Environmental Statement

Part I (text)
Volume I

December 2011

Imperial West | Masterplan

List of Contents

Technical Appendices (bound as separate document)

List of Tables

List of Figures

LIST OF ABBREVIATIONS & ACRONYMS

AADT	Annual Average Daily Traffic
AAHT	Annual Average Hourly Traffic
AAWT	Average Annual Weekday Traffic
ABH	Actual Bodily Harm
ACEC	Aggressive Chemical Environment for Concrete
ADF	Average Daylight Factor
ADMS	Atmospheric Dispersion Modelling System
AMR	Annual Monitoring Report
AOD	Above Ordnance Datum
APSH	Annual Probable Sunlight Hours
AQMA	Air Quality Management Area
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BIS	The Department of Business, Innovation and Skills
BRE	Building Research Establishment
BREEAM	Building Research Establishment & Environmental Assessment Method
BREVe3	Software package for measuring wind speed
BMU	Building Maintenance Unit
CAA	Civil Aviation Authority
CABE	Commission for Architecture and the Built Environment
CAZ	Central Activities Zone
CCTV	Closed Circuit Television
CEMP	Construction Environment Management Plan
CE&D	Construction, excavation and demolition
CIE	International Commission on Illumination
CIL	Community Infrastructure Levy
CIRIA	Construction Industry Research and Information Association
CLP	Construction Logistics Plan
CoCP	Code of Construction Practice
CHP	Combined Heat and Power
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment
CLR11	Contaminated Land Report 11
COBA	Department For Transport Transport Cost Benefit Analysis
COPA	Control of Pollution Act
CSO	Combined Sewer Overflow
CP	Construction Plan
CPZ	Controlled Parking Zones
CRTN	Calculation of Road Traffic Noise
CSH	Code for Sustainable Homes
CSM	Conceptual Site Model
CTRL	Channel Tunnel Rail Link
CTU	Clinical Trials Unit
D&A	Design and Access
DBH	Diameter at Breast Height
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment, Food & Rural Affairs
DMAG	Data Management and Analysis Group
DMRB	Design Manual for Roads and Bridges
DOE	Department of the Environment
DoH	Department of Health
DPD	Development Plan Document
DWS	Drinking Water Standards
EA	Environment Agency
EIA	Environmental Impact Assessment
EMT	Emission Factor Toolkit
EPA	Environmental Protection Act
EPUK	Environmental Protection UK's
EQS	Environmental Quality Standards
ES	Environmental Statement
ERA	Environmental Risk Assessment
ESI	Employment Status Indicator
EU	European Union
Exceedence	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations.
FDMS	Filter Dynamics Measurement System
FRA	Flood Risk Assessment
FTE	Full-Time Equivalent
GAC	Generic Assessment Criteria
GEA	Gross External Area
GLA	Greater London Authority
GIA	Gross Internal Area
GIGL	Greenspace Information for Greater London
GLHER	Greater London Historic Environment Record
GI	Ground Investigations
GP	General Practitioner
HAP	Habitat Action Plans
HEPPG	Historic Environment Planning Practice Guide
HGV	Heavy Goods Vehicle
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMP	Her Majesty's Prison
HMSO	Her Majesty's Stationery Office
HVAC	Heating, ventilation and air conditioning
IAQM	Institute of Air Quality Management
ICE	Institute of Civil Engineers
ICT	Information and Communications Technology
IEMA	Institute of Environmental Management and Assessment
IFA	Institute for Archaeologists
LA	Local Authority
LAMDA	The London Academy of Music and Dramatic Art
LAEI	London Atmospheric Emissions Inventory
LPA	Local Planning Authority
LAQM	Local Air Quality Management
LBHF	London Borough of Hammersmith and Fulham
LDF	Local Development Framework
LDFCS	Local Development Framework Core Strategy
LDV	Light Duty Vehicles (<3.5 tonnes)
LGV	Low Emission Zone
LEZ	Low Emission Zone
LIGS	Locally Important Geological Sites
LINSIG	Modelling software for traffic signal design and assessment
LIP	Local Implementation Plans
LNR	Local Nature Reserve
LOPR	London Office Policy Review
LUL	London Underground Limited
MAQS	Mayor's Air Quality Strategy
Met	Meterological
NGR	National Grid Reference
NHS	National Health Service
NO_2	Nitrogen dioxide
NO	Nitric oxide.
NO_x	Nitrogen oxides (taken to be NO2 + NO).
NPPF	National Planning Policy Framework
NRRM	Non-Road Mobile Machinery
OAPF	Opportunity Area Planning Framework
ODPM	Office of the Deputy Prime Minister
OFSTED	Office for Standards in Education, Children's Services and Skills
ONS	Office for National Statistics
OS	Ordnance Survey
PCT	Primary Care Trust
PERS	Pedestrian Environment Review System
PHV	Private Hire Vehicle
PICADY	Priority Intersection Capacity and Delay
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.
$PM_{2.5}$	Small airborne particles less than 2.5 micrometers in aerodynamic diameter
PPE	Personal Protective Equipment
PPG	Planning Policy Guidance
PPS	Planning Policy Statements
PPV	Peak Particle Velocity
PTAL	Public Transport Accessibility Level
RBKC	Royal Borough of Kensington and Chelsea
RIGS	Regionally Important Geological Sites
RSL	Registered Social Landlord
RPA	Root Protection Areas
S106	Section 106
SAAR	Standard Annual Average Rainfall
SINC	Sites of Importance for Nature Conservation
SFRA	Strategic Flood Risk Assessment
SMINC	Site of Metropolitan Importance for Nature Conservation
SSSI	Sites of Special Scientific Interest
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
SUDS	Sustainable Urban Drainage Systems
SWMP	Site Waste Management Plan
TA	Transport Assessment
TE2100	Thames Estuary 2100
TEA	Triethanolamine – used to absorb nitrogen dioxide

TEMPRO	Trip End Model Presentation Programme
TEOM	Tapered Element Oscillating Microbalance
TER	Target Emission Rate
TIA	Transport Impact Assessment
TFL	Transport for London
TLRN	Transport for London Road Network
TPO	Tree Preservation Order
TRAVL	Trip Rate Assessment Valid for London
TRL	Transport Research Laboratory
TW	Thames Water
$\mu g/m^3$	Microgrammes per cubic metre
UDP	Unitary Development Plan
ULSD	Ultra Low Sulphur tax exempt Diesel
VDV	Vibration Dose Values
VISSIM	A microscopic simulation programme for multi-modal traffic flow modelling
VSC	Vertical Sky Component
WCOA	White City Opportunity Area
WCOAPF	White City Opportunity Area Planning Framework
WHO	World Health Organisation
WRAP	Waste and Resources Action Programme

1. Introduction

1.1 OVERVIEW

1.1.1 This Environmental Statement (ES) accompanies a 'hybrid' (part detailed/part outline) Planning Application submitted by Imperial College London (hereafter referred to as Imperial) for the comprehensive redevelopment of land at Imperial West, W12 (hereafter referred to as Imperial West). The Statement has been prepared following an Environmental Impact Assessment (EIA) (commonly referred to as Environmental Assessment) of the likely significant environmental effects of the proposed development.

1.1.2 Imperial is a science-based university based on one main campus at South Kensington with eight other campuses across West London and at Ascot. Imperial's requirement for additional accommodation and constraints at its other campuses underlies the proposals which are the subject of this Environmental Statement.

1.1.3 The application site to which this Statement relates has an approximate area of 2.27ha (5.60 acres) and is bounded by Wood Lane to the west, Shinfield Street to the north, railway lines to the east and the A40 Westway to the south. On the northern boundary of the application site is the Wood Lane Studios at Imperial West development which is currently under construction and fronts Shinfield Street. This development does not form a part of the current application but is the first phase within an integrated Master Plan for the entirety of the site within Imperial's ownership which includes the application site.

1.1.4 The entirety of the application site is located within the administrative jurisdiction of the London Borough of Hammersmith and Fulham (LBHF). The boundary with the London Borough of Kensington & Chelsea (RBKC) is directly to the east. .

1.1.5 The planning application proposals represent a second and final phase of development of land within Imperial's ownership to deliver a new 'urban quarter' including new academic and education facilities.

1.1.6 The 'description of development' which is the subject of this Statement is presented in more detail in **Chapter 3 - The Proposals**. In summary however, this 'hybrid' application seeks:

detailed consent for three buildings to provide:

- § (1) an academic building (Class D1) including postgraduate teaching, day nursery, health research and restaurant facilities (Class A3);
- § (2) offices and research units (Class B1); &
- § (3) a residential building (Class C3) with Class A1 and A3 use at ground floor level;
- § together with an access road, car/cycle parking (part basement/part surface), ancillary plant and landscaping; &

outline consent for three buildings:

- § a hotel (class C1); &
- § two buildings for education use (class D1) (with Class A1/A3 space), office (class B1); and administrative uses.

1.1.7 The format of the application and its relevance to the Environmental Assessment process is considered subsequently below.

1.2 REQUIREMENT FOR ENVIRONMENTAL ASSESSMENT

1.2.1 European Community Directives 85/337/EC as amended by 97/11/EC require developers to provide information on likely environmental effects for specific projects which – set out in an Environmental Statement – must be considered by a 'determining authority' before making a decision on a planning application.

1.2.2 The Directives have been implemented in the UK by a series of Regulations implemented through the Town & Country Planning system. Most recently, the Town & Country Planning (Environmental Impact Assessment) Regulations 2011 which came in to force in England in August 2011 - hereafter referred to as 'the Regulations' - update earlier Regulations implemented in 1988 and 1999.

1.2.3 The Regulations set out the statutory provisions in respect of the content of an Environmental Statement and identify information reasonably required to assess the environmental effects of a development together with minimum requirements for the inclusion of information within an Environmental Statement.

1.2.4 In determining both the requirement for an Environmental Assessment and the content of the Environmental Statement, reference has been made to the Regulations and also to the Guidance of Circular 02/99: 'Environmental Impact Assessment' ['the Circular] which remains extant advice notwithstanding the most recent publication of revised Regulations. Further commentary on the statutory and legal context for the assessment of the proposed development is provided below.

1.2.5 Following initial consultation with London Borough of Hammersmith and Fulham (LBHF) and - having regard to the Regulations, considering the size and quantum of the proposed development and the potential for significant environmental effects to arise - Imperial accepted that the scheme would fall within Schedule 2 of the (then 1999) Regulations and voluntarily undertook to commission an Environmental Impact Assessment (EIA) of the proposed development and prepare an Environmental Statement (ES) to be submitted with the Planning Application.

1.3 STATUTORY AND LEGAL CONTEXT

Introduction

1.3.1 The Environmental Assessment has been undertaken, and this Statement prepared, in accordance with the Regulations; the Guidance contained within Circular 02/99: 'Environmental Impact Assessment'; various other guidance and best practice documents including the (former) Department of the Environment (DOE) Good Practice Guide – Preparation of Environmental Statements for Planning Projects that require Environmental Assessment, HMSO (1995); the (former) Department of the Environment, Transport and the Institute of Environmental management & Assessment Guidelines for Environmental Impact Assessment.

1.3.2 Additionally, regard has been had to a number of Court judgements interpreting the application of the European Directives to domestic planning decisions – considered separately below.

The Regulations

1.3.3 Parts I and II of Schedule 4 to the Regulations set out the requirements as to the contents of the Environmental Statements.

1.3.4 Part I – for the purposes of the definition in Regulation 2(1) of an Environmental Statement – identifies the information referred to as being "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" which includes:

"Part I

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;

(b) a description of the main characteristics of the production processes, for instance nature and quantity of the materials used; &

(c) an estimate by type and quantity of expected residues and emissions resulting from the operation of the proposed development.

2. An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.

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 archeological heritage, landscape and the inter-relationship between the above factors.

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:*

   (a) the existence of the development;
   (b) the use of natural resources; &
   (c) the emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the applicant of the forecasting methods used to assess the effects on the environment.

5. *A description of the measures to prevent, reduce and where possible offset any significant adverse effects on the environment.*

6. *A non-technical summary of the information provided under Paragraphs 1-5 of this Part.*

7. *An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information".*

1.3.5 Not all areas of the environment identified in Part I of Schedule 4 will necessarily require consideration in detail in a particular Environmental Statement. Regulation 2(1) requires under the definition on an Environmental Statement that a Statement "includes at least the information referred to in Part II of Schedule 4" which is:

"Part II:

1. A description of the development comprising information on the site, design and size of the development.
2. A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.
3. The data required to identify and assess the main effects which the development is likely to have on the environment.
4. An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.
5. A non-technical summary of the information provided under paragraphs 1-4 of this Part".

Circular 02/99: 'Environmental Impact Assessment'

1.3.6 The guidance of Circular 02/99 is various but of particular note is the assertion at paragraph 82 that:

"the emphasis of Schedule 4 is on the 'main' or 'significant' environmental effects to which a development is likely to give rise. In many cases, only a few of the effects will be significant and will need to be discussed in the ES in any great depth. Other impacts may be of little or no significance for the particular development in question and will need only very brief treatment to indicate that their possible relevance has been considered. While each ES must comply with the realistic requirements of the Regulations, it is important that they should be prepared on a realistic basis and without unnecessary elaboration".

Relevant Case Law

1.3.7 Of relevance to the 'hybrid' format of the planning application which is considered below and which includes an element of 'outline', the High Court has in R v Rochdale MBC ex-part Milne (2000) clarified the requirements for detailed information to accompany outline planning applications for development requiring Environmental Assessment. In this judgement, the Court confirmed that whilst a bare outline planning permission cannot be granted if a proposed development requires Environmental Assessment, that does not preclude the grant of outline permission provided that parameters, within which flexibility can be encompassed – are clearly defined with sufficient precision to enable the likely significant environmental effects from the development to be assessed.

1.3.8 The guiding principles established by this Judgement are that sufficient information must be provided to allow for the likely significant effects to be assessed and mitigation measures to be described. Further, the development described and assessed must be the development which is proposed to be carried out.

1.3.9 The means by which the principles of this judgement have been applied to the assessment of the significant effects of the proposed development are considered below in respect of both the 'format' of the planning application and 'methodology' of the assessment.

1.3.10 In addition to the minimum requirements for information set out in the Regulations and with the adequacy of the information submitted within it, the case of R v Cornwall County Council ex part Hardy (2001) is relevant in the context of the outline proposals. In summary, this judgment established that the assessment of any likely significant environmental effects should not be postponed until the reserved matters stage if such effects had been identified at the outline application stage.

1.3.11 This approach was endorsed by the House of Lords in Barker (2006) following Commission v UK (2006), namely that an account should be taken of the environmental effects of a proposed scheme at the earliest possible stage in the planning decision making process.

1.3.12 This Environmental Statement seeks to achieve that aim for all components of the proposed development.

1.4 METHODOLOGY

SCOPING

1.4.1 Following acknowledgement of a requirement for Environmental Impact Assessment, the process of identifying the likely significant environmental effects of the proposed development requiring investigation and the' environmental topic areas' to be included within the Environmental Statement was undertaken informed by a number of means including:-

§ reference to Schedule 4 to the Regulations, 'Information to be included in an Environmental Statement' Part I and Part II;

§ consideration of the site and its context;

§ consideration of adopted Development Plan policies within the Regional Spatial Strategy of the London Plan and the LBHF Unitary Development Plan (2003);

§ consideration of emerging Local Development Framework policies and proposals and the draft Whiter City Opportunity Area Planning Framework;

§ a review of the planning application and other history of the site and surroundings including in particular a review of the scope of any Environmental Statements for recent major developments in the wider locality;

§ consultations with LBHF Council officers in respect of a provisional list of environmental topic areas, between technical consultants and officers of the Council ,with future consultees to the planning application and with the general public and other interested parties; &

§ a review of various existing technical reports and data from earlier investigations.

1.4.2 Through these means the potentially significant environmental effects requiring investigation – and any not reasonably required to be assessed – were provisionally identified. Although not necessarily required to be considered to the same level of detail and mindful that the emphasis of the Regulations is upon the 'main' or 'significant' effects to which a development is likely to give rise, those environmental topic areas determined through these activities to be the most likely to be the subject, or source, of significant effects have been identified as follows:

Table 1.1 Aspects of the Environment & Environmental Topic Areas

Schedule 4, Part I(3) 'Aspects of the Environment'	Environmental Topic Areas
Material Assets	Archaeology, Built Heritage, Townscape & Visual
Climatic Factors	Wind, Sunlight / Daylight
Soil	Ground Conditions
Water	Flood Risk
Air	Air Quality, Transport
Population	Air Quality, Flood Risk, Noise & Vibration, Radio & TV, Socio-economics, Radio & TV, Townscape & Visual,
Fauna / Flora	Construction Management, Ecology

1.4.3 The proposed development was considered to be unlikely to give rise to significant effects upon 'aviation' given the height relative to aerodrome safeguarding thresholds and consultation with relevant authorities. Consequently this environmental topic area was not proposed to be considered within the assessment process but given subsequent changes in the heights of buildings further consideration of aviation is provided as a non-significant effect within the Environmental Statement at Chapter 18 – Residual Effects, Interrelationships, Cumulative & Non Significant Effects.

1.4.4 On the basis of the above considerations, a request for a Scoping Opinion was submitted to LBHF in June 2011. Following the submission, subsequent dialogue with officers and consideration of various consultation responses the areas of technical assessment to be included within the Statement were confirmed as follows:

- § Townscape & Visual;
- § Built Heritage;
- § Archaeology;
- § Transport;
- § Noise & Vibration;
- § Air Quality;
- § Ground Conditions;
- § Flood Risk;
- § Daylight / Sunlight;
- § Wind;
- § Socio Economic effects;
- § Ecology / Biodiveristy;
- § Construction Management;
- § Site Waste Management; &
- § TV/Radio Reception.

1.4.5 To reflect most recent best practice the energy and sustainability strategies submitted with the planning application are treated as components of the proposed development to be assessed. Consequently, their consideration and assessment is integrated within technical assessments of the Environmental Statement where appropriate. The full Energy and Sustainability information is available as technical appendices to the Environmental Statement.

1.4.6 In formulating its Scoping Opinion the Council consulted a number of statutory consultees, as designated in the Regulations - and other parties – to inform the scope of the Environmental Assessment and the Environmental Statement to accompany the planning application including:

- § Transport for London (TfL);
- § Environment Agency;
- § Natural England;
- § English Heritage;
- § RBKC;
- § NATS;
- § CAA;
- § Thames Water Utilities Ltd;
- § The Hammersmith Society; &
- § St Helens Residents Association.

1.4.7 Consideration of any potential interrelationships between effects and the potential cumulative effects of the development in association with other consented but as yet unimplemented development and/or new development under construction has also, necessarily, been given consideration and recorded in this Statement at **Section 18 – Residual Effects Cumulative Effects & Interaction of Effects.**

STRUCTURE OF THE ENVIRONMENTAL ASSESSMENT

1.4.8 On the basis of the scoping exercises and the regulatory requirements for information the structure of the Environmental Statement has been determined as follows:

PART 1 TEXT
VOLUME 1

1. **INTRODUCTION**

2. **THE SITE & ITS SURROUNDINGS**

A broad outline of the application site and its surroundings - the 'baseline environment' as it currently exists – which is potentially subject to effects arising from the development and against which effects are to be assessed.

This Section is informed by outline descriptions for the application site and immediate surroundings including; transport infrastructure, surface water features, ecology, trees, site development and planning application histories, local planning authority designations. This outline is provided as an introduction to the baseline environment to be supplemented within each technical assessment by more detailed, subject-specific, information relevant to that topic area.

3. **THE PROPOSALS**

The comprehensive development is summarised before each of the principal elements of the development are considered in more detail.

Schedule 4 to the Regulations requires at Part I (2) and II (4) that where alternatives have been considered "an outline of the main alternatives studied by the applicant and an indication of the main reasons for his choice, taking into account the environmental effects" be outlined in the Environmental Statement. The applicant's consideration of alternatives considered in respect of location, development and site arrangements is outlined.

4. **PLANNING POLICY**

An assessment of planning policy is provided to demonstrate how international, national, regional and local planning policy frameworks have been considered in the Environmental Assessment process and in the design of the proposed development. The findings of the various technical assessments have informed this assessment with more detailed consideration of the influence of policy being given within specific assessment as appropriate.

Environmental Topic Areas (Technical Assessments)

The scope of the assessments of individual topic areas is given more detailed consideration in dedicated sections below. The principal sections of the Environment Statement are set out as immediately below. A common, generic method statement to ensure a consistent approach to satisfying the requirements of the Regulations is set out further below.

TOWNSCAPE & VISUAL EFFECTS
submitted as an independent document referred to as Environmental Statement Part I Volume II

5. BUILT HERITAGE

6. ARCHAEOLOGY

7. TRANSPORT

8. NOISE & VIBRATION

9. AIR QUALITY

10. GROUND CONDITIONS

11. FLOOD RISK

12. DAYLIGHT, SUNLIGHT AND OVERSHADOWING

13. WIND

14. SOCIO-ECONOMIC EFFECTS

15. ECOLOGY / BIODIVERSITY

16. CONSTRUCTION MANAGEMENT

17. SITE WASTE MANAGEMENT

18. TV / RADIO RECEPTION

19. RESIDUAL EFFECTS, INTERRELATIONSHIPS, CUMULATIVE & NON SIGNIFICANT EFFECTS

The residual effects of the proposed development are summarised, any interrelationships between those effects are considered and the potential cumulative effects of the development will be assessed.

PART II – TECHNICAL APPENDICES

Part II includes detailed technical data assembled for baseline studies informing

technical assessments which it is appropriate to excluded from the main text. This part of the Statement also includes any relevant correspondence regarding the scoping exercise, consultation exercises and advice from expert bodies and statutory consultees.

PART III – NON-TECHNICAL SUMMARY

This part of the Environmental Statement provides summary descriptions of the development; the main alternatives considered; the relevant 'main' or 'significant' aspects of the environment subject to effects and assessment; the significance of effects; mitigation measures; and residual effects - in a format and language accessible to the public.

