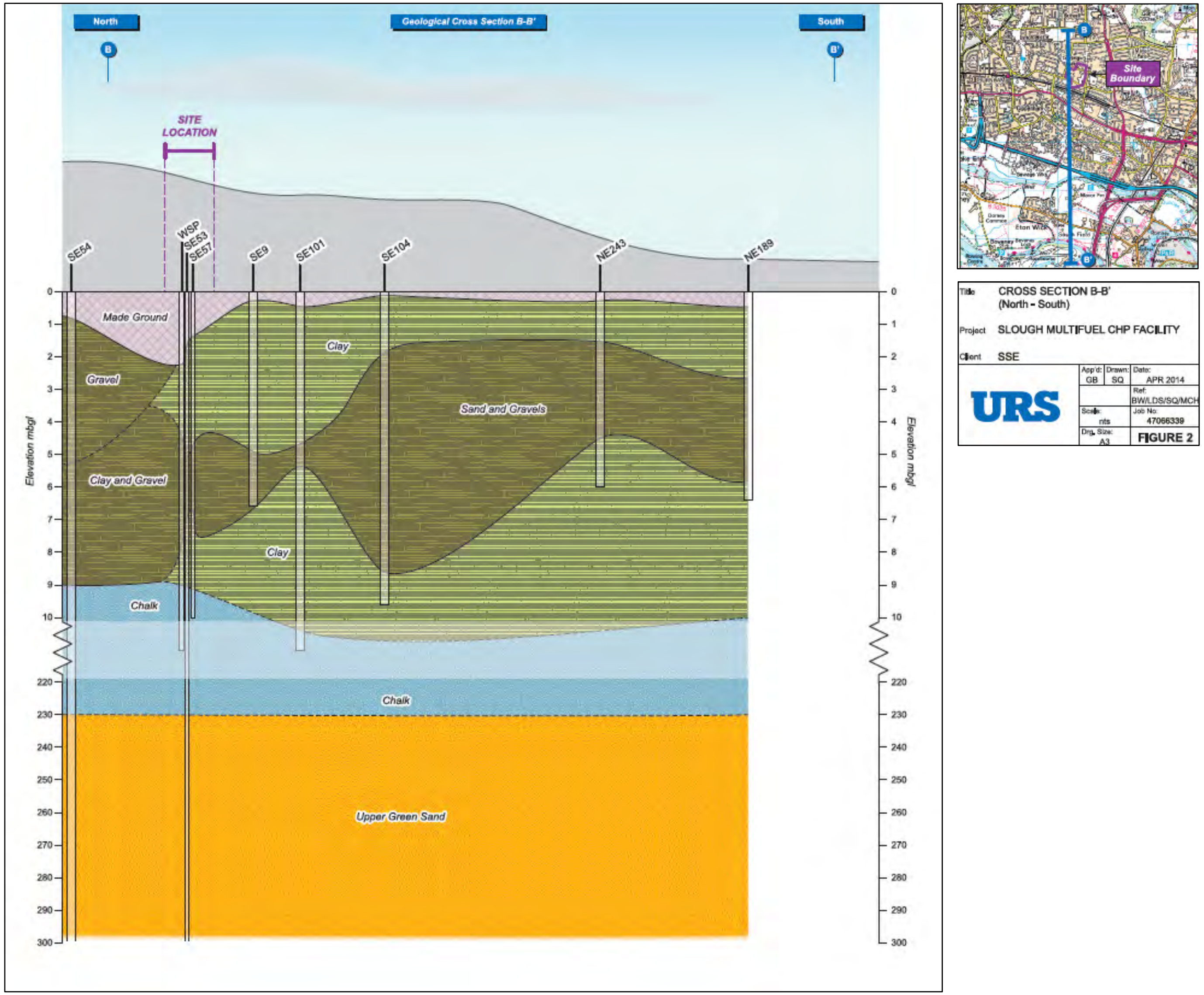
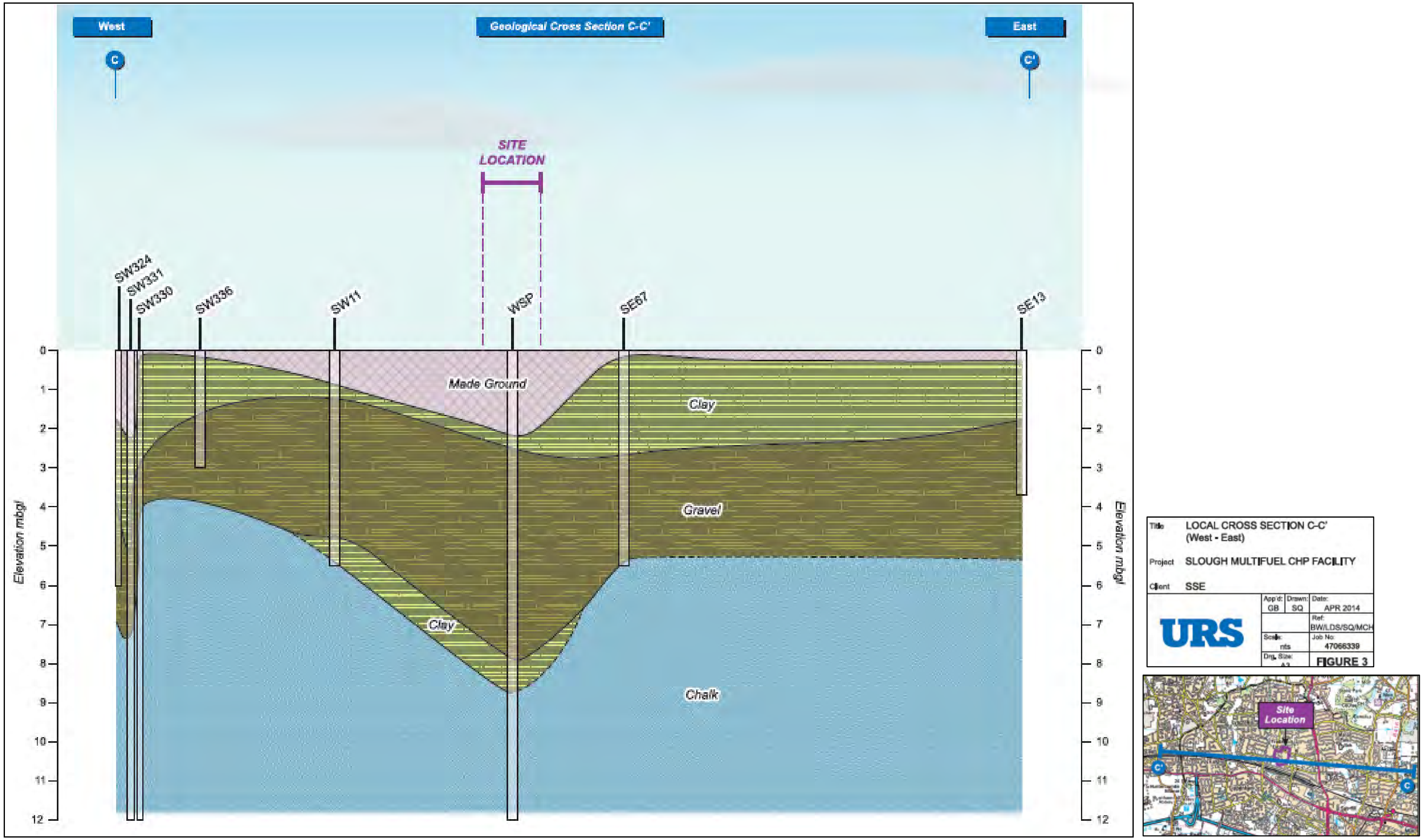


Figure 10-3 A Cross Section of Local Ground Conditions near the Proposed Development Site



Hydrogeology and Hydrology

10.4.7. The nearest surface water courses to the Site comprise two streams, one located approximately 1.2km to the west of the Site, named Chalvey Brook, and the other located approximately 1.1km to the east of the Site named Salt Hill Stream. Both streams run along an approximate north-south orientation before finally reaching the River Thames. The River Thames is located 4.1km south of the Site and flows in a broadly easterly direction.

10.4.8. Further information on the Site's hydrological setting is provided in *Chapter 11: Water Resources, Drainage and Flood Risk* of this ES.

10.4.9. Hydrogeological mapping of the Site and surrounding area (Ref. 10-15) indicates that the superficial deposits underlying the Site comprise units defined as a moderately productive aquifer with intergranular flow defined as the primary flow mechanism. The underlying chalk is defined as a highly productive aquifer with flow primarily through fractures and other discontinuities.

10.4.10. Resting water levels as indicated on available borehole records lie between 4.1m and 4.7m below ground level (bgl). Published hydrogeological mapping for the area (BGS Hydrogeology Map Sheet 14: Hydrogeological Map of the Area Between Cambridge and Maidenhead (1:100,000) – 1984) indicates regional groundwater flow in the area to be in a broadly south south-easterly direction. Regional groundwater elevation in the vicinity of the Site is indicated to lie between 20m and 30m above ordnance datum (AOD), approximately equivalent to between 2m and 12m bgl. Indicative groundwater elevations are dated 'autumn 1976'.

10.4.11. The River Terrace Deposits in the area of the Site, as shown on mapping presented within the Envirocheck Report for the Site (Ref. 10-1), are defined as a Secondary A aquifer. Secondary A aquifers are *"permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers"*.

10.4.12. The Chalk bedrock underlying the site is classed as a Principal aquifer. Principal aquifers are defined as *"layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer"*.

10.4.13. It is considered that the underlying Secondary A Aquifer of the River Terrace Deposits and the Principal Aquifer of the Chalk are likely to be in hydraulic continuity, with impacts to either aquifer having the potential to impact the other. This is based on records from on-site and nearby boreholes showing no laterally continuous aquitard to be present between the two units.

10.4.14. The area surrounding the Site has a groundwater vulnerability zone classification of 'major aquifer high'. Major aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability meaning they usually provide a high level of water storage, supply and/or river base flow on a strategic scale.

10.4.15. Correspondence with the EA confirms the status of the underlying Chalk as a Principal Aquifer.

10.4.16. The Site lies wholly within the total catchment zone (zone 3) of a groundwater source protection zone, which relates to groundwater abstractions located to the southeast and northwest of the Site. The outer zone (zone 2) of the two adjacent abstraction zones lies approximately 200m from the south-eastern Site boundary and 200m from the north-western Site boundary.

10.4.17. It is understood that one or more of the deep boreholes present offsite are used for the abstraction of process water for use in the production of power and steam at the SHP site. It is understood that water is pumped to an adjacent service reservoir from where it is fed to the SHP site. This service reservoir is located approximately 750m northwest of the northern part of the SHP site boundary at Kennedy Park.

10.4.18. It is understood that there is a groundwater testing borehole present on the SHP site immediately to the west of the package boiler and outside of the Proposed Development Site. It is understood that annual water quality testing is undertaken on samples collected from this borehole.

10.4.19. There are no recorded licensed and active surface water abstractions within 1km of the Site and the EA records no surface water quality data for water bodies within 1km of the Site.

10.4.20. Based on the information detailed in this section, with regard to the geology and the use of groundwater locally for industrial activities, the Site is considered to be of high environmental sensitivity.

Unexploded Ordnance

10.4.21. Given the historical industrial nature of the SHP site and surrounding area the potential for unexploded ordnance (UXO) to be present in the sub-surface at the Site cannot be discounted. Although it is highly unlikely, given the disturbed nature of the Site and past development, the contractor may consider the need for a UXO assessment of the Site prior to the commencement of groundwork's at the Site.

Radon

10.4.22. The BGS National Geoscience Information Service indicates that the Site is not in a radon affected area, as less than 1% of homes are above the action level.

Site History and Contaminated Land Potential

The Proposed Development Site

10.4.23. A review of historical mapping of the Site and surrounding area contained within The Landmark Envirocheck® Report, dating to 1876, has been undertaken. Development of the Site is first recorded on mapping dated to 1924, with mixed industrial uses indicated across the SHP site area.

10.4.24. Labelled developments include 'Electricity Works' in the central part of the Site, 'Razor Factory' in the southern part of the Site and 'Jam Factory' in the western part of the Site. Additionally, railway sidings are shown running in a broad east to west orientation through the southern part of the Site. The industrial usage of the Site continues to the present day, with some changes indicated in the uses of some of the buildings located on site. These changes include the change in use of 'Razor Factory' to 'Confectionary Works' and subsequently 'Rubber Works', and the change in use of the 'Jam Factory' to a 'Surgical Dressing Works' to variously a 'Surgical Dressing Works', 'Hosiery Works', 'Engineering Works', 'Pharmaceutical Factory' and a 'Sweet Factory'. The central area of the Site has remained as either an 'Electricity Works' or 'Power Station' since the initial site development. The latest map showing railway sidings running through the Site is dated 1975 (these have since been removed).

10.4.25. Based on the outline of site use and an evaluation of the risk of such land uses, there is moderate potential for ground contamination given the nature of the former land use.

10.4.26. No information on previous ground gas monitoring at the site is available. However, given the nature of the anticipated geology, and the historical land use at the SHP site and in the surrounding area there is considered to be a negligible potential for there to be adverse effects from ground gas at the Site.

Surrounding Area

10.4.27. Early mapping of the area surrounding the Site indicates that the area was formerly agricultural land with very limited development. The Great Western Railway is indicated running approximately 250m south of the Site and following a broadly south-easterly to westerly course.

10.4.28. Between 1924 and the present day the areas to the east, south and west of the Site have been developed for a variety of industrial uses, including various food manufacturing and processing facilities, 'Motor Works', 'Cabinet Works' and 'Cable & Rubber Works'. The area to the north of the Site is shown as being developed for various industrial uses from 1956 onwards, including 'Gasket Works', 'Engineering Works', 'Coal Yard', 'Cannery' and 'Foundry'.

10.4.29. Based on this risk outline, there is the potential for contamination from surrounding land uses of major significance that could have an adverse effect on environmental receptors.

Previous Investigations

Draft Report No: 97160, Geo-Technical Report. Ground Explorations Limited – February 1998

10.4.30. Ground Explorations Limited undertook site investigation works at the SHP site. The purpose of the work was to determine ground conditions and provide recommendations concerning foundation design and geotechnical support for proposed on-site construction works. The work comprised the drilling of four cable percussion boreholes to a maximum depth of 25m bgl, with in-situ and laboratory geotechnical testing, and some limited contamination testing.

10.4.31. Reported ground conditions were generally consistent with that made available from public records, with the exception of the presence of Made Ground at all investigation locations. Made Ground comprised reinforced concrete overlying fill material up to a depth of 0.5m and comprising dark brown silty fine to coarse sand with some flint and slag gravel.

10.4.32. River Brickearth was encountered underlying the Made Ground, comprising 'soft to firm brown or orange brown silty sandy clay with varying proportions of flint gravel'. The maximum recorded depth of River Brickearth was 3.9m bgl.

10.4.33. River Terrace Gravels of brown sandy fine to coarse angular to sub-angular flint gravel was present beneath the River Brickearth to a maximum depth of 8.2m bgl.

10.4.34. All boreholes were terminated in the Upper Chalk. Given the drilling method employed, detailed rock descriptions were not possible for the recovered material. Occasional flint gravel was recorded in the Chalk.

10.4.35. Groundwater seepages were recorded in the River Terrace Gravels at depths of between 5m and 6.5m, rising to a maximum height of 4.2m bgl. Seepage was recorded in the Chalk at 9.5m bgl in one borehole.

10.4.36. The report did not identify any significant ground issues in respect of geotechnical or contamination constraints to the development that was being proposed at the time of the report production.

Phase II Environmental Assessment – Scottish & Southern Energy Former Tank Farm: WSP Environment & Energy UK. December 2009

10.4.37. WSP Environment & Energy UK (WSP) undertook the drilling of eight boreholes inside and outside of the former tank bund area within the former tank farm area of the SHP site. The investigation comprised the drilling of 8 dynamic sample boreholes to a maximum depth of 5.0m bgl and 4 rotary auger boreholes to a maximum depth of 8.2m bgl.

10.4.38. Ground conditions were generally consistent with those detailed in the Ground Explorations Limited report and published geology.

10.4.39. Made Ground was present to a maximum depth of 1.5m bgl, comprising of a mixture of fill materials, including clinker, chalk, flint and concrete.

10.4.40. Brickearth deposits comprising silty Clay to sandy Silt were recorded to a depth of 3.0m bgl, with encountered thickness ranging between 0.2 and 1.5m.

10.4.41. River Terrace Deposits comprising a mix of cohesive and granular Clay and Sand deposits were present, to a minimum depth of 5.8m bgl, with the unit base not determined in nine of the holes drilled.

10.4.42. Lambeth Group deposits were encountered in three of the investigation locations and were noted to generally comprise of silty Clay. The base of the unit was proved at 6.8m bgl in BH4 (see Figure 10-1), with the base not proven in the other two locations at which it was encountered. The Upper Chalk was encountered in one borehole (BH4) at a depth of 6.8m bgl.

10.4.43. During drilling works water strikes were recorded in two drilling locations (BH1 and BH3) within the granular component of the River Terrace Deposits at a depth of approximately 5.5m bgl. Standing water was encountered in all wells installed within the River Terrace Deposits during subsequent monitoring. Analysis of encountered groundwater levels indicates a direction of groundwater flow in a west/north-west direction.

10.4.44. Observations of ground contamination recorded during site investigation works predominantly focussed on the presence of black staining and hydrocarbon type odours in the Made Ground. Visual and olfactory indications of hydrocarbon contamination within the natural ground were noted only in BH1 to a maximum depth of 4.4m bgl.

10.4.45. Analytical results from the chemical testing of soil and groundwater samples collected during the investigation works indicated the presence of hydrocarbon contamination in a number of soil samples obtained from both the Made Ground and natural strata. No recorded concentrations were in excess of the assessment screening criteria used by WSP, protective of an industrial/commercial end use.

10.4.46. One groundwater sample recorded concentrations of total petroleum hydrocarbons (TPH) compounds above the relevant method detection limit (BH1, TPH Aromatic >C12-C16 at 14 ug/L). The reported concentration was below the site screening criteria employed by WSP.

10.4.47. Gas monitoring of the installed boreholes generally indicated no significant ground gas issue, with the exception of elevated methane concentrations in BH1 (maximum of 14.5%). It should be noted that monitoring was undertaken at an atmospheric pressure ranging from 1011 to 1013 millibar and rising, thus the assessment of ground gas is unlikely to be indicative of a worst case scenario.

SSE Silo – Slough Heat and Power – Intrusive Site Investigation and Geotechnical Assessment: WSP Environmental. January 2012

10.4.48. WSP Environmental (WSP) undertook the drilling of one borehole in the northern part of the Site to a depth of 25m bgl, along with in-situ and ex-situ geotechnical testing and soil chemical testing. The purpose of the investigation was to provide information in support of the proposed construction of a new storage silo at the SHP site.

10.4.49. Ground conditions encountered were consistent with those reported in the Ground Explorations Limited and previous WSP reports, and published information. The Made Ground comprised hard standing, overlying Made Ground of gravelly fill material. Langley Silt was presented beneath the Made Ground, from depths of between 2.2m to 2.5m bgl, 'comprising soft to firm, orangish brown slightly sandy, very gravelly clay with numerous pockets of sandy clay'.

10.4.50. River Terrace Deposits, underlying the Langley Silt, were present to a depth of 8m bgl, comprising 'brown, slightly sandy gravel of fine to coarse, sub-angular to sub-rounded flint. Lambeth Group deposits were recorded underlying the River Terrace Deposits, to a depth of 8.8m bgl. Lambeth Group Deposits comprised 'stiff to very stiff, mottled dark red and orangish brown clay'.

10.4.51. White Chalk was encountered at 8.8m bgl to the base of the hole and was recovered as 'greyish white mottled light orange slightly sandy clayey gravel'. The hole was terminated at 25m bgl in the White Chalk.

10.4.52. Water strikes were encountered in the River Terrace Gravels (depth not determined) and at the top of the Chalk. A standing water level of 4.6m bgl was recorded upon monitoring of the installed well.

10.4.53. The results of chemical testing of recovered soil samples did not record concentrations of any chemicals in excess of WSP screening values based on an on-going commercial/industrial land use. This is consistent with field observations and the results of field screening utilising a hand held photo-ionisation detector (PID).

10.4.54. No significant geotechnical limitations were noted based on the nature of the development that was being sought at that time, which comprised of a silo.

Potential Pollutant Linkages

10.4.55. In order for an area of potential contamination identified within the confines of the Site to pose a significant level of risk to the Proposed Development or the wider environment, a potential source and sensitive target or receptor has to be identified, together with a plausible and effective pathway by which the receptor may be exposed to any given hazard.

10.4.56. Potential sources that exist on the Site are considered to include the current and historic above ground oil and diesel storage tanks, acid and caustic storage tanks, the Slough south substation, as well as any small-scale storage facilities that exist or have existed within the workshop and stores buildings. Potentially contaminating storage facilities and activities were located on a concrete plinth, or took place over concrete hardstanding. Several of the potentially impacted land areas underwent appropriate testing and remediation following the removal of existing structures, although this process did not occur across all areas where ground contamination may be an issue. Additionally the nature of activities within present and former SHP site buildings and infrastructure may have affected the ground. Contaminants of concern associated with the on-site activities and historic railway line include TPH, polycyclic aromatic hydrocarbons (PAHs) and metals.

10.4.57. Potential pathways are divided into those that may potentially cause a risk to human health and those that may potentially cause a risk to controlled waters. Potential human health pathways include:

- Direct contact with contaminants in shallow soils;
- Direct contact with contaminants in groundwater;
- Inhalation of contaminants from the partitioning of vapours from soil and/or groundwater contamination;
- Vapour migration of volatile compounds or gases through areas of un-surfaced ground or along service ducts to the atmosphere or buildings located nearby; and
- Build-up of vapours in confined spaces, such as poorly ventilated rooms or cellars/basements, if present.

10.4.58. Potential controlled water pathways include:

- Vertical and lateral migration of dissolved phase contaminants from the Made Ground into the underlying deposits; and
- Potentially rapid vertical migration of dissolved phase contaminants through permeable units in the Made Ground and underlying natural strata where un-surfaced areas or poor integrity hard standing exists.

10.4.59. Given the environmental setting of the Site and the nature of the Proposed Development, the following potentially sensitive receptors, or targets, require consideration:

- Future users/occupiers of the Site;
- Workforce on the Proposed Development;
- Secondary A aquifer of River Terrace Deposits beneath the Site; and,
- Chalk Principal aquifer beneath the Site.

10.5. Potential Effects and Mitigation Measures

Demolition and Construction Phase

10.5.1. Pollution sources arising from demolition and construction activities, which could affect soil and groundwater comprise the following:

- The use of liquid fuels such as oils / petrol and/or diesel;
- Generation of construction wastes, including asbestos and asbestos containing material (ACM); and
- An increase in the generation of wastewater.

10.5.2. As discussed in *Chapter 5: The Proposed Development* of this ES, the buildings located on the Proposed Development Site will have already had much of the internal equipment removed from inside leaving only the physical structure of the building remaining. It is understood that some chemical storage remains on-site, including chemical storage associated with the on-site water treatment plant and some diesel storage tanks. It is assumed that the decommissioning of all liquid fuel and chemical storage facilities undertaken to date was completed in accordance with best practice to minimise the potential for release of contamination to ground, and that similar best practice will be employed in future decommissioning works.

10.5.3. The Site is currently occupied by buildings and storage areas associated with the existing SHP site, and therefore hard standing and underground obstructions are likely to be encountered. The presence of underground structures may influence the distribution and migration of any sub-surface contamination present or released to ground during the demolition phase of works.

10.5.4. It is understood that the majority of asbestos containing material (ACM) is in the process of being removed from the Site. However, the potential remains for ACM to remain on-site as part of building fabric after the ACM removal works, where ACM may have been present in inaccessible areas. It is anticipated that material will be inspected and screened for the possible presence of ACM during demolition works. Based on this information the potential for impact from ACM in site buildings is considered to be **negligible**.

10.5.5. Ground investigation and testing works undertaken by WSP in the area of the former tank farm in October 2009 identified the presence of asbestos in the shallow sub-surface as free fibres of chrysotile and crocidolite. Based on the use of appropriate control measures during demolition and construction works, and the retention, where possible, of hardstanding ground cover at the Site, the potential for impact from ACM present in the sub-surface is considered to be **negligible**.

10.5.6. Construction workers will be protected from contact with hazardous materials by adopting appropriate health and safety measures including an assessment of appropriate measures under the Control of Substances Hazardous to Health (COSHH) Regulations (2002). Such measures will include suitable personal protective equipment (PPE), hygiene facilities and the implementation of dust control where considered necessary. With these control measures, the effect associated with hazardous materials is considered to be **negligible**.

10.5.7. The main potential source of oils and diesel on the Site is from plant and machinery. All plant and machinery will be checked regularly and, where necessary, the use of drip trays should be employed. An emergency spillage action plan will be produced and provisions made to contain any leak/spill. Implementation of the above measures will reduce the effect to **negligible**.

10.5.8. Given the historical land use within the Site, there is a potential for contamination to be encountered locally within excavations, particularly in the vicinity of the former tank farm, where previous ground investigation works have identified the presence of some hydrocarbon contamination. No known remediation works have been undertaken in this area of the site. If contamination is identified materials will be stockpiled and subject to chemical testing to determine the most suitable route for re-use, treatment or disposal.

10.5.9. Foundations constructed for the Proposed Development will include the use of piled foundations, anticipated to penetrate into the Chalk bedrock (see Figures 10-1 to 10-3 for details of local ground conditions near the Site). Further information on the possible effects from piling to groundwater quality are detailed in paragraphs 11.5.7 and 11.5.8 of *Chapter 11: Water Resource and Flood Risk* of this ES. Based on the final pile design, and subject to the granting of consent for the development a full piling risk assessment will be undertaken prior to the commencement of intrusive works.

10.5.10. The construction contractor’s compound will require water supply and sewage capabilities. It is anticipated that these will be incorporated into the on-site network. Temporary laydown areas and a contractor’s compound will be required, however it is anticipated that these will be mainly located offsite and will not require earth movement or enabling works (the potential sites are shown in Figure 5-4, *Chapter 5: The Proposed Development* of this ES). Surface water run-off from these areas is considered within *Chapter 11: Water Resources, Drainage and Flood Risk* of this ES.

10.5.11. Construction activities will result in the generation of waste materials that, if not used or recycled, will require off-site disposal to landfill, with associated indirect negative effects on the soils and geology of the landfill area. Such wastes will predominantly be of a domestic nature associated with the construction personnel, with some industrial and construction wastes. In order to minimise this effect, waste will be segregated on site and where possible, reused or recycled. A DCMS and CEMP will be adhered to and this is described in *Chapter 5: The Proposed Development,* along with a framework CEMP presented in Appendix B-1, Volume II Technical Appendices of this ES. Landfill sites identified for receipt of any residual waste materials will be appropriately licensed to receive them and accordingly the indirect effects will be **negligible**.

Operational Phase

10.5.12. The operation of the Proposed Development could result in sources of contamination associated primarily with solid and liquid fuel storage area or transformers, including:

- WDF stored in an underground bunker;
- Bottom ash stored in an underground bunker;
- Liquid fuels such as oils / petrol / diesel from motor vehicles;
- Liquid fuels such as oils / petrol / diesel from plant and machinery;
- Bulk chemicals for use in the flue gas treatment processes;
- Waste oily materials; and
- Flue gas treatment residues.

10.5.13. Any liquid fuel storage areas and transformer building areas will be appropriately bunded to ensure that, in the event of any spillage, the materials are safely contained. Most significant effects to soil and groundwater can be avoided with good housekeeping and management practices adopted and adhered to, including adherence to the requirements of the Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref. 10-16). However, potential emissions of oil based materials from road vehicles are more difficult to manage, such as oil leaks. Oil/ water separators are incorporated as appropriate within the existing SHP site drainage system to reduce the likelihood of oil-based materials affecting the environment and this is discussed further in *Chapter 11: Water Resources, Drainage and Flood Risk* of this ES. Implementation of good housekeeping and management practices is expected to reduce the effect to **negligible**.

10.5.14. A Major Aquifer underlies the Site and the potential for contamination at the Site impacting on groundwater is of major adverse significance. However, no groundwater abstraction currently takes place onsite and all known historic groundwater abstractions operated by the Applicant for industrial usage on the SHP site were for non-potable water supply, thereby reducing the effect to **minor adverse** or **negligible** based on the physical properties of the Major Aquifer, and the storage of liquid fuels on-site. Such an assessment assumes a compliance point at the Site boundary.

10.5.15. The fuel storage bunker containing WDF onsite will be constructed to a maximum depth of 4m below ground level. Similarly, part of the boilerhouse may include an underground component for storing bottom ash which could also be constructed to a maximum depth of 4m bgl. These structures are expected to be above groundwater based on the information presented in this chapter, which suggests groundwater begins at between 4.1m and 4.7m bgl. However in order to reduce effect to the underlying aquifer(s) the proposed fuel storage bunker, boilerhouse and bottom ash bunker will be constructed with a coarse gravel layer of a minimum 300 millimetre (mm) thickness around and beneath the structures, in accordance with feedback received in letter correspondence with the EA. The storage of fuel materials in this way is in accordance with the principles outlined in Environment Agency document 'Groundwater Protection: Principles and Practice (GP3)' (Ref. 10-17) and as detailed within position statement D3 within this document. This is expected to reduce the potential effect to **negligible**.

10.5.16. Wastes generated when operating the plant, including bottom ash, FGT residue and ferrous metal extracted from bottom ash will be stored and managed in accordance with the material classification as detailed in *Chapter 5: The Proposed Development* of this ES, including recycling where possible. Given the use of appropriate waste management protocols the potential impact from the generation and storage of process waste is considered to be **negligible**.

10.5.17. Gas-fired start up burners will be used to reach the 850℃ temperature required for combustion of waste and there will be a small diesel generator with its own small diesel tank for emergency standby should the power fail. Diesel will also be kept on site in a portable bowser for use in mobile plant. All liquid fuel storage will be stored in compliance with the requirements of the Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref. 10-16). The regulations detail the requirements for the structural integrity and maintenance of the storage container, the use of secondary containment systems, including bunds and drip trays, and the requirements for pipework. Given the volume of liquid diesel fuel intended to be stored and the use of appropriate containment systems the significance of effect from the storage of diesel is considered to be **negligible**.

10.6. Residual Effects and Conclusions

10.6.1. No significant effects on soil and groundwater are expected through the construction phase of the Proposed Development provided that standard mitigation measures are applied as discussed previously, and hence the residual effect is predicted to be **negligible**. A residual effect of **minor adverse** / **negligibl**e is attributed to the potential for groundwater contamination.

10.6.2. Overall, no residual effects are anticipated on soils and groundwater as a result of the operation of the Proposed Development, following implementation of the mitigation measures outlined above. Minor effects characterised by limited localised contamination of soils by a range of materials deposited during operations may result, however, it is anticipated that effective operating procedures and good housekeeping should limit their frequency and severity. Hence, operational effects are expected to be of **negligible** significance.

10.6.3. Table 10-2 below presents a summary of the anticipated residual effects of the Proposed Development.

Table 10-2 Summary of anticipated Residual Effects

Description	Nature of Effect	Geographic Scale	Significance
Demolition and Construction Phase			
Effect of Oils and Hydrocarbons	Negligible	Local	Negligible
Effect of Asbestos	Negligible	Local	Negligible
Effect of Contaminated Soil	Negligible	Local	Negligible
Effect of Ground Gas	Negligible	Local	Negligible
Effect of UXO	Negligible	Local	Negligible
Effect of Underground Structures	Negligible	Local	Negligible
Operational Phase			
Effect from soil and groundwater contamination on human health and controlled waters	Minor Adverse or Negligible	Local, District, Regional	Minor
Effect on underground structures	Negligible	Local	Negligible

10.7. Cumulative Effects

10.7.1. This section assesses the effect of the Proposed Development in combination with the likely effect to ground conditions arising from other developments in the area. The developments included in the cumulative effect assessment are described in more detail in *Chapter 2: Assessment Methodology* of this ES.

10.7.2. It is considered that development in the area surrounding the Site is unlikely to have a significant effect on the current underlying ground conditions, due to the nature of the underlying geology and the type of developments identified. As a result the cumulative effect of the demolition and construction phase of the Proposed Development and other developments in the area is considered to be of **negligible** significance.

10.7.3. Similarly, there are minimal anticipated effects from the operational phase of the Proposed Development, and hence cumulative effects associated with the Proposed Development and potential developments nearby are considered to present a negligible contribution to the cumulative effect of the development which remains **minor adverse**. The operation of the on-site water treatment plant and any associated chemical storage, which constitute part of the Further Development, will be undertaken in accordance with environmental best practice, including the storage of chemicals in dedicated, bunded containment areas and this is expected to produce a negligible effect.

10.8. References

Ref. 10-1 Landmark Information Group, 2013, Landmark Envirocheck® Report

Ref. 10-2 Environmental Protection Act, 1990, Part IIA Contaminated Land

Ref. 10-3 Water Resources Act, 1991

Ref. 10-4 The Town & Country Planning Act, 1990

Ref. 10-5 Environment Act, 1995

Ref. 10-6 The Building Act, 1984

Ref. 10-7	The Building Regulations, 2000
Ref. 10-8	DECC (2011) Overarching National Policy Statement for Energy (EN-1), Department for Energy and Climate Change, HMSO
Ref. 10-9	DECC (2011) Overarching National Policy Statement for Renewable Energy Infrastructure (EN-3), HMSO
Ref. 10-10	DCLG (2012) The National Planning Policy Framework, Communities and Local Government (March 2012)
Ref. 10-11	Environment Agency, 2010, CPLC1 – Guiding Principles for Land Contamination, Environment Agency
Ref. 10-12	Slough Borough Council, 2008, Slough Local Development Framework, Core Strategy 2006-2026, Development Plan Document (December 2008)
Ref. 10-13	Slough Borough Council, 2004, The Local Plan for Slough
Ref. 10-14	Defra and Environment Agency, 2004, Model Procedures for the Management of Land Contamination (CLR11)
Ref. 10-15	British Geological Survey, 1984, Sheet 14: Hydrogeological Map of the Area between Cambridge and Maidenhead (1:100,000). Ordnance Survey, Southampton.
Ref. 10-16	Water Resources, England. The Control of Pollution (Oil Storage) (England) Regulations 2001.
Ref. 10-17	Environment Agency, 2013, Groundwater Protection: Principles and Practice (GP3).

11. WATER RESOURCE AND FLOOD RISK

11.1. Introduction

11.1.1. This chapter of the ES assesses the potential effects of the Proposed Development on water resources, both within the boundary of the Proposed Development Site (the 'Site') and in the immediate surrounding area.

11.1.2. It identifies key water resources and features, and allocates an importance to identified receptors, identifying the direct and indirect effects of the Proposed Development on these resources. Consideration of potential effects is made in the context of existing site conditions; demolition and construction phase; and once the Proposed Development is operational. The need for mitigation measures is addressed and any residual effects are identified.

11.1.3. It should be noted that some of the potential effects relating to the hydrogeology underlying the development site are also addressed within *Chapter 10: Ground Conditions* of this ES due to overlap between the two subject areas.

11.2. Legislation and Planning Policy Context

National and European Legislation

11.2.1. The Water Resources Act (1991) (as amended) (Ref. 11-1) sets out the relevant regulatory controls that provide protection to water bodies and water resources. It was modernised by the introduction of The Water Act (2003) (Ref. 11-2) which amended the regulation of water resources and abstraction, discharge to water bodies, water impoundment, conservation and drought provision. The Water Resources Act originally excluded dewatering from engineering activities; however, the Water Act now lists this activity as requiring a 'Temporary' or 'Transfer' licence.

11.2.2. The Water Environment (Water Framework Directive) for England and Wales (2003) (Ref. 11-3) provides an opportunity to plan and deliver a better water environment, focusing on ecology through the River Basin Management Plan (RBMP).

11.2.3. The Water Resources Act is supported by:

- The Environment Act 1995 (Ref. 11-4), which established the EA; and
- The Environmental Protection Act 1990 (Ref. 11-5), which provides for integrated pollution control.

11.2.4. A number of specific regulations have also been implemented to enact the statutory law as set out above and which have a bearing on the assessment of the Proposed Development. These regulations include:

- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (Ref. 11-3) which transposed the EU Water Framework Directive (2000/60/EC) (Ref. 11-6) into law in England and Wales;
- The Anti-Pollution Works Regulations 1999 (Ref. 11-7);
- The Control of Pollution (Oil Storage) (England) Regulations (2001) (Ref. 11-8);

- The Groundwater Regulations (England and Wales) (2009) (Ref. 11-9) which transposed the EU Groundwater Directive (2006) (2006/118/EC) (Ref. 11-10) into UK law;
- The Environmental Damage Regulations (2009) (Ref. 11-11);
- The Water Resources Act (Amendment) (England & Wales) Regulations (2009) (Ref. 11-12);
- The Environmental Permitting (England and Wales) Regulations (2010) (Ref. 11-13) which control discharge of water from permitted industrial activities to surface water and groundwater; and
- Water Supply (Water Quality) Regulations (2010) (Ref. 11-15).

11.2.5. The Flood and Water Management Act 2010 (Ref. 11-15) is largely aimed at delivering the recommendations of the Pitt Review following the 2007 floods. The Flood and Water Management Act makes the following recommendations which are relevant to the Proposed Development:

- Sustainable drainage systems (SuDS) must be the first choice for drainage for all new developments, and the SuDS Approval Body within the Lead Local Flood Authority, which is either the Unitary Authority or the County Council, have a duty to adopt the SuDS (subject to approval); and
- It introduces changes to the rights to connect to sewers for surface water discharge. Automatic connection rights are to be restricted only to adopted sewer schemes constructed to the new National Sewer Standard or approved SuDS schemes constructed to the new National SuDS Standard, consultation on which has recently been undertaken.

11.2.6. Some elements of the Flood and Water Management Act are yet to come into force.

National Planning Policy

National Planning Policy Framework (NPPF) 2012

11.2.7. The NPPF (Ref. 11-16) and its associated Planning Practice Guidance (Flood Risk and Coastal Change) (2014) (Ref. 11-17) provides the current guidance for planning with respect to water resource and flood risk.

11.2.8. The NPPF outlines that Local Planning Authorities should support the transition to a low carbon future in a changing climate whilst taking full account of (inter alia) flood risk and coastal change. Development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.

11.2.9. With respect to flood risk and water resources, the NPPF sets out that the planning system should:

- Prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of land, air, water or noise pollution;
- Ensure several SuDS techniques, covering the whole range of sustainable approaches to surface drainage management, are incorporated into new developments; and

- Ensure new development is planned to avoid increased vulnerability to impacts arising from climate change.

Local Planning Policy

11.2.10. Core Policy 8 - Sustainability and the Environment in the SBC Local Development Core Strategy (Ref. 11-18) states that development will only be permitted where it is safe and it can be demonstrated that there is minimal risk of flooding to the property, and it will not impede the flow of floodwaters, increase the risk of flooding elsewhere or reduce the capacity of a floodplain. It also states that development must manage surface water arising from a site in a sustainable manner which will also reduce the risk of flooding and improve water quality. Sustainable drainage systems should be used to attenuate surface water runoff and to minimise the risk of future sewer flooding where this is practical in terms of ground water levels, geology and land quality.

Other Relevant Policy and Guidance

Environment Agency Pollution Prevention Guidance Notes

11.2.11. The EA Pollution Prevention Guidance Notes (PPG) provides advice on statutory responsibilities and good environmental practice. The Guidance Notes of particular relevance to the Proposed Development include:

- PPG 1: General Guide to the Prevention of Pollution (Ref. 11-19) which provides an introduction to pollution prevention and the pollution prevention guidance notes;
- PPG 2: Above Ground Oil Storage Tanks (Ref. 11-20), which provides guidance to those responsible for the storage of oil on construction sites. The document provides guidance on location, bunding, protection and operation of oil stored in addition to maintenance and brief guidance on dealing with spills;
- PPG 3: Use and Design of Oil Separators in Surface Water Drainage Systems (Ref. 11-21), which provides guidance on when oil separators are appropriate and what size and type of separator are required;
- PPG4: Disposal of Sewage where no Mains Drainage is Available (Ref. 11-22), offers advice if connection to the local sewage network is not possible and offers guidance on alternative means of wastewater disposal;
- PPG5: Works In, Near or Liable to Affect Watercourses (Ref. 11-23) provides guidance on general precautions to take when working in the vicinity of a watercourse, along with more specific measures to take to prevent contamination and to minimise any impacts;
- PPG 6: Working at Construction or Demolition Sites (Ref. 11-24) is a document that mirrors much of PPG 5 (Works and maintenance in or near water) but with particular emphasis on the situations likely to occur at demolition and construction sites;
- PPG 7: Refuelling Activities (Ref. 11-25), which provides information on the correct delivery, storage and dispensing of fuel to help reduce the risk of pollution; and
- PPG 21: Pollution Incident Response Planning (Ref. 11-26) assists those developing site-specific pollution incident response plans to prevent and mitigate damage to the environment caused by accidents such as spillages and fires.

Construction Industry Research and Information Association Guidance

11.2.12. C532 – Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors (Ref. 11-27) brings together the PPGs but goes into much more detail with regard to sources of water on construction sites, pollutants and pathways in addition to providing guidance on planning for the type and location of suitable control measures.

11.2.13. C697 – The Sustainable Urban Drainage System (SuDS) Manual (Ref. 11-28) provides best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments. This supersedes a number of guidance notes including C521.

11.3. Assessment Methodology and Significant Criteria

Assessment Methodology

11.3.1. Baseline conditions have been established through a desk study and via consultation with the following bodies:

- EA;
- SBC; and
- Thames Water Utilities Limited (TWUL).

11.3.2. Additional data has also been collected from the following sources:

- Ordnance Survey (OS) Map, 1:25,000 (2013) (Ref. 11-29);
- British Geological Survey (BGS) Maps, (1962) (Ref. 11-30);
- Landmark Envirocheck Report (2013) (Ref. 11-31);
- Intrusive Site Investigation and Geotechnical Assessment report (2013) (Ref. 11-32);
- Environment Agency (EA) website (Ref. 11-33);
- TWUL Asset Location Search (2013) (Ref. 11-34);
- SBC Strategic Flood Risk Assessment (SFRA) (2012) (Ref. 11-35); and
- SBC Preliminary Flood Risk Assessment (PFRA) (2011) (Ref. 11-36).

11.3.3. The methodology used to identify the baseline conditions at the Proposed Development Site, and to assess the potential effects to water resources and flood risk as a result of the Proposed Development, has involved the following stages:

- Identification of potential surface water and groundwater resources that may be potential receptors, and determination of their importance;
- Preparation of a conceptual site model, identifying feasible pollution sources and pathways during the demolition and construction works and once the Proposed Development is completed and operational;
- Determination of the magnitude of change of the potential effects of the Proposed Development on these receptors;

- Evaluation of the significance of the effects relative to the quality and quantity of the receptors (importance); and

- Identification of suitable and appropriate mitigation measures, for all key stages of the Proposed Development (i.e. demolition/construction and operation). An assessment is made of the significance of any residual effects.

Significant Criteria

11.3.4. Significance criteria for the assessment of effects on water resources and flood risk has been based on the methodology given in the Department for Transport's document 'The Water Environment Sub-Objective' Transport Analysis Guidance (TAG) UNIT 3.3.11 (Ref. 11-37), which brings together the 'New Approach to Transport Appraisal (NATA)' document (Ref. 11-38) and the 'Guidance on the Methodology for Multi-Modal Studies (GOMMMS)' document (Ref. 11-39). Whilst this guidance was produced to facilitate the comparison of transport schemes, the definitions provided take into account the sensitivity and vulnerability of the water resource and are therefore applicable to the activities associated with the Proposed Development.

11.3.5. Mustow *et al.,* (2005) (Ref. 11-40) expanded the GOMMMS methodology in their publication 'Practical Methodology for Determining the Significance of Effects on the Water Environment' to make the application of the method more standardised and less open to the subjectivity of the assessor, and it is this specific method that has been used in this assessment.

11.3.6. In accordance with the stages of the methodology, there are three stages to the assessment of effects on water resources, which are as follows:

- A level of importance (low to very high) is assigned to the water resource receptor based on a number of attributes such as water supply, biodiversity, transport and dilution of waste products, recreation, and conveyance (Table 11-1);

- The magnitude of the potential and residual effect (classed as high, medium, low or negligible) is determined based on Table 11-2 and the assessor's knowledge of the Proposed Development. Specifically for the assessment of residual effects, mitigation measures are taken into account in determining the magnitude of change; and

- A comparison of the importance of the resource and magnitude of the effect (for both potential and residual) results in an assessment of the overall significance of the effect on the water resource receptor (Table 11-3). Each identified effect (both potential and residual) will be classed as Major, Moderate, Minor or Negligible, and either Beneficial or Adverse significance.

11.3.7. Where other receptors and attributes are identified, professional judgement and available information has been used to determine their importance.

11.3.8. The following significance categories have been used for both potential and residual effects:

- **Negligible**: An imperceptible effect or no effect to a water resources receptor;

- **Beneficial:** A beneficial/positive effect on the quality of a water resource receptor; or

- **Adverse:** A detrimental/negative effect on the quality of a water resources receptor.

11.3.9. An effect can be temporary or permanent, with effects quantified temporally as being short-term (0-5 years), medium term (6-10 years) or long-term (>10 years).

11.3.10. When an effect is considered to be beneficial or adverse, the following levels of significance are stated, as shown in Table 11-2:

- **Minor:** It is a limited, very short or highly localised effect on a water resource of high or medium importance, or a wide extent or long duration effect on a water resource of low quality/importance. It would not prevent compliance with legislation, water quality standards or policy;
- **Moderate:** A local scale medium magnitude of change on a water resource of high quality; or a large (reversible) effect on a water resource of medium quality/importance. Effects would not affect long term status of a waterbody under the Water Framework Directive; and
- **Major:** A magnitude of change on a water resource of high quality/importance resulting in a deterioration of waterbody status; preventing Water Framework Directive objectives or compliance with other legislation being met.

Table 11-1 Terms Used to describe the importance of the Water Resource Receptor

Feature	Attribute/ Service	Indicator of Quality	Measure	Grading	Importance Level
River	Water Supply	Chemical Water Quality	Water Framework Directive RBMP Chemical Classification	Classified	High
				Not classified	Low
		Industrial/ agricultural abstractions	Location and volume of abstraction	All abstractions within 1 km up/down stream:	
				>1,000 m^3/day	Very High
				500 – 1,000 m^3/day	High
				50 – 499 m^3/day	Medium
				<50 m^3/day	Low
		Drinking water supply	Classification defined within Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996, No. 3001	DW1 or DW2 within critical travel time for pollution downstream	Very High
				DW3 within critical travel time downstream	High
				Not designated	Medium/Low
	Bio-diversity	Ecological Quality	Water Framework Directive RBMP Ecological Classification	Classified	High
				Not classified	Low
		Fisheries quality	Fisheries status as defined within the Freshwater Fish Directive 78/659/EEC	Designated salmon fishery	Very High - High
				Designated cyprinid fishery	High – Medium
				Undesignated fishery	Medium – Low

Feature	Attribute/ Service	Indicator of Quality	Measure	Grading	Importance Level
				Not a fishery	Low
	Transport & dilution of waste products	Surface Water/ effluent discharges	Type of discharges with reference to the EC Dangerous Substances (76/464/EEC) & Daughter Directives	All discharges within 2km up/down stream:	
				List I discharge	Very High-High
				List II discharge	Medium
				Other discharge/no discharge	Medium/Low
	Recreation	Riverside access	Presence/ absence of route and importance	National trail/cycleway/other route	Very High
				Regional trail	High
				Definitive footpath /bridleway	Medium
				No route	Low
		Presence of clubs/ recreation use	Presence/ absence	Club/recreation use present	Very High – High/Medium
				No club/recreation use	Low
	Conveyance of flow & material	Presence of watercourse	Size of watercourse	Main river >10 m wide	Very High
				Main river <10 m wide	Medium
				Ordinary watercourse >5 m wide	Medium
				Other	Low

Feature	Attribute/ Service	Indicator of Quality	Measure	Grading	Importance Level
Floodplain	Flooding	Flood Risk	Return period	Flood Zone 3b	Very High
				Flood Zone 3a	High
				Flood Zone 2	Medium
				Flood Zone 1	Low
Groundwater	Water Supply	Industrial/ agricultural abstractions	Location and volume of abstraction	All abstractions within 1km:	
				> 1,000 m^3/day	Very High
				500 – 1,000 m^3/day	High
				50 – 499 m^3/day	Medium
				<50 m^3/day	Low
		Drinking water supply	Presence of potable public supply or private water supply within zone of influence of development	Public supply	Very High
				Private water supply >10 m^3/day or serves >50 people	High
				Other public water supply	Medium
				No supply	Low
		Groundwater vulnerability	Source Protection Status	Zone 1	Very High
				Zone 2	High
				Zone 3	Medium

Feature	Attribute/ Service	Indicator of Quality	Measure	Grading	Importance Level
			Classification of Aquifer vulnerability	Principal Aquifer with H, I or U soils	Very High
				Secondary Aquifer with H or U soils/	High
				Principal Aquifer with L soils	Medium
				Secondary Aquifer with I soils	Medium
				Secondary Aquifers with L soils or Unproductive Strata	Low
	Conveyance of flood flows	Acceptance Potential of flood flows	Soil type / groundwater table levels	Gravels with low water table (>1 m below infiltration point)	Very High
				Sands with low water table	High
				All soil types with high water table	Medium
				Clay	Low

Note: Adapted from Mustow, Burgess and Walker 2005

Table 11-2 Terms Used to Describe the Magnitude of the Effect on the Water Resource Receptor

Magnitude	Criteria	Example
High	Effect results in a shift in a water body's potential attributes.	• Loss of EC designated Salmonid fishery; • Change in Water Framework Directive classification of a waterbody; • Compromised employment source; • Loss of flood storage/increased flood risk; • Pollution of potable source of abstraction.
Medium	Results in effect on integrity of attribute or loss of part of attribute.	• Loss in productivity of a fishery; • Contribution of a significant proportion of the effluent in the receiving waterbody, but insufficient to change its Water Framework Directive classification; • Reduction in the economic value of the feature.
Low	Results in minor effect on water body's attribute.	• Measurable change in attribute, but of limited size and/or proportion.
Imperceptible	Results in an effect on attribute but of insignificant magnitude to affect the use / integrity.	• Discharges to watercourse but no significant loss in quality, fishery productivity or biodiversity; • No significant effect on the economic value of the feature; • No increase in flood risk; and • No loss in integrity of ground conditions.

Note: Adapted from Mustow, Burgess and Walker 2005

Table 11-3 Criteria for Estimating Significance of Effect

Magnitude of Potential Effect	Importance of the Resource			
	Very High	High	Medium	Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Imperceptible	Negligible	Negligible	Negligible	Negligible

Note: Adapted from Mustow, Burgess and Walker 2005

11.4. Baseline Conditions

Site Description

11.4.1. The Proposed Development Site lies within the existing SHP site boundary, within the Slough Trading Estate. The SHP site is mainly located on the south side of Edinburgh Avenue, with two associated natural draught cooling towers occupying an area immediately to the north of Edinburgh Avenue.

Surface Water Resource

11.4.2. The Slough Trading Estate has two streams and a River that run in relatively close vicinity of the Proposed Development Site. Chalvey Brook is 1.2km to the west; the Salt Hill Stream is 1.1km to the east; and the River Thames is 4.1km south of the Site. According to the draft Local Flood Risk Management Strategy, the Proposed Development Site is located in the catchment of the Salt Hill Stream.

11.4.3. The 1:10,000 OS maps show that there are ponds located 800m west and 925m southeast of the Site. A review of the mapping suggests that there are no open reservoirs or other artificial waterbodies within a 1km radius of the vicinity of the Site. A covered reservoir is located approximately 750m northwest of the Site, near Kennedy Park Recreation Ground.

Water Quality

11.4.4. The EA surveys all main watercourses in England and Wales on a regular basis in order to analyse, monitor and review the status of waterbodies against the Water Framework Directive objectives set out for them. The Water Framework Directive requires all waterbodies to reach at least 'Good status' or 'Good potential' by 2015. However, provided that certain conditions are satisfied, in some cases the achievement of Good status may be delayed until 2021 or 2027.

11.4.5. For surface waters, Good status is a statement of 'overall status', which in turn consists of chemical and ecological components. Chemical status considers priority substances that present a significant risk to the water environment. Chemical status is classified as 'good', 'fail' or 'does not require assessment'. Ecological status is measured on a scale of 'high', 'good', 'moderate', 'poor' and 'bad'. The ecological status takes into account physico-chemical elements, biological elements, specific pollutants and hydromorphology.

11.4.6. Some waterbodies are designated as 'artificial' or 'heavily modified' and are not able to achieve near natural conditions. For this reason, the classification of these waterbodies and the biology they represent are measured against 'ecological potential' rather than status.

11.4.7. For an artificial or heavily modified waterbody to achieve good ecological potential, its chemistry must be good. In addition, any modifications to the structural or physical nature of the waterbody that would harm its biology must be essential for its valid use. For an artificial or heavily modified waterbody to achieve good ecological potential, all other modifications must have been altered or managed to reduce or remove their adverse effects, so that there is the potential for the biology of the waterbody to be as close as possible to that of a similar natural waterbody.

11.4.8. The Salt Hill Stream is classified as heavily modified due to the presence of flood defences. The Salt Hill Stream is currently classed as having poor Ecological quality potential in regards to the Water Framework Directive and it does not require assessment to meet good chemical status. This will remain the same until 2015, which is the date when it is reassessed.

11.4.9. Chalvey Brook is classified as being heavily modified, and having a moderate Ecological status. It does not require a chemical quality check and therefore chemistry data is not available. The EA predicts that this status will remain the same until 2015 (Ref. 11-33). Good ecological potential status is expected to be met in 2027 for Salt Hill stream and Chalvey Brook.

11.4.10. The stretch of the River Thames nearest to the Site (Thames Cookham to Egham) is classified as being of Moderate ecological potential. It is predicted to remain at Moderate ecological potential to 2015, the current target date for achieving Environmental Objectives, corresponding to the end of the first cycle of the River Basin Management Plan process.

11.4.11. The stretch of the River Thames nearest to the Site currently has a classification of 'Good' in relation to chemical quality. This is predicted to remain the same in 2015. The chemical status is assessed by compliance with the environmental standards for chemicals that are listed in the Priority Substances Directive 2008/105/EC (Ref. 11-41), which is a 'daughter' directive of the Water Framework Directive. Chemical status is recorded as either 'Good' or 'Fail'.

11.4.12. The River Basin Management Plan for the Thames River Basin District aims to improve the ecological and chemical quality of surface waterbodies. The objectives of the River Basin Management Plan are as follows:

- By 2015, 22% of surface waters will improve by at least one biological, chemical or physical element;
- By 2015, 25% of surface waters will be at good ecological status; and
- By 2015, at least 30% of assessed waters will be at good or better biological quality.

11.4.13. The Salt Hill Stream, Chalvey Brook and River Thames are considered to be a water resource of **high importance** with respect to water quality, as they have a water quality objective under the Water Framework Directive.

Surface Water Abstractions and Discharges

11.4.14. According to the Envirocheck Report (Ref. 11-31) there have been no licensed surface water abstractions from surface water within 1km of the Proposed Development Site, or from Salt Hill Stream or Chalvey Brook.

11.4.15. As there are no abstractions or discharges to surface water within 1km of the Site, this attribute is not assessed.

Geology

11.4.16. A ground investigation at the SHP site was undertaken by WSP Environmental & Energy Ltd (WSP) on the 23 January 2012 and 25 January 2012, with a borehole installed to a depth of 25m bgl (Ref. 11-36). The ground conditions found were in line with other investigations that are available on the British Geological Survey (BGS) mapping and online borehole viewer.

11.4.17. The reported ground conditions at the SHP site comprises hard standing reinforced concrete overlying fill material up to a depth of 0.5m bgl. The BGS surface geology map and the Envirocheck maps indicate that under the Made Ground, the underlying geology is Langley Silt Member, from 2.2 to 2.5m bgl. This comprises 'soft to firm, orangish brown slightly sandy very gravelly clay with numerous pockets of sandy clay'. The gravel can be found coarse, angular to subangular flint (Ref. 11-30 and Ref. 11-31).

11.4.18. River Terrace Deposits underlying the Langley Silt were present to a depth of 8.0m bgl, comprising 'brown, slightly sandy gravel of fine to coarse, sub-angular to sub-rounded flint'. Below this lies Lambeth Group, to a depth of 8.8m bgl. This comprises stiff clay with clay, flint and chalk as layers get deeper.

11.4.19. White Chalk was encountered at 8.8m bgl to the base of the borehole and was recovered as 'greyish white mottled light orange slightly sandy clayey gravel'. The borehole was terminated at 25.0m bgl in the White Chalk. The base of the Chalk has been proven in one borehole in the southern portion of the Site at a depth of 220m bgl,

11.4.20. *Chapter 10: Ground Conditions* of this ES contains a full review of the geology and hydrogeology of the area.

Groundwater

Groundwater Vulnerability

11.4.21. A review of the EA website (Ref. 11-33) and Envirocheck report reveals that the River Terrace Deposit in the area of the Proposed Development Site is defined as a Secondary A Aquifer. Secondary A Aquifers are defined by the EA as "*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers*". These are generally aquifers formerly classified as minor aquifers. Records from the exploratory boreholes note that the River Terrace Deposits were found between 2.8m bgl and 8m bgl.

11.4.22. The boreholes indicate that shallow groundwater and localised perched groundwater may be present within the River Terrace Deposits beneath the Proposed Development Site. Historical borehole data suggests the possibility of perched water at approximately 4.5m bgl and standing water levels lie between 4.1m bgl and 4.7m bgl.

11.4.23. The Chalk bedrock underlying the Proposed Development Site is classed as a Principal Aquifer. Principal Aquifers are defined as "*layers of rock or drift deposits that have high intergranular and/or fracture permeability*", meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, Principal Aquifers are aquifers previously designated as major aquifers.

11.4.24. A review of the Envirocheck groundwater vulnerability map for the Proposed Development Site suggests that drift deposits have been assigned soil leaching potential classed as highly permeable 'HU'. This indicates that they have been assigned a high leaching potential as a worst case scenario due to a limited amount of data being available within any urban area. Soils of high leaching potential are considered to diffuse source pollutants and to allow liquid discharges to move rapidly to underlying strata and to shallow groundwater.

11.4.25. *Chapter 10: Ground Conditions* states that it is considered that the underlying River Terrace Deposits Secondary A Aquifer and the Chalk Principal Aquifer may be in hydraulic continuity, with impacts to either aquifer having the potential to impact the other.

11.4.26. The Proposed Development Site is located within a groundwater Source Protection Zone 3, source catchment protection zone, according to the EA and the Envirocheck map.

11.4.27. The EA defines Source Protection Zones as sources such as wells, boreholes and springs that are used for public drinking water supply. These zones show the potential risk of contamination from any activities that might cause pollution in the area. Source Protection Zone 3 is the total catchment area for groundwater protection zone for the public water supply borehole.

11.4.28. Water Framework Directive status for groundwater consists of two components: quantitative and chemical status. These two components result in a single final classification of Good or Poor status. The Water Framework Directive status of the local groundwater is currently Poor quantitative quality, which will still remain Poor by 2015. The current chemical quality is Good and is expected to remain so by 2015.

11.4.29. Due to the Proposed Development Site being assigned soil leaching potential as highly permeable, groundwater vulnerability and it being located in Source Protection Zone 3, the Secondary A Aquifer is classified as **high importance** while the Principal Aquifer is classified as **very high importance**.