Having established the scope of the Environmental Assessment and the content of the Statement, the Environmental Assessment has been undertaken in six principal generic stages, which are presented in each of the environmental topic area Technical Assessments within the Statement although variations appropriate to particular disciplines have in some instances been made – in particular the Townscape & Visual Assessment in Volume II which uses in part guidelines produced by the Landscape Institute with the Institute of Environmental Management & Assessment. These stages can be summarised as follows:

1. Establishing Baseline Conditions

Establishing baseline conditions for those elements of the environment likely to be affected – as identified in the scoping process.

The baseline conditions are derived from the site (and immediate surroundings) as it exists – that is in the absence of the proposed development.

Establishing a clear understanding of baseline conditions serves to identify the character, extent, importance and vulnerability of the various components of the environment.

2. Identification & Evaluation of Key Effects

The direct, indirect and any secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative environmental effects of the project are identified - having been compared to the environmental baseline conditions identified in the step above – with those effects being considered as both:

- § effects during demolition and construction; &
- § effects during operation.

Where appropriate, the magnitude of any identified effects predicted to occur are expressed as a deviation from baseline conditions.

3. Evaluation of the Significance of Effects

This step requires levels of significance to be assigned to the effects predicted in the step above. Effects are generally categorised as being of 'major', 'minor' or 'negligible' / 'no significance' although specific terminologies apply to describing the significance of some particular environmental effects. It is necessarily a matter of value judgement and expert analysis as to whether and to what degree, an effect may be significant. Nevertheless, quantitative and qualitative criteria, guidelines and standards are applied where available and appropriate to assist evaluation.

4. Scope for Mitigation

Any significant adverse effects should be the subject of consideration for mitigation in order to avert, reduce or remedy those effects. Evidence should also consider how the proposed mitigation measures will be effective when implemented.

5. Evaluation of Significance of Residual Effects Following Mitigation

As for stage 3 above, this stage similarly requires value judgments to assign levels of significance are assigned to residual - or unavoidable - effects which mitigation cannot wholly remedy.

6. Monitoring

Provisions for monitoring the actual effects of the development relative to those predicted are desirable to test the effectiveness of the identified mitigation measures in order to ensure the least possible effect on the environment. Such measures may ultimately be required to be implemented by condition on any planning permission or by legal agreement, thereby enabling enforcement.

All of the above considerations are applicable to all stages of the development process, i.e. during construction and during operation, with any commissioning/reinstatement considerations principally being relevant to post-construction matters in respect of the site construction office/material storage areas etc.

Care has been taken to ensure that the effects, if any, arising from the assessment work has been the subject of discussion and review with the project team. This has helped in identifying potential inter-relationship effects between topics.

The masterplan proposals for the site have been informed by environmental baseline condition assessments undertaken by the applicant when first considering the comprehensive redevelopment of the site in conjunction with the Wood Lane Studios at Imperial West development. Subsequent assessments have been integrated with the design process for the proposals which are the subject of this Statement. This early consideration of environmental conditions has allowed the design of the proposed development to respond to the environmental constraints, to identify the likely adverse and beneficial environmental effects of the proposed development and to incorporate mitigation through site planning and building design, identify other mitigation measures and embody beneficial features.

1.5 FORMAT OF THE PLANNING APPLICATION

1.5.1 Planning permission is sought for the development by means of a 'hybrid' planning application. With regard to the elements for which permission is sought in outline, the Town & Country Planning (Development Management Procedure) (England) Order 2010 sets out the information required to support an outline planning application and defines 'Reserved Matters' as any of the following matters in respect of which details have not been given in the application:

- § access
- § appearance
- § landscaping
- § layout; &
- § scale.

1.5.2 The Order confirms what information is required in the event that a particular matter is reserved as detailed consideration will always be required on the use and amount of development. In addition, even if appearance, layout, scale and access are reserved, an outline application will still require a basic level of information on these issues. As a minimum, therefore, applications should always include information on:

- § Use – the use or uses proposed for the development and any distinct development zones within the site identified.
- § Amount of development – the amount of development proposed for each use.
- § Indicative layout – an indicative layout with separate development zones proposed within the site boundary where appropriate.
- § Scale parameters – an indication of the upper and lower limits for height, width and length of each building within the site boundary.
- § Indicative access points – an area or areas in which the access point or points to the site will be situated.

1.5.3 The planning application is submitted with the following documents:

- § Planning Statement;
- § Design and Access Statement for the Master Plan (outline elements);
- § Design & Access Statements for buildings C, D and F (detailed elements);
- § Sustainability Statement;
- § Energy Strategy;
- § Statement of Community Involvement;
- § Statement of Management;
- § Transport Assessment;

- § Residential and Work Place Travel Plans;
- § Servicing & Delivery Management Plan for buildings C, D and F;
- § PERS Review; &
- § Transport Assessment.

1.5.4 In the context of the regulatory requirements governing the Environmental Assessment process and production of an Environmental Statement - and the legislative requirements and guidance for information to accompany both outline applications and applications including proposals for tall buildings, the approach to the provision of the requisite information is outlined below.

1.5.5 The Master Plan Design & Access Statement - including Plot Developments Design Guidelines - provides an overarching design and access statement for the proposals as a whole. The Master Plan also indicates the location for all land uses proposed, access points, landscaping and open space provision. Individual Design and Access Statements provided for each of buildings C, D and F provide more detailed information about the design and access arrangements for those components of the development.

1.5.6 The provision of information for the purposes of the detailed elements of the hybrid application together with the Master Plan and Plot Developments Design Guidelines which provide information on the outline elements and which variously set out the general arrangement of infrastructure and built development - provide information sufficient to 'describe' the development which is proposed to be carried out and for the environmental effects to be assessed. Section 3 – Proposals below sets out the information submitted with the planning application.

1.5.7 The material submitted with the application provides a framework of information on uses, locations, amounts and heights of development sufficient to condition and control any subsequent planning permission to a 'framework' within which Reserved Matters for the outline elements can come forward and for which the likely significant environmental effects will have been assessed.

1.5.8 Similarly, the information provided in the Design & Access Statements and illustrative material is submitted to demonstrate how design quality can be achieved and secured at this application stage for the elements proposed in outline and provides a means for design quality to subsequently be controlled through 'Reserved Matters'.

1.5.9 For the outline elements of the planning application, technical assessments have been undertaken on the basis of the fixed amount of floorspace applied for. A 3D model issued for the purposes of microclimate assessments – wind and sunlight and daylight - and townscape and visual assessments applied the detailed design for those elements for which detailed consent is sought and fixed building 'envelopes' for the outline elements.

1.5.10 In this way, mindful of, and consistent with, the principles established in the 'Rochdale Judgement', the outline planning application provides sufficient information on those elements of the development for the determining authority to assess the likely significant environmental effects.

1.5.11 The use of conditions in any planning permission to tie subsequent Reserved Matters applications to the 'description of development' - referenced to the Master Plans and Plot Developments Design Guides - will ensure that the elements of the development that come forward is consistent with the development for which the environmental effects will have been assessed.

The Role of Environmental Assessment in Decision Making

1.5.12 The acceptability of the proposed development is required to be determined in accordance with the 'Development Plan' unless material considerations indicate otherwise. The Planning Statement and other documentation submitted with the application address the planning policies relevant to the site and sets out the material considerations which need to be taken into account. The Regulations however also require that consideration be given to all the available 'environmental information' which includes the Environmental Statement but also information provided by statutory consultees and third parties before the grant of planning permission.

1.5.13 The following research and technical analyses of the likely significant environmental effects of the development and any recommended mitigation is provided to assist LBHF in its determination of the planning application. The Council's consideration of the residual environmental effects of the development will inform its judgement of the overall environmental acceptability of the proposals.

1.5.14 Planning Application documents and the Environmental Statement and Technical Appendices can be viewed at:

Planning Division, Environment Services Department
London Borough of Hammersmith and Fulham
Town Hall Extension
King Street
London W6 9JU
where comments should be addressed.

1.5.15 Copies of the Environmental Statement are available at a cost of £175. Individual copies of the Non-Technical Summary are available free of charge. Requests for copies of the Environmental Statement should, in the first instance, be addressed to:

Jones Lang LaSalle
Planning & Development (Ref: TB)
Hanover Square
London W1S1JA.

2. The Site and Surroundings

2.1 INTRODUCTION

2.1.1 This Chapter provides a broad outline of the 'baseline environment' – the environment as it currently exists – which is potentially subject to effects arising from the development and against which any effects can be assessed.

2.1.2 An understanding of the baseline environment has been informed through consideration of the planning application 'history' of the site and immediate surroundings[1]; walkover surveys and various technical assessments which include consideration of previous uses; together with consideration of local planning policy designations and other national, regional and local planning policy considerations relevant to the development.

2.1.3 The application site as demarcated by the red line boundary on Figure 2.1 is approximately 2.27 hectares (5.60 acres) in area. The site is bounded by the A40 Westway to the south, Wood Lane to the west, Shinfield Street to the north, and West London Line railway to the east. The Royal Borough of Kensington and Chelsea (RBKC) boundary runs along the West London Line. Brick boundary walls and fence lines currently surround the site which is not publicly accessible.

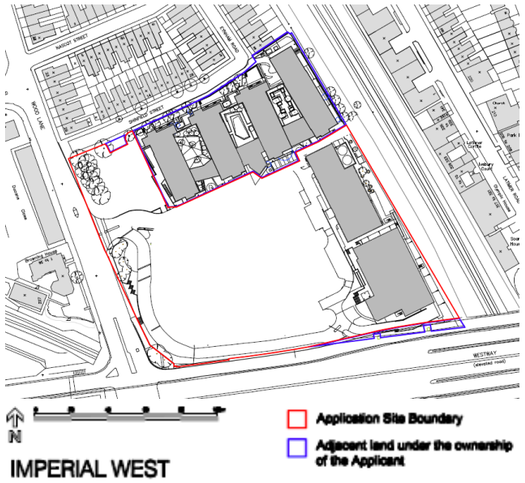


Figure 2.1: Red Line Application Site Boundary

2.1.4 The application site previously accommodated approximately 28,000 sq m of principally office floorspace for the BBC with a gym/sports centre, nursery, catering and plant rooms and approximately 240 car parking spaces. The majority of buildings have been demolished and the application site now consists of the only retained buildings – an office and the sports centre - hardstanding, construction operations and disturbed ground related to the Wood Lane Studios at Imperial West development.

2.1.5 The area surrounding the application site is a mix of commercial, industrial and predominantly 19th Century residential buildings and is consequently characterised by a diversity of built form. The transport infrastructure to the south (an elevated section of the A40/Westway) and east (railway viaduct) forms visual and physical barriers between the application site and the surroundings. To the west are four/five storey blocks of flats with commercial uses at ground floor.

2.1.6 The land beyond the Westway to the south is occupied by large industrial sheds and warehouses including a Marks & Spencer distribution centre, BBC Television Centre and further to the south, beyond the White City Underground Station, the Westfield Shopping Centre. The Edward Woods Estate lies to the south east of Westway and contains five residential towers built between 1966-70 which are 21-23 storeys in height with Grenfell House being the tallest at 67m located on Latimer Road.

2.1.7 Beyond the railway line to the east are a series of commercial properties and an extensive area of established residential properties - the historical development and form and scale of which is considered in detail at **Chapter 5 - Built Heritage**.

2.1.8 To the north of the application site lies the Wood Lane Studios at Imperial West development. This development was granted planning permission (ref: 2010/02218/FUL) in November 2010 and is currently under construction to provide 606 postgraduate units of student accommodation and 9 Class C3 residential units for Imperial College staff. The development is programmed for completion by Summer 2012 so that the postgraduate accommodation is available for the start of the 2012 academic year.

2.1.9 A small selection of convenience stores and other facilities can be found opposite the site to the west and within the BBC Media Village. The main retail and leisure facilities in the area are located around Shepherds Bush Green, a 15 minute walk to the south. The Westway Sports Centre is located to the south east of the site underneath the elevated sections of Westway and contains tennis courts, climbing walls, leisure facilities, and five-a-side football pitches further east.

2.1.10 Land to the north is largely two and three storey, private residential in nature, with traditional pitched roofs, primarily Edwardian in character. Immediately to the east of the railway lines is a band of mixed, mostly industrial, low scale properties, and further east and north the residential areas of north Kensington

2.1.11 Further to the north west a broad mix of sites including a secondary school, Latymer School Sports Grounds, Hammersmith Hospital, Wormwood Scrubs Prison, the Linford Christie Stadium, and Wormwood Scrubs Pony Centre. Wormwood Scrubs Park is large open space and playing fields area further still to the north west. Du Cane Road links most of these areas to Wood Lane just 100m from the Imperial West site.

Access and Transport

2.1.12 Vehicular and pedestrian access to the application site is from a single point of entrance on Wood Lane which leads to an access road that serves the site. A set of steps from the pavement on Wood Lane also serves as pedestrian access into the site.

2.1.13 The application site and the surrounding local area are served by an extensive range of public transport services. Bus routes and bus stops along Wood Lane and Du Cane Road provide a range of services between and the site is within walking distance of London Underground services serving the Central, Hammersmith & City and Circle Lines with stations at White City, Wood Lane, Westfield, Hammersmith and Shepherds Bush Market.

2.1.14 Overground and other National Rail Services (Southern Train Services) which are available from White City, Wood Lane, Westfield and Hammersmith tube stations as well as Shepherd's Bush Market tube station and interchange.

2.1.15 Designated cycle routes and lanes are available on Shinfield Street and Wood Lane and advisory cycle lanes are provided along Du Cane Road and on Wood Lane north of the Du Cane Road junction. More detailed consideration of the baseline access and transport conditions is provided in **Chapter 7 – Transport**.

Heritage and Townscape

2.1.16 The site does not contain or adjoin any buildings listed as being of special architectural or historical interest and is not located within a Conservation Area. There are several listed buildings, Conservation Areas and other built heritage 'assets' in the immediately surrounding area considered subsequently below.

2.1.17 There are twenty buildings listed as being of special architectural or historical interest at Grade II* or Grade II within a 1km radius of the application site and four Conservation Areas – Old Oak & Wormholt, Wood Lane, Oxford Gardens & St Quintin and Avondale Park Gardens. There are also five buildings designated by LBHF as 'Buildings of Merit'.

2.1.18 Detailed consideration of the built heritage baseline environment and the townscape characteristics of the application site and its surroundings is provided in **Chapter 5 – Built Heritage** and in **Volume II** of this Statement in **Townscape & Visual Impact Assessment.**

[1] The immediate surroundings considered included adjoining sites and beyond within an approximately 1km radius from the boundary of the site. The identification of 'surroundings' relevant to the application site and of schemes for possible inclusion in the assessment of cumulative effects necessarily involves judgement and neither the area of search or size criteria are intended to be prescriptive or exclusive.

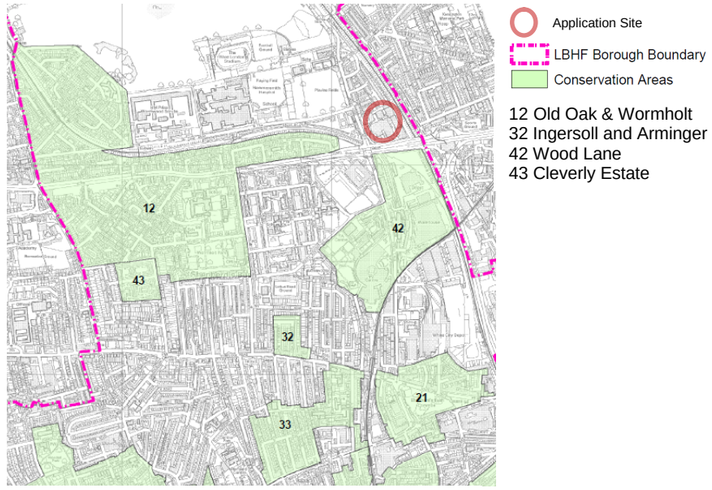


Figure 2.2: LBHF Conservation Areas

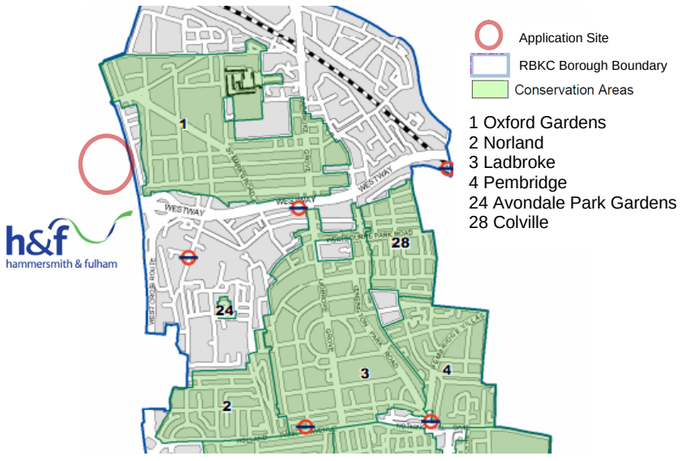


Figure 2.3: RBKC Conservation Areas

Surface Water Features

2.1.19 The entirety of the application site is identified in the Environment Agency's flood maps as being located within Flood Zone 1 - an area at low risk of flooding i.e. not at risk from fluvial or tidal flooding during the 1 in 1000 year event. The nearest above ground watercourse to the site is an unnamed drain located adjacent to the north eastern corner of the site between the site and the railway line. There are no other surface water features on or within 500m of the site - the Grand Union Canal – Paddington Branch being approximately 1 km to the north of the site. Consideration of flood risk is provided in **Chapter 11Flood Risk**.

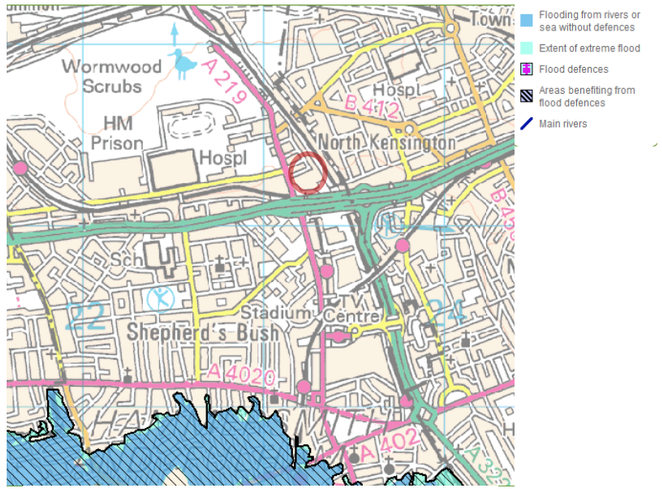


Figure 2.4: Environment Agency Flood Map

Nature Conservation Features

2.1.20 The previously developed site is predominantly occupied by buildings, hardstanding, construction spoil and plant associated with the Wood Lane Studios at Imperial West development. The site has some small areas of planted borders and amenity grass/landscape areas located principally at the boundaries of the site together with some young and semi mature trees – none of which are subject to Tree Preservation Orders (TPOs). The site is otherwise largely devoid of vegetation and is not subject to any statutory or non-statutory designations in respect of nature conservation interest.

2.1.21 Railway land to the east of the application site is identified as a 'Rail Side Habitat' designated within the LBHF UDP as a Nature Conservation Area – Area of Grade I Borough-wide Importance.

2.1.22 Consideration of the effects of the proposed development upon the ecology and biodiversity of the site is considered in **Section 15 – Ecology/Biodiversity.**

Topography & Ground Conditions

2.1.23 Levels vary across the site due to ground works carried out over past generations. At the site perimeter the ground is broadly level on the northern boundary through the Wood Lane Studios development to the Shinfield Street pavement. On Wood Lane the road and pavement rise gradually by almost 2m from near Shinfield Street towards Westway. The main access road drops into the main site which is between 1.5m to over 2.5m below the adjoining land. A series of steps and retaining walls evidence these level changes along Wood Lane. The lowest level is in the south east corner of the site where it is at least 3.0 to 4.0m below the grade level under Westway. A further series of existing steps and retaining walls accommodate these changes of levels close to the concrete support column structures of Westway in the south east corner of the application site.

Air Quality

2.1.24 The entirety of the London Borough of Hammersmith & Fulham is within an Air Quality Management Area (AQMA) declared in respect of nitrogen dioxide NO2 and Particulate Matter < 10 µm PM10 levels which exceed national objectives. The effects of the development upon air quality are considered further in **Chapter 9 – Air Quality**.

Application Site History

2.1.25 A summary of the application site's development history referenced to Ordnance Survey (OS) data is provided below with more detailed information and analysis of the site's origins available, in particular, within Chapters 5 and 6 – concerning Built Heritage and Archaeology respectively.

2.1.26 Ordnance Survey records show that in 1893 the site was open land and the southern edge had become part of the Eynham Brickfields.

2.1.27 In 1914, OS data shows that the application site was laid out with two streets – Forsbrook Street and Kirkbridge Street. The residential area of Shinfield Street is shown to abut the site to the north. The south western corner of the site is 'clipped' by a railway siding.

2.1.28 In 1955, OS data shows that the site was occupied by railway lines running north west – south east, with a large engineering works on the eastern edge of the site, a metal casting works on the northern boundary, a perfumery towards the north eastern boundary, with a foundry and fire fighting apparatus works towards the centre of the site.

2.1.29 The Westway (A40) on the southern boundary of the site was constructed between1964 and 1970.

2.1.30 OS data identifies the site in 1972 as being occupied by several warehouse buildings and part of the engineering works in the north eastern corner.

2.1.31 In 1981, the BBC developed the site as a base for BBC Enterprises (the forerunner of BBC Worldwide, the BBC's commercial subsidiary) and a base to co-locate all of its Studio Capital Projects. The BBC occupied most of the site until it moved to the Media Village just to the south of the Westway.

2.1.32 Imperial College bought the site in September 2009 and submitted a planning application for the Wood Lane Studios at Imperial West in July 2010 which was granted consent in November 2010.

2.2 PLANNING HISTORY

2.1.33 Consideration has been given in the preparation of the Environmental Statement to the 'planning history' for the application site and immediate surroundings for which available records date back to 1961. A schedule of the potentially most relevant planning applications is provided at Table 2.1 below.

2.1.34 The most recent planning application history is concerned with land adjoining the application site concerning the permission and submission and approval of details pursuant to conditions attached to the planning permission for the Wood Lane Studios at Imperial West development. This development was preceded by a series of planning approvals across the site, submitted by former owners the BBC for alterations and extensions to the various units on site including permission for the provision of additional office floorspace. In addition to the planning applications of principal interest relating to current development and the operations of the BBC summarised in Table 2.1 there have been a number of applications for minor operations, including replacement of windows, external staircase, additional access lane and traffic lights (withdrawn) and equipment cabin and a transmitter dishes.

Table 2.1: Planning History of the Application Site & Adjoining Land

No	Application Ref Date received	Description	Decision Date
1	2011/00437/CONDS 08/04/2011	Enforcement Enquiry (Subsequently remedied)	Case Closed 08/04/2011
2	2011/00441/DET 08/02/2011	Submission of details for demolition and construction method statement pursuant to Condition 13 of Planning Permission 2010/02218/FUL granted 26 November 2010	Approved 26/05/2011
3	2010/04062/DET 23/12/2010	Submission of details for Layout of Amenity Space pursuant to Condition 4; submission of details for Boundary Treatment pursuant to Condition 14; submission of details for Sound Insulation pursuant to Condition 37; submission of details for Noise Exposure pursuant to Condition 44 of Planning Permission 2010/02218/FUL granted 26 November 2010.	Approved 26/05/2011
4	2010/03957/DET 03/12/2010	Submission of details for Tree Protection pursuant to Condition 12; submission of details for Temporary Fencing pursuant to Condition 15; submission of details for Television Interference pursuant to Condition 29; submission of details for Sustainable Urban Drainage and Surface Water Run Off pursuant to Condition 34 and 35; submission of details for Kitchen Exhaust Control pursuant to Condition 36; submission of details for Archaeology Investigation pursuant to Conditions 41 and 42; submission of details for Bat Boxes pursuant to Condition 43 of Planning Permission 2010/02218/FUL granted 26 November 2010	Approved 15/02/2011
5	2010/02218/FUL 13/07/2010	Redevelopment of part of Imperial College Campus Woodlands, which comprises the erection of postgraduate student accommodation buildings comprising 606 units, 9 x residential units (Class C3) and 120sqm GEA of Class D1 floorspace plus ancillary facilities, access, parking, cycle storage, ancillary plant, landscaping and public realm	Approved 26/11/2010
6	1998/01714/FUL 04/08/1998	Erection of an additional floor at first floor level to existing single storey building to create 1008 sq m. of office floorspace.	Approved 07/04/1999
7	1996/01582/FUL 03/09/1996	Erection of a single storey extension to Block C to provide additional office floorspace.	Approved 24/10/1996
8	1994/02083/FUL 07/12/1994	Erection of single storey extension to Block C to provide office canteen.	Approved 16/01/1995
9	1991/00928/OUT 06/06/1991	Construction of sports facilities (Class D2) and 81 replacement car parking spaces.	Approved 02/02/1993
10	1988/02240/FUL 31/10/1988	Change of use of the ground floor of Block "D" from warehousing to a children's nursery for B.B.C employees together with minor external alterations to the elevations.	Approved 16/01/1990
11	1988/01892/FUL 08/09/1988	Erection of a two storey temporary building (portakabin) for use as offices.	Approved 03/01/1989
12	1987/01495/FUL 06/07/1987	Alterations to access road and erection of a security kiosk.	Approved 25/09/1987
14	1987/01605/FUL	Creation of additional access lane and installation of traffic lights.	Application Withdrawn 25/09/1987
15	1985/01675/FUL 12/08/1985	Provision of 27 additional car parking spaces.	Approved 15/10/1985
16	1985/00545/FUL 19/03/1985	Alterations to the ground floor elevations (installation of new windows) and erection of two plant rooms at roof level.	Approved 11/04/1985

2.1.35 With the exception of the Wood Lane Studios at Imperial West development and some of the BBC's former activities the planning history of the application site and immediate surroundings is otherwise characterised by a series of planning permissions for relatively minor developments which are not of a nature or scale to usefully inform the Environmental Assessment process. In this regard the significance of the 'planning history' of the site as a potential information source to inform the Environmental Assessment is limited.

2.1.36 More detailed information on the 'baseline environment' and conditions subsisting at the time of the Environmental Assessment specific to particular assessments is provided within the various technical chapters of this Statement.

3 The Proposals

3.1 DESCRIPTION OF DEVELOPMENT

3.1.1 The summary description of development, the effects of which are assessed within the Environmental Statement, is for the demolition of existing buildings and redevelopment for a mixed use comprising educational, residential, retail, hotel, leisure and other uses with associated public realm and open space; and associated highway infrastructure.

3.1.2 The formal description of development for the planning application is:

Hybrid planning application (part detailed/part outline) for the Imperial West ('Woodlands') site comprising detailed application for 3 buildings: (1) academic building (9 storeys/23,077 m2) (Class D1) including day nursery, health research and restaurant facilities (Class A3); (2) Offices and research units (part 6, part 12 storeys/22,528m2) (Class B1) of which 77sqm (Class A1/A3) and 313sqm (Class A3); and (3) 35-storey residential tower (Class C3) providing 20,324m2 of floorspace in total, 192 units (59 of which are key worker units) and 319m2 of A1/A3 floorspace at ground floor level; along with an access road, car/cycle parking (part basement and part surface), ancillary plant and landscaping; outline application for the erection of 3 additional buildings comprising a hotel (13 storeys/14,500 m2) and 2 further buildings to be used for education (7 storeys/ 6,500 m2) (Class D1) of which 600sqm (Class A1/A3); office (Class B1) and administrative uses (part 3, part 5 storeys/5,900 m2); and demolition of existing sports hall building (Class D1) and existing office (Class B1).

3.1.3 The planning application 'red line' boundary within which the developments are proposed is provided below as Figure 3.1. Each of the principal elements of the development are considered in more detail below. Consideration of the construction methodology and phasing is provided in the Construction Management at Chapter 16 which has informed assessments of effects on traffic, noise and vibration and air quality during demolition and construction which are considered in Chapters 7, 8 and 9 respectively. A summary of the proposed phasing and demolition programme is provided further below.

3.2 Key Components of the Proposals

Masterplan

3.2.1 The Masterplan for the application site seeks to provide a mixed use urban quarter to include new facilities for Imperial College within the wider White City Opportunity Area.

3.2.2 The Masterplan encompasses Imperial College's strategy to provide a range of uses for its own purposes at the site including postgraduate student accommodation (delivered as part of the Wood Lane Studios at Imperial West development currently under construction); academic and technology transfer space; administrative support facilities; new flexible teaching and conference space; and various support facilities.

3.2.3 Due to the scale of the site, the Master Plan also accommodates a wide range of other non-academic and commercial uses including key worker and private residential accommodation; offices; hotel; convenience retail; and other support facilities. Such facilities include a fitness centre; an 'early years' nursery; a Health Centre; and a range of café/restaurant spaces generally around a new 'urban square' located at the heart of the development.

3.2.4 In summary the Master Plan seeks to :

- § create a new urban quarter within the White City Opportunity Area;
- § provide a mixed use development;
- § implement Imperial College's academic and spatial growth strategy;
- § create new homes and wide range of new employment opportunities;
- § provide a safe and vibrant community;
- § create a new visual and physical permeability to integrate the site with the existing wider community;
- § provide a fragmented built form to provide interest and variation in scale and massing, sensitive to the location and context;
- § create an exemplar focal tall building presence on the routes into and out of London;
- § create high quality architecture and public realm; &
- § accommodate a strategy for a progressive, phased, redevelopment.

3.2.5 **Hybrid Application**

3.2.6 The planning application is a 'hybrid' submitted part in outline and part with full details. The format of the application is considered above in Chapter 1 – Introduction.

3.2.7 Together with landscaping, the building plots of the 'Detailed Elements' of the application are:

- § Building C Biomedical and Health research facilities; an education faculty, publicly accessible café, restaurant, day nursery and health centre
- § Building D New Business Incubator and Offices;
- § Building F Residential building with ground floor retail /café / restaurant uses;
- § Underground car park; &
- § A Central Square.

3.2.8 The building plots of the 'Outline Elements' of the application are:

- § Building A Imperial academic and office uses and ancillary retail uses;
- § Building G Imperial academic and office uses and ancillary retail uses; &
- § Building E Hotel.

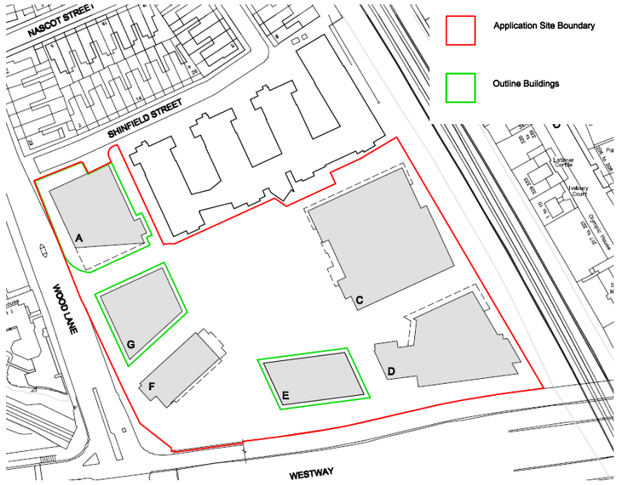


Figure 3.1: Plot Boundary Plan with Outline Application Buildings

3.2.9 A Gross External Area (GEA) Schedule confirming the areas for which planning permission is sought and a Gross Internal Area (GIA) breakdown of uses for the purposes of assessing car and cycle parking provisions and employment generation - are provided in the tables below.

Table 3.1: Gross External Areas including Basement

Building	GEA (sqm)	GEA (sq ft)
A	5,900	63,507
C	23,077	248,378
D	22,528	242,469
E	14,500	156,064
F	20,324	218,744
G	6,500	69,960
Total	**114,351[1]**	**1,230,763**

[1] GEA –areas and floors include basement and roof level plant areas.

Table 3.2: Areas and Uses for Each Building

Building	Use	GIA (m²)
A	Offices	5723
C	Health Centre	2318
	Nursery	1029
	Research & Teaching Facilities	16464
	Restaurant	2127
	Day Nursery	1029
	Total	**21,939**
D	Office	10,155
	Incubator Space/Teaching/Admin	7978
	Retail	77
	Café/ Restaurant	313
	Small Business Space	622
	Total	**19,145[1]**
E	Hotel	11570
	Gym	850
	Restaurant/Bar	1080
	Conferencing Facilities	275
	Total	**13775**
F	Affordable Residential	5180
	Private Residential	12589
	Restaurant	319
	Total	**18088[2]**
G	Office	5705
	Café / Retail	600
	Total	**6305**
Total development area		**108,195**

3.2.10 The proposed maximum heights of the various buildings are contained in the table below.

Table 3.3: Maximum Heights of Proposed Buildings

Building	Maximum Proposed Storey Heights	Maximum Height (AOD)
A	5	34.0
C	9	50.4
D	12	60.24
E	13	57.3
F	35 (maximum height to top of design feature)	121.00 (146.97)
G	7	41.97

[1] excludes some 1162 sq m areas of plant and basement.
[2] excludes some 1461 sq m of plant and basement.

OUTLINE ELEMENTS

3.2.11 In accordance with the Governments Circular 01/06 (Communities and Local Government): Guidance on Changes to the Development Control System (2006) and Town and Country Planning (Development Management Procedure)(England) Order 2010 Part 2 Article 4, approval is sought for the outline elements of the planning application for:

§ Use – the use or uses proposed for the development and any distinct building plots within the site identified.

§ Amount of development – the maximum amount of development proposed for each use.

§ Indicative layout – an indicative layout showing separate building plots proposed within the site boundary where appropriate.

§ Scale parameters – an indication of the upper and lower limits for height, width and length of each building within the site boundary.

§ Means of Access – areas in which the access point or points to the site will be situated.

3.2.12 The development of individual buildings is outlined as follows.

Imperial College Academic and Office Use

3.2.13 **Building A** is proposed to be located in the north west corner of the site on corner of Wood Lane and Shinfield Street. The building is proposed to be directly to the north of the main vehicular access to the site from Wood Lane. The building will accommodate Imperial uses including offices and academic floorspace. Building A will provide a maximum floorspace of 5,900 sqm GEA over 5 storeys to a maximum height of 34m AOD.

3.2.14 The Design Guidelines for Building A set out in the Design and Access Statement seek:

§ a defined building line on the north and west façades;

§ West and North facades set out orthogonal to the Master Plan site geometry;

§ a ground floor colonnade (2 floors maximum) to west and south facades;

§ an angled chamfer to lower two floors of south facade to create an open vista at the site entrance;

§ that Buildings A & G to relate to one another to create a gateway approach at the main site entrance;

§ a minimum of 12m between buildings A & G;

§ a minimum of 12m between buildings A & B1 (excluding any escape stairs);

§ a set back on the North facade to relate to the 3 storey units J1-J3 on Shinfield Street;

§ that any external escape stairs not within the main building footprint are preferably only located on the East elevation;

§ that active frontages and main building entrances are preferably located on the chamfered South facade/ South East corner; &

§ that Buildings A &G respect visibility splays required at the main site entrance.

Hotel Building

3.2.15 **Building E** is proposed to be located on the southern boundary of the site abutting the A40 / Westway. Building D the Technology Transfer Building is immediately to the east and Building F the tall building to the west.

3.2.16 The building will provide a maximum of 14,500 sqm GEA of hotel floorspace which is anticipated to accommodate approximately 200 beds. It will provide 4 star hotel accommodation, together with a conference centre of some 268 sqm GIA and gymnasium leisure facilities of 723 sq m GIA to a maximum height of 57.3 m AOD.

3.2.17 The building will also incorporate a bar/restaurant/café to a maximum floorspace of 918 sqm GIA.

3.2.18 Imperial is currently in discussions with hotel operators in relation to building E and is likely to partner with a 4-star operator. However, as the hotel operator has not been selected to develop the brief for the building, as only outline consent for Building E at this stage.

3.2.19 **Building G** is proposed to be located on the west side of the site, to the south of Block A and the main vehicular access from Wood Lane. The building will accommodate Imperial offices and will provide education and academic floorspace. It will provide a maximum of 6,500 sqm GEA of floorspace over 7 storeys to a maximum height of 44.61 m AOD.

3.2.20 Some 600 sqm GIA of convenience retail space would be offered at ground floor level.

DETAILED ELEMENTS

3.2.21 **Building C Biomedical & Health Research Facilities**

3.2.22 **Building C** may be occupied by the School of Public Health and be located on the east side of the site to the south of the postgraduate

development (Building B) currently under construction and abutting the railway line boundary.

3.2.23 Building C is proposed to be a low carbon building for which the design aspiration is to achieve an 'Excellent' rating under the BREEAM environmental assessment method (2010). Key design objectives have been to minimise the use of energy and water; maximise recycling and reuse of materials whilst providing an indoor climate that is safe; flexible; comfortable; promotes learning and people productivity. Further details are contained within the **Technical Appendix 3.1 Sustainability Statement**.

3.2.24 Building C will primarily offer research, education and computational spaces as well as providing a range of complementary uses. Building C will offer a maximum of 23,077 sqm GEA of floorspace for office and laboratory based research, a postgraduate education centre, conferencing teaching and clinical uses.

3.2.25 The building is proposed to be 9 storeys (Max 50.0m height of AOD) within which the broad disposition of uses across each of the floors is considered further below.

Lower Ground Floor

3.2.26 The lower ground level is proposed to have a 250 seat lecture theatre with break out space. This level will also accommodate most of the building support uses.

3.2.27 Approximately 265 staff and student cycle storage spaces will be provided on this floor. This floor will also include changing facilities with showers and lockers. Access to the cycle parking will be through the use of a dedicated staircase with rill or via a lift from main entrance. 20 visitor cycle parking provisions will be located at ground level as part of the external landscaping.

3.2.28 It is proposed to combine the delivery and waste collections for both Building C & D in order to centralise the extent of 'back of house' uses for each building. The intent is to accommodate these provisions on the lower ground level of Building C accessed directly via the lower level of Building D.

3.2.29 A single Energy Centre will be situated within the eastern side of the lower ground level in Block C. The Energy Centre will supply heating to all buildings within this application via a district heating network. The Energy Centre will house gas-fired Combined Heat and Power (CHP) plant, likely to be modular and installed in a phased approach as the construction of the buildings progresses.

3.2.30 An energy assessment has been undertaken and an Energy Statement has been submitted with the planning application, a copy of which is included as **Technical Appendix 3.2.**

Ground Floor

3.2.31 The ground floor of Building C is proposed to accommodate a range of uses to engage the public and introduce active frontages to the public square. A central atrium on the ground floor will be used for the main reception and waiting area.

3.2.32 A restaurant / cafe of 2,127 sq m GIA with over 200 'covers' is proposed on the south side with possible seating opportunities on the space between Building D. A servery and kitchen is to 'wrap around' the south eastern corner with access to kitchen deliveries via lower ground floor.

3.2.33 A 1029 sq m GIA Day Nursery for 100-140 children of age 0-5 is proposed to be located on the north side of the building wrapping around the north eastern corner and overlooking the railway embankment. The space between Building C and the Wood Lane Studios development currently under construction will be used as a designated outdoor play area for the nursery with some 251 sq m.

3.2.34 A lift / stair lobby on the north western corner is proposed to take visitors to a first floor Health Care facility. The main escape route for the building is designed to discharge occupants to the eastern façade.

First Floor

3.2.35 The First Floor is proposed to accommodate a 1,029 sq m GIA Health Centre.

3.2.36 The Health Centre will serve Imperial staff and students and will be open to the general public offering a wide range of health care and diagnostic services.

3.2.37 This facility will be provided with a separate and secure entrance. A shared drop off / disabled parking area is also incorporated.

3.2.38 The Health Centre will be accessed via a dedicated lift / stair core on the north western corner. The Health Centre will be a stand alone facility with no direct link to the central entrance of the building apart from emergency escape arrangements.

3.2.39 The south western corner of this floor is proposed to accommodate additional restaurant / cafe use located on the ground level, linked via a double height lobby.

Second Floor

3.2.40 The northern side of the second floor accommodates the School of Public Health's Clinical Trials Unit (CTU). Imperial's CTU delivers clinical trials and other high quality research. These trials and research projects help to develop and test new healthcare interventions, drugs and therapies to the highest scientific standards.

3.2.41 The CTU floor is provided with a dual link, one to the first floor Health Centre via the dedicated lift / stairs from the north western corner, and another to the School of Public Health via the central core.

Third Floor

3.2.42 This floor is proposed to accommodate the majority of the postgraduate teaching facilities including a student information centre / 'hub', several lecture halls for up to 120 people, quiet study areas, shared break out spaces and administration / support facilities.

3.2.43 The massing of the building incorporates a set back on the third floor which will create an external south facing terrace. A student cafe is set centrally on the southern side of the building with access to the south facing terrace.

Fourth - Eighth Floors

3.2.44 Floors 4 - 8 are proposed to be primarily used by various existing and new School of Public Health departments. The primary area use is general open plan and cellularised office uses. This will provide accommodation for up to 700 staff and 200 postgraduate students with shared break out spaces, meeting rooms and refreshment tea points.

3.2.45 The 'stepping' of the sixth floor will create another roof terrace. The majority of the roof plant is proposed to be located on the northern wing double stacked on the seventh and eight floors, with plant / BMU equipment on top of the eighth floor.

3.2.46 The south side of the seventh floor is proposed to accommodate office spaces while the south side of the eighth and top floor is planned for limited low contamination level (level1) wet-lab uses.

Roof

3.2.47 All open roof surfaces of Building C excluding the roof plant areas are proposed to be treated with a bio-diverse green roof similar to the Wood Lane Studios development.

3.2.48 Access to the BMU and plant is proposed via a central lift / stairs. Provisions for exhaust flues approximately 5m above roof level is required for the central energy plant located on the lower ground level. These flues supported by a chimney structure are strategically placed to be central within the building footprint. The flue pipes and structural framework of the chimney are treated with silver grey smooth finish.

Building D New Business Incubator & Offices

3.2.49 **Building D** is proposed in the south east corner of the site to the south of the Building C. The Imperial Technology Transfer Building is proposed to accommodate a maximum 22,528 sq m GEA of floorspace. 'Grade A' office space to some 10,155 sq m GIA is proposed to be provided across Levels 6-12. Reception and visitor areas are proposed at ground floor level

with a café of 313 s qm GIA. The building will also incorporate 77 sq m GIA of retail and 622 sq m GIA to facilitate a small business unit.

3.2.50 The building is designed to a maximum height of 60.0m AOD.

3.2.51 Building D will provide office 'incubator' space that provides new businesses with a place to start and grow, but with enough space that allows for their sometimes rapid expansion. This will help prevent incubator companies relocating to areas with lower rents outside London, rather than continuing their expansion locally. Building 'D' will provide essential expansion space for their companies. Market offices will also be provided alongside the incubator space, helping foster innovation and collaboration between established and newly emerging organisations.

3.2.52 Levels 1 and 2 will offer up to 7,978 sq m GIA of incubator space that will combine laboratory and office/write-up space with labs located on the outer perimeter of the building. Levels 3, 4 and 5 will accommodate similar type of floorspace for 'accelerator businesses'.

3.2.53 The design of the building is intended to ensure that early stage companies will benefit from the interaction of other start-ups and veteran companies by co-existing in the same environment.

3.2.54 A site wide security and management office – to be manned 24 hours a day - is proposed to be located in Building D to provide immediate surveillance at this location which would include the area of an east-west underpass if constructed in the future.

Building F Residential Building

3.2.55 **Building F** is proposed to occupy the south west corner of the site abutting the A40/ Westway and is detailed to provide some 192 residential dwellings.

3.2.56 The building is proposed to be the tallest on the site at 35 storeys up to a 121.73m AOD with a maximum structural height of 146.96 m AOD. The building will provide a maximum GEA of 20,324 sqm of residential floorspace.

3.2.57 The residential unit provision will be 69% private purchase/ rental, with 31% of units to be key worker intermediate accommodation for Imperial or Imperial College Healthcare NHS Trust workers.

3.2.58 The intermediate homes are proposed in a mix of 1 and 2 beds and the private residential units will form a mix of studios, 1, 2 and 3.

3.2.59 The residential accommodation includes apartments of a range of sizes. including:

- § 17 studio apartments
- § 53 one bed apartments
- § 95 two bed apartments
- § 25 three bed apartments
- § 2 penthouse apartments

3.2.60 The ground floor entrance to the units is proposed to be located on the western side of the building with direct access from Wood Lane.