Groundwater Abstractions and Discharges

11.4.30. The Envirocheck report states that there are 12 licensed groundwater abstractions within 1km of the Proposed Development Site. These are for a range of commercial uses, including pump and treat pollution remediation, non-evaporative cooling, general cooling, general use and spray irrigation.

11.4.31. The Envirocheck provides information on licensed abstraction volumes for two of the abstractions within 1km of the Site. The Envirocheck reports that SHP, referenced as both Slough Energy Supplies Ltd (subsidiary of SHP) and Slough Estates (former owners of SHP) has a permit to abstract up to 16,673m^3/day from locations approximately 700m northwest of the Site, and an additional 4,545m^3/day from a borehole approximately 900m northwest of the Proposed Development Site, both for general use. The abstracted groundwater feeds two SHP reservoirs at Kennedy Park, located approximately 750m northwest of the SHP site, which then feed the potable water system which is pumped to the SHP site. This includes make-up water for the SHP site's Cooling Towers. The water demand for the existing SHP site is approximately 1,000,000 m^3/ year.

11.4.32. Separately, the Sara Lee Household and Personal Care abstraction point is located approximately 720m south of the Site and can abstract up to 655m^3/day for general cooling use.

11.4.33. Based on the above, groundwater is considered to be of **very high importance** in relation to water supply.

Foul and Surface Water Drainage

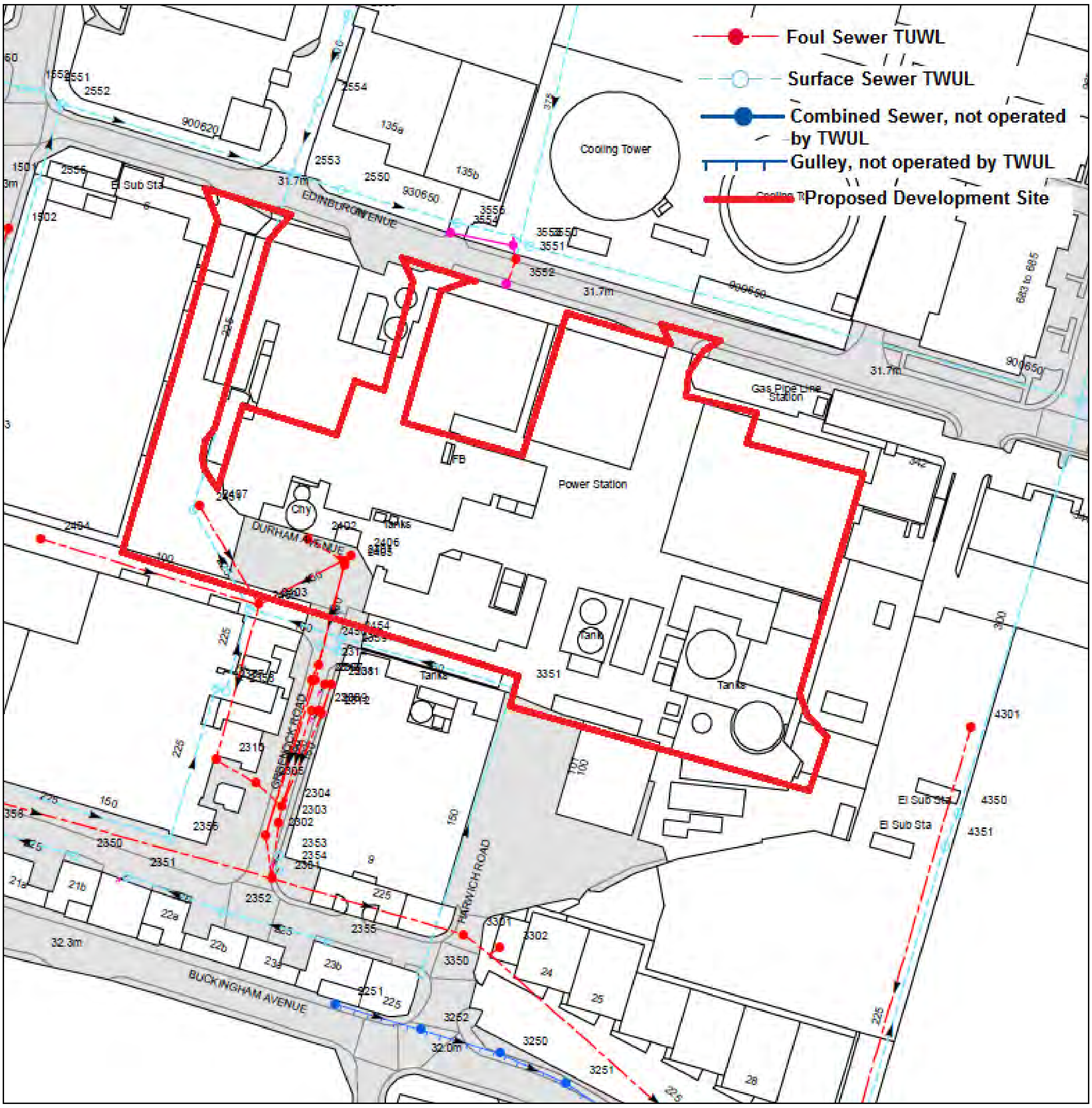
11.4.34. TWUL was consulted and has provided asset location plans for the existing drainage and water supply system at the Site and in the surrounding area (Ref. 11-42). The plan indicates that the Site is served by a separate foul and surface water sewer (as shown in Figure 11-1).

11.4.35. The Site is connected to the foul sewer to the south in two places in what was formerly Durham Avenue, both flowing in a southern direction along Greenock Road. Under Greenock Road three further foul sewer pipes flow south alongside these two foul sewers, all combining into one foul sewer pipe flowing east towards Harwich Road and then continuing in a southeast direction. Based on discussions with the Flood Specialist at SBC, Steve Brocklebank (per comm, 17/01/14), the TWUL foul water drainage system serving the SHP site eventually discharges to the Slough sewage treatment works (STW) under a discharge consent, where it is treated and then discharged into the River Thames.

11.4.36. The TWUL asset location plan indicates that a surface water sewer is present along Edinburgh Avenue north of the Site (referred to as the Edinburgh Avenue culvert), which flows in an easterly direction. Two surface water sewers flow either side of the SHP site in a northern direction from Buckingham Avenue which discharges into the Edinburgh Avenue culvert.

11.4.37. According to information held by SBC, the TWUL surface water system surrounding the Site ultimately discharges into Salt Hill Stream and finally into the River Thames, when the system is not surcharged. During high flow when Edinburgh Avenue culvert surcharges, surface water overflows into the foul sewer system to a surface sewer west of the Proposed Development Site and ends up in Chalvey Brook before finally reaching the River Thames.

Figure 11-1 TWUL Sewer Network



11.4.38. A drainage layout detailing the surface water sewer network serving the Site indicates that the Site surface water drains into either soakaways (there are 10 present on the SHP site currently) or into the Edinburgh Avenue culvert.

11.4.39. In addition to discharging standard foul effluent to the TWUL network, the environmental permit for the SHP site limits discharge of trade effluent into the TWUL foul sewer system to 5 locations (Ref. 11-43). The trade effluent includes waste liquids arising from water treatment (reverse osmosis and demineralisation), cooling tower blowdown, boiler blowdown and boiler tube washing. The consent includes the following conditions on the discharge:

- Temperature no higher than 43.3ºC;
- pH value between 6 and 11;
- A discharge rate up to 32 m^3/hour; and
- A discharge volume up 905 m^3/day**.**

Water Supply

11.4.40. SHP is the water utility provider for the SHP site and the Slough Trading Estate. As discussed in paragraph 11.4.31 the SHP site water supply is sourced from a groundwater abstraction from an offsite aquifer located north of the Site which is owned by the Applicant.

11.4.41. There are three main areas of water consumption on the SHP site: makeup water to the cooling system (550,000m^3/yr); feedwater to the water treatment plant (400,000m^3/yr); and general process and office water (90,000m^3/yr). Approximately half of the feedwater is eventually recycled into the cooling system after use.

11.4.42. TWUL were consulted regarding the existing water supply network in the surrounding area of the Site and has supplied asset location plans detailing the water supply network surrounding the Site (Ref. 11-42). The plans show a trunk main under Edinburgh Avenue with a connection to the cooling towers at the Site.

11.4.43. An emergency water supply exists to the cooling tower compound from the TWUL network (which is connected to a break tank on the mains water pumphouse); however this has never been used.

Flood Risk

11.4.44. A Flood Risk Assessment (FRA) has been prepared for this Application and should be read in conjunction with this ES Chapter for details about the baseline flood risk conditions, the potential impact of the Proposed Development on flooding and the proposed mitigation measures. The FRA is presented in *Appendix F, Volume II* of this ES, with a summary provided below.

Tidal and Fluvial

11.4.45. The Site lies within Flood Zone 1. This zone is classified as low risk from main rivers and tidal flooding, and covers land that has been assessed as having a less than 0.1% annual exceedence probability (1 in 1000 annual probability) of fluvial or tidal flooding.

11.4.46. The Site is considered to be at low risk of flooding from tidal and fluvial sources.

Groundwater

11.4.47. According to the Preliminary Flood Risk Assessment (Ref. 11-36) there are no recorded instances of historical groundwater flooding within the vicinity of the Proposed Development Site. The Strategic Flood Risk Assessment update (Ref. 11-35) states that groundwater flooding is not considered to be an issue at the Slough Trading Estate. The Proposed Development Site is considered to be at low risk of flooding from groundwater sources.

Pluvial Flooding and Overland Flow

11.4.48. The EA has produced surface water flood maps that provide an indication of the areas that may be at risk of surface water flooding from intense rainfall. This includes the 'Areas Susceptible to Surface Water Flooding' (AStSWF) mapping and the 'Flood Map for Surface Water' (FMfSW) for the area around the Proposed Development Site.

11.4.49. The AStSWF map shows that southern parts of the Site are 'more susceptible' to surface water flooding, with water ponded in the open spaces between buildings. The FMfSW also shows water ponded at the site, with depths from less than 0.1m to over 0.3m for the 0.5% annual probability storm event. The Preliminary Flood Risk Assessment (Ref. 11-36) identifies historical surface water flooding incidents along Edinburgh Avenue and to the south on Buckingham Avenue. Figures 6, 7 and 8 within the FRA (*Appendix F, Volume II* of this ES) depict this mapping.

11.4.50. The risk to the Proposed Development Site from overland flow under the current baseline is considered to be moderate.

Surface Water and Sewer Flooding

11.4.51. Surface water and sewer flooding are often interconnected; insufficient drainage capacity in the sewer network can result in extensive surface water flooding and, by the same rationale, large volumes of surface water can overload the public sewers, causing the sewer network to back up, surcharge and ultimately flood.

11.4.52. The Strategic Flood Risk Assessment (Ref. 11-35) states that the majority of the sewers in the area have been adopted and maintained by TWUL; however some of the sewers in the Slough Trading Estate were un-adopted. With the introduction of the Flood and Water Management Act, these sewers may have since been adopted by TWUL. The Strategic Flood Risk Assessment states that there are known problems associated with sewer flooding in Slough, however, it is limited in geographical area and generally occurs during storm events when the sewer system becomes surcharged with surface water in excess of its capacity, rather than from overloading from sewerage.

11.4.53. The FRA (*Appendix F, Volume II* of this ES) details historical and anecdotal evidence of surface water and sewer flooding both on the Proposed Development Site and within the wider Slough Trading Estate.

11.4.54. The Proposed Development Site could be subject to sewer flooding either directly, by surcharging of sewers beneath the site and flooding from on-site manholes, or from floodwater flowing onto the site from surrounding areas. The presence of kerbs along the surrounding roads affords some protection to the Proposed Development Site from shallow flooding of roads associated with surcharged sewers. However the topography around the Proposed Development Site is relatively flat (around 32m AOD) and the vehicle access points to the north and south of the site could present potential flowpaths onto the Site if surcharging of sewers and flooding of the surrounding road network occurs.

11.4.55. Based on the information provided within the Strategic Flood Risk Assessment regarding the reported sewer capacity issues and incidences of flooding close to the site the risk of flooding from sewer sources close to the site is considered to be moderate.

Flood Risk Importance

11.4.56. The NPPF (Ref. 11-16) and associated Planning Practice Guidance (Ref. 11-17) stipulates that the planning system should prevent development from being put at unacceptable risk from flooding and should not increase flood risk elsewhere. Although flood risk is not considered to be a water resource receptor, the impact of the development on flood risk is an important consideration and therefore is considered to be of **high importance** in this assessment.

Summary of Resource Classification

Table 11-4 summarises the importance assigned to the various water resources discussed above.

Table 11-4 Criteria for Estimating Significance of Effect

Water Resources/Attribute	Importance
Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	High
Secondary A Aquifer (shallow groundwater)- Groundwater vulnerability	High
Principal Aquifer - Groundwater vulnerability, Abstractions, Water Supply	Very High
Flood Risk	High

11.5. Potential Effects and Mitigation Measures

Demolition and Construction Phase

11.5.1. Throughout the demolition and construction phase of the Proposed Development, there are potential sources of pollution/contamination in addition to the demolition/construction processes themselves that may potentially affect water resource receptors. For each of the sources/processes, there are particular 'triggers'; these are onsite actions that cause the potential effects, and are detailed in Table 11-5.

11.5.2. The likely pathways between the source of contamination or demolition/construction process and the associated water resource feature or attribute have been identified. The potential effects (pre-mitigation) are stated below, and are the result of the potential interaction between the contamination source/ process and the water resource feature, via a defined pathway.

11.5.3. Potential pollution sources/ processes arising from demolition and construction activities that could affect water resource receptors include the following:

- Creation of preferential pathways for pollution and disturbance to groundwater;
- Disturbance of existing drainage systems and water supply networks;
- Disturbance of contaminated land;
- Leaks and spillages of oils/hydrocarbons, etc.;
- Creation and mobilisation of suspended sediments; and
- Leaks, spillages or washdown of concrete and cement products.

11.5.4. Other activities associated with the construction phase comprise:

- Additional water demand; and
- Additional wastewater generation.

Table 11-5 Potential Sources, Pathways and Receptors for Consideration during the Demolition and Construction Phase

Source/ Process	Triggers	Water Resources Receptor	Pathways/ Mechanisms	Potential Effects (Pre-mitigation)
Creation of Preferential Pathways and Disturbance to Groundwater	Piling, excavations and other subsurface works, dewatering of excavations.	Secondary A Aquifer (Shallow Groundwater) Principal Aquifer	Creation of preferential pathways, driving of contaminants down into the Secondary and Principal aquifer. Existing surface water soakaways	Pollution and degradation of the water quality of the underlying Secondary A and Principal aquifers.
			Encountering groundwater in Secondary and Principal aquifers.	Disturbance of shallow groundwater flows
			Disturbance of shallow groundwater flows.	Lowering the groundwater table (i.e. reducing moisture content within foundation soils).
Existing Drainage Systems and Water Supply Network	Disturbance of existing on-site drainage systems and water supply network.	Principal Aquifer	Water supply network.	Pressure issues potentially affecting groundwater abstractions
		Flood Risk (from surface water runoff and sewer network)	Physical Damage to water supply and sewer infrastructure.	Uncontrolled release of potable water, drainage or sewage, and localised flooding.
		Secondary A Aquifer (Shallow Groundwater) Principal Aquifer	Infiltration (vertical and lateral migration of pollutants) into local geology and hydrogeology. Existing surface water soakaways	Contamination of substrata from foul drainage and resultant pollution and degradation of water quality of underlying Secondary A and Principal aquifer.
On Site Historical Land Contamination	Disturbance of contaminated land through subsurface works.	Secondary A Aquifer (Shallow Groundwater) Principal Aquifer	Creation of preferential pathways. Infiltration (vertical and lateral migration of pollutants) into local geology and hydrogeology. Existing surface water soakaways	Mobilisation of contaminated Made Ground and soils and resultant pollution and degradation of water quality of underlying Secondary A and Principal aquifer.
		Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	Surface water runoff discharging into the surface water sewer network and discharging to local watercourses	Pollution of watercourses.

Source/ Process	**Triggers**	**Water Resources Receptor**	**Pathways/ Mechanisms**	**Potential Effects (Pre-mitigation)**
Leaks and Spillages	• Underground and above ground fuel tanks. • Improper storage of diesel, other fuels, oils, lubricants and coolants; irregular maintenance of plant equipment and on site vehicles; improper use of diesel, other fuels and oils. • Improper storage, handling and disposal of general waste from welfare facilities and demolition/construction activities, and hazardous waste (including contaminated soil if defined as hazardous waste).	Secondary A Aquifer (Shallow Groundwater) Principal Aquifer	Infiltration (vertical and lateral migration of pollutants) into local geology and hydrogeology. Existing surface water soakaways	Contamination of underlying soils and aquifers resulting in the pollution and degradation of water quality of underlying Secondary A and Principal aquifer.
		Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	Surface water runoff discharging into the surface water sewer network and discharging to local watercourses	Pollution of watercourses.
Suspended Sediments	• Waste water from demolition/construction activities e.g. dust suppression techniques and wheel washing. • Exposed ground, excavations and stockpiles (could also contain contaminated material e.g. soils). • Grouting works.	Flood Risk (from surface water runoff and sewer network)	Surface water run off (during rainfall events or when areas are being washed down).	Increased sediment loading to local sewer network– risk of blockages which could cause flooding.
		Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	Surface water runoff discharging into the surface water sewer network and discharging to local watercourses	Pollution of watercourses.
		Secondary A Aquifer/ (Shallow Groundwater) Principal Aquifer	Infiltration (vertical and lateral migration of pollutants) into local geology and hydrogeology. Existing surface water soakaways	Contamination of substrata and resultant pollution and degradation of water quality of underlying Secondary A and Principal aquifer.
Concrete and Cement washdown,	• Concrete and cement products - concrete mixing and washing down of areas where mixing has taken place.	Secondary A Aquifer (Shallow Groundwater) Principal Aquifer	Infiltration (vertical and lateral migration of pollutants) into local geology and hydrogeology. Existing surface water soakaways	Contamination of substrata and resultant pollution and degradation of water quality of underlying Secondary A and Principal aquifer.

Source/ Process	Triggers	Water Resources Receptor	Pathways/ Mechanisms	Potential Effects (Pre-mitigation)
spills or leaks		Flood Risk (from surface water runoff and sewer network)	Runoff into the TWUL sewer network.	Increased loading to local sewer network – risk of blockages which could cause flooding and the potential for pollution of existing drainage and sewer network
		Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	Surface water runoff discharging into the surface water sewer network and discharging to local watercourses	Pollution of watercourses.
Water Demand	• Increase in water demand from activities such as dust suppression techniques, wheel washing; construction techniques; and workers / on site welfare facilities.	Principal Aquifer	Water supply network.	Increased pressure on local water resources (groundwater aquifer).
Wastewater Generation	• Increase in waste water discharged off-site due to effluent from sanitary facilities provided on site, sediment laden water from excavations and washing down / wheel wash facilities.	Flood Risk (from sewer network and surface water runoff and)	TWUL sewer network.	Increased pressure on the TWUL sewer network can increase flood risk.

Preferential Pathways and Disturbance to Groundwater

11.5.5. Historic borehole data suggests that perched and standing water was found in the River Deposits at 4.5m bgl and 4.6m bgl. Consideration should be given to the possibility of encountering shallow groundwater within and around the perimeter of the Site during excavations for foundations and piling activities.

11.5.6. As part of the Proposed Development a fuel bunker, as well as a section of the boilerhouse (including for storage of bottom ash), is expected to be constructed to a maximum depth of 4m bgl (as discussed in *Chapter 5: The Proposed Development* of this ES). The Proposed Development is situated within the River Deposits just above the perched or standing groundwater. At this depth the installation of the fuel bunker, ash bunker and boilerhouse may create a pathway into the shallow water in the Secondary A Aquifer. The effect would be adverse and of a medium magnitude which, when combined with the importance of the receptor would result in an effect of moderate adverse significance, prior to the implementation of mitigation measures, which are discussed later in this chapter.

11.5.7. Shallow groundwater could be encountered during demolition and construction works, particularly relating to excavations for foundations and piling activities for the bunkers and boilerhouse. The excavations piercing the River Deposits have the potential to either introduce shallow contaminants (as soil residues) or provide pathways for mobilised pollutants to reach the Principal Aquifers. Due to the swelling impacts of the Lambeth Group such pathways are expected to be limited, however, should shallow contamination be highly concentrated near the piles then such limited conduits may still be significant. Due to the properties of the Lambeth Group, potential effects would be limited to where unforeseen contamination was punctured and drawn down by the piling activities. The significance of any effect would be related to what shallow contamination was encountered and drawn down with the pile. The effect would be adverse and of medium magnitude of change on the Secondary A Aquifer, and when combined with the importance of the receptor, would result in an effect of moderate adverse prior to mitigation. The potential effect on the Principle Aquifer is anticipated to be localised, adverse and of small magnitude and therefore lead to an effect of moderate adverse significance prior to mitigation.

11.5.8. In order to reduce the movement of contamination via these pathways, a number of mitigation measures will be undertaken, which include:

- If perched groundwater is encountered during construction of the bunker, dewatering may be required. The most appropriate methods to dewater excavations will be selected in agreement with the EA. For example, prior to dewatering, the perimeter of the excavation could be enclosed with either sheet-pile or a diaphragm wall. Piezometers (standpipes) could then be placed outside the sheet pile wall to monitor groundwater levels;
- Measures such as cut-off trenches will be put in place to prevent any potentially polluted runoff from within the Proposed Development Site entering the excavation;
- Pile casing during piling and isolation of the area around the piling from surface water until piling is complete;
- Any water arising from excavations will need to be disposed of to the Salt Hill stream (subject to an EA issued discharge license) or to the local sewer network (subject to agreement with TWUL) if uncontaminated and following the removal of silt via settlement ponds or alternative measures; and

- The bunker, and any other structure built below ground to a maximum of 4m bgl, will be constructed with a coarse gravel drainage layer (at least 300mm thick) around and beneath that part of the construction below the perched groundwater table, following EA guidelines and recommendations.

11.5.9. The adoption of these mitigation measures is anticipated to reduce the residual effect on preferential pathways and disturbance to groundwater to **negligible,** as seen in Table 11-6.

Table 11-6 Preferential Pathways: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change Pre Mitigation	Magnitude of Change Post Mitigation	Residual Effect Significance (Post Mitigation)
Secondary A Aquifer – Groundwater vulnerability	High	Medium (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**

Disturbance of Existing Drainage Systems and Water Supply Network

11.5.10. During demolition and construction of the Proposed Development, subject to consent from TWUL, the TWUL foul sewer and surface water network surrounding the Proposed Development Site will be expected to transport any surface water, sewerage and wastewater generated.

11.5.11. Disturbance of the existing drainage network onsite increases the risk of pollutants being released in an uncontrolled manner and contaminating underlying substrata and affecting water quality in the aquifers. Pathways include infiltration, vertical and lateral preferential pathways, surface water runoff and the drainage network. This effect would be of adverse effect and of short-term, which when combined with the importance of the receptor (Secondary A and Principal Aquifer) would result in an effect of minor to moderate adverse significance prior to the implementation of mitigation measures.

11.5.12. Damage to the offsite borehole water supply is not expected to occur as it is sufficiently separated from the works anticipated onsite by 600m, therefore it is anticipated that there will be **negligible** effect on water supply.

11.5.13. The uncontrolled release from the water supply or sewer network could cause flooding, either directly from the network or from subsequent overland flow, resulting in an impact of moderate significance at a local scale without implementation of mitigation measures outlined below.

11.5.14. A number of mitigation measures will be implemented as part of the Proposed Development to protect the exiting water supply and drainage systems:

- All existing utilities will be identified and marked prior to works commencing;
- Signs will be used to warn of the presence of utility infrastructure;

- Any damage to the drainage network will be immediately repaired;
- Seal off or install barriers to prevent surface water flowing to the existing soakaways; and
- An emergency response plan will be produced to ensure spillages and leakages are immediately contained.

11.5.15. The mitigation measures described above are intended to reduce the magnitude of effect and likelihood of damage occurring to water supply infrastructure, mobilisation of pollutants and to restrict their passage to controlled waters. This is anticipated to reduce the residual effect to **negligible**, as shown in Table 11-7.

Table 11-7 Disturbance of Existing Drainage Systems and Water Supply: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Secondary A Aquifer – Groundwater vulnerability	High	Low (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**
Flood Risk (surface water runoff and sewer network)	High	Medium (Adverse)	Negligible	**Negligible**

Disturbance of Contaminated Land

11.5.16. Disturbance of potentially contaminated soils during the construction works may adversely affect groundwater within the Secondary A or Principal Aquifers. *Chapter 10: Ground Conditions* of this ES concludes that the Proposed Development Site has previously been used for activities that have had potential to cause a moderate level of ground contamination prior to any additional mitigation.

11.5.17. It is possible that undiscovered areas of contamination could exist and may be present within made ground that underlies the Proposed Development Site. This will have the potential for disturbance by construction activities, excavations or piling and the re-mobilisation of contaminants into surface water (via surface water runoff and the surface water drainage network) or groundwater (via preferential pathways or infiltration). This would have an adverse effect of low magnitude which, when combined with the importance of the Secondary A and Principal Aquifer) would result in an effect of minor to moderate adverse significance prior to mitigation.

11.5.18. Due to the distance of the site from Salt Hill Stream, Chalvey Brook and the River Thames and dilution provided within the sewer network, it is considered that there would be a low impact (minor significance) on the water quality by discharging from the surface water sewer network.

11.5.19. Stockpiling of possible contaminated excavated materials and the appropriate management, such as positioning the stockpiles away from watercourses or drainage systems and the subsequent covering to help prevent runoff or infiltration of contaminants into the ground, will minimise the risk of pollution of water bodies. Existing soakaways should be sealed off or barriers installed to prevent surface water entering them, which could provide a direct pathway to groundwater.

11.5.20. In the event that contamination is discovered, work will stop immediately and measures will be taken to prevent disturbance and mobilisation of contaminants, until the contamination has been treated in-situ or removed for off-site disposal or treatment.

11.5.21. Therefore, with the appropriate methodology and control measures in place (mitigation measures), the residual effect is considered to be **negligible** (Table 11-8).

Table 11-8 Disturbance of Contaminated Land: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Secondary A Aquifer – Groundwater vulnerability	High	Low (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**
Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	High	Low (Adverse)	Negligible	**Negligible**

Leaks and Spillages

11.5.22. The main source for oils and hydrocarbons during demolition and construction of the Proposed Development will be from spillages and leaks associated with plant and machinery and from vehicle fuel storage. The pathways for oils and hydrocarbons to reach receptors are via surface water runoff, the drainage network and through infiltration.

11.5.23. The release of oils and fuel can contaminate underlying soils and aquifers and result in a reduction in the quality of local groundwater. Oils can also bind to sediments, strata and organisms and can form emulsions that float on the water surface and upon breakdown the action of microbes can lower the dissolved oxygen content of water.

11.5.24. Surface water runoff containing oils and hydrocarbons could be intercepted by either the 10 soakaways (via oil interceptors) on the SHP site or discharged to Edinburgh Avenue culvert. Here surface water is transported into the Salt Hill Stream during low flow or Chalvey Brook during high flow. Therefore, the effect would be adverse but of low magnitude, and when this is combined with the importance of the receptor (Salt Hill Stream and Chalvey Brook water quality) would result in a minor adverse effect.

11.5.25. The main pathway for oils and hydrocarbons to affect the groundwater environment is through infiltration via preferential pathways, such as soakaways or open excavations. The effect would be adverse but of low magnitude, and when this is combined with the importance of the Secondary A and Principal Aquifer vulnerability this would result in a minor to moderate significance prior to mitigation.

11.5.26. Measures will be taken to protect controlled waters from the release of oils and hydrocarbons at the site. These measures comprise:

- Oils and hydrocarbons will be stored in designated locations with specific measures to prevent leakage and release of their contents, including the siting of storage areas away from surface water drains and on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked when not in use;
- Wherever possible, plant and machinery will be kept away from the drainage system and will have drip trays beneath oil tanks/engines/gearboxes/hydraulics which will be checked and emptied regularly via a licensed waste disposal operator;
- Surface water drainage would be routed to oil interceptors prior to discharge to sewer or soakaway; and
- An emergency spillage action plan will be produced, which site staff will have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material. As part of the existing drainage system, a penstock valve, which already exists on the entry point from the SHP site to the Edinburgh Avenue culvert, will be used to help contain a spill within the Site so that it can be effectively controlled and managed without leading to off-site effects.

11.5.27. Implementation of the above mitigation measures would reduce the magnitude of the potential effect to the environment and thus result in a residual effect of **negligible** significance on the groundwater and surface water receptors.

11.5.28. Table 11-9 summarises the potential and residual effects to water resource receptors as a result of the release of oils and hydrocarbons.

Table 11-9 Oil and Hydrocarbons: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Secondary A Aquifer – Groundwater vulnerability	High	Low (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**
Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	High	Low (Adverse)	Negligible	**Negligible**

Suspended Sediments

11.5.29. Potential sources of suspended sediments during the construction of the Proposed Development include excavations, exposed ground and stockpiles, grouting, plant and wheel washing and dust and sediment generated during the works. The major pathway for suspended sediments to reach water receptors is through runoff during rainfall events or when areas are being washed down. This may cause sediment-laden water to enter the local drainage network, cause blockages, and infiltrate the ground.

11.5.30. Suspended sediments can result in the suffocation of fish, smothering of plants, reduced levels of light within water bodies and decreased water quality surface water abstractions. Any organic matter contained within the sediment can increase the Biological Oxygen Demand (BOD) of the water and result in a lowering of dissolved oxygen (DO). Suspended sediments are also a major transport mechanism for low-solubility contaminants that can bind to sediment particles and enter water bodies resulting in adverse effects to the receiving water.

11.5.31. The release of potentially polluted suspended sediments could have a medium magnitude of change locally on flood risk, through deposition and build-up of sediment in the sewer network, resulting in potential blockages and localised flooding, and an adverse change of low magnitude on the groundwater (Secondary A and Principal Aquifers). When the importance of the resource is combined with the potential effect, it could result in an effect of moderate significance regarding flood risk (drainage network) and the Principal Aquifer and minor adverse significance on the Secondary A Aquifer prior to mitigation.

11.5.32. The suspended sediment could be transported by surface water and trapped on Site by the soakaways or discharge to the Edinburgh Avenue culvert and ultimately into Salt Hill Stream of Chalvey Brook. Therefore, the change would have a low magnitude, when this is combined with the importance of the receptors (Salt Hill Stream and Chalvey Brook water quality) would result in an effect of minor adverse significance prior to mitigation.

11.5.33. A number of mitigation measures will be employed at the Proposed Development Site to prevent the release of suspended sediments and reduce the effect to negligible. These comprise:

- Cut-off ditches and/or geotextile silt-fences, where practicable, which will be installed around excavations or exposed ground and stockpiles to prevent the uncontrolled release of sediments from the Site;
- Site access points which will be regularly cleaned to prevent build-up of dust and mud;
- Earth movement will be controlled and monitored to reduce the risk of construction silt combining with the development site run-off; and
- Properly contained wheel wash facilities will be used where required, to isolate sediment rich run-off.

11.5.34. Adoption of these mitigation measures will minimise the magnitude and the likelihood of uncontrolled release of sediment, therefore resulting in a predicted change of negligible magnitude and therefore an effect of **negligible** significance on flood risk (from the local drainage system) and Secondary A and Principal Aquifers.

11.5.35. Table 11-10 summarises the residual effect (post mitigation) on water resource as a result of the release of suspended sediments.

Table 11-10 Suspended Sediment: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Flood Risk (surface water runoff and sewer network)	High	Medium (Adverse)	Negligible	**Negligible**
Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	High	Low (Adverse)	Negligible	**Negligible**
Secondary A Aquifer-Groundwater vulnerability	High	Low (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**

Concrete and Cement Products

11.5.36. Concrete and cement products are highly alkaline and their release into controlled waters could have an adverse effect on fauna in controlled waters and on the water quality in general, resulting in a poor taste and an increase in pH to levels above the legal drinking water standards.

11.5.37. Construction processes that can result in the release of concrete and cement include on-site concrete mixing and washing down of areas where mixing has taken place. This could lead to large quantities of wastewater runoff which can flow into the surface water drainage system or infiltrate the ground.

11.5.38. The release of concrete and cement products has the potential to lead to a medium magnitude of change (short-term) to local flood risk (through blockage of the TWUL sewer network) and a low magnitude of change (medium-term) on the groundwater (Secondary A and Principal Aquifer). This could result in an effect of moderate adverse significance on flood risk (associated with the local drainage network) and the Principal Aquifer prior to mitigation, with an effect of minor adverse significance on the shallow groundwater (Secondary A Aquifer).

11.5.39. Surface water runoff containing concrete or cement products from the Site will runoff and drain into either the ten soakaways currently present on the SHP Site (some of which will be recreated during enabling works) or into the Edinburgh Avenue culvert. Concrete and cement products could discharged into the Salt Hill Stream, Chalvey Brook and finally the River Thames via the surface water network. It is considered that there would be a low magnitude of change on the water quality of these watercourses.

11.5.40. A number of precautions will be taken on-site to reduce the potential magnitude of an effect. These include:

- The majority of concrete used will be pre-mixed and delivered from an off-site source, thereby negating the need to mix concrete on-site and reducing the creation of alkaline wastewater;
- Wherever possible, any mixing and handling of wet concrete on-site will be undertaken in designated impermeable areas, away from any drainage channels or surface water; and
- A designated impermeable area will be used for any washing down or equipment cleaning associated with concrete or cementing processes and wastewater will be discharged to the foul drainage system, provided it meets discharge requirements, or contained and removed by tanker to a suitable discharge location via a licences waste operator.

11.5.41. These control (mitigation) measures will reduce the volume of potentially contaminated wastewater being produced and therefore the residual potential effect to both surface water, groundwater and the drainage network will be of **negligible** significance.

11.5.42. Table 11-11 summarises the potential and residual effects (post mitigation) to water resources as a result of concrete and cement products.

Table 11-11 Concrete and Cement: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Secondary A Aquifer – Groundwater vulnerability	High	Low (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**
Flood Risk (surface water runoff and sewer network)	Medium	Medium (Adverse)	Negligible	**Negligible**
Salt Hill Stream, Chalvey Brook and River Thames – Water Quality	High	Low (Adverse)	Negligible	**Negligible**

Water Demand

11.5.43. Processes during the demolition and construction phase of the Proposed Development which may require significant volumes of water supply include mixing (especially relating to concrete) supply for washing down and potable water for sanitary facilities for site staff. The most intensive use of water, for the mixing of concrete, will be done off-site where possible and therefore is not expected to significantly affect water supply to the Site.

11.5.44. It is expected that water supply to the Proposed Development during the demolition and construction phase will be provided by the existing groundwater abstraction network that is supplied by SHP.

11.5.45. Water demand for demolition and construction processes may represent a short-term increase in supply volumes to the Site; however, the abstraction volumes would be within the limits of the existing permit and offset by reduced consumption for the cooling towers. The effect on the Principal Aquifer is therefore considered to be **negligible**.

11.5.46. However, water saving measures will be adopted where possible thereby reducing the effect on the water supply network. Means of reducing water consumption that may be considered include:

- Selection and specification of equipment to reduce the amount of water required;
- Implementation of staff-based initiatives such as turning off taps, plant and equipment when not in use both on-site and within site offices;
- Use of recycling water systems such as wheel washes, site toilets hand wash; and
- Use of a rainwater harvesting system for use in equipment and vehicle washing.

11.5.47. As SHP has been granted the license for water supply by the groundwater abstraction for the SHP site already, the effect on water resources is considered to be **negligible**, as shown in Table 11-12.

Table 11-12 Water Supply: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Principal Aquifer – Abstractions, Water Supply	Very High	Negligible	Negligible	**Negligible**

Wastewater Generation

11.5.48. Wastewater generation on construction sites includes effluent from sanitary facilities provided on-site and sediment laden water from washing down and wheel wash facilities. It is expected that foul water generated at the Site will be drained via the existing connections to the TWUL foul sewers which will be treated within the Slough STW. If dewatering is required during excavations, then abstracted water may be discharged to the TWUL network (subject to agreement), following sediment removal.

11.5.49. The construction activities may result in an increase in the volumes of wastewater generated. An increase in wastewater volumes generated can increase pressure on the local sewer network capacity and increase flood risk.

11.5.50. The rate at which the Proposed Development Site can discharge to the TWUL sewer network is restricted by the size of the existing sewer connections. If no additional connections to the sewer network are obtained, then the maximum discharge into the sewer network will not exceed the existing situation. If wastewater is generated at a greater volume than it can be discharged to the sewer network, for example if large quantities of water are used during the event of a fire onsite, then it can be diverted to a holding area onsite where it can be subsequently treated and/or discharged to foul sewer or tankered off-site. Therefore, the effect on flood risk associated with the sewer network and subsequent overland flow is considered to be **negligible** (Table 11-13).

11.5.51. The use of water efficient fixtures and fittings and the use of mitigation measures to prevent water ingress can help to reduce the volume of water entering the TWUL foul drainage network and reduce flood risk.

Table 11-13 Wastewater Generation: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Flood Risk (surface water runoff and sewer network)	High	Negligible	Negligible	**Negligible**

Operational Proposed Development

11.5.52. The Proposed Development may potentially affect the features and attributes of water resource receptors. In line with the methodology used for the demolition and construction effect assessment, for the operational Proposed Development there are particular 'triggers'. The likely pathways between the source and the associated water resources feature or attribute have been identified. These sources, triggers, features/ attributes, and pathways are shown in Table 11-14. The effect (pre-mitigation) has been stated, and is fundamentally the result of the interaction between the source and the water resources feature, via a defined pathway.

11.5.53. Potential sources arising from the operational use of the Proposed Development, which could affect surface and groundwater, comprise the following:

- Leaks, spillages;
- Contamination from fuels and materials stored and handled on site, including oils, FGT and boiler treatment chemicals and residues;
- Flood risk; and
- Physical disturbance of shallow groundwater.

11.5.54. Other activities associated with the completed and operational Proposed Development comprise:

- Additional water demand; and
- Additional wastewater generation.

Table 11-14 Operational Phase of the Proposed Development - Associated Sources, Triggers, Features, Pathways/ Mechanisms and Potential Effects

Source	Triggers	Water Resources Feature / Attribute	Pathways/ Mechanisms	Potential Effects (Pre-mitigation)
Leaks and Spillages	• Improper storage and use of diesel, other fuels, oils, lubricants/coolants. • Vehicles using the Site access routes, and on-site car parks. • Vehicle washing. • Improper storage, handling and disposal of general and hazardous waste from proposed Site uses and activities. • Use of chemicals in the FGT plant.	Secondary A Aquifer (Shallow groundwater) Principal Aquifer	Infiltration (vertical and lateral migration of pollutants) into local geology and hydrogeology.	Contamination of Made Ground and soils and resultant pollution and degradation of water quality of underlying Secondary A and Principal aquifers.
		Salt Hill Stream, Chalvey Brook and River Thames - Water Quality	Surface water runoff discharging into the surface water sewer network and discharging to local watercourses	Pollution of watercourses.
In-situ Material storage including fuels	Presence of below ground structures, such as the drainage network, basements and foundations can present a source of pollutants to groundwater.	Secondary A Aquifer (Shallow groundwater) Principal Aquifer	Groundwater coming into contact with the materials used in foundations and basements and leaks from drainage networks.	Pollution and degradation of water quality of underlying Secondary A and Principal Aquifers.
On-site conditions which cause surface water run off (Flood Risk)	Increase in surface water run-off to local drainage / sewer network from on-site structures and impermeable surfaces.	Flood Risk (surface water runoff and sewers)	TWUL sewer network.	The increased pressure on the local sewer network capacity could result in a flood risk to the local surrounds.
Operations which require water use	Increase in water usage from proposed on-Site uses / activities.	Principal Aquifer	Water supply network	Increased pressure on local water resources (groundwater aquifer).
Operations which produce waste water	Increase in waste water discharged offsite from proposed on-site uses/activities.	Flood Risk (surface water runoff and sewers)	TWUL sewer network.	Pollution and increased pressure on the TWUL sewer network can increase flood risk.

Leaks and Spillages

11.5.55. Typical sources of pollution from developments include oil leaks and petrol spillages from vehicles or storage facilities, and chemicals associated with the FGT plant. Pollutants can be mobilised in surface water runoff and enter the surface water drainage network. The release of oil and chemicals in this way is anticipated to have a **negligible** effect on the surface water environment, as the quantities are likely to be relatively small and the soakaways and oil interceptors on site will trap any oil or chemicals before it is discharged to the Edinburgh Avenue Culvert. Dilution of pollutants is likely to occur within the surface water sewer network before discharging into the Salt Hill Stream or Chalvey Brook.

11.5.56. The main pathway for these pollutants to affect the groundwater environment is via infiltration through soft landscaped areas and via preferential pathways. However, due to the majority of the Proposed Development Site containing impermeable surfaces, there is a limited pathway to groundwater and therefore the effect would be of low magnitude (short-term), when combined with the importance of the receptor (Secondary A and Principal aquifer) would result in an effect of minor to moderate adverse significance prior to mitigation.

11.5.57. The risk of this occurring will be managed by operational measures such as use of bunded storage areas, speed limits and road markings and procedures during delivery or movement of materials. Oil/ petrol separators may be required within the surface water drainage systems at appropriate locations (for example, for drainage servicing parking or delivery areas). The drainage system will also have cut-off measures that will allow a spill to be contained within the Proposed Development Site, so that it can be effectively controlled and managed without leading to off-site effects. An emergency spillage response plan is already in place and this will continue to be used. This involves education/information on waste treatment/ emergency events/spills etc. provided to staff. Interceptors, drain covers and a penstock valve will be used in association with the drainage network, that serves high-risk areas as defined by the EA's PPG 3 (Ref. 11-21), such as access roads and areas with diesel storage.

11.5.58. Following the implementation of the aforementioned mitigation measures, the residual effect on water quality of the Salt Hill Stream, Chalvey Brook and the underlying groundwater quality is considered to be **negligible**. Table 11-15 summarises the potential contamination effects from leaks, spillages, fuel, chemicals and ash.

Table 11-15 Leaks, Spillages, Application of Fertilisers and Pesticides: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Secondary A Aquifer – Groundwater vulnerability	High	Low (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**
Salt Hill Stream and Chalvey Brook – Water Quality	High	Negligible	Negligible	**Negligible**

Contamination from In-Situ Materials

11.5.59. The presence of below ground structures, such as the drainage network and building foundations, in particular the fuel bunker, can present a source/pathway of pollutants to groundwater, through water coming into contact with the materials used in foundations and basements and leaks from drainage networks. This could have an adverse effect of medium magnitude on the Secondary A aquifer and low magnitude on the Principal aquifer and therefore a potential effect of moderate adverse significance prior to mitigation.

11.5.60. As part of the Proposed Development, the fuel bunker, as well as a section of the boilerhouse (for storage of bottom ash), is expected to be constructed to a maximum depth of 4m bgl, which will be constructed above the groundwater level. A contingency measure of a coarse gravel drainage layer (at least 300mm thick) around and beneath that part of the construction that is near and below the water table will be enforced. This follows the EA's guidelines and will mean that the fuel bunker will not affect groundwater. In line with the EA's guidance note 'Groundwater protection: principles and practice (GP3)' the bunker would be leak tested on commissioning, supplemented by regular, long term monitoring of the perched groundwater. Therefore the residual effect on groundwater quality post-mitigation is likely to be negligible.

11.5.61. It is envisaged that all the proposed drainage/service runs will be surrounded by appropriate granular bedding materials and located above the static level of any shallow groundwater. Some confirmatory tests of the new drainage systems may be carried out in accordance with statutory requirements. The drainage network installed as part of the Proposed Development will be constructed to meet with Building Regulations 2000, Part H (Ref. 11-44). As a result, the effect of any permanent horizontal pathways on water flows and on groundwater quality is considered to be of negligible significance.

11.5.62. The potential residual effect is therefore considered to be of **negligible** significance. Table 11-16 summarises the potential contamination effects from in-situ materials.

Table 11-16 Contamination from In-Situ Materials: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Secondary A Aquifer – Groundwater vulnerability	High	Medium (Adverse)	Negligible	**Negligible**
Principle Aquifer – Groundwater vulnerability, Abstractions, Water Supply	Very High	Low (Adverse)	Negligible	**Negligible**

Flood Risk

11.5.63. URS has prepared a FRA (*Appendix F, Volume II* of this ES) that assesses the risk of flooding to and from the Proposed Development under both the current and future baseline. The FRA concludes that the Proposed Development and operational activities at the Site will not increase the risk of flooding from fluvial, tidal, groundwater or artificial sources.

11.5.64. A conceptual surface water management strategy has been developed within Section 4 of the FRA to ensure that the Proposed Development does not increase the risk of flooding from surface water, overland flow and sewers. In brief, the conceptual surface water management strategy proposes that prior to construction:

- A survey is undertaken to determine the existing flow rate to the Edinburgh Avenue sewer;
- Ground investigations are undertaken to determine the infiltration capacity of the soils;
- That surface water is discharged to both the Edinburgh Avenue culvert and to ground through the provision of soakaway, pending confirmation of the ground conditions;
- The Proposed Development retains the existing connections with the surface water sewers (i.e. the Edinburgh Avenue culvert) adjacent to the site and that, as a minimum, surface water discharge to the Edinburgh Avenue sewer is restricted to, and does not exceed the existing flow rate under the Proposed Development scenario (thereby ensuring that flood risk is not increased elsewhere);
- That opportunities to provide betterment upon the existing situation (i.e. aspiring towards reducing surface water runoff towards a greenfield runoff rate of 5 litres/second/hectare through the implementation of SuDS and additional attenuation storage) will be investigated for feasibility at the detailed design stage, including:
  - That a sufficient volume of attenuation storage is provided within the Site to accommodate a 1 in 30 year storm (equivalent to an Annual Exceedance Probability (AEP) of 3.3%) without resulting in ground-level surface water flooding on the Site; the surface water discharge rate should thus be restricted to the existing outfall rate whilst accommodating surface water runoff from the 1 in 30 year storm;
  - That the Proposed Development is designed for exceedance of the 1 in 30 year drainage system in accordance with CIRIA 635, with controlled flooding being utilised on the surface (e.g. through ground level contouring or surface drains) to accommodate surface water runoff generated from those storm events exceeding the 1 in 30 year (3.3% AEP) storm and up to the 1 in 100 year (1% AEP) storm plus an allowance for climate change; thus ensuring that the development does not increase flood risk elsewhere through the generation of overland flows; and
  - That flood resistant and flood resilient measures are adopted to manage the residual risk of flooding from pluvial and sewer sources at the Site where appropriate.

11.5.65. Section 4 of the FRA (*Appendix F, Volume II* of this ES) should be consulted for further details on the proposed mitigation measures, as well as the potential opportunities for SuDS and attenuation storage at the Site.

11.5.66. In addition to the mitigation measures outlined above, the Applicant will voluntarily aim to delay flushing from the cooling tower water to the sewer network during a heavy rainfall event, so that it does not overload the network. This is an abnormal and infrequent event, and the cooling tower system can retain the water for approximately 1-2 hours, which may be sufficient to avoid it coinciding with some short-term, intense rainfall events. This will reduce pressure on the wider sewer network capacity at peak flows (due to the connectivity between the foul and surface water sewers).

11.5.67. As discharge to the Edinburgh Avenue sewer will be restricted to the existing rate, the Proposed Development will therefore not increase the risk of flooding elsewhere, thereby meeting with the requirements of the NPPF.

11.5.68. The Proposed Development will therefore have an effect on **negligible** significance on flood risk. If at detailed design it is determined to be feasible to reduce the surface water runoff generated by the Site, the Proposed Development will potentially have a **minor beneficial** effect on flood risk.

11.5.69. Table 11-17 summarises the flood risk effects resulting from the Proposed Development.

Table 11-17 Flood Risk: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Flood Risk	High	Negligible	Negligible	**Negligible** to **minor beneficial**

Water Supply and Wastewater Generation

11.5.70. The SHP site is currently being used by the Applicant as a CHP Plant. The water supply for the cooling system, feedwater for the water treatment plant, general processes, and office water is currently from a groundwater abstraction offsite. The water demand once the Proposed Development is operational will remain comparable to water demand up until the closure of the CFB boilers, in the order of 150-200m^3/hr; therefore the effect will be **negligible.**

11.5.71. The Proposed Development foul water generated onsite will remain discharging into the TWUL foul network under the existing discharge consent and arrangements. The trade effluent will continue discharging to the 5 existing discharge points across the Site into the foul network in accordance with the existing environmental permit. Trade effluent will not be discharged directly to the surface water sewer network. Process effluent generated by Proposed Development should therefore not increase the pressure on the foul sewer network or, by virtue of the various sewer overflows, the surface water sewers within the wider Trading Estate.

11.5.72. Therefore, the discharge of process effluent to the foul sewer system will not increase flood risk from the foul or surface water sewers. During the operational phase of the Proposed Development, it anticipated that the workforce will increase by an estimated 20 people. This increase will have negligible effect on the water demand and wastewater generation. Therefore the effect on wastewater generation and water resources will be **negligible**, and therefore insignificant.

Table 11-18 Post-Development Water Supply and Wastewater Generation: Summary of Effects

Receptors	Receptor Importance	Magnitude of Change (Pre Mitigation)	Magnitude of Change (Post Mitigation)	Residual Effect Significance (Post Mitigation)
Flood Risk (surface water runoff and sewer network)	High	Negligible	Negligible	**Negligible**
Principle Aquifer – Abstractions, Water Supply	Very High	Negligible	Negligible	**Negligible**

11.6. Residual Effects and Conclusions

11.6.1. No significant effects to water resources are expected throughout the demolition and construction works associated with the Proposed Development provided that the mitigation measures as discussed throughout this chapter are applied.

11.6.2. The assessment also concludes that the completed and operational Proposed Development will have a negligible effect on the volumes of surface water runoff and flood risk. Table 11-19 summarises the residual effects on water resources.

Table 11-19 Summary of Residual Effects (post-mitigation)

Description	Effect Magnitude	Effect Significance
Demolition and Construction		
Preferential pathways and disturbance to groundwater	Negligible	**Negligible**
Disturbance of the existing drainage and water supply networks	Negligible	**Negligible**
Disturbance of contaminated land	Negligible	**Negligible**
Leaks and Spillages (oils and hydrocarbons)	Negligible	**Negligible**
Release of suspended sediment	Negligible	**Negligible**
Use of concrete and cement products	Negligible	**Negligible**
Water Demand	Negligible	**Negligible**
Wastewater generation	Negligible	**Negligible**
Completed Operational Development		
Leaks and Spillages	Negligible	**Negligible**
Contamination from in-situ materials	Negligible	**Negligible**
Flood Risk	Negligible to Low	**Negligible, Minor Beneficial**
Water Supply and Wastewater generation and sewer flooding	Negligible	**Negligible**

11.7. Cumulative Effects

11.7.1. This section of the chapter assesses the effects of the Proposed Development in combination with the potential effects of other proposed developments in the vicinity as outlined in *Chapter 2: Assessment Methodology* of this ES.

Demolition and Construction Effects

11.7.2. Cumulative effects to water resources during demolition and construction processes are associated with the creation of preferential pathways and disturbance to groundwater, generation of sediments and the release into the sewer drainage network; spillage and leakage of oils and fuels; spillage or leakage of wet concrete or cement; disturbance of contaminated land; and foul drainage.

11.7.3. As outlined in previous sections of this chapter, measures exist to manage and control these effects and reduce the magnitude of change and significance of effects to a minimum. It is assumed that during the demolition and construction phases of the identified cumulative schemes, that best practice measures (as highlighted within this ES chapter) will also be identified and adopted.

11.7.4. Therefore, as a result of the control measures utilised in the Proposed Development and the cumulative developments, as well as the potential that not all of the cumulative schemes will be under construction at the same time and therefore are not liable to discharge at exactly the same time, the cumulative effect is considered to be of **negligible** significance**.**

Operational Effects

11.7.5. As outlined in previous sections of this chapter, it is possible (and industry standard practice) to manage and control these effects and reduce the magnitude of change and significance of effects to a minimum. It is assumed that these appropriate measures will be adopted for the cumulative schemes, where necessary. This includes the separate application by the Applicant for Further Development, including a water treatment plant, on land within the SHP site, which will utilise chemical treatment of water to make it suitable for use in the process. Taking these measures into account, the cumulative effect from leaks and spills, contaminated land and flood risk are considered to be of **negligible** significance.

11.7.6. The Proposed Development will retain its existing connection points to the TWUL foul network under the existing discharge consent and arrangements. Therefore the volume of foul and trade effluent discharged to TWUL foul sewer system should therefore not increase the pressure on the network. Increased generation of foul water at other cumulative schemes may put pressure on the TWUL sewer network, if discharging to a connected system. TWUL will need to come to an agreement on the rate that foul water can be discharged to the sewer system for these cumulative schemes. If capacity issues in the sewer network are identified by TWUL then this can be dealt with by holding back foul flows before discharging to the TWUL sewer or by financial contributions from developers to the upgrade of the sewer system. Taking this into account, a cumulative effect of **negligible** significance is anticipated**.**

11.7.7. The water supply to the SHP site is covered by an abstraction licence which restricts the volume of water that can abstracted. The source of water for the cumulative schemes is unknown and could be supplied by another source, for example, from TWUL water network. A separate planning application by the Applicant for Further Development includes a central site services building and water treatment plant (which will replace two aged plant currently operating on the SHP site; the reverse osmosis and demineralisation plant), on land within the SHP site. This will be supplied from the same groundwater source as the SHP site and will have similar water use requirements to the plant historically operated on the SHP site. The abstraction licence issued by the Environment Agency already has a limit on the volume of water that may be used, in order to avoid adverse environmental effects, and the Further Development will therefore lead to no change or betterment in terms of water abstraction. The cumulative effect on water supply is therefore considered to be **negligible**.

11.8. References

Ref. 11-1 HMSO, 1991; 'The Water Resources Act'.

Ref. 11-2 HMSO, 2003; 'The Water Act'.

Ref. 11-3 HMSO, 2003; 'The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003'

Ref. 11-4 HMSO, 1995; 'Environment Act'.

Ref. 11-5 HMSO, 1990; 'Environmental Protection Act 1990' (c.43).

Ref. 11-6 Commission of the European Communities, (2000); Directive 2000/60/EC 'The Water Framework Directive'.

Ref. 11-7 HMSO, 1999; The Anti-Pollution Works Regulations.

Ref. 11-8 HMSO, 2001; .The Control of Pollution (Oil Storage) (England) Regulations.

Ref. 11-9 HMSO, 2009; 'The Groundwater (England and Wales) Regulations.

Ref. 11-10 European Commission, 2006; Directive 2006/118/EC, on the protection of groundwater against pollution and deterioration, PE-CONS 3639/1/100 Rev 1 Luxembourg.

Ref. 11-11 HMSO, 2009; 'The Environmental Damage Regulations'.

Ref. 11-12 HMSO, 2009; 'The Water Resources Act (Amendment) (England & Wales) Regulations'.

Ref. 11-13 HMSO, 2010; 'The Environmental Permitting (England and Wales) Regulations'.

Ref. 11-14 HMSO, 2000; 'The Water Supply (Water Quality) Regulations 2000'.

Ref. 11-15 HMSO, 2010; 'The Flood and Water Management Act'.

Ref. 11-16 Department for Communities and Local Government (2012); 'National Planning Policy Framework'

Ref. 11-17 Planning Policy Guidance (2014) http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/ (Accessed 04/04/2014)

Ref. 11-18 Slough Borough Council (2008); 'Local Development Framework'

Ref. 11-19 Environment Agency; 'Pollution Prevention Guidelines 1: General Guide to the Prevention of Pollution'

Ref. 11-20 Environment Agency; 'Pollution Prevention Guidelines 02: Above Ground Oil Storage Tanks'.

Ref. 11-21 Environment Agency, 'Pollution Prevention Guidance 03: Use and Design on Oil Separators in Surface Water Drainage Systems'.

Ref. 11-22 Environment Agency, 'Pollution Prevention Guidelines 4: Disposal of Sewage where no Mains Drainage is available'.

Ref. 11-23 Environment Agency; 'Pollution Prevention Guidelines 5: Works in, near or liable to affect watercourses'

Ref. 11-24 Environment Agency; 'Pollution Prevention Guidelines 6: Working at construction or demolition sites'.

Ref. 11-25 Environment Agency, 'Pollution Prevention Guidelines 7: Refuelling Facilities'.

Ref. 11-26 Environment Agency; 'Pollution Prevention Guidelines 21: Pollution Incident Response Planning'.

Ref. 11-27 CIRIA, (2001); 'Control of water pollution from construction sites: Guidance for consultants and constructors'. C532.

Ref. 11-28 CIRIA, (2007); 'The SuDS Manual'. C697

Ref. 11-29 Ordnance Survey Map, Explorer, Sheet 176 London West, 1:25,000.

Ref. 11-30 BGS Map, (1981) Sheet 256 North London; Solid and Drift Edition, 1981

Ref. 11-31 Landmark Information Group (2012); 'Envirocheck Report 4576233_1'

Ref. 11-32 WSP, (2013); 'Intrusive Site Investigation and Geotechnical Assessment report'

Ref. 11-33 Environment Agency Website, http://www.environment-agency.gov.uk/ Accessed July

Ref. 11-34 Thames Water Utilities Limited (TWUL) Asset Location Plans

Ref. 11-35 Slough Borough Council (SBC), (2012); Strategic Flood Risk Assessment.

Ref. 11-36 WSP, (2011); 'Preliminary Flood Risk Assessment, Slough Borough Council.'

Ref. 11-37 Department of Transport (2003); 'Transport Analysis Guidance' (TAG) UNIT 3.3.11'.

Ref. 11-38 Department of the Environment Transport and the Regions (DETR), (1998); 'New Approach to Transport Appraisal'.

Ref. 11-39 DETR (2000); 'Guidance for the Methodology of Multi-Modal Studies Volume 2'.

Ref. 11-40 Mustow, S.E, Burgess, P.F. and Walker, N., (2005); 'Practical Methodology for Determining the Significance of Impacts on the Water Environment. Journal of the Chartered Institution of Water and Environmental Management, 19 (2)'.

Ref. 11-41 Commission of the European Communities, (2008); Directive 2008/105/EC 'Priority Substances Directive'

Ref. 11-42 Thames Water Utilities Limited (2013), 'Asset Location Search.'

Ref. 11-43 Thames Water Utilities Limited (2008) The Water Industry Act 1991, Consent to discharge trade effluent into a public sewer

Ref. 11-44 Office of the Deputy Prime Minister (2002) 'Building Regulations Part H: Drainage and Waste Disposal'

12. CULTURAL HERITAGE AND ARCHAEOLOGY

12.1. Introduction

12.1.1. This chapter of the ES identifies the location, type and significance of cultural heritage assets and their setting and reports on the potential effects of the Proposed Development on this resource.

12.1.2. Heritage assets are defined by Government as "*A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest*" (NPPF, Annex 2 Glossary) (Ref. 12-1). Heritage assets include those that are designated under legislation (refer to NPPF Glossary, Designated Asset) as well as those that are undesignated. Undesignated heritage assets are assets recognised by Local Planning Authorities as having a degree of local interest or significance and are usually identified by their inclusion within the local Historic Environment Record (HER) (2010) (Ref. 12-2).

12.1.3. Cultural Heritage is generally divided into three key areas comprising:

- Archaeology;
- Historic buildings; and
- Historic landscape.

12.1.4. These are discussed separately in each component of this chapter but have been combined to identify the significance of effects, in accordance with the holistic approach advocated by the NPPF.