3.2.61 A café/ restaurant of some 319 sq m GIA is proposed to be located on the ground floor.

3.2.62 Building F is designed to meet the Lifetime Home Standards and to achieve Code for Sustainable Homes Level 4 Accreditation.

Basement Level

3.2.63 The basement level is primarily to be allocated for servicing, plant, storage and cycle storage. The basement is connected to the main car park of the whole development and will include 77 allocated spaces for the residents. Building F will have 329 cycle spaces located within the basement cycle store.

Amenity Space for Residents

3.2.64 Building F allows for landscaped wintergardens on its eastern elevation to directly address the central square.

3.2.65 Given the presence of the adjacent Westway glazed wintergardens are appropriate to the context rather than external balconies. These spaces, with single glazed openable louvres will provide a semi-external buffer zone adjacent to living rooms. The glazed louvered wintergardens form vertical bay windows on the east and west facades of Building F.

Car Parking

3.2.66 An underground car park is proposed to be provided beneath the central square and Building G. Access is proposed to be provided via a two lane ramp alongside Building F. A total of 239 car parking spaces are proposed across the site to serve the residential, hotel and commercial/academic use. This will include 33 disabled spaces. The Transport Assessment submitted in support of the planning application provides more details – included at **Technical Appendix 7.1**.

Table 3.4: Proposed Parking Numbers

Use	Building	Area (GIA)	Proposed All Parking	Proposed Disabled Parking
Offices/ Accelerator/ Incubator	A	5,723	**6**	**2**
	C	16,464	**18**	**2**
	D	18,755	**20**	**2**
	G	5,705	**6**	**2**
Residential	F	192 Units	**77**	**7**
	B	20,069	**16**	**6**
Hotel	E	200 rooms	**67**	**7**
Conferencing	E	298		
Gym	E	850	**12**	**1**
Health Centre	C	2,318	**2**	**1**
Crèche	C	1,029	**2**	**1**
Café/ Restaurant/ Bar	C	2,127	**6**	**1**
	D	313		
	E	1,080		
	F	319		
Retail	D	77	**5**	**1**
	G	576		
Car Club			**2**	**-**
Total			**239**	**33**

3.2.67 Building F will provide 77 car parking spaces, which would be allocated to residents which equates to 0.4 spaces per unit. Parking for disabled people is to be appropriately located at grade. 2 new car spaces will be made available to a car club in an accessible location.

3.2.68 Cycle parking provision will meet the standards laid out by TfL, LBHF and BREAAM. The development will provide high quality cycle facilities. This includes safe/secure/in-building cycle parking for the staff and occupants of each building with showers, lockers and drying areas located either at grade or within the basement. Separate visitor and cycle parking will be provided for each building. Visitor cycle parking will be located at ground level near to each of the buildings entrances and will be safe, secure and covered by CCTV. The site will make an area available for TFL Cycle Hire once the scheme extends to the general White City area.

3.2.69 Buildings C, D and F will provide some 800 staff/ resident cycle parking and 60 visitor cycle parking. Further details are available in the Transport Assessment included as **Technical Appendix 7.1**.

Table 3.5: Cycle Parking for Staff, Students and Residents

Building	Cycle Parking Spaces
C	265
D	206
F	329

Servicing

3.2.70 The Delivery and Servicing Plan submitted with the Transport Assessment sets out the servicing arrangements for Buildings 'C', 'D' and 'F'.

3.2.71 Buildings C and D will share a common basement servicing area to be used by all servicing and delivery vehicles for the buildings, including refuse and recycling collections. The servicing area will be accessed via a ramp at ground floor level with separate lifts allowing access internally.

3.2.72 Building F will be serviced from 4 bays outside the property allowing easy access to the refuse and recycling storage area on the south-east corner of the building. However 'long-stay' vehicles can gain access to the basement parking area through special arrangement.

Access

3.2.73 The main vehicular access is provided from Wood Lane.

3.2.74 The main two way route through the site will lead from the main entrance on Wood Lane, run between Buildings E and F, run alongside the Westway and then under the Westway as areas to the south develop. The main route will also lead between Buildings C and E to a turning area.

3.2.75 Access to Buildings B and C will be controlled through the use of barriers located between Buildings C and D.

3.2.76 A shared surface is proposed for the site with priority to pedestrians (and cycles) and not vehicles. All internal routes within the site will be designed as high quality, shared surface with a low vehicle design speed. Access to the site for vehicles will be controlled (although not gated) and a large part of the development will be pedestrianised and available to cyclists and 'street activity'. The site is proposed to be permeable to pedestrians with new and enhanced connections to surrounding areas.

3.2.77 Imperial operates its own shuttle bus between its various campuses and this service will enter the site and be available for Imperial staff and students.

Landscaping

3.2.78 A central public square of some 5000 sq m is proposed to be provided in the centre of the site and act as the principal public space within the development incorporating the main pedestrian circulation around and between the buildings.

3.2.79 A clear area of lawn of some 1376.6 sq m will be safeguarded within the central square that could accommodate a variety of playspace, informal passive and managed activities. A terraced area of some 483 sq m will be provide on the southern end of the square.

3.2.80 The central space will be designed following shared space principles to accommodate occasional use by servicing vehicles and vehicular access for those requiring disability parking bays.

3.2.81 A range of fixed seating will be provided within the central space. As well as areas to accommodate moveable chairs and tables adjacent to the pavilion building.

3.2.82 Tree planting will seek to define the edges of the square and pedestrian movement between the various buildings. A more tranquil garden space will be provided within the central square with distinctive planting and sitting spaces.

3.2.83 The space between Buildings B & C and C & D is proposed to create a landscaped 'mews' that will extend the central square and provide the opportunity for active frontages.

3.2.84 Green and brown roofs are proposed to be provided on Buildings C and D, and the potential for a green/brown roof has been identified on other buildings.

PHASING

3.2.85 An indicative programme has been prepared to inform the Transport Assessment and other relevant assessments. In summary, it is proposed to demolish the remaining buildings (Block B & F and the Sports Centre) prior to construction of 'Imperial West W12' commencing and it is anticipated that demolition will commence in early 2013. Following demolition, construction of the first phase of the 'Imperial West W12' development comprising Buildings C and D is expected to commence in early 2013. Construction of Building E is due to commence in 1st Quarter 2014, with construction Building F, G and A due to commence in June 2015, 2016 and 2017 respectively.

3.2.86 The descriptive and quantitative information concerning the proposed development - including the processes of demolition and construction - have been used to inform the various technical assessments within this Statement of the likely significant effects of the development during demolition, construction and operation. The identification of potential environmental effects of demolition and construction has informed assessments of transport, noise and vibration and air quality variously considered in Chapters 7, 8 and 9 respectively.

Figure 3.2: Indicative Phasing Strategy

ASSESSMENT OF ALTERNATIVES

3.2.87 Schedule 4 to the Regulations requires at Part 1(2) and part 2(4) that where alternatives have been considered "an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects" should be included within the Environmental Statement. An outline of the applicant's consideration of alternatives is provided below.

A 'Do Nothing' Scenario

3.2.88 A 'do nothing' scenario is not an option for Imperial in the context of its academic and accommodation requirements. A 'do nothing' scenario is similarly not a feasible option for this part cleared and otherwise vacant site.

Alternative Locations

3.2.89 The application site is located within a wider area of recent and proposed development and regeneration and is in a policy framework - both adopted and emerging – that promotes development for a mix of land uses and scales of buildings. The site is within the ownership of Imperial College. Alternative locations for the mixed use development have therefore not been considered although Imperial has, in arriving at the mix of uses, considered its own accommodation requirements in the context of its wider estate.

Alternative Layouts

3.2.90 Alternative approaches to the inclusion of open space within the scheme in terms of its location(s), extent and relationship to neighbouring sites and development has also been considered. Examples of the some of the alternatives considered are provided below as available in the Masterplan and detailed Design & Access Statements.

3.2.91 The underground car park now sits under the main square and Building G with its ramp adjacent Building F, rather than under Buildings D/E/F. This facilitates a more flexible and deliverable phasing strategy.

3.2.92 A new landscaped terrace area is created as an arrival space in the south west corner of the site. This creates a strong frontage threshold and break out area addressing both the residential building, Building F, and Building E

3.2.93 Buildings A and G relate more strongly together as a gateway pair of buildings at the main site entrance.

3.2.94 A common geometry and form of linear buildings is created on the Westway frontage, providing a more calm disposition of massing on this southern relationship to the elevated structures of the A40, and the site boundary.

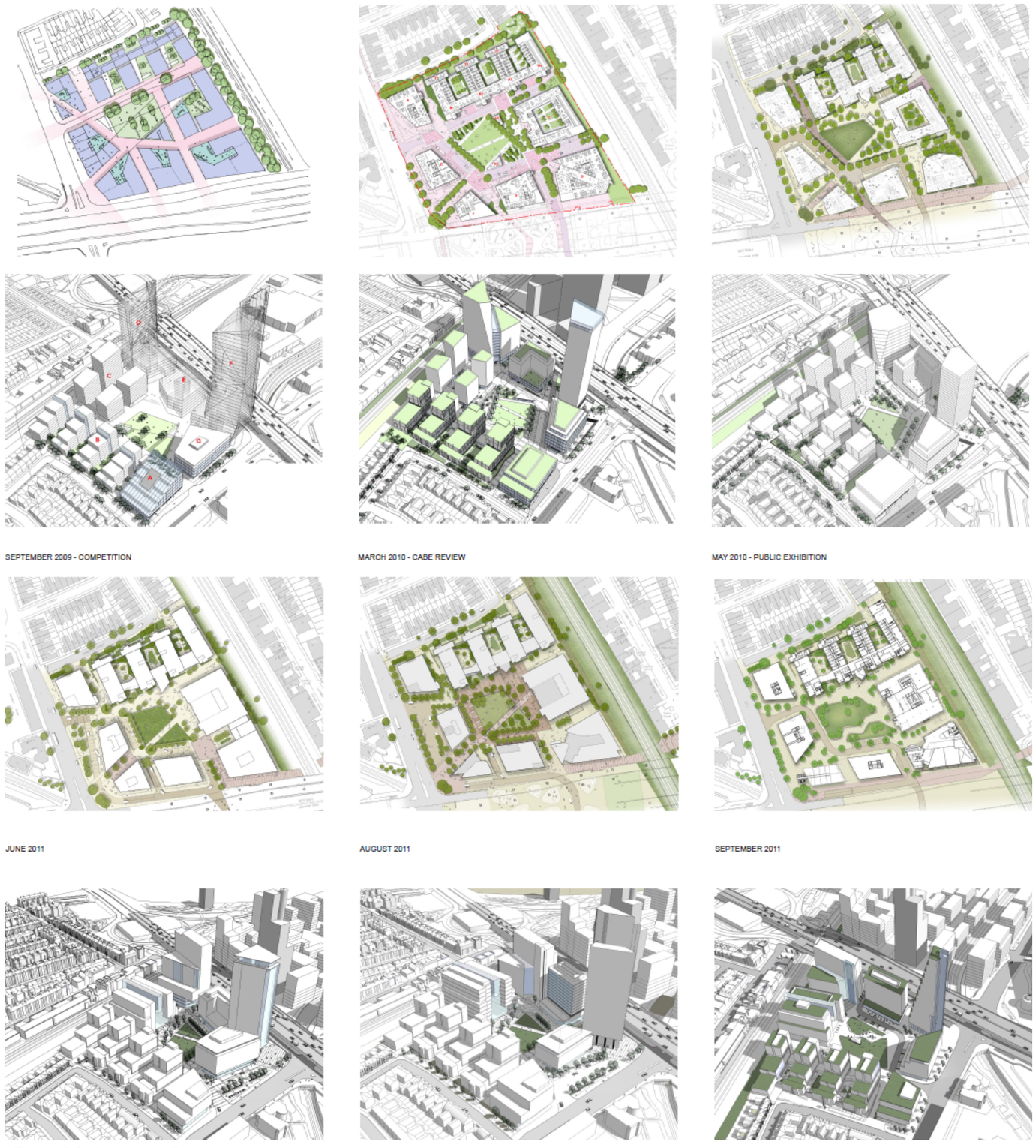


Figure 3.3: Alternative Designs

Alternative Scale & Form

3.2.95 Alternative scales and forms of the building elements within the application site have been subject to particularly detailed consideration in respect of the potential visual effects in short and longer distance views and also in respect of the potential effects on sunlight and daylight to ensure adequate light within the development itself - in particular the new central square.

3.2.96 Undergraduate accommodation formerly proposed as Building C has now been replaced with an academic building. This building has been reduced in height to 9 floors of accommodation, and is 'fragmented' and stepped in form to respond to local context and views. An Energy Centre is located in Building C.

3.2.97 Building D - a Technology Transfer building with offices at upper levels - has been very significantly reduced in size from the 18-22 floors proposed in an earlier Master Plan. It is now' fragmented' in form and comprises two elements. The northern form is reduced down to just 7 floors and the southern form reduced down to 12 floors.

3.2.98 Building E – the hotel building - is modified in form to create a stronger relationship with the form, massing and alignment of Buildings D.

3.2.99 Building F – the tallest, predominantly residential, building has been significantly refined in form and massing to present a slimmer profile.

Alternative Design

3.2.100 Proposals for redevelopment have been the subject of pre-application discussions with the London Borough of Hammersmith & Fulham and the GLA. Ongoing dialogue has informed the evolution of the current scheme to meet the requirements and aspirations of the planning authorities. In this regard a number of design iterations particularly for the tall building element of the proposals have been considered to inform assessments of the likely effects of the development particularly in respect of townscape, visual and heritage effects.

3.2.101 As part of the design development process Imperial consulted residents on its Master Plan and detailed design proposals for Imperial West via four Public Exhibitions on:

- § Thursday 6th & Friday the 7th October 2011 at the Women's Pioneer Housing Association Du Cane Road;
- § Saturday 8th October 2011 at St Helen's Church Hall St Helen's Gardens; &
- § Monday 10th October 2011 at The Harrow Club 187 Freston Road.

3.2.102 The consultation process has informed the development of the scheme and has helped to shape the land use principles for the site as well as the emerging Master Plan. Specific alternative outcomes from the community consultation process include:

- § the reduction in height and massing of the buildings along the eastern boundary facing the residential area of North Kensington;
- § the 'stepping' of building form related to axial vistas from Oxford Gardens and Kelfield Gardens;
- § changes to the height and form of the tall building located in the south west corner of the site adjacent to Wood Lane and the Westway including an east/west orientation to minimise its profile and tapering its form in relation to north/south views;
- § provisions and design features to reduce light spillage on the eastern boundary;
- § creation of active frontages on the east/west link;
- § removing the proposed undergraduate student accommodation on the eastern boundary;
- § permeability and north/south links to the wider OAPF; &
- § recognition in the layout of the future potential for an east/west link for pedestrians and cyclists under the West London line.

Figure 3.4: Alternative Designs post Consultation

3.2.103 The approach to the consideration of alternatives has been informed by adopted and emerging policies for the application site and the wider area, by detailed analysis of the site and its surroundings and particularly the existing and future operational requirements of Imperial. The alternative options for layout and design have been considered taking into account the pre-application consultation responses of key stakeholders; information generated from technical assessments in the design development process including energy and sustainability; and consideration of adjoining properties and uses.

4 Planning Policy

4.1 INTRODUCTION

4.1.1 The purpose of this Chapter of the Environmental Assessment is to demonstrate how national, regional and local planning policy frameworks have been considered in the Environmental Assessment process and in the design of the proposed development.

4.1.2 Consideration as to whether proposals accord or conflict with relevant policies and whether in circumstances of conflict any material considerations exist which are sufficient to override the provisions of those policies is presented in the Planning Statement accompanying the application. This Chapter considers Development Plan site designations together with both Development Plan policies and other policies and guidance constituting 'material considerations' in the planning process. Consideration is given in the context of the land uses proposed in the development and where relevant to environmental topic areas relating to aspects of the environment likely to be affected by the development.

4.1.3 This Chapter is necessarily written in the context of the findings of some of the technical assessments which follow in this Statement. Reference is made to any relevant statutory designations and attendant policies with detailed technical consideration being given in specific assessments as appropriate.

4.1.4 The Development Plan for the purposes of Section 38(6) of the Town & Country Planning Act 1990 consists of:

§ the London Plan (adopted July 2011) - the strategic plan for London. It sets out an integrated social, economic and environmental framework for the future development of London which encapsulates the Mayor's vision for the Capital looking forward 15–20 years;

§ the LBHF Core Strategy adopted in October 2011; &

§ The revised LBHF Unitary Development Plan (UDP) adopted in August 2003. However, on 27th September 2007 a number of the UDP policies expired, the majority had their life extended following a direction issued by the Secretary of State.

4.1.5 A number of policies which constitute material considerations for the purposes of determining the planning application are relevant to the proposed development and include national planning policy from Central Government in the form of Planning Policy Guidance notes (PPGs) and Planning Policy Statements (PPSs) and the requirements of relevant Circulars, as well as Supplementary Planning Guidance. The Guidance and Statements relevant to the proposed development are:

§ PPS1: Delivering Sustainable Development (2005)
§ Planning and Climate Change – Supplement to PPS1 (2007)
§ PPS3: Housing (2011)
§ PPS4: Planning for Sustainable Economic Growth (2009)
§ PPS5: Planning for the Historic Environment (2010)
§ PPG 8: Telecommunications (2001)
§ PPS9: Biodiversity and Geological Conservation (2005)
§ PPS10: Planning for Sustainable Waste Management (2011)
§ PPG13: Transport (2011)
§ PPG17: Planning for Open Space, Sport & Recreation (2002)
§ PPS22: Renewable Energy (2004)
§ PPS23: Planning & Pollution Control (2004)
§ PPG24: Planning & Noise (1994)
§ PPS25: Development & Flood Risk (2010)

4.1.6 The supplementary guidance and emerging policy considered as part of this policy review is as follows:

§ White City Opportunity Area Planning Framework (WCOAPF) Draft for Public Consultation (April 2011);

§ White City Opportunity Area Framework for Development (SPG) July 2004;

§ Replacement London Plan Sustainability Statement (July 2011);

§ CABE/ English Heritage Design Guidance: Guidance on tall buildings (July 2007);

§ draft National Planning Policy Framework published for consultation until the October 2011.

Site Designations

4.1.7 The application site is subject to a number of policy designations which are identified on the Hammersmith and Fulham UDP Proposals Map (2003). Formerly, the site was designated an Employment Zone under UDP **Policy E1 Employment Zones**; this policy was allowed to expire by the Secretary of State in 2007.The site therefore has no saved UDP designations..

4.1.8 Under UDP **Policy EN27 Nature Conservation Areas**, land adjoining the eastern boundary of the site is designated Nature Conservation Area BI.7. This policy designation protects rail side habitats in various locations across the borough.

4.1.9 The remaining current policy designations relate to transport policy. Under UDP **Policy TN8 Borough Road Network**, the A40(M) which runs east-west across the southern boundary of the application site is designated a Strategic Route. Wood Lane, which lies to the west of the site is designated a London Distributor Road. Under **Policy TN6 Provision for Cyclists -** Wood Lane is allocated as a Strategic and Local Cycle Route.

4.1.10 UDP **Policy TN23 Public Transport – Safeguarding Land for Future Transport Schemes** this allocation specifically safeguards land abutting the eastern boundary of the site for the purposes of accommodating a siding for the Channel Tunnel Rail Link.

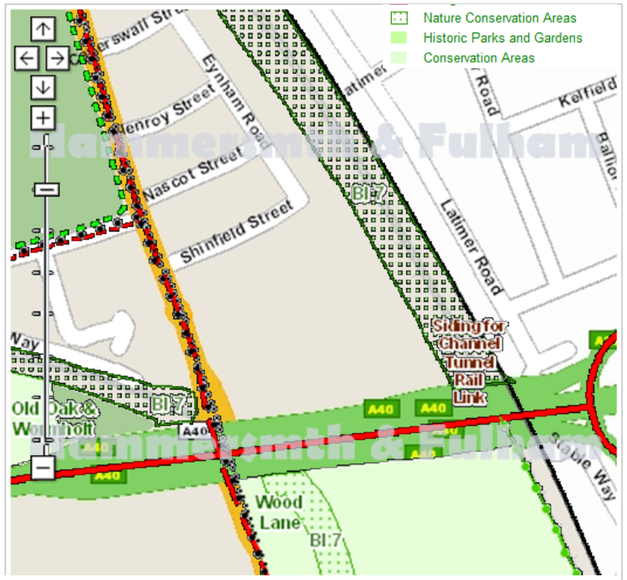


Figure 4.1: LBHF UDP Extract

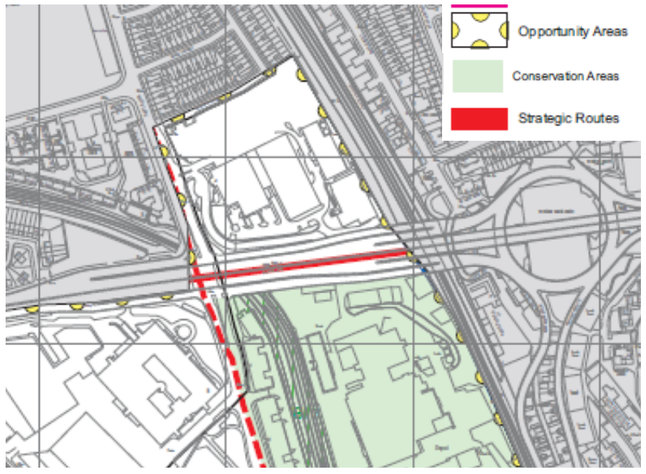


Figure 4.2: LBHF Core Strategy Extract

4.1.11 The site is located within the White City Opportunity Area as defined by the London Plan. LBHF's Core Strategy sets out the Borough's aspirations for the Wider White City Opportunity Area:

"to create a vibrant and creative place with a stimulating and high quality environment where people will want to live, work, shop and spend their leisure time".

4.1.12 The new homes built in the Opportunity Area will be expected to 'provide a local ladder of affordable housing opportunity. Regeneration schemes will need to provide an appropriate level of supporting leisure, green space, schools, community and other facilities, possibly funded through a tariff-based scheme'.

4.1.13 Furthermore 'all development must incorporate high levels of environmental performance by the use of low and zero carbon technologies, including combined heat and power, the establishment of a decentralised energy network and the installation of renewable energy systems'.

4.1.14 RBKC have a SPD on uses under the Westway that provides guidance on the sort of activity that can be successfully promoted and delivered under the A40 flyover.

Commentary

4.1.15 The proposed mixed-use development seeks to secure a high density development on previously developed land maximising the use of land within an urban area.

4.1.16 The location of the site is accessible by a range of modes of transport for a mixed-use development which offers opportunities to optimise and enhance transport sustainability and to address existing problems of pedestrian safety. Detailed consideration in this regard has been given in the Planning Statement and Transport Statement submitted with the planning application and within the Chapter 7 of this Statement - Transport. As part of the design process, consultation has been undertaken with transport authorities, local business organisations, members of the local community and other interested stakeholders. Details of the various discussions are detailed in the Statement of Community Involvement submitted with the planning application

REGENERATION POLICIES

National Policy

4.1.17 **PPS1 Delivering Sustainable Development (2005)** contains general guidance on development principles. It promotes pre-application discussions with local planning authorities and seeks to ensure that development supports existing communities and contributes to the creation of safe, sustainable, liveable and mixed communities with good access to jobs and key services for all members of the community. PPS1 also supports the best and most optimal use of land compatible with the local context and amenity.

4.1.18 PPS1 identifies a range of sustainable development objectives, which notably includes promoting a 'more efficient use of land through higher density, mixed use development and the use of suitably located previously developed land and buildings. Planning should seek actively to bring vacant and underused previously developed land and buildings back into beneficial use to achieve the targets the Government has set for development on previously developed land.'

4.1.19 Mixed used developments are valued because they offer opportunities to deliver 'urban… regeneration to improve the well being of communities, improve facilities, promote high quality and safe development and create new opportunities for the people living in those communities' and in doing so create 'more vibrant places'. Local authorities are therefore encouraged to 'bring forward sufficient land of a suitable quality in appropriate locations to meet the expected needs for housing …for retail and commercial development and for leisure and recreation'.

4.1.20 **Planning and Climate Change – Supplement To PPS1 (2007)** supplements PPS1 by advising how planning should contribute to reducing emissions and stabilising climate change and to consider the unavoidable consequences.

4.1.21 In selecting land for development, and deciding what uses and density are appropriate on that land, the document advises that the following, amongst other things should be considered:

- § "the extent to which existing or planned opportunities for decentralised and renewable or low-carbon energy could contribute to the energy supply of development;
- § whether there is, or the potential for, a realistic choice of access by means other than the private car and for opportunities to service the site through sustainable transport;
- § the capacity of existing and potential infrastructure (including for water supply, sewage and sewerage, waste management and community infrastructure such as schools and hospitals) to service the site or area in ways consistent with cutting carbon dioxide emissions and successfully adapting to likely changes in the local climate;
- § the ability to build and sustain socially cohesive communities with appropriate community infrastructure, having regard to the full range of local impacts that could arise as a result of likely changes to the climate;
- § the effect of development on biodiversity and its capacity to adapt to likely changes in the climate;
- § the contribution to be made from existing and new opportunities for open space and green infrastructure to urban cooling, sustainable drainage systems, and conserving and enhancing biodiversity; &
- § known physical and environmental constraints on the development of land such as sea level rises, flood risk and stability, and take a precautionary approach to increases in risk that could arise as a result of likely changes to the climate".

4.1.22 Land which satisfies all the criteria should be considered as preferential for development. If sites perform poorly against these measures, Councils are advised to consider whether it is possible for this performance to improve.

4.1.23 Whilst many of the criteria are subject to detailed consideration and technical assessment all of these criteria have, to greater or lesser degrees, been given consideration in either the design of the development or within technical assessments. Whilst inevitably only a broad analysis can be given to a broad range of criteria for consideration, the design and planning of the proposed development has been consistent with the objectives of the Supplement to PPS1. The overall sustainability and potential effects on climate change of the proposed development are considered further in in the Sustainability and Energy Statements submitted with the planning application and included at **Technical Appendix 3.1 and 3.2.**

Strategic Policy

4.1.24 The London Plan (July 2011) has six overarching objectives which the Mayor seeks to implement by working with strategic partners and in exercising his planning functions. Of these, Objective 2, ensuring London is 'an internationally competitive and successful city'; Objective 3 'a city of diverse, strong, secure and accessible neighbourhoods' and Objective 6 'a city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities' are of particular relevance in the context of the Imperial West development.

4.1.25 London Plan **Policy 1.1 Delivering the Strategic vision and objectives for London** outlines the strategic approach to delivering these objectives and London Plan **Policy 2.1 London in its global, European and United Kingdom Context** emphasises their importance in ensuring that 'London retains and extends its global role as a sustainable centre for business, innovation, creativity, health, education and research, culture and art and as a place to live, visit and enjoy'.

4.1.26 Of particular relevance to the Imperial West site is the strategic imperative that the most efficient use be 'made of London's limited reserves of land, identifying places with the potential for development on a strategic scale, and ensuring policies are in place to enable this to happen'.

4.1.27 London Plan **Policy 2.13 Opportunity Areas and Intensification Areas** identifies White City as an Opportunity Area in LBHF. It states that developments in the area should 'seek to optimise residential and non-residential output and densities, provide necessary social and other infrastructure to sustain growth, and, where appropriate, contain a mix of uses'. The White City Opportunity Area is 110ha in size and Table A1.1 identifies the Area as having an indicative employment capacity of 10,000 and a minimum homes target of 5,000 to 2031.

4.1.28 The draft WCOAPF (April 2011) is intended to create an area which is 'a model of high quality urban design, sustainable architecture and construction situated within a first class, permeable and inclusive public realm to encourage walking and cycling'. It is anticipated that 'many people will choose to both live and work in the area, reducing the need for commuting and demand on the public transport and road network. The majority of new trips in and out of the area will be made by public transport, walking and cycling, to avoid adding to road congestion. Outstanding environmental performance will be achieved by the use of low and zero carbon technologies, including renewable energy sources, a district heat network and combined heat and power.'

4.1.29 **London Plan Policy 2.14 Areas for Regeneration** identifies the application site as being located in an Area for Regeneration. The London Plan recognises that where regeneration areas fall within Opportunity Areas "regeneration action should be co-ordinated with development frameworks and other policies for the area concerned".

4.1.30 Within the Areas for Regeneration "the Mayor will work with strategic partners and local partners to co-ordinate their sustained renewal by prioritising them for action and investment".

Local Policy

4.1.31 Core Strategy **Policy CF1 Supporting Community Facilities and Services** sets out that the council will seek 'borough wide high quality accessible and inclusive facilities and services for the community'. In particular, the Council supports securing sites for future healthcare provision and requires that 'developments that increase the demand for community facilities and services to make contributions towards, or provide for, new or improved facilities'.

4.1.32 Core Strategy **Strategic Policy A Planning for Regeneration and Growth** identifies the White City area as a key area to accommodate regeneration and growth.

4.1.33 Core Strategy **Strategic Policy WCOA** identifies that the Opportunity Area can accommodate approximately 5,000 additional homes. It specifies that developments must not have an adverse impact on the transport network and that this is 'particularly important in the core development area east of Wood Lane.'

4.1.34 Paragraph 3.16 of the Core Strategy notes that 'many of the sites that were previously designated for employment uses are no longer appropriate for the location of H&F's new employment activities, particularly offices and creative activities. Core Strategy **Strategic Policy WCOA** adds that 'the main area for new employment will be as part of mixed use development east of Wood Lane'.

4.1.35 Under the 'Regeneration Area Strategies' it is noted that 'the regeneration areas represent an opportunity for significant new sustainable place making and will provide the focus for new development in the Borough'.

4.1.36 UDP **Policy CS5 Premises for Community Groups** aims to provide secure premises for community groups. The Council will try to make suitable local premises available to community groups, including their provision as a community benefit in commercial developments, where this is appropriate.

Supplementary Planning Guidance

4.1.37 The White City Opportunity Area Framework for Development was adopted as Supplementary Planning Guidance (SPG) to the borough's UDP in July 2004. The framework identifies objectives and principles for development within the 30ha of land that make up the White City Opportunity Area. The intention is to maximise 'physical, economic, social and environmental regeneration benefits in the borough and West London'. The North of the borough is identified as an Area for Regeneration in the London Plan, and encourages Opportunity Areas to link to wider Areas for Regeneration where possible.

Commentary

4.1.38 The application site is situated within the broad strategic designation of the White City Opportunity Area. The site will contribute towards the regeneration objectives of the London Plan and Core Strategy.

4.1.39 The design and planning of the proposed development has been consistent with the objectives of PPS1 and the Supplement to PPS 1. The scheme also provides valuable open space in the form of a public square for community activity and services. The local community has been consulted during the design process and details of the consultation process are contained within the Statement of Community Involvement submitted as part of the planning application.

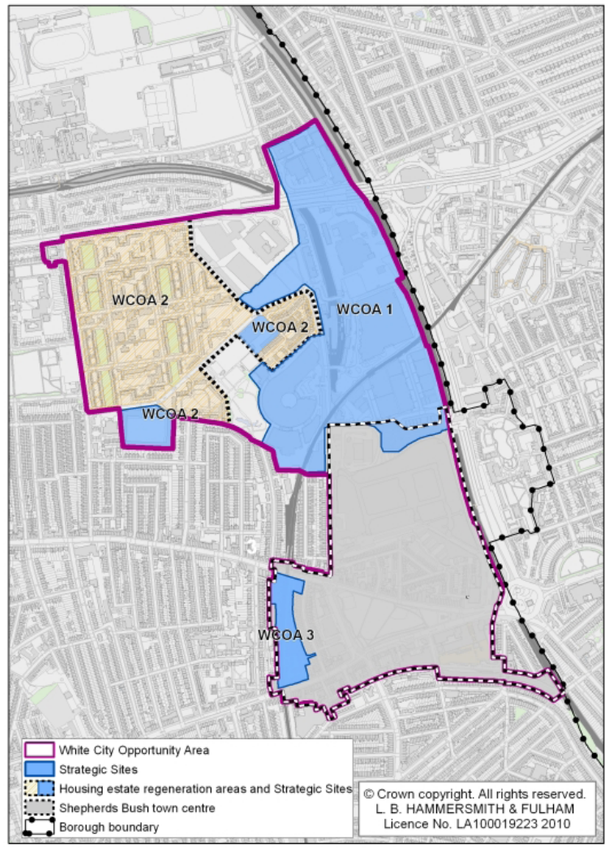


Figure 4.3: LBHF Core Strategy White City Opportunity Area

STUDENT AND EDUCATION POLICY

National Policy

4.1.40 PPS 1 advises that planning authorities should 'consider the needs and problems of the communities in their areas and how they interact, and relate them to the use and development of land.' This policy also advocates the integration of a 'wide range of activities relating to development and regeneration' There is otherwise no specific reference o student accommodation.

4.1.41 **Strategic Policy**

4.1.42 London Plan **Policy 3.18 Education Facilities** advocates that 'boroughs should support and maintain London's international reputation as a centre of excellence in higher education'.

4.1.43 Policy 3.18 states that 'development proposals which enhance education and skills provision will be supported, including new build, expansion of existing or change of use to educational purposes'. It also specifies that higher education facilities must be 'adequate to meet the demands of a growing and changing population and to enable greater educational choice, particularly in parts of London with poor educational performance'.

4.1.44 This supporting text recognises that 'universities also play a vital part in ensuring Londoners have the higher order skills necessary to succeed in a changing economy, and for the capital to remain globally competitive.'

4.1.45 London Plan **Policy 3.17 Health and social care facilities** outlines that development proposals which provide high quality health and social care facilities will be supported in areas of identified need, particularly in places easily accessible by public transport, cycling and walking. Where local health services are being changed, the Mayor will expect to see replacement services operational before the facilities they replace are closed, unless there is adequate justification for the change.

Local Policy

4.1.46 The Core Strategy under '**Policy CF1 Supporting Community Facilities and Services'** the council 'will generally support developments that improve independent educational, further educational and training facilities in the borough'.

4.1.47 The Core Strategy **Strategic Site 1 – WCOA -**White City East considers that 'within the overall mix of uses there could be scope to accommodate major educational, cultural and health facilities.'

Supplementary Planning Guidance

4.1.48 The WCOA SPG requires that the need to increase local provision for educational services be considered as part of the social and community strategy.

Commentary

4.1.49 The application site is an education led mixed used development which will contribute towards enhancing the education and skills provision in the local area. Building C will offer research, education and computational spaces as well as providing a publicly accessible polyclinic offering a wide range of health care and diagnostic services.

4.1.50 It is therefore considered that the Imperial West proposals will meet and significantly exceed the priorities set out in education policies at the national, strategic and local levels.

ECONOMIC AND EMPLOYMENT POLICY

National Policy

4.1.51 Under PPS 1 the Government is 'committed to promoting a strong, stable, and productive economy that aims to bring jobs and prosperity for all'. Planning authorities must 'recognise that economic development can deliver environmental and social benefits' and balance the wider sub-regional, regional or national benefits of economic development against any adverse local impacts'.

4.1.52 Under PPS 4 (2009) Policy EC10.1 states that 'local planning authorities should adopt a positive and constructive approach towards planning applications for economic development. Planning applications that secure sustainable economic growth should be treated favourably.'

4.1.53 In reaching a decision, the local authorities should consider:

§ 'whether the proposal has been planned over the lifetime of the development to limit carbon dioxide emissions, and minimise vulnerability and provide resilience to, climate change;

§ the accessibility of the proposal by a choice of means of transport including walking, cycling, public transport and the car, the effect on local traffic levels and congestion (especially to the trunk road network) after public transport and traffic management measures have been secured;

§ whether the proposal secures a high quality and inclusive design which takes the opportunities available for improving the character and quality of the area and the way it functions;

§ the impact on economic and physical regeneration in the area including the impact on deprived areas and social inclusion objectives;

§ the impact on local employment'.

4.1.54 Policy EC17 deals with planning applications for development of main town centre uses not in a centre and not in accordance with an up to date development plan. It specifies that the applicant must have demonstrated compliance with the requirements of the sequential approach under policy EC15 and that there are no significant adverse impacts in terms of fulfilling EC10 detailed above.

Where the above criteria has been met, planning applications should be determined by consideration of:

§ the positive and negative impacts of the proposal in terms of policies EC10.2 and 16.1 and any other material considerations; and

§ the likely cumulative effect of recent permissions, developments under construction and completed developments.

Strategic Policy

4.1.55 Development of the London economy is one of the key objectives of the London Plan under **Policy 4.1 Developing London's Economy**. This seeks to 'promote and enable the continued development of a strong, sustainable and increasingly diverse economy across all parts of London, ensuring the availability of sufficient and suitable workspaces in terms of type, size and cost, supporting infrastructure and suitable environments for larger employers and small and medium sized enterprises'. This policy also emphasises the 'need for greater recognition of the importance of enterprise and innovation'.

4.1.56 Similarly, under London Plan **Policy 4.10 New and Emerging Economic Sectors** which considers new and emerging sectors, the Mayor will 'support innovation and research, including strong promotion of London as a research location and encouraging the application of the products of research in the capital's economic development'.

4.1.57 The London Plan aims to ensure that 'London continues to excel as a world capital for business, while also supporting the success of local economies and neighbourhoods'. Additionally, the Plan identifies 'opportunity areas across London providing significant capacity for new employment (Policy 2.13 and Annex 1)'.

4.1.58 Under London Plan **Policy 4.2 Offices** the Mayor will 'support the management and mixed use development and redevelopment of office provision to improve London's competitiveness and to address the wider objectives of this Plan, including enhancing its varied attractions for businesses of different types and sizes including small and medium sized enterprises'.

4.1.59 The findings from the 2009 London Office Policy Review indicate that 'office based employment may grow by some 303,000 between 2011 and 2031. On the basis of this… London might need an additional 3.9 million sq m (net) or 4.6 - 5.2 million sq.m (gross) office floorspace by 2031'. The provision of diverse office markets can be supported by 'focusing new development on viable locations with good public transport, enhancing the business environment including through mixed use redevelopment'.

4.1.60 Policy 4.1 encourages 'developing London's economy and states that the Mayor will work with partners to promote and enable the continued development of a strong, sustainable and increasingly diverse economy across all parts of London, ensuring the availability of sufficient and suitable workspaces in terms of type, size and cost, supporting infrastructure and suitable environments for larger employers and small and medium sized enterprises'. It also seeks to 'emphasise the need for greater recognition of the importance of enterprise and innovation'.

4.1.61 The Context and Strategy chapter of the London Plan encourages the support of innovation recognising that 'the next 20 years are likely to see continued changes to the London economy, with new sectors and enterprises emerging, building on the capital's rich resources of research and innovation and its world-class universities and specialist institutions'.

4.1.62 One of the key ambitions of London Plan **Policy 3.17 Health and Social Care Facilities** is to support the 'continued role and enhancement of London as a national and international centre of medical excellence and specialised facilities'.

4.1.63 According to London Plan **Policy 4.10 New and Emerging Economic Sectors** the Plan's 'managed approach to provision for offices and industrial type activities will help underpin innovative firms seeking affordable premises, as well as ensuring there is adequate capacity to accommodate innovation among more established businesses'.

4.1.64 London Plan **Policy 4.11 Encouraging a connected economy** outlines that 'The Mayor and the GLA Group will, and all other strategic agencies should:

a) facilitate the provision and delivery of the information and communications technology (ICT) infrastructure a modern and developing economy needs, particularly to ensure: adequate and suitable network connectivity across London (including well designed and located street-based apparatus); data centre capability; suitable electrical power supplies and security and resilience; and affordable, competitive broadband access meeting the needs of enterprises and individuals; and

b) support the use of information and communications technology to enable easy and rapid access to information and services and support ways of working that deliver wider planning, sustainability and quality of life benefits.

4.1.65 London Plan **Policy 4.7 Retail and town centre development** states that planning decisions on proposed retail and town centre development should apply the following principles:

a) the scale of retail, commercial, culture and leisure development should be related to the size, role and function of a town centre and its catchment;

b) retail, commercial, culture and leisure development should be focused on sites within town centres, or if no in-centre sites are available, on sites on the edges of centres that are, or can be, well integrated with the existing centre and public transport; and

c) proposals for new, or extensions to existing, edge or out of centre development will be subject to an assessment of impact.

4.1.66 London Plan **Policy 4.9 Small Shops** sets out 'in considering proposals for large retail developments, the Mayor will, and Boroughs should, consider imposing conditions or seeking contributions through planning obligations where appropriate, feasible and viable, to provide or support affordable shop units suitable for small or independent retailers and service outlets and/or to strengthen and promote the retail offer, attractiveness and competitiveness of centres'.

4.1.67 London Plan **Policy 4.12 Improving opportunities for all states '**the Mayor will provide the spatial context to co-ordinate the range of national and local initiatives necessary to improve employment opportunities for Londoners, to remove barriers to employment and progression and to tackle low participation in the labour market'. Furthermore 'strategic development proposals should support local employment, skills development and training opportunities'.

Commentary

4.1.68 The Imperial West site is anticipated to generate over 3,650 jobs and will deliver a significant economic boost to the local economy. Imperial College is a long term stakeholder and occupier of the local area and the development of the Imperial West site represents significant investment in the local area.

4.1.69 The application secures the efficient use of land by utilising previously developed land. The scheme proposes a high quality mixed use development including new employment, educational and retail floorspace, which is readily accessible by a range of transport options including rail and bus. It is considered that the scheme will enhance the vitality and viability of the local area. Additionally the development will meet and significantly exceed the priorities set out in economic policies at the national, strategic and local levels.

4.1.70 An assessment of the socio-economic effects of the development is provided in **Chapter 14 - Socio-Economic**.

Local Policy

4.1.71 Under UDP **Policy E5 Provision for Small Businesses** the Council states that 'further provision of premises for this sector as well as the protection of existing small units where development is proposed would provide much needed encouragement to local enterprise and provide further assistance to this important growth sector'.

Supplementary Planning Guidance

4.1.72 The WCOA SPG states that the 'priority for the development area as a whole is to maximise the provision of jobs in a high quality mix of employment generating activities'. In doing so, schemes must deliver a mix of accommodation primarily in the range of B Class uses. The OAPF also emphasises that the jobs created by virtue of regeneration of the area should better serve the local community than the existing mix of uses.

HOTEL POLICY

Strategic Policy

4.1.73 London Plan **Policy 4.5 London's Visitor Infrastructure** addresses visitor accommodation and facility requirements and seeks to achieve '40,000 net additional hotel bedrooms by 2031, of which at least 10 per cent should be wheelchair accessible'. It specifically states that 'within the CAZ strategically important hotel provision should be focussed on its opportunity areas, with smaller scale provision in CAZ fringe locations with good public transport.'

4.1.74 Part B of this policy states under 'planning decisions' that developments should 'contribute towards the hotel provision target and ensure that at least 10 per cent of bedrooms are wheelchair accessible'.

4.1.75 In terms of parking for hotel and leisure uses, Chapter 6 of the London Plan states that 'no maximum standards are set for hotels'; however it advises that for applications in 'locations with a PTAL of 4 –6, on-site provision should be limited to operational needs, parking for disabled people and that required for taxis, coaches and deliveries/ servicing.' It adds that 'developments should provide for one coach parking space per 50 rooms for hotels'.

Local Policy

4.1.76 UDP **Policy E11 Hotel Development** specifies that hotel development will only be permitted in circumstances where 'in terms of its scale and location is well related to public transport and tourist facilities' and where 'the site or building is not within or close to a residential area'.

Commentary

4.1.77 Building E of the Imperial West site will provide some 200 hotel bedrooms, of which 10% will be wheelchair accessible. The hotel is suitably located on a site which has excellent transport accessibility; recognised by a PTAL rating of 5. The Imperial West site is open to the public and will therefore act as a potential tourist destination with public open space available in the centre of the site.

4.1.78 It is considered that the Imperial West proposals will meet the priorities set out in hotel policies at the national, strategic and local levels.