12.1.5. The specific aims of this chapter are to:

- Identify and characterise designated and undesignated assets both within the Proposed Development Site and the defined study area (as described below);
- Assess the significance and setting of those assets;
- Identify areas disturbed by modern activity that might have affected the survival and significance of heritage assets within the Proposed Development Site;
- Assess the presence/absence, and condition of heritage assets within the Proposed Development Site and the potential effect of the proposed works upon them;
- Assess the effect of development on the significance and setting of heritage assets both within the Proposed Development Site and the defined study area; and
- Outline strategies to mitigate any identified effect arising from the Proposed Development upon heritage assets.

12.1.6. The assessment has been carried out in accordance with the Institute for Archaeologists (IfA) Code of Conduct, Standards and Guidance (Ref. 12-3) and in accordance with policy and guidance with specific reference to:

- Policies within the NPPF;
- English Heritage, Conservation Principles Policy and Guidance (2008) (Ref. 12-4); and
- English Heritage, The Setting of Heritage Assets (Ref. 12-5).

12.2. Legislation and Planning Policy Context

National Legislation

12.2.1. This section presents the national legislation that is of relevance to Cultural Heritage in the context of the Proposed Development.

Ancient Monuments and Archaeological Areas Act

12.2.2. The Ancient Monuments and Archaeological Areas Act 1979 sets out the requirement for Scheduled Ancient Monument Consent for any works of demolition, repair, and alteration that might affect a Scheduled Ancient Monument. For archaeological sites that are not covered by the above Act, protection is afforded through development control, the Town and Country Planning Act 1990 and the NPPF.

Planning (Listed Buildings and Conservation Areas) Act 1990

12.2.3. The Planning (Listed Buildings and Conservation Areas) Act 1990 (Paragraph 1) imposes a duty on the Secretary of State to compile lists of buildings of special architectural or historic interest. Section 7 of the Act requires applicants to obtain consent for the demolition of a listed building or for works of alteration or extension, which would affect its character as a listed building. In consideration of proposals within the setting of listed buildings, the Act establishes a requirement to have special regard to the desirability of preserving that setting.

12.2.4. The Act (Paragraph 69) requires local planning authorities to determine which parts of their area are of special architectural or historic interest and to designate those areas as conservation areas. The local planning authority also has a duty to formulate and publish proposals for the preservation and enhancement of their conservation areas (Paragraph 71).

12.2.5. Paragraph 73 ensures that no building situated within a conservation area may be demolished without the local planning authority's consent.

National Planning Policy

National Planning Policy Framework (2012)

12.2.6. The NPPF (Ref. 12-8) sets out a series of policies that are a material consideration to be taken into account in development management decisions in relation to heritage consent regimes established in the Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) Act 1990. More specifically Section 12 defines the policies for conserving and enhancing the historic environment and heritage assets.

12.2.7. Section 12 of the NPPF sets out the importance of being able to assess the significance of heritage assets that may be affected by a development. Significance is defined in Annex 2 as being the "*value of an asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic interest*".

12.2.8. The definition of significance provided in Annex 2 also clearly states that significance is not only derived from an asset's physical presence, but also from its setting. The setting of a heritage asset is defined at Annex 2 as *"the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the assets and its surroundings evolve"*.

12.2.9. Paragraphs 128 and 129 of the NPPF state that when determining applications, local authorities should require an applicant to describe the significance of assets that may be affected by a development, to a level of detail that is proportionate to their importance and that is no more than sufficient to understand the potential impact on their significance; this should also include assets where their setting may be affected by a proposal.

12.2.10. Paragraph 132 recognises that heritage assets are irreplaceable and that where proposed development may impact on the significance of designated heritage assets, great weight should be placed on its conservation; the more important the asset, the greater the weight should be. Substantial harm to or loss of assets of the highest significance for example scheduled monuments, registered battlefields, grade I and II* listed buildings and registered parks and gardens and World Heritage Sites should be wholly exceptional. The NPPF notes that alteration or destruction of a heritage asset or development within its setting can harm its significance.

12.2.11. Where substantial harm is found, substantial public benefits must be achieved to outweigh this loss. The NPPF sets out four tests in paragraph 133 for local authorities to consider when assessing applications of this nature.

12.2.12. The NPPF states that the effect of a planning application on non-designated heritage assets should be taken into account when considering the application. Paragraph 135 sets out the need for a balanced judgement between the significance of the heritage assets and the scale of any harm or loss, when considering assets directly or indirectly affected by proposed development.

12.2.13. At Paragraph 139 the NPPF recognises that non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.

National Planning Practice Guidance (2014)

12.2.14. The National Planning Practice Guidance (NPPG) was published as a web-based resource in March 2014 (Ref. 12-9). The NPPG provides up to date advice for the application of the policies within the NPPF. Guidance related to heritage issues is provided in the "*Conserving and enhancing the historic environment*" section of the guide.

12.2.15. The NPPG provides useful guidance on the assessment of substantial harm. As the primary test of the effect of development upon the significance of heritage assets, guidance is given in the NPPG as to how to assess if the harm is substantial or not. The NPPG states that *"in general terms, substantial harm is a high test, so it may not arise in many cases… it is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed. The harm may arise from works to the asset from development within its setting.*"

12.2.16. When establishing the parameters of what constitutes substantial harm, the NPPG points to total destruction being the most 'obvious' cause of substantial harm. Anything less than this needs to be judged on its own merits. Partial destruction may remove elements of an asset which were detrimental to its significance and therefore may not be harmful at all. When discussing works that are moderate or minor in scale, the NPPG advises that these are "*likely to cause less than substantial harm or no harm at all".* The importance of considering each development on its own merits is reinforced by the statement that even minor works have the potential to cause substantial harm to an assets' significance.

PPS5: Planning for the Historic Environment: Historic Environment Planning Practice Guide (2010)

12.2.17. Although PPS5: Planning for the Historic Environment has been superseded by the National Planning Policy Framework (NPPF), the PPS5 Planning Practice Guide (2010) (Ref. 12-10) is still valid. English Heritage is currently preparing a good practice guide to accompany the NPPG, providing additional clarity where needed. Until such a time as this good practice guide is published, the PPS5 Planning Practice Guide remains in force as a material consideration in the planning process and is to be utilised alongside the guidance offered in the NPPG.

12.2.18. For non-designated assets, the guide states that "*the desirability of conserving them and the contribution their setting may make to their significance is a material consideration, but individually less of a priority than for designated assets or their equivalents*" (paragraph 83).

12.2.19. For designated assets, the PPS5: Planning Practice Guide states "*any harmful impact on the significance of designated assets needs to be justified on the grounds set out in HE9.2 (substantial harm or total loss) or HE9.4 (less than substantial harm)"* (paragraph 85). This is clarified in paragraphs 91 to 95 which set out parameters for establishing the definition of substantial harm. Paragraph 91 states: "*where substantial harm to, or total loss of, the asset's significance is proposed a case can be made on the grounds that it is necessary to allow a proposal that offers substantial public benefits*." This suggests that substantial harm is equated to serious harm, or total loss of significance.

12.2.20. The practice guide also provides guidance with regards to developments affecting the setting of heritage assets (paragraph 113 to 124).

Local Planning Policy

12.2.21. Core Policy 9 of Slough Local Development Framework Core Strategy (Ref. 12-11) states that development should respect the character and distinctiveness of existing buildings, townscapes and landscapes and their local designations.

12.2.22. The Local Plan of 2004 (Ref. 12-12) has been superseded by the Local Development Framework, however, Appendix 6 provides a list of buildings defined as having local historic interest, which has been taken into account.

12.2.23. Further planning policy is discussed in *Chapter 3: Planning Policy Context*.

Other Guidance

English Heritage Conservation Principles 2008

12.2.24. In 2008 English Heritage published a set of principles governing the approach to decision making (Ref. 12-4). The document sets out six key guiding principles. Of most relevance to proposals for development, Principle 3 states that understanding the significance of places is vital whilst Principle 4 states that significant places should be managed to sustain their values.

12.2.25. The significance of a place can be determined with reference to a series of heritage values comprising Evidential, Historical, Aesthetic and Communal. Having first understood and addressed the values that make up the significance of a place, the document sets out how then to assess significance; Paragraphs 76 and 77 deal specifically with matters such as setting and context.

Seeing the History in the View: A Method for Assessing Heritage Significance within Views

12.2.26. English Heritage's 'Seeing the History in the View' (Ref. 12-13) presents a method for understanding and assessing heritage significance within views. This is a two part process; the first part involves establishing the baseline significance of heritage in views, whilst the second part includes the assessment of the potential impact of a development proposal on the heritage significance of the identified view.

12.2.27. The Guidance uses values for the importance of heritage assets identified within the view, for the view as a whole and criteria for determining the magnitude of impact of a development on the heritage significance within the view. The overall effect is expressed in a range from negligible to major.

The Setting of Heritage Assets

12.2.28. In 'The Setting of Heritage Assets' (Ref. 12-5) English Heritage defines setting as 'the surroundings in which a heritage asset is experienced.' Setting in this definition does not have a fixed extent and can change as the asset and its surroundings evolve. Elements of a setting can make positive or negative contributions to the significance of an asset and affect the ways in which it is experienced. The guidance is clear that setting is more extensive than the curtilage of a building and other factors contribute to this other than the visual elements, including noise, dust and vibration.

12.2.29. The Guidance recommends a five step approach to the assessment of the effect of development on the setting of heritage assets as follows:

- Step 1: identify which heritage assets and their settings are affected;
- Step 2: assess whether, how and to what degree these settings make a contribution to the significance of the heritage asset(s);
- Step 3: assess the effects of the proposed development whether beneficial or harmful, on that significance;
- Step 4: explore ways of maximising enhancement and avoiding or minimising harm;
- Step 5: make and document the decision and monitor outcomes.

12.3. Assessment Methodology and Significance Criteria

Study Area

12.3.1. An initial study area of 1km, centred on the Proposed Development Site has been utilised for the study. Further to this, designated assets of the greatest potential sensitivity, encompassing Scheduled Monuments, Parks and Gardens, and Grade I and II* listed buildings, have been identified within an outer 10km study area. This was cross-referenced to the Zone of Theoretical Visibility (ZTV), details of which can be found in *Chapter 14: Landscape and Visual* of this ES.

12.3.2. A site visit determined that no designated assets outside of 5km from the Site would suffer effects to views or setting, except where they were situated on very high ground. Therefore the majority of listed buildings between 5km and 10km from the Site have been scoped out of this assessment following this site based investigation. Historic Landscape (excluding Registered Park and Gardens) is also scoped out of this assessment as the Proposed Development Site is located within a modern industrial estate.

12.3.3. A gazetteer of heritage assets is provided in *Appendix G-1, Volume II* of this ES; each heritage asset is numbered within the gazetteer to correspond with the numbers on Figures 12-1 to 12-5, which map the heritage assets within the 1km study area and the 10km study area.

Conservation Areas

12.3.4. All conservation areas within 10km of the Proposed Development Site were identified during the initial appraisal stage. These were assessed prior to the final scoping of heritage assets where effects were likely to occur. From this initial study it was established that those conservation areas beyond 5km were unlikely to experience an effect, predominantly due to the Proposed Development Site being located within an area of dense commercial and industrial structures. Analysis of long range effects (outside of the 5km study area) caused by the Proposed Development has been focused on those heritage receptors which have designed views (i.e. heritage receptors which were designed to be viewed from other locations), or where the view from the asset is significant in its heritage value. By their nature, conservation areas tend to be inward-looking, centred on a historic focal point, such as a street, park or other grouping of assets. In certain cases, a vista down a street or as part of a landscape can be significant to a conservation area. However, in the case of the Proposed Development, any wide views to the site will not substantially change due to its current and proposed form and its location.

12.3.5. Where there are Grade I or II* designated assets within a conservation area which have designed or significant views, these have been assessed as assets in their own right. In the case of Windsor and Eton for example, whilst there are possible effects on the Castle and Eton School, the conservation areas that surround these assets are focused inwards upon these major assets and the townscape and landscape patterns within which they are located.

12.3.6. Therefore, it is considered that assessment of conservation areas outside of the 5km study area was not relevant in relation to the Proposed Development and these are not considered further in this assessment. Conservation Areas within the 5km have been considered (as shown on Figure 12-6 and listed in *Appendix D-2, Volume II)*, and where site assessment and analysis of existing appraisals have identified that there will be no significant effects, they have been scoped out of further assessment. This is the case for the following Conservation Areas:

- South Buckinghamshire:
  - Boveney Conservation Area;
  - Burnham Conservation Area;
  - Farnham Royal Conservation Area;
  - Framewood Road Conservation Area;
  - Stoke Poges West End Conservation Area;
  - Stoke Green Conservation Area;
  - Taplow Conservation Area;
- Royal Borough of Windsor and Maidenhead:
  - Mill Lane Conservation Area;
  - Trinity Place/Clarence Crescent Conservation Area.
- Slough Borough Council:

- St Bernard's School Conservation Area; and
- Sussex Place/Clifton Road Conservation Area.

12.3.7. The following Conservation Areas are being retained for further assessment:

- South Buckinghamshire;
  - Stoke Park Conservation Area;
  - Taplow Riverside Conservation Area;
- Royal Borough of Windsor and Maidenhead;
  - Dorney Conservation Area;
  - Eton Conservation Area;
  - Windsor Town Centre Conservation Area;
- Slough Borough Council;
  - Huntercombe Conservation Area; and
  - Upton Park/Upton Village Conservation Area.

Sources of Information

12.3.8. The preparation of the baseline has been informed by a range of material collected and collated from a variety of sources, including:

- Datasets and asset descriptions provided by Berkshire Historic Environment Record;
- Ordnance Survey (OS) maps and other historic map sources from Berkshire Local Studies Library, Reading;
- Details of designated assets from English Heritage National Heritage List for England;
- Estate and Tithe mapping from the National Archives, Kew;
- SBC Local List of Buildings of Historic Interest;
- Site walkover surveys; and
- Archaeological and historical journals, books and internet sources as appropriate.

12.3.9. Site walkover surveys were undertaken in September 2013. During the site visits, setting and views from relevant assets were assessed. Conditions during the site visits varied, one being on a clear day, and the other being overcast and cloudy with heavy rain.

Assessment Methodology and Significance Criteria

12.3.10. The overall approach to the assessment and significance criteria is set out in *Chapter 2: Assessment Methodology* of this ES.

12.3.11. For the purposes of the assessment described in this chapter, the term significance is defined as the value of the heritage asset arising from heritage interest which may be evidential, historical, aesthetic or communal (Ref. 12-4). Significance can also be derived from an asset's setting. Taking these criteria into account, each identified heritage asset can be assigned a level of significance in accordance with a five-point scale (see Table 12-1).

Table 12-1 Criteria for Determining the Significance of Heritage Assets

Sensitivity	Criteria
High	Remains of inscribed international importance, such as World Heritage Sites Grade I and II* listed buildings Grade I and II* Registered Parks and Gardens Registered Battlefields Scheduled Monuments Non-designated archaeological assets of schedulable quality and importance Buildings, sites and areas that can be shown to have particularly important qualities in their fabric or historical association
Medium	Grade II listed buildings Grade II listed Registered Parks and Gardens Conservation Areas Non-designated buildings, monuments or sites that are of special interest and can be shown to have qualities in their fabric or historical association of regional interest
Low	Locally listed buildings Parks and gardens of some local interest Non-designated buildings, monuments or sites of local importance or of modest quality including those historic townscapes with historic integrity Assets that are damaged so that too little remains to justify inclusion into a higher grade
Not significant	Assets identified as being of no archaeological, architectural, artistic, or historic value Assets whose values are compromised by poor preservation or survival or of contextual associations to justify inclusion into a higher grade.
Uncertain	Buildings, sites, monuments or areas of identified archaeological potential not yet investigated

12.3.12. Having identified the significance of the heritage assets, the next stage is to assess the level or magnitude of the effect from the Proposed Development. Effects can be considered in terms of direct, indirect and cumulative. The sources of effect may arise during construction, operation and/or decommissioning, and can be characterised in terms of timing, scale, duration, reversibility and the likelihood of an effect to occur and can be beneficial or adverse. All have been considered in this assessment. Table 12-2 provides a description of magnitude of change on a cultural heritage asset.

Table 12-2 Criteria for Magnitude of Change on a Cultural Heritage Asset

Change Rating	Description of Effect
High	Change such that the significance of the asset is totally altered or destroyed. Comprehensive change to setting affecting significance, resulting in changes in our ability to understand & appreciate the resource and its historical context and setting.
Medium	Change such that the significance of the asset is affected; and/or changes such that the setting of the asset is noticeably different, affecting significance resulting in changes in our ability to understand and appreciate the resource and its historical context and setting.
Low	Change such that the significance of the asset is slightly affected; and/or changes to the setting that have a slight effect on significance resulting in changes in our ability to understand and appreciate the resource and its historical context and setting.
Minimal	Changes to the asset that hardly affect significance; and/or changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the resource and its historical context and setting.
No change	The development does not affect the significance of the asset; and/or changes to the setting do not affect the significance of the asset or our appreciation of it.

12.3.13. It should be noted that only those heritage assets where there is a potential for an effect have been included within the assessment. Following on from this, the assessment of the significance of effects is considered and takes into consideration any design mitigation or additional mitigation proposed during development.

12.3.14. The assessment of the level of overall significance of effect taking into consideration mitigation is arrived at by cross-referencing between the significance of the asset (Table 12-1) and the magnitude of effect (Table 12-2) as shown in Table 12-3 below. The assessment of the overall significance of effect of the scheme on each identified heritage asset can be Negligible, Adverse or Beneficial. Effects are considered to be significant if they are major or moderate.

Table 12-3 Matrix for establishing Significance of Effect

Significance of Asset	Magnitude of Change				
	No change	**Minimal**	**Low**	**Medium**	**High**
High	Negligible	Minor	Moderate	Major	Major
Medium	Negligible	Minor	Minor	Moderate	Major
Low	Negligible	Negligible	Minor	Minor	Moderate
Not significant	Negligible	Negligible	Negligible	Negligible	Negligible
Uncertain	Determinable only on definition of the asset				

12.3.15. Within national planning policy, principally the NPPF, effects are considered in terms of ‘substantial’ or ‘less than substantial’ harm. Where a development proposal would lead to less than substantial harm to the signfnicance of a designated heritage asset, this harm should be weighted against the public benefits of the proposal (paragraph 133).

12.3.16. The NPPF does not provide a qualitative definition of what constitutes ‘substantial’ or ‘less than substantial’ harm. The ES is required to report on the significance of an effect and does not make a judgement on whether ‘substantial’ or ‘less than substantial’ harm will be caused. The judgement of whether an effect causes ‘substantial’ harm is based on whether the effect on the individual asset has an effect on the wider historic environment; where the significance of an asset is such that its loss would be detrimental to the understanding of the unique values of the wider asset type. This may include extensive physical damage to an asset or loss of critical elements of an asset’s setting. The identification of ‘substantial’ harm is therefore one of professional judgment and not directly equitable to the significance of the effect.

12.4. Baseline Conditions

12.4.1. For this assessment each identified asset, according to its category, has been given its own unique reference number. The equivalent English Heritage List Entry Numbers and local authority Historic Environment Record (HER) numbers are referenced in the cultural heritage gazetteer (*Appendix G-1, Volume II* of this ES). The Proposed Development Site and asset locations for the heritage assets are shown on Figures 12-1 to 12-5.

Figure 12-1 Location of Archaeological Assets within 1km of the Proposed Development Site

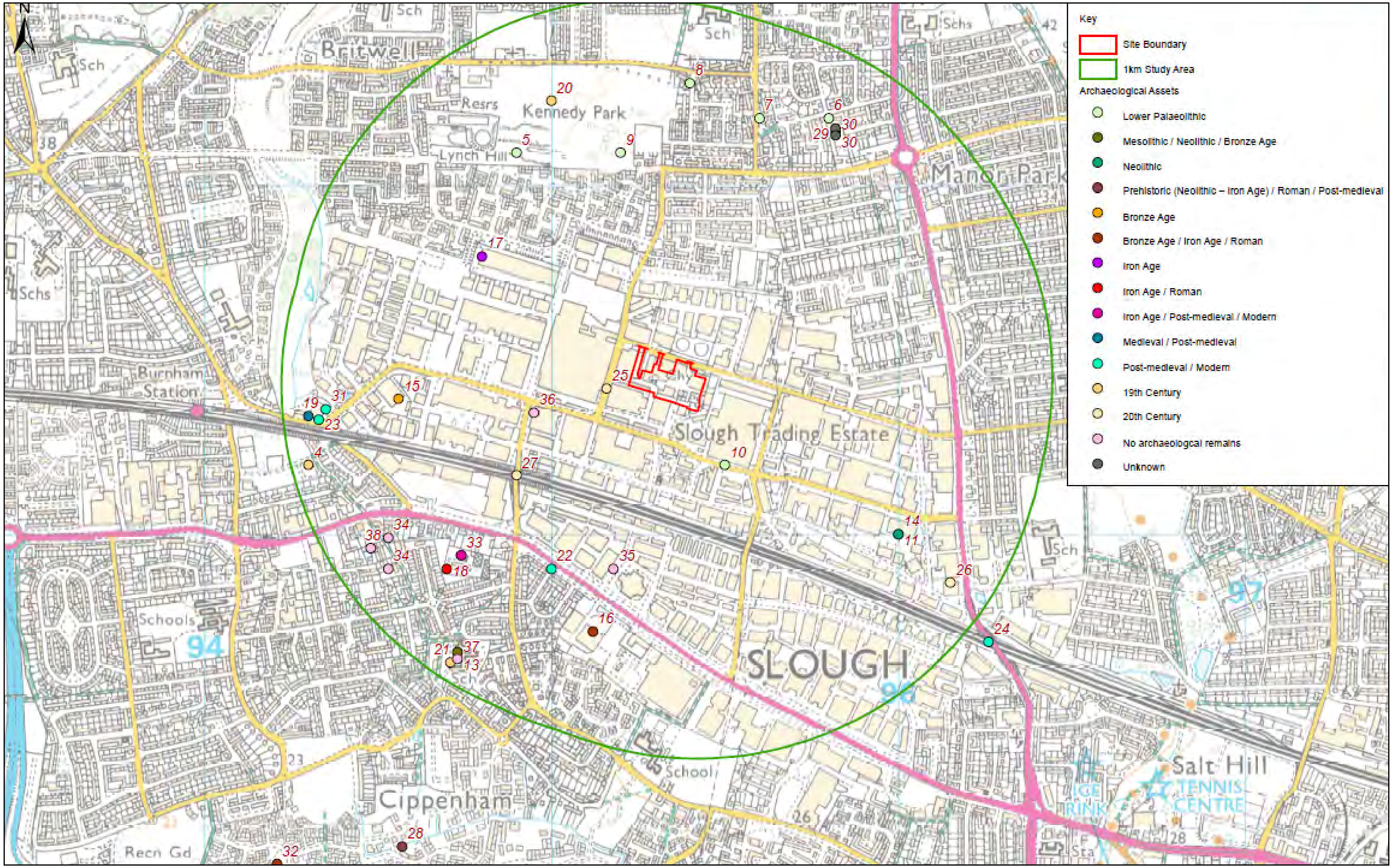


Figure 12-2 Location of Archaeological Assets within 10km of the Proposed Development Site

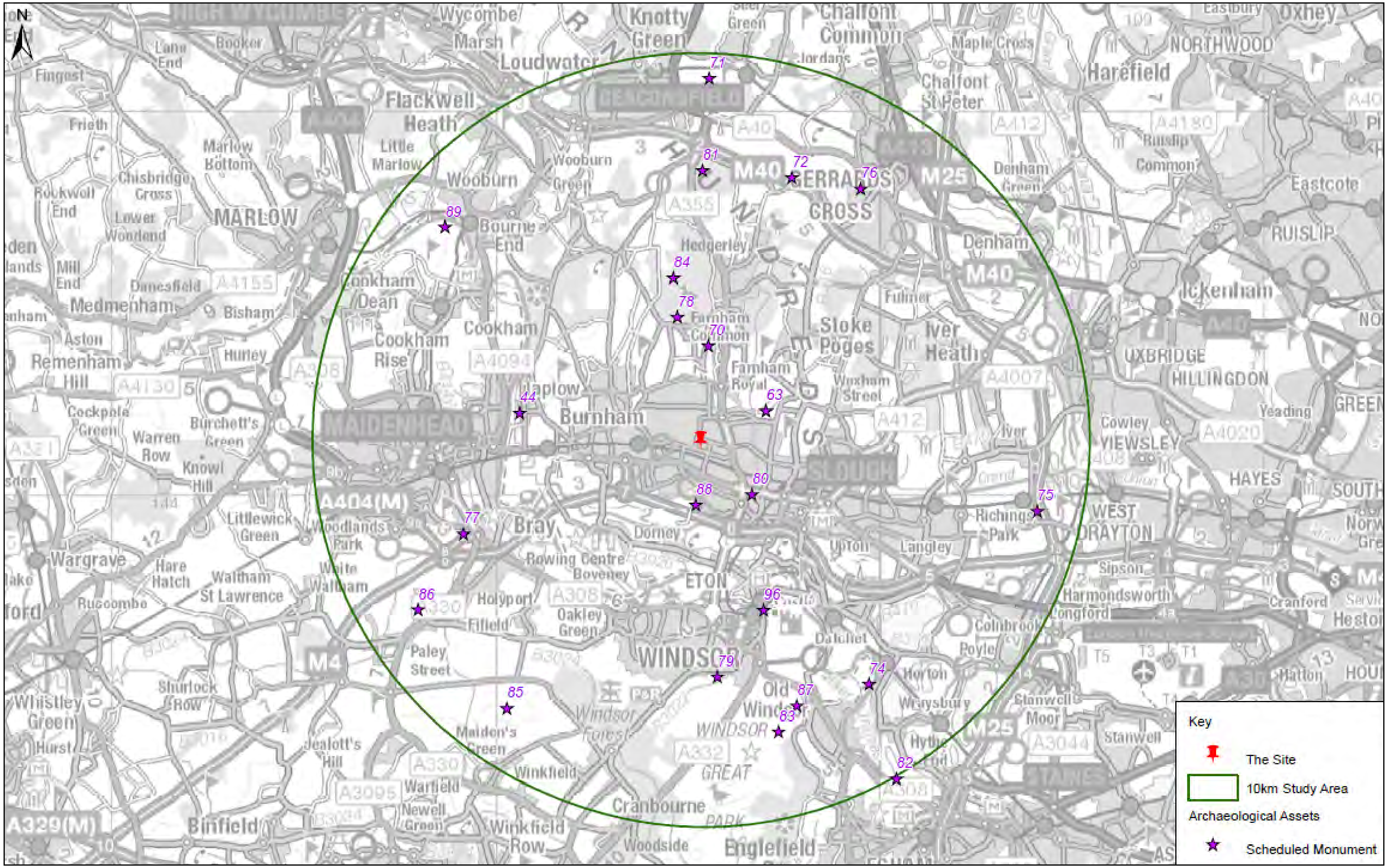


Figure 12-3 Location of Built Heritage Assets within 1km of the Proposed Development Site

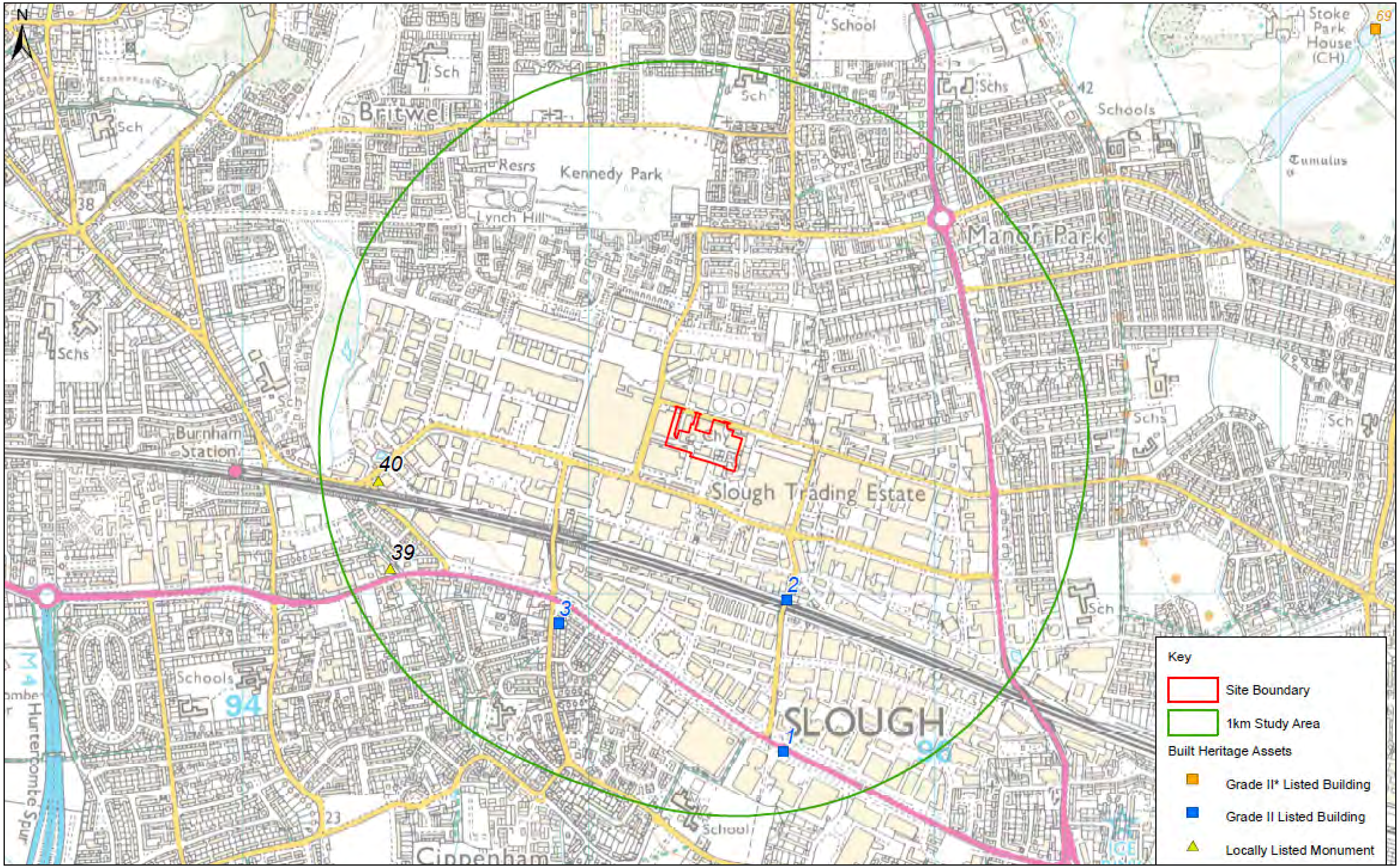


Figure 12-4 Location of Built Heritage Assets within 10km of the Proposed Development Site

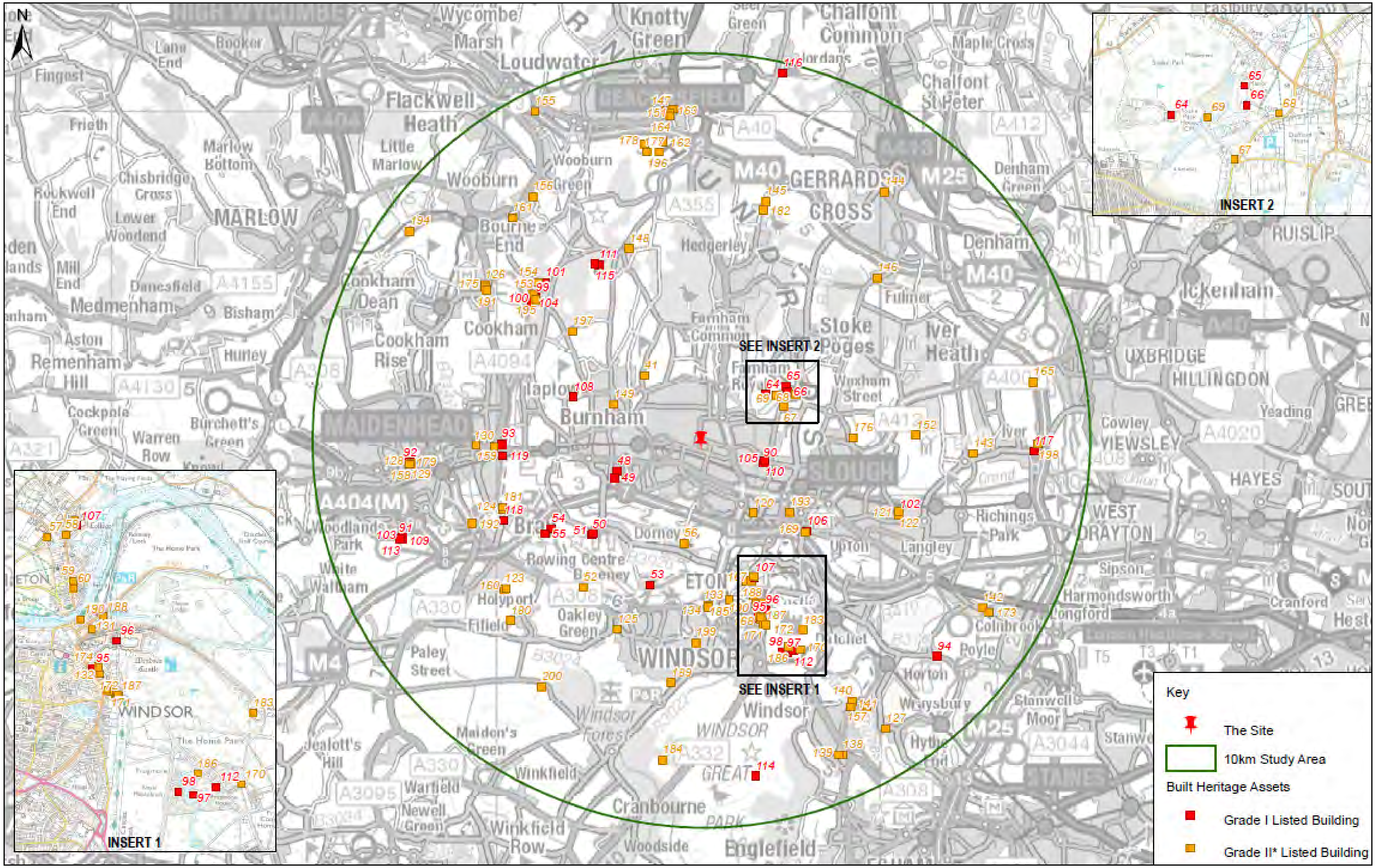


Figure 12-5 Location of Parks and Gardens within 10km of the Proposed Development Site

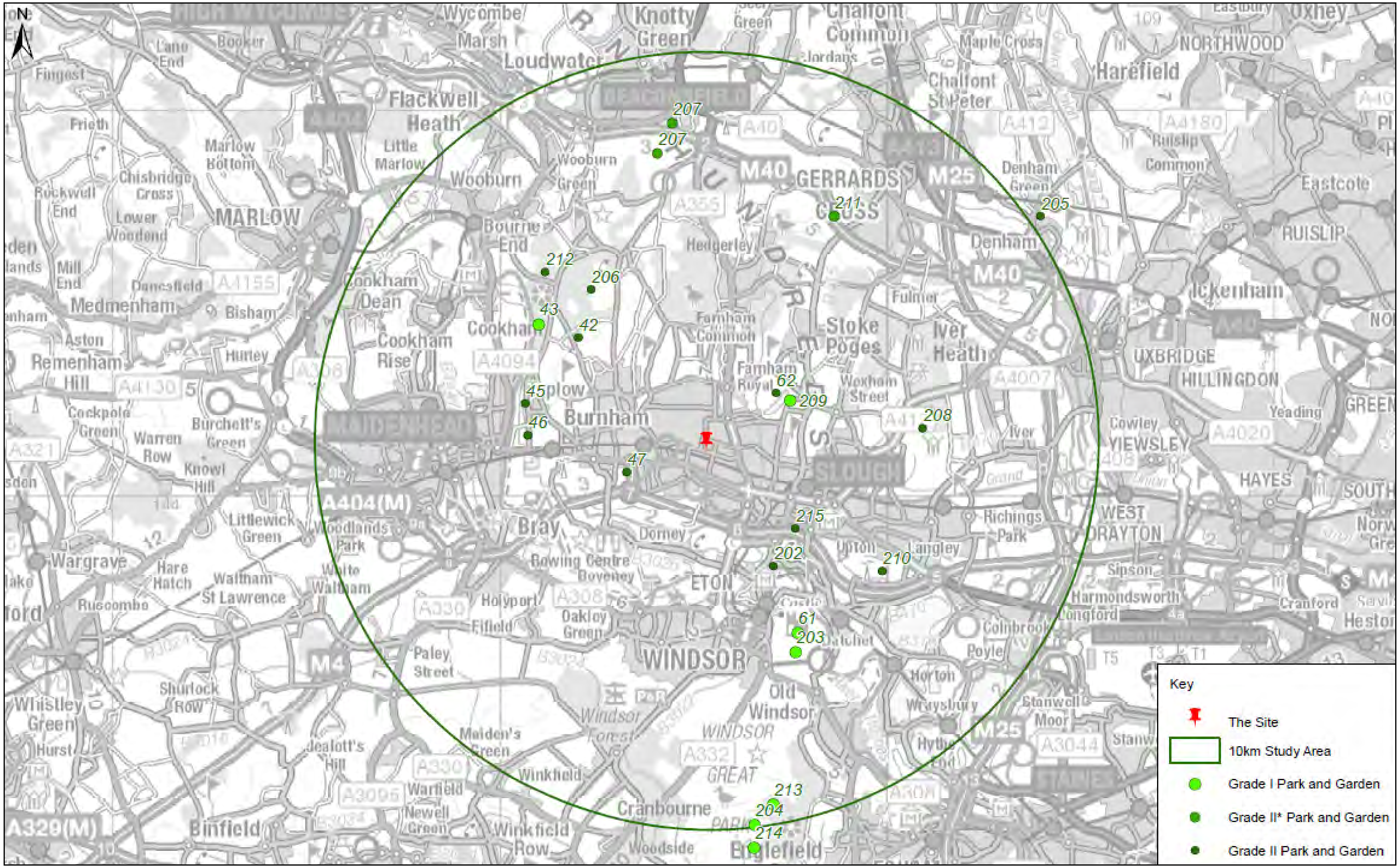
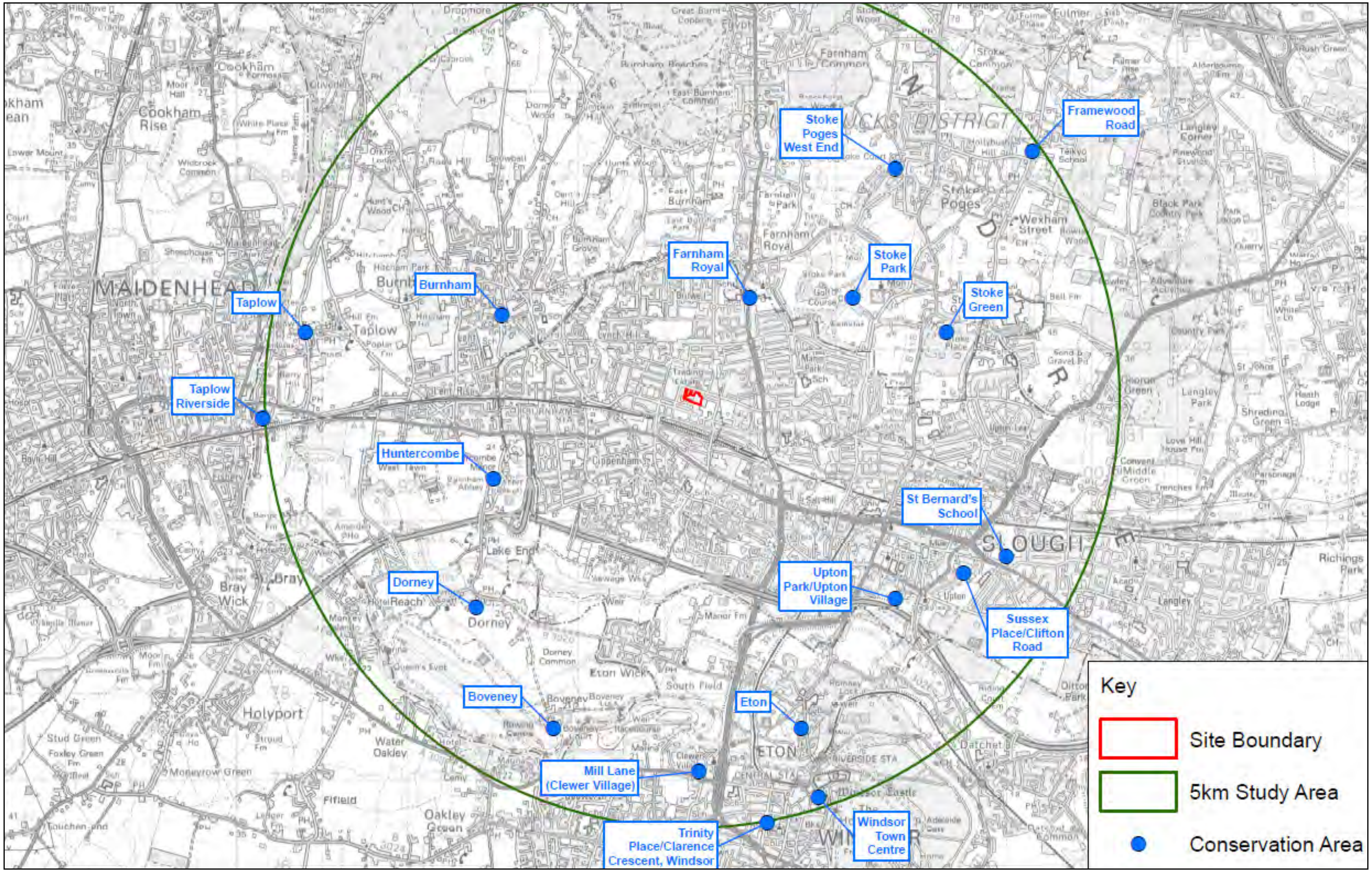


Figure 12-6 Location of Conservation Areas within 5km of the Proposed Development Site



Site Location, Topography and Geology

12.4.2. The Proposed Development Site comprises an irregular shaped parcel of land between Edinburgh Avenue to the north and the northern ends of Greenock Road and Harwich Road to the south on the Slough Trading Estate. It is part of the SHP site and is currently occupied by Slough Heat and Power (SHP). The Proposed Development Site is centred on National Grid Reference (NGR) SU 9535 8144 and is situated approximately 3.2km to the northwest of the centre of Slough. It lies approximately 4km north of the modern course of the River Thames, and is equidistant from the former historic villages of Burnham, Farnham Royal and Cippenham. The Site is surrounded by industrial buildings associated with SHP to the north, west and east and with industrial warehousing to the south.

12.4.3. The Proposed Development Site is situated approximately 32m AOD on relatively flat land (former gravel terraces) to the north of the River Thames. The area is occupied by the predominantly industrial Slough Trading Estate, which developed from the 1920s onwards.

12.4.4. The solid geology of the area is of the Lambeth Group (Clay, Silt and Sandstone), sedimentary bedrock formed approximately 55 to 65 million years ago in the Palaeogene Period. The drift geology underneath the site is Langley Silt Member (Clay and Silt) (Brickearth) formed in the Devensian period (c. 115,000 – 10,000 Before Present (BP)) (Ref. 12-14) which overlies the Taplow Gravel Member. To the north of the Site lies the Lynch Hill Gravel Member (Sand and Gravel) formed in the Wolstonian period (200,000 – 125,000 BP). The Taplow Gravel Member is believed to be slightly younger in date than the Lynch Hill Gravel Member, but still formed in the Wolstonian period, the Taplow Gravel Member formed from the reworking of earlier river gravel deposits.

Designated Heritage Assets

12.4.5. Heritage assets range from the prehistoric period through to the modern period (1901 and later). For those heritage assets discussed below, they are identified by name and a number in bold (e.g. **88**), which is cross-referenced to the Gazetteer of Cultural Heritage Assets in *Appendix G-1, Volume II* of this ES, as well as being shown on Figures 12-1 to 12-5.

12.4.6. There are no designated heritage assets within the Proposed Development Site boundary.

12.4.7. There are three Listed Buildings but no conservation areas within the 1km study area and a review of baseline conditions has shown that there are no World Heritage Sites, Registered Battlefields or Protected Wrecks within the outer study area. There are, however, a number of Scheduled Monuments, listed buildings and registered parks and gardens within the 10km study area and the ZTV.

12.4.8. There are, in total, 22 Scheduled Monuments within or crossing the 10km study area boundary. The nearest is a moated site at Cippenham Court (**88**) that is located approximately 1.6km to the south of the Site boundary.

12.4.9. There are 1598 listed buildings within the 10km study area, with notable concentrations in the built-up areas of Windsor, Eton, Farnham Royal and Cliveden. The closest designated building is the Grade II listed Railway Bridge at Leigh Road (**2**), 450m to the southeast of the Site boundary.

12.4.10. There are 22 English Heritage Registered Parks and Gardens (RPG) within the 10km study area. The closest is Stoke Park Grade II RPG (62), 1.5km to the northeast of the Site boundary.

12.4.11. There are 18 Conservation Areas (CA) within the 5km CA study area. The closest is Farnham Royal, approximately 1.5km to the north of the Site boundary.

Archaeological Remains

12.4.12. The search has identified a total of 35 undesignated archaeological assets within the 1km (inner) study area that comprise archaeological sites and findspots and historical features identified from documentary sources. The assets are described in chronological order in the following section.

12.4.13. *Appendix D-1, Volume II* of this ES sets out the cultural heritage assets that are located within the 1km study area (all heritage assets) and those that are considered within the wider 10km outer study area and the ZTV (designated heritage assets only).

Early Prehistoric (Palaeolithic and Mesolithic)

12.4.14. The earliest activity within the 1km study area comes from a number of finds of Lower Palaeolithic artefacts from the Lynch Hill and Taplow Gravel terraces. These include a number of handaxes and other implements (**5**-**12**) including cleavers, choppers, roughouts, cores and flakes. These have mainly been recovered from gravel quarries in the area including Lynch Hill Gravel Pit and Baker's Farm Pit, situated *c.*800m to the north and northeast of the Proposed Development Site.

12.4.15. Hosfield (2007) (Ref. 12-15) in his analysis of the Lower / Middle Palaeolithic in Berkshire suggests that due to the large numbers and the high proportion of sharp and near-mint handaxes from Baker's Pit, it is likely that artefacts from this locale indicate a minimally disturbed local site. Lower Palaeolithic artefacts (primarily small numbers of handaxes) have also been recovered from the younger Taplow Terrace, which has been formed from reworked older terrace deposits. This is evident by their rolled and abraded state. Slough Trading Estate is situated on Taplow terrace deposits, or a secondary gravel terrace context and therefore, if palaeoliths are contained within the gravel member underlying the Proposed Development Site, these will be from reworked gravel deposits and not *in situ*.

12.4.16. Unstratified worked flint artefacts of Mesolithic or Early Neolithic date have also been recovered within the 1km study area. This was from an archaeological evaluation carried out at Western House School (**13**), *c.*950m to the southwest of the Site.

12.4.17. In the outer study area a scheduled Late Mesolithic site (**77**) known as Moor Farm, Holyport, lies some 6.7km to the southwest, on a minor tributary of the River Thames. This has been partially excavated revealing over 8,000 pieces of worked flint on the wetland edge. A range of tools were recovered including a tranchet axe, cores, scrapers, microlithics, microburins and unretouched blades and flakes. The Scheduled Monument is set within a modern agricultural landscape on the south side of a modern stream known as The Cut and to the west of the modern line of the River Thames. Immediately north of The Cut is the embankment of the modern A308 National Trunk Road, which is thickly screened by landscape planting. Views are restricted out of the site to the north due to dense vegetation / landscape screening along the A308, to the east along Ascot Road and to the south by small plantations and the M4 motorway. The landscape in Mesolithic times is likely to have been densely wooded and so there is unlikely to have been any views or strong contextual linkage between the Proposed Development Site and the Scheduled Monument. The Proposed Development Site is therefore considered not to be within the setting of this Scheduled Monument of high significance.

Later Prehistoric (Neolithic to Iron Age)

12.4.18. More extensive evidence for occupation from the Neolithic period onwards is evident from within the 1km study area and the 10km study area. At a distance of 1.5km to the south of the Proposed Development Site at Cippenham (**28**), archaeological evaluations have revealed a Neolithic pit, Bronze Age ring ditch and evidence for extensive Iron Age occupation (enclosures and field systems, pits and postholes). At 225, Bath Road (**16**), *c.*650m to the south, archaeological evaluation has also revealed linear features of possible Late Bronze Age to Early Iron Age date and two prehistoric pits. Bronze Age / Iron Age activity was also recorded during the construction of water and sewage infrastructure improvements in Burnham and Cippenham (**32**), *c.*1.75km to the southwest of the development area, including two cremation burials, one of Middle/Late Bronze Age date and one of Late Iron Age date, and three further potential examples. A number of pits and ditches may also indicate activity in the Iron Age. Ephemeral, possibly Iron Age activity, as well as unstratified prehistoric finds have also been recorded at Hill Rise Nursery (**18**), c. 750m to the southwest of the Proposed Development Site.

12.4.19. Within the 1km study area, later prehistoric finds have included unstratified flint artefacts of potential Neolithic or Bronze Age date from an archaeological evaluation at Western House School (**13**), a Neolithic stone axe (**14**), a hoard of Bronze Age palstaves (**15**) and an Iron Age jar (**17**).

12.4.20. The above evidence suggests that the Thames gravel terraces were increasingly exploited from at least the Neolithic period onwards. Increasing exploitation and perhaps population pressure or stratification of society, led to the division and enclosure of the landscape in the Late Bronze Age and Iron Age. Monumental architecture is also increasingly apparent, particularly in the 10km study area, where a number of scheduled barrows are noted (such as the bowl barrows at Stoke Park (**63**) and Beaconsfield Golf Course (**71**) and a round barrow cemetery on Cock Marsh (**89**). A scheduled double ring ditch at Thorney (**75**) may also date to the Bronze Age.

12.4.21. The bowl barrow (**63**), 1.7km to the northeast of the Site, is set within the grounds of Stoke Park which is currently landscaped as a golf course. Thick tree planting at the edges of the park obscure all views to the southwest towards the Proposed Development Site. The monument would have originally been constructed in a prominent position, overlooking the surrounding landscape and its setting would have included the Proposed Development Site. Modern development, within the monuments setting to the south and west, and its position within a landscaped park and golf course detracts from the monuments significance.

12.4.22. The Beaconsfield bowl barrow (**71**), 9.5km to the north of the Site, is set within a dense tree plantation on Beaconsfield Golf Course. Originally it would have occupied a prominent position within the surrounding landscape. The current tree cover contributes nothing to the significance of the asset and detracts from the monuments setting. The Proposed Development is not within the setting of this Scheduled Monument.

12.4.23. The round barrow cemetery at Cock Marsh (**89**) is set within modern agricultural land on low lying, former marshland on the south bank of the River Thames at Bourne End, 8.6km to the northwest of the Proposed Development Site. It would have originally occupied a prominent position in the landscape overlooking the River Thames. To the south, Winter Hill obscures all views in this direction. There are no views between the Proposed Development Site and this Scheduled Monument of high significance. The Proposed Development Site is not within this monument's setting.

12.4.24. A scheduled double ring ditch at Thorney (**75**) is set within a pasture field directly west of the M25 and to the east of Thorney Lane South, 9km to the southeast of the Site. Thick landscape planting along the M25 and a tall hedge and tree planting along Thorney Lane

South screen the site in all directions. The monuments would have been set in a prominent location overlooking the surrounding landscape, but much of this setting has been developed with modern housing to the west and the M25 to the east. There are no views between the Proposed Development Site and this Scheduled Monument of high significance. The Proposed Development Site is not within its setting.

12.4.25. Towards the end of the period, two hillforts were built within the 10km study area. These both lie to the north of the Proposed Development Site, one at Seven Ways Plain, Burnham Beeches (**78**), 3.4km to the north, and a second at Bulstrode Camp (**76**), 8km to the northeast. These are likely to date from the later Iron Age.

12.4.26. The hillfort at Burnham Beeches (**78**) is set within a heavily wooded landscape on part of the former Burnham Common, to the northeast of the historic village of Burnham. The hillforts setting includes the surrounding landscape to the south and the Proposed Development Site, as this defensive site would have originally overlooked and dominated the surrounding landscape in the Iron Age. Although set on a high point in the landscape, the current tree cover detracts severely from the setting and does not contribute to the monuments high significance, allowing no views of the surrounding landscape. There are, therefore, no views to or from the Proposed Development Site to the Scheduled Monument.

12.4.27. Bulstrode Camp (**76**) is a heavily wooded hilltop, surrounded by modern housing development at Gerards Cross, 8km to the northeast of the Proposed Development Site. The hillforts setting includes the surrounding landscape, in which it would have provided a dominant feature and focus in the Iron Age. Although set on a high point in the landscape, the current tree cover and modern housing development detracts from the setting and does not contribute to the monument's high significance, allowing no views out to the surrounding landscape. There are also no views to or from the Proposed Development Site to the Scheduled Monument. Dense vegetation and rolling hills to the southwest block all views towards the development area and, therefore, there is no relationship between Bulstrode Camp (**76**) and Burnham Beeches hillfort (**78**). The Proposed Development Site is not within the Scheduled Monuments setting.

Roman

12.4.28. In the Roman period, the area that is now Berkshire was part of the civitas of the Atrebates whose administrative centre lay at Calleva (or Silchester). The Proposed Development Site lies considerably to the north of the main Roman road from London to Silchester (The Port Way) that passes through Pontes (Staines) to the southeast.

12.4.29. Evidence from the 1km study area suggests that Iron Age activity at a number of sites continued into the early Roman period. This includes activity at 225 Bath Road, Slough (**16**), where evidence included linear ditches, gullies, pits and postholes all dated to the 1st Century AD; occupation deposits and linear ditches dated to the Roman period at Cippenham (**28**), and a number of pits and ditches dated to the early Roman period from the water and sewerage infrastructure works at Burnham and Cippenham (**32**).

12.4.30. There are no scheduled sites of Roman date within the 10km study area.

Early Medieval

12.4.31. The Proposed Development Site lies equidistant between the three villages of Burnham, Cippenham and Farnham Royal. Burnham and Farnham Royal have their basis in natural features – Burnham meaning 'village on a stream'; whilst Farnham means 'village where ferns grew' (Ekwall 1960) (Ref. 12-16). Cippenham may have later, post-Norman conquest origins being first mentioned in 1163 and means 'Cippa's village' (*ibid* 1960).

12.4.32. There is no evidence for early medieval activity within the 1km study area.

12.4.33. In the 10km study area a Scheduled Saxon Barrow and Anglo-Saxon Church site are situated at the Old Churchyard, Taplow (**44**), 4.6km to the west of the Site. The barrow, or *hlaew*, is dated to the 7th century AD and is an exceptional example, both in the wealth of finds from the site and the excellent state of preservation of the surviving remains. The barrow, despite being partly excavated, survives almost in its original form. The buried remains of the adjacent Anglo-Saxon church are also quite exceptional in their importance, as buildings of this type are very rare. The church's close proximity to the barrow provides a strong link between the pagan and Christian use of the site, reflecting the site's continued religious significance through the transition from pagan to Christian belief. The monument includes a large Saxon burial mound, the buried remains of an early Anglo-Saxon and later medieval church, and part of the pagan and Christian cemeteries thought to have surrounded these features.

12.4.34. The Scheduled Saxon Barrow and Anglo-Saxon Church (**43**) are set within the landscaped gardens of Taplow Court, a Grade II English Heritage Registered Park and Garden. It lies directly to the south of the main house. The barrow has been landscaped as a garden feature and the site of the church is a flat lawn. The site lies at the southern end of a small spur, and according to the scheduling description it commands extensive views to the west over the River Thames, Maidenhead and the Berkshire countryside. Originally it would have been constructed as a prominent monument overlooking the River Thames and been visible for travellers utilising the river and travelling either upstream to the north or downstream to the south. At the time of the site visit, it was not possible to gain access to the grounds of Taplow Court to undertake an assessment of views from the top of the barrow to the Proposed Development Site. There are no views towards the Scheduled Saxon Barrow and Anglo-Saxon Church site from the Proposed Development. The Proposed Development Site is within the setting of the Scheduled Monument and the monument, which is of high significance, would have been a prominent feature in the surrounding landscape.

12.4.35. There is also a Scheduled early medieval site at Kingsbury (**74**), 7km to the southeast of the Site. The site is traditionally thought to have been the site of a palace used by Edward the Confessor (1042 – 1066) and the early Norman Kings of England. It was excavated from 1953 to 1958, resulting in several phases of early medieval settlement, dating from the 7th – 8th centuries, 9th century and 10th – 11th centuries being uncovered. Both 9th century and 10th / early 11th century watermills were also excavated. The tradition of a Royal residence at Old Windsor is thought to have begun in the 9th century.

12.4.36. The Kingsbury site (**74**) is set on the west bank of the River Thames, in relatively flat pasture, with Old Windsor to the southwest and Wraysbury across the River Thames to the southeast. The site has links with Windsor to the northwest and has clear views of Windsor Castle. The Proposed Development Site is not within the setting of this Scheduled Monument of high significance. There are no views to or from the Proposed Development Site and the Scheduled Monument.

Medieval

12.4.37. The village of Burnham, to the west of the Proposed Development Site was first recorded in the Domesday Book (1086), when the manor belonged to Walter Fitz-Other. Burnham was once an important village and comprised a large parish, in which the Proposed Development was situated. An Augustinian Abbey was founded here in 1266 by Richard, Earl of Cornwall, brother of King Henry III and Burnham received a Royal charter to hold a market and an annual fair in 1271.

12.4.38. Cippenham, to the southwest of the Proposed Development Site was a manor and a district or liberty within the parish of Burnham in the medieval period. An estate called

East Burnham is mentioned in the Domesday Book (1086). The estate is identical with the later Manor of Cippenham owned by Westminster Abbey from 1086 until the mid-12th century. In the mid-13th century, perhaps half of the Manor was acquired by Richard, Earl of Cornwall and he enclosed land to form a medieval deer park (on the south side of Cippenham) (Ref. 12-17). The village was probably in existence from the 12th century. Burnham Abbey was endowed with land in Cippenham in 1266 including Hay Mill and its dam and fishponds (VCH Vol. I 1969, 384; VCH Vol. III 1969, 179) (Ref. 12-18). In the 14th century documentary evidence describes the work of the manorial tenants of Cippenham (VCH Vol. II 1969, 49). Wheat, corn and oats were the main cereal crops, with meadowland for hay. Woodland and forage surrounded the settlement and sheep-rearing was important by 1318 (VCH Vol. II 1969, 61). A windmill is also mentioned in 1605, but its location is unknown (VCH Vol. III 1969, 179).

12.4.39. Farnham Royal, to the northeast of the Proposed Development Site, is mentioned in the Domesday Survey of 1086 and was owned by Bertram de Verdon. Due to his support of the King's right arm at the coronation, Farnham gained the 'Royal' tag through tenure of Grand Sergeantry. A water mill is also noted at Farnham in the Domesday Survey, documentary records of which survive up to the 18th century. The manor of Farnham Royal continued in the Verdon family until the early 14th century when Farnham Manor was at first granted with the other Verdon estates to Roger Dammory and then passed to Thomas Furnival, later Lord Furnival. It then passed to the Nevills in 1379 and then by marriage to the Talbots (The Earls of Shrewsbury). The manor was exchanged for Worksop by Henry VIII in 1541 and was owned by the Crown until 1628 when it was sold to Edward Ditchfield and others, trustees for the City of London. Following this, it was bought in 1630 by Sir Edward Coke. The Coke family held it until the mid-18th century when it was given to Francis Godolphin and the Dukes of Leeds (Ref. 12-19).

12.4.40. Within the 1km study area there is one heritage asset of medieval date noted on the HER. A mill in Cippenham called Aymill (**19**), situated *c.*970m to the west of the Proposed Development Site, was given with the chapel there to Burnham Abbey by Richard, Earl of Cornwall. In the grant were included the dam, fish-pond and water-course. Henry III confirmed the grant in 1268. The mill is mentioned in disputes of 1583 and 1638. There is a mention of a place called Aymell in 1638, but no later trace of the mill. At some time the tail waters from the Hay Mill were dammed to drive more mills at the head of Two Mile Brook.

12.4.41. A number of Scheduled Monuments dating to the medieval period are located within the 10km study area. The earliest of these is Montem Mound: a motte at Salt Hill, Upton-cum Chalvey (**80**), c.1.8km to the southeast of the Proposed Development Site. This was constructed on the edge of a gravel terrace overlooking a stream. It is possible that it was constructed in the 11th century, possibly to control a fording point and at a strategic point in the Thames Valley, and would have been a prominent feature in the landscape. The Proposed Development Site is therefore within the setting of this Scheduled Monument of high significance, which would have been roughly circular in shape with a diameter of 28m and 6m high. The current setting does not contribute to the monument's significance, it being set within the car park of a modern leisure centre, with urban development surrounding it and modern roads flanking it to the east and north. There are views from the top of the Scheduled Motte to the Proposed Development Site.

12.4.42. As is common in the landscape of this part of southern England, a large number of medieval moated manors survive within the 10km study area and are designated as Scheduled Ancient Monuments and of high significance. These include moated sites at Cippenham Court (**88**), Moat Park, New Windsor (**79**), Bower Wood (**81**), Royal Manorial site at Bear's Rails (**83**), Hartley Court (**84**), Foliejon Park (**85**), Foxley Green Farm (**86**) and at Tileplace, Old Windsor (**87**). All of these are set within low-lying parts of the landscape, or within enclosed valleys. Their setting is their immediate surrounding landscape, farmland and related settlements, such as the relationship between

Cippenham Court and the village of Cippenham to the north. The Proposed Development Site is not within the setting of any of these Scheduled Monuments and there are no views to or from them and the Proposed Development.

12.4.43. A Knights Templar preceptory lies well to the north of Moat Farm, Hedgerley (**72**), 7.2km to the northeast of the Site. This was built by 1276, but following the suppression of the Templars in 1308, the land was seized by the Crown and in 1337 it was given to Bisham Priory. The preceptory's setting would have been its immediate landscape. The current setting adjacent to the M40 Motorway and within areas of modern gravel extraction and landfill does not contribute to the monuments high significance. The Proposed Development Site is not within this monuments setting.

12.4.44. Ankerwyke Priory, a Benedictine nunnery with associated moat and fishponds (**82**) is also located on the southeastern edge of the 10km study area. This was constructed on the north bank of the River Thames. Today the remains consist of a portion of a ruined 13th century building (listed Grade II), moat, fishponds and an extensive area of earthworks, set within wooded grassland. The setting of this monument of high significance is its relationship to the River Thames and the farmland to the north and east. The Proposed Development Site is not within the monument's setting and there are no views to or from the Proposed Development Site to the Scheduled Monument.

12.4.45. Designated historic buildings dating to the medieval period situated within the 10km study area are considered in the Historic Buildings section below (see paragraphs 12.4.79 to 12.4.101) including the Scheduled Windsor Castle (**96**) and East Burnham Animal Pound (**70**).

Post-medieval

12.4.46. Early maps of the Proposed Development Site show it occupying an area of agricultural land to the north of Bath Road (1761 Rocque Map (Ref. 12-20), 1770 Jefferys Map (Ref. 12-21) and 1825 Bryant's Map (Ref. 12-22)). The Bath Road (A4) from London to Bristol (**22**) was a major route westwards from medieval times onwards and was improved in the post-medieval period as a coach road.

12.4.47. A plan of Burnham Parish in 1808 (Ref. 12-23) and the 1841 Burnham Tithe Map (Ref 12-24) show the site as part of enclosed agricultural fields. The fields are relatively large and suggest the enclosing of outfields / common in the later post-medieval period. On the 1808 map field names are recorded including 'Oaks', 'Kite' and 'Court Filed' and 'Biddles'. Fields covered by the name 'Biddles' may suggest the presence of strip fields / medieval ridge and furrow, south of Biddles Farm, prior to enclosure.

12.4.48. The Great Western Railway (**20)** was constructed to the south of the development area between 1836 and 1838. This linked London to Bristol and the engineer who oversaw the project was the renowned Isambard Kingdom Brunel.

12.4.49. The 1st edition Ordnance Survey (OS) map of 1876 (Ref. 12-25) (1:2500 scale) reveals the Proposed Development Site as unchanged from the 1808 map. A scatter of farms and trackways are apparent within the wider landscape. This includes Biddles Farm, located 100m to the north of the Proposed Development Site. Crossing the landscape to the south is the Great Western Railway line and the Bath Road, beyond this lies the small village of Cippenham.

12.4.50. The 1899 OS map (Ref. 12-26) (1:2500 scale) depicts Baker's Farm located to the east of Biddles Farm. There are no other notable changes.

12.4.51. Archaeological evaluations within the surrounding area have revealed some 19th century evidence. This has included a 19th century farm complex at Western House School, Cippenham (**21**), an area of clay pipe manufacturing at Cippenham (**28**), a 19th century well at Burnham Lane (**23** / **32**) and drainage features (**33**) off the Bath Road.

12.4.52. A number of 19th and 20th century bridges are also noted in the Berkshire HER (**4, 24** and **27**).

Modern

12.4.53. During the First World War, the War Office chose farmland close to Slough for the location of a military vehicle repair depot. In 1918 the 'Slough Project' was approved by Government and 668ha of agricultural land were purchased by the War Office for the development of the depot. By the end of the war, the project was still far from complete; the site was waterlogged and full of rusting vehicles. In 1920 the Government sold the 'Slough Project' to a private investor and the Slough Trading Company Ltd., was formed. A rail station on the estate was opened soon after. In 1926 the company name was changed to Slough Estates plc (and more recently to SEGRO plc).

12.4.54. The significant changes in the landscape are revealed on the 1924 OS map (Ref. 12-27) (1:2500 scale). The agricultural land that made up the Proposed Development Site had been replaced by industrial works and business premises that included an Electricity Works (Power Station). A Razor Factory and Sweet Factory were situated to the south. Other premises at the new Slough Trading Estate include St Helens Cable & Rubber Works, a large Chemical Works, a Motor Works, offices and a restaurant and Fire Station. The Trading Estate was connected to a new road that included Edinburgh Avenue and Buckingham Avenue. New rail links were established. A Trading Estate station was constructed to the southeast with rail lines connecting all the main works with the Great Western line and also linking to a gravel quarry located to the northwest of the site, north of Biddles Farm. A new large-scale nursery was located to the east and a brickworks, depicted as ‘Timber Town’.

12.4.55. In 1929 Slough Urban District Council extended its boundary to include 312 acres of the Trading Estate which were in the parish of Farnham Royal and parts of Burnham, Stoke Poges and Langley Marsh.

12.4.56. By 1932 Slough Trading Estate had expanded further to the south, with new business premises between Buckingham Avenue and Bedford Avenue (1932 OS map, 1:2500 scale) (Ref 12-28). To the west of Farnham Road the OS map depicts residential development north of Slough Trading Estate. It appears that Bakers Farm had been demolished by this time to make way for the expanding housing and rail lines to the north have been replaced by a road. A cooling tower and water tower are depicted within the site boundary, adjacent to the eastern side of the Electricity Works.

12.4.57. The 1938 OS map (1:10,560 scale) (Ref 12-29) shows further housing being built off Farnham Road with a number of new roads laid out ready for development. Expansion of the Trading Estate had occurred to the west and it is apparent from the road layout that further expansion was planned in this area. There is extensive development to the south of the industrial estate on the other side of the Great Western Railway. A second cooling tower is depicted on the northeastern edge of the Proposed Development Site.

12.4.58. A Light Anti-Aircraft artillery site (**27**) is noted on the Berkshire HER and is recorded as in place in May 1940 within the 1km study area.

12.4.59. On the 1955-1963 OS map (1:2500 scale) (Ref 12-30), a new engineering works had been constructed to the north of Edinburgh Avenue, with other business premises to the northwest, including a coal yard. Within the Proposed Development Site, south of Edinburgh Avenue, new buildings have been laid out including a gasholder and ancillary buildings replacing the water tower. The power station building appears to have been extended to the east and north. Between the Proposed Development Site and Biddles Farm are a number of sports grounds and other industrial developments linked by a new road network.

12.4.60. The 1961-1974 OS map (1:1250 scale) (Ref 12-31) shows that the engineering works to the north of the Proposed Development Site had been replaced by a cooling tower. Further north and replacing Biddles Farm a new residential development is shown on the map. Also, to the south of the industrial estate there is extensive development (residential and commercial) on the south side of the main railway line. Within the Proposed Development Site the gas holder and adjacent tank are replaced by three smaller oil tanks and ancillary buildings on the eastern edge of the site.

12.4.61. A pair of cooling towers are depicted at the site and north of Edinburgh Avenue on the 1969-1978 OS maps (1:1250 scale) (Ref 12-32). Further infilling with business premises is also noted to the north of the Proposed Development Site. A new electricity sub-station has also been constructed over one of the sports grounds.

12.4.62. By 1993 (on the 1:1250 scale OS map) (Ref 12-33), the cooling towers and gasholder, south of Edinburgh Avenue, are no longer depicted at the Proposed Development Site and have been replaced by a number of square buildings. To the north, residential housing has replaced the sports ground and the wider area has been infilled with development.

Modern Disturbance Review

12.4.63. Historic map evidence reveals that the western part of the Proposed Development Site had been developed as an Electricity Works or Power Station by 1924. Railway lines also flanked the northern and southern sides of the area at this time as well as roads. By the late 1930s, two large cooling towers had been built on the eastern side of the SHP site as part of the power station. A number of additional small buildings (possibly workshops) had been constructed between the cooling towers and the main building. Considerable change had occurred by the early 1960s with extensions to the main building to the south, north and east. Some of the small buildings had been replaced by larger buildings or extended and a gas holder was constructed in the southeastern part of the Proposed Development Site. The gasholder was short lived, however, and was removed by the mid-1970s. By this point, the main buildings appeared to be further extended to the east, with the demolition of many of the small buildings. The railway line along Edinburgh Avenue was also fully removed by this point. By the end of the 1980s, the main building fully covered the area between Durham Avenue and Edinburgh Avenue, on the western part of the Proposed Development Site. The southeastern corner was now taken up with oil tanks and smaller buildings, where the former gasholder had been, whilst the northeast corner contained cooling towers. The power station main building appears to have been rebuilt in the 1990s as the 2006 OS 1:10,000 scale map (Ref 12-34) reveals the main building on a slightly different orientation. The two cooling towers on the eastern side of the Proposed Development Site had also been demolished and replaced with two large buildings. The 2012 OS 1:10,000 scale map (Ref 12-35) shows no further changes.

12.4.64. A Slough Estate Plan of the existing structures on the Proposed Development Site reveals a complex series of buildings and structures on site including parts of the current power station (Boiler and Turbine Houses, pump rooms, south chimney, hotwells, control rooms, workshops, and offices). In the southeast part of the Proposed Development Site are housed the stores, oil pump houses, laboratories, kitchen and canteen, whilst in the northeast sits a large fuel store. Open spaces between buildings are criss-crossed with service and utility trenches and there is an inspection pit and HGV weighbridge in the centre of the Site. Several large underground heat ducts are also noted, travelling from the vicinity of the south stack and gas turbine to the west and from the turbine to the north, adjacent to Edinburgh Avenue, southwards towards the centre of the Site.

12.4.65. Ground investigations on the Proposed Development Site, (as discussed in *Chapter 10: Ground Conditions* of this ES), suggest that there is limited made ground (0.30m to 0.50m) in all but one borehole (which contained made ground to 2.2m), on top of natural geology (brickearth and gravels). This would suggest that remnant soils have been removed prior to the construction of the power station.

12.4.66. The multiple rebuilds, the likely extensive, large-scale, reinforced foundations for the power station, former oil tanks, former gas holder and cooling towers within the development boundary, as well as the presence of complex utility and service trenches and underground heat ducts, suggest that all archaeological interest within the development site has been removed.

Conclusions – Archaeological Remains

12.4.67. The underlying Taplow Gravel Member is a secondary deposit of reworked earlier terrace deposits. Any Palaeolithic implements will be heavily rolled and *ex-situ*. Only a few unstratified Mesolithic implements are known from within the 1km study area. The potential therefore for the Proposed Development Site to contain deposits from the Palaeolithic or Mesolithic period is very low and any remains will be not significant.

12.4.68. Although the surrounding landscape contains evidence for occupation from the later prehistoric periods (Neolithic through to Iron Age) as well as evidence for medieval and post-medieval exploitation of the site, the Proposed Development Site has been heavily developed since the 1920s, with multiple rebuilds and extensions of the power station complex over almost 90 years of electricity production. It is therefore thought likely that modern disturbance caused by previous 20th century development will have removed any archaeological remains from within the Proposed Development Site's boundary.

12.4.69. The setting of Scheduled Monuments within the 10km study area will therefore be the only archaeological assets to be considered and taken forward in the assessment.

Built Heritage

12.4.70. There are three Grade II listed buildings within 1km of the Proposed Development Site. Of these, the railway bridge at Leigh Road (**2**) is the closest, being located approximately 450m to the southeast of the Site. The bridge dates from 1838 and comprises two semi-elliptical arches in brick with Leigh Road running over the bridge and the railway below. The bridge is a feature of the wider Great Western Railway, designed by Brunel, though its current immediate context is that of the Slough Trading Estate. The listed bridge is of medium significance. A new two way replacement railway bridge is currently being constructed adjacent to the listed bridge and forms part of the existing baseline (due for completion in 2015). This is being developed separately to the Proposed Development.

12.4.71. Approximately 600m to the south of the Site, located to the south of the Bath Road (A4), the milestone at SU 9556 8054 (**1**) is a white painted stone with black lettering. The milestone has retained its prominent roadside setting, and gives distances for London, Slough and Maidenhead. The asset is of medium significance.

12.4.72. Approximately 800m to the southwest of the Site, Cippenham Lodge (**3**) is located to the south of the Bath Road. This 18th century building is of red brick and classical in style, and was the lodge to Cippenham Court; the site of Cippenham Court is now occupied by a locally listed 19th century building, and the original setting and relationship between these buildings has been eroded by housing development. The building is currently in business use, but retains its associated walled garden to the rear. The setting of the building has been eroded by housing and small industrial development. This asset is of medium significance.

12.4.73. There are two locally listed buildings within the 1km study area. 329 Bath Road (**39**) is approximately 950m to the southwest of the Site, and the Slough Trading Estate Marker Post (**40**) is to the north of Bath Road, around 900m to the west of the Site. 329 Bath Road is a red brick house dating from the 19th century, and is a survival of earlier housing amongst the more prevalent 20th century structures within this part of Bath Road. The Trading Estate Marker Post is an early feature of the Trading Estate, providing a branded entrance sign for the estate. Both of these assets are of interest locally and are of low significance.

12.4.74. Within 10km of the Proposed Development Site, there are 123 Grade I and II* listed buildings. Of these, 16 have been identified as within the ZTV for the Proposed Development and therefore subject to potential effects from the development. There are also eleven Registered Parks and Gardens (RPG) within the 10km study area. Seven of these have been verified as subject to potential effects from the development, five of which are associated with the above mentioned listed buildings. There are two Scheduled Monuments located within the ZTV which are also listed buildings, and which have been identified as having potential effects.

12.4.75. Windsor Castle (**96**) is both Grade I listed and a Scheduled Monument. It is located approximately 5km to the southeast of the Proposed Development Site. The buildings comprising the castle date to the 12th century, with further stages of construction continuing into the 19th century. The castle is situated on an artificial motte made from chalk originally excavated from the surrounding ditch, and as such lies at a significantly higher level than the surrounding land. The west terrace and upper ward, which contains the Round Tower, both have far reaching views to the north, west and east, and the Round Tower also to the south. The setting of the castle is built-up to the west, due to its location within the villages of Windsor and Eton, and parkland to the south and east, with Windsor Great Park (**61**) and Home Park providing the immediate context. The park incorporates avenues and rides from the castle, most notably the Long Walk to the south. These assets are of high significance, and have particular prominence in the local landscape. There are a number of listed buildings within the parkland which site visits have shown to have similar views and setting as the Park, and which will be assessed as one with the RPG for clarity.

12.4.76. Windsor Castle and Great Park are within the Windsor Town Centre Conservation Area, designated in 2009.

12.4.77. The Grade II* listed Oakley Court Hotel (**52**) is located to the west of Windsor, on the banks of the River Thames, and has views to the north across the Thames. The building dates from the 19th century and is in Victorian Gothic style, with buff brick construction and stone detailing. This asset is of high significance.

12.4.78. There are a number of sensitive assets in Eton. The buildings of Eton village itself look inward to the High Street and the River Thames, which define their setting with little influence beyond this. Eton College Park, in contrast, (**202**) is a Grade II RPG approximately 1km to the north of Windsor Castle, situated at the northeastern side of Eton village, and bounded to the north by the River Thames. The Park has views over the Thames to the north towards Slough and northeast to Datchet, with a tall brick wall comprising the western boundary. This asset is of medium significance. To the south of Eton College Park, the buildings of Eton College comprise the Grade I listed school hall and teaching buildings (**107**), dating from the 15th century with continued development during the 19th century, and the prominent Perpendicular 19th century Lower Chapel (**57**) which is Grade II* listed. These assets are of high significance, and have far reaching views beyond their immediate location, particularly the Lower Chapel which has views to the south towards Windsor Castle, and to the north to Slough. These assets are within the Eton Conservation Area, designated in 2009.

12.4.79. Bell Barn Farmhouse (**56**), Grade II* listed, is a medieval house with timber frame and brick construction. Its setting is agricultural to the north and east, and urban to the south and west. The building lies to the north of Eton, its grounds facing the River Thames; it is located approximately 4km from the site. The building has some partially screened views towards the north. This asset is of high significance.

12.4.80. The Grade I listed Dorney Court (**51**) is located in the centre of Dorney village, approximately 3.5 km from the proposed development site. The building dates from circa. 1500, and is timber framed with red brick infill and tall star-plan chimneys. There are views toward the River Thames to the rear, and partially screened views to the north and east towards Slough. The setting of this building is provided by its grounds running towards the river to the north, and the village to the south. This asset is of high significance. Dorney Court is within the Dorney Conservation Area, designated in 1996.

12.4.81. The Church of St James (**50**) and the Chapel of St Mary Magdalene (**53**), both in Dorney approximately 3.7km from the site, are Grade I listed. The Church of St James dates from the 12th century, with a short square tower of the 16th century. It is constructed of random rubble with stone dressings, and contains a range of good quality church fittings and memorials. The Chapel of St Mary Magdalene is of flint with ashlar dressings, and has a short weather-boarded tower. It dates from the 12th century. These two religious buildings have a strong inter-relationship, and their setting is comprised of the wider village. Both assets are of high significance.

12.4.82. The Monkey Island Hotel (**54**) and the Temple on Monkey Island (**55**), which is located to the southwest of Dorney, are both Grade I listed. Dating from the 18th century, Monkey Island Hotel was previously a fishing lodge, and is a timber framed building with an octagonal section being the central portion, with the primary elevation to the south. The Temple, formerly a summerhouse and having rendered stone elevations, now houses offices for the hotel. The setting of these buildings is defined by the River Thames which they were designed to use and appreciate, and views are predominantly to the south. Both assets are of high significance.

12.4.83. The Grade I listed Huntercombe Manor (**48**) is located approximately 1.5km from the Proposed Development Site. The building dates from the 14th century at its core, with developments in the 17th, 18th and 19th centuries. The current exterior is mainly of 19th century construction, and is of rendered brick with stone dressings. The Manor sits within a formal garden and small park which form part of a Grade II listed RPG (**47**). This provides the setting of the building, although current context is also provided by hospital buildings associated with its current use. To the east of the listed building and park, towards the site, there has been both residential development and the construction of laboratory and research facilities. The listed building is of high significance, and the RPG of medium significance; however, due to their interdependency of significance, for the purposes of this assessment both are viewed as having a high significance. Both assets are within the Huntercombe Manor Conservation Area, designated in 1977.

12.4.84. The Grade I listed Burnham Abbey (**49**) is located to the south of Huntercombe Manor, and dates from the 13th century, with 20th century additions. The building retains its medieval cloistered form, and is still in use as a religious establishment. Its setting is deliberately secluded, centred on the inner gardens and courtyards, with few views beyond the walled landscape which surrounds it. The asset is of high significance.

12.4.85. Berry Hill (**46**) is a grade II listed RPG dating from the 19th century and located approximately 3.5km to the west of the Proposed Development Site. The park has been developed with modern flats. Some historic features do survive, such as a stone built fernery and lakes now used for fishing. The park has an agricultural setting to the east and west, with long views to the south and southwest. Evergreen screening runs round the perimeter of the park. This asset is of medium significance.

12.4.86. Taplow Court (**45**) is a Grade II listed RPG. The park lies approximately 4km from the Proposed Development Site, and dates from the 19th century. Based around a 19th century house, Grade II listed, are formal gardens, with terracing and extensive long views towards Maidenhead to the southwest and Windsor and Eton far to the southeast. The park is surrounded and screened from local roads by tree and shrub planting. This asset is of medium significance. Within the park is a Scheduled Monument, comprising Saxon burial monuments and mounds (**44**), discussed as part of the archaeology section of this chapter.

12.4.87. Taplow Riverside Conservation Area was designated in 1975, with boundary changes of 2006. The conservation area is linear, set along the Thames riverside, and its appraisal notes a view extending towards the centre of Slough from one area to the south of the railway bridges over the Thames.

12.4.88. Cliveden (**99**) is a grade I listed building, set within a Grade I RPG (**43**). The house dates from the 19th century, having been designed and constructed by Sir Charles Barry on the site of an earlier house. The three story building's main elevation faces to the south, overlooking the Great Parterre which has long views to the south towards the River Thames. The formal gardens date from the 18th and 19th centuries, and comprise formal planting to the south and north of the house, giving onto pastureland and woodland to the far south and west. The site of the house is approximately 4.5km to the northwest of the Proposed Development Site, though the park stretches to the south, ending to the north of Taplow Court and 4km from the site. These assets are of high significance.

12.4.89. East Burnham Animal Pound (**70**) is a Scheduled Monument and also a Grade II listed building, located approximately 2.5km to the north of the Proposed Development Site. This 18th century site is a brick walled enclosure, historically used for confining stray or illegally pastured stock; the pound is strongly associated with the common land of Burnham Beeches and surrounding woodland and village, and this forms its setting. This asset is of high significance.

12.4.90. The Manor House to the south of Stoke Poges (**65**), a Grade I listed building, is constructed of red brick, two storeys high with prominent brick chimneys. The building dates to the 16th century, and is located approximately 2.5km from the Proposed Development Site. It lies within large gardens which define its setting, with open land to the north, and the parkland of Stoke Park to the south. This asset is of high significance.

12.4.91. Stoke Park (**64**) is a Grade I listed building dating from the 18th century, of three storeys and stucco rendered. The building is now a hotel. It sits within a Grade II listed RPG (**62**), located approximately 2km to the northeast of the Proposed Development Site. The parkland setting of the house is now predominantly a golf course, with a range of trees giving onto woodland and pasture to the edges of the park. To the north is a tree lined avenue and obelisk. Views from the south terrace of the house are screened by this woodland; however, there are wide views to the south and southwest from the upper storeys of the house. Stoke Park house is of high significance, whilst the RPG is of medium significance. Stoke Park Conservation Area has the same boundary as the RPG, and was designated in 1987.

12.4.92. To the east of Stoke Park is the Stoke Poges Garden of Remembrance (**209**), dating from the early 20th century. The asset is a Grade I listed RPG, and is located 3km from the Proposed Development Site. The park is formally laid out with walks and yew hedging, with spaces of remembrance and memorial to family and other groups, including one for the Ghurkhas. The significance of the asset lies in its function as a memorial rather than its setting. Views are predominantly to the northwest over Stoke Park, and to the south and east. This asset is of high significance.

12.4.93. The Church of St Giles in Stoke Poges (**66**) is a Grade I listed building. The church lies in the centre of the village, and is of flint and brick with a short 16^{th} century tower; the building holds a plaque to Gray, and it is thought that his 'Elegy' may refer to this churchyard. The setting of the church is defined by its village location. Its squat tower means that it does not have the visual effect within the wider landscape experienced by other ecclesiastical structures. This asset is of high significance.

12.4.94. The area of the Upton Park/Upton Village Conservation Area was once Upton Court estate, but is now an urban area focused on a group of listed buildings to the east, and Herschel Park to the west.

12.5. Potential Effects and Mitigation Measures

12.5.1. There will be no physical effects on buried archaeological remains within the Proposed Development Site from the construction or operation of the scheme, as no archaeological remains are thought to have survived repeated redevelopment of the site over the previous 90 years. There will be no effects on the material form of built heritage assets resulting from the Proposed Development. The effects arising will be short term during demolition and construction on heritage assets close to the Site, and long term during operation when there will be changes to the setting and views from particular assets.

Demolition and Construction Phase

12.5.2. There will be no change to archaeological remains within 1km of the Proposed Development Site from the demolition and construction phase.

12.5.3. A new two-way replacement railway bridge is being constructed alongside the listed railway bridge at Leigh Road for completion in 2015 (not part of the Proposed Development), which will carry some of the construction traffic during the proposed works. Therefore, there will be minimal increased traffic flow or prospective effects from heavy vehicles during construction. The effect on the listed railway bridge at Leigh Road during construction is therefore anticipated to be **negligible**.

12.5.4. The Scheduled Monument Montem Motte (**80**) will not be affected during construction as construction traffic will be routed down the A355 to the west of the Scheduled Monument. The impact is therefore assessed as No Change to this asset of high significance. The significance of the effect is therefore anticipated to be **negligible** for the duration of construction.

12.5.5. There will be no change and therefore a **negligible** significance of effect to all other designated heritage assets within the 10km study area from construction activities as these are well screened or situated at a considerable distance from the development area.

Operation Phase

12.5.6. There will be no change to archaeological remains within 1km of the Site from the operation of the Proposed Development.

12.5.7. The Bronze Age bowl barrow (**63**) in Stoke Park is currently set within the grounds of Stoke Park golf course. Thick tree planting along the park's southwest boundary obscure views towards the Proposed Development from the Scheduled Monument and modern development in this direction also detracts from the monument's setting. The effect from the Proposed Development is therefore assessed as no change on this asset of high significance. The significance of the effect is therefore anticipated to be **negligible** from the operation of the Proposed Development.

12.5.8. A Scheduled Iron Age Hillfort at Burnham Beeches (**78**) is currently set within a heavily wooded landscape on part of the former Burnham Common, to the northeast of the historic village of Burnham. The hillfort's original setting would have included the surrounding landscape to the south and the Proposed Development Site. The current tree cover detracts severely from the monument's setting allowing no views of the surrounding landscape from the Scheduled Monument. The effect from the Proposed Development is therefore assessed as no change on this asset of high significance. The significance of the effect is therefore anticipated to be **negligible** from the operation of the scheme.

12.5.9. The Scheduled Saxon Barrow and Anglo-Saxon Church (**43**) are set within the landscaped gardens of Taplow Court, a Grade II English Heritage Registered Park and Garden. Operation of the Proposed Development may introduce a replacement stack, possibly up to 90m high into long distance views to the east from the top of the scheduled monument. The proposed new boiler house will also not be prominent against the skyline being positioned amongst other large industrial buildings. As views in this direction already include the cooling towers and the higher north chimney stack (which is 104m high), the impact of a replacement, slightly taller south stack (from the existing 82m up to potentially 90m) and new 48m high boiler house is assessed as no change on this asset of high significance. The significance of effect is anticipated to be **negligible** from the operation of the scheme.

12.5.10. With regards to the Scheduled Monument Montem Motte (**80**), operation may introduce a slightly taller stack (by 8m) into long distance views northwest from the top of the scheduled monument. It should be noted that only the tops of the north stack are currently visible from the Scheduled Monument (the south stack being currently not visible). As the setting of the monument is already severely detracted from by modern offices, a leisure development and roads, in close proximity to the scheduled site, the effect of the operation of the Proposed Development is assessed as no change on this asset of high significance. The significance of effect is anticipated to be **negligible** from the operation of the scheme.

12.5.11. Effects on the Scheduled Monument Windsor Castle (**96**) are considered below. The operation of the Proposed Development will not affect the settings of the other Scheduled Monuments identified within the 10km study area.

12.5.12. The current context of the railway bridge at Leigh Road (**2**) will also be affected during operation. This long term effect will be due to the change in form of the power station. The present power station already forms part of the context of the bridge, its setting being defined by its relationship to the transport network. The magnitude of change of the proposals on the significance of the asset is, therefore, considered to be minimal, with the effect considered as having a **negligible** significance.

12.5.13. The chimneys of the Proposed Development will be visible from the milestone at SU 9556 8054 (**1**), as they currently are, although screening is provided by existing industrial buildings. The current setting of the asset is industrial, and the change to this setting will not be adverse. The long term magnitude of change of the proposals during operation will be minimal to this asset of medium significance, and the significance of effect will be **negligible**.

12.5.14. Cippenham Lodge (**3**) is now surrounded by residential and commercial development and no longer functions as a 'lodge'. The chimney of the Proposed Development will be visible from some areas of this setting, as is the case currently. Due to the lack of change in the view, and the narrow setting of the building, it is assessed that there will be a minimal magnitude of change to this asset, resulting in a **negligible** significance of effect.

12.5.15. The two locally listed buildings within the study area will experience different effects. 329 Bath Road (**39**) does not have views to the Proposed Development Site, and its main elevation is focused south to Bath Road. Therefore, there will be no effect to this asset. The Slough Trading Estate Marker Post (**40**) takes its setting from the Slough Trading Estate of which it forms a part. The lack of change to the use and general form of the energy generation site mean that there will be a minimal magnitude of change on the asset which is of low significance, resulting in a **negligible** significance of effect.

12.5.16. Windsor Castle (**96**) has direct views from the north terrace and the Round Tower to the Proposed Development Site, with the current chimneys of the power station visible from this view (see *Chapter 14: Landscape and Visuals* of this ES). There will be little change to the view resulting from the Proposed Development, and the proposed new boiler house will not be prominent against the skyline being positioned amongst other large industrial buildings and viewed from height. The minimal change in view will not affect the current significance of the building or its setting, however, it will exacerbate the impact caused to significance by the exisiting chimney stacks. The magnitude of change to this building of high significance is assessed as minimal, resulting in an effect of **minor adverse** significance.

12.5.17. The influence of buildings within Windsor Town Centre Conservation Area itself, which surround the foot of the castle, does not extend beyond the town, their setting being defined by their relationship to the castle and wider settlement. Any potential glimpsed views of the Proposed Development will not affect this relationship and, therefore, the significance of the Conservation Area.

12.5.18. Windsor Great Park (**61**) and Home Park provide the setting of Windsor Castle. Views through the park are focused through the long avenues and rides to the south and east of the Castle. To the north, there are some fleeting views through wooded areas which provide screening; the centre of Slough is visible, however, the Slough Trading Estate and Proposed Development Site is not prominent in these views. There will be no change to this asset of high significance, resulting in an effect of **negligible** significance.

12.5.19. The Grade II* listed Oakley Court Hotel (**52**) has views to the north over the River Thames. These views encompass the southern periphery of Slough, but the Proposed Development Site is not prominent in the view. The top section of the stack may be partially visible to the northwest during the operation of the site from upper windows of the listed building. There will be no change to this asset of high significance, resulting in an effect of **negligible** significance.

12.5.20. Eton College Park (**202**) has views over the Thames to the north towards Slough. Although the Slough Trading Estate is visible, the Proposed Development Site is not discernible from the northern areas of the park. There will be no change to this asset of medium significance resulting in an effect of **negligible** significance.

12.5.21. The buildings of Eton College (**107**) are sited at a lower level than the Lower Chapel (**57**) and there are views across to Slough from the upper windows of those buildings located on the north side of the college complex. The stacks associated with the Proposed Development will be visible in these views, as it is currently and the proposed new boiler house will not be prominent amongst the existing industrial buildings. The chapel itself occupies a rise, and has clear views to the Proposed Development Site. There will be little change in the view resulting from the Proposed Development, with no effect to the collegiate setting of the buildings, although the new stack heights will increase the current visibility from the chapel to the Site. Therefore, the magnitude of change on these buildings of high significance is assessed as minimal, resulting in a **minor adverse** effect during operation.

12.5.22. The Eton Conservation Area is centred on Eton College, and aside from those decribed above has limited views towards the Site. Any potential glimpsed views of the Proposed Development will not affect this relationship and, therefore, their significance.

12.5.23. Bell Barn Farmhouse (**56**), to the north of Eton, has some partially screened views towards the north, which in part take in the periphery of Slough. The Proposed Development Site is not prominent in this view, and the chimneys do not penetrate the skyline. Furthermore, the agricultural setting of the building will not be impacted. Therefore, there will be no change to this asset of high significance, resulting in a **negligible** effect during operation.

12.5.24. The Grade I listed Dorney Court (**51**) has partially screened views towards the periphery of Slough across the River Thames. The Proposed Development Site is not prominent in this view, and there will be no change to the setting of this asset of high significance during operation. Therefore the significance of effect will be **negligible**. This is also the case for the Church of St James (**50**) and the Chapel of St Mary Magdalene (**53**), as the setting of these buildings is local, and their squat towers limit their visibility within the surrounding landscape.

12.5.25. The Dorney Conservation Area, which is focused upon the listed buildings within it, will not be affected by the Proposed Development and will not change the relationship of listed buildings and other assets within the Conservation Area. The effect during operation of the Proposed Development is therefore negligible,

12.5.26. The Monkey Island Hotel (**54**) and the Temple on Monkey Island (**55**), have views predominantly to the south. There are partially screened views through trees to the north; however, the setting of the listed buildings relates to the river and river bank surroundings. The Proposed Development Site is not prominent in these views, and the stacks do not currently penetrate above the skyline. Therefore, there will be no change to these assets of high significance, resulting in a **negligible** effect during operation.

12.5.27. The Grade I listed Huntercombe Manor (**48**) has as its setting the surrounding Grade II listed RPG (**47**). There are no views from the RPG towards the Proposed Development Site due to the development of housing and industrial buildings to the east. The tops of the stacks of the Proposed Development will be visible from the upper storeys of the listed building. There will be no change to the significance of this asset, which is of high significance. This will result in a **negligible** effect during operation.

12.5.28. Huntercombe Manor Conservation Area is focused on the listed buildings within it, and as with the RPG, there are no views from the Conservation Area towards the Site. There will be no effect on this asset.

12.5.29. Burnham Abbey (**49**) retains its enclosed setting, and is surrounded by walls, beyond which is pasture. Due to the low building types and enclosure of the Abbey, there is no view towards the Proposed Development Site, beyond the peripheries of Slough to the east. Therefore there will be no change to the setting of this asset of high significance, resulting in a **negligible** effect during operation.

12.5.30. Berry Hill (**46**) is screened to the east by evergreen planting. In its current form, there are no views toward the Proposed Development Site, and therefore there will be no change to this asset of medium significance. The resulting significance of effect will be **negligible** during operation.

12.5.31. Taplow Court (**45**) has tree and shrub screening at its boundaries. The significant views are towards the south and southeast, with fleeting glimpses towards Slough to the east. There will be little change in the views towards Slough, as the Proposed Development Site is not prominent in the view. Therefore there will be a no change to the asset which is of medium significance. This will result in an effect of **negligible** significance to the asset during operation.

12.5.32. Taplow Riverside Conservation Area has one panoramic view towards the centre of Slough and the Site. Otherwise, the Conservation Area focuses on the river and railway. The effect of the Proposed Development within the noted view will be negligible, as the magnitude change of the Proposed Development within the noted view will be of an urban mass with the chimneys of the proposed development only slightly above the general building line. The effect will be of **negligible** significance.

12.5.33. Cliveden (**99**) is set within a Grade I RPG (**43**). There are some fleeting views of Slough to the southeast from the Great Parterre and upper storeys of the house; however, there will be little change to these views as the Proposed Development Site is not prominent. Therefore, it is assessed that there will be no change change to these assets of high significance, resulting in a **negligible** significance of effect during operation.

12.5.34. The East Burnham Animal Pound (**70**) has a restricted local setting, and is surrounded by trees. In its current form there are no views towards the Proposed Development Site; therefore, there will be no change to the setting of this asset of high significance during operation, resulting in a **negligible** effect.

12.5.35. The Manor House (**65**) has views from its upper windows across Stoke Park to the south towards Slough. The Proposed Development Site is not prominent in these views, although the upper portions of the tall chimney will be visible on clear days. This will cause little change in the view and no change to the setting of the building. There will be no change to this asset of high significance. This will result in an effect of **negligible** significance.

12.5.36. Stoke Park (**62**), the RPG of medium significance, has no views from the formal gardens towards Slough, due to screening from trees. However, outlying areas of the park situated on higher ground may have glimpses of the Proposed Development Site. Due to the lack of change in these views, and of effect upon the setting of the park, it is assessed that there will be no change to the asset, resulting in an effect of **negligible** significance during operation.

12.5.37. Stoke Park House (**64**), now a hotel, has views across Slough from upper storey windows, which incorporate the Proposed Development Site (see *Chapter 14: Landscape and Visuals* of this ES). The tall chimney will rise slightly above the urban mass in this view, although there will be little change from the current view. This change in view will not affect the setting of the building, which is provided by its parkland; however, the views from this prominent building form part of its significance and there will be a change within the view. There will be a minimal change on the asset, and the significance of effect to this asset of high significance will be **minor adverse** during operation.

12.5.38. Effects at the Stoke Park Conservation Area, which has the same boundary as Stoke Park, will be the same as those discussed above for Stoke Park.

12.5.39. Views from the Stoke Poges Garden of Remembrance (**209**) are predominantly to the north, although there are fleeting glimpses towards Slough through tree planting and boundaries. The views from the asset, which is of high significance, will not change, and there will be no change to the significance of the asset, resulting in an effect of **negligible** significance during operation.

12.5.40. The Church of St Giles (**66**) in Stoke Poges has no views from the building towards the Proposed Development Site, including from its short tower. The setting of this building is local, and there will be no change to this setting resulting from the Proposed Development. Therefore, the significance of effect is considered to be **negligible**.

12.5.41. The Upton Park/Upton Village Conservation Area has as its focus a group of listed buildings to the east. Though there may be glimpsed views along the streets of the Conservation Area towards the Proposed Development Site, these will not affect the heritage value of the asset, or change the relationships between buildings and open spaces within the conservation area. Therefore there will be a **negligible** significance of effect to the asset.

Mitigation Measures

12.5.42. Traffic management and the development of the replacement railway bridge by a third party (which is not part of the Proposed Development) will help alleviate the effect on the listed Leigh Road Railway Bridge (2) from minor adverse to negligible, and will prevent the possibility of vehicle strikes upon the fabric. This will be enforced by the Construction Traffic Management Plan (CTMP) and will be achieved by the use of the replacement railway bridge to the west, which is being constructed and is scheduled to be completed in 2015.

12.5.43. For designated assets, where it has been noted that there will be a minimal change to the asset’s setting, and therefore a minor adverse significance of effect is presented in the effect assessment, mitigation has been incorporated into the scheme through the principles of good design, for example the height of the boilerhouse has been limited to a maximum of 48m. Due to the nature of the Proposed Development (representing a slight change to the current site layout and use) and the distance to many of the designated heritage assets, no further specific mitigation measures are proposed for the operational phase for these assets.

12.6. Residual Effects and Conclusions

12.6.1. Table 12-4 summarises the identified residual effects, which range from negligible during the demolition and construction phase of the Proposed Development and negligible to minor adverse during the operational phase.

Table 12-4 Residual Effects

Description	Asset ID and Name	Significance of effects without Mitigation	Mitigation	Significance of effects following Mitigation
Demolition and Construction Phase				
Demolition/Construction effect on Landscape and Visual Amenity of Cultural Heritage and Archaeological Assets	All heritage assets.	Negligible	None	Negligible
Operational Phase				
Operational effect on Landscape and Visual Amenity of Cultural Heritage and Archaeological Assets	All heritage assets except for those listed below.	Negligible	None	Negligible
	96. Windsor Castle	Minor adverse	None	Minor adverse
	107. Eton College	Minor adverse	None	Minor adverse
	57. Lower Chapel, Eton College	Minor adverse	None	Minor adverse
	64. Stoke Park House	Minor adverse	None	Minor adverse

12.6.2. The significance of effects following mitigation from the demolition/construction phase of the Proposed Development on a number of heritage assets of high significance is assessed as **negligible**, whilst effects from the operation of the Proposed Development phase is assessed as **negligible** to **minor adverse**. This includes one Scheduled Monument (Windsor Castle (**96**) (also a Grade I listed building)) and three Grade I or Grade II* listed buildings (Eton College (**107**), Lower Chapel, Eton College (**57**), and Stoke Park House (**64**)). This is as a result of a minimal change to the setting of these heritage assets of high significance with the demolition, construction and operation of the scheme. The scheme colour design will limit the effects from the scheme as far as possible and blend it into the surrounding industrial development, whilst the design intention to avoid the boilerhouse breaking the hill line to the north and west in views will also limit effects (see *Chapter 14: Landscape and Visuals* of this ES for further details).

12.6.3. It is therefore considered that the demolition/construction and operation of the Proposed Development will not result in any significant (moderate or major) effects or cause substantial harm to heritage assets or the historic environment.

12.7. Cumulative Effects

12.7.1. This section considers the cumulative effect of the Proposed Development alongside other consented and planned schemes in the vicinity. There are four schemes under consideration.

12.7.2. Two schemes relate to the same site, and are alternate options for a site on Leigh Road and Bath Road, 0.5km southeast of the Proposed Development. Both schemes comprise predominantly commercial uses, at a similar scale and massing to that already visible across the Slough Trading Estate. There will be no general cumulative effect to the wider setting of heritage assets resulting from this development as the proposed buildings will not greatly rise above the existing urban mass, and therefore will not create an additional visual impact within views. In addition, as part of the schemes a new bridge crossing over the railway is being constructed alongside the listed bridge at Leigh Road (**2**). The construction of the new railway bridge is currently underway and therefore forms part of the existing baseline. It is expected to be completed by the start of construction of the Proposed Development, therefore avoiding any potential cumulative effects. However, the construction of both the Proposed Development and the Leigh Road//Bath Road Central Core development would directly affect the listed bridge due to increased construction traffic on all surrounding roads. This would have a **minor adverse** cumulative effect on the listed bridge, although the Proposed Development is only predicted to have a negligible contribution to this effect, which would be short-term and temporary in duration during the construction phase.

12.7.3. The Applicant is proposing a scheme for ancillary buildings and parking within the SHP site. As there would be no buildings of significant height or large massing proposed, this scheme would not add to the cumulative effects on the heritage assets within the study area, or those within the ZTV.

12.7.4. The Britwell Regeneration proposals comprise a mixed residential, commercial and amenity space development, 0.7km to the north of the Proposed Development Site. These proposals include low rise building scales, and the demolition of an existing higher-rise block. This would give rise to a beneficial cumulative effect alongside the Proposed Development, as the long range views of Slough would be improved.

12.7.5. It is expected that any potential effects from these cumulative developments on buried archaeological remains will be considered and appropriately mitigated as part of the planning applications for these schemes, and hence no cumulative effects are anticipated on buried archaeology.

12.8. References

Ref. 12-1 DCLG, (2012) National Planning Policy Framework, Annex 2 Glossary.

Ref. 12-2 English Heritage (2010) Historic Environment Practice Guide, paragraph 15

Ref. 12-3 The Institute for Archaeologists (2012) Code of Conduct. Standard and Guidance for historic environment desk-based assessment.

Ref. 12-4 English Heritage (2008) Conservation Principles. Policies and Guidance for the Sustainable Management of the Historic Environment.

Ref. 12-5 English Heritage (2012) Setting of Heritage Assets. EH Guidance.

Ref. 12-6 DECC (2011) Overarching National Policy Statement for Energy (EN-1), Department for Energy and Climate Change, HMSO

Ref. 12-7 DECC (2011) Overarching National Policy Statement for Renewable Energy Infrastructure (EN-3), HMSO

Ref. 12-8 DCLG (2012) National Planning Policy Framework. www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

Ref. 12-9 DCLG (2014) National Planning Practice Guidance. http://planningguidance.planningportal.gov.uk/blog/guidance/conserving-and-enhancing-the-historic-environment/

Ref. 12-10 DCLG (2010) PPS5: Planning for the Historic Environment Planning Practice Guide. http://www.english-heritage.org.uk/publications/pps-practice-guide/pps5practiceguide.pdf

Ref. 12-11 SBC (2008) Slough Local Development Framework, Core Strategy Development Plan Document, Slough Borough Council

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Ref. 12-13 English Heritage (2012) Seeing the History in the View. A Method for Assessing Heritage Significance within Views.

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Ref. 12-18 VCH (1969) Victoria County Histories, Buckinghamshire. Volume I, 384

Ref. 12-19 VCH (1969) Victoria County Histories, Buckinghamshire. Volume III, 225

Ref. 12-20 Rocque's Map of Buckinghamshire (1761)

Ref. 12-21 Jefferys Map of Buckinghamshire (1770)

Ref. 12-22 Bryant's Map of Buckinghamshire (1825)

Ref. 12-23 Plan of Burnham Parish in the County of Buckinghamshire (1808)

Ref. 12-24 Burnham Tithe Map (1841)

Ref. 12-25 Ordnance Survey (1876) Ordnance Survey Map Scale 1:2500

Ref. 12-26 Ordnance Survey (1899) Ordnance Survey Map Scale 1:2500

Ref. 12-27 Ordnance Survey (1924) Ordnance Survey Map Scale 1:2500

Ref. 12-28 Ordnance Survey (1932) Ordnance Survey Map Scale 1:2500

Ref. 12-29 Ordnance Survey (1938) Ordnance Survey Map Scale 1:10,560

Ref. 12-30 Ordnance Survey (1955-1963) Ordnance Survey Map Scale 1:2500

Ref. 12-31 Ordnance Survey (1961-1974) Ordnance Survey Map Scale 1:1250

Ref. 12-32 Ordnance Survey (1969-1978) Ordnance Survey Map Scale 1:1250

Ref. 12-33 Ordnance Survey (1993) Ordnance Survey Map Scale 1:1250

Ref. 12-34 Ordnance Survey (2006) Ordnance Survey Map Scale 1:10,000

Ref. 12-35 Ordnance Survey (2012) Ordnance Survey Map Scale 1:10,000

13 ECOLOGY

13.1. Introduction

13.1.1. This chapter of the ES assesses the potential effects of the Proposed Development on relevant ecological receptors.

13.1.2. It assesses the potential effects (based on surveys undertaken in 2011 and updated in 2013) on ecology through the demolition, construction and operational stages of the Proposed Development. Where adverse effects are identified, this chapter discusses appropriate mitigation measures.

13.1.3. The assessment comprises:

- A review of the local and national ecological planning policy requirements and legislative context;
- Collection and compilation of existing ecological data;
- An ecological walkover survey of the Proposed Development Site;
- An assessment of the Site's ecological importance, including an analysis of the potential of the site to support protected species or species of conservation concern;
- Identification of effects beneficial or adverse on the site's ecological value;
- Recommendations for mitigation to minimise, or remove, potential effects; and
- Identification of any residual effects.

13.2. Legislation and Planning Policy Context

13.2.1. This section identifies the principal legislation and planning policy relevant to ecology.

National Policy and Legislation

13.2.2. Legislation for the protection of wildlife and ecology in the United Kingdom (UK) includes:

- The Wildlife and Countryside Act, 1981 (as amended) (WCA) (Ref. 13-3);
- The Countryside and Rights of Way Act, 2000 (as amended) (CRoW Act) (Ref. 13-4);
- Natural Environment and Rural Communities Act, 2006 (NERC Act) (Ref. 13-5);
- The Conservation of Habitats and Species Regulations, 2010 (Ref. 13-6); and
- Wild Mammals (Protection) Act, 1996 (Ref. 13-7).

National Planning Policy Framework (NPPF)

13.2.3. The NPPF (Ref. 13-8) and its associated Planning Practice Guidance (Natural Environment – Biodiversity, ecosystems and green infrastructure) (2014) (Ref. 13-9) provides the current guidance for planning with respect to ecology.

13.2.4. The NPPF states that the planning system should contribute to and enhance the natural and local environment by, among others, minimising impacts on biodiversity and providing net gains in biodiversity where possible. The NPPF should be read in conjunction with the Government Circular 06/2005 (Ref. 13-10).

Local Planning Policy

13.2.5. The 'Core Strategy 2006-2026' (Ref. 13-11) includes a number of polices aimed at protecting nature conservation. Developments are required to demonstrate they appropriately mitigate impacts on ecology. The policy of the Spatial Strategy is to direct development into the most accessible locations in the Borough, while protecting other more environmentally sensitive areas from over-development and which is most likely to protect existing biodiversity.

13.2.6. A more detailed background on these policies is presented in *Chapter 3: Planning Policy Context.*

Biodiversity Action Plans

UK Post-2010 Biodiversity Framework

13.2.7. This document was produced in response to a change in strategic thinking following the publication of the Convention of Biological Diversity's Strategic Plan for Biodiversity 2011-2020 and its 20 'Aichi targets' and the launch of the new EU Biodiversity Strategy (Ref. 13-12).

13.2.8. It set a broad enabling structure for action across the UK between now and 2020, including a shared vision and priorities for UK-scale activities to help deliver the Aichi targets and the EU Biodiversity Strategy. A major commitment by Parties to the Convention of Biological Diversity is to produce a National Biodiversity Strategy and/or Action Plan.

13.2.9. The UK Post-Development Framework is relevant in the context of Section 40 of the NERC Act 2006, meaning that Priority Species and Habitats are material considerations in planning. These species are identified as species of conservation concern due to their rarity or a declining population trend.

Berkshire Biodiversity Action Plan (BAP)

13.2.10. The Berkshire Local Nature Partnership (LNP) (Ref. 13-13) includes partners from the health, education, local authority, business, and nature conservation sectors. Such partners are working together to create a sustainable, healthy and vibrant Berkshire by promoting the conservation and enhancement of nature.

13.2.11. Local Nature Partnership's originate from the Government's Natural Environment White Paper 'The Natural Choice: Securing the Value of Nature' (Ref. 13-14). In the paper the Government recognised the importance of partnership work in delivering positive environmental change at a local level.

13.2.12. The Berkshire Biodiversity Strategy will conserve and enhance the habitats and species of principal importance (those on Section 41 of the NERC Act) in Berkshire. The focus of Berkshire Local Nature Partnership in recent years has been the identification of Biodiversity Opportunity Areas (BOAs) and delivery of conservation action within these areas.

13.3. Assessment Methodology and Significance Criteria

Survey Scope and Methods

Desk-based study

13.3.1. URS commissioned Thames Valley Environmental Record Centre (TVERC) to complete a data search for statutory and non-statutory sites, UK Biodiversity Action Plan (BAP) Priority Habitats and records of protected and notable species, from the Site and surrounding area. The data search was carried out in 2011, and then again in 2013,

13.3.2. Information on designated sites and the majority of the species records were requested from within a 2km radius from the site. However, bat records were requested from within a 5km radius of the Site (as bats are mobile and use a large area to fulfil their roosting and feeding requirements). The majority of bird records held by TVERC, except those in the north of the county of Berkshire (to the west of the Site), have been provided by the Oxford Ornithological Society. Records of statutory sites provided by TVERC were verified using the MAGIC and Natural England's Nature on the Map websites.

13.3.3. The northern extent of the 2km search area falls within Buckinghamshire, as well as the northern part of the 5km data search for bats. TVERC only holds records for Berkshire and Oxfordshire. This was not considered to be a significant limitation, as the majority of the search areas fall within Berkshire.

Surveys for Flora and Fauna

13.3.4. Table 13-1 summarises previous surveys and methodologies that had been undertaken at the Site that have been referenced in this report.

Table 13-1 Summary of Ecological Surveys Undertaken

Date	Survey and Method Used	Consultant	Report Name	Appendix
August 2011 and updated in June 2013	Extended Phase 1 habitat survey (including scoping for protected species) in accordance with Joint Nature Conservation Committee (JNCC) (2010) (Ref. 13-15) and desk based study.	URS	Slough Heat and Power: Proposed Multi-Fuel Facility: Desk Study and Extended Phase 1 Habitat Survey Report	Appendix H-1
October 2012	Bat roost potential survey and emergence/ re-entry surveys in accordance with Bat Conservation Trust Guidelines (BCT) (2012) (Ref. 13-16).	URS	Slough Heat and Power Proposed Multifuel Facility Bat Report	Appendix H-2
June 2012	Breeding bird and peregrine survey. Standard breeding bird survey (BBS) (Ref. 13-17).	URS	Slough Multifuel Power Station – Breeding Bird and Peregrine Survey Report	Appendix H-3

Phase I Survey

13.3.5. An Extended Phase 1 Habitat Survey was undertaken of the SHP site by a URS ecologist in June 2013, in order to verify and update the ecological baseline information collected between 2011 and 2012 where necessary. The survey followed methods set out by JNCC (2010) and involved undertaking a walkover of the site while recording habitat types and floral species. In addition, the presence or potential presence of protected or notable species of flora and fauna was recorded along with the presence of invasive species of plant such as Japanese knotweed. The extended Phase 1 habitat survey included a bat roost potential survey in order to update the bat roost potential of buildings and trees recorded within the site boundary. Bat Roost Potential assessments of buildings followed the methodology set out by the BCT (2012).

Limitations

13.3.6. During 2013 surveys, works were progressing to decommission operations within some of the buildings (B1 to B3, and B13, as shown on Figure 13-2) which resulted in some restricted access for safety reasons. However, sufficient access was granted to complete a bat roost potential assessment based on exterior examination and limited internal searches. It is considered highly unlikely that the above limitation significantly affects the following evaluation and assessment.

Assessment Methodology

13.3.7. The methodology used to assess the significance of effects on ecological receptors is based on the Institute for Ecology and Environmental Management (IEEM) Ecological Impact Assessment (EcIA) guidelines published in July 2006 (Ref. 13-18). This guidance follows a 'biodiversity' approach to effect assessment; rather than solely relying on the legal protection of a habitat or species to characterise geological extent, other factors such as local abundance and rarity are also considered. The assessment method uses a process of assigning values to the identified ecological features and resources, predicting and characterising ecological effects and, through this process, determining significance of likely significant effects on ecological receptors.

13.3.8. The guidelines suggest that the value or importance of an ecological resource or feature should be defined in terms of a geographic scale. Therefore the value (or potential value) of ecological receptors on, and in the immediate vicinity of, the site has been considered at the following scales:

- International;
- National (England);
- Regional (southeast);
- County (Berkshire);
- Borough (Slough);
- Local (site plus a 2km radius);
- Site; and
- Negligible (less than site value).

13.3.9. Once the ecological receptor (designated site, habitat, assemblage or species) has been identified, a judgement is made as to whether the redevelopment proposals are likely to result in effects upon each receptor and, if appropriate, the nature of those effects. Each likely significant ecological effect has a number of characteristics that need to be adequately described before significance can be assessed. A number of factors have been considered when describing and assessing ecological effect, including:

- Extent (area or distance);
- Magnitude (amount or level of effect);
- Duration;
- Timing and frequency (e.g. related to life cycles); and
- Reversibility (whether the effect is permanent or temporary).

13.3.10. Once each of these factors has been considered, a judgment on the significance of the effect on a particular receptor is made. This will depend on both the characteristics of the effect and the value of the receptor. IEEM states that *"an ecologically significant effect is defined as an effect (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area"*. Effects on ecological integrity of designated sites are those which affect integrity as described by the Government Circular: Biodiversity and Geological Conservation as "*the coherence of ecological structure and function… that enables it to sustain the habitat, complex of habitats and/or levels of populations or species for which it was classified"*. The guidelines also provide definitions for the conservation status of habitats and species:

- "*For habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and*
- *For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area."*

13.3.11. Once an effect is identified, the geographic scale at which that effect will take place is established. For example, an effect may not be significant at a national scale but may be significant at a county or local scale. All of these judgements are based, wherever possible, on quantitative evidence; however in some cases the professional judgement of an experienced ecologist may also be required.

13.3.12. The scale and significance of the effect will help to determine the correct level of mitigation or compensation required. Enhancement measures may also be identified and may result in a beneficial residual effect. For the purposes of this assessment, effects on ecological receptors are assessed without mitigation and then with mitigation to determine the residual effect.

13.3.13. Effects on ecology and nature conservation are subsequently assessed under the IEEM guidance as being:

- Not significant; or
- A significant positive or negative effect at the relevant geographical scale.

13.3.14. In order to provide consistent assessment terminology throughout this ES each effect assigned using the IEEM criteria has been translated to a significance level on scale of negligible, minor, moderate or major, as outlined in Table 13-2.

Table 13-2 Significance Criteria

IEEM Assessment	Effect Category	Significance
Positive effect on ecological integrity or conservation status at regional, national or international level.	Major beneficial	Significant
Positive effect on ecological integrity or conservation status at borough - county level.	Moderate beneficial	
Positive effect on ecological integrity or conservation status at site - local level.	Minor beneficial	Non-significant
No significant effect on ecological integrity or conservation status.	Negligible	Negligible
Negative effect on ecological integrity or conservation status at site - local level	Minor adverse	Not-significant
Negative effect on ecological integrity or conservation status at borough - county level.	Moderate adverse	Significant

13.3.15. A similar process has been used to assess cumulative effects. This assessment is essentially a receptor-based assessment. Other projects in the surrounding area that are likely to either effect a receptor that has been affected by the redevelopment proposals 'alone', or reduce the usefulness of a particular mitigation measure, has been considered. The temporal and spatial parameters of this assessment will help determine which cumulative projects are likely to be included. Effects will be assessed and categorised in a manner similar to that outlined previously.

13.4. Baseline Conditions

13.4.1. A summary of the desk study and field survey results for the Proposed Development is provided below.

Desk Study Results

Designated Sites

13.4.2. There are no Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Sites of Special Scientific Interest (SSSI) or National Nature Reserves (NNR) within a 2km radius of the Proposed Development Site. However, for the purposes of this assessment the closest European Protected Site is Burnham Beeches SAC located approximately 2.9km north of the Proposed Development Site.