RESIDENTIAL POLICY

National Policy

4.1.79 PPS1 makes specific reference to the prudent use of resources and advises that the broad aim should be to 'ensure that outputs are maximised whilst resources used are minimised (for example, by building housing at higher densities on previously developed land)'. In particular the Government seeks to ensure the provision of sufficient, good quality, new homes (including an appropriate mix of housing and adequate levels of affordable housing) in suitable locations, whether through new development or the conversion of existing buildings.

4.1.80 PPS3 advises that a principal objective of the Government is to achieve a 'step change in housing delivery through a new, more responsive approach to land supply at the local level' and provide a wide choice of high quality homes, both affordable and market housing, to address the requirements of the community. Further, the Government seeks to create sustainable, inclusive, mixed communities. To achieve these objectives, PPS3 advises that the Planning System should deliver, amongst other things:

- § "high quality housing that is well-designed and built to a high standard;
- § a mix of housing, both market and affordable, particularly in terms of tenure and price, to support a wide variety of households in all areas, both urban and rural;
- § a sufficient quality of housing taking into account need and demand and seeking to improve choice;
- § housing developments in suitable locations, which offer a good range of community facilities and with good access to jobs, key services and infrastructure; &
- § a flexible, responsive supply of land – managed in a way that makes an efficient and effective use of land, including re-use of previously developed land, where appropriate". (Paragraph 10)

4.1.81 Good design is identified in Paragraph 12 as key to the development of high quality new housing which contributes to the creation of sustainable, mixed communities. Local authorities are therefore advised to encourage applicants to bring forward sustainable and environmentally friendly new housing developments. Paragraph 16 of the document further advises that consideration should be given to the extent to which a development is accessible and well-connected to public transport and community facilities and services and to the efficient use of space and integration with its surroundings. Developments are also encouraged to include measures which both facilitate an efficient use of resources during construction and whilst in use – and reduce the effect on climate change.

4.1.82 Paragraph 36 of PPS3, which relates to identifying suitable locations for housing development, advises that to achieve the objective of creating mixed and sustainable communities priority will be afforded to making effective use of land, existing infrastructure and public and private investment. The Statement further advises that priority for development should be on previously developed land.

4.1.83 In respect of the determination of planning applications, Paragraph 69 of the Statement advises that Local Planning Authorities should have regard to:

"achieving high quality housing;

- § ensuring developments achieve a good mix of housing reflecting the accommodation requirements of specific groups, in particular, families and older people;
- § the suitability of the site for housing, including its environmental sustainability;
- § using land effectively and efficiently; &
- § ensuring the proposed development is in line with housing objectives, reflecting the need and demand for housing in, and the spatial vision for, the area and does not undermine wider policy objectives".

Strategic Policy

4.1.84 Under London Plan **Policy 3.3 Increasing Housing Supply** the Mayor recognises the 'pressing need for more homes in London in order to promote opportunity and provide a real choice for all Londoners in ways that meet their needs at a price they can afford'.

4.1.85 Policy 3.3 establishes the minimum target for housing provision in London per year at 32,210 additional homes (Table 3.1). Of this target, Hammersmith and Fulham is expected to deliver 615 additional homes (with a minimum ten year target of 6,150). Policy 3.3 states that 'Boroughs should seek to achieve and exceed the relevant minimum borough annual average housing target in Table 3.1'.

4.1.86 The Mayor will work with relevant partners to ensure the housing will 'enhance the environment, improve housing choice and affordability and provide better quality accommodation for Londoners'.

4.1.87 The identification of new sources of housing supply is promoted, and this may be delivered through a range of initiatives including the intensification of housing provision through development at higher densities.

4.1.88 London Plan **Policy 3.4 Optimising Housing Potential** states that 'a rigorous appreciation of housing density is crucial to realising the optimum potential of sites' and that 'development should optimize housing output for different types of location within the relevant density range shown in Table 3.2'.

4.1.89 Density ranges are set out in Table 3.2 and paragraph 3.29 A specifies that 'higher density provision for smaller households should be focused on areas with good public transport accessibility (measured by Public Transport Accessibility Levels (PTALs)'.

4.1.90 London Plan **Policy 3.7 Large Residential Developments** are recognised as making 'a significant contribution to meeting housing need and provide opportunities to create particularly attractive neighbourhoods with distinctive identities and the critical mass to support social, physical and environmental infrastructure and provide employment opportunities'. Part A of this policy notes that 'Proposals for large residential developments including complementary non-residential uses are encouraged in areas of high public transport accessibility'.

4.1.91 London Plan **Policy 3.8 Housing Choice** states that 'Londoners should have a genuine choice of homes that they can afford and which meet their requirements for different sizes and types of dwellings in the highest quality environments'. Furthermore:

a) 'new developments offer a range of housing choices, in terms of the mix of housing sizes and types, taking account of the housing requirements of different groups and the changing roles of different sectors, including the private rented sector, in meeting these;

b) provision of affordable family housing is addressed as a strategic priority in LDF policies;

c) all new housing is built to 'The Lifetime Homes' standards

d) ten per cent of new housing is designed to be wheelchair accessible, or easily adaptable for residents who are wheelchair users;

e) account is taken of the changing age structure of London's population and, in particular, the varied needs of older Londoners, including for supported and affordable provision

f) account is taken of the needs of particular communities with large families

g) other supported housing needs are identified authoritatively and coordinated action is taken to address them in LDF and other relevant plans and strategies

h) strategic and local requirements for student housing meeting a demonstrable need are addressed by working closely with stakeholders in higher and further education and without compromising capacity for conventional homes

i) the accommodation requirements of gypsies and travellers (including travelling show people) are identified and addressed in line with national policy, in co-ordination with neighbouring boroughs and districts as appropriate'.

4.1.92 London Plan **Policy 3.9 Mixed and balanced communities** outlines that:

A. Communities mixed and balanced by tenure and household income should be promoted across London through incremental small scale as well as larger scale developments which foster social diversity, redress social exclusion and strengthen communities' sense of responsibility for, and identity with, their neighbourhoods. They must be supported by effective and attractive design, adequate infrastructure and an enhanced environment.

B. A more balanced mix of tenures should be sought in all parts of London, particularly in some neighbourhoods where social renting predominates and there are concentrations of deprivation.

4.1.93 London Plan **Policy 3.11 Affordable Housing Targets** specifies that the Mayor will seek to 'maximise affordable housing provision and ensure an average of at least 13,200 more affordable homes per year in London over the term of this Plan'. It adds that 'in order to give impetus to a strong and diverse intermediate housing sector, 60% of the affordable housing provision should be for social rent and 40% for intermediate rent or sale'.

4.1.94 London Plan **Policy 3.12 Negotiating affordable housing on individual private residential and mixed use schemes** advises that whilst the 'maximum reasonable amount of affordable housing should be sought' regard should be had for the need to 'encourage rather than restrain residential development' and the specific circumstances of individual sites. This policy also acknowledges that 'boroughs should take a reasonable and flexible approach to securing affordable housing on a site by site basis'.

4.1.95 The policy advises that, 'in estimating provision from private residential or mixed-use developments, boroughs should take into account economic viability and the most effective use of private and public investment, including use of financial contributions'.

4.1.96 London Plan **Policy 3.13 Affordable Housing Thresholds** and states that boroughs should normally require affordable housing provision on a site which has a capacity to provide 10 or more homes, applying the density guidance set out in Policy 3.4 and Table 3.2 of the London Plan.

Local Policy

4.1.97 A number of Hammersmith and Fulham's UDP housing policies were not saved, including those relating to residential density and affordable housing.

4.1.98 UDP **Policy HO6 Housing Mix and Special Needs**, relating to housing mix and special needs, did not expire and requires that applications for development for 20 or more dwellings should include a mixture of units of different sizes in order to meet the needs of family and non-family households. The policy also specifies that 10% of the units should be designed to be suitable for occupation by wheelchair users.

4.1.99 Under UDP **Policy HO14 Waste Management** new housing development 'should provide within the layout facilities that will enable householders to re-use, compost or recycle waste.' Furthermore, family dwellings with accommodation at ground level must have direct access to amenity space of an area not less than 36 sqm according to policy S5A.1. In the case of non-family dwellings this amenity space is reduced to 12 sqm under policy S5A.2.

4.1.100 One of the strategic objectives of the Core Strategy is to 'increase the supply and choice of high quality housing and ensure that the new housing meets local needs and aspirations, particularly the need for affordable home ownership and for homes for families'. Specifically, under Strategic Policy A 'planning for regeneration and growth' the acceptability of a development will be measured against a number of factors including 'the

creation of inclusive and accessible places that provide acceptable living environments with a suitable mix of housing types, sizes and affordability'.

4.1.101 Under Core Strategy **Policy H1 Housing Supply** the council will work with 'partner organisations and landowners to exceed the proposed London Plan target of 615 additional dwellings a year up to 2021 and to continue to seek at least 615 additional dwellings a year in the period up to 2032'.

4.1.102 The WCOA SPG acknowledges an 'overwhelming housing need in the borough'. In accordance with the London Plan, housing should meet the Lifetime Homes Standard and 10% should be designed to mobility standard.

Commentary

4.1.103 The application site is suitable in principle for residential development, being located within a defined urban area, on previously developed land in an area of low flood risk and providing access to a range of jobs, shops, services and a variety of transport opportunities.

4.1.104 The proposal for a mixed used development with educational uses, hotel and residential units is designed in the context of making efficient and effective use of previously developed land.

4.1.105 In terms of delivering an appropriate housing density, the application site is identified as having PTAL level 5 in a 'central' setting which sets the density target at 650-1100 habitable rooms per hectare.

4.1.106 The scheme will provide 59 units for Imperial College academics and key worker. The development will offer a range of housing choices in terms of mix of housing sizes and types.

DESIGN POLICY

National Policy

4.1.107 PPS 3 acknowledges that good design is fundamental to using land efficiently. It advises local planning authorities to facilitate good design by identifying the distinctive features that define the character of a particular local area. Moreover, 'the density of existing development should not dictate that of new housing by stifling change or requiring replication of existing style or form. If done well, imaginative design and layout of new development can lead to a more efficient use of land without compromising the quality of the local environment' (paragraph. 50).

4.1.108 PPG10 notes that opportunities for sustainable waste management can be secured through good design and layout, including for kerbside collection and community recycling (paragraph 35).

Strategic Policy

4.1.109 London Plan **Policy 7.1 Building London's neighbourhoods and communities** outlines that:

A. 'Development should be designed so that the layout, tenure, and mix of uses interface with surrounding land and improve people's access to social and community infrastructure (including green spaces), the Blue Ribbon Network, local shops, employment opportunities, commercial services and public transport.

B. Development should enable people to live healthy, active lives; should maximize the opportunity for community diversity, inclusion and cohesion; and should contribute to people's sense of place, safety and security. Places of work and leisure, streets, neighbourhoods, parks and open spaces should be designed to meet the needs of the community at all stages of people's lives, and should meet the principles of lifetime neighbourhoods.

C. The design of new buildings and the spaces they create should help reinforce or enhance the character, legibility, permeability and accessibility of the neighbourhood.

D. The policies in this chapter provide the context within which the targets set out in other chapters of this Plan should be met'.

4.1.110 London Plan **Policy 7.2 An Inclusive Environment** seeks to achieve 'achieve the highest standards of accessible and inclusive design and supports the principles of inclusive design'.

4.1.111 The 'Context and Strategy' chapter' of the London Plan seeks to achieve a new focus on quality of life within the city and recognises the importance of 'protecting and enhancing what is distinctive about the city and its neighbourhoods, securing a sense of place and belonging through high quality architecture and design that sits well with its surroundings'.

4.1.112 This chapter also recognises the importance of future adaption; 'making sure buildings and the wider urban realm are designed with a changing climate in mind'.

4.1.113 The Mayor is committed to delivering 'genuinely sustainable neighbourhoods, while setting out a suite of housing policies to help deliver more homes for Londoners which meet a range of needs and are of high design quality'.

4.1.114 London Plan **Policy 3.2 Improving health and addressing health inequalities** recognises the value of good design in helping to improve health and address health inequalities. It specifies that 'new developments should be designed, constructed and managed in ways that improve health and promote healthy lifestyles to help to reduce health inequalities'.

4.1.115 London Plan **Policy 3.5 Quality and design of housing developments** states that **'**Housing developments should be of the highest quality internally, externally and in relation to their context and to the wider environment, taking account of strategic policies in this Plan to protect and enhance London's residential environment and attractiveness as a place to live.

4.1.116 Furthermore 'the design of all new housing developments should enhance the quality of local places, taking into account physical context; local character; density; tenure and land use mix; and relationships with, and provision of, public, communal and open spaces, taking particular account of the needs of children and older people'.

4.1.117 London Plan **Policy 7.3 Designing out crime** seeks to create safe, secure and appropriately accessible environments where crime and disorder, and the fear of crime do not undermine quality of life or community cohesion. Planning decisions for development should reduce the opportunities for criminal behaviour and contribute to a sense of security without being overbearing or intimidating.

4.1.118 London Plan **Policy 7.4 Local character** outlines that buildings, streets and open spaces should provide a high quality design response that:

a) has regard to the pattern and grain of the existing spaces and streets in orientation, scale, proportion and mass

b) contributes to a positive relationship between the urban structure and natural landscape features, including the underlying landform and topography of an area

c) is human in scale, ensuring buildings create a positive relationship with street level activity and people feel comfortable with their surroundings

d) allows existing buildings and structures that make a positive contribution to the character of a place to influence the future character of the area

e) is informed by the surrounding historic environment.

4.1.119 London Plan **Policy 7.6 Architecture** 'should make a positive contribution to a coherent public realm, streetscape and wider cityscape. It should incorporate the highest quality materials and design appropriate to its context'. Buildings and structures should:

a) be of the highest architectural quality

b) be of a proportion, composition, scale and orientation that enhances, activates and appropriately defines the public realm

c) comprise details and materials that complement, not necessarily replicate, the local architectural character

d) not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy,

overshadowing, wind and microclimate. This is particularly important for tall buildings

e) incorporate best practice in resource management and climate change mitigation and adaptation

f) provide high quality indoor and outdoor spaces and integrate well with the surrounding streets and open spaces

g) be adaptable to different activities and land uses, particularly at ground level

h) meet the principles of inclusive design

i) optimise the potential of sites.

4.1.120 London Plan **Policy 7.7 Location and design of tall and large buildings** promotes the development of tall buildings as part of the plan-led approach to 'changing or developing an area by the identification of appropriate, sensitive and inappropriate locations. Tall and large buildings should not have an unacceptably harmful impact on their surroundings'.

4.1.121 This policy also suggests that tall and large buildings should be limited to certain areas of London, including locations such Opportunity Areas and other sites that have good access to public transport.

4.1.122 The design and impact of large-scale buildings is also considered under London Plan Policy 7.7. It is important that tall buildings 'relate well to the form, proportion, composition, scale and character of surrounding buildings, urban grain and public realm (including landscape features), particularly at street level'. They should also improve the legibility of an area and 'enhance the skyline and image of London'.

4.1.123 Tall buildings should also 'incorporate the highest standards of architecture and materials, including sustainable design and construction practices'. London Plan **Policy 5.3 Sustainable Design and Construction** will also be 'important in helping to reduce the demand for natural materials'.

Local Policy

4.1.124 Under Core Strategy **Policy OS1 Improving and Protecting Parks and Open Spaces** the Council seeks to 'ensure provision of quality open space and children's play provision in new developments'.

4.1.125 Core Strategy **Policy BE1 Built Environment** sets out that 'all development must have regard to its setting and context within the OA'. Strategic policy WCOA adds that developments should reflect, extend, improve, and integrate with the urban grain and pattern of development in that surrounding area'. It notes that 'the council will expect most of the new development to be low to medium rise, however a limited number of tall buildings of exceptionally good design may be acceptable, in particular, close to the A40 and A3220 and in any other areas identified in the White City OA planning framework tall buildings strategy'.

4.1.126 Core Strategy Policy BE1 specifies that all development should create a 'high quality urban environment that respects and enhances its townscape context and heritage assets. There should be an approach to accessible and inclusive urban design that considers how good design, quality public realm, landscaping and land use can be integrated to help regenerate places'.

4.1.127 This ambition is also supported by saved UDP policies **EN8 Design of New Developments**, **EN8D Shopfronts, EN10 Designing Out Crime** and **EN21 Environmental Nuisance**, which detail the design standards for new developments, shopfronts, designing out crime and contending with environmental nuisance respectively.

CABE Guidance

4.1.128 CABE, which became the 'Design Council CABE' in 2010, published its **CABE and English Heritage: Guidance on tall buildings** (July 2007) 'which advises that national, strategic and local policy relating to tall buildings must be taken into careful consideration. It states that 'any new tall building should be in an appropriate location, should be of excellent design quality in its own right and should enhance the qualities of its immediate location and wider setting.' The document sets out criteria for evaluating tall building proposals which include the following:

§ the relationship to context;
§ the effect of the historic context;
§ the effect on world heritage sites;
§ the relationship to transport infrastructure;
§ the architectural quality of the building;
§ the sustainable design and construction;
§ the credibility of the design;
§ the contribution to public space and facilities;
§ the effect on the local environment;
§ the contribution made to permeability; &
§ the provision of a well-designed environment.

Emerging Policy

4.1.129 The WCOA SPG states that 'consideration of tall buildings of exceptional design quality is encouraged' and it advises that building heights may generally rise towards the A40 and A3220 subject to no adverse impacts upon the amenity of surrounding buildings. Overall, the design objectives seek an 'innovative and visually exciting urban development that links with surrounding environment'.

4.1.130 The Mayor has produced a draft Housing Design Guide (April 2010) which supports the London Housing Strategy (February 2010) in the move towards achieving higher Code for Sustainable Homes (CSH) levels. It also outlines the minimum space standards which are intended to 'improve residents' quality of life and ensure that our homes are accessible and able to accommodate changing personal circumstances and growing families'.

Commentary

4.1.131 The application site is suitable for residential development, being located within a defined urban area, on previously developed land and providing access to a range of jobs, shops, services and a major transport node. The proposal makes efficient and effective use of previously developed land.

4.1.132 The design of the proposed development has included consideration of all of the principles of design, architecture and accessibility identified at the national strategic and local policy levels. In several instances these design principles reflect and incorporate the requirements of other policies in respect of sustainability; and making the most efficient use of previously developed land.

4.1.133 A specialist architectural practice was instructed specifically to deliver an exemplary design for the tall building on the site. The design has been refined to ensure that it is sensitive to its urban setting and employs appropriate use of materials.

4.1.134 The detail of the design and impacts of the proposals relative to the policies is necessarily considered within various technical assessments within this Statement.

SUSTAINABILITY POLICY

National Policy

4.1.135 PPS1 sets out the Government's overarching policies on delivering sustainable development through the planning system. The document contains general guidance on development principles. It promotes pre-application discussions with local planning authorities and seeks to ensure that development supports existing communities and contributes to the creation of safe, sustainable, liveable and mixed communities with good access to jobs and key services for all members of the community. PPS1 also supports the best and most optimal use of land compatible with the local context and amenity.

4.1.136 PPS1 states that sustainable development should be achieved through the following:

§ making suitable land available for development in line with economic, social and environmental objectives to improve people's quality of life;
§ contributing to sustainable economic development;
§ protecting and enhancing the natural and historic environment, the quality and character of the countryside, and existing communities;
§ ensuring high quality development through good and inclusive design, and the efficient use of resources; and

§ ensuring that development supports existing communities and contributes to the creation of safe, sustainable, liveable and mixed communities with good access to jobs and key services for all members of the community.

4.1.137 PPS 1 sets out four aims for sustainable development which should be pursued in an integrated way to secure a 'sustainable, innovative and productive economy that delivers high levels of employment, and a just society that promotes social inclusion, sustainable communities and personal well being, in ways that protect and enhance the physical environment and optimise resource and energy use.'

4.1.138 These aims are:

§ social progress which recognises the needs of everyone;

§ effective protection of the environment;

§ the prudent use of natural resources; &

§ the maintenance of high and stable levels of economic growth and employment.

4.1.139 Under PPS 4 Policy EC10.01 states that 'Planning applications that secure sustainable economic growth should be treated favourably.'

4.1.140 In reaching a decision, the local authorities should consider whether the proposal secures a 'high quality and inclusive design which takes the opportunities available for improving the character and quality of the area and the way it functions'.

4.1.141 PPS 4 also specifies that the local development plan should:

§ 'make the most efficient and effective use of land, prioritising previously developed land which is suitable for re-use'; and

§ 'at the local level, encourage new uses for vacant or derelict buildings, including historic buildings'.

4.1.142 The supplement to PPS1 identifies a number of key planning objectives which pertain to the provision of homes, jobs, services and infrastructure needed by communities and businesses whilst securing a full contribution and commitment to delivering sustainable development.

4.1.143 The supplement requires that local authorities, when considering applications for development', 'take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption, including maximising cooling and avoiding solar gain in the summer; and, overall, be planned so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form, together with the proposed density and mix of development, support opportunities for decentralised and renewable or low-carbon energy supply'.

4.1.144 Proposed development must 'deliver a high quality local environment', 'give priority to the use of sustainable drainage systems' and 'provide for sustainable waste management'.

4.1.145 **PPS22 Renewable Energy (2004)** advises that the increased development of renewable energy resources, alongside improvements in energy efficiency and the development of combined heat and power, is vital to facilitating the delivery of the Government's commitment on both climate change and renewable energy. Positive planning facilitating renewable energy developments, is identified as being key to contribute to the Government's sustainable development strategy.

4.1.146 Paragraph 18 of the Guidance advises that local planning authorities and developers should consider the opportunity for incorporating renewable energy products in all new developments. The Guidance goes on to state that small scale renewable energy schemes utilising technology such as solar panels, biomass heating, small scale wind turbines, photo/voltage cells, and combined heat and power schemes can be incorporated both into new developments and some existing buildings.

4.1.147 PPS22 goes on to advise that in determining applications for renewable energy developments, consideration will be given to landscaping and visual effects, noise and odour.

4.1.148 PPS22 states that 'renewable energy developments should be capable of being accommodated throughout England in locations where the technology is viable and environmental, economic and social impacts can be addressed satisfactorily'. It advises that 'development proposals should demonstrate any environmental, economic and social benefits', whilst also giving consideration to how 'any environmental and social impacts have been minimised through careful consideration of location, scale, design and other measures.'