13.4.3. There are two statutory sites within 2km of the site (see Figure 13-1 for site locations); these are Cocksherd Wood Local Nature Reserve (LNR) and Haymill Valley LNR:

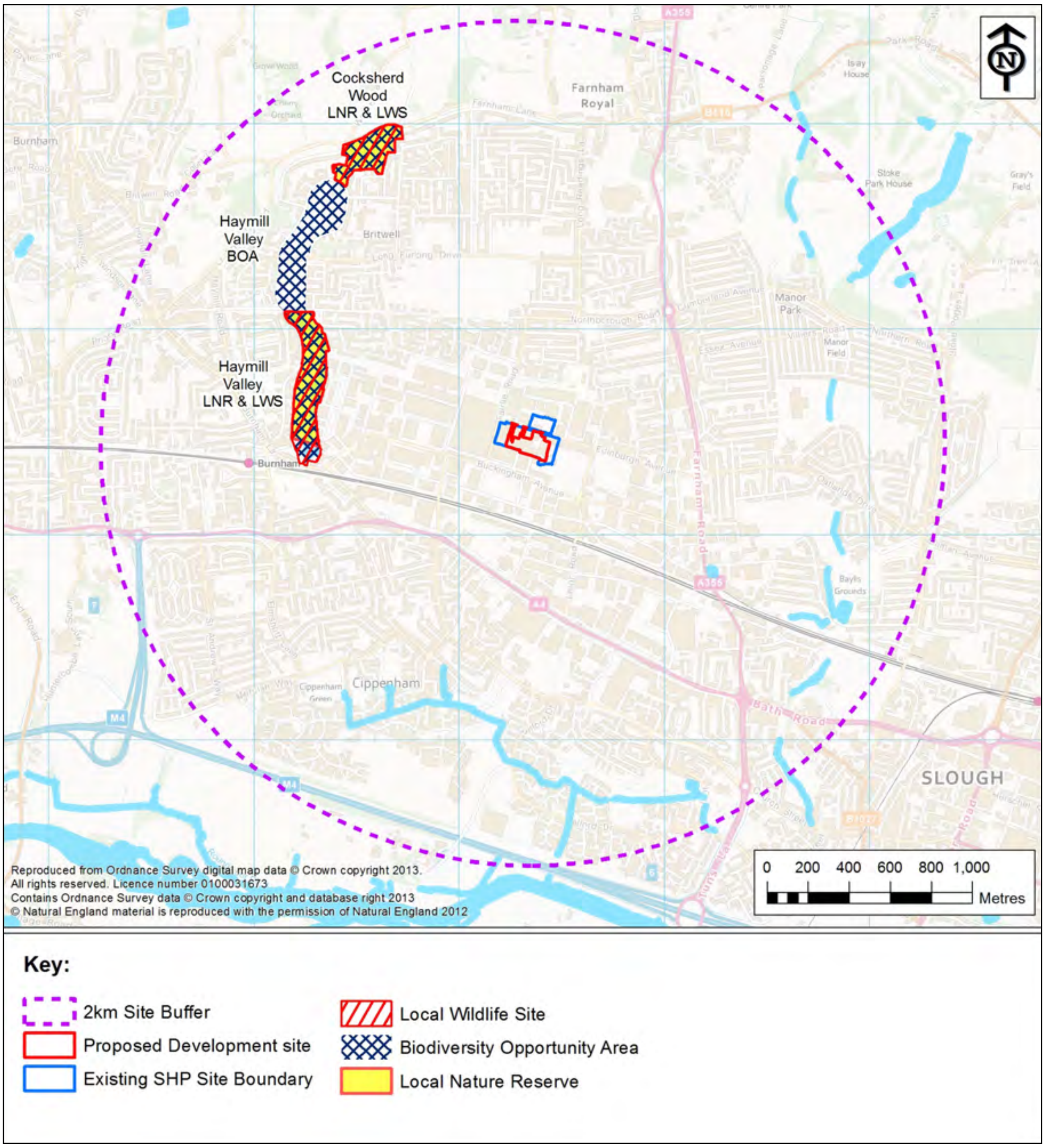
- *Cocksherd Wood LNR* - This 4ha ancient woodland, approximately 1.4km northwest of the Site, contains beech *Fagus sylvatica* woodland with a sparse shrub layer and ground flora running along the chalky northern edge.

- *Haymill Valley LNR* - This designated site is approximately 900m west of the Site and covers an area of 8.67ha. It comprises an area of marshy wet woodland, reedbed, streams and open water. The site is described as a valuable haven for wildlife within Slough.

13.4.4. There are three non-statutory sites located within 2km of the Proposed Development Site (see Figure 13-1 for site locations); Cocksherd Wood Local Wildlife Site (LWS) (located 1.4km northwest of the Site), Haymill Valley LWS (located 800m west of the Site) and Boundary Copse Woodland Trust Reserve (WT) (located 1.3km northeast of the Site).

13.4.5. The data search undertaken in 2013 revealed that, in addition to the above, Haymill Valley Biodiversity Opportunity Area (BOA) and Bray to Eton Pits & Meadows BOA were located within the area of search.

Figure 13-1 Location of Nature Conservation Sites



Protected and Notable Species Records

Bats

13.4.6. Surveys have revealed that no bat roosts have been recorded within the Proposed Development Site or SHP site. However, the desk study undertaken in 2011 and 2013 revealed that there have been several sightings of bats. Table 13-3 shows the bat species that have been recorded within the search area. All bat species are fully protected under the WCA and the Habitat Regulations 1994 (as amended). Furthermore, *soprano pipistrelles* are listed on the UK BAP.

Table 13-3 Bat species within 5km of the Proposed Development Site

Name	Species	Distance (km)	Direction	Year
Pipistrelle Bat species	*Pipistrelle sp*	Exact location and distance unknown (insufficient OS data provided)	All directions	2003, 2004, 2007 & 2011
Soprano pipistrellle	*Pipistrelle pygmaeus*	Exact location and distance unknown (insufficient OS data provided)	Southwest	2011

Birds

13.4.7. Table 13-4 presents records of birds provided by TVERC during 2011 and 2013 data search. Anecdotal evidence from local workers on site suggests that peregrine falcon also nests occasionally within the blast vents of building B17 (as shown on Figure 13-2).

Table 13-4 Bird species within 2km of the Proposed Development Site

Common Name	Scientific Name	Protected and Conservation Status	Distance (km)	Direction	Year
Kestrel	*Falco tinnunculus*	W&CA	2.2	South	2004
Green woodpecker	*Picus viridis*	W&CA Birds Directive Annex I Amber BoCC	1.8	Northwest	2008

Invertebrates

13.4.8. Table 13-5 displays the invertebrate records provided by TVERC within the area of search.

Table 13-5 Invertebrate species within 2km of the Proposed Development Site

Common Name	Scientific Name	Protected and Conservation Status	Distance (km)	Direction	Year
Stag beetle	*Lucanus cervus*	Schedule 5, parts 5(a) and (b) (W&C Act 1981)	0.95 – 1.7	South, south west, west, north and north west.	2006 -2007

Phase 1 Habitat Survey

Land Use

13.4.9. The SHP site contains various industrial buildings associated with energy generation including boiler houses, warehouses and offices, as well as some areas of amenity planting around the perimeter. At the time of the survey the Former Metal Colours site immediately to the south of the SHP site, which may be used as laydown during construction, contained two hoarded areas which were primarily bare ground, as well as an area of hard standing. There were also small areas of amenity grassland with scattered trees to the south of one of the hoarded areas. As of June 2014, a new building is now present on the Former Metal Colours site.

13.4.10. Figure 13-2 illustrates the findings of the Phase 1 habitat Survey.

Figure 13-2 Phase 1 Habitat Map

Habitats

13.4.11. The Phase 1 habitat types that were recorded during the 2011 survey are described below. These uses were confirmed to still be presented in 2013.

Dense Scrub

13.4.12. An area of dense scrub was recorded growing over the eastern boundary fence of the cooling towers site. This was dominated by bramble *Rubus fruticosus agg*. with frequent woody nightshade *Solanum dulcamara*.

Broadleaved Scattered Trees

13.4.13. Four young to semi-mature hybrid black poplar *Populus x canadensis* trees were recorded to the south of the car park in the northeast corner of the SHP site. One wild cherry *Prunus avium* was recorded within introduced shrub in the northeast corner of this car park, with a further five adjacent to (outside) the boundary of the SHP site. Ten immature whitebeam *Sorbus sp* trees were also noted within an area of amenity grassland within the SHP site, adjacent to the site building labelled B27 in Figure 13-2. Six semi-mature Norway maple Acer *platanoides* trees were recorded within areas of amenity grassland to the southeast and southwest.

Tall Ruderal

13.4.14. Tall ruderal vegetation was recorded around the perimeter of the cooling towers site. This was dominated by field horsetail *Equisetum arvense*, with a wide range of species recorded occasionally, including creeping thistle *Cirsium arvense*, petty spurge *Euphorbia peplus*, stinging nettle *Urtica dioica*, and hogweed *Heracleum sphondylium*. Rarely noted species included common ragwort (*Senecio jacobaea*), black nightshade *Solanum nigrum* and yarrow *Achillea millefolium*. Local abundant species were mugwort *Artemisia vulgaris* and rat's tail fescue *Vulpia myuros*, with locally frequent perennial sow thistle *Sonchus arvensis*. A strip of tall ruderal vegetation was also noted growing through the edges of hardstanding car park in the eastern part of the SHP site. Numerous species were occasionally recorded, including creeping thistle, hedge mustard *Sisymbrium officinale*, woody nightshade and Yorkshire fog *Holcus lanatus*. Wall barley *Hordeum murinum* was locally abundant. Rarely noted species included opium poppy *Papaver somniferum* and common ragwort. A strip of tall ruderal vegetation was recorded along the eastern boundary of the SHP site and north of the fenced off area. Creeping thistle was abundant, with frequent field horsetail and creeping buttercup *Ranunculus repens*. Occasional species included Yorkshire fog, hedge mustard and broad-leaved dock *Rumex obtusifolius*. A small patch of tall ruderal vegetation dominated entirely by great willowherb *Epilobium hirsutum* was also noted in a damp area in the corner adjacent to B26.

Amenity Grassland

13.4.15. Patches of amenity grassland were recorded adjacent to the car park north of B20. This was dominated by annual meadow grass *Poa annua*, with frequent hop trefoil *Trifolium campestre* and rough hawkbit *Leontodon hispidus*. Occasional species were perennial rye grass *Lolium perenne*, common bent *Agrostis capillaris* and wall barley, with rarely noted species including common ragwort, smooth sow thistle *Sonchus oleraceus* and groundsel *Senecio vulgaris*. Another area of amenity grassland was recorded adjacent to B27, at the western end of the site. This was also dominated by annual meadow grass, with frequent autumn hawkbit *Leontodon autumnalis* and occasional species including yarrow, cocksfoot *Dactylis glomerata* and daisy *Bellis perennis*. Rare species included dandelion *Taraxacum officinale*, meadow buttercup *Ranunculus acris* and hogweed. At the time of the survey, to the south of the Former Metal Colours site shown in Figure 13-2 were two areas of amenity grassland. These areas were dominated by annual meadow grass, with occasional yarrow, hop trefoil, cocksfoot and daisy and common mallow *Malva sylvestris* recorded rarely. As of June 2014, a new building is now present on the Former Metal Colours site. Amenity grassland was also noted to the south and southwest of B22 along with the surrounding hardstanding. Annual meadow grass was dominant, with abundant ribwort plantain *Plantago lanceolata*, frequent yarrow and daisy and occasional red fescue *Festuca rubra*.

Ephemeral/Short Perennial

13.4.16. This habitat type was recorded within the cooling towers site, north of Edinburgh Avenue. A wide variety of species were recorded in this area, including species typically associated with wasteland and disturbed ground. Black medick *Medicago lupulina* and rat's tail fescue were abundant, with creeping thistle, creeping cinquefoil *Potentilla reptans*, daisy, dandelion and autumn hawkbit seen occasionally. Rarely noted species included wall barley, annual meadow grass, bramble, annual wall rocket *Diplotaxis muralis* and hedge bindweed *Calystegia sepium*. Common fleabane *Pulicaria dysenterica* was locally abundant. A small area of ephemeral/short perennial vegetation was recorded immediately south of B6. Common ragwort and narrow leaved pepperwort *Lepidium ruderale* were frequent, with petty spurge and smooth sow thistle recorded rarely.

Introduced Shrub

13.4.17. Frequent firethorn *Pyracantha coccinea* and wall cotoneaster *Cotoneaster horizontalis* was recorded along the northern fence line of the cooling towers site. Beds of introduced shrub were recorded around car parking areas. A range of ornamental species were recorded, as well as some self-seeded species, including abundant Aaron's beard *Hypericum calycinum* and firethorn, frequent rosemary *Rosmarinus officinalis* and occasional wall cotoneaster and hedge bindweed. Rarely noted species included butterfly bush *Buddleja davidii*, ornamental rose *Rosa sp*. and wall barley. At the time of the survey, scattered stands of butterfly bush were also recorded within the Former Metal Colours site to the south of the existing SHP site. As of June 2014, a new building is now present on the Former Metal Colours site.

Species-Poor Intact Hedge

13.4.18. Two hedges were recorded within the SHP site: a beech hedgerow adjacent to B27; and a firethorn hedge above a wall to the south of B22.

Buildings

13.4.19. A total of 45 buildings were recorded within the SHP site at the time of the survey. This included two concrete cooling towers (B18) in the northern part of the SHP site. There are two concrete chimneys (B15 and B14), two office buildings (B20, and the northern section of B27) and various modern metal-framed warehouses and boiler houses within the SHP facility. There are also numerous ancillary single and two-storey brick buildings associated with the SHP facility and the sites to the south of the existing SHP boundary. The majority of these have flat roofs; however a number of pitched-roof buildings were recorded, including B1, B7, B9 and B10. The majority of the buildings were in use, with the exception of a small brick building sub-station associated with the Former Metal Colours site to the south of the Proposed Development Site. As of June 2014, the sub-station building has been demolished and a new building is now present on the Former Metal Colours site.

Other Habitats

13.4.20. Large areas of bare ground were recorded within the sites to the south of the SHP facility. Fencing was recorded around much of the boundary of the SHP site, as well as sectioning off certain areas of the site. Hoarding around the two sites to the south of the existing SHP facility has also been labelled as fencing on Figure 13-2. Short sections of brick and concrete wall were recorded within the site. Large areas of hardstanding were also recorded within the SHP facility.

Adjacent Habitats

13.4.21. Habitat located adjacent to the west, north and east of the SHP site comprised existing industrial development. Land to the south of the site comprises hard standing with small stands of butterfly bush and tall ruderal herbaceous growth.

Update Results

13.4.22. The update survey carried out in 2013 revealed that the condition of the buildings remained unchanged in comparison to 2011.

Bats

13.4.23. No direct evidence of bats was recorded during surveys undertaken in 2012, and the buildings on site were considered to have low bat roost potential with minimal opportunities for roosting. This was supported by a bat activity study undertaken during 2012 which recorded no bat activity and subsequently reclassified the buildings on site as having negligible bat roost potential. The 2013 update survey revealed that little had changed within the site to enhance foraging, commuting or roosting potential for bats. Although no activity surveys have been carried out within the site during 2013 it is considered that the results gained during 2012 remain valid and bats are unlikely to have colonised any of the buildings on site.

13.4.24. The full survey details are presented in *Appendix H-2, Volume II* of this ES)

Breeding Birds

13.4.25. A total of 14 bird species were recorded within the site during surveys carried out in 2012 these are shown in Table 13-6 (for full survey details see *Appendix H-3, Volume II* of this ES).

13.4.26. Of the birds recorded, five species are listed as Red or Amber Listed Birds of Conservation Concern (BoCC). Birds of Conservation Concern are listings that reflect each species' global and European status as well as that within the UK. Red listed BoCC's have had the greatest decline with amber species showing a lesser level of decline.

13.4.27. Anecdotal records for peregrines using the site in years prior to 2012 have been provided by site staff and an adult peregrine was recorded perched on an explosion panel of the boiler house during the extended Phase 1 Habitat Survey in 2013. However, no confirmed nesting of peregrines has been recorded within the SHP site.

Table 13-6 Bird Species Recorded during Breeding Bird Surveys of the SHP site

Common name	Scientific name	BoCC	Maximum Count recorded on site
Blackbird	*Turdus merula*	Green	1
Carrion Crow	*Corvus corone*	Green	1
Dunnock	*Prunella modularis*	Amber	1
Feral Pigeon	*Columba livia*	Green	12
Goldfinch	*Carduelis carduelis*	Green	3
Herring Gull	*Larus argentatus*	Red	5
Lesser black backed gull	*Larus fuscus*	Amber	6
Magpie	*Pica pica*	Green	1
Peregrine	*Falco peregrinus*	Green Schedule 1	3
Pied wagtail	*Motacilla alba*	Green	2
Robin	*Erithacus rubecula*	Green	1
Starling	*Sturnus vulgaris*	Red	3
Swift	*Apus apus*	Amber	2
Wood pigeon	*Columba palumbus*	Green	8

13.5. Evaluation

13.5.1. This section evaluates the nature conservation interest of the study area in terms of the habitats and the species it supports. This value is placed in a geographical context through the framework described in the Assessment Methodology section.

Designated Sites

13.5.2. Two LNRs/LWS' are located within 2km of the Proposed Development Site along with two BOA's and one Woodland Trust Reserve. These designated sites contain principal listed habitats under the Berkshire BAP (namely woodland and wet woodland). As such it is considered that these sites are of local conservation value.

Habitats

13.5.3. Figure 13-2 illustrates the vegetation and habitats recorded during an Extended Phase 1 habitat survey of the site carried out by URS (2013).

13.5.4. The surveys carried out in 2013 revealed that the condition of the Proposed Development Site remained largely unchanged since 2011. The Site supports small areas of plant species associated with landscaped areas and disturbed land. As such, floral species contained within the semi-natural and ornamental habitats present on site were considered to be common and widespread throughout England and can easily be replaced.

13.5.5. Based on the above information it is considered that habitats recorded are of value at a local level and the significance is therefore low.

Species

Bats

13.5.6. Following bat roost potential and activity surveys in 2012 along with update survey undertaken in 2013; all buildings on site are considered to have negligible potential to support roosting bats. Equally the habitats on site do not provide suitable foraging habitat or commuting corridors and the surrounding area provides equally poor habitat for bats, due to the lack of green spaces.

13.5.7. The 2013 survey confirms that the potential for bats to use the site for foraging, commuting, roosting or hibernating remains unchanged from conditions recorded during 2012. Therefore it can be concluded that bats are not ecological receptors to the Proposed Development and will therefore not be considered further.

Birds

13.5.8. It is recognised that the breeding bird survey undertaken during 2012 recorded five species of BoCC, along with 11 other bird species. In addition the only evidence of bird breeding was that of feral pigeon (a common species of low conservation interest). It is therefore considered that the conservation value of the bird community recorded is of value within the site only.

Invertebrates

13.5.9. No suitable habitat was recorded on site which was considered likely to support stag beetle. A number of records of stag beetle within the area of search were provided by TVERC however these range from 950m to 1.9km away from the Site. Due to the distance and isolated nature of these records from the Site it is considered highly unlikely that construction or operational phases of works would have any direct or indirect effect upon the status of this species. It is therefore concluded that stag beetle is of negligible value and will therefore not be considered further in this assessment.

13.6. Potential Effects and Mitigation Measures

Demolition and Construction Phase

Designated Sites

13.6.1. The closest of the designated sites within the area of search is Haymill Valley LNR/LWS, located 700m to the west. However, these sites are unlikely to be adversely affected, either directly or indirectly, by the Proposed Development during demolition and construction. This is due to the urban/industrial nature of the surroundings and the distance between these sites and the Proposed Development site itself. Any potential effects resulting from noise, light or dust or human activity during demolition and construction will be buffered or screened by the surrounding urban land, resulting in a **negligible** effect on any designated sites.

13.6.2. Demolition and construction HGV traffic will be routed along Farnham Road/Edinburgh Avenue, A4 and Dover Road or A4 and Leigh Road. The route along the A4 and Dover Road will pass approximately 300m to the south of the Haymill Valley LNR and it is therefore predicted that this will result in a **negligible** effect on the Haymill Valley LNR.

Breeding Birds

13.6.3. Some of the buildings and vegetation on the site may support breeding birds. The habitats and buildings present in the immediate vicinity are comparable in their quality. The temporary loss of nesting features for birds through vegetation removal and building demolition is considered to be a short-term effect significant at site level (i.e. minor adverse) and unlikely to adversely affect the conservation status of bird populations.

13.6.4. In order to meet national legislation which protects all native birds, the demolition of the large structures on site should ideally take place outside of the breeding bird season (i.e. conduct works between October and February, inclusive), however, it should be noted that pigeon can nest at any time of the year. Demolition during the breeding bird season will require a pre-demolition check by a qualified ecologist.

13.6.5. If, following checks, no breeding birds are found to be present then works can proceed. Furthermore, any areas of bare soil should be checked prior to any enabling works or lay down of materials to ensure that black redstart are not using the area for nesting, if such works are to take place between March and July.

13.6.6. It is possible that peregrine may nest close to the Site and surveys will be conducted to locate this nest prior to any works that could disturb them. Alternatively, demolition of structures near to the eastern end of the boiler house will be undertaken outside the bird breeding season to reduce disturbance to possible breeding peregrine as this is the location closest to the possible nest site. It should be noted that the peregrine nesting season is between March and August. If it is not possible to adhere to this, an appropriately qualified ecologist will survey the structures beforehand to confirm that no birds are nesting in the buildings (demolition work will cease if they are found to be nesting).

Enhancement Measures

13.6.7. Although no evidence of peregrine falcon nesting has been recorded during any ecological surveys of the Site it is noted that the site is likely to form part of the breeding territory for one pair of this species. In order to enhance the site for peregrine falcons artificial nesting habitat will be provided onsite if they are still deemed to be in residence onsite or in the local area at the start of the demolition and construction phase. The artificial nest site could be positioned upon a number of buildings or structures onsite, including the stacks, cooling towers or other tall structures onsite. A peregrine falcon mitigation and monitoring scheme will be put together post planning and subject to agreement with SBC.

13.6.8. While there is no guarantee that such an alternative nest site would be used by adult birds, the incorporation of such a feature into the Proposed Development will provide alternative nesting habitat in the local area.

13.6.9. The artificial nest site should face north-east or east and will be positioned no lower than 20m from ground level.

13.6.10. Following incorporation of these mitigation measures and enhancement measures, the potential effect on birds is considered **negligible**.

Operational Phase

Designated Sites

13.6.11. Atmospheric emissions from the operation of the Proposed Development have the potential to affect local habitat sites. Emissions of oxides of nitrogen (NO_X) and nitrogen and acid disposition in particular have the potential to adversely affect Burnham Beeches SAC, which is the nearest sensitive receptor within close proximity to the stacks. *Chapter 8: Air Quality* of this ES discusses the predicted effect of atmospheric emissions on habitats in more detail; the stack height has been specifically designed to avoid a significant impact on the local habitat sites and, as a result, a **negligible** effect is predicted for Burnham Beeches SSSI, Stoke Common, Black Park, and at all other ecological receptors.

13.6.12. The number of workers onsite during the operational phase of the Proposed Development is likely to increase by approximately 20 people. A number of these new workers may visit some of the designated sites in the local area. The majority of these Sites of Importance to Nature Conservation (SINCs) are open to the public and are likely to provide valuable retreats for office workers and residents associated with the scheme, especially considering the urban character of the surrounding landscape. It is considered, however, that these visits are unlikely to adversely affect either the designated sites themselves or their qualifying features. This is because these sites are already subject to high recreation pressure and have been for a number of decades. It is therefore unlikely that any additional visits from future residents or employees of the Proposed Development will cause a significant adverse effect on nearby designated sites.

13.6.13. All commercial vehicles during the operational phase of the Proposed Development shall use one of the following routes; Farnham Road/Edinburgh Avenue, A4 and Dover Road or A4 and Leigh Road. The route along the A4 and Dover Road will pass approximately 300m to the south of the Haymill Valley LNR, however traffic emissions are imperceptible approximately 150-200m from a major road, and therefore it is predicted that this will result in a **negligible** effect on the Haymill Valley LNR.

13.6.14. Therefore, the Proposed Development is considered likely to have a **negligible** effect on any designated sites or their interest features and will therefore not be considered further.

Birds

13.6.15. It is considered that there would be no potential effects on breeding birds during the operational phase of the Proposed Development. Therefore no mitigation is planned for this phase of works and the effect is considered to be **negligible**.

13.7. Residual Effects and Conclusions

13.7.1. This assessment has considered potential effects and associated ecological effects on-statutory and non-statutory designated sites and birds.

13.7.2. Surveys carried out to date have shown that the site represents habitats of very limited conservation value with the exception of the presence / potential presence of breeding birds within buildings on site.

13.7.3. Following implementation of the aforementioned mitigation measures and enhancement measures, it is considered that the conservation value of the site for breeding birds will remain unchanged and that legislative constraints will be avoided. In addition it is considered that works would remain in compliance with national and local planning policies. It can therefore be concluded that the Proposed Development would result in no significant adverse effects.

13.7.4. Furthermore, no adverse residual effects are expected to occur as a result of the Proposed Development. All residual effects are considered to be of **negligible** significance.

Table 13-7 Summary of Residual Effects

Description	Geographical Scale	Significance
Demolition and Construction Phase		
Effects to Designated Sites	Local	Negligible
Effect to Breeding Birds	Local	Negligible
Operational Phase		
Effects to Designated Sites	Local	Negligible
Effect to Breeding Birds	Local	Negligible

13.8. Cumulative Effects

13.8.1. Cumulative effects occur as a result of the Proposed Development in combination with one or more other schemes in the local area, which on an individual basis might be insignificant but together could have a significant effect. *Chapter 2: Assessment Methodology* identifies four schemes to be considered within the cumulative assessment; the Leigh Road / Bath Road Central Core Planning Application 1 & 2; SSE's simultaneous planning application for a central site services building and water treatment plant on the SHP site; and the Britwell Regeneration development.

13.8.2. The combination of the above projects will result in a number of new residents moving to the area and this could put pressure on existing green spaces including designated sites. However, enhancement measures within this scheme and other cumulative schemes are expected to offset this pressure by providing alternative recreational spaces or, in the case of the Britwell Regeneration, development improvements to local parks. The cumulative effect of the schemes is therefore expected to be **negligible**.

13.9. References

Ref. 13-1 DECC (2011) Overarching National Policy Statement for Energy (EN-1), Department for Energy and Climate Change, HMSO

Ref. 13-2 DECC (2011) Overarching National Policy Statement for Renewable Energy Infrastructure (EN-3), HMSO

Ref. 13-3 Her Majesty's Stationary Office (HMSO) (1981) The Wildlife and Countryside Act (as amended)

Ref. 13-4 HMSO (2000) The Countryside and Rights of Way Act

Ref. 13-5 HMSO (2006) Natural Environment and Rural Communities Act

Ref. 13-6 HMSO (2010) The Conservation of Habitats and Species Regulations

Ref. 13-7 HMSO (1996) Wild Mammals (Protection) Act 1996

Ref. 13-8 Department for Communities and Local Government (2012) National Planning Policy Framework

Ref. 13-9 Planning Policy Guidance (2014) http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/ (Accessed 04/04/2014)

Ref. 13-10 Office of the Deputy Prime Minister (2005) Government Circular: Biodiversity and Geological Conservation

Ref. 13-11 Slough Borough Council (2008) Slough Local Development Framework. Core Strategy (2006 -2026), Development Plan Document

Ref. 13-12 Convention on Biological Diversity (2010) Strategic Plan for Biodiversity 2011–2020. Available at: http://www.cbd.int/decision/cop/?id=12268

Ref. 13-13 Berkshire Local Nature Partnership at *www.berkshirelnp.org*

Ref. 13-14 HMSO (2011) The Natural Choice: Securing the Value of Nature

Ref. 13-15 Joint Nature Conservation Committee (JNCC) (2010) Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit, revised reprint 2003. JNCC. Peterborough

Ref. 13-16 Bat Conservation Trust (2012) Bat Surveys; Good Practice Guidelines. Bat Conservation Trust

Ref. 13-17 Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S. (2007) Bird Census Techniques. 2nd Edition. Academic Press, London

Ref. 13-18 Institute of Ecology and Environmental Management (2006); Guidelines for Ecological Impact Assessment

14. LANDSCAPE AND VISUAL

14.1. Introduction

14.1.1. This chapter of the ES describes the likely effects of the Proposed Development upon landscape and views.

14.1.2. Landscape effects are the changes in a landscape, its character and quality. Visual effects relate to the appearance of these changes and the resulting effect on visual amenity.

14.1.3. This Landscape and Visual Impact Assessment (LVIA) has been carried out by developing an understanding of the baseline landscape character and baseline visual amenity within an initial 10km study area, through a combination of desk and field-based study. A Zone of Theoretical Visibility (ZTV) has been generated for the Proposed Development and based on a review of the ZTV it is considered that beyond the 10km study area there would not be any significant visual effects. The baseline for landscape character was subsequently refined to a 5km study area following a field survey, and likewise it is considered that beyond a 5km radius from the Site there would not be any significant effects on landscape character as a result of the Proposed Development.

14.1.4. The location of the Proposed Development Site in the context of the 5km and 10km study areas is illustrated in Figure 14-1. All figures are located at the end of *Chapter 14: Landscape and Visual*.

14.1.5. The likely effects of the Proposed Development on the setting of heritage and archaeological assets is assessed within *Chapter 12: Cultural Heritage and Archaeology* of this ES.

14.2. Legislation and Planning Policy Context

14.2.1. This assessment takes account of relevant legislation and guidance set out in European, national, county and local planning policy relating to landscape character and visual amenity. An overall review of policy relating to the Proposed Development can be found in *Chapter 3: Planning Policy Context* of this ES.

14.2.2. There are no national landscape or townscape designations within or adjacent to the Proposed Development Site. Much of the land within the 10km study area, outside the urban areas of Slough, Windsor and Maidenhead is designated Green Belt. The effects of the Proposed Development are assessed against the five purposes of Green Belt as defined in the NPPF, within Appendix I-4 of this chapter.

National Planning Policy

14.2.3. The European Landscape Convention (ELC) became binding on the UK in 2007 (Ref. 14-1) and aims to promote landscape protection, management and planning at all scales. It includes a number of articles which set out both general and specific measures aimed at recognising the importance of landscapes in law through to the identification and assessment of landscapes. This assessment conforms to the articles of the ELC.

14.2.4. The NPPF (Ref. 14-2) lays out the core land-use planning principles that should underpin decision making. Key principles relevant for LVIA and the Proposed Development are to:

- "*always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings";*

- *"take account of the different roles and character of different areas";*
- *"encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.*"

14.2.5. The NPPF does not contain specific policies for power generating projects however paragraph 65 notes that Local Planning Authorities "*should not refuse planning permission for buildings or infrastructure which promote high levels of sustainability*".

Local Planning Policy

14.2.6. Policy WLP30 of the Waste Local Plan for Berkshire (Ref. 14-3) states that the merits of waste management development proposals will be assessed with regard to:

- "*The visual impact of the proposed development, and its effect on the landscape;*
- *The need to safeguard and enhance areas of attractive landscape and local landscape character;*
- *The need to safeguard the character and setting of rivers, canals and streams; and*
- *The likely cumulative effects of the proposed development in combination with other developments taking place, or permitted to take place, in the locality.*"

14.2.7. Core Policy 8 – Sustainability and the Environment: 2B of the SBC Core Strategy Development Plan Document 2006-2026 (Ref. 14-4) states *"All development will respect its location and surroundings".* Core Policy 9 – Natural and Built Environment requires that development should respect *"the character and distinctiveness of existing buildings, townscapes and landscapes, and their local designations."*

14.2.8. Policy EMP2 from the Slough Local Plan saved policies (Ref. 14-5) requires a development to "*not significantly harm the physical or visual character of the surrounding area*", whilst Policy EN-1 requires development proposals "*to be compatible with and/or improve their surroundings in terms of scale; height; massing; layout;…visual impact"*.

14.2.9. There are no specific policies of relevance to this LVIA in the Slough Local Development Framework Site Allocations Development Plan Document (Ref. 14-6). However, development which is compatible with a site specific allocation should in principle be supported; the Site is located within the Slough Trading Estate (SSA4) and the Proposed Development is compatible with the relevant strategic objectives of the Core Strategy and the Sites Development Plan Document as discussed in *Chapter 3: Planning Policy Context* of this ES.

14.3. Assessment Methodology and Significance Criteria

Overview

14.3.1. The planning application is based on maximum building parameters and enables the Proposed Development to be either a single line or a twin line configuration, as described in *Chapter 5: The Proposed Development*.

14.3.2. To ensure that competing suppliers of multifuel process plant can be accommodated within the building envelope, the Applicant has defined parameters upon which to base this EIA, to ensure that the likely significant effects of the development have been robustly assessed. The design parameters provide a 'worst-case scenario' for the Proposed Development, including footprint, mass, height and colour / tone. The Applicant has included a Design and Access Statement, together with a Design Code that sets out the design details. Further building design evolution and the final design of the Proposed Development will be within the parameters of the planning application, this ES, the Design and Access Statement and the Design Code and will be agreed with SBC post-consent.

14.3.3. The primary visual difference between the single and twin line configurations, which can both be delivered within the worst-case maximum parameters, would be the height of the stacks. A single line configuration would constitute a power output of approximately 40MWe and could utilise the existing south stack on the SHP site but with a 3m extension, raising it from 82m to 85m. A twin line configuration with a design capacity of up to 50MWe would require the demolition of the existing south stack and the construction of a replacement stack, of light grey colour, up to 90m in height and in a similar position to the existing south stack. For both the single and twin line configurations the existing 104m north stack would be retained. The proposed south stack heights have been dictated by the assessment presented in *Chapter 8: Air Quality* of this ES.

14.3.4. For the purpose of this LVIA, the assessment has been based on what is considered the worse of the two configurations, which is a new, 90m high south stack alongside the retained 104m north stack.

14.3.5. The massing of the power station buildings would also change; most of the existing buildings would be demolished and replaced with modern buildings, larger in size, in roughly the same location as the existing buildings, as described in Section 5.4 of *Chapter 5: The Proposed Development* of this ES. The proposed massing of the buildings is similar for both the single and twin line configurations. The maximum height of the proposed buildings has been limited to less than the height of the two cooling towers of the existing SHP station to limit visual effects.

14.3.6. The visual effects of lighting have been assessed at both the demolition/construction phase and operational phase of the Proposed Development.

14.3.7. This LVIA has been carried out through a combination of site and desk-based survey and analysis using recommendations and guidance from the following:

- Guidelines for Landscape and Visual Impact Assessment 3rd Edition (Ref. 14-7);
- Landscape Character Assessment: Guidance for England and Scotland, Countryside Agency and SNH, 2002 (Ref 14-8); and
- Landscape Institute Advice Note 01/11: Photography and photomontage in landscape and visual impact assessment (Ref. 14-9).

Terminology

14.3.8. Landscape Character Areas (LCAs) are single unique areas which are the discrete geographical areas of a particular landscape type.

14.3.9. Zone of Theoretical Visibility (ZTV) is a map showing areas of land within which an existing or proposed development is theoretically visible. ZTVs are generated by computer by analysing a model of the development and a bare ground Digital Terrain Model (DTM). In addition, features such as urban areas and woodland can be included in the model.

14.3.10. Visual Receptors are individuals and/or defined groups of people whose visual amenity has the potential to be affected by a proposal.

14.3.11. Visual Amenity is defined as the contribution of views towards the overall pleasantness or attractiveness of a place. The degree of visual amenity therefore varies between locations according to the quality of views available. Visual amenity considers the views people enjoy of their surroundings, which can provide an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.

14.3.12. The LVIA process requires that a clear distinction is drawn between landscape and visual effects:

- Landscape effects relate to the degree of change to physical characteristics or components of the landscape, which together form the character of that landscape, e.g. landform, vegetation and buildings.
- Visual effects relate to the degree of change to an individual receptor's or receptor group's view of that landscape, e.g. local residents, users of public footpaths or motorists passing through the area.

Landscape Character Assessment Methodology

14.3.13. The assessment of landscape effects is structured around the identification of LCAs. Within the study area there would be areas where development would take place resulting in direct effects, or where there is a degree of intervisibility between the Proposed Development and the surrounding landscape (i.e. where they are mutually visible), causing indirect effects, or where no change would be perceptible.

14.3.14. Each LCA is assigned an importance or sensitivity based on the value attached to the existing landscape and its susceptibility to the type of change or development proposed. Sensitivity of each LCA is classified as High, Medium or Low, as follows:

- **High sensitivity landscape** – landscape with distinctive components and characteristics, therefore sensitive to small changes;
- **Medium sensitivity landscape** – landscape with relatively common components and characteristics, therefore reasonably tolerant of changes; and
- **Low sensitivity landscape** – landscape with relatively inconsequential components and characteristics, the nature of which is therefore tolerant of substantial change.

14.3.15. The magnitude of potential change is determined through a combination of the size/scale of a development, the geographical extent of the area influenced, the type of development, the level of integration of new features with existing elements, and its duration and reversibility. Magnitude of potential change is classified as High, Medium, Low, or Imperceptible, as follows:

- **High** – a limited change in landscape characteristics over an extensive area influencing several LCAs, or an intensive change over a more limited area;
- **Medium** – a limited change in landscape characteristics at the scale of the LCA within which the proposal lies, or a moderate change in a localised area;
- **Low** – a limited change in landscape characteristics at the level of the immediate setting of the site; and
- **Imperceptible** – no discernible change, or virtually no perceivable change in any component outside the development site itself.

Visual Assessment Methodology

14.3.16. It is widely accepted that visual effects tend to decrease with distance. The ZTV identifies areas where there could theoretically be views of the Proposed Development. This can be further assessed through fieldwork to identify actual visual receptors and viewpoints. Representative viewpoints have been selected to show the existing Site and the Proposed Development at a number of locations from a range of distances and directions to cover a variety of receptor groups and landscape types from close, middle and long distance.

14.3.17. An initial list of twelve representative viewpoints was agreed with SBC (telephone conference between URS, the Applicant, and SBC on 28 March 2013). Three additional viewpoints (at Dorney Common, Huntercombe Manor, and Stoke Park House) were requested in a scoping response by South Bucks District Council; however, following a site visit the viewpoint at Huntercombe Manor was scoped out of this assessment as it was found that no part of the existing SHP station is visible, and therefore, on that basis, and bearing in mind the existing north stack and Cooling Towers are taller than the proposed structures, it can be expected that no part of the Proposed Development would be visible.

14.3.18. SBC subsequently requested three further representative viewpoints (at Farnham Park Golf Club, Park Lawn, and Upton Court Park) to comprehensively assess the visual impact of the Proposed Development; however, following a site visit the viewpoint at Park Lawn was scoped out of this assessment as views of the existing SHP station and stacks are extremely limited.

14.3.19. A final selection of sixteen representative viewpoints was agreed with SBC on 27 March 2014. Visually verifiable photomontages and wirelines of the Proposed Development (based on the maximum parameters and twin line configuration, considered the worst-case scenario) have been produced, as agreed, as set out in Table 14-1.

Table 14-1 Visually Verifiable Photomontages and Wirelines

Representative Viewpoint No.	Location	Visually Verifiable Wireline	Visually Verifiable Rendered Photomontage	Visually Verifiable Rendered Photomontage with Cumulative Development	Approximate Distance from Proposed Development
1	View north along Hamilton Road from Bedford Avenue	Included	Included	Included	250m
2	View south from Bodmin Avenue	Included	Included	Included	250m
3	View south from Kennedy Park	Included	Included	Included	650m
4	View north-east from the A4 Bath Road at its junction with Dover Road	Included	-	-	600m

Representative Viewpoint No.	Location	Visually Verifiable Wireline	Visually Verifiable Rendered Photomontage	Visually Verifiable Rendered Photomontage with Cumulative Development	Approximate Distance from Proposed Development
5	View east from the A4 Bath Road	Included	-	-	1.1km
6	View south from Long Readings Lane	Included	Included	Included	1.3km
7	View north-east from the Lake End Road bridge over the M4	Included	Included	Included	2.8km
8	View north-east from the commemorative plaque at the Jubilee River bridleway near Dorney	Included	Included	Included	2.3km
9	View north-east from Dorney Common	Included	-	-	3.1km
10	View north from the Jubilee River cycle path near Eton Wick	Included	-	-	2.9km
11	View north from the A332 Eton Relief Road, north of Eton	Included	-	-	2.8km
12	View north from the River Thames at Boveney Lock	Included	-	-	3.8km
13	View north-west from the North Terrace at Windsor Castle	Included	Included	Included	4.8km
14	View north-west from Upton Court Park	-	-	-	4.7km

Representative Viewpoint No.	Location	Visually Verifiable Wireline	Visually Verifiable Rendered Photomontage	Visually Verifiable Rendered Photomontage with Cumulative Development	Approximate Distance from Proposed Development
15	View south-west from Farnham Park Golf Course	-	-	-	2.6km
16	View south west from the roof viewing platform at Stoke Park House	Included	Included	Included	2.1km

14.3.20. Visual receptors have been assigned a category of sensitivity based on a combination of their susceptibility to a change in views resulting from a development of this nature and the value attached to the particular view. Susceptibility is mainly a function of the occupation or activity of people experiencing the view, the extent to which their attention or interest is focused on the view, and the visual amenity experienced. Sensitivity of receptors is classified as High, Medium or Low as follows:

- **High** – activity resulting in a high interest or appreciation of the view (e.g. residents or people engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views) and/or a high value of visual amenity (e.g. a designated landscape, or unspoilt countryside);
- **Medium** – activity resulting in a medium interest or appreciation of the view (e.g. people engaged in outdoor recreation which does not involve or depend upon an appreciation of views of the landscape) and/or a medium value of visual amenity (e.g. suburban residential areas or intensively farmed countryside); and
- **Low** – activity resulting in a low interest or appreciation of the view (e.g. people at work or motorists travelling through the area) and/or low value of visual amenity (e.g. industrial areas or derelict land).

14.3.21. The magnitude of potential change results from a combination of the degree of change to the view resulting from the Proposed Development, including the extent of the area over which the changes would be visible, the period of exposure to the view and reversibility. The magnitude of potential change is classified as High, Medium, Low or Imperceptible, as follows:

- **High** – total loss or major alteration to the key elements/features/characteristics of the baseline view and/or introduction of proposed elements which are totally uncharacteristic when set within the attributes of the view;
- **Medium** – partial loss of or alteration to key elements/features/characteristics of the baseline view and/or introduction of proposed elements which are considerably uncharacteristic when set within the attributes of the view;
- **Low** – minor loss of or alteration to key elements/features/characteristics of the baseline view and/or introduction of proposed elements which may not necessarily be considered to be uncharacteristic when set within the attributes of the view; and

- **Imperceptible** – very minor loss of or alteration to key elements/features/ characteristics of the baseline view and/or introduction of elements that are not uncharacteristic of the view; approximating to the 'no change' situation.

Significance of Effects

14.3.22. A degree of subjectivity is involved in determining the significance of landscape and visual effects, and the professional judgement of the Landscape Architect(s) undertaking the assessment therefore plays a key role. However, levels of significance can broadly be determined by the interaction of the sensitivity of the receptor and magnitude of potential change.

14.3.23. This interaction results in a categorisation of effects as shown in Table 14-2. For this assessment effects are considered to be significant in every case if they are Major or Moderate. Minor and Negligible effects are considered to be not significant.

Table 14-2 Classification of Landscape and Visual Effects

Magnitude of Potential Change	Sensitivity of Receptor		
	High	**Medium**	**Low**
High	Major	Moderate	Minor
Medium	Moderate	Moderate	Minor
Low	Minor	Minor	Minor
Imperceptible	Negligible	Negligible	Negligible

14.3.24. Landscape and visual effects can also be classified as being beneficial, adverse or neutral. A description of the classification of landscape and visual effects is set out in Table 14-3.

Table 14-3 Description of the Classification of Landscape and Visual Effects

Classification of Effect	Description of Landscape Effect	Description of Visual Effect
Major beneficial	Where a development would enhance the scale, landform and pattern of the landscape and/or enrich quality or characteristic features.	Where a development would result in a clearly substantial improvement to the existing view.
Moderate beneficial	Where a development would be characteristic of the scale, landform and pattern of the landscape, and/or would enhance quality or characteristic features.	Where a development would result in noticeable improvement to the existing view.

Classification of Effect	Description of Landscape Effect	Description of Visual Effect
Minor beneficial	Where proposed changes would be intermittent and at slight variance with the underlying character of an area and landscape features.	Where a development would result in a small improvement to the existing view.
Neutral	Where a development would cause scarcely perceptible deterioration or improvement to the existing landscape.	Where a development would cause scarcely any perceptible deterioration or improvement to the existing view.
Minor adverse	Where proposed changes would be intermittent and at slight variance with the underlying character of an area and landscape features.	Where a development would cause small deterioration to the existing view.
Moderate adverse	Where a development is not characteristic of the scale, landform and pattern of the landscape, and/or would damage quality or characteristic features.	Where a development would cause noticeable deterioration to the existing view.
Major adverse	Where a development is at considerable variance with the scale, landform and pattern of the landscape and/or would be considerably detrimental to quality or characteristic features.	Where a development would cause a clearly substantial deterioration to the existing view.

14.4. Baseline Conditions

Proposed Development Site

14.4.1. Figure 4-1 in *Chapter 4: Site Description, Project Alternatives and Evolution* of this ES presents a map of the existing SHP site. Figure 5-1 in *Chapter 5: Proposed Development* of this ES shows the layout of the Proposed Development.

14.4.2. The Proposed Development Site is contained within the SHP site and occupies an area of approximately 1.9ha. It is currently accessible from Edinburgh Avenue to the north and from Greenock Road and Harwich Road to the south.

Site Context and Study Area

14.4.3. The area immediately surrounding the SHP site is occupied by various industrial, warehouse and business uses, both large and small, and typical of much of the Slough Trading Estate that covers an area of approximately 158ha in total.

14.4.4. The nearest residential properties are located approximately 200m north of the Proposed Development Site on Bodmin Avenue, with the nearest public park, Kennedy Park, situated approximately 400m northwest of the Site.

14.4.5. Slough is a large urban area of residential, business, leisure, retail and industrial uses, which typically make-up a town. Much of the industrial and business development in Slough is within Slough Trading Estate, the largest trading estate in Europe under single ownership. Given the extent and location of Slough Trading Estate, Slough differs from many towns and cities.

14.4.6. Windsor lies approximately 5km south of the Proposed Development Site, and Maidenhead approximately 7km to the west. The predominant land-use in the wider surrounding landscape beyond Slough is farmland, with numerous small settlements and busy roads, including the M4 corridor. The landscape is more wooded to the north than the south, which is more open partly owing to much of the area comprising the River Thames floodplain.

14.4.7. The Proposed Development Site lies in the Thames Valley, approximately 4km north of the River Thames. The surrounding terrain is generally flat to the south of Slough in the River Thames floodplain and its open character allows more far-reaching views than from the north. To the north of the Proposed Development Site the landform gently rises out of Slough through the wooded landscape of South Bucks District. The wooded character of this area filters and screens most views towards the Proposed Development Site. Windsor Castle to the southeast of the Proposed Development Site is on a chalk outcrop which affords it views including the built up area of Slough and the existing buildings and stacks on the SHP site. Figure 14-2 shows the local topography within the 5km and 10km study areas.

14.4.8. The area to the south of Slough is important for recreation; the Thames Path National Trail runs the length of the River Thames while a variety of different activities are enjoyed on the river and at Dorney Lake. The Jubilee River, which lies 2km south of the Proposed Development Site, is also important for recreation, with a well used cycle path and public footpath running along its length.

Landscape Character

14.4.9. The landscape character of the 10km study area has been extensively studied at a number of levels through published studies produced by national, county, and local statutory bodies before being refined to the 5km study area, beyond which it is not anticipated there would be significant effects. In order to provide context to the Proposed Development Site this section reviews and summarises the existing landscape character assessments at these levels and places the landscape and townscape of Slough Borough within that context.

National Landscape Character

14.4.10. National Character Areas (NCAs) are defined and described by Natural England (Ref. 14-10). Whilst providing landscape context, NCAs do not provide sufficient detail in themselves to assess the impact of individual developments. Each NCA is defined by a unique combination of landscape, biodiversity, geodiversity and cultural and economic activity. The boundaries are broad transition areas following natural lines in the landscape and not administrative boundaries; nor are they defined by distinctive lines on the ground. The entirety of the 5km study area falls within NCA 115: Thames Valley. To the northwest within the 10km study area there is also NCA 110: Chilterns.

14.4.11. Of these two NCAs, NCA 110: Chilterns would have little relevance to the Proposed Development beyond the 5km study area, due to its distance from the Proposed Development Site. Therefore at the national scale, the key characteristics of NCA 115: Thames Valley has been used to understand the context. The characteristics of NCA 115 are described by Natural England as follows:

- *“Flat and low-lying land, rising to low, river-terraced hills, which include the prominent local outcrop of chalk on which Windsor Castle sits.*
- *Woodlands characterise the north-western area, with the wooded character extending up to the southern edge of the Chiltern Hills.*
- *Grazed pasture is the major land use within a generally open, flat and featureless landscape. The field pattern is medium-scale and irregular, with smaller fields to the west.*

- *Towards London in the east, the natural character of the area is overtaken by urban influences: a dense network of roads (including the M25 corridor), Heathrow Airport, railway lines, golf courses, pylon lines, reservoirs, extensive mineral extraction and numerous flooded gravel pits.*
- *The area has an urban character, and there are very few villages of more traditional character, although almost half of the area is greenbelt land and development has been restricted in areas like the Crown Estate and Eton College grounds.*
- *The area is important for recreation, both for residents and visitors. Historic parkland and commons provide access to green space, the Thames Path National Trail runs the length of the NCA, and a variety of activities are enjoyed on the river and other waterbodies."*

County Landscape Character

14.4.12. County landscape character assessments are produced at a county level. The key characteristics of the landscape within the 5km study area have been considered in order to further understand the area surrounding the Proposed Development Site. County landscape character is not at a suitable level of detail to assess an individual development against, but does provide a descriptive landscape context.

14.4.13. At the county level, the 5km study area is covered by two published studies:

- Berkshire Landscape Character Assessment, 2003 (Ref. 14-11); and
- The Landscape Plan for Buckinghamshire, 2000 (Ref. 14-12).

14.4.14. Key characteristics of the landscape within a 5km study area are summarised below.

14.4.15. The Berkshire Landscape Character Assessment describes the landscape character of the county as:

- *"Quality of views to the River Thames and towards Windsor Castle;*
- *Flat and open broad lowland floodplain;*
- *Important transportation networks;*
- *Crown Estate land with distinctive regal and ancient ambience;*
- *Urban and rural settlements;*
- *Diverse wetland habitats; and*
- *Arable and pastoral farmland."*

14.4.16. The Landscape Plan for Buckinghamshire describes the landscape character of the county as:

- *"Gently sloping wooded plateau of a wild unkempt character;*
- *Landscape dominated by development, major roads and pylon lines;*
- *Landscape and wildlife interest associated with water courses;*
- *Unfenced woodland and common land with public access; and*

- *Large areas of disturbed ground associated with landfill and mineral extraction."*

Local Surrounding Landscape Character

14.4.17. There are two published local landscape character assessments for the 5km study area:

- South Bucks District Landscape Character Assessment (Ref. 14-13); and
- Landscape Character Assessment for the Royal Borough of Windsor and Maidenhead (Ref. 14-14).

14.4.18. No landscape or townscape character assessment currently exists for the Slough Borough area. In order to provide detail at a relevant level to the Proposed Development the local landscape character has been considered within the 5km study area by examining the two published studies alongside a field-based study. These local LCAs have been mapped on Figure 14-3 and key characteristics are summarised below.

14.4.19. The South Bucks District Landscape Character Assessment defines the following LCAs:

- Floodplain: A flat, low-lying floodplain landscape to the south of Slough, with slight local topographic variation. The low-lying landscape allows for some far-reaching views and panoramic vistas, particularly towards Slough. Large, open, arable cultivation with smaller fields of rough grazing and pasture are commonly defined by low hedgerows. There are areas of attractive and ecologically valuable landscape associated with rivers, streams, and ponds, notably the River Thames and Jubilee River. Tree cover is sparse and often associated with water bodies and field boundaries. There are recreational opportunities associated with water bodies, including established public rights of way, fishing and bird watching. The area is cut by the M4 which has a high visual and audible impact. There is strong historic character in Dorney and Dorney Common.

- Lowland Fringe: A flat lowland topography, gently rising northwards and gradually becoming more undulating. It is a mixed-use landscape which is characterised by urban development, with settlement surrounding the character area linearly spread through the landscape along a network of roads. Parkland at Stoke Park provides a distinctive rural and tranquil character within an otherwise busy landscape. Tree cover is sparse and scattered along field boundaries or roads, with the exception of Stoke Park, which has extensive tree cover, creating a sense of intimacy and enclosure. Areas of rough grazing and paddocks are interspersed, often located close to development. The mixed landscape and overt human influence has created a fragmented landscape, lacking unity and visually busy.

- Undulating Farmland: An undulating, transitional lowland topography gently rising between the River Thames floodplain in the south and the higher wooded terrace to the north. It is predominantly open arable cultivation in the north and rough grazing and paddocks in the south. Several golf courses intersperse field systems. A strong network of hedgerows with trees delineates field boundaries and roadside edges often providing dense and irregular wooded backdrops. Settlement is sparse, linearly spread along roads. It is an intimate and calm landscape with little movement despite the close proximity to Slough, with a strong rural character overall.

- Wooded Terrace: An undulating terrace landform, formed on river terrace deposits. It is a landscape of small-scale mixed farmland with large tracts of woodland, heathland, wooded commons and pasture. Much of the woodland has established recently within the 20th century. Fields are contained by a tall, dense network of hedgerows and trees, and often bounded by woodland blocks. Settlement is low and diverse. There is strong ecological importance, with extensive woodland cover and a rich network of hedgerows. Views are often restricted by dense woodland cover; there is limited intervisibility with adjacent landscapes. It is an accessible and relatively permeable landscape, with comprehensive road and footpath networks, yet remains a tranquil landscape, with a strong sense of enclosure and intimacy.

14.4.20. The Landscape Character Assessment for the Royal Borough of Windsor and Maidenhead defines the following LCAs:

- Settled Farmed Floodplain: A flat and open floodplain to the south of Slough with a rich farming heritage. The wide, meandering river has diverse river edge habitats. Linear woodlands and designed landscapes give a subtly wooded character to much of the River Thames valley floor. The historic town of Eton has an attractive riverside setting. There are strong views from the surrounding farmland of Windsor Castle. The A332 and M4 have a noticeable visual and audible impact on much of the area.
- Settled Developed Floodplain: A broad flat open floodplain to the south of Slough with a fragmented landscape pattern, the River Thames is wide and slow moving through the area, with natural, diverse river edge and wooded island habitats. Linear woodland shelters much of this area. There are detached riverside residential developments, and the M4 corridor runs through the area. There are numerous marinas and water-based recreation facilities.
- Farmed Parkland: A small part of this LCA is within the study area, the landscape is an open floodplain used as a public park. Views of the channelled river, Waterloo to Windsor branchline, and across to Eton are obtained from the park, which has a busy but pleasant feel. The land is under crown ownership.
- Estate Parkland: Part of Windsor Great Park falls within the study area, the character of which is dominated by Windsor Castle, which forms a focal point across most of the historic parkland.

Slough Landscape/Townscape Character

14.4.21. There is no published landscape or townscape character assessment for the Slough Borough area, and therefore LCAs have been identified for the purposes of this assessment. Three broad LCAs within the 5km study area have been defined, shown on Figure 14-3, as follows:

- Slough Business LCA;
- Slough Urban LCA; and
- Thames Floodplain LCA.

14.4.22. Within the urban area of Slough, west of the town centre, the Slough Business LCA forms a distinctive ‘island’ of larger-scale commercial and industrial buildings. In addition, due to the fact that the Borough extends beyond the edge of the built-up area to the south, a third, non-urban character area is formed by the linear belt of open land along the southern edge of Slough, comprising a mix of uses including a major sewage works, public open space, main road corridors and waterways.

14.4.23. The key features and characteristics of these three LCAs are described below.

Slough Business LCA

14.4.24. The Proposed Development Site is located within this LCA, where the existing buildings and stacks form a prominent landmark. The LCA chiefly comprises Slough Trading Estate, and is a business and industrial area, with a mix of both new and old offices, warehouses and industrial buildings built over the past century. There are also a number of small retail businesses. In addition, a number of plots are currently in the process of being redeveloped; the LCA is subject to an ongoing process of evolution.

14.4.25. Between the buildings, the landscape across the Slough Business LCA is entirely artificial and is predominantly made up of hard surfaces in the form of car parks, roads and pathways. In places the hard landscape is broken up by vegetation in the form of hedges, shrubs and amenity grass softening the boundaries between roads and office/industrial land. There are some mature and young trees sparsely distributed, which help to break up some views between buildings and add to the visual amenity of frontages.

14.4.26. Buildings across the Slough Business LCA are predominantly between two and four storeys. The architectural style and construction material of buildings is highly varied across the LCA, with no uniform character. The existing SHP station has a dominant effect on the LCA; its size and scale in comparison to its surroundings has an influence on wider LCAs and furthers the feeling that this is a landscape of commerce and industry.

14.4.27. The Slough Business LCA is surrounded on all sides by the Slough Urban LCA.

Slough Urban LCA

14.4.28. For the purpose of this assessment Slough Urban LCA has been classified as the built up area of Slough, within the boundary of Slough Borough.

14.4.29. The LCA is principally residential with a number of small urban centres including retail and leisure facilities and the town centre approximately 1km east of Slough Business LCA. The A4 Bath Road is a key east-west route through the centre of Slough, fronted by large-scale commercial development along some stretches.

14.4.30. The LCA comprises chiefly low-rise residential properties, principally two storeys, mainly red brick and of varying styles, including detached, semi-detached and terraced houses and flats. The town centre of Slough is more densely developed with high-rise office and residential buildings, as well as large retail complexes.

14.4.31. The built up area is interspersed with numerous local parks, recreation grounds and playing fields of various sizes, many of which appear to be well used by local residents. In terms of character, these public open spaces comprise mostly amenity grassland with occasional trees. There are few street trees in the area, most of the residential roads being used for parking or fronted by private driveways.

Thames Floodplain LCA

14.4.32. Thames Floodplain LCA is to the south of Slough comprising the Jubilee River and floodplain, Upton Court Park, the M4 motorway and A332 link road, and a sewage works; it is approximately 2km from the Proposed Development Site. The Jubilee River is a man-made river designed to reduce the Thames flood impact on the towns of Maidenhead, Windsor and Eton. The character area studied here is bounded by SBC administrative boundary to the south, east and west, and the M4 to the north, as shown in Figure 14-3. The LCA essentially forms an extension to the Floodplain LCA within South Bucks District and the Settled Farmed Floodplain of the Royal Borough of Windsor and Maidenhead, and would be a part of these if administrative boundaries were ignored.

14.4.33. This character area is habitat diverse, with reed beds and wetland habitats designed into the man-made Jubilee River. Species-rich hedgerows interspersed with mature trees form boundaries.

14.4.34. Upton Court Park in the south-east of Slough, north of the M4, is on the boundary between the urban area and the floodplain. It has an open aspect and comprises sports pitches, amenity grass and mature trees, and being partially within the floodplain has greater characteristics of the floodplain than the urban area.

14.4.35. The flat nature of the LCA means it has high intervisibility with the landscape to the south, and particularly with Windsor Castle to the south-east. There is intervisibility with the landscape to the north from raised embankments along the Jubilee River; the built up area of Slough and M4 motorway impact on the LCA's character.

14.4.36. There is a network of footpaths through the area with numerous attractive footbridges crossing the river, including boardwalks heading out amongst the wetland islands of the river. National Cycle Route 61 runs alongside the river here.

14.4.37. The LCA shares many characteristics of the two adjacent floodplain LCAs to its south in the South Bucks District and Royal Borough of Windsor and Maidenhead landscape character assessments, which are also shown on Figure 14-3, and described in sections 14.4.19 and 14.4.20 of this chapter.

Summary of Landscape Character

14.4.38. Landscape character has been assessed at the national, regional and local scales in order to describe the baseline conditions, and understand the landscape context.

14.4.39. The Proposed Development Site is within Slough Business LCA, which has relatively inconsequential components and characteristics, with very little unifying character present. It is considered to be potentially tolerant of substantial changes. Slough Urban LCA surrounds Slough Business LCA and has some unifying characteristics and components, it is considered to be reasonably tolerant of change. Thames Floodplain LCA to the south of Slough Borough area is a reasonably attractive landscape set within the floodplain, and has relatively common components and characteristics; however the M4 motorway is a major component impacting on the character of the floodplain to the south of Slough, reducing the tranquillity and sense of isolation from development in the area. The LCA is considered to be reasonably tolerant of change.