Strategic Policy

4.1.149 London Plan **Policy 5.1 Climate change mitigation** states 'The Mayor seeks to achieve an overall reduction in London's carbon dioxide emissions of 60 per cent (below 1990 levels) by 2025. It is expected that the GLA Group, London boroughs and other organisations will contribute to meeting this strategic reduction target, and the GLA will monitor progress towards its achievement annually'.

4.1.150 London Plan **Policy 5.2 Minimising carbon dioxide emissions** outlines 'development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy':

1 be lean: use less energy;

2 be clean: supply energy efficiently; &

3 be green: use renewable energy.

4.1.151 Furthermore 'The Mayor will work with boroughs and developers to ensure that major developments meet the following targets for carbon dioxide emissions reduction in buildings. These targets are expressed as minimum improvements over the Target Emission Rate (TER) outlined in the national Building Regulations leading to zero carbon residential buildings from 2016 and zero carbon non-domestic buildings from 2019'.

4.1.152 Furthermore 'Major development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction outlined above are to be met within the framework of the energy hierarchy'. As a minimum, energy assessments should include the following details:

a) calculation of the energy demand and carbon dioxide emissions covered by the Building Regulations and, separately, the energy demand and carbon dioxide emissions from any other part of the development, including plant or equipment, that are not covered by the Building Regulations (see paragraph 5.22) at each stage of the energy hierarchy

b) proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services

c) proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)

d) proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.

4.1.153 The carbon dioxide reduction targets should be met on-site. Where it is clearly demonstrated that the specific targets cannot be fully achieved on-site, any shortfall may be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.

4.1.154 London Plan **Policy 5.3 Sustainable design and construction** sets out that 'the highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

4.1.155 Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process. Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

a) minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems);

b) avoiding internal overheating and contributing to the urban heat island effect;

c) efficient use of natural resources (including water), including making the most of natural systems both within and around buildings;

d) minimising pollution (including noise, air and urban run-off);

e) minimising the generation of waste and maximising reuse or recycling ;

f) avoiding impacts from natural hazards (including flooding);

g) ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions;

h) securing sustainable procurement of materials, using local supplies where feasible; &

i) promoting and protecting biodiversity and green infrastructure.

4.1.156 London Plan **Policy 5.5 Decentralised energy networks** outlines that 'The Mayor expects 25 per cent of the heat and power used in London to be generated through the use of localised decentralised energy systems by 2025. In order to achieve this target the Mayor prioritises the development of decentralised heating and cooling networks at the development and area wide levels, including larger scale heat transmission networks'.

4.1.157 London Plan **Policy 5.6 Decentralised energy in development proposals** sets out that:

A. Development proposals should evaluate the feasibility of Combined Heat and Power (CHP) systems, and where a new CHP system is appropriate also examine opportunities to extend the system beyond the site boundary to adjacent sites.

B. Major development proposals should select energy systems in accordance with the following hierarchy:

1 connection to existing heating or cooling networks;

2 site wide CHP network; &

3 communal heating and cooling.

C. Potential opportunities to meet the first priority in this hierarchy are outlined in the London Heat Map tool. Where future network opportunities are identified, proposals should be designed to connect to these networks.

4.1.158 London Plan **Policy 5.7 Renewable energy** outlines that 'The Mayor seeks to increase the proportion of energy generated from renewable sources, and expects that the projections for installed renewable energy capacity outlined in the Climate Change Mitigation and Energy Strategy and in supplementary planning guidance will be achieved in London'. Planning decisions should be made within the within 'the framework of the energy hierarchy (see Policy 5.2), major development proposals should provide a reduction in expected carbon dioxide emissions through the use of on-site renewable energy generation, where feasible.'

4.1.159 London Plan **Policy 5.8 Innovative energy technologies** outlines 'The Mayor supports and encourages the more widespread use of innovative energy technologies to reduce use of fossil fuels and carbon dioxide emissions. In particular the Mayor will seek to work with boroughs and other partners in this respect, for example by stimulating the uptake of advanced conversion technologies such as anaerobic digestion.

4.1.160 London Plan **Policy 5.9 Overheating and cooling** outlines 'the Mayor seeks to reduce the impact of the urban heat island effect in London and encourages the design of places and spaces to avoid overheating and excessive heat generation, and to reduce overheating due to the impacts of climate change and the urban heat island effect on an area wide basis. Planning decisions should:

A. 'Major development proposals should reduce potential overheating and reliance on air conditioning systems and demonstrate this in accordance with the following cooling hierarchy:

1. minimise internal heat generation through energy efficient design;

2. reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls;

3. manage the heat within the building through exposed internal thermal mass and high ceilings;

4. passive ventilation;

5. mechanical ventilation; &

6. active cooling systems (ensuring they are the lowest carbon options).

B. Major development proposals should demonstrate how the design, materials, construction and operation of the development would minimise overheating and also meet its cooling needs. New development in London should also be designed to avoid the need for energy intensive air conditioning systems as much as possible. Further details and guidance regarding overheating and cooling are outlined in the London Climate Change Adaptation Strategy'.

4.1.161 London Plan **Policy 5.11 Green roofs and development site environs** establishes major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible, to deliver as many of the following objectives as possible:

§ adaptation to climate change (ie aiding cooling);

§ sustainable urban drainage;

§ mitigation of climate change (ie aiding energy efficiency);

§ enhancement of biodiversity;

§ accessible roof space;

§ improvements to appearance and resilience of the building; &

§ growing food.

Local Policy

4.1.162 UDP **Policy G0 Sustainable Development**, which addresses sustainable development, seeks a range of objectives including delivering: adequate provision of housing accommodation, sustaining a wide range of economic activities and seeking to ensure that 'large development projects contribute to regeneration and provide clear benefits to the community.'

4.1.163 UDP **Policy EN20C Light Pollution** protects against light pollution and specifies that external lighting should be designed to conserve energy and avoid glare and light spillage from the site.

4.1.164 Core Strategy **Policy CC1 Reduce Carbon Emissions and Resource Use and Adapt to Climate Change Impacts** requires developments to make the fullest possible contribution to the mitigation of and adaptation to climate change.The council will reduce carbon emissions and tackle climate change by:

§ reducing carbon emissions from the redevelopment or reuse of buildings,

§ by ensuring developments minimise their energy use, make use of energy from efficient sources and use renewable energy where feasible;

§ maximising the provision of decentralised energy networks and integrating the use of renewable energy in the proposed regeneration areas;

§ meeting London Plan targets for reducing carbon emissions from new development;

§ promoting the efficient use of land and buildings and patterns of land use that reduce the need to travel by car;

§ safeguarding existing heating and cooling networks in the borough; &

§ requiring developments to be designed and constructed to take account of the increasing risks of flooding, drought and heatwaves.

Supplementary Planning Guidance

Sustainable Design and Construction (SPG) May 2006

4.1.165 The SPG specifies that new developments should 'minimise, reuse and recycle demolition waste' and by 2010 new schemes should provide facilities to recycle or compost at least 35% of household waste.

4.1.166 The WCOA SPG advocates that new development embraces the principles of sustainable design and construction. The particulars of this requirement are dealt with in the accompanying Sustainability Statement.

Commentary

4.1.167 The design and planning of the proposed development has been consistent with the objectives of PPS1 and the Supplement to PPS 1.

4.1.168 An energy assessment has been undertaken and an Energy Statement has been submitted with the planning application, a copy of which is included as **Technical Appendix X.**

4.1.169 The overall sustainability and potential effects on climate change of the proposed development are considered further in more technical detail in the Building Sustainability and Energy Statements submitted with the planning application and included at **Technical Appendix 3.1 and 3.2** to this Statement.

HISTORIC ENVIRONMENT AND CONSERVATION POLICIES

National Policy

4.1.170 **PPS5 Planning for the Historic Environment (2010)** sets out the Government's approach to the conservation of the historic environment. It seeks to deliver sustainable development, whist concomitantly conserving England's heritage assets in a manner appropriate to their significance. It is also intended that this approach should serve to contribute to our knowledge and understanding of our past.

4.1.171 The development management of heritage assets is set out in policies HE6-HE12 which deal with enabling development, the information requirements, policy principles and recording of information relating to all heritage assets, as well as additional policy principles applicable to designated assets and their settings.

4.1.172 These policies focus upon the need to identify and assess the particular significance of any element of the historic environment that may be affected by the proposal and how the impact of the proposals can be minimized. The conservation of heritage assets should be balanced against the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment.

4.1.173 The Government's overarching is that the historic environment and its Heritage assets should be conserved and enjoyed with the quality of life they bring to this and future generations.

4.1.174 The strategic objectives set out within the PPS state that local authorities should:

- § Seek to deliver sustainable development by ensuring the policies and decisions concerning the historic environment:
  - § recognise that Heritage assets are a non-renewable resource;
  - § take account of the wider social, cultural, economic and environmental benefits of Heritage conservation; and
  - § recognise that intelligently manage change may sometimes be necessary if Heritage assets are to be maintained for the long term.
- § To conserve England's Heritage assets in a manner appropriate to their significance, ensuring that:
  - decisions are based on the nature, extent and level that significance investigated to a degree proportionate to the importance of the Heritage asset;
  - wherever possible, Heritage assets are put into an appropriate and viable use that is consistent with their conservation;
  - the positive contribution of such Heritage assets to local character and sense of place is recognised and valued; and
  - consideration for the historic environment is integrated into planning policies, promoting place shaping.

4.1.175 Policies within the Guidance seek to ensure that where an application site includes or is considered to have the potential to include, Heritage assets with archaeological interest, Local Planning Authorities should require developers to submit an appropriate desk-based assessment. (Policy HE6).

4.1.176 Policy HE7: Policy Principles guiding the determination of applications for consent relating to all Heritage assets sets out that Local Planning Authorities should seek to identify and assess the particular significance of any element of the historic environment that may be affected by the relevant proposal (including by development affecting the setting of a Heritage asset).

4.1.177 Policy HE7.5 states that Local Planning Authorities should take into account the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment. The consideration of design should include scale, height, massing, alignment, materials and use.

4.1.178 Policy HE9: Additional policy principles guiding the consideration of applications for consent relating to designated Heritage sites, states that there is a presumption in favour of the conservation of designated Heritage sites and the more significant re-designated Heritage asset, the greater the presumption in favour of its conservation should be.

4.1.179 Policy HE10 sets out the additional policy principles tied into consideration of applications for development affecting the setting of a designated Heritage asset. It states that when considering applications for development that affect the setting of a Heritage asset, Local Planning Authorities should treat favourably the applications that preserve those elements of the setting that make it a positive contribution or to better reveal the significance of the asset.

4.1.180 It recommends that when considering applications that do not do this, Local Planning Authorities should weigh any such harm against the wider benefits of the application. The greater negative impact on the significance of the Heritage asset, the greater benefits that would be needed to justify approval.

4.1.181 Paragraph HE10.2 sets out that Local Authorities should identify opportunities for changes in the setting to enhance or better reveal the significance of a Heritage asset. Taking such opportunities should be seen as a public benefit and part of the process of place shaping.

Strategic Policy

4.1.182 London Plan **Policy 7.8 Heritage assets and archaeology** outlines that 'development should identify, value, conserve, restore, re-use and incorporate heritage assets, where appropriate. Development affecting heritage assets and their settings should conserve their significance, by being sympathetic to their form, scale, materials and architectural detail. New development should make provision for the protection of archaeological resources, landscapes and significant memorials. The physical assets should, where possible, be made available to the public on-site. Where the archaeological asset or memorial cannot be preserved or managed on-site, provision must be made for the investigation, understanding, recording, dissemination and archiving of that asset'.

Local Policy

4.1.183 UDP **Policy EN2B Effect of Development on the Setting of Conservation Areas and Views into and out of them** deals with the effect of development on the setting of conservation areas and views into and out of them. It states that 'development (including development outside conservation areas) will only be permitted if the character or appearance of the conservation areas in terms of their setting and views into or out of them is preserved or enhanced'.

4.1.184 UDP **Policy EN3 Listed Buildings** protects listed buildings of special architectural or historic interest which usually prevents their demolition, alteration and extension, and limits development which would not preserve the setting of any listed building.

4.1.185 In accordance with PPS5 consideration has been given to the potential archaeological remains in advance of the submission of the planning application. An archaeological desk-based assessment has been undertaken and consideration given to geo-technical investigation findings to conclude upon appropriate mitigation. Further detail in respect of the assessment of the effects of the development upon archaeology is provided in **Chapter 6 – Archaeology**.

Commentary

4.1.186 The planning and design for the proposed development has been prepared in the context of the objectives of PPS5.

4.1.187 The application site is not located within a Conservation Area and does not include any listed or locally listed building within its boundary. The closest listed building lies to the north-west of the site; the grade II listed Burlington Danes school building is located 300m from the site boundary. There are 19 listed buildings within 1km of the site, 17 of which are Grade II and 2 are Grade II*. Consideration has been given to the potential effect of the proposed development upon the setting of nearby listed buildings and this has informed the evolution of the design of the proposals.

4.1.188 Detailed consideration of the effects of the development upon the local heritage and wider townscape is given in this Statement in **Chapter 7 – Built Heritage**, and Volume 2 – Townscape & Visual Impact Assessment respectively and in the Design and Access Statement(s)submitted with the planning application.

GREEN INFRASTRUCTURE POLICY

National Policies

4.1.189 **Planning Policy Guidance 17: Planning for Open Space, Sport and Recreation (2002)** recognises that 'open spaces, sport and recreation all underpin people's quality of life'. The provision of open space is considered fundamental to delivering upon a number of broader Government objectives notably 'supporting an urban renaissance', promotion of social inclusion and community cohesion' delivering 'health and well being' and 'promoting more sustainable development'.

4.1.190 The Guidance sets out the Government's Policy on planning for open space, sports and recreational facilities. In planning for new open spaces local authorities should seek opportunities to improve the local open space network, to create public open space from vacant land, and to incorporate open space within new development on previously-used land.

Strategic Policy

4.1.191 The opening comments of the London Plan recognise that green infrastructure and open spaces have 'a crucial part to play in ensuring good health and a high quality of life'.

4.1.192 London Plan **Policy 7.5 Public Realm** sets out that London's public spaces should be secure, accessible, inclusive, connected, easy to understand and maintain, relate to local context, and incorporate the highest quality design, landscaping, planting, street furniture and surfaces. Planning decisions on proposed development 'should make the public realm comprehensible at a human scale, using gateways, focal points and landmarks as appropriate to help people find their way. Landscape treatment, street furniture and infrastructure should be of the highest quality, have a clear purpose, maintain uncluttered spaces and should contribute to the easy movement of people through the space. Opportunities for the integration of high quality public art should be considered, and opportunities for greening (such as through planting of trees and other soft landscaping wherever possible) should be maximised. Treatment of the public realm should be informed by the heritage values of the place, where appropriate. Development should incorporate local social infrastructure such as public toilets, drinking water fountains and seating, where appropriate. Development should also reinforce the connection between public spaces and existing local features such as the Blue Ribbon Network and parks and others that may be of heritage significance'.

4.1.193 London Plan **Policy 7.18 Protecting local open space and addressing local deficiency** supports the creation of new open space in London to ensure satisfactory levels of local provision to address areas of deficiency.

4.1.194 London Plan **Policy 7.19 Biodiversity and access to nature** development proposals should: 'wherever possible, make a positive contribution to the protection, enhancement, creation and management of biodiversity'.

4.1.195 Under London Plan **Policy 2.18 Green infrastructure** it is recognised that green infrastructure performs a number of valuable functions including 'increasing recreational opportunities, access to and enjoyment of open space ..to promote healthy living'.

4.1.196 There is also an expectation that provision will be made for children to play under London Plan **Policy 3.6 Children and young people's play and informal recreation facilities.** This is a requirement for development schemes which contain housing provision to provide different provision for 'different age groups, including consideration of communal space, roof gardens, indoor space for young children and youth facilities for young people.'

4.1.197 London Plan **Policy 5.10 Urban Greening** states 'The Mayor will promote and support urban greening, such as new planting in the public realm (including streets, squares and plazas) and multifunctional green infrastructure, to contribute to the adaptation to, and reduction of, the effects of climate change. The Mayor seeks to increase the amount of surface area greened in the Central Activities Zone by at least five per cent by 2030, and a further five per cent by 2050. Planning decisions for development proposals should integrate green infrastructure from the beginning of the design process to contribute to urban greening, including the public realm. Elements that can contribute to this include tree planting, green roofs and walls, and soft landscaping. Major development proposals within the Central Activities Zone should demonstrate how green infrastructure has been incorporated

Local Policy

4.1.198 The Borough is identified as having a deficiency of open space provision. Under UDP **Policy EN23 New Open Space Provision in Connection with Development** new developments are required to 'make provision of open space to meet the needs of occupiers and users'. Where this includes residential development, provision will need to be in accordance with development standards S5A and S7.

4.1.199 UDP **Policy EN27 Nature Conservation Areas** seeks to protect identified areas 'from development likely to cause demonstrable harm to their wildlife value.' However, the policy also qualifies that 'development will not be permitted unless… the proposed development would release a site for built development needed to realise a qualitative gain for the local community in pursuance of other physical, social and economic regeneration objectives of the UDP'.

4.1.200 UDP **Policy EN29 Nature Conservation on Development Sites** sets out guidelines for nature conservation on development sites. It promotes new development which is sympathetic to nature conservation. Under Appendix 4.5 of the UDP, 'BI.7 Rail side habitats' is identified as an area of 'Grade I borough-wide importance'. These are described as 'the best of the rail – side habitats in the borough. These are found beside the Central and District Lines and railway lines, including the North London Link, West London Line and the main lines out of Euston.'

Supplementary Planning Guidance

Sustainable Design and Construction [SPG] May 2006

4.1.201 The SPG specifies that 'net gain of publically accessible open space' is the Mayor's Preferred Standard for Open Space. It states that the design of new development should 'improve linkages between open spaces and the wider public realm' and 'ensure that open space can be used and owned by the community'. It also promotes the re-use of land and buildings specifying that 'previously developed land is re-used, and that green spaces within London are protected and opportunities for the provision of new open space are maximised'.

Commentary

4.1.202 The proposed development includes the provision of a 2,500 sqm central square. The proposed development also includes the provision of`children and young people's playspace in accordance with the GLA's guidelines.

TRANSPORT POLICY

National Policy

4.1.203 **Planning Policy Guidance 13: Transport (2001)** supports the Government's policy for achieving integrated and sustainable forms of transport in the UK. PPG 13, in accordance with the objectives of PPS1 and PPS3, seeks 'greater intensity of development at places with good public transport accessibility, such as city, town, district and local centres or around major nodes along good quality public transport corridors'. The document also makes clear that reducing the amount of car parking in developments is essential to promoting more sustainable transport choices.

4.1.204 **PPS4** emphasises that local authorities, when assessing sites to meet the established need for development, should 'identify the appropriate scale of development, ensuring that the scale of the sites identified and the level of

travel they generate, are in keeping with the role and function of the centre within the hierarchy of centres and the catchment served'. Under PPS4, policy EC18.1 states that local parking standards should apply to individual planning applications unless 'the applicant has demonstrated (where appropriate through a transport assessment) that a higher level of parking provision is needed and shown the measures proposed to be taken (for instance in the design, location and operation of the scheme) to minimise the need for parking.

Strategic Policy

4.1.205 Under London Plan **Policy 3.7 Large Residential Developments** of the London Plan 'proposals for large residential developments including complementary non-residential uses are encouraged in areas of high public transport accessibility'. It adds that 'the highest development densities and most varied mixes of uses should be located where there is the highest public transport accessibility'.

4.1.206 London Plan **Policy 6.1Strategic Approach** of the plan seeks to integrate transport and development by seeking to 'to improve the capacity and accessibility of public transport, walking and cycling, particularly in areas of greatest demand'.

4.1.207 London Plan **Policy 6.2 Providing public transport capacity and safeguarding land** for transport the Mayor will work with strategic partners to:

a) improve the integration, reliability, quality, accessibility, frequency, attractiveness and environmental performance of the public transport system;

b) co-ordinate measures to ensure that the transport network, now and in the future, is as safe and secure as reasonably practicable;

c) increase the capacity of public transport in London over the Plan period by securing funding for and implementing the schemes and improvements set out in Table 6.1.

4.1.208 London Plan **Policy 6.3 Assessing effects of development on transport capacity** in determining any planning application the local planning authority should have regard to:

A. Development proposals should ensure that impacts on transport capacity and the transport network, at both a corridor and local level, are fully assessed. Development should not adversely affect safety on the transport network.

B. Where existing transport capacity is insufficient to allow for the travel generated by proposed developments, and no firm plans exist for an increase in capacity to cater for this, boroughs should ensure that development proposals are phased until it is known these requirements can be met, otherwise they may be refused. The cumulative impacts of development on transport requirements must be taken into account.

C. Transport assessments will be required in accordance with TfL's Transport Assessment Best Practice Guidance for major planning applications. Workplace and/or residential travel plans should be provided for planning applications exceeding the thresholds in, and produced in accordance with, the relevant TfL guidance. Construction logistics plans and delivery and servicing plans should be secured in line with the London Freight Plan and should be co-ordinated with travel plans.

4.1.209 London Plan **Policy 6.7 Better streets and Surface Transport** promotes 'better streets and surface transport' and seeks to ensure 'direct, secure, accessible and pleasant walking routes to [bus] stops'.

4.1.210 London Plan **Policy 6.9 Cycling** in turn requires that developments provide secure, integrated and accessible cycle parking facilities in line with the minimum standards set out in Table 6 of the plan.

4.1.211 In terms of car parking standards, Table 6.2 specifies under 'parking for residential development' that 'all residential developments in areas of good public transport accessibility should aim for significantly less than 1 space per unit'.

4.1.212 London Plan **Policy 6.10 Walking** establishes the Mayor will work with all relevant partners to bring about a significant increase in walking in London, by emphasising the quality of the pedestrian and street environment, including the use of shared space principles – promoting simplified streetscape, decluttering and access for all. Development proposals should ensure high quality pedestrian environments and emphasise the quality of the pedestrian and street space.