14.4.40. LCAs outside Slough Borough area, shown on Figure 14-3, have varying levels of intervisibility with the SHP site. Landscape guidelines that have been produced by local authorities for these LCAs are considered in this chapter as part of the assessment to define sensitivity as a result of susceptibility to the Proposed Development. There is approximately 1.5km between the Proposed Development site and the nearest of these LCAs outside the Slough Borough area.

14.4.41. There is strong intervisibility between the open floodplain landscape to the south of Slough and the SHP site, however, due to the distance to the SHP site, and its context within the urban area of Slough, its indirect influence on the character of the landscape is limited. To the north-west of Slough the stacks of the SHP site are only intermittently visible from within the wooded and undulating farmland landscape.

Future Landscape Character Baseline

14.4.42. SEGRO, the land owner and primary developer of the Slough Trading Estate, has plans to implement a major development to begin transforming the Trading Estate into a more attractive place to work. This development will begin on Leigh Road between Bath Road and Buckingham Avenue. This scheme has been included under the cumulative impact assessment in Section 14.7 of this chapter.

Visual Baseline

Representative Views

14.4.43. To determine the likely visual impact of the Proposed Development, sixteen representative views have been identified within the ZTV, along with field-based site surveys, as agreed with SBC and listed in Table 14-1.

14.4.44. ZTVs for the Proposed Development are presented on Figures 14-4a and 14-4b, and discussed further in paragraph 14.5.14. The representative viewpoint locations are illustrated on Figure 14-5, whilst baseline photographs of views towards the existing SHP site from each of these locations are illustrated on Figures 14-6 to 14-21.

14.4.45. Table 14-4 provides a description of the identified representative views, and visual receptors.

Table 14-4 Representative Views and Visual Receptors

Viewpoint Number	Representative View and Reason for Inclusion	Visual Receptor(s)	Description of View
Representative Viewpoint 1	Looking north along Hamilton Road from Bedford Avenue, representing similar, close views from within Slough Trading Estate.	People working in or visiting Slough Trading Estate.	The size and scale of the stacks, cooling towers, and CFB boilerhouse of the existing SHP station make them prominent in views from across most of Slough Trading Estate. The vertical scale of the existing power station creates a focal point within the Trading Estate. Business and industrial buildings of varying sizes across the Estate partially screen views from ground level; however, there are views in the immediate vicinity of the existing SHP station where sightlines are unobstructed. There are no views out of Slough Trading Estate from ground level. Summer and winter views would be much the same from within the Estate as there is very little vegetation except some amenity planting alongside roads, and sparse roadside young deciduous trees.

Viewpoint Number	Representative View and Reason for Inclusion	Visual Receptor(s)	Description of View
Representative Viewpoint 2	Looking south from Bodmin Avenue, representing views from properties in close proximity to the north of Slough Trading Estate.	• Residents to the north living in close proximity to Slough Trading Estate. • Public open space users on the northern boundary of Slough Trading Estate.	Properties to the immediate north of the Slough Trading Estate have views of the existing SHP station, which is prominent due to its size and scale. Properties not on the boundary of the residential estates have views towards the existing SHP station, but partially screened by intervening buildings. The combination of flat topography and built development of the area means there are no views beyond Slough Trading Estate or the urban area. A small planted embankment exists between Bodmin Avenue and the SHP site, however this isolated feature is not considered to represent a significant change of level due to there being less than a 5m change in height between these two locations. There are small belts of green open space between residential estates and the Slough Trading Estate which have young and mature trees that partially screen views, especially during the summer months.
Representative Viewpoint 3	Looking south from Kennedy Park, included as a large public park to the north-west of the development.	Recreational users of Kennedy Park.	The view here is from an elevated point within Slough urban area, and therefore there are far-reaching views consisting of residential properties, business units and industrial buildings that make up the skyline. The existing power station rises prominently above Slough Trading Estate and the surrounding Slough urban area due to its size and scale. This makes it a key focal point interrupting the horizon from the north. There are few mature trees in the park, sparsely located, and due to the topography of the area, offer little screening of the existing SHP station.
Representative Viewpoint 4	Looking north-east from the A4 Bath Road at its junction with Dover Road, a representative stationary view for motorists stopped at the traffic lights.	• People travelling east along the A4 Bath Road. • People working at or visiting commercial & retail premises	The A4 Bath Road is the main east-west road through Slough. There are residential, commercial and business buildings along the length of this road, which tend to focus views along the road. The A4 is busy with traffic through the day that brings considerable movement and distraction to the view. The existing SHP station is visible above the row of properties on the north side of the road (Representative Viewpoint 5), but is less visible closer to the SHP site, as the properties on the

Viewpoint Number	Representative View and Reason for Inclusion	Visual Receptor(s)	Description of View
Representative Viewpoint 5	Looking east along the A4 Bath Road, representing a sequential view along Bath Road along with View 4	along the A4 Bath Road. • Pedestrians on footpaths along the A4 Bath Road.	north side of the road have a greater screening effect through the change in perspective. These views towards the existing SHP station are sequential and oblique, with screening from properties, and in the summer mature trees would further add to this screening. At the busy junction between the A4 Bath Road and Dover Road (Representative Viewpoint 4) there is a view of the two stacks and the top of the CFB boilerhouse of the existing SHP station, however, most of the existing SHP station is screened by vegetation and buildings. There are no views out of the Slough urban area from the A4 Bath Road.
Representative Viewpoint 6	Looking south along Long Readings Lane, included to represent the residential area to the north of Slough.	• People living in the northern Slough urban area. • People travelling through the area.	The north of Slough is a predominantly residential area with views towards the Slough urban centre as the topography gently rises up from the urban area to the south. Throughout this area the residential properties in the foreground of views screen the existing SHP station; however there are breaks in the urban fabric such as roads oriented on a north-south axis and open spaces that open up views to the south and the existing SHP station. The existing SHP station rises prominently from the surrounding townscape of Slough, where the cooling towers and stacks are its predominant visible features.
Representative Viewpoint 7	Looking northeast from the Lake End Road bridge over the M4.	• People travelling through the south-west of Slough. • People travelling along the M4 motorway.	The representative view is taken from Lake End Road bridge which is a raised viewpoint over the M4 motorway. The existing SHP station is visible on the skyline above the urban area of Slough in the distance, with the foreground made up of the M4, and agricultural land. Views towards the existing SHP station from this area would be intermittent sequential glimpses as the mature trees within field boundaries, and the linear belt of vegetation alongside the M4 filter the view. The movement on the M4 makes the view very busy.
Representative Viewpoint 8	Looking northeast from the commemorative plaque on the Jubilee River bridleway near Dorney, included to represent this statutory public right of way and the general recreational area associated with the Jubilee River.	Recreational users of the Jubilee River bridleway/cycle path/footpath.	This viewpoint is taken from outside the urban boundary of Slough and the flat topography between the Jubilee River and existing SHP station mean that the existing SHP station is visible, where it rises noticeably above the horizon in the distance about 3km away. This view is from a raised embankment to the south of the man-made Jubilee River, between the river and Dorney Common to the south. Much of the view is grassland and wetland, with sparse blocks of trees and shrubs providing intermittent screening. The urban area of Slough is visible in the distance.

Viewpoint Number	Representative View and Reason for Inclusion	Visual Receptor(s)	Description of View
Representative Viewpoint 9	Looking northeast from Dorney Common, included as an important open space with public access.	Recreational users of Dorney Common.	From within Dorney Common views towards Slough are screened by the man-made embankment to the south of the Jubilee River and intervening vegetation in the middle ground. The embankment and vegetation that lines the banks of the Jubilee River curtail ground-level views from most of Dorney Common. The tops of the stacks are visible from the west of Dorney Common, while from the east of the Common there are locations where more of the existing SHP station can be seen through gaps in the vegetation. These views from within Dorney Common are glimpsed and distant being just over 3km from the existing SHP station. The existing SHP station is not a focal point for views from within Dorney Common.
Representative Viewpoint 10	Looking north from the Jubilee River cycle path / footpath near Eton Wick, included to represent cyclists and pedestrians travelling along this part of the River and the general recreational area associated with the Jubilee River.	Recreational users of the Jubilee River footpath and cycle path.	There is little influence of the urban environment along this part of the river, the exception being a few buildings partially visible over the vegetation and landform, less visible in summer than in winter. The stacks, cooling towers and CFB boilerhouse of the existing SHP station are intermittently visible on the distant skyline as people move along the path.
Representative Viewpoint 11	Looking north-west from the A332 Eton relief road, north of Eton.	Motorists on the A332 Eton relief road, north of Eton.	The foreground of the view is maturing roadside vegetation and the railway bridge parapet. The Jubilee River and the M4 motorway can be seen beyond intervening woodland and grassland. Beyond the M4 the urban area of Slough is partially visible amongst trees. The stacks, cooling towers and CFB boilerhouse of the existing power station are visible above the wooded skyline. The M4 introduces movement and distraction to the middle ground of the view, and the existing SHP station is seen here in the context of this movement. This view is only ever a kinetic view for people in vehicles travelling along the road.

Viewpoint Number	Representative View and Reason for Inclusion	Visual Receptor(s)	Description of View
Representative Viewpoint 12	Looking north from the River Thames at Boveney Lock, included to represent views from the Thames Path National Trail.	• Recreational users of the Thames Path National Trail; • Visitors to Boveney Lock.	The view from the National Trail in this area is made up of arable farmland in the foreground, with a row of houses interspersed with large mature trees on the far side of these fields. Beyond the houses, the stacks and part of the existing power station buildings are the only development visible on the skyline. The view is open, making the residential built up edge of Eton Wick prominent. The existing SHP station, although partially visible, does not form a key focal point in the view.
Representative Viewpoint 13	Looking north-west from the North Terrace at Windsor Castle.	Residents of and visitors to Windsor Castle.	Along the North Terrace at Windsor Castle, the view is intermittently screened by trees, meaning that distant views in summer are curtailed. The view looks out over the roofscape of Eton with the prominent Eton College Chapel visible. The existing SHP station is noticeable beyond the Chapel, but the cooling towers and the CFB boilerhouse sit below the horizon with just the stacks of the existing SHP station rising above the horizon, this helps reduce its visual prominence. Windsor Castle's raised location above the surrounding plain affords it expansive panoramic views of the nearby areas and the existing SHP station forms a small horizontal part of the overall view.
Representative Viewpoint 14	Looking north-west from Upton Court Park.	Recreational users of Upton Court Park.	There are open views from Upton Court Park looking north at the built-up edge of Slough. Predominant vertical features above the built-up area of Slough include high-rise office and residential buildings within Slough town centre, a chimney stack at the AkzoNobel facility, and the spire of St Mary's Church. The stacks of the existing SHP station are partially visible from this distance; no other features of the SHP station are visible.
Representative Viewpoint 15	Looking south from Farnham Park Golf Club.	Recreational users of public footpaths north of Slough.	Views from public footpaths around Farnham Park Golf Club are curtailed by mature trees in the foreground and middle-distance of views, therefore the upper extents of the existing SHP station stacks are intermittently visible; no other features of the SHP station are visible.

Viewpoint Number	Representative View and Reason for Inclusion	Visual Receptor(s)	Description of View
Representative Viewpoint 16	Looking south-west from the upper viewing platform at Stoke Park House.	Visitors to Stoke Park House.	The upper viewing platform at Stoke Park House is on the roof of the House, from this elevated position there are expansive far-reaching views to the south over mature trees within and surrounding the grounds of the House. The view beyond these mature trees is of Slough urban area, beyond which is the more open landscape of the River Thames floodplain. The existing SHP station is prominent in the view due to its size in relation to adjacent industrial development in Slough, which is also visible but less prominent. Views from this viewing platform are mostly focussed towards Windsor Castle in the south, and not in the direction of the SHP station. This is not a specific viewpoint but is considered representative of views from local houses and flats to the northeast of the Proposed Development. At ground level within Stoke Park views of the existing SHP station are very limited.

Summary of Baseline Views

14.4.46. The predominantly flat topography to the south of Slough combined with the relatively low urban roofscape of Slough, mean that from most viewpoints only the upper extents of the existing SHP station are intermittently visible. To the north the landform gently rises up from the Proposed Development Site with the result that there are some views from within Slough of the existing SHP station; beyond the urban boundary of Slough the wooded landscape character screens most views towards the existing SHP station. Localised vegetation, buildings, and small topographical changes offer screening of varying degrees from surrounding visual receptors. Within Slough there are very few extensive or panoramic views out of the urban environment with the exception of a few elevated locations in the north. Beyond the Slough urban boundary there are more extensive views. Where the SHP station is visible, it forms a key feature within Slough and a notable landmark.

Future Baseline

14.4.47. The future visual baseline (excluding cumulative schemes) is unlikely to substantially change within the urban boundary of Slough, with maturing vegetation the only change likely to partially screen some views. In particular, views towards the Proposed Development Site from the south of Slough around the Jubilee River could be screened by maturing vegetation that is recently planted.

14.5. Potential Effects and Mitigation Measures

14.5.1. The potential landscape and visual effects have been assessed against the demolition/construction phase and the completed/operational phase of the Proposed Development. The assessment is made against the baseline conditions, considering the magnitude of potential change in relation to the sensitivity of the receiving landscape/visual receptor to classify a significance of the effect.

Landscape Impact Assessment

14.5.2. The baseline assessment identifies LCAs within 5km of the Proposed Development. In order to determine degrees of significance of the effects of the Proposed Development, it is necessary to attach levels of sensitivity to each LCA. The LCAs, their sensitivity, and reasoning are listed below.

LCAs within Slough Borough

- Slough Business LCA – Low sensitivity landscape: This LCA is defined by relatively inconsequential landscape components with little uniform character across the area, and therefore is considered to be tolerant of substantial change.
- Slough Urban LCA - Medium sensitivity landscape: This LCA has some common landscape components and character across the area, and would be potentially tolerant of some change.
- Thames Floodplain LCA - Medium sensitivity landscape: This LCA has some common landscape components and characteristics across its area; it would be potentially tolerant of some change.

South Bucks District Landscape Character Assessment

- Floodplain LCA - High sensitivity landscape: The M4 fragments the landscape and reduces the distinctiveness of character; however, there is valuable green infrastructure of important recreational value. The LCA would be highly susceptible to a development of this nature, which would contradict the landscape guideline to monitor vertical development along the floodplain to retain the low-lying and open character.
- Lowland Fringe LCA - Medium sensitivity landscape: There are numerous settlements, roads and golf courses which fragment the landscape and reduce the distinctiveness of character. The LCA would be susceptible to a development of this nature, however, there is already a strong influence of urban development. Guidelines for this LCA include the conservation of views south towards Windsor Castle, and tree planting to reduce the visual impact of urban development.
- Undulating Farmland LCA - High sensitivity landscape: This LCA is a peaceful landscape of mixed farmland and wooded field boundaries. The LCA would be highly susceptible to a development of this nature. The landscape guidelines for this LCA are aimed at maintaining the intimate rural and enclosed character, and maintaining open views across fields by avoiding the introduction of large scale elements.
- Wooded Terrace LCA - High sensitivity landscape: This LCA has been categorised as a high sensitivity landscape. It is described as a peaceful, natural landscape mosaic of wood-pasture, heathland, woodland, paddocks and historic parkland which has an intimate and enclosed character. Development such as settlement and roads is beginning to weaken the character of some areas. The LCA would be highly susceptible to a development of this nature.

Landscape Character Assessment for the Royal Borough of Windsor and Maidenhead

- Settled Farmed Floodplain LCA - Medium sensitivity landscape: This LCA has a mature, diverse and unified character despite its recent decline due to modern pressures such as the M4 motorway and A332 Eton Relief Road. The LCA is susceptible to development of this nature, which includes important views towards Windsor Castle in the south.

- Settled Developed Floodplain LCA - Medium sensitivity landscape: There is considerable variety in the strength of landscape character within this LCA; landscape character is strong in established wetland areas, however in recently disturbed areas, or areas in close proximity to transportation corridors and settlement the landscape shows signs of neglect. The LCA is susceptible to a development of this nature.
- Farmed Parkland LCA - High sensitivity landscape: There is a strong sense of history within the landscape and it would be highly susceptible to development of this nature.
- Estate Parkland LCA - High sensitivity landscape: It is a historic landscape with naturally important cultural, historical and ecological assets. It would be highly susceptible to a development of this nature.

Demolition/Construction Phase

14.5.3. Appendix I-1, Volume II of this ES tabulates the magnitude of change, sensitivity of landscape and significance of effect during demolition/construction for the identified LCAs within the 5km study area of the Proposed Development. A summary is provided below.

14.5.4. The demolition and construction phase of the Proposed Development would have direct and indirect effects on the surrounding area, most noticeably:

- Demolition work of existing buildings and, the south stack;
- Demolition/construction vehicles and machinery accessing and operating on the Site;
- The passage of demolition/construction vehicles and machinery through the local road network;
- Cranes operating on the Site;
- Introduction of new buildings as construction of the Proposed Development progresses;
- Illumination as a result of lighting on construction equipment, e.g. cranes; and
- Traffic management signs and equipment along the local road network offsite.

14.5.5. The above would have a direct effect on the Slough Business LCA. The movement of heavy construction vehicles through the area on a short-term basis would be noticeable, but not totally out of place, and demolition and construction activity on the Proposed Development Site would have a limited change in characteristics of a localised part of the LCA. Overall the magnitude of change is considered to be medium, on this low sensitivity landscape. Therefore the predicted landscape effect is **minor adverse**, and temporary, which is not significant.

14.5.6. It is not anticipated that demolition and the construction of the Proposed Development would have any direct effects on landscape amenity within the Slough Urban LCA. There would be minor indirect effects as a result of intervisibility and from construction vehicles moving through the LCA, but overall it is considered the magnitude of change would be low on a medium sensitivity landscape. Therefore the landscape effect is considered **minor adverse**, and temporary, which is not significant.

14.5.7. It is predicted that the demolition and construction phase of the Proposed Development would have a **negligible** effect, which is not significant, on all LCAs beyond Slough

Business LCA and Slough Urban LCA within the 5km radius study area of the Proposed Development.

Completed/Operational Development

14.5.8. Appendix I-1, Volume II of this ES tabulates the magnitude of change, sensitivity of landscape and significance of effect associated with the completed and operational development for the identified LCAs within the 5km radius study area. A summary is provided below.

14.5.9. The completed/operational Proposed Development would have a different effect on the surrounding landscape than the demolition/construction phase and are therefore considered separately. Effects of demolition and construction would be temporary, whereas effects from the completed/operational development would be permanent.

14.5.10. The Proposed Development would be located within the SHP site boundary on land historically occupied by redundant buildings and plant. This setting would therefore have a limited change on the characteristics of the Slough Business LCA..Once built there would be limited direct discernible effects from the Proposed Development; indirectly there would be a small increase in HGVs travelling to and from the Site compared with the historic situation. The magnitude of change from the completed and operational development is considered low. There would be a discernible change in the form through a change in materials and appearance, and in the scale and massing of the Proposed Development, which would be larger than the existing stacks and buildings on the SHP site. However the effect on the landscape is considered to be **minor adverse** and not significant, as the Proposed Development would not be wholly different to the existing situation.

14.5.11. It is predicted that the completed and operational development would have a **negligible** effect, which is not significant, on all LCAs beyond Slough Business LCA within the 5km study area of the Proposed Development.

Visual Impact Assessment

Visibility within the Study Area

14.5.12. The Proposed Development includes changes to the building heights and massing, and a change in height of one of the two stacks (see Section 5.4 of *Chapter 5: The Proposed Development* for further details). Therefore for this assessment, two computer-generated comparative ZTVs (Figures 14-4a and 14-4b) have been taken from the highest points of the Proposed Development (the proposed south stack and proposed Boiler House) and integrated with areas of woodland and urban development, which have been identified and attributed heights of 15m and 8m respectively to give a refined scope of theoretical visibility.

14.5.13. Figure 14-4a illustrates the proposed change in ZTV due to the increase in height of the south stack, showing the extent of visibility of the proposed 90m south stack beyond the ZTV of the existing 82m south stack. The extent of ZTV of the existing 104m north stack, which would be retained, is also shown.

14.5.14. Figure 14-4b illustrates the proposed change in ZTV due to the change in building height and massing, showing the extent of visibility of the highest proposed building at 48m compared with the existing highest building of 46m within the Proposed Development Site. It should be noted that the ZTV model for Figure 14-4b includes both the height and massing of the Proposed Development for comparison with the existing buildings. The cooling towers within the SHP site are currently 49m and the north stack is 104m, although because these are not part of the Proposed Development Site they have been excluded from the drawing.

14.5.15. Each of these ZTVs demonstrates that the proposed changes in height of the south stack and the buildings would not have a great influence on the extent of visibility of the SHP Site compared to the existing situation.

Demolition/Construction Phase

14.5.16. Appendix I-2, Volume II of this ES tabulates the magnitude of change, sensitivity of receptors and the significance of effect associated with the demolition/construction phase for the sixteen viewpoints identified in the baseline. A summary is presented below.

14.5.17. The visual effects of demolition and construction of the Proposed Development would mostly involve the presence of cranes, construction vehicles, and the visible demolition and construction of both the buildings and the south stack.

14.5.18. The magnitudes of change of the various activities involved in the demolition and construction phase differ with distance from the Proposed Development. For example higher magnitudes of change are anticipated closer to the Proposed Development, with lower magnitudes of change anticipated further away from the Proposed Development. There are no high magnitudes of change anticipated at any of the visual receptors; most of the magnitudes of change are low.

14.5.19. There would be significant visual effects as a result of the demolition and construction phase of the Proposed Development. There are anticipated to be **moderate adverse** visual effects on visual receptors at Viewpoint 2 (residents to the north living in close proximity to the Slough Trading Estate and recreational users of public open space on the north boundary of the Trading Estate), Viewpoint 3 (recreational users of Kennedy Park), and Viewpoint 6 (residents in the northern Slough urban area). These effects, although significant would be temporary in duration. The effect at all other viewpoints is anticipated to be either negligible or minor adverse.

14.5.20. It is not anticipated that associated lighting would have significant effects on any visual receptor. Although demolition and construction work would be ongoing 24/7, this is predominantly for the internal fit out of the Proposed Development. External works that would require extensive lighting are not expected to be carried out at night. Warning lights fitted to the top of cranes would be intermittently visible from more distant viewpoints around Slough; however, these would be seen in the context of warning lights on other existing stacks in the area.

Completed/Operational Development

14.5.21. The visual effects of the completed and operational development are outlined in Appendix I-2. A summary is provided below.

14.5.22. The completed and operational development would have a different effect on views from the surrounding landscape than the demolition/construction phase of the Proposed Development.

14.5.23. The Proposed Development is on the site of the existing SHP station, retaining some of the buildings, the cooling towers and north stack (104m). The Proposed Development buildings and stack are slightly lower than the existing cooling towers and north stack, but the Proposed Development will increase the building mass onsite, mainly in the centre and southern half of the Proposed Development Site. Figures 5-4a and 5-4b in *Chapter 5: The Proposed Development* illustrates the change in massing associated with the

Proposed Development with the dotted line showing the existing building profiles including the cooling towers. The change in massing is summarised below.

14.5.24. When viewed from the Edinburgh Avenue/ Fairlie Road junction (from the west), the largest building lining Edinburgh Avenue will reduce in height by approximately 16m (from 46m currently to 30m) due to the removal of the CFB boilerhouse and the construction of the proposed turbine hall.

14.5.25. The buildings in the southern half of the Proposed Development Site which will comprise the bunker, boiler house, and FGT plant, will increase in height from around 10 to 15m to up to 48m height and there is a degree of 'in-filling' within the Site which increases the building massing, especially when viewed from the south, although these smaller buildings have had the backdrop of the 30m/46m buildings along the main Edinburgh Avenue frontage.

14.5.26. The maximum height of the buildings associated with the Proposed Development (excluding the South Stack) will be 1m lower than the existing cooling towers situated north of Edinburgh Avenue, and hence views from the north of the Site will continue to be obscured by and/or viewed in context with these existing structures.

14.5.27. The most noticeable change in massing is from close views to the south of the Proposed Development Site. The in-filling within the Site does not cause a significant change to the existing visual amenity however, which is already dominated by the existing power station buildings from these locations.

14.5.28. The massing has been mitigated during design by limiting the tipping hall to a maximum height of 15m to avoid eastward creep of buildings beyond the CFB boilerhouse eastern sightline and to be no higher than the existing fuel store (as explained in *Chapter 4: Site Description, Project Alternatives and Evolution* of this ES).

14.5.29. Constructing the Proposed Development on the site of the existing SHP station reduces the potential magnitude of change experienced by the identified visual receptors. Most of the anticipated magnitudes of change are imperceptible (i.e. the Proposed Development would cause a very minor alteration to the existing view), and none are high. The greatest magnitude of change experienced as a result of the completed/operational development is low, i.e. the Proposed Development would cause a minor alteration to the existing view. This is because the Proposed Development approximates to the 'no change' situation as distance from the power station increases. It is only the closer receptors that would experience the differences in size and massing.

14.5.30. Lighting of the site is required for security and safety purposes to avoid adverse effects upon local residents and road users (i.e. similar to the baseline situation, including some low-level external lighting within the Site). The lighting strategy will be carefully designed to minimise light spill and sky glow resulting from external and internal lighting. Lighting would be controlled by means of photocell(s) with timers to be programmed to suit and reflect the operational requirements of the Proposed Development, which would be seasonally dependent. The translucent cladding and glazing of the tipping hall (see Figure 5-4 of this ES) would be designed to minimise external light emission and maximise natural light ingress. The design of the Proposed Development is discussed further in the Design and Access Statement, which forms part of the planning application for the Proposed Development.

14.5.31. It is anticipated that associated lighting and potential effects would be similar to the existing SHP plant. There would be aircraft warning lights atop the two stacks, and some low-level external lighting within the Proposed Development Site. There are not expected to be any significant visual effects from the proposed translucent cladding to the tipping hall; the tipping hall would be a low building similar in size to other buildings within the

Slough Trading Estate, and therefore the anticipated light spill through the cladding would be seen in the context of the heavily illuminated Slough Trading Estate, where it would not be significant.

14.5.32. Potential plume visibility is discussed in *Chapter 8: Air Quality* of this ES, and the likely change to visual amenity is not considered significant. The emission exit gas temperature will be sufficiently high to avoid issues associated with the creation of visible plumes, however as outlined in EA guidance, the level of effect expected for the Proposed Development is considered to be acceptable.

14.5.33. None of the predicted visual effects of the completed/operational development are greater than **minor adverse**, and therefore none are considered of significance.

Assessment of Green Belt

14.5.34. The effects of the Proposed Development on the character of the Green Belt land surrounding Slough Borough are outlined in Appendix I-4.

14.5.35. There would be no significant effect on the character of the landscape beyond the built up area of Slough, as a result of inter-visibility with the Proposed Development. That area comprises entirely Green Belt (with the exception of some larger settlements). It can therefore be concluded that no harm would result to the openness or permanence of the Green Belt and the setting and special character of historic towns would therefore be preserved. There is therefore no conflict with any of the 5 purposes of the Green Belt outlined in Appendix I-4.

Mitigation Measures

14.5.36. The design evolution of the Proposed Development has taken into account the site constraints and incorporated a number of mitigation measures, as outlined in *Chapter 4: Site Description, Project Alternatives and Evolution*. In particular, the design was limited to a 48m building height, which has kept the scale of the Proposed Development in line with the existing SHP station and minimised the potential effects of the completed/operational development. The appearance of the Proposed Development has also been designed to provide an integrated generating station on the SHP site which complements the surrounding structures within the Slough Trading Estate.

14.5.37. Within the parameters set by the planning application, detailed design will be required following the identification of a supplier and contractor. This will include minimising the footprint and building height/mass by considering a range of measures which might include:

- Lowering some or all of the floor level of the boilerhouse by up to 4m;
- Selecting a single loading crane track in the bunker building which may reduce the bunker building height by up to 5m;
- Optimising the boiler layout which may reduce height but increase length; and
- Optimising the FGT plant layout and access for maintenance requirements.

14.5.38. The exact layout and dimensions of the Proposed Development are not fully determined at this stage; as such this assessment has been undertaken based on maximum parameters within the planning ‘envelope’ for which permission is being sought. This is considered a robust and worst-case assessment of the potential effects on landscape and visual amenity, and the effects of anything less than the maximum parameters would be similar to or less than the assessment presented in this chapter.

14.5.39. No further mitigation measures are considered necessary.

14.6. Residual Effects and Conclusions

14.6.1. The demolition/construction phase is anticipated to create a **minor adverse** effect on the landscape character of the immediate area, i.e. the proposed changes would be intermittent and at slight variance with the underlying character of the area and landscape features, this effect would be temporary in duration.

14.6.2. The presence of construction equipment, cranes, and traffic movements are considered to result in a **moderate adverse** visual effect at three of the sixteen representative viewpoints assessed, which is significant, although this effect would be temporary in duration. The effect on visual amenity from the other thirteen viewpoints is considered **minor adverse** or **negligible**, which is not significant.

14.6.3. The completed and operational development would be larger in height and massing than the existing buildings within the Proposed Development Site (although lower than the cooling towers and north stack). This is considered to result in a **minor adverse** effect on landscape character within the Slough Business LCA, and a **negligible** effect on surrounding LCAs within the 5km study area.

14.6.4. There are expected to be **minor adverse** visual effects from the completed/operational development (i.e. the proposed development would cause a small deterioration to the existing view) at five of the sixteen representative viewpoints. The effect of the completed and operational development is considered **negligible** from the remaining eleven representative viewpoints, i.e. the Proposed Development would cause scarcely any perceptible deterioration or improvement to the existing view.

14.6.5. Table 14-5 provides a summary of the residual effects.

Table 14-5 Summary of Residual Effects

Aspect	Phase	Significance of Residual Effects
Landscape Effects	Demolition/Construction	Minor adverse (Slough Business LCA) Negligible (all other LCAs within the 5km radius study area)
	Operation	Minor adverse (Slough Business LCA) Negligible (all other LCAs within the 5km radius study area)
Visual Effects	Demolition/Construction	Moderate adverse (Viewpoints 2, 3 and 6) Minor adverse (Viewpoints 1, 4, 5, 7-14 and 16) Negligible (Viewpoint 15)
	Operation	Minor adverse (Viewpoints 1, 2, 3, 6 (residents) and 16 (visitors) Negligible (all other Viewpoints)

14.7. Cumulative Effects

14.7.1. The schemes included within the cumulative effect assessment have been identified in consultation with SBC. A list of development schemes consented for planning, under construction or at pre-planning submission stage that have been included within the cumulative impact assessment is provided below. The locations of these cumulative schemes are illustrated in Figure 2-1 of this ES and are described in *Chapter 2: Assessment Methodology*. The developments include a simultaneous application by the Applicant for a water treatment plant and central site services within the SHP site, the Leigh Road / Bath Road Central Core development for mixed use, and the Britwell Regeneration mixed use development.

Cumulative Landscape Impact Assessment

14.7.2. The landscape effects of the three cumulative development schemes have been tabulated in Appendix I-3, Volume II of this ES. The sensitivity of the LCAs remains the same as for the landscape impact assessment for the Proposed Development, i.e. there is no cumulative effect when taking into account these other schemes.

14.7.3. The Britwell Regeneration scheme would take land from the west of Kennedy Park for residential, community and retail development. Although this could detract from the quality of the park, development of this nature would not be out of place within the Slough Urban LCA. The Britwell Regeneration Scheme would have a negligible landscape effect on the Slough Business LCA.

14.7.4. The two cumulative development schemes within the Slough Trading Estate are also in keeping with the baseline landscape character. The Leigh Road / Bath Road Central Core development would have a minor effect on the baseline landscape character of the Slough Business Area, the improvement of public realm and improved building designs means this is likely to be a beneficial change.

14.7.5. The simultaneous planning application for Further Development within the SHP site (including a new central site services building, a water treatment plant and parking on the SHP site) has a low magnitude of change as it is contained within the existing SHP site and is not expected to exceed 10m in height.

14.7.6. Considering both the cumulative development schemes and the Proposed Development together it is not anticipated there would be a greater effect than minor adverse, i.e. the landscape changes as a result of the Proposed Development and cumulative schemes would be intermittent and at slight variance with the underlying character of the area and landscape features. This is not considered significant.

14.7.7. None of the cumulative development schemes would have a significant landscape effect on the baseline landscape character and are not expected to alter the residual effects identified for the Proposed Development.

Cumulative Visual Impact Assessment

14.7.8. The visual effects of the three cumulative development schemes have been tabulated in Appendix I-3, Volume II of this ES. The sixteen representative viewpoints and associated visual receptors remain appropriate to assess the impacts of the three cumulative development schemes against the Proposed Development. The sensitivity of the visual receptors remains the same.

14.7.9. Most of the visual magnitudes of change from the cumulative development schemes are low or imperceptible as the vertical massing of the cumulative developments does not exceed the existing surrounding townscape.

14.7.10. The Britwell Regeneration scheme would be visible from within Kennedy Park and parts of the residential area to the north of Slough and has been assigned a low magnitude of change as the development would cause a minor alteration to the baseline view but is not considered uncharacteristic when set within the attributes of the receiving landscape.

14.7.11. The cumulative development schemes all have negligible or minor adverse visual effects on receptors when considered alongside the Proposed Development. In the event that the Britwell Regeneration scheme and Proposed Development are constructed at similar times, it is anticipated to increase the visual effect from Kennedy Park and parts of the residential area to the north of Slough from minor to moderate adverse during the construction period. This effect, although significant, would therefore be temporary, lasting only for the duration of the construction phase. Once operational, the developments are considered to be in keeping with the appearance of the existing area.

14.7.12. Although not part of any cumulative schemes, it is the aspiration of the Applicant to integrate the rest of the SHP site with the Proposed Development. This would include painting the two cooling towers a consistent colour, which would change the appearance in the future. Although a positive change locally, it is considered to have a negligible landscape and visual effect and is illustrated on the Proposed View and Cumulative Development Figures listed in Appendix I-3 of this chapter.

14.8. References

Ref. 14-1 Council of Europe. (2000). European Landscape Convention.

Ref. 14-2 Department of Communities and Local Government. (2012). National Planning Policy Framework.

Ref. 14-3 Slough Borough Council. (2008). Core Strategy Development Plan Document 2006-2026.

Ref. 14-4 Berkshire Joint Strategic Planning Unit. (1998). Waste Local Plan for Berkshire. Ref. 14-5 Slough Local Plan (March 2004) Saved Policies (September 2007)

Ref. 14-6 Slough Borough Council. (2010). Slough Local Development Framework Site Allocation Development Plan Document

Ref. 14-7 Landscape Institute and Institute of Environmental Management & Assessment. (2013). Guidelines for Landscape and Visual Impact Assessment: Third Edition. Abingdon: Routledge.

Ref. 14-8 Countryside Agency and Scottish Natural Heritage. (2002). Landscape Character Assessment: Guidance for England and Scotland

Ref. 14-9 Landscape Institute. (2011). Photography and Photomontage for Landscape and Visual Impact Assessment.

Ref. 14-10 Natural England. (2013). National Character Areas – Defining England's Natural Boundaries

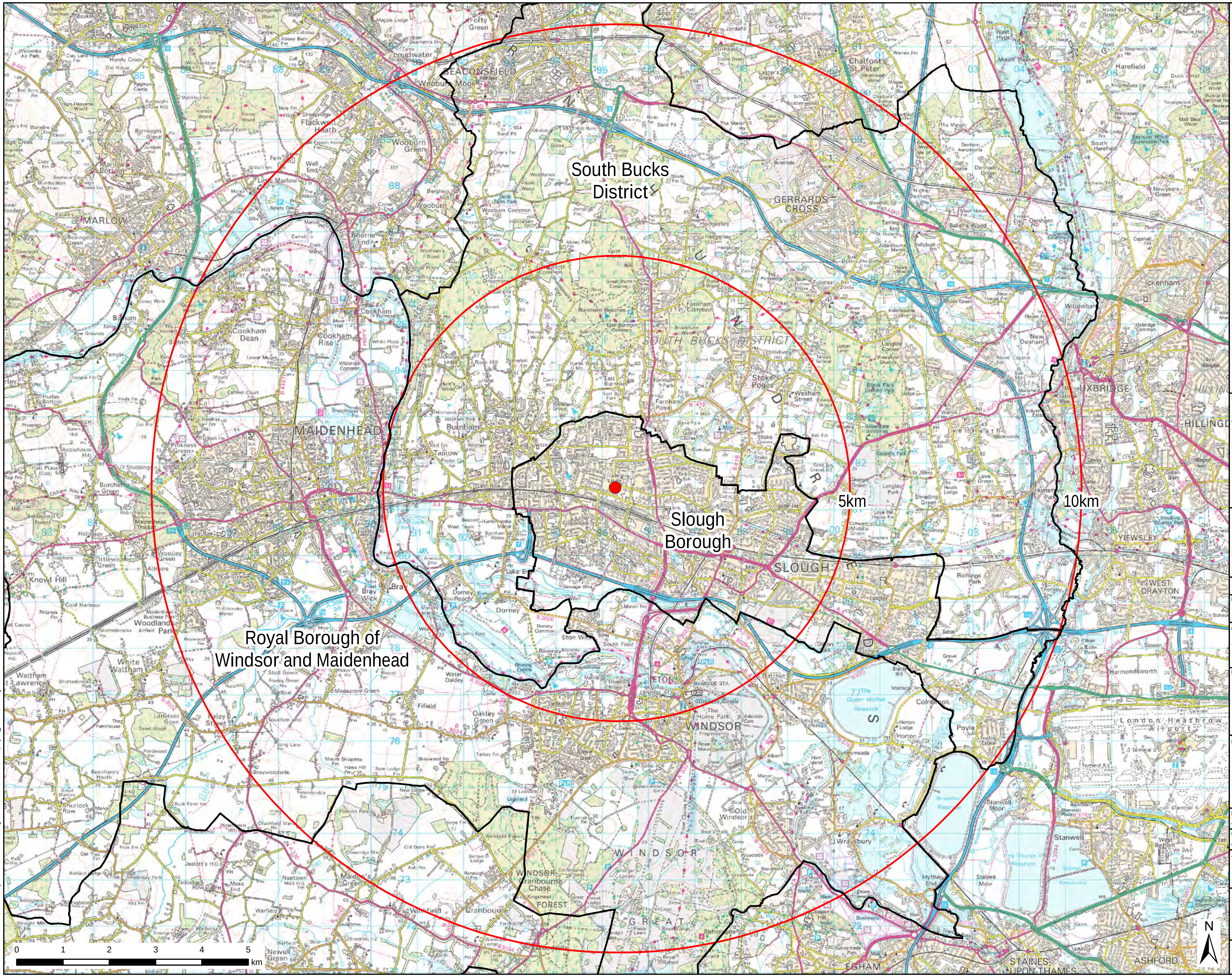
Ref. 14-11 Berkshire Joint Strategic Planning Unit. (2003). Berkshire Landscape Character Assessment

Ref. 14-12 Buckinghamshire County Council. (2000). The Landscape Plan for Buckinghamshire

Ref. 14-13 South Bucks District Council. (2011). South Bucks District Landscape Character Assessment

Ref. 14-14 The Royal Borough of Windsor and Maidenhead. (2004). Landscape Character Assessment

Figures



LEGEND

- Proposed Development Site
- 5km/10km distance band
- Administrative boundaries

Copyright

Revision Details	By	Check	Date	Suffix

Purpose of Issue
DRAFT

Client
SSE

Project Title
SLOUGH MULTIFUEL CHP FACILITY

Drawing Title
SITE LOCATION

Drawn	Checked	Approved	Date
JW	TR	EH	01/05/2014

URS Internal Project No.	Scale @ A3
46369029	1:75,000

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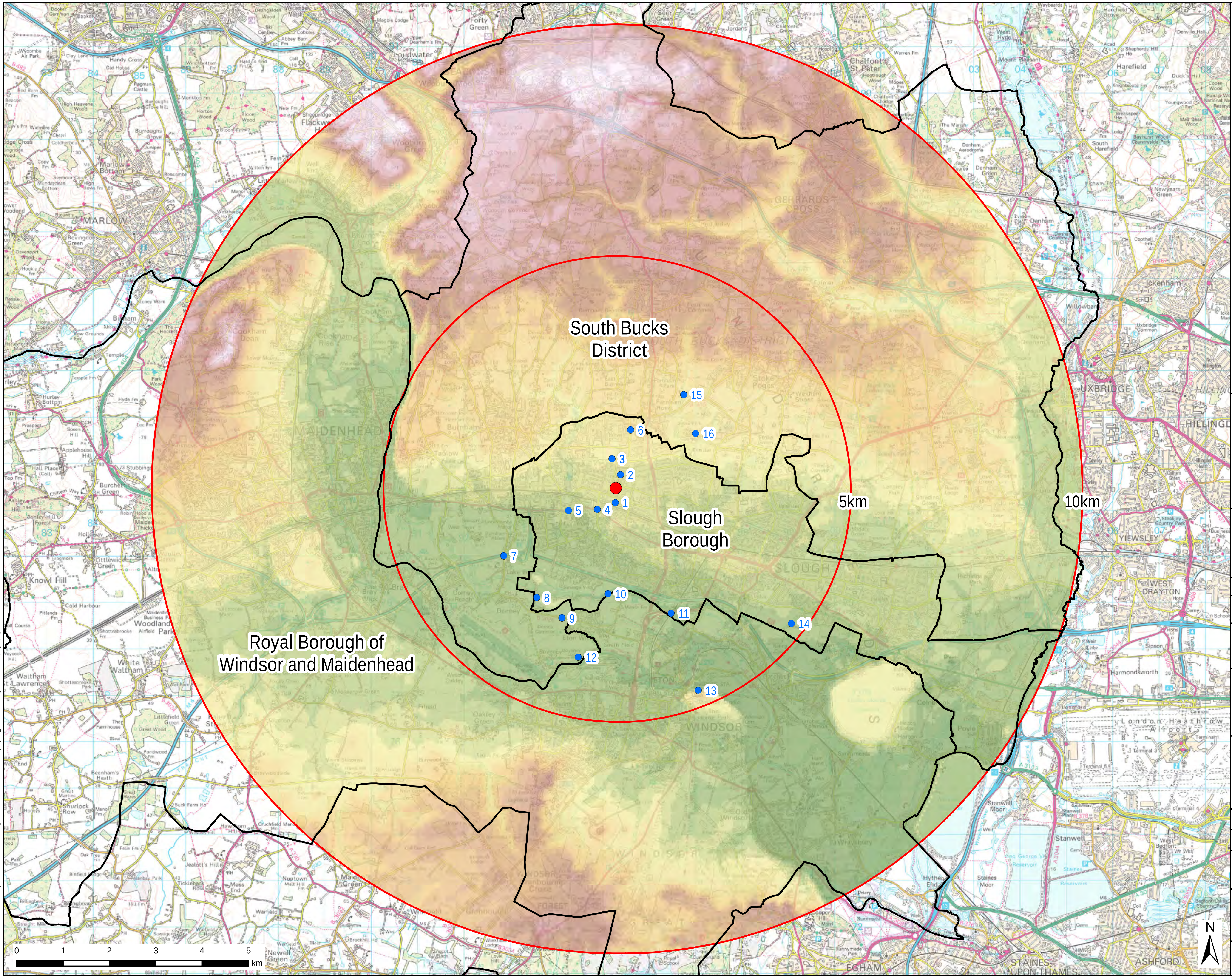
FIGURE 14.1	1

Plot Date: 01 May 2014
File Name: I:\5004 - Information Systems\46369029 Slough Multi Fuel Power Station\project_files\MXDs\Figure 14-1 Site Location.mxd



LEGEND

Proposed Development Site

Representitive viewpoint locations (as agreed with Slough Borough Council)

5km/10km distance band

Administrative boundaries

Elevation (m)

- >10 to <15
- >15 to <20
- >20 to <25
- >25 to <30
- >30 to <35
- >35 to <40
- >40 to <45
- >45 to <50
- >50 to <55
- >55 to <60
- >60 to <65
- >65 to <70
- >70 to <75
- >75 to <80
- >80 to <85
- >85 to <90
- >90 to <95
- >95 to <100
- >100 to <105
- >105 to <110
- >110 to <115

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue

DRAFT

Client

SSE

Project Title

SLOUGH MULTIFUEL
CHP FACILITY

Drawing Title

TOPOGRAPHY

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JW	TR	EH	01/05/2014

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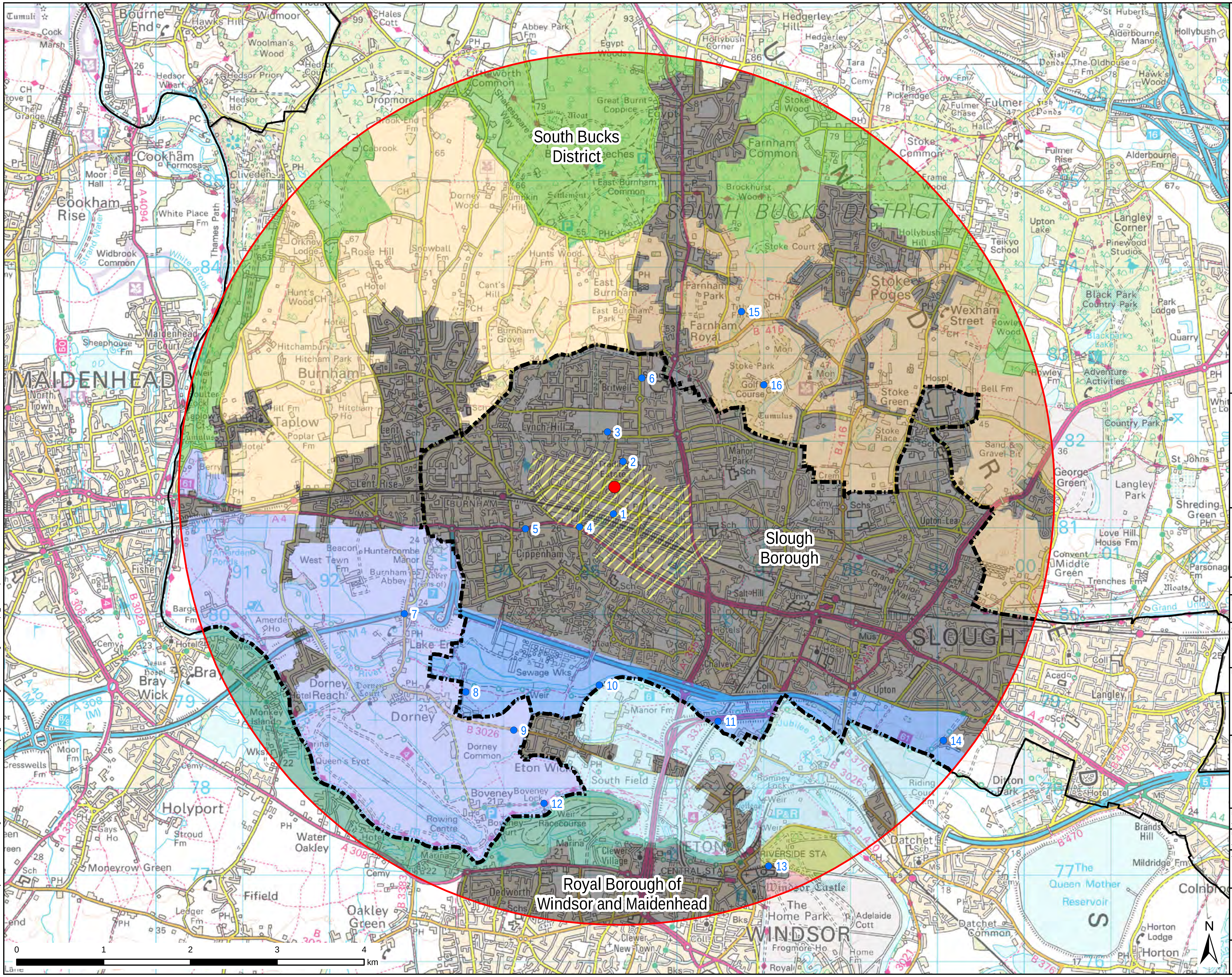
Drawing Number: FIGURE 14.2

Rev: 2

Plot Date: 01 May 2014
File Name:\\15004 - Information Systems\46369029 Slough Multi Fuel Power Station\project_files\MXDs\Figure 14.2 - Topography.mxd



LEGEND

- Proposed Development Site
- Representitive viewpoint locations (as agreed with Slough Borough Council)
- 5km distance band
- Administrative boundaries
- Administrative boundaries within study area

Slough Borough Landscape Character Areas (no published study)

- Slough Business Area
- Slough Urban Area
- Thames Floodplain

Landscape Character Assessment for the Royal Borough of Windsor and Maidenhead (2004) - Landscape Character Areas

- Estate Parkland
- Farmed Parkland
- Settled Development Floodplain
- Settled Farmed Floodplain
- Urban Area

South Bucks District Landscape Character Assessment (2011) - Landscape Character Areas

- Floodplain
- Lowland Fringe
- Undulating Farmland
- Urban Area
- Wooded Terrace

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: DRAFT

Client: SSE

Project Title: SLOUGH MULTIFUEL CHP FACILITY

Drawing Title: SLOUGH LANDSCAPE CHARACTER AREAS

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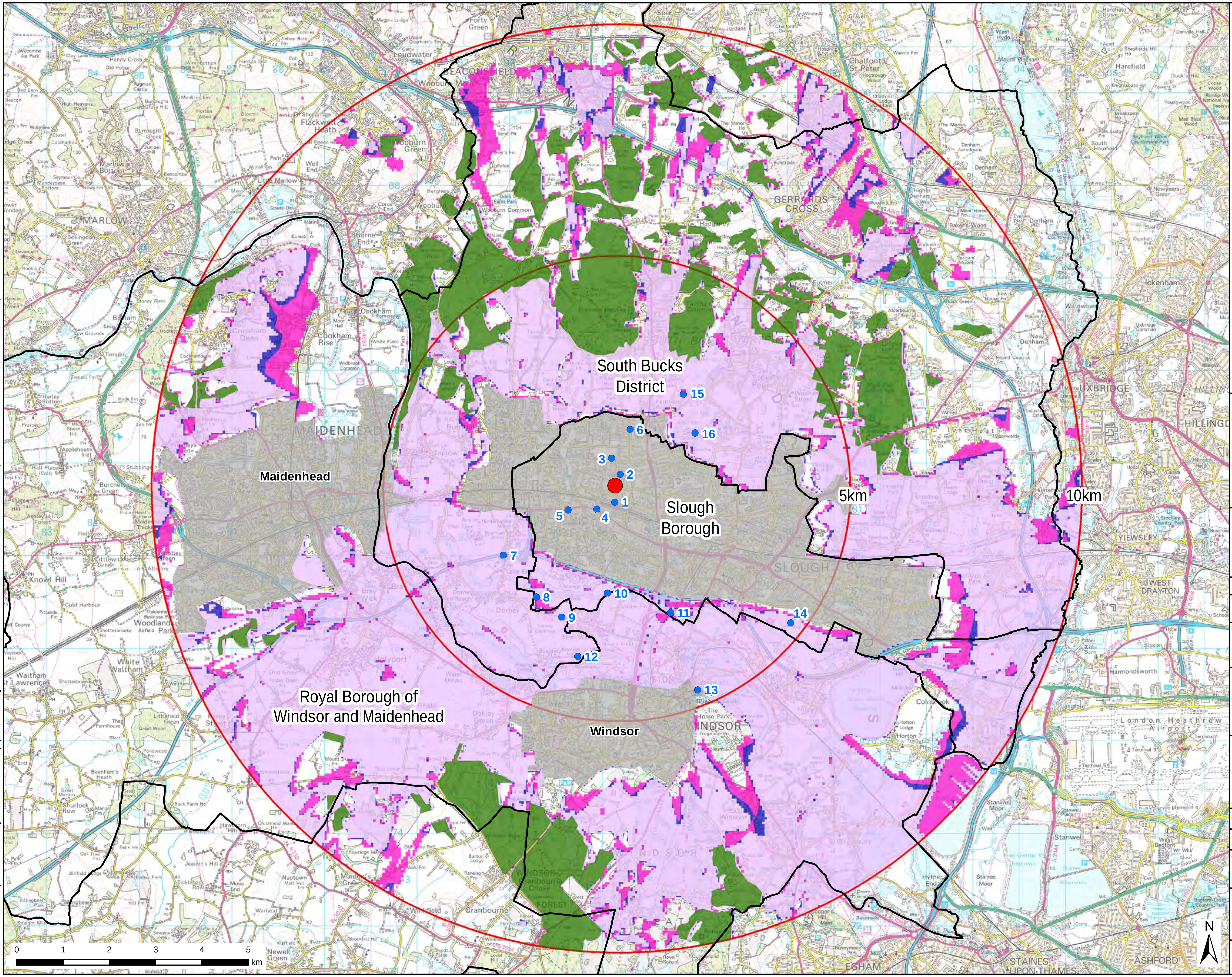
Drawing Number: FIGURE 14.3

Rev: 1

Plot Date: 01 May 2014
File Name: I:\5004 - Information Systems\46369029 Slough Multi Fuel Power Station\project_files\MXDs\Figure 14-3 - Slough Landscape_Townscape Character Areas.mxd



LEGEND

- Proposed Development Site
- Representitive viewpoint locations (as agreed with Slough Borough Council)
- ZTV of existing 82m stack (i.e. both existing stacks potentially visible)
- Extent of ZTV of proposed 90m stack beyond ZTV of existing 82m stack
- Extent of ZTV of existing 104m stack beyond ZTV of proposed 90m stack
- Urban area (indicative 8m height)
- Woodland (indicative 15m height)
- 5km/10km distance band
- Administrative boundaries

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue

DRAFT

Client

SSE

Project Title

SLOUGH MULTIFUEL CHP FACILITY

Drawing Title

COMPARATIVE ZONES OF THEORETICAL VISIBILITY – STACKS (TAKING URBAN AND WOODLAND AREAS INTO ACCOUNT)

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JW	TR	EH	01/05/2013

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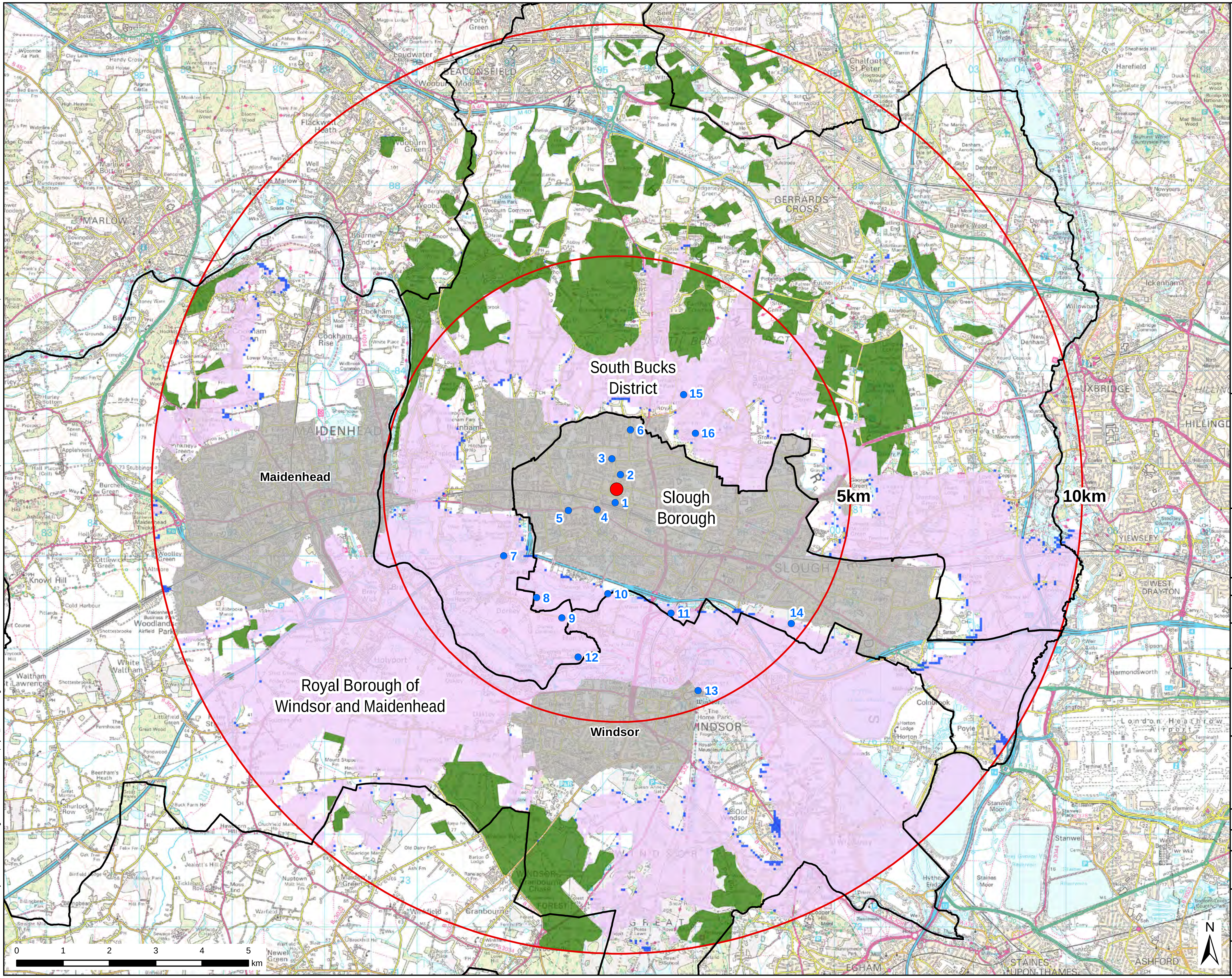
FIGURE 14.4a	4

Plot Date: 01 May 2014
File Name: I:\5004 - Information Systems\46369029 Slough Multi Fuel Power Station\project_files\MXDs\Figure 14.4a - COMPARATIVE ZONES OF THEORETICAL VISIBILITY – CHIMNEYS (TAKING URBAN AND WOODLAND AREAS INTO ACCOUNT).mxd



LEGEND

- Proposed Development Site
- Representive viewpoint locations (as agreed with Slough Borough Council)
- ZTV of existing highest building at 45.3m
- Extent of ZTV of proposed highest building at 48m, beyond ZTV of existing highest building at 45.3m
- Urban area (indicative 8m height)
- Woodland (indicative 15m height)
- 5km/10km distance band
- Administrative boundaries

Revision Details	By	Check Date	Suffix

Purpose of Issue
DRAFT

Client
SSE

Project Title
SLOUGH MULTIFUEL CHP FACILITY

Drawing Title
COMPARATIVE ZONES OF THEORETICAL VISIBILITY – BUILDINGS (TAKING URBAN AND WOODLAND AREAS INTO ACCOUNT)

Drawn	Checked	Approved	Date
JW	TR	EH	25/11/2013

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Drawing Number
FIGURE 14.4b

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2

Plot Date: 01 May 2014
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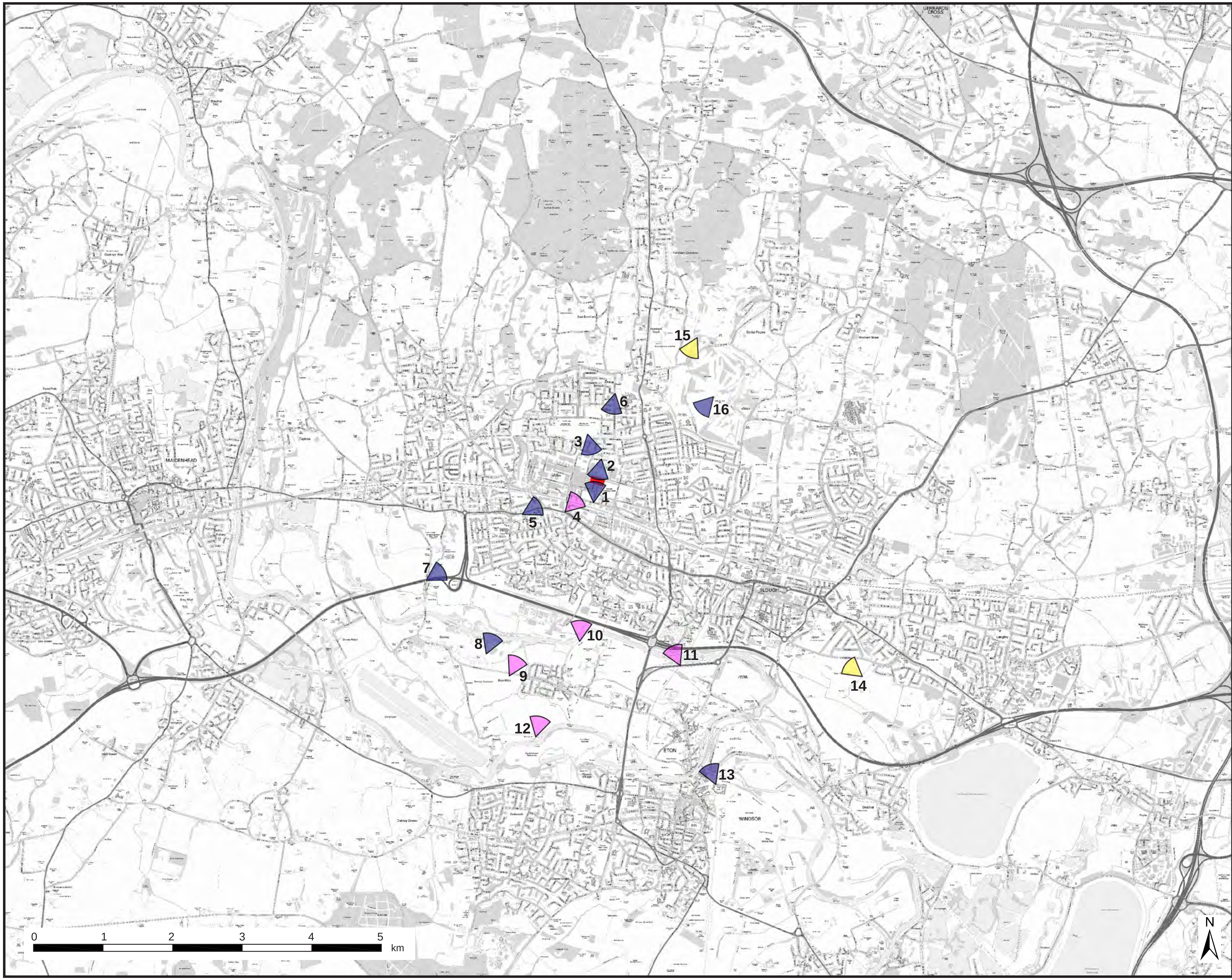

LEGEND

Proposed Development Site

Viewpoints with wireline, rendered and cumulative photomontages:

1. View north along Hamilton Road from Bedford Avenue
2. View south from Bodmin Avenue
3. View south from Kennedy Park
5. View east along the A4 Bath Road
6. View south along Long Readings Lane
7. View north-east from the Lake End Road bridge over the M4
8. View north-east from the commemorative plaque on the Jubilee River bridleway near Dorney
13. View north-west from the North Terrace at Windsor Castle
16. View south-west from the roof of Stoke Park House

Viewpoints with wireline photomontage only:

4. View north-east from the A4 Bath Road at its junction with Dover Road
9. View north-east from Dorney Common
10. View north from the Jubilee River cycle path near Eton Wick
11. View north-west from the A332 Eton Relief Road, north of Eton
12. View north from the River Thames at Boveney Lock

Viewpoints without photomontages

14. View north-west from Upton Court Park
15. View south-west from Farnham Park Golf Course

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: FINAL

Client: SSE

Project Title: SLOUGH MULTIFUEL CHP FACILITY

Drawing Title: REPRESENTATIVE VIEWPOINT LOCATIONS

Drawn	Checked	Approved	Date
TR	EH	NT	01.05.2014

URS Internal Project Number	Scale @ A3
47066339	1:50000

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Drawing Number: Figure 14-5

Rev

Representative Viewpoint 1, Hamilton Road - Existing View

Representative Viewpoint 1, Hamilton Road - Wireline Proposed View

Representative Viewpoint 1 Hamilton Road

X,Y,Z Location: 495284.432, 181133.965, 31.945
Date: 04/03/2014, 10:49
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title: Slough Multifuel CHP Facility	Drawing Title: Representative Viewpoint 1 Sheet 1 of 5
				Client: SSE	

Purpose of issue				
Designed	Drawn: JJH	Checked: TR	Approved: EH	Date: 01.05.14
URS Internal Project No. 47066339		Suitability		
Scale @ A3: NTS		Zone / Mileage		

Drawing Number: Figure 14-6a
Rev: 0

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Representative Viewpoint 1, Hamilton Road - Existing View

Representative Viewpoint 1
Hamilton Road

X,Y,Z Location: 495284.432, 181133.965, 31.945
Date: 04/03/2014, 10:49
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 1 Sheet 2 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: **Figure 14-6b**

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Representative Viewpoint 1, Hamilton Road - Wireline Proposed View

Representative Viewpoint 1 Hamilton Road

X,Y,Z Location: 495284.432, 181133.965, 31.945
Date: 04/03/2014, 10:49
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Project Title	Slough Multifuel CHP Facility	Drawing Title	Visually Verifiable Photomontage Representative Viewpoint 1 Sheet 3 of 5	Purpose of issue				
Client	SSE			Designed	Drawn JJH	Checked TR	Approved EH	Date 01.05.14
Revision Details	By / Check	Date	Suffix	URS Internal Project No. 47066339	Suitability			
				Scale @ A3 NTS	Zone / Mileage			

Drawing Number: Figure 14-6c
Rev: 0

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Representative Viewpoint 1, Hamilton Road - Proposed View

Representative Viewpoint 1
Hamilton Road

X,Y,Z Location: 495284.432, 181133.965, 31.945
Date: 04/03/2014, 10:49
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 1 Sheet 4 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: **Figure 14-6d**

Rev: **0**

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Representative Viewpoint 1, Hamilton Road - Proposed View & Cumulative Development

Representative Viewpoint 1
Hamilton Road

X,Y,Z Location: 495284.432, 181133.965, 31.945
Date: 04/03/2014, 10:49
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 1 Sheet 5 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-6e**
Rev: **0**

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Representative Viewpoint 2, Bodmin Avenue - Existing View

Representative Viewpoint 2, Bodmin Avenue - Wireline Proposed View

Representative Viewpoint 2 Bodmin Avenue

X,Y,Z Location: 495393.614, 181773.483, 32.598
Date: 04/03/2014, 11:01
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title: Slough Multifuel CHP Facility	Drawing Title: Representative Viewpoint 2 Sheet 1 of 5
				Client: SSE	

Purpose of issue				
Designed	Drawn: JJH	Checked: TR	Approved: EH	Date: 01.05.14
URS Internal Project No.: 47066339		Suitability		
Scale @ A3: NTS		Zone / Mileage		

Drawing Number: Figure 14-7a | Rev: 0

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Representative Viewpoint 2, Bodmin Avenue - Existing View

Representative Viewpoint 2
Bodmin Avenue

X,Y,Z Location: 495393.614, 181773.483, 32.598
Date: 04/03/2014, 11:01
Camera model: Canon EOS 5D
Focal length: 20mm
Tripod height: 1.6m
Viewing distance: 168mm
Viewing distance @ A1: 336mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 2 Sheet 2 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-7b**
Rev: **0**

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Representative Viewpoint 2, Bodmin Avenue - Wireline Proposed View

Representative Viewpoint 2
Bodmin Avenue

X,Y,Z Location: 495393.614, 181773.483, 32.598
Date: 04/03/2014, 11:01
Camera model: Canon EOS 5D
Focal length: 20mm
Tripod height: 1.6m
Viewing distance: 168mm
Viewing distance @ A1: 336mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title: Slough Multifuel CHP Facility	Drawing Title: Visually Verifiable Photomontage Representative Viewpoint 2 Sheet 3 of 5
				Client: SSE	

Purpose of issue				
Designed	Drawn: JJH	Checked: TR	Approved: EH	Date: 01.05.14
URS Internal Project No.: 47066339		Suitability		
Scale @ A3: NTS		Zone / Mileage		

Drawing Number: Figure 14-7c | Rev: 0

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Representative Viewpoint 2
Bodmin Avenue

X,Y,Z Location: 495393.614, 181773.483, 32.598
Date: 04/03/2014, 11:01
Camera model: Canon EOS 5D
Focal length: 20mm
Tripod height: 1.6m
Viewing distance: 168mm
Viewing distance @ A1: 336mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 2, Bodmin Avenue - Proposed View

Revision Details	By / Check	Date	Suffix

Project Title	Slough Multifuel CHP Facility
Client	SSE
Drawing Title	Visually Verifiable Photomontage Representative Viewpoint 2 Sheet 4 of 5
Purpose of issue	
Designed	
Drawn	JJH
Checked	TR
Approved	EH
Date	01.05.14
URS Internal Project No.	47066339
Suitability	
Scale @ A3	NTS
Zone / Mileage	
Drawing Number	Figure 14-7d
Rev	0

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Representative Viewpoint 2, Bodmin Avenue - Proposed View & Cumulative Development

Representative Viewpoint 2
Bodmin Avenue

X,Y,Z Location: 495393.614, 181773.483, 32.598
Date: 04/03/2014, 11:01
Camera model: Canon EOS 5D
Focal length: 20mm
Tripod height: 1.6m
Viewing distance: 168mm
Viewing distance @ A1: 336mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: Slough Multifuel CHP Facility

Client: SSE

Drawing Title: Visually Verifiable Photomontage Representative Viewpoint 2 Sheet 5 of 5

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: Figure 14-7e

Rev: 0

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Representative Viewpoint 3, Kennedy Park - Existing View

Representative Viewpoint 3, Kennedy Park - Wireline Proposed View

Representative Viewpoint 3
Kennedy Park

X,Y,Z Location: 495198.001, 182106.759, 46.003
Date: 05/03/2014, 12:30
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Representative Viewpoint 3 Sheet 1 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: **Figure 14-8a**

Rev: **0**

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Representative Viewpoint 3, Kennedy Park - Existing View

Representative Viewpoint 3
Kennedy Park

X,Y,Z Location: 495198.001, 182106.759, 46.003
Date: 05/03/2014, 12:30
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue				
				Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 3 Sheet 2 of 5	Designed	Drawn JJH	Checked TR	Approved EH	Date 01.05.14
				Client: SSE		URS Internal Project No. 47066339		Suitability		
						Scale @ A3 NTS		Zone / Mileage		

Drawing Number: Figure 14-8b
Rev: 0

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Representative Viewpoint 3, Kennedy Park - Wireline Proposed View

Representative Viewpoint 3
Kennedy Park

X,Y,Z Location: 495198.001, 182106.759, 46.003
Date: 05/03/2014, 12:30
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 3 Sheet 3 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: **Figure 14-8c**

Rev: **0**

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Representative Viewpoint 3 Kennedy Park

X,Y,Z Location: 495198.001, 182106.759, 46.003
Date: 05/03/2014, 12:30
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 3, Kennedy Park - Proposed View

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 3 Sheet 4 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-8d**
Rev: **0**

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Representative Viewpoint 3
Kennedy Park

X,Y,Z Location: 495198.001, 182106.759, 46.003
Date: 05/03/2014, 12:30
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 3, Kennedy Park - Proposed View & Cumulative Development

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 3 Sheet 5 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: **Figure 14-8e**

Rev: **0**

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Representative Viewpoint 4
North East from Bath Road

X,Y,Z Location: 494872.000, 181012.000, 29.500
Date: 04/03/2014, 10:42
Tripod height: 1.6m

Representative Viewpoint 4, North East from Bath Road - Existing View

Representative Viewpoint 4, North East from Bath Road - Wireline Proposed View

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: Slough Multifuel CHP Facility

Client: SSE

Drawing Title: Representative Viewpoint 4 Sheet 1 of 3

Purpose of issue				
Designed	Drawn JJH	Checked TR	Approved EH	Date 01.05.14
URS Internal Project No. 47066339		Suitability		
Scale @ A3 NTS		Zone / Mileage		

Drawing Number: Figure 14-9a | Rev: 0

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Representative Viewpoint 4, North East from Bath Road - Existing View

Representative Viewpoint 4 North East from Bath Road

X,Y,Z Location: 494872.000, 181012.000, 29.500
Date: 04/03/2014, 10:42
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Purpose of issue

Project Title
Slough Multifuel CHP Facility

Client
SSE

Drawing Title
Visually Verifiable Photomontage Representative Viewpoint 4 Sheet 2 of 3

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339 | Suitability
Scale @ A3 NTS | Zone / Mileage

Drawing Number **Figure 14-9b** | Rev **0**

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Representative Viewpoint 4, North East from Bath Road - Wireline Proposed View

Representative Viewpoint 4
North East from Bath Road

X,Y,Z Location: 494872.000, 181012.000, 29.500
Date: 04/03/2014, 10:42
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Purpose of issue

Project Title
Slough Multifuel CHP Facility

Client
SSE

Drawing Title
Visually Verifiable Photomontage Representative Viewpoint 4 Sheet 3 of 3

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339 | Suitability
Scale @ A3 NTS | Zone / Mileage

Drawing Number **Figure 14-9c** | Rev **0**

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Representative Viewpoint 5, East from Bath Road - Existing View

Representative Viewpoint 5, East from Bath Road - Wireline Proposed View

Representative Viewpoint 5
East from Bath Road

X,Y,Z Location: 494250.184, 180973.705, 26.683
Date: 04/03/2014, 10:35
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title	Slough Multifuel CHP Facility
Client	SSE
Drawing Title	Representative Viewpoint 5 Sheet 1 of 5
Purpose of issue	
Designed	
Drawn	JJH
Checked	TR
Approved	EH
Date	01.05.14
URS Internal Project No.	47066339
Suitability	
Scale @ A3	NTS
Zone / Mileage	
Drawing Number	Figure 14-10a
Rev	0

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Representative Viewpoint 5
East from Bath Road

X,Y,Z Location: 494250.184, 180973.705, 26.683
Date: 04/03/2014, 10:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 5, East from Bath Road - Existing View

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue				
				Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 5 Sheet 2 of 5	Designed	Drawn: JJH	Checked: TR	Approved: EH	Date: 01.05.14
				Client: SSE		URS Internal Project No.: 47066339		Suitability		
						Scale @ A3: NTS		Zone / Mileage		

Drawing Number: Figure 14-10b
Rev: 0

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Representative Viewpoint 5
East from Bath Road

X,Y,Z Location: 494250.184, 180973.705, 26.683
Date: 04/03/2014, 10:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 5, East from Bath Road - Wireline Proposed View

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue
				Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 5 Sheet 3 of 5	
				Client: SSE		

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339
Suitability
Scale @ A3: NTS
Zone / Mileage

Drawing Number: Figure 14-10c
Rev: 0

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Representative Viewpoint 5
East from Bath Road

X,Y,Z Location: 494250.184, 180973.705, 26.683
Date: 04/03/2014, 10:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 5, East from Bath Road - Proposed View

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue
				Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 5 Sheet 4 of 5	
				Client: SSE		

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339
Suitability
Scale @ A3: NTS
Zone / Mileage

Drawing Number: Figure 14-10d
Rev: 0

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Representative Viewpoint 5
East from Bath Road

X,Y,Z Location: 494250.184, 180973.705, 26.683
Date: 04/03/2014, 10:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 5, East from Bath Road - Proposed View & Cumulative Development

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue				
				Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 5 Sheet 5 of 5	Designed	Drawn JJH	Checked TR	Approved EH	Date 01.05.14
				Client: SSE		URS Internal Project No. 47066339		Suitability		
						Scale @ A3: NTS		Zone / Mileage		

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Drawing Number: **Figure 14-10e** | Rev: **0**

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Representative Viewpoint 6, Long Readings Lane - Existing View

Representative Viewpoint 6, Long Readings Lane - Wireline Proposed View

Representative Viewpoint 6
Long Readings Lane

X,Y,Z Location: 495595.717, 182708.276, 47.705
Date: 04/03/2014, 11:35
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title: Slough Multifuel CHP Facility	Drawing Title: Representative Viewpoint 6 Sheet 1 of 5
				Client: SSE	

Purpose of issue				
Designed	Drawn JJH	Checked TR	Approved EH	Date 01.05.14
URS Internal Project No. 47066339		Suitability		
Scale @ A3 NTS		Zone / Mileage		

Drawing Number: **Figure 14-11a** | Rev: **0**

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Representative Viewpoint 6, Long Readings Lane - Existing View

Representative Viewpoint 6
Long Readings Lane

X,Y,Z Location: 495595.717, 182708.276, 47.705
Date: 04/03/2014, 11:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 6 Sheet 2 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339
Suitability
Scale @ A3: NTS
Zone / Mileage

Drawing Number: **Figure 14-11b**
Rev: **0**

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Representative Viewpoint 6, Long Readings Lane - Wireline Proposed View

Representative Viewpoint 6
Long Readings Lane

X,Y,Z Location: 495595.717, 182708.276, 47.705
Date: 04/03/2014, 11:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title
Slough Multifuel CHP Facility

Client
SSE

Drawing Title
Visually Verifiable Photomontage Representative Viewpoint 6 Sheet 3 of 5

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3 NTS

Zone / Mileage

Drawing Number **Figure 14-11c**

Rev **0**

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Representative Viewpoint 6, Long Readings Lane - Proposed View

Representative Viewpoint 6
Long Readings Lane

X,Y,Z Location: 495595.717, 182708.276, 47.705
Date: 04/03/2014, 11:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue
				Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 6 Sheet 4 of 5	
				Client: SSE		

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	

Scale @ A3	Zone / Mileage
NTS	

Drawing Number	Rev
Figure 14-11d	0

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Representative Viewpoint 6, Long Readings Lane - Proposed View & Cumulative Development

Representative Viewpoint 6
Long Readings Lane

X,Y,Z Location: 495595.717, 182708.276, 47.705
Date: 04/03/2014, 11:35
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title
Slough Multifuel CHP Facility

Client
SSE

Drawing Title
Visually Verifiable Photomontage Representative Viewpoint 6 Sheet 5 of 5

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-11e**
Rev: **0**

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Representative Viewpoint 7, Lake End Road Bridge - Existing View

Representative Viewpoint 7, Lake End Road Bridge - Wireline Proposed View

Representative Viewpoint 7
Lake End Road Bridge

X,Y,Z Location: 492872.190, 180006.470, 30.350
Date: 04/03/2014, 12:04
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Representative Viewpoint 7 Sheet 1 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: **Figure 14-12a**

Rev: **0**

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Representative Viewpoint 7
Lake End Road Bridge

X,Y,Z Location: 492872.190, 180006.470, 30.350
Date: 04/03/2014, 12:04
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 7, Lake End Road Bridge - Existing View

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 7 Sheet 2 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	
Scale @ A3	**Zone / Mileage**
NTS	

Drawing Number	Rev
Figure 14-12b	0

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Representative Viewpoint 7, Lake End Road Bridge - Wireline Proposed View

Representative Viewpoint 7
Lake End Road Bridge

X,Y,Z Location: 492872.190, 180006.470, 30.350
Date: 04/03/2014, 12:04
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 7 Sheet 3 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3 NTS

Zone / Mileage

Drawing Number **Figure 14-12c** Rev **0**

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Representative Viewpoint 7, Lake End Road Bridge - Proposed View

Representative Viewpoint 7
Lake End Road Bridge

X,Y,Z Location: 492872.190, 180006.470, 30.350
Date: 04/03/2014, 12:04
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue	
				Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 7 Sheet 4 of 5	Designed	Drawn JJH
				Client: SSE		Checked TR	Approved EH
						Date 01.05.14	
						URS Internal Project No. 47066339	Suitability
						Scale @ A3 NTS	Zone / Mileage

Drawing Number: Figure 14-12d
Rev: 0

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Representative Viewpoint 7, Lake End Road Bridge - Proposed View & Cumulative Development

Representative Viewpoint 7
Lake End Road Bridge

X,Y,Z Location: 492872.190, 180006.470, 30.350
Date: 04/03/2014, 12:04
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 7 Sheet 5 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: **Figure 14-12e**

Rev: **0**

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Representative Viewpoint 8, Jubilee River Bridleway - Existing View

Representative Viewpoint 8, Jubilee River Bridleway - Wireline Proposed View

Representative Viewpoint 8
Jubilee River Bridleway

X,Y,Z Location: 493627.377, 179098.316, 31.374
Date: 04/03/2014, 12:23
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Representative Viewpoint 8 Sheet 1 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-13a**
Rev: **0**

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Representative Viewpoint 8 Jubilee River Bridleway

X,Y,Z Location: 493627.377, 179098.316, 31.374
Date: 04/03/2014, 12:23
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 8, Jubilee River Bridleway - Existing View

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 8 Sheet 2 of 5**

Purpose of issue				
Designed	Drawn: JJH	Checked: TR	Approved: EH	Date: 01.05.14
URS Internal Project No.: 47066339		Suitability		
Scale @ A3: NTS		Zone / Mileage		

Drawing Number: **Figure 14-13b** Rev: **0**

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Representative Viewpoint 8
Jubilee River Bridleway

X,Y,Z Location: 493627.377, 179098.316, 31.374
Date: 04/03/2014, 12:23
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 8, Jubilee River Bridleway - Wireline Proposed View

Revision Details	By / Check	Date	Suffix

Project Title
Slough Multifuel CHP Facility

Client
SSE

Drawing Title
Visually Verifiable Photomontage Representative Viewpoint 8 Sheet 3 of 5

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3 NTS

Zone / Mileage

Drawing Number **Figure 14-13c**

Rev **0**

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Representative Viewpoint 8, Jubilee River Bridleway - Proposed View

Representative Viewpoint 8
Jubilee River Bridleway

X,Y,Z Location: 493627.377, 179098.316, 31.374
Date: 04/03/2014, 12:23
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 8 Sheet 4 of 5**

Purpose of issue				
Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-13d**
Rev: **0**

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Representative Viewpoint 8
Jubilee River Bridleway

X,Y,Z Location: 493627.377, 179098.316, 31.374
Date: 04/03/2014, 12:23
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 8, Jubilee River Bridleway - Proposed View & Cumulative Development

Revision Details	By / Check	Date	Suffix

Project Title	Slough Multifuel CHP Facility
Client	SSE
Drawing Title	Visually Verifiable Photomontage Representative Viewpoint 8 Sheet 5 of 5
Purpose of issue	
Designed	
Drawn	JJH
Checked	TR
Approved	EH
Date	01.05.14
URS Internal Project No.	47066339
Suitability	
Scale @ A3	NTS
Zone / Mileage	
Drawing Number	Figure 14-13e
Rev	0

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Representative Viewpoint 9, Dorney Common - Existing View

Representative Viewpoint 9, Dorney Common - Wireline Proposed View

Representative Viewpoint 9
Dorney Common

X,Y,Z Location: 494148.466, 178673.632, 20.819
Date: 05/03/2014, 11:48
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: Slough Multifuel CHP Facility

Client: SSE

Drawing Title: Representative Viewpoint 9 Sheet 1 of 3

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	
Scale @ A3	**Zone / Mileage**
NTS	

Drawing Number	Rev
Figure 14-14a	0

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Representative Viewpoint 9, Dorney Common - Existing View

Representative Viewpoint 9
Dorney Common

X,Y,Z Location: 494148.466, 178673.632, 20.819
Date: 05/03/2014, 11:48
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 9 Sheet 2 of 3**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	

Scale @ A3	Zone / Mileage
NTS	

Drawing Number	Rev
Figure 14-14b	0

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Representative Viewpoint 9
Dorney Common

X,Y,Z Location: 494148.466, 178673.632, 20.819
Date: 05/03/2014, 11:48
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 9, Dorney Common - Wireline Proposed View

Revision Details	By / Check	Date	Suffix

Project Title: Slough Multifuel CHP Facility

Client: SSE

Drawing Title: Visually Verifiable Photomontage Representative Viewpoint 9 Sheet 3 of 3

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: Figure 14-14c
Rev: 0

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Representative Viewpoint 10, Jubilee River cycle path - Existing View

Representative Viewpoint 10, Jubilee River cycle path - Wireline Proposed View

Representative Viewpoint 10
Jubilee River cycle path

X,Y,Z Location: 494975.346, 179104.731, 20.198
Date: 05/03/2014, 11:28
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Representative Viewpoint 10 Sheet 1 of 3**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-15a**
Rev: **0**

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Representative Viewpoint 10, Jubilee River cycle path - Existing View

Representative Viewpoint 10
Jubilee River cycle path

X,Y,Z Location: 494975.346, 179104.731, 20.198
Date: 05/03/2014, 11:28
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 10 Sheet 2 of 3**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	

Scale @ A3	Zone / Mileage
NTS	

Drawing Number	Rev
Figure 14-15b	0

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Representative Viewpoint 10, Jubilee River cycle path - Wireline Proposed View

Representative Viewpoint 10
Jubilee River cycle path

X,Y,Z Location: 494975.346, 179104.731, 20.198
Date: 05/03/2014, 11:28
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 10 Sheet 3 of 3**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	
Scale @ A3	**Zone / Mileage**
NTS	

Drawing Number: **Figure 14-15c** Rev: **0**

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Representative Viewpoint 11, A332 Eton Relief Rd. - Existing View

Representative Viewpoint 11, A332 Eton Relief Rd. - Wireline Proposed View

Representative Viewpoint 11
A332 Eton Relief Rd.

X,Y,Z Location: 496561.536, 178813.392, 28.413
Date: 04/03/2014, 13:46
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Representative Viewpoint 11 Sheet 1 of 3**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339

Suitability:

Scale @ A3: NTS

Zone / Mileage:

Drawing Number: **Figure 14-16a**

Rev: **0**

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Representative Viewpoint 11, A332 Eton Relief Rd. - Existing View

Representative Viewpoint 11
A332 Eton Relief Rd.

X,Y,Z Location: 496561.536, 178813.392, 28.413
Date: 04/03/2014, 13:46
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 11 Sheet 2 of 3**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339

Suitability:

Scale @ A3: NTS

Zone / Mileage:

Drawing Number: **Figure 14-16b**

Rev: **0**

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Representative Viewpoint 11, A332 Eton Relief Rd. - Wireline Proposed View

Representative Viewpoint 11
A332 Eton Relief Rd.

X,Y,Z Location: 496561.536, 178813.392, 28.413
Date: 04/03/2014, 13:46
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: Slough Multifuel CHP Facility

Client: SSE

Drawing Title: Visually Verifiable Photomontage Representative Viewpoint 11 Sheet 3 of 3

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339

Suitability:

Scale @ A3: NTS

Zone / Mileage:

Drawing Number: **Figure 14-16c**

Rev: **0**

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Representative Viewpoint 12, Boveney Lock - Existing View

Representative Viewpoint 12, Boveney Lock - Wireline Proposed View

Representative Viewpoint 12 Boveney Lock

X,Y,Z Location: 494148.466, 178673.632, 20.819
Date: 05/03/2014, 10:54
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Project Title	Drawing Title	Purpose of issue
Slough Multifuel CHP Facility	Representative Viewpoint 12 Sheet 1 of 3	
Client: SSE		

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	

Scale @ A3	Zone / Mileage
NTS	

Revision Details	By / Check	Date	Suffix

Drawing Number	Rev
Figure 14-17a	0

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Representative Viewpoint 12, Boveney Lock - Existing View

Representative Viewpoint 12
Boveney Lock

X,Y,Z Location: 494148.466, 178673.632, 20.819
Date: 05/03/2014, 10:54
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title
Slough Multifuel CHP Facility

Client
SSE

Drawing Title
Visually Verifiable Photomontage Representative Viewpoint 12 Sheet 2 of 3

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3 NTS

Zone / Mileage

Drawing Number **Figure 14-17b** Rev **0**

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Representative Viewpoint 12, Boveney Lock - Wireline Proposed View

Representative Viewpoint 12
Boveney Lock

X,Y,Z Location: 494148.466, 178673.632, 20.819
Date: 05/03/2014, 10:54
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title	Drawing Title	Purpose of issue
Slough Multifuel CHP Facility	Visually Verifiable Photomontage Representative Viewpoint 12 Sheet 3 of 3	
Client: SSE		

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	
Scale @ A3: NTS	Zone / Mileage

Drawing Number	Rev
Figure 14-17c	0

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Representative Viewpoint 13, Windsor Castle - Existing View

Representative Viewpoint 13, Windsor Castle - Wireline Proposed View

Representative Viewpoint 13
Windsor Castle

X,Y,Z Location: 497049.526, 177120.636, 49.535
Date: 20/03/2014, 13:13
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Representative Viewpoint 13 Sheet 1 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339

Suitability:

Scale @ A3: NTS

Zone / Mileage:

Drawing Number: **Figure 14-18a**

Rev: **0**

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Representative Viewpoint 13, Windsor Castle - Existing View

Representative Viewpoint 13
Windsor Castle

X,Y,Z Location: 497049.526, 177120.636, 49.535
Date: 20/03/2014, 13:13
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 13 Sheet 2 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-18b**
Rev: **0**

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Representative Viewpoint 13, Windsor Castle - Wireline Proposed View

Representative Viewpoint 13
Windsor Castle

X,Y,Z Location: 497049.526, 177120.636, 49.535
Date: 20/03/2014, 13:13
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 13 Sheet 3 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339

Suitability

Scale @ A3 NTS

Zone / Mileage

Drawing Number: **Figure 14-18c**

Rev: **0**

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Representative Viewpoint 13, Windsor Castle - Proposed View

Representative Viewpoint 13 Windsor Castle

X,Y,Z Location: 497049.526, 177120.636, 49.535
Date: 20/03/2014, 13:13
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 13 Sheet 4 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339

Suitability:

Scale @ A3: NTS

Zone / Mileage:

Drawing Number: **Figure 14-18d**

Rev: **0**

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Representative Viewpoint 13
Windsor Castle

X,Y,Z Location: 497049.526, 177120.636, 49.535
Date: 20/03/2014, 13:13
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 13, Windsor Castle - Proposed View & Cumulative Development

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 13 Sheet 5 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339
Suitability:
Scale @ A3: NTS
Zone / Mileage:

Drawing Number: **Figure 14-18e**
Rev: **0**

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Representative Viewpoint 14
Upton Court Park

X,Y,Z Location: 499073, 178549, 21
Date: 20/03/2014, 13:51
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 14, Upton Court Park - Existing View

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 14 Sheet 1 of 1**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
47066339	
Scale @ A3	**Zone / Mileage**
NTS	

Drawing Number	Rev
Figure 14-19	0

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Representative Viewpoint 15, Farnham Park Golf Club - Existing View

Representative Viewpoint 15
Farnham Park Golf Club

X,Y,Z Location: 496747.500, 183489.519, 45.084
Date: 05/03/2014, 14:24
Camera model: NIKON D7000
Focal length: 35.5mm
Tripod height: 1.6m
Viewing distance: 481mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 15 Sheet 1 of 1**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
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URS Internal Project No. 47066339

Suitability

Scale @ A3 NTS

Zone / Mileage

Drawing Number **Figure 14-20**

Rev **0**

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Representative Viewpoint 16, Stoke Park House - Existing View

Representative Viewpoint 16, Stoke Park House - Wireline Proposed View

Representative Viewpoint 16
Stoke Park House

X,Y,Z Location: 497004.258, 182647.765, 64.811
Date: 20/03/2014, 10:59
Tripod height: 1.6m

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix	Project Title	Drawing Title	Purpose of issue
				Slough Multifuel CHP Facility	Representative Viewpoint 16 Sheet 1 of 5	
				Client: SSE		

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
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Scale @ A3	**Zone / Mileage**
NTS	

Drawing Number	Rev
Figure 14-21a	0

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Representative Viewpoint 16
Stoke Park House

X,Y,Z Location: 497004.258, 182647.765, 64.811
Date: 20/03/2014, 10:59
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 16, Stoke Park House - Existing View

Revision Details	By / Check	Date	Suffix	Project Title: Slough Multifuel CHP Facility	Drawing Title: Visually Verifiable Photomontage Representative Viewpoint 16 Sheet 2 of 5
				Client: SSE	

Purpose of issue				
Designed	Drawn: JJH	Checked: TR	Approved: EH	Date: 01.05.14
URS Internal Project No.: 47066339		Suitability		
Scale @ A3: NTS		Zone / Mileage		

Drawing Number	Rev
Figure 14-21b	0

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Representative Viewpoint 16, Stoke Park House - Wireline Proposed View

Representative Viewpoint 16
Stoke Park House

X,Y,Z Location: 497004.258, 182647.765, 64.811
Date: 20/03/2014, 10:59
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title	Slough Multifuel CHP Facility
Client	SSE
Drawing Title	Visually Verifiable Photomontage Representative Viewpoint 16 Sheet 3 of 5
Purpose of issue	

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.	Suitability
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NTS	

Drawing Number	Rev
Figure 14-21c	0

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Representative Viewpoint 16
Stoke Park House

X,Y,Z Location: 497004.258, 182647.765, 64.811
Date: 20/03/2014, 10:59
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Representative Viewpoint 16, Stoke Park House - Proposed View

Revision Details	By / Check	Date	Suffix

Project Title: **Slough Multifuel CHP Facility**

Client: **SSE**

Drawing Title: **Visually Verifiable Photomontage Representative Viewpoint 16 Sheet 4 of 5**

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No. 47066339	Suitability
Scale @ A3 NTS	Zone / Mileage

Drawing Number: **Figure 14-21d** Rev: **0**

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Representative Viewpoint 16, Stoke Park House - Proposed View & Cumulative Development

Representative Viewpoint 16
Stoke Park House

X,Y,Z Location: 497004.258, 182647.765, 64.811
Date: 20/03/2014, 10:59
Camera model: Canon EOS 5D
Focal length: 50mm
Tripod height: 1.6m
Viewing distance: 424mm

Location Plan
(Site in red, not to scale)

Revision Details	By / Check	Date	Suffix

Project Title: Slough Multifuel CHP Facility

Client: SSE

Drawing Title: Visually Verifiable Photomontage Representative Viewpoint 16 Sheet 5 of 5

Purpose of issue

Designed	Drawn	Checked	Approved	Date
	JJH	TR	EH	01.05.14

URS Internal Project No.: 47066339

Suitability

Scale @ A3: NTS

Zone / Mileage

Drawing Number: Figure 14-21e

Rev: 0

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15. TV AND RADIO INTERFERENCE

15.1. Introduction

15.1.1. This chapter of the ES presents the findings of an assessment of the potential effects on digital terrestrial and satellite television reception (hereafter referred as TV reception) associated with the Proposed Development. Consideration has also been given to the potential effects on radio reception, mobile telephone signals, wireless networks and emergency service communications.

15.1.2. As well as presenting the planning policy context for the assessment, the chapter also presents the methodologies used and the assumptions made in the assessment of potential effects. Areas of potential effect are quantified and mitigation measures are proposed where appropriate.

15.2. Legislation and Planning Policy Context

15.2.1. The NPPF (2012) (Ref. 15-1) states in paragraph 44 that:

- *"Local planning authorities should ensure that: …they have considered the possibility of the construction of new buildings or other structures interfering with broadcast and telecommunications services".*

15.2.2. The SBC Core Strategy Development Plan Document (2008) (Ref. 15-2) has no policies that relate specifically to broadcasting interference due to new structures.

15.2.3. Slough Borough Council Local Plan Saved Policies and Policies (2007) (Ref. 15-3) has one saved policy that relates specifically to broadcasting interference due to new structures. Chapter 5 Policy EN6 (Interference with Telecommunication Signals) states:

- *"Where it is anticipated that disruption to television services and other telecommunications services will be a problem either because of: a) the proposed development's height or mass… planning permission will only be granted subject to a condition requiring the developer to take appropriate measures to restore any loss of quality of reception".*

15.3. Assessment Methodology and Significance Criteria

15.3.1. The potential for the Proposed Development to cause interference to TV reception has been assessed by a combination of desk-based calculations and an on-site inspection of domestic aerial installations in the surrounding area (terrestrial and satellite). The assessment has been carried out based on the:

- Location of the Proposed Development, with respect to key radio, TV and satellite transmitters;
- Details regarding the design of the Proposed Development, in particular siting and massing; and
- Principles of radiowave propagation.

15.3.2. The introduction of new structures of significant height and bulk into a residential environment can cause disruption to both terrestrial and satellite TV reception. Principles of radiowave propagation from transmitting to receiving antennae (both terrestrial and satellite) are used to study the likely significant effect of the Proposed Development on TV reception in the area surrounding the Site. This is because these signals use frequencies that travel more or less in straight lines and hence can be blocked by the introduction of new buildings.

15.3.3. Terrestrial TV signals are transmitted in digital format (e.g. Freeview). The only relevant interference mechanism affecting terrestrial TV signals is attenuation due to buildings physically blocking (and absorbing) the signals. The same mechanism also affects TV signals received by satellite, and if they are too weak, then the pictures very quickly deteriorate into random 'blocks' and then disappear altogether.

15.3.4. The assessment is based on first applying geometrical optics to broadly identify the areas around the Proposed Development that are likely to be affected. The principles of radiowave propagation are then used to narrow down the potential areas that will be affected.

15.3.5. In order to define those areas where TV reception is likely to be at risk, the proposed changes in the physical form or mass of the Proposed Development relative to existing buildings have been placed on a 1:10,000 scale map and, by calculation, illuminated by the TV transmitters that serve the area. The shadows subsequently cast have been marked on a map (Figure 15-1). Calculations have been carried out using International Radio Consultative Committee/International Telecommunication Union (CCIR/ITU) criteria, specifically the Recommendation 655 parameters (Ref. 15-4). Predicted TV signal strengths for the area were then calculated.

15.3.6. Within these theoretical areas of potential interference to TV reception, a physical survey of domestic TV aerials was undertaken on the 12 March 2013. The type and positions of the aerials gave an indication of the strength and quality of the available signals. The presence of cable and satellite services was also noted.

15.3.7. The highest element of the Proposed Development considered for the purposes of the assessment is the boiler house, which is 48m above ground level and 78m AOD.

15.3.8. The existing or proposed stacks will not have an effect for this assessment and are not considered further. This is because the stacks are slender and TV signals will diffract around the edges before meeting up again a few metres away, therefore creating no shadow.

Significance Criteria

15.3.9. The sensitivity of the receptors will vary with their use of TV services but experience shows that many high-use receptors will be highly sensitive. To determine the significance of the potential and residual effects to TV reception unless or until mitigation is used, the following criteria have been applied (the assumption being that the Proposed Development is completed or nearly completed):

- **Adverse** – The Proposed Development is likely to cause a noticeable deterioration in reception that will involve random 'blocks' appearing on the screen or else total loss of service .
- **Negligible** – The Proposed Development is likely to result in no noticeable effect on reception.
- **Beneficial** – The Proposed Development is likely to result in a noticeable improvement in reception.

15.3.10. Where adverse or beneficial effects have been identified, the magnitude is described as:

- **Minor** – The Proposed Development is likely to affect reception for up to 100 dwellings.
- **Moderate** – The Proposed Development is likely to affect reception for more than 100 but less than 500 dwellings.
- **Major** – The Proposed Development is likely to affect reception for 500 or more dwellings.

Assumptions

15.3.11. The assessment has taken a reasonable 'worst case' approach; the areas of reduced signal strength have been identified in addition to the number of dwellings within those areas. However, it cannot be predicted with absolute certainty as to whether or not the signal degradation will be subjectively 'annoying' to the viewers because only general assumptions can be made about their receiving systems. An above-average system may well have sufficient signal margin to be able to lose some of that signal without reception being subjectively affected, whereas other systems may not.

15.3.12. In order to calculate the possible detrimental effects to TV reception, it has been assumed that each dwelling has one main TV set, fed by an external roof-mounted aerial of the correct type and connected by a good quality down-lead. Only main TV sets have been considered in this assessment. Portable TV sets within the dwelling cannot be considered as it is not possible to make robust assumptions on their location within the dwelling, the signal attenuation due to the walls, the signal gain (if any) of the set-top aerial and the existing quality of the reception.

15.3.13. All mitigation measures described within this chapter are expected to provide TV reception of at least the same quality as that previously enjoyed by those affected households prior to the implementation of the Proposed Development (i.e. in the baseline scenario).

15.3.14. There is considered to be no significant risk to radio reception (both analogue and digital) as they use signals at lower frequencies that can bend to a greater extent around obstructions. Combined with an ability to make constructive use of reflected signals, radios are able to operate successfully in urban environments. Therefore, radio reception is not considered further in this assessment.

15.3.15. The potential effect on the reception of mobile telephone signals, wireless networks and emergency service communications would be compromised in situations where their transmitting aerials are sited on top of nearby buildings at heights less than those of the Proposed Development. No such aerials have been found, either from a search of the Ofcom database or during the site visit, but the estate owner, SEGRO, has noted that they operate a security pager system throughout the industrial estate. Therefore the operating parameters of this system have been investigated. The only other services deemed to be at risk of degradation are digital terrestrial and satellite TV reception and it is these that are the subject of the remainder of this chapter.

15.4. Baseline Conditions

15.4.1. Digital terrestrial TV signals in the vicinity of the Proposed Development are provided by the Crystal Palace and Hannington transmitters, carrying the digital 'Freeview' service. The Crystal Palace transmitter is located approximately 39.7km southeast of the Site and the Hannington transmitter is 49.3km southwest of the Site. The survey of the housing in the predicted TV shadow areas identified that the land is flat and that the buildings are a mix of light industrial and 2-4 storey residential dwellings and blocks of flats.

15.4.2. General reception of digital terrestrial signals is considered to be poor due to existing tall buildings in the industrial estate, as well as tall trees. The site survey ascertained that satellite dishes are present on approximately 90% of dwellings within the predicted shadow areas and that cable TV (Virgin and BT) is available throughout. In keeping with a 'worst case' analysis, it has been assumed that all dwellings with external roof-mounted digital terrestrial TV aerials will be using these signals as their main source of viewing TV programmes. However, in practice they may alternatively be using cable or satellite signals instead and have simply not had their external aerials removed. As a result, the figures presented in this chapter of potential adversely affected dwellings could be higher than is the actual case.

15.5. Potential Effects and Mitigation Measures

Demolition and Construction

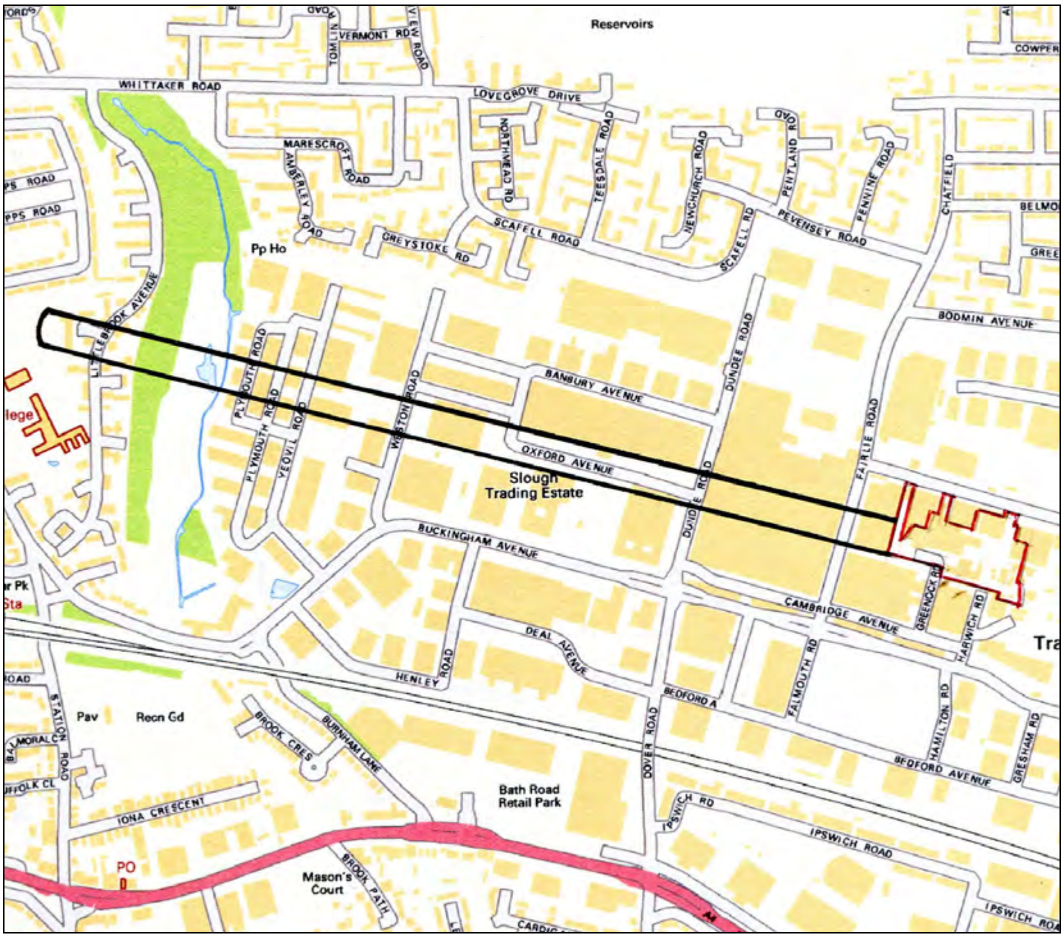
15.5.1. Interference caused by temporary structures, such as cranes and scaffolding, used during demolition and construction works is temporary and unlikely to affect TV and radio signals due to their slender nature and the ability of the signals to diffract around these structures. Any mitigation that may be applied would only work in the short-term because as soon as cranes or scaffolding change shape or position the interference would also change. Consequently, interference caused by temporary structures associated with the Proposed Development has not been assessed.

15.5.2. To avoid disruption to services carried by communication cables (copper and fibre) to neighbouring properties (such as accidental cutting of cables during demolition and construction phases), the Applicant will obtain information on any cable routes that run across the Site from the service providers prior to demolition or enabling works. This information can then be used by the Contractor carrying out these works to avoid any potential disruption.

Completed and Operational Development

15.5.3. Areas where TV reception has the potential to be adversely affected are in the 'shadow' cast by the Proposed Development, as illustrated in Figure 15-1. The redline area identifies the Site. The area enclosed by the black contour identifies where viewers of Crystal Palace digital terrestrial TV services are at risk of degraded reception.

Figure 15-1 Areas of Potential TV Reception Interference



Reproduced from OS Landplan Site-centred map 1:10000 scale. By permission of Ordnance Survey on behalf HMSO © Crown copyright. All rights reserved. Licence number 100042534.

Digital Terrestrial TV Signals

15.5.4. The predicted shadow from the Crystal Palace transmitter is predicted to lie west-north-west of the Proposed Development and extend for approximately 1.2km. Beyond this distance the loss in digital terrestrial TV signal is not considered to be significant. All dwellings within this predicted shadow area that are using terrestrial TV signals are using those from the Crystal Palace transmitter, so they are at risk of degraded reception.

15.5.5. The survey showed that there were no users of the Hannington service within the predicted Hannington shadow so there are no dwellings at risk of degraded reception. As a consequence the predicted shadow from the Hannington transmitter has not been shown on Figure 15-1.

15.5.6. The survey identified 22 dwellings, including one block of flats, within the predicted Crystal Palace shadow area. Cable television is available to all of them, and 19 have satellite dishes. A worst-case treatment, assuming that they all use terrestrial signals from the Crystal Palace transmitter as their primary source of TV, means that up to 22 dwellings will have their Crystal Palace TV signals adversely affected. This is therefore considered to be a **minor adverse** effect based on the significance criteria, prior to mitigation. A best-case analysis suggests that, as 19 are probably using satellite signals, only 3 dwellings will have their signals adversely affected. If these 3 are using cable services then no dwellings would be at risk (cable TV is not affected).

Satellite TV Signals

15.5.7. Most domestic satellite dishes are oriented to the southeast and the satellite shadow cast by the Proposed Development will lie to the northwest to a maximum effective distance of 80m. Any domestic satellite TV reception within this shadow will be adversely affected. However, there are no dwellings within this very small predicted domestic satellite shadow area with satellite dishes because the shadow falls exclusively within the industrial estate. The effect is therefore considered to be **negligible**.

Mitigation Measures

15.5.8. No specific mitigation was identified for incorporation into the design of the scheme because it is generally considered that there is relatively very little that can be done to the design of a building to lessen the effects of blocking transmission signals. It is the mass of the building that is significant. However, it has been assessed that to reduce the predicted terrestrial TV shadow sufficiently so that there would be no loss of reception to local viewers, the proposed 48m tall boiler house would have to be reduced by approximately 8m in height and the tipping hall bunker would have to be reduced in width to that of the boiler house, from 60m to 46m. This reduction in width would be required because a part of the shadow is also defined by TV signals diffracting around the sides of the Proposed Development. Due to the specific design parameters of the internal equipment required for the Proposed Development, a reduction in the massing of the buildings of this magnitude is not feasible.

15.5.9. Instead, for those dwellings with adversely affected terrestrial TV reception, mitigation would include upgrading the existing aerials by increasing their height and/or gain, using signals from the Hannington transmitter, or providing a non-subscription satellite service which is available from either the BBC and ITV ('Freesat') or 'Sky' for a one-off cost.

15.5.10. As noted in Paragraph 15.3.16, SEGRO operates a security pager system within the trading estate. In the event that elements of the Proposed Development are found to block parts of the service area of the security pager system the Applicant will provide a suitable location (on the roof of one of the buildings) for a repeater transmitter, if necessary. It is expected that this would fully mitigate any effects on this local service.

15.6. Residual Effects and Conclusions

15.6.1. It is predicted that there will be at worst, a **minor adverse** effect to the reception of Crystal Palace TV services as shown in Table 15-1. This reduces to **negligible** if the affected dwellings are using satellite or cable services, or following implementation of the mitigation measures.

Table 15-1 Summary of Residual Effects

Description	Geographic Scale	Potential Effect (pre-mitigation)	Mitigation	Residual Effect
Effect to terrestrial TV reception	Local, Regional	Minor Adverse	Upgrade, use Hanington signals or use satellite service	Negligible
Effect to satellite TV reception	Local, Regional	Negligible	None Required	Negligible
Effect to broadcast radio services, mobile telephone signals, wireless networks, emergency service communications and DLR signalling	Local, Regional	Negligible	None Required	Negligible

15.7. Cumulative Effects

15.7.1. Effects on terrestrial TV reception are generally of a cumulative and interactive nature. At reception sites, cumulative TV interference effects can be experienced which are caused by a large number of obstructions and interactions. The sources of these effects can be spread over a wide geographical area.

15.7.2. This section assesses the effect of the Proposed Development in combination with the likely effect to TV reception arising from other proposed schemes in the area. These schemes are described in more detail within *Chapter 2: EIA Methodology* of this ES.

15.7.3. Key schemes considered are those located within the predicted shadow areas as well as those to the east that might block the incoming TV signals to the Proposed Development. By applying the same assessment methodology used for the Proposed Development, four schemes have been investigated (as discussed in *Chapter 2: Assessment Methodology* of this ES). The two versions of the Leigh Road/Bath Road Central Core Planning Application (P/14515/000 and P14515/3) are located to the south and therefore do not have the potential to interact with the terrestrial TV signal. The third scheme is the application for Further Development within the SHP site which encompasses the land to the southeast and northwest of the Proposed Development. Although this area is in-line with the incoming terrestrial TV signals, the proposed structures/buildings will be shorter than the Proposed Development and so there will be no cumulative effect. The fourth scheme relates to the Britwell Regeneration Scheme (P/15513/000). This is located approximately 1km to the north of the Proposed Development and therefore does not have the potential to interact with the terrestrial TV signal.

15.7.4. The cumulative effect is therefore considered to be **negligible**.

15.8. References

Ref. 15-1 DCLG (2012) The National Policy Framework

Ref. 15-2 Slough Borough Council (2008) Slough Local Development Framework Core Strategy Development Plan Document

Ref. 15-3 Slough Borough Council (2010) Slough Local Plan (adopted March 2004) Saved Policies and Policies still in use at December 2010

Ref. 15-4 European Broadcasting Union (1988) Tech. 3254-E Planning Parameters and Methods for Terrestrial Television Broadcasting in the VHF/UHF Bands

16. SUSTAINABILITY AND CLIMATE CHANGE

16.1. Introduction

16.1.1. This chapter of the ES addresses the potential wider sustainability effects predicted to arise as a consequence of the Proposed Development. It aims to outline the measures that will be considered for implementation to improve the sustainability of design and management of the Proposed Development.

16.1.2. The chapter considers national, regional and local policy guidance which promotes sustainability principles, and addresses the effects (and where appropriate proposes mitigation measures) of the Proposed Development through consideration of the following key sustainability themes:

- Natural resource efficiency (land, materials, energy and water);
- Waste minimisation;
- Sustainability of the generation and sourcing of the proposed fuel stock;
- Transport;
- Climate change mitigation and adaptation; and,
- Biodiversity and Ecology.

16.1.3. It should be noted that many of the sustainability issues are also discussed within other specific chapters, due to overlap between subject areas, and relevant chapters are referenced where appropriate. This chapter is also supported by a WRATE (Waste and Resources Assessment Tool for the Environment) assessment and Climate Change assessment of the Proposed Development, contained within *Appendix J-1 and J-2*, *Volume II* of this ES respectively, which contain the detailed methodology and results summarised below.

16.2. Legislation and Planning Policy Context

National Legislation and Policy

Climate Change Act 2008

16.2.1. A landmark piece of environmental legislation, the Climate Change Act (Ref. 16-1) sets a legally binding target for the UK to reduce its greenhouse gas emissions from 1990 levels by at least 80% by 2050. This overall target is supported by a system of binding five-year 'carbon budgets' as well as an independent body, the Committee on Climate Change.

Planning our electric future: a White Paper for secure, affordable and low carbon electricity, 2011

16.2.2. This White Paper (Ref. 16-2) identifies a number of 'unprecedented' challenges to power generation in the UK including threatened security of supply as existing power stations closes, decarbonisation of electricity generation, likely rise in electricity demand, and expected rise in electricity prices. A strategy is put forward and includes the introduction of an Emissions Performance Standard (EPS) proposed to be set as an annual limit equivalent to 450 grams of carbon dioxide (CO_2) per kilowatt hour at baseload.

Overarching National Policy Statement (NPS) for Energy (EN-1) July 2011

16.2.3. NPS EN-1 (Ref. 16-3) emphasises the importance of a diverse mix of energy generating technologies, including renewables, nuclear and fossil fuels, to avoid over-dependence on a single fuel type and thereby ensure security of supply. It also recognises the increasingly prominent role waste can play in providing a diversified and decarbonised electricity generation capacity as a future source of fuel on a large scale. This supports Government policy on waste, i.e. to use it as a resource wherever possible.

16.2.4. NPS EN-3 (Ref. 16-4) emphasises that the recovery of energy from the combustion of waste, where in accordance with the waste hierarchy, will play an increasingly important role in meeting the UK's energy needs. It also recognises that the recovery of energy from the combustion of waste forms an important element of waste management strategies in the UK.

Government Review of Waste Policy in England, 2011

16.2.5. This Government review of waste policy (Ref. 16-5) contains actions and commitments which set a direction towards England becoming a zero waste economy. The review's principal commitments are centred on a sustainable approach to the use of materials and an improved waste service to households and businesses.

Planning for Sustainable Waste Management

16.2.6. The draft national waste planning policy '*Planning for Sustainable Waste Management'* (2013) (Ref. 16-6) is intended to replace the existing Planning Policy Statement 10 (Revised March 2011) (Ref. 16-7) and forms part of the national waste management plan for the UK, outlining the policies that should be taken into account by planning bodies and when reviewing individual planning applications.

Local Planning Policy

16.2.7. Since 2011 the six Berkshire unitary authorities have been responsible for minerals and waste planning policy in their own areas.

16.2.8. The main minerals and waste planning documents are the saved policies from the Joint Minerals and Waste Development Framework Core Strategy, the Replacement Minerals Local Plan and from the Waste Local Plan. These policies form part of the 'development plan' and are one of the main considerations in deciding planning applications.

16.2.9. The Joint Minerals and Waste Development Framework Core Strategy (2007) (Ref. 16-8) identifies that within Berkshire waste will need to be treated and disposed of through a range of measures including recovery of energy from waste.

16.2.10. Core Policy 8 (Sustainability and the Environment) of Slough Borough Council: Local Development Framework - Core Strategy 2006 – 2026 Development Plan Document (December 2008) (Ref. 16-9) requires all development to address the impact of climate change.

16.2.11. A more detailed discussion of planning policy is presented in *Chapter 3: Planning Policy Context* of this ES.

16.3. Assessment Methodology and Significance Criteria

16.3.1. There is no standard methodology for assessing the magnitude of sustainability effects and significance of effects of developments. Each project is evaluated according to its individual characteristics. The approach taken is to qualitatively consider the Proposed

Development against key sustainability themes and policy objectives relevant to the Proposed Development and outline the measures that will be taken to incorporate and improve sustainability within the design and management. This is considered to be appropriate for the likely types of effect that may result from the Proposed Development.

16.3.2. A Sustainability Assessment provides a mechanism for considering the sustainability of the project as a whole and for integrating sustainability considerations throughout the lifecycle of the development. It summarises the features and attributes of the Proposed Development that will contribute to or affect each of the sustainability themes, and sets out actions which could be taken during the design, construction and operation that would further assist in delivering sustainability benefits for the local and wider area.

16.4. Baseline Conditions

16.4.1. A description of the existing Proposed Development Site is provided in *Chapter 4: Site Description, Alternatives and Design Evolution* of this ES. The Proposed Development will reuse an area currently occupied by a number of obsolete and redundant buildings which are not currently in use.

16.5. Potential Effects and Mitigation Measures

Natural Resource Efficiency

Reducing the Use of Natural Resources in Construction Materials

16.5.1. The selection of materials for the construction of the Proposed Development has been informed by sustainability principles, including the prudent and efficient use of natural resources and the use of re-used and recycled materials. A primary principle of sustainable procurement is to question the need/requirement for the proposed commodity.

16.5.2. To minimise the use of natural resources and unnecessary materials procured for the Proposed Development, suitable infrastructure already present on site will be used where possible. For example, the two existing natural draft cooling towers within the SHP site will provide cooling for the Proposed Development. Re-using existing structures reduces the need for additional raw materials.

16.5.3. As mentioned in *Chapter 5: The Proposed Development* of this ES, a DCMS will be prepared prior to commencing works onsite; this will identify all best practice procedures, including environmental best practice such as the processing and re-use of all recovered materials onsite where practical.

Minimising Use of Greenfield land

16.5.4. The Proposed Development Site is situated within the existing SHP site, in the Slough Trading Estate. Undeveloped 'greenfield' land will not be used for the Proposed Development.

Minimising use of Water

16.5.5. Water demand for the demolition and construction phase may represent a short-term increase in supply volumes to the Site over current levels, although these would still be less than water use when the CFB boilers were operational.

16.5.6. The water demand once the Proposed Development is operational will be comparable to that of the CFB boilers and their associated turbine; therefore the change in demand will be negligible and insignificant.

16.5.7. During operation, boiler feed water will be supplied from SHP's existing groundwater boreholes and treated in a new onsite water treatment plant (this is the subject to a separate planning application as discussed in *Chapter 2: Assessment Methodology*) to generate high quality boiler feed-water. Cooling water is sourced from these same boreholes, which are located offsite. Wastewater will be treated if necessary to enable compliance with the Environmental Permit for the installation, and will be discharged to the foul sewer.

16.5.8. Water saving measures will be adopted where possible to reduce the effect on the water supply network. These include:

- Condensation of steam from the turbine exhaust for re-use;
- Selection and specification of water efficient equipment to reduce the amount of water required;
- Implementation of staff-based initiatives such as turning off taps, plant and equipment when not in use both on-site and within site offices; and
- The potential for re-use opportunities, e.g. the use of recycling water systems such as site toilets hand wash.

16.5.9. Water consumption will be monitored through process and administration areas to identify opportunities for water usage reduction and leak detection.

Energy Efficiency

16.5.10. The design of the proposed plant is based on Best Available Techniques (BAT) for plants fired on solid waste derived fuels and is expected to operate at an anticipated net thermal efficiency of in excess of 25% when not operating in CHP mode, which compares favourably with indicative BAT efficiencies for energy from waste plants of 17-30% as outlined in the Waste Incineration BAT (Ref. 16-10). The net thermal efficiency in CHP mode would be expected to rise to around 35%.

16.5.11. Elements of the plants design that will help achieve this efficiency include:

- Modern design following current best practices in optimising efficiency;
- Plant components are sized appropriately for the design capacity of the plant;
- The plant is designed to fire on fuel with a net calorific value (NCV) of 12MJ/kg, however the plant will also be designed to be able to accept WDF within an NCV design range of circa 8.5 to 16MJ/kg which will allow for changes in composition due to changes in recycling practices affecting the WDF element of the input fuel, whilst maintaining efficiency;
- Where possible variable speed drives will be included on all sizeable motors (such as cooling water pumps and fans);
- Plant to be designed to operate as a CHP system connecting to the Slough Trading Estate steam and heat demand (which is currently up to 10MWth), which enables the use of heat from the Proposed Development; and
- Insulation of surfaces.

16.5.12. The plant will also be subject to regular planned maintenance in order to optimise the efficiency of the equipment on site.

16.5.13. The Proposed Development will be designed to deliver space heating and process steam to neighbouring properties on the Slough Trading Estate as well as electricity for export to the UK power grid. This reduces waste heat and replaces the need for fossil-fuel generated heating.

16.5.14. The design of the Proposed Development will be fully compliant with the requirements of the Industrial Emissions Directive (IED) (2010/75/EU) (Ref. 16-11). Whilst a number of options have been considered to provide adequate cooling for the Proposed Development, the final selection and technology design will demonstrate the use of BAT to maximise plant efficiency.

16.5.15. The overall efficiency of the Proposed Development will be optimised and, as a minimum, will achieve an 'R1' value of equal or greater than 0.65. R1 is a method of calculating plant efficiency as set out by Annex II of the Waste Framework Directive 2008 (Ref. 16-12) to demonstrate that the plant is a Recovery process.

16.5.16. In the last twenty years, energy generation on the SHP site has gradually moved from fossil fuels to newly available low carbon fuels. The Proposed Development would continue this evolution, providing further capacity to provide electricity and heat from a secure low carbon source.

16.5.17. In addition to supplying heat to the existing Slough Trading Estate heat network, which has a typical demand of up to 10MWth, the Proposed Development is expected to have the potential to contribute up to a total of 20MW of heat, meaning that additional heat supply is potentially available for other off-site users. Further investigation into the heat demand in the Leigh Road/Bath Road Core Central development and in Slough town centre will be undertaken; when combined, these areas may provide adequate heat demand to support the required infrastructure. Further detail is included in the CHP Feasibility assessment presented in *Appendix J-3, Volume II* of this ES.

16.5.18. The Applicant is focused on generating electricity as efficiently as possible and maximising exported power. Therefore, the following Key Performance Indicators (KPIs) regarding energy will be regularly monitored and tracked:

- Tonnage of fuel per MWh exported electricity;
- Electricity consumption on site (the parasitic load).

16.5.19. The Applicant is strongly committed to providing energy in a reliable and sustainable way and a key priority is a significant and continuing reduction in the carbon intensity of the electricity produced by its generation fleet. This is defined in SSE's corporate goal to reduce the carbon intensity of its energy generation by 50% by 2020 (against a 2006 baseline).

16.5.20. This goal will be achieved through a diverse range of solutions including:

- The commissioning and development of additional renewable energy capacity;
- Lower emissions from more efficient and flexible gas-fired generation;
- Delivering innovative solid fuel solutions at coal-fired stations; and
- Reduced output from coal-fired stations as they use up their allocated running hours under the EU's Industrial Emissions Directive.

16.5.21. The Applicant has also successfully completed the Certified Emissions Management and Reduction Scheme (CEMARS) and encouraged eighty six of its main suppliers to sign up to the programme.

Waste Minimisation

16.5.22. The Applicant endorses the waste hierarchy. This means that the first priority is to prevent waste, second priority to reuse with the last resort being disposal.

16.5.23. A DCMS and CEMP will be produced for the Proposed Development, which will describe the specific mitigation measures to be followed to reduce effects (including waste) throughout demolition and construction.

16.5.24. To minimise waste generation by the operational plant, ash will be collected and recycled where possible, or otherwise disposed of to an appropriately licensed landfill offsite.

16.5.25. In addition, the Proposed Development will operate using a diverse range of WDF. It will utilise non-hazardous materials diverted from landfill in accordance with the Waste (England and Wales) Regulations 2011 (Ref. 16-13) derived from the Waste Framework Directive 2006, 2008 (Ref. 16-14) and the Waste Strategy for England 2007 (Ref. 16-15). This will save landfill space and reduce the associated methane emissions, whilst providing low carbon 'green' electricity (in accordance with the Energy White Paper 2007 (Ref. 16-16), the UK Renewable Energy Strategy (2009) (Ref. 16-17), and National Policy Statements for Energy (2011) (Ref. 16-18).

Fuel Sustainability (Generation and Sourcing of the Proposed Fuel Stock)

16.5.26. Only WDF processed to meet a pre-determined fuel composition range will be sourced for the Proposed Development. WDF will be made from various sources of processed municipal solid waste (MSW), Commercial and Industrial (C&I) waste and waste wood. All WDF will be processed offsite to extract recyclable material, screened and delivered to site via HGVs.

16.5.27. As set out in *Chapter 5: The Proposed Development* of this ES, it is not yet possible to determine the source of fuel for use at the Proposed Development. However, as noted there are commercial, environmental and policy considerations which suggest that the majority of the fuel would be derived from local and regional sources, thereby helping to maintain the region's self-sufficiency in the management of waste and to minimise transportation distances for fuel.

Transport

16.5.28. A detailed transport assessment is considered in *Chapter 7: Traffic and Transport* of this ES. Whilst assessments have demonstrated that, for both the demolition/construction and operational phases, there will be minor adverse or negligible significant effects to any of the road sections assessed, a number of traffic management measures will be considered for implementation. In particular, mitigation measures to minimise traffic movements during peak hours and through the Three Tuns Air Quality Management Area (AQMA) are considered. These potential measures are set out below and will be agreed with SBC prior to implementation as appropriate.

16.5.29. During the demolition and construction phase, the Applicant will apply the following mitigation measures in respect of the local highways:

- A CEMP will be prepared by the contractor and submitted to SBC for approval prior to the commencement of any demolition or construction work on site; all travel to site by staff will be managed through the CEMP, including management of parking, provision of minibuses and a car share scheme

- All construction traffic entering and leaving the Site will be closely controlled and will be managed through the CEMP. Vehicles making deliveries to site or removing spoil or demolition material etc. will travel via designated routes which will have been previously agreed with SBC and other relevant bodies to minimise the impact of traffic;
- Limitations on construction shift start/finish times will be identified such that the addition of the construction traffic will not result in traffic flows exceeding the current peak hour flows;
- Deliveries will be phased on a 'just in time' basis where possible. This will minimise travel time and potential congestion around the Site;
- The access and egress of demolition/construction traffic will be carefully planned to minimise effects on the surrounding highway and local road users, including any employees still occupying parts of the site that will be developed during later stages of the works. The increase in construction traffic flows will be managed where possible to minimise the effect on the surrounding highways and all local road users, in particular the morning and evening commuter peak periods. Discussions will be held with SBC to agree a safe site access strategy in advance of site works commencing, and prior to each phase of the works;
- Construction staff will be encouraged to travel to and from the site by sustainable means. In particular, emphasis will be given to car sharing and the use of minivans. Parking within the site for demolition/construction staff will be managed to minimise overspill parking on the surrounding side roads. A Workplace Travel Plan will be produced for the Site, which will cover both the demolition/construction and operational phases; and
- Pedestrian access to the Site will be segregated from vehicular traffic at all times, with clear signage to maintain the safety of the site and the general public.

16.5.30. During the operational phase, the Applicant will apply the following mitigation measures in respect of the local highways:

- A previous condition of the operation of the SHP site outlined pre-determined routes and a maximum number of HGV trips per day. The analysis of the traffic resulting from the Proposed Development indicates traffic movements, including remaining operational plant, will be less than those currently permitted;
- A comprehensive Workplace Travel Plan will be prepared for the Proposed Development and submitted to SBC following receipt of planning permission. The Travel Plan will identify measures to be incorporated into the design of the development to encourage more sustainable means of transport, and will include targets for modal change and measures to monitor progress towards achieving these goals;
- The Applicant will commit to all operational HGV's delivering the Site being EURO VI compliant by the year of operation (2019), offering over a 75% reduction (in g/kWh) on Euro V standard HGVs and about a 90% reduction (in g/kWh) on Euro IV standard HGVs;
- The avoidance of peak hours (07:30 to 09:30 and 16:30 to 18:30) will minimise idling traffic and maximise average speed, which has the potential to reduce CO_2 emissions from delivery vehicles;

- At the main access point on Edinburgh Avenue, the entrance barrier will be relocated further into the Site to avoid queuing on the road due to HGVs protruding, and the access and the exit on Edinburgh Avenue will become yellow box junctions to prevent HGVs from being blocked while accessing/egressing the Site, therefore preventing further queuing at these junctions; and
- To increase the safety of vulnerable road users, HGV operators will be encouraged to use safety equipment such as sidebars, blind spot cameras, audible ‘turning left’ warnings and reversing beeps for all HGVs accessing the site.

16.5.31. An assessment of carbon emissions arising from the transport of waste derived fuels and other raw materials to the Site and waste arising from the Site has been undertaken and is provided in the Climate Change Assessment (*Appendix J-2, Volume II* of this ES) and also discussed below.

16.5.32. It is worth noting however that NPS EN-1 and EN-3 outline the need for additional generating stations in the UK, and hence local planning authorities (in this case, SBC) do not need to take into account the carbon emissions associated with these developments.

Climate Change

16.5.33. The design, construction and operation of the Proposed Development will seek to mitigate the causes of climate change by contributing to reducing greenhouse gas emissions and adapting to the predicted effects of climate change, as discussed below.

16.5.34. An assessment of the operational carbon emissions/footprint from the combustion and transport of WDF for the Proposed Development has been undertaken and the results of this assessment are presented in *Appendix J-2: Climate Change Impact Assessment, Volume II* of this ES, and discussed below.

16.5.35. A WRATE (Waste and Resources Assessment Tool for the Environment) assessment has also been undertaken for the Proposed Development to compare two scenarios: the disposal of waste directly to landfill (the baseline); and the pre-treatment and combustion of WDF at the Proposed Development. WRATE is a Life Cycle Assessment (LCA) tool developed by the Environment Agency and allows users to quantify and compare environmental burdens of equivalent waste management systems across their entire life cycle. This assessment is presented in *Appendix J-3: WRATE assessment, Volume II* of this ES, and also discussed below.

Carbon Footprint

16.5.36. The Greenhouse Gas Protocol (Ref. 16-19) has been used as a basis for calculating the Proposed Development’s carbon footprint. It provides a methodology for calculating the carbon footprint of a project and was developed by the World Resources Institute and the World Business Council for Sustainable Development. The Greenhouse Gas Protocol defines different sources of greenhouse gas (GHG) emissions into a series of categories or “scopes”. These definitions have been used in this assessment to determine the scope and sources of emissions to be considered for the carbon footprint of the Proposed Development.

16.5.37. The relevant aspects of the GHG scopes, as defined in the Greenhouse Gas Protocol, are as follows:

- Scope 1: Direct Emissions:

  - Fossil Fuel combustion on site: Minor quantities of natural gas used at start up to enable the grate boilers to reach operating temperature and the plant to meet air emission limits when solid fuel is introduced); and
  - Combustion of WDF, comprising fossil and non-fossil fuel elements.
- Scope 2: Indirect Emissions
  - Imported grid electricity during periods of no generation.
- Scope 3: Other Indirect Emissions (for the purpose of this assessment, Scope 3 emissions focus on those elements over which the Applicant has significant control and influence during the operation of the power station and are also anticipated to differ from any equivalent power plant):
  - Transport of multifuel WDF to site;
  - Transport of major raw materials to site; and
  - Transport of ash and residue streams from the site.

16.5.38. The Proposed Development has been designed to accept WDF from various sources of processed MSW, C&I waste and waste wood, and will have a fuel throughput of circa 400,000 tonnes per annum. Both the WRATE assessment and the carbon footprint assessment have been based on a 50/50 MSW/C&I waste input. The default WRATE Municipal Solid Waste (MSW) composition for England has been used for the MSW composition in the models as the specific sources for the facility are not known. The composition of the C&I waste has been based on the data from a study undertaken for the Environment Agency Wales in 2007 (*Appendix J-2, Volume II* of this ES).

16.5.39. In the absence of information regarding the exact sources of WDF to be taken by the Proposed Development, this WDF composition is considered representative and is also considered to represent the worst case.

16.5.40. Table 16-1 summarises the total annual operational carbon footprint of the Proposed Development, which is calculated at 116,718 tonnes carbon dioxide equivalent (CO_2e).

Table 16-1 Carbon Footprint of the Proposed Development

Emissions Source	Annual carbon emissions by scope (tCO_2e)
Scope 1	
Process emissions from WDF combustion	108,151
Emissions from fossil fuel combustion	1,618
Scope 2	
Electricity imported from the National Grid	780
Scope 3	
Transport of WDF to the Site	4,161
Transport of raw materials to the Site	383
Transport of waste materials from the Site	1,625
Total annual carbon emissions (tCO_2e)	**116,718**

16.5.41. As Table 16-1 shows, the majority of emissions will originate from the combustion of the WDF.

16.5.42. Table 16-2 presents the carbon intensity of the Proposed Development, along with national averages for other existing UK power stations (Ref. 16-20). The carbon intensity is presented in tonnes CO_2-eq (tCO_2e) per gigawatt-hour (GWhr). It should be noted that the carbon intensity figures stated below comprise carbon intensity associated with the combustion of the primary fuel source (e.g. coal, natural gas, WDF) i.e. Scope 1 emissions only, and do not include other elements of the carbon footprint such as transport of primary fuel or electricity use on site. Therefore results are presented compared to the Scope 1 intensity of the Proposed Development only.

Table 16-2 Comparison of Carbon Intensities for the Proposed Development with other Existing Power Stations

Nature of power station	Carbon intensity of electricity supplied (tCO_2e/GWh)
Average UK power station - coal	895
Average UK power station – fossil fuels only	700
Average UK power station – gas-fired only	415
Average UK power station - all fuel types (including nuclear & renewable)	483
Proposed Development, Scope 1 only (with CHP)	**233**
Proposed Development, Scope 1 only (without CHP)	**305**

16.5.43. The Proposed Development will outperform the average existing power stations within the UK both with and without CHP.

16.5.44. Using the average carbon intensity data shown in Table 16-2 above, a comparison of the Scope 1 tonnes of CO_2e emitted from existing UK power stations and the Proposed Development are presented in Table 16-3.

Table 16-3 Comparison of Tonnes of CO_2e Emissions for the Proposed Development with other Existing UK Power Stations

Nature of Power Station	Scope 1 tonnes of CO_2e emitted (Without CHP)	Scope 1 tonnes of CO_2e emitted (With CHP)
Average UK power station - all fuel types (including nuclear & renewable)	173,900	228,000
Average UK power station – gas-fired only	149,400	195,900
Proposed Development	109,769	109,769*

*There is no difference in absolute emissions for the Proposed Development with or without CHP as the process is using heat that would otherwise be a by-product.

16.5.45. The results in Table 16-3 indicate that the generation of electricity by the Proposed Development using WDF compares favourably with national averages. The Proposed Development represents annual carbon savings of 64,100 tCO_2e without CHP, increasing to 118,200 tCO_2e with CHP when compared to a UK average power station using all fuel types. When compared to a UK average gas-fired power station, savings of 39,600 tCO_2e without CHP and 86,100 tCO_2e with CHP are still possible. These carbon savings include the emissions associated with the Scope 1 emissions only, i.e. the burning of the primary fuel source and does not include a comparison of other elements of the carbon footprint such as transport of the primary fuel to site, electricity use on site, etc.

WRATE Analysis

16.5.46. A WRATE assessment (*Appendix J-1, Volume II* of this ES) has also been undertaken for the Proposed Development to compare two scenarios: the disposal of waste directly to landfill (the baseline); and the treatment of waste to produce WDF for combustion at the Proposed Development. WRATE calculates the potential effects arising from all processes in the waste management system including the collection, transportation, transfer, treatment, disposal and recycling of materials. The model takes account of the construction and operation of infrastructure and vehicles, and offsets this burden against the avoided burdens associated with materials and energy recovery. All inputs of waste, energy and materials, and outputs of energy, process residues, materials and emissions are accounted for.

16.5.47. The collection methodology and transport effect of the waste collection has not been included in the WRATE assessment as specific sources of waste that will result in the fuel for the Proposed Development are not yet known. However it is likely that much of the WDF sources will be waste treatment facilities predominantly within an average of 40 miles of the Proposed Development Site. The assumption of 40 miles is a best estimate until the fuel supply is agreed. Sensitivity analysis as part of the WRATE Assessment shows that doubling the distance the WDF is transported (from 40 miles to 80 miles) would only lead to a 0.5% increase in the overall carbon footprint.

16.5.48. A scenario has been modelled assuming 100% of the waste from waste collection facilities being transported directly to a landfill site with no intermediate treatment or processing. A second scenario shows the waste being sent to a processing facility where WDF is produced and other recyclable materials are separated for recovery. The resulting WDF fraction is then transported to the Proposed Development.

16.5.49. The available information about the design of the Proposed Development has been used in the model wherever possible. The energy from waste process depicted within WRATE is a ‘Flexible Energy from Waste Process’. This process allows the WRATE user to define a variety of different parameters in relation to gross heat and electrical efficiencies, the assumed method of power off-take (electricity, CHP and heat only), the flue gas cleaning and reduction systems, and the recovery rate of Ferrous and Non-ferrous metals at the grate. These variable parameters therefore focus on the key processes and the outputs with the greatest environmental effects.

16.5.50. The WRATE model identifies the global warming potential of the baseline option as a positive number i.e. a net increase in emission of CO_2. In contrast, the model assesses the Proposed Development as a facility that, in the processing of a waste source to produce heat and power, displaces conventional energy or electricity use and landfill gas emissions and therefore represents a net reduction in CO_2 emissions. In this assessment two different baseline energy mixes were selected. The first marginal mix modelled is the mix forecast by WRATE (using Department of Energy and Climate Change [DECC] data). WRATE forecasts the marginal energy mix for 2020 in the UK to be 33.8% Coal, 4.2% Gas and 62.0% Gas – Combined Cycle Gas Turbine (CCGT). The second marginal mix modelled as a comparison is a ‘user defined’ mix set at 100% Gas CCGT.

16.5.51. Based on the outputs from the modelled scenarios, the environmental impact of the Proposed Development against a baseline of the same waste being disposed of to landfill can be summarised as shown in Table 16-4 (default UK 202 Marginal Mix) and Table 16-5 (100% Gas CCGT Marginal Mix).

16.5.52. The WRATE model identifies the global warming potential of the baseline option as a positive number i.e. a net increase in emissions of CO_2. In contrast, the model assesses the Proposed Development as a facility that, in the processing of a waste source to produce heat and power, displaces conventional energy or electricity use and therefore represents a net reduction in CO_2 emissions.

16.5.53. The assessment undertaken allows for the comparison of the Proposed Development with an alternative 'do-nothing' baseline scenario where the same waste that would be treated at the Proposed Development is disposed of to landfill.

Table 16-4 Summary of Results (WRATE Default UK 2020 Marginal Mix)

Scenario	Waste Management Route	Total Kg CO_2 eq	Kg CO_2/T waste
1	Baseline – disposal of waste to landfill	65,982,632	156.3
2	Production of WDF for combustion at the Proposed Development	-117,627,292	-278.7

Table 16-5 Summary of Results (100% Gas CCGT Marginal Mix)

Scenario	Waste Management Route	Total Kg CO_2 eq	Kg CO_2/T waste
1	Baseline – disposal of waste to landfill	81,141,959	192.2
2	Production of WDF for combustion at the Proposed Development	-56,076,355	-132.8

16.5.54. Table 16-4 shows that the transfer of waste (400,000 tonnes of WDF) to the Proposed Development will provide annual carbon savings of over 183 million kg CO_2-eq in comparison to the baseline of disposal of the equivalent waste directly to landfill (when displacing the WRATE Default UK Marginal Mix for 2020). This is equivalent to 435 kg CO_2-eq per tonne of waste when compared with the same amount and composition of waste being disposed of, without treatment, to landfill.

16.5.55. Table 16-5 shows that the transfer of waste to the Proposed Development will provide annual carbon savings of over 137 million in comparison to the baseline of disposal of the equivalent waste directly to landfill (when displacing the 100% Gas CCGT Marginal Mix), equivalent to 325 kg CO_2-eq per tonne of waste.

16.5.56. The assessment therefore demonstrates that the treatment of waste at the Proposed Development is environmentally preferable to the disposal of waste to landfill in terms of global warming potential. The two different marginal energy mixes used in this assessment indicate a higher benefit if the energy displaced is modelled as being more carbon intensive (i.e. WRATE Default UK 2020) than if the energy displaced is of a lower carbon intensity (i.e. 100% gas CCGT displacement as advised in the Defra guidance).

However, the Proposed Development is shown to be of net benefit for both of the future energy mix scenarios modelled.

Maximising the Provision of Renewable Energy

16.5.57. The Proposed Development will be designed as a CHP Plant to deliver up to 20MW of space heating and process steam to neighbouring properties on the Slough Trading Estate. This reduces waste heat and replaces the need for fossil-fuel generated heating. Further detail is included in the CHP report, presented in *Appendix J-3, Volume II* of this ES.

Climate Change Adaptation

16.5.58. In addition to any potential effects of the Proposed Development on climate change, climate change also has the potential to impact on the design and operation of the Proposed Development. For example, increased incidences of heavy and prolonged rainfall could increase flood risk from surface water, groundwater and drainage systems. Consequently, adaptation to climate change concerns how the Proposed Development avoids or reduces its exposure to the effects of future climate change, such as increased temperatures and flood risk.

16.5.59. The Applicant has prepared a Climate Adaptation Report (June 2011) (Ref. 16-21) and the management of risk from climate related events has been central to the company for a considerable period of time. They have been early adopters of many practices that have over the years resulted in an increasingly resilient network as can be demonstrated by the improvements in network performance over the last 10 years. They have prepared for climate change adaptation within their Asset Management System by, for example, enhancing their ability to respond to the extreme weather events more likely with climate change.

16.5.60. A Flood Risk Assessment (FRA) is provided in *Chapter 11: Water Resources and Flood Risk* (*Appendix F-1, Volume II* of this ES). To date, there have been no flooding incidents on the Proposed Development Site due to tidal, fluvial or groundwater causes. The outputs of the UK Climate Projections (UKCP09) climate change scenarios indicate a shift towards wetter winters over the whole of England by as much as 20% by the 2050s.

16.5.61. The UKCP09 climate projections have been included in the Flood Risk Assessment which indicates that the risk from fluvial and ground water flooding remains low in the future. However, the increased rainfall intensity reported in the FRA will require the proposed drainage systems to take into account the risks resulting from projected climate change.

16.5.62. There are no known normally occurring problems associated with sewer flooding on the Slough Trading Estate. The Flood Risk Assessment highlights the anticipated increase in surface water runoff under climate change scenarios that may increase the risk of flooding from sewer sources.

16.5.63. The FRA details the current use of soakaways onsite as well as drainage to a culvert beneath Edinburgh Avenue. The demolition works and enabling works for the Proposed Development will be designed to attenuate runoff from the Site and ensure that there is no surface water flooding of the Site during a 1 in 30 year storm. The provision of this attenuation storage could be potentially achieved on the Site through a combination of soakaways, attenuation tanks and oversized pipes. Further to this, the Applicant aims to delay the discharge of blow down effluent from the cooling towers to the sewer network during a heavy rainfall event to reduce pressure on the sewer network.

16.5.64. As discussed in Section 16.5.8, the Proposed Development incorporates a number of measures to conserve water during operation which increases resilience to future temperature rises and potential droughts as a result of climate change.

Sustainable Building Design (BREEAM)

16.5.65. The Building Research Establishment Environmental Assessment Method (BREEAM) sets the standard for best practice in sustainable building design, construction and operation and is one of the most comprehensive and widely recognised measures of a building's environmental performance.

16.5.66. A BREEAM assessment uses recognised measures of performance which are set against established benchmarks to evaluate a building's specification, design, construction and use. The measures used represent a broad range of categories and criteria from energy to ecology. They include aspects related to energy and water use, the internal environment (health and well-being), pollution, transport, materials, waste, ecology and management processes.

16.5.67. The Applicant will consider undertaking a formal BREEAM Assessment at an appropriate stage in the design evolution of the Proposed Development, when specific issues such as choice of building and insulation materials are being addressed.

Biodiversity / Ecology

16.5.68. *Chapter 13: Ecology* of this ES considers in detail the potential effects and associated ecological effects of the Proposed Development on landscape and wildlife. Surveys have shown that the current site represents habitats of very limited conservation value with the exception of the presence / potential presence of breeding birds within buildings on site.

16.5.69. Following implementation of the proposed mitigation measures and enhancement measures (including provision of artificial nesting habitat) the conservation value of the site for breeding birds will remain unchanged and the Proposed Development is expected to result in no significant adverse or beneficial ecological effects.

Job Creation

16.5.70. As well as environmental demands, sustainable development also considers the social and economic demands. The Proposed Development will result in the creation of jobs during the site enabling, construction, operation and decommissioning phases. It is expected to provide an average of 300 temporary jobs during the construction period and act as a catalyst for future development within the Slough Trading Estate. The Proposed Development is anticipated to support 72 jobs of which approximately 20 will be new jobs during operation (see *Chapter 6: Socio-Economics* of this ES for further details).

16.6. Residual Effect and Conclusions

16.6.1. The Proposed Development has several characteristics incorporated into its design, construction and management which meet the key sustainability requirements as set out in national, regional and local policy.

16.6.2. The design, construction and operation of the Proposed Development will seek to mitigate the causes of climate change by contributing to reducing greenhouse gas emissions and adapt to the predicted impacts of climate change.

16.6.3. The Proposed Development will provide a low carbon source of electricity. The carbon assessment demonstrates that the Proposed Development will outperform the average existing power stations within the UK on a tonnes CO_2 per GWh basis.

16.6.4. The Proposed Development also has potential to provide heat through CHP as provision of a low carbon source of heat off-take. This would offset grid gas or electricity from being used for heating.

16.6.5. The diversion of waste from landfill will be a positive consequence of the Proposed Development in accordance with the waste hierarchy. Results of the WRATE assessment show that the transfer of waste to the Proposed Development presents significant carbon savings, of over 137 million kg CO_2-eq (137,000 tonnes CO_2-eq when the displaced energy mix is set to 100% Gas CCGT) in comparison to the baseline of disposal of waste directly to landfill. This is considered a **beneficial** effect on the environment of major significance.

16.7. Cumulative Effects

16.7.1. This section assesses the effect of the Proposed Development in combination with other developments in the area that have been identified in *Chapter 2: Assessment Methodology* of this ES.

16.7.2. Sustainability considerations will need to be incorporated into these other cumulative developments to avoid significant effects to the environment. Given that none of these are power generating facilities or waste facilities it is not considered that they have the potential to lead to cumulative effects when considered with the Proposed Development. The cumulative effect is therefore considered to remain as beneficial.

16.8. References

Ref. 16-1 The Climate Change Act (2008). Available online: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf

Ref. 16-2 Planning our electric future: a White Paper for secure, affordable and low - carbon electricity (2011) DECC. Available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48129/2176-emr-white-paper.pdf

Ref. 16-3 Overarching National Policy Statement (NPS) for Energy (EN-1) (July 2011). Department for Energy and Climate Change.

Ref. 16-4 Overarching National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3) (July 2011) Department for Energy and Climate Change

Ref. 16-5 Government Review of Waste Policy in England (2011). Department for Environment, Food and Rural Affairs. Available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69401/pb13540-waste-policy-review110614.pdf

Ref 16-6 Updated national waste planning policy: planning for sustainable waste management (Draft July 2013). Available online: https://www.gov.uk/government/consultations/updated-national-waste-planning-policy-planning-for-sustainable-waste-management

Ref. 16-7 Joint Minerals and Waste Development Framework Core Strategy (2007) Available online: http://www.reading.gov.uk/businesses/Planning/planning-policy/minerals-and-waste-planning-policy/mineralswastedf/

Ref. 16-8 Core Strategy 2006 – 2026 Development Plan Document (December 2008). Slough Borough Council. Available online: http://static.slough.gov.uk/downloads/Adopted_Core_Strategy_16-12-08.pdf

Ref. 16-9 The Waste Incineration Directive. Version 3.1 (2010). Department for Environment, Food and Rural Affairs. Available online: http://archive.defra.gov.uk/environment/policy/permits/documents/ep2010wasteincineration.pdf

Ref. 16-10 Industrial Emissions Directive (IED) (2010/75/EU)

Ref. 16-11 Waste Incineration BREF (2006). European Commission. Available online: http://eippcb.jrc.ec.europa.eu/reference/BREF/wi_bref_0806.pdf?bcsi_scan_AB11CAA0E2721250=0&bcsi_scan_filename=wi_bref_0806.pdf

Ref. 16-12 Waste Framework Directive 2008

Ref. 16-13 HMSO (2011) Waste (England and Wales) Regulations 2011

Ref. 16-14 EC (2006) Waste Framework Directive 2006/12/EC, European Commission

Ref. 16-15 Defra (2007) Waste Strategy for England 2007, HMSO

Ref. 16-16 DECC (2007) Energy White Paper, Department for Energy and Climate Change, HMSO.

Ref. 16-17 HMSO (2009) UK Renewable Energy Strategy

Ref. 16-18 DECC (2011) National Policy Statements for Energy, 2011, Department for Energy and Climate Change, HMSO.

Ref. 16-19 GHG Protocol for Project Accounting. World Resources Institute and the World Business Council for Sustainable Development (2005).

Ref. 16-20 DECC (2013) Electricity, chapter 5, Digest of United Kingdom energy statistics (DUKES). Published by the Department of Energy & Climate Change. July 2013. Available Online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/279523/DUKES_2013_published_version.pdf (last accessed 17 July 2014)

Ref 16-21 SSE Power Distribution. Climate Change Adaptation Report. Appended Version 3.1, June 2011. Available online: http://archive.defra.gov.uk/environment/climate/documents/adapt-reports/04distribute-trans/sse-power-distribution.pdf

17. RESIDUAL EFFECTS AND CONCLUSIONS

17.1. Introduction

17.1.1. This chapter of the ES provides a summary of the 'residual effects' associated with the Proposed Development, which are those effects that remain following the implementation of the mitigation measures presented in the preceding technical chapters.

17.1.2. Mitigation measures relate to each of the three key phases (design; demolition of existing structures and construction of the plant; operation) of the Proposed Development and are discussed in full in the relevant technical chapters of this ES. In addition, each technical chapter also contains a detailed consideration of both positive (beneficial) and negative (adverse) residual effects arising.

17.1.3. The significance criteria applied to these effects is outlined in *Chapter 2: Assessment Methodology* of this ES, and its application is also discussed individually within each of the technical chapters.

17.2. Background

17.2.1. Preparation of the EIA and evolution of the design of the Proposed Development have been undertaken in parallel, and as such, many mitigation measures have already been incorporated within the design parameters to eliminate adverse environmental and social effects before they occur – a process termed Impact Avoidance. These include, for example, determining the appropriate stack height to avoid significant effects on local air quality and designated sites, as well as HGV vehicle restrictions so as to avoid adverse effects to nearby communities and habitat sites.

17.2.2. A Demolition and Construction Method Statement (DCMS) and Construction Environmental Management Plan (CEMP) will be prepared and approved by SBC prior to the onset of the demolition and construction phase to maintain consideration of environmental effects beyond the planning stage of the Proposed Development. This will incorporate the commitments made within the ES with regard to mitigating against potentially adverse effects throughout the site enabling, demolition and construction phase (refer to *Chapter 5: The Proposed Development* of this ES). A framework CEMP is presented in *Appendix B-1, Volume II* of this ES.

17.2.3. The DCMS and CEMP will address all relevant environmental issues including: noise and vibration, waste management, air emissions, hours of working and neighbourhood liaison.

17.2.4. *Chapter 18: Cumulative Effects* of this ES addresses the potential effects taking into account the other nearby schemes identified in *Chapter 2: Assessment Methodology*.

17.3. Summary of Residual Effects

17.3.1. Table 17-1 provides a summary of the identified residual effects associated with the Proposed Development in the demolition, construction and operational phases.

Table 17-1 Summary of Demolition, Construction and Operational Residual Effects

Chapter No.	Project Phase	Description	Geographical Scale	Effect Significance
06. Socio Economics	Demolition and Construction	Employment creation and supply chain benefits during demolition and construction	Local, Regional	Minor Beneficial
	Operation	Employment creation and supply chain benefits during operation	Local, Regional	Negligible
07. Traffic and Transport	Demolition and Construction	Driver delays due to traffic management on local highway network	Local	Negligible
		Increase in HGV movements on local highway network and effects on pedestrian/cyclist amenity	Local	Negligible
		Effects on Public Transport	Local	Negligible
	Operation	Increase in traffic movements on local highway network and delays	Local	Negligible
08. Air Quality	Demolition and construction	Demolition and construction plant exhaust emissions	Local	Negligible
		Fugitive dust emissions	Local	Negligible
		Road traffic emissions associated with demolition and construction	Local, Regional	Negligible
	Operation	Road traffic emissions associated with operation	Local, Regional	Negligible
		Operational power plant emissions	Local Regional	Minor adverse
		Dust and odour	Local	Negligible
09. Noise and Vibration	Demolition and Construction	Demolition and construction noise	Local	Negligible / Minor adverse
		Demolition and construction vibration	Local	Negligible
		Road traffic noise	Local, District	Negligible
	Operation	Daytime operational traffic noise	Local, District	Negligible
		Night-time operational traffic noise	Local, District	Negligible / Minor adverse
		Power plant operational noise	Local	Minor adverse

Chapter No.	Project Phase	Description	Geographical Scale	Effect Significance
10. Ground Conditions	Demolition and Construction	Effect of oils and hydrocarbons	Local	Negligible
		Effect of contaminated soil, asbestos and ground gas	Local	Negligible
		Effect of unexploded ordnance	Local	Negligible
		Effect of underground structures	Local	Negligible
	Operation	Effect from soil and groundwater contamination on human health and controlled waters	Local, Regional	Negligible / Minor adverse
11. Water Resource and Flood Risk	Demolition and Construction	Creation of pathways and disturbance to groundwater	Local	Negligible
		Disturbance of the existing drainage and water supply networks from demolition and construction	Local, District	Negligible
		Disturbance of contaminated land	Local	Negligible
		Potential effects from leaks and spillages (oils and hydrocarbons)	Local	Negligible
		Water demand and wastewater generation	Local, District	Negligible
		Use of concrete and cement products	Local	Negligible
		Release of suspended sediment	Local	Negligible
	Operation	Leaks and Spillages	Local	Negligible
		Contamination from in-situ materials	Local	Negligible
		Flood Risk	Local	Negligible[1]
		Water Supply and Wastewater generation and sewer flooding	Local, Regional	Negligible
12. Cultural Heritage	Demolition and Construction	Effects on buried archaeology	Local	Negligible
		Effects on the setting of heritage assets	Local	Negligible
	Operation	Effects on buried archaeology	Local	Negligible
		Effects on the setting of heritage assets	Local	Negligible / Minor adverse
13. Ecology	Demolition and construction	Effects on designated sites	Local	Negligible
		Effects on habitat onsite, breeding birds and protected species	Local	Negligible
	Operation	Effects on designated sites	Local	Negligible

Chapter No.	Project Phase	Description	Geographical Scale	Effect Significance
		Effects on habitat onsite, breeding birds and protected species	Local	Negligible
14. Landscape and Visual Impact	Demolition and Construction	Landscape effects	Local, District	Minor adverse (Slough Business Area) Negligible (all other LCAs within the 5km study area)
		Visual Amenity	Local, District	Moderate adverse (View 2, 3 and 6) Minor adverse (Viewpoints 1, 4, 5, 7-14 and 16) Negligible (Viewpoint 15)
	Operation	Landscape Effects	Local, District	Minor adverse (Slough Business Area) Negligible (all other LCAs within the 5km study area)
		Visual Amenity	Local, District	Minor adverse (Viewpoints 1, 2, 3, 6 (residents) and 16 (visitors) Negligible (all other Viewpoints)
15. TV and Radio Interference	Demolition and Construction	Effect on terrestrial and satellite TV reception, broadcast radio services, mobile telephone signals, wireless networks, emergency service communications and DLR signalling	Local, Regional	Negligible
	Operation	Effect on terrestrial and satellite TV reception, broadcast radio services, mobile telephone signals, wireless networks, emergency service communications and DLR signalling	Local, Regional	Negligible
16. Sustainability and Climate Change	Operation	Significant carbon savings in comparison to the disposal of waste directly to landfill.	National	Major Beneficial

[1] It has the potential to increase to minor beneficial if betterment is achieved for Greenfield runoff rate.

17.4. Summary and Conclusions

Demolition and Construction Phase

17.4.1. Residual effects associated with the demolition and construction phase of the Proposed Development are considered short term, temporary and reversible. These effects have been assessed as being predominantly negligible, with a short-term minor beneficial effect on local employment, as well as some temporary minor adverse effects at local receptors due to demolition and construction noise.

17.4.2. There are anticipated to be moderate adverse visual effects on some visual receptors as a result of the demolition and construction phase, namely residents to the north living in close proximity to Slough Trading Estate and recreational users of public open space on the north boundary of the Trading Estate (Viewpoint 2), recreational users of Kennedy Park (Viewpoint 3), and residents in the northern Slough urban area (Viewpoint 6), however these effects will be temporary in duration.

17.4.3. During the demolition and construction phase a number of mitigation measures (or actions) will be put in place to ensure that these effects are minimised. These will be incorporated into the CEMP and DCMS, which will be agreed with SBC prior to commencement of site works.

Operational Phase

17.4.4. The majority of operational effects associated with the Proposed Development are considered negligible, including a long term negligible but beneficial effect on employment. A major beneficial effect is attributed to the operation of the Proposed Development through the transfer of waste from landfill, which presents significant carbon savings in comparison to the baseline of disposal of waste directly to landfill.

17.4.5. There are anticipated to be some minor adverse effects associated with air and noise emissions, as well as on the setting of a number of heritage assets within the 10km study area, however these are not considered significant. The effect on the setting of heritage assets is the result of a possible 8m increase in stack height, which is visible at several nearby assets; however the change is expected to be small to imperceptible.

17.4.6. During the operation of the Proposed Development, a number of mitigation measures will be put in place to ensure that these effects are minimised. These will primarily be managed through the Environmental Permit required for the operation of the Proposed Development, and regulated by the EA.

18. CUMULATIVE EFFECTS

18.1. Introduction

18.1.1. This chapter of the ES assesses the effect of the Proposed Development in combination with the potential environmental and socio-economic effects of other consented developments in the area.

18.1.2. Cumulative effect interactions can occur as either interactions between effects associated with just one project or interactions between the effects of a number of projects in an area. As a result, two types of cumulative effect interaction have been considered within this ES as follows:

1) The combined effect of individual effects arising as a result of the Proposed Development, for example effects in relation to atmospheric emissions from the stacks and HGV deliveries affecting a single receptor; and

2) The combined effects of the Proposed Development with several other development schemes which may, on an individual basis be insignificant but, together (i.e. cumulatively), have a significant effect.

18.1.3. In some EIA guidance documents, these two types of cumulative impact interactions are referred to as ‘Type 1’ and ‘Type 2’ cumulative effects respectively. Both types have been considered within each of the technical chapters of this ES.

18.1.4. Details of the other schemes considered within the cumulative effects assessment can be found in Table 18-1 below and are discussed within *Chapter 2: EIA Methodology* of this ES.

18.2. Legislative Requirement

18.2.1. The requirement to assess cumulative effects is outlined in a number of EC Directives (Ref. 18-1; Ref. 18-2) and the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (Ref. 18-3). The latter in particular states *“the characteristics of development must be considered having regard, in particular to…b) the cumulation with other development”*

18.3. Assessment Methodology

18.3.1. Table 18-1 sets out the other developments considered within the cumulative effect assessment (‘the cumulative schemes’) presented within this ES (replicated from Chapter 2: Assessment Methodology). The locations of these cumulative schemes are illustrated within Figure 2-1 in *Chapter 2: Assessment Methodology*. The schemes have been identified in consultation with SBC on the basis of a planning search within a 2km radius of the Site for major development projects / EIA scale projects. Each technical specialist has reviewed the cumulative schemes to determine if any could have potential cumulative effects with the Proposed Development. Where no cumulative effects have been identified, this is also stated.

Table 18-1 Developments Considered within the Cumulative Effect Assessment

Address	Description	Status
Leigh Road/Bath Road Central Core 1 and 2 Outline planning permission, Slough Trading Estate	• Leigh Road/Bath Road Central Core Outline planning permission (Ref: P/14515/000) - SBC granted outline planning permission for the redevelopment of 21.9ha of land at Leigh Road/Bath Road on the 30th September 2010 to include commercial offices, hotel, retail, financial and leisure facilities etc. (LRCC1). The application proposes the development of total floorspace (gross internal) of 152,800m^2, representing a net increase of 87,586m^2; Or • Leigh Road/Bath Road Central Core 2 Planning Application (Ref: P14515/3) - Outline planning permission was granted on the 18th June 2012 for an alternative planning application for the redevelopment of the 21.9ha of land at Leigh Road/Bath Road to include the mix of uses referred to in planning permission P/14515/000. Only one of the two above mentioned developments will be developed.	Consented (Outline Planning Permission)
Further Development: 1ha of land in the east / northwest of the SHP Site	A separate planning application by the Applicant to SBC to include a Central Site Services Building, a Water Treatment Plant and parking on land within the SHP site to serve both the Proposed Development and other generating facilities. This will be the subject of a separate composite planning application to be submitted in parallel with the Application for the Proposed Development.	Application to be Submitted.
Britwell Regeneration Scheme (P/15513/100)	Demolition and redevelopment of two linked development sites (site 2A Kennedy Park and 2B Wentworth Avenue shops/Marunden Green) to include mixed use residential, community and retail development.	Application Submitted.

18.4. Further Development

18.4.1. In addition to the Proposed Development there is a requirement for *'Further Development'* on the SHP site, which will include a new central site services building, a water treatment plant and parking to serve both the Proposed Development and other generating facilities. This will be the subject of a separate composite planning application to be submitted in parallel with the application for the Proposed Development.

18.4.2. This ES concludes that the construction and operation of the Further Development on the SHP site will result in a negligible effect. Thus, cumulatively the Further Development will not add to the residual effects from the Proposed Development.

18.4.3. The main environmental considerations for the Further Development include:

- The visual effect of the Further Development, including the height and massing of the buildings, will be low and the majority of the development will be screened by the Proposed Development;
- Once fully operational the Further Development will reduce car parking spaces on the SHP site by approximately 10% which will help to reduce the number of vehicles arriving at the site. It is therefore expected to have a negligible, but beneficial effect on operational traffic from the SHP site; and
- The water supply to both the Proposed Development and the Further Development is covered by an EA abstraction licence which restricts the volume of water that can be abstracted in order to avoid adverse environmental effects. Water supply for the Further Development will be supplied from the same groundwater source as the SHP site and the cumulative effect on water supply is therefore considered to be negligible. Appropriate design will further control the effects of water supply and the Further Development will be required to discharge in accordance with the existing environmental permit for the SHP site.

18.5. Combined Effects of Individual Effects -Type 1

18.5.1. The main Type 1 cumulative effect associated with the Proposed Development is the combined effect of atmospheric emissions from the stack and additional road traffic, as well as the combination of noise emissions from the operational facility and HGV delivery traffic.

18.5.2. *Chapter 8: Air Quality* addresses this issue and demonstrates that, together, these atmospheric emissions are predicted to lead to an 'imperceptible' magnitude of change of negligible significance at the worst affected receptor.

18.5.3. *Chapter 9: Noise and Vibration* demonstrates that the significance of operational noise emissions is minor adverse at the worst affected dwellings, regardless of whether HGV traffic is taken into account, and therefore not considered significant.

18.5.4. Specific mitigation measures for individual effects are addressed in the technical chapters of this ES.

18.6. Combined Effects of the Proposed Development with Other Development Schemes – Type 2

18.6.1. As highlighted within the introduction to this chapter, the review of the combined effects of the Proposed Development with other schemes (or 'Type 2' cumulative effects) is presented within each of the technical chapters of this ES.

18.6.2. Generally, it is not anticipated that the cumulative schemes would change the significance of the predicted residual effects associated with the Proposed Development. The exception to this, where consideration of the cumulative schemes has increased the residual effects identified within this ES, are as follows:

1) *Chapter 6: Socio-economics* notes that the Britwell Regeneration and updated Leigh Road/Bath Road schemes will create new residential units, and there will also be substantial new commercial, retail, and leisure space created. This new employment space will provide job opportunities for existing residents and therefore, these

schemes, when considered along with the Proposed Development, are expected to have a major beneficial effect on the local economy;

2) *Chapter 7: Traffic and Transport* notes that increases in driver delay and journey times as a result of the cumulative developments is expected to have a minor adverse effect on Leigh Road due to the additional traffic. The Proposed Development is only predicted to have a negligible contribution to this effect during operation however, and the Applicant will engage with the other developers at the time of works to agree traffic routes;

3) *Chapter 12: Cultural Heritage and Archaeology* notes that as part of the Leigh Road/Bath Road Central Core development, a new bridge is being built near to the listed bridge at Leigh Road which will form part of the existing baseline. It is expected to be complete by the start of construction of the Proposed Development, therefore avoiding any potential cumulative effects. The construction of both the Proposed Development and the Central Core development would directly affect the listed bridge due to increased construction traffic on all surrounding roads, including the new Leigh Road bridge, and the effect on the listed bridge is therefore predicted to increase from negligible to minor adverse. However, the Proposed Development is only predicted to have a negligible contribution to this effect, which would be short-term and temporary in duration during the construction phase;

4) *Chapter 14: Landscape and Visual* states that, in the event that the Britwell Regeneration scheme and Proposed Development are constructed at similar times, it is anticipated to increase the visual effect from Kennedy Park and parts of the residential area to the north of Slough from minor to moderate adverse. This effect, although significant, would be temporary, lasting only for the duration of the construction phase. Once operational, the developments are considered to be in keeping with the appearance of the existing area.

18.6.3. It is not expected that any other residual effects attributed to the Proposed Development would change when taking into account these cumulative schemes. No significant adverse cumulative effects have therefore been identified, and only one significant beneficial cumulative effect related to employment generation.

18.7. References

Ref. 18-1 European Commission, (1985); EIA Directive (85/337/EEC).

Ref. 18-2 European Commission, (1997); Amendments to 1985 EIA Directive (97/11/EC).

Ref. 18-3 DETR, (2011); Town and Country Planning (Environmental Impact Assessment) Regulations, (as amended).

GLOSSARY OF TERMS

Glossary of Defined Terms

Abbreviation	Definition
Applicant	SSE Generation Limited
CHP	Combined Heat and Power. Also known as cogeneration, it is a way to beneficially use waste heat in the exhaust gases following the generation of electricity through the provision of hot water or steam for other uses, which may be off-site.
Multifuel	A term applied to any type of engine, boiler, or heater or other fuel-burning device which is designed to burn a range of different solid fuels in its operation. In the example of the Proposed Development the multifuel comprises Waste Derived Fuels (WDF), which is made up of a mixture of processed municipal solid waste (MSW), commercial & industrial waste, and waste wood; but excluding hazardous (impregnated) waste.
SHP site	The existing Slough Heat and Power (SHP) site on 342 Edinburgh Avenue, Slough, SL1 4TU. The Proposed Development Site is located within the SHP site, which contains land for which planning permission is not being sought. The SHP site is owned by SSE Generation Ltd.
The Proposed Development	A multifuel combined heat and power (CHP) generating station of up to 50 megawatt (MW) gross electrical capacity, together with associated infrastructure. The generating station has been designed to export up to 20MW of heat to supply the existing Slough Trading Estate heat network.
The Proposed Development Site ('Site')	An area of land approximately 1.9 hectare in size for the Proposed Development set wholly within the SHP site. It is located in the administrative area of Slough Borough Council.
Further Development	Further Development on the SHP site to serve the Proposed Development and existing generating facilities, including a new central site services building, a water treatment plant and parking. The central site services building will include new stores, workshop and changing facilities. This will be the subject of a separate planning application to be submitted in parallel with the application for the Proposed Development.

Glossary of Abbreviations

Abbreviation	Term
AADT	Annual Average Daily Traffic
AAWT	Average Annual Weekday Traffic
ACM	Asbestos Containing Materials
ADMS	Atmospheric Dispersion Modelling System
AEP	Annual Exceedance Probability

Abbreviation	Term
agl	Above Ground Level
AOD	Above Ordinance Datum
AONB	Area of Outstanding Natural Beauty
APC	Air Pollution Control
APIS	Air Pollution Information System
AQMA	Air Quality Management Areas
AQS	Air Quality Strategy
ARM	Alternative Raw Material
As	Arsenic
AStSWF	Areas Susceptible to Surface Water Flooding
ATC	Automatic Traffic Counts
BAPS	Biodiversity Action Plans
BAT	Best Available Technique
BAT-AEL	Best Available Technique Achievable Emission Limits
BBOWT	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
BBS	Standard Breeding Bird Survey
BCT	Bat Conservation Trust
bgl	Below Ground Level
BGS	British Geological Survey
BH	Borehole
BIS	Business, Innovation and Skills
BNL	Basic Noise Level
BOA	Biodiversity Opportunity Areas
BoCC	Birds of Conservation Concern
BOD	Biological Oxygen Demand
BP	Before Present
BRE	The Building Research Establishment
BREEAM	The Building Research Establishment Environmental Assessment Method
BREF	The name of a BAT Reference Document
BS	British Standard
CAA	Civil Aviation Authority
C&I	Commercial and Industrial

Abbreviation	Term
CCIR/ITU	International Radio Consultative Committee/International Telecommunication Union
CCR	Carbon Capture Readiness
CCS	Carbon Capture and Storage
CCTV	Closed Circuit Television
Cd	Cadmium
CDM	The Construction (Design and Management) Regulations
CEH	Centre for Ecology and Hydrology
CEMARS	Certified Emissions Management and Reduction Scheme
CEMP	Construction and Environmental Management Plan
CEMS	Continuous Emissions Monitoring System
CFB	Circulating Fluidised Bed
CFMP	Catchment Flood Management Plan
CHP	Combined Heat and Power
CLEA	Contaminated Land Exposure Assessment
CLPVE	Critical Levels That Have Been Developed For The Protection of Vegetation and Ecosystems
CLR	Contaminated Land Report
CO	Carbon Monoxide
Co	Cobalt
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COPA	Control of Pollution Act
COSHH	Control of Substances Hazardous to Health
CP	Core Policy
Cr	Chromium
CRoW	Countryside Right of Way
CRTN	Calculation of Road Traffic Noise
CSO	Combined Sewer Overflows
Cu	Copper
CV	Calorific Value
dB	Decibels
dBA	A-weighting frequency - Acceptable Noise Decibels

Abbreviation	Term
DCLG	Department for Communities and Local Government
DCMS	Demolition and Construction Method Statement
DECC	Department of Energy and Climate Change
DEFRA	Department of Environment, Food and Rural Affairs
DETR	Department for the Environment Transport and the Regions
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DO	Dissolved Oxygen
DOE	Department of the Environment
DPD	Development Plan Document
DQRA	Detailed Quantitative Risk Assessment
DWD	Dalton Warner Davis LLP
DWS	Drinking Water Standards
EA	Environment Agency
EAL	Environmental Assessment Levels
Ecol-SSL	Ecological Soil Screening Level
EfW	Energy from Waste
EH	English Heritage
EIA	Environmental Impact Assessment
ELVs	Emission Limit Values
EMP	Environmental Management Plan
EMS	Environmental Management System
EN-1	Overarching National Policy Statement for Energy
EN-3	National Policy Statement for Renewable Energy Infrastructure
EPA	Environmental Protection Act
EPAQS	Expert Panel on Air Quality Standards
EPC	Engineering, Procurement and Construction
EPR	The Environmental Permitting (England and Wales) (Amended) Regulations 2010
EPS	Emissions Performance Standard
EPUK	Environmental Protection United Kingdom
EQS	Environmental Quality Standards

Abbreviation	Term
ES	Environmental Statement
EU	European Union
FEH	Flood Estimation Handbook
FGT	Flue Gas Treatment
FMfSW	Flood Map for Surface Water
FRA	Flood Risk Assessment
GAC	Generic Assessment Criteria
GEA	Gross External Area
GHG	Greenhouse Gas
GOMMMS	Guidance on the Methodology for Multi-Modal Studies
GP3	EA's guidance note 'Groundwater protection: principles and practice
GQA	General Quality Assessment
GVA	Gross Value Added
GW	Gigawatts
GWh	Gigawatt-hour
Ha	Hectare
HA	Highways Agency
HCI	Upstream Hydrogen Chloride Concentration
HER	Historic Environment Record
HF	Hydrogen Fluoride
Hg	Mercury
HGV	Heavy Goods Vehicle
HHRA	Human Health Risk Assessment
HLC	Historic Landscape Characterisation
HMSO	Her Majesty's Stationary Office
HPA	Health Protection Agency
HSE	Health Safety Executive
HV	High voltage
Hz	Hertz
H_2O	Water
IED	Industrial Emissions Directive

Abbreviation	Term
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
IPPC	Integrated Pollution Prevention & Control
JNCC	Joint Nature Conservation Committee.
JSA	Job Seekers' Allowance
JSP	Joint Structure Plan
JWLP	Joint Waste Local Plan
km	Kilometre
km/h	Kilometres per hour
KPIs	Key Performance Indicators
kW	Kilowatt
L_{A10}	A-weighted sound pressure level exceeded for 10% of the measured time
L_{A90}	A-weighted sound pressure level exceeded for 10% of the measured time
L_{Aeq}	Equivalent continuous A-weighted sound pressure level over a given period of time
L_{max}	The maximum of the sound pressure levels recorded over an interval of 1 second
LAQM	Local Air Quality Management
$L_{Ar,Tr}$	Free-field rating level of 50 dB by day and a façade rating level of 45 dB by night
LCA	Landscape Character Area
LCP	Large Combustion Plant
LDDs	Local Development Documents
LDF	Local Development Framework
LEN	English Heritage List Entry Numbers
LGV	Light Goods Vehicle
LNR	Local Nature Reserve
LPA	Local Planning Authorities
LQM	Land Quality Management
LRCC1	Commercial Offices, Hotel and Leisure Facilities
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Sites
m	Metres

Abbreviation	Term
M&WDF	Minerals and Waste Development Framework
m/s	Metres per second
m^2	Metres squared
MBT	Mechanical Biological Treatment
mg/Nm^3	Milligrams pollutant per normalised cubic metre of air
MJ/kg	Megajoules per Kilogram
mm	Millimetres
Mn	Manganese
MRF	Materials Recycling Facility
MSW	Municipal Solid Waste
MW	Megawatt
MWe	Megawatts Electrical
MWth	Megawatts Thermal
NATA	New Approach to Transport Appraisal
NCV	Net Calorific Value
NE	Natural England
NERC	Natural Environment Research Council
NERP	National Emission Reduction Plan
NG	National Grid
NGR	National Grid Reference
NH_3	Ammonia
Ni	Nickel
NNR	National Nature Reserves
NO_2	Nitrogen dioxide
NOPVE	National Objective for the Protection of Vegetation and Ecosystems
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Projects
NTS	Non Technical Summary
NVC	National Vegetation Classification

Abbreviation	Term
O_3	Ozone
O4B	Open4Business
ODPM	Office of the Deputy Prime Minister
Ofgem	Office of Gas and Electricity Markets
OHS	Outer Horizontal Surface
ONS	Office for National Statistics
OS	Ordnance Survey
PA	Planning Act 2008
Pb	Lead
PAH	Polycyclic Aromatic Hydrocarbons
PC	Process Contributions
PCB	Polychlorinated Biphenyls
PCPA	Planning and Compulsory Purchase Act 2004
PCT	Slough Primary Care Trust
PFRA	Preliminary Flood Risk Assessment
PIA	Personal Injury Accident
PID	Photo-ionisation Detector
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter (particles less than 2.5 micrometers in diameter)
PM_{10}	Particulate Matter (particles up to 10 micrometers in size)
POPs	Persistent Organic Pollutants
PPC	Pollution Prevention and Control
PPE	Personal Protective Equipment
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
PPS25	Planning Policy Statement 25
PPV	Peak Particle Velocity
RAMSAR	Ramsar Convention Sites
RBWM	Royal Borough of Windsor and Maidenhead
RNR	Roadside Nature Reserve
RPG	English Heritage Registered Parks and Gardens
RS	Regional Strategy
RSPB	The Royal Society for the Protection of Birds

Abbreviation	Term
RSS	Regional Spatial Strategy
RTS	Regional Transport Strategy
SAC	Special Areas of Conservation
Sb	Antimony
SBC	Slough Borough Council
SBDC	South Bucks District Council
SEGRO	Owners of Slough Trading Estate
SFRA	Strategic Flood Risk Assessment
SGV	Soil Guideline Values
SHP	Slough Heat and Power
SNCI	Sites of Nature Conservation Importance
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulphur Dioxide
SPA	Special Protection Area
SPL	Sound Pressure Level
SPZ	Simplified Planning Zone
SSAC	Site Specific Assessment Criterion
SSA2	Britwell and Haymill Regeneration Area
SSA4	Slough Trading Estate
SSI	Site of Local Scientific Interest
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SuDS	Sustainable Urban Drainage Systems
SVOC	Semi Volatile Organic Compounds
SWL	Sound Power Level
SWMP	Site Waste Management Plan
TA	Transport Assessment
TAG	Transport Analysis Guidance
tCO2e	Tonnes of CO_2 equivalent
TCPA	Town and Country Planning Act 1990
Tl	Thallium
Tpa	Tonnes per annum

Abbreviation	Term
TPH	Total Petroleum Hydrocarbons
TPM	Total Particulate Matter
TSP	Total Suspended Particles
TTWA	Travel to Work Area
TV	Television
TVERC	Thames Valley Environmental Record Centre
TWUL	Thames Water Services Limited
UK	United Kingdom
UKCP09	UK Climate Projections
URS	URS Infrastructure & Environment UK Limited
UXO	Unexploded Ordnance
V	Vanadium
VDV	Vibration Dose Values
VOC	Volatile Organic Compound
WCA	Wildlife and Countryside Act
WDF	Waste Derived Fuel
WEEE	Waste Electrical and Electronic Equipment
WFD	Water Framework Directive
WHO	World Health Organisation
WHRB	Waste Heat Recovery Boiler
WID	Waste Incineration Directive
WML	Waste Management Licensing
WRMP	Water Resource Management Plan
WRZ	Water Resource Zone
WSP	WSP Environmental Ltd
WT	Boundary Copse Woodland Trust Reserve
WTNs	Waste Transfer Notes
WWI	World War One
WWII	World War Two
ZTV	Zone of Theoretical Visibility
ZVI	Zone of Visible Influence
$\mu g/m^3$	Micrograms pollutant per cubic metre of air