4.1.213 London Plan **Policy 6.11 Smoothing Traffic Flow and Tackling Congestion** outlines the Mayor wishes to see DPDs and Local Implementation Plans (LIPs) take a coordinated approach to smoothing traffic flow and tackling congestion.

4.1.214 London Plan **Policy 6.12 Road Network Capacity** sets out 'The Mayor supports the need for limited improvements to London's road network, whether in improving or extending existing capacity, or providing new links, to address clearly identified significant strategic or local needs'. In assessing proposals for increasing road capacity, including new roads, the following criteria should be taken into account:

a) the contribution to London's sustainable development and regeneration including improved connectivity;

b) the extent of any additional traffic and any effects it may have on the locality, and the extent to which congestion is reduced;

c) how net benefit to London's environment can be provided;

d) how conditions for pedestrians, cyclists, public transport users, freight and local residents can be improved;

e) how safety for all is improved.

4.1.215 Furthermore proposals should show, overall, a net benefit across these criteria when taken as a whole. All proposals must show how any dis-benefits will be mitigated.

4.1.216 London Plan **Policy 6.13 Parking** sets out the maximum parking standards. In addition, developments must:

a) ensure that 1 in 5 spaces (both active and passive) provide an electrical charging point to encourage the uptake of electric vehicles;

b) provide parking for disabled people in line with London Plan Table 6.2;

c) meet the minimum cycle parking standards set out in London Plan Table 6.3;

d) provide for the needs of businesses for delivery and servicing.

Local Policy

4.1.217 Core Strategy **Policy T1 Transport** seeks to relate the intensity of development to public transport accessibility and highway capacity.

4.1.218 UDP **Policy G4 Transportation and Accessibility** supports the design of development which secures 'easy access by disabled people, safe, secure and direct access by pedestrians, and facilities to encourage travel to and from the development by cycling and other sustainable modes of travel and transport' in accordance with policies TN4 –TN6. This latter policy is particularly relevant as the western boundary of the Imperial West site (Wood Lane) is designated a strategic and local cycle route under policy TN6. This policy states that 'where appropriate land will be safeguarded for the formation of the London Cycle Network and complementary local cycle networks'.

4.1.219 Under UDP **Policy TN8 Borough Road Network - Hierarchy of Roads** development will not permitted if it would prejudice the effectiveness of either the strategic route network or a London distributor road. The Imperial West site is bounded to the south by the Westway, which is classified as a strategic route. Direct frontage access from development sites onto strategic route networks 'will be resisted unless there is no prospect of an alternative access to a lower tier road.'

4.1.220 UDP **Policy TN13 Transport Impact Assessment** states that 'where a development is expected to generate more than a specific number of trips per day, or during peak hours, the council will require a Transport Impact Assessment (TIA) to be submitted'. Due to the scale of the Imperial West development, a Transport Impact Assessment has been prepared and submitted as part of this planning application.

4.1.221 UDP **Policy TN23 Public Transport – Safeguarding Land for Future Transport Schemes** contends with 'public transport-safeguarding land for future transport schemes'. Under this policy, land will be safeguarded for 'The Channel Tunnel rail link [CTRL] siding for Eurostar trains'. Hammersmith and Fulham are pressing for a CTRL depot to be established at Stratford to release capacity on the West London Line for enhanced local services. In this case, the additional siding would not be required.'

4.1.222 Policy S18.1-4, which addresses provision of car parking, requires that parking spaces are provided in accordance with Table 12.1 of the UDP, unless the Council acknowledges that exceptional circumstances exist to dictate otherwise. Similarly, policy S20 which addresses cycle parking requirements, states that provision of cycle spaces must be provided in accordance with Table 12.2 unless such provision is demonstrably inappropriate. Policy S22 and Policy S23 deal with vehicular and pedestrian access respectively. All these matters are addressed in detail in the Transport Assessment submitted as part of this planning application.

White City Opportunity Area Framework for Development (SPG) July 2004

4.1.223 Development must provide ease of access for all users, including disabled people, on inclusive design principles.

Commentary

4.1.224 The proposals for development have been prepared in the context of and consistent with the central tenets of PPG13.

4.1.225 The application site is in a location with good access to rail and bus transport services. The proposal seeks to reduce the need to travel by car by providing an integrated mixed use development with restricted parking closely linked with public transport facilities. **Chapter 7 -Transport,** of this Environmental Statement provides further detail on the integration of planning and land uses and the effects of the development in this regard.

WASTE POLICY

National Policy

4.1.226 **PPS10 Planning and Waste Management (2011)** encourages sustainable waste management by considering waste as a resource and regards disposal as a last resort. When determining planning applications, the Statement advises that good design and layout in new development can help secure opportunities for sustainable waste management, including for kerbside collection and community recycling as well as for larger waste facilities. Planning authorities should ensure that new development makes sufficient provision for waste management and promote designs and layouts that secure the integration of waste management facilities without adverse effects on the street scene.

Strategic Policy

4.1.227 London Plan **Policy 5.17 Waste Capacity** proposals for waste management should be evaluated against the following criteria:

a) 'a locational suitability (see LDF preparation paragraphs F and G below)

b) proximity to the source of waste

c) the nature of activity proposed and its scale

d) a positive carbon outcome of waste treatment methods and technologies (including the transportation of waste, recyclates and waste derived products) resulting in greenhouse gas savings, particularly from treatment of waste derived products to generate energy

e) the environmental impact on surrounding areas, particularly noise emissions, odour and visual impact and impact on water resources

f) the full transport and environmental impact of all collection, transfer and disposal movements and, in particular, the scope to maximise the use of rail and water transport using the Blue Ribbon Network. The following will be supported:

g) developments that include a range of complementary waste facilities on a single site

h) developments for manufacturing related to recycled waste

i) developments that contribute towards renewable energy generation, in particular the use of technologies that produce a renewable gas developments for producing renewable energy from organic/biomass waste.

A. Wherever possible, opportunities should be taken to provide combined heat and power and combined cooling heat and power.

B. Developments adjacent to waste management sites should be designed to minimise the potential for disturbance and conflicts of use.

C. Suitable waste and recycling storage facilities are required in all new developments'.

4.1.228 London Plan **Policy 5.18 Construction, excavation and demolition waste** sets out that in making planning decisions:

A. 'New construction, excavation and demolition (CE&D) waste management facilities should be encouraged at existing waste sites, including safeguarded wharves, and supported by:

a) using mineral extraction sites for CE&D recycling

b) ensuring that major development sites are required to recycle CE&D waste onsite, wherever practicable, supported through planning conditions.

B. Waste should be removed from construction sites, and materials brought to the site, by water or rail transport wherever that is practicable'.

4.1.229 London Plan **Policy 5.20 Aggregates** encourages the re-use and recycling of construction, demolition and excavation waste within London with a target of 95 per cent recycling/re-use of construction, demolition and excavation waste by 2020.

Local Policy

4.1.230 Core Strategy **Strategic Policy CC3 Waste Management** seeks to pursue sustainable waste management, including promoting sustainable waste behaviour, including sustainable demolition and in new and existing developments; ensuring that all developments provide suitable waste and recycling storage facilities.

4.1.231 UDP **Policy EN17: Waste Collection and Disposal** sets out that development will not be permitted unless suitable facilities are incorporated for the storage and collection of segregated waste in accordance with development standard S5.

4.1.232 UDP **Policy EN19A: Recycling of Demolition Waste** the Council will encourage the re-use and recycling of demolition waste; recyclable materials should wherever feasible be segregated on site, providing there is no significant adverse local impact. On larger demolition sites the council will request details of the type and quantity of waste arising and details of the proposed methods of disposal, including means of transport.

4.1.233 **Commentary**

4.1.234 It is proposed to combine the delivery and waste collections for both Building C & D in order to centralise the extent of back of house uses for each building. The intent is to accommodate these provisions on the lower ground level of Building C accessed directly via the lowe r level of Building D.

4.1.235 During the construction phase a site wide waste minimisation scheme will be implemented to encourage the reduction of waste, reuse of waste and recycling of waste.

POLLUTION POLICY

National Policy

4.1.236 **PPS23: Planning & Pollution Control (2004)** the Guidance advises that the Planning System plays a key role in determining the location of development which may give rise to pollution and that other uses and developments are not, as far as possible, affected by major existing or potential sources of pollution. Further, the Guidance advises that

development provides an opportunity to deal with risks associated with contaminated land and bring the land back into beneficial use.

4.1.237 With regard to development control matters, the Guidance advises that authorities must be satisfied that planning permission can be granted on land use grounds, taking full account of potential environmental impacts. Land contamination, or the possibility of it, is therefore a material planning consideration in the determination of planning applications. It is the responsibility of the landowner or the applicant to identify land affected by contamination and to ensure that remediation is undertaken to secure development.

4.1.238 In considering a planning application, the potential for contamination to be present on site must be considered in relation to the existing use and circumstances of the land, together with the proposed new use and the possibility of encountering contamination during development. The local planning authority should satisfy itself that the potential for contamination and any risks arising are properly assessed and that the development incorporates any necessary remediation and subsequent management measures to deal with unacceptable risks. The Guidance further states that the authorities should pay particular attention to development proposal sites where there is a reason to suspect contamination, such as the existence of former industrial uses. The remediation of land affected by contamination through the granting of planning permission should secure the removal of unacceptable risk and make the site suitable for its new use.

4.1.239 Annex A to the Guidance identifies a number of matters which should be considered in the determination of the planning application where pollution considerations arise. They include:

§ the environmental benefits that the development might bring, such as:
- resulting reductions in the need to travel;
- improvements to transport infrastructure;
- enhancement or creation of habitats; &
- the remediation of past contamination.

§ the economic and wider social need for development, such as:
- the creation of new jobs.

4.1.240 Consideration of the potential effects of contamination is provided in **Chapter 9 – Ground Conditions and Contamination.**

4.1.241 The Guidance also advises that existing and likely future air quality should be taken into account, as well as the presence of any Air Quality Management Areas.

4.1.242 PPS23 notes that the findings of local authority air quality reviews and assessments will be important, as they will identify local air pollution problems, which may in turn influence the siting of certain types of development. The need for compliance with any statutory environmental quality standards or objectives, including the air quality objectives prescribed by the Air Quality Regulations 2000 (as amended), will also be a factor in determining whether air quality is a material consideration.

4.1.243 Further emphasis is given to the importance of air quality objectives and AQMAs in the Appendices to PPS23. The effect of a development on air quality is likely to be particularly important:

§ where the development is proposed inside, or adjacent to an AQMA;

§ where the development could in itself result in the designation of an AQMA; &

§ where to grant planning permission would conflict with, or render unworkable, elements of a local authority's Air Quality Action Plan.

4.1.244 PPS23 states clearly that not all planning applications for developments inside or adjacent to AQMAs should be refused, even if the development would result in a deterioration of local air quality. Whilst air quality is a material consideration in the determination of planning applications, locations designated as AQMAs are not intended to cause the refusal of development outright. Local planning authorities, transport authorities and pollution control authorities are required to explore the possibility of securing mitigation measures that would allow the proposal to proceed.

Strategic Policies

4.1.245 London Plan **Policy 5.21 Contaminated Land** supports the remediation of contaminated sites and will work with strategic partners to ensure that the development of brownfield land does not result in significant harm to human health or the environment, and to bring contaminated land to beneficial use. Appropriate measures should be taken to ensure that development on previously contaminated land does not activate or spread contamination.

4.1.246 London Plan **Policy 7.14 Improving Air Quality** outlines development proposals should:

§ 'minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)

§ promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'

§ be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs).

§ ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches.

§ where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified'.

Local Policies

4.1.247 Core Strategy **Policy CC4 Protecting and enhancing environmental quality** will 'support measures to protect and enhance the environmental quality of the borough including harmful emissions to land, air and water and the remediation of contaminated land. It will work with partner organisations to help deliver this. In particular, measures will be taken to:

§ reduce levels of local air pollution and improve air quality in line with the national air quality objectives and the council's Air Quality Action Plan;

§ minimise the impact of noise, by managing the development and distribution of noise-making and noise-sensitive developments in the borough;

§ minimise the impact of light pollution; and

§ manage the development of land to minimise the potential harm of contaminated sites and where appropriate, ensure that mitigation measures are put in place'.

Commentary

4.1.248 Site investigations and assessments have been undertaken pursuant to discussions with relevant agencies to identify the potential for pollution in respect of both ground conditions and air quality. Where necessary, appropriate remediation and construction management measures have been identified. More detailed information on pollution related matters is provided in **Chapter 10 Ground Conditions** and **Chapter 9 Air Quality**.

Waste management will be a key consideration at all stages: demolition, construction and during operation. The opportunities to recycle demolition waste will be maximised through careful construction management (e.g. temporary material compound during the whole construction) and in terms of construction waste, the high construction waste recycling target will be set.

NOISE

4.1.249 **PPG24: Planning & Noise (1994)** recognises noise at Paragraph 1 as potentially having a significant effect on the environment and on the quality of life enjoyed by individuals and communities. The PPG provides advice

as to how the planning system can "minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of the business".

4.1.250 The impact of noise is identified as a potential material consideration in the determination of planning applications and whilst recognising that it is difficult to reconcile some land uses such as housing, hospitals or schools with other activities which generate high levels of noise, the Planning System should ensure that wherever practical, noise sensitive developments are separated from major sources of noise. Where it is not possible to achieve a separation of land uses, local planning authorities are advised to consider whether it is practical to control and reduce the noise levels, or to mitigate the impact of noise, through the use of conditions or planning obligations.

4.1.251 The Guidance advises that much of the development which is necessary for the creation of jobs and the construction and improvement of essential infrastructure will generate noise, but the planning system should not place unjustifiable obstacles in the way of such development. A number of measures which can be introduced to mitigate the impact of noise either through controlling the source or through limiting exposure are identified in the Guidance. The advice is that such measures should be proportional and reasonable and may include one or more of the following measures:

"(i) Engineering: reduction of noise at point of generation; containment of noise generated; and protection of surrounding noise sensitive buildings;
(ii) Layout: adequate distance between source and noise sensitive building or area; screening by natural barriers, other buildings, or non critical rooms in a building; &
(iii) Administrative: limiting operating time of source; restricting activities allowed on the site, specifying unacceptable noise limit".

Strategic Policies

4.1.252 London Plan **Policy 7.15 Reducing noise and enhancing soundscapes** outlines that development proposals should seek to reduce noise by minimising the existing and potential adverse impacts of noise on, from, within, or in the vicinity of, development proposals.

Local Policies

4.1.253 UDP **Policy EN20B: Noise Pollution** sets out that **'**housing and other noise-sensitive development will not normally be permitted where the occupants/users would be affected adversely by noise from existing or proposed noise generating uses. Exceptions will only be made if it can be demonstrated that adequate mitigation measures will be taken'.

4.1.254 UDP **Policy EN21: Environmental Nuisance** states that 'all developments (including new buildings, demolition of existing buildings, conversions and changes of use) shall ensure that there is no undue detriment to the general amenities at present enjoyed by existing surrounding occupiers of their properties, particularly where commercial and service activities are close to residential properties. The council will, where appropriate, require precautionary and/or remedial action if a nuisance would otherwise be likely to occur, to ensure that it will not'.

Commentary

4.1.255 The potential effects of noise- and vibration - generated by the proposed development and associated activities have been assessed and reported in **Chapter 8 - Noise & Vibration.**

WATER RESOURCES POLICY

National

4.1.256 **PPS25: Development and Flood Risk (2010)** flooding is an established material consideration in the determination of planning applications and is identified as such in PPS3: Housing. PPS25 aims to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at highest risk. The Guidance advocates taking a precautionary approach to the uncertainty inherent in flood estimation to enable more open and better informed decisions to be made to reduce the environmental impact and improve the safety of people and property despite the existence of risk which may change over time.

4.1.257 Local planning authorities are expected to apply a risk-based approach in the determination of planning applications through a sequential test – essentially requiring those responsible for decision making to demonstrate that there are no reasonable options available in a lower risk flood zone category, consistent with other sustainable development objectives.

Strategic

4.1.258 London Plan Policy 5.12 Flood risk management outlines that development proposals must comply with the flood risk assessment and management requirements set out in PPS25 over the lifetime of the development and have regard to measures proposed in Thames Estuary 2100 (TE2100 – see paragraph 5.55) and Catchment Flood Management Plans. Developments which are required to pass the PPS25 Exceptions Test will need to address flood resilient design and emergency planning by demonstrating that:

a) the development will remain safe and operational under flood conditions;

b) a strategy of either safe evacuation and/ or safely remaining in the building is followed under flood conditions;

c) key services including electricity, water etc will continue to be provided under flood conditions; and

d) buildings are designed for quick recovery following a flood.

4.1.259 Development adjacent to flood defences will be required to protect the integrity of existing flood defences and wherever possible should aim to be set back from the banks of watercourses and those defences to allow their management, maintenance and upgrading to be undertaken in a sustainable and cost effective way.

4.1.260 London Plan **Policy 5.13 Sustainable drainage** states that 'development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1. store rainwater for later use;
2. use infiltration techniques, such as porous surfaces in non-clay areas;
3. attenuate rainwater in ponds or open water features for gradual release;
4. attenuate rainwater by storing in tanks or sealed water features for gradual release;
5. discharge rainwater direct to a watercourse;
6. discharge rainwater to a surface water sewer/drain;
7. discharge rainwater to the combined sewer.

4.1.261 Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation.

4.1.262 London Plan **Policy 5.14 Water quality and wastewater infrastructure** establishes that 'development proposals must ensure that adequate wastewater infrastructure capacity is available in tandem with development. Proposals that would benefit water quality, the delivery of the policies in this Plan and of the Thames River Basin Management Plan should be supported while those with adverse impacts should be refused. Development proposals to upgrade London's sewage (including sludge) treatment capacity should be supported provided they utilise best available techniques and energy capture. The development of the Thames Tideway Sewer Tunnels to address London's combined sewer overflows should be supported in principle'.

4.1.263 London Plan **Policy 5.15 Water use and supplies** outlines development should minimise the use of mains water by:

a) 'incorporating water saving measures and equipment

b) designing residential development so that mains water consumption would meet a target of 105 litres or less per head per day'.

Local

4.1.264 Core Strategy **Policy CC2 Water and Flooding** sets out:

'The council will expect all development to minimise current and future flood risk and the adverse effects of flooding on people. In particular:

§ all development at risk of flooding should be subject to a site specific flood risk assessment, appropriate to the scale and type of development;

§ development within the High and Medium Residual Risk areas should assess the type and severity of flood risk and manage the residual flood risks contributions from development proposals will be required to assist in mitigation and/or relief measures which will reduce the overall risk of flooding; and

§ development adjoining the river will be expected to maintain the integrity of river defences and setback development in order to allow the maintenance and improvement of the defences'.

4.1.265 In addition, 'the Council will strive to reduce the risk of flooding from surface water and foul water and its contribution to fluvial flooding by requiring development proposals to include appropriate sustainable drainage systems and systems to reduce the amount of water discharged to the foul water drainage'.

4.1.266 UDP **Policy H015: Water Conservation** establishes **'w**ater efficiency measures will be encouraged in new developments and renovation projects. These measures may include:

§ the collection of run-off from roofs for watering gardens;

§ the use of 'grey' (used water from baths, showers and washing machines) water recycling schemes'.

Commentary

4.1.267 As part of PPS25, sites must ensure there are no off-site effects with regards to flood risk. The proposed development is based upon the principle of reducing surface water runoff rates to 50% of those currently existing. Further detail is provided in **Chapter 11 Flood Risk.**

GROUND CONDITIONS POLICY

National

4.1.268 **PPS9: Biodiversity and Geological Conservation (2005)** sets out Government policy on nature conservation and provides a reference framework for the drawing up of planning policies and strategies at regional and local scales. The broad aim of the policy is that planning, construction, development and regeneration should have a minimal effect on biodiversity and enhance it wherever possible. The policy identifies a number of key principles to ensure that the potential effects of a planning decision on biodiversity and geological conservation are fully considered.

4.1.269 When determining planning applications, the Statement advises that decisions should be based on up-to-date information about the environmental characteristics of an area. The aim of a planning decision should be to prevent harm to biodiversity and geological conservation interests and where possible ensure that they are maintained and enhanced. The overarching objective that planning decisions aim to maintain, enhance, restore or add to biodiversity.

4.1.270 In respect of 'networks of natural habitats', the Statement advises that they should be protected from development and, where possible, strengthened by, or integrated within it. The Guidance further states that the re-use of previously developed land for new development can make a major contribution to sustainable development by reducing the amount of countryside and undeveloped land that needs to be used. However, if previously developed sites have significant biodiversity or geological interest of recognised local importance, local planning authorities and developers should aim to retain this interest or incorporate it into any development. Local planning authorities should look to adopt and encourage the adoption of opportunities to 'build in' beneficial biodiversity features as part of good design.

Strategic Policies

4.1.271 London Plan **Policy 7.20 Geological Conservation** sets out development proposals should:

a) wherever possible, make a positive contribution to the protection and enhancement of geodiversity;

b) be resisted where they have significant adverse impact on sites with existing or proposed European or national designations in accordance with Government guidance;

c) protect regionally important geological sites (RIGS); and

d) give locally important geological sites (LIGS) the level of protection commensurate with their importance.

Commentary

4.1.272 At a strategic level the location and nature of the proposed development is consistent with the approach of PPS9 to reduce the consumption of undeveloped land and countryside.

4.1.273 The existing site is of low ecological value and the proposed development is likely to have a minor beneficial effect on biodiversity, through new landscaping and bird nesting opportunities. The proposed development is broadly consistent with the provisions of PPS9. **Chapter 15 – Ecology /Biodiversity** of this Statement provides further details on the effects of the development on biodiversity.

DEVELOPER CONTRIBUTIONS

Strategic Policies

4.1.274 London Plan **Policy 8.2 Planning Obligations** sets out:

A. 'When considering planning applications of strategic importance, the Mayor will take into account, among other issues including economic viability of each development concerned, the existence and content of planning obligations.

B. Development proposals should address strategic as well as local priorities in planning obligations.

C. Affordable housing; supporting the funding of Crossrail where this is appropriate (see Policy 6.5); and other public transport improvements should be given the highest importance. Where it is appropriate to seek a Crossrail contribution in accordance with Policy 6.5, this should generally be given higher priority than other public transport improvements.

D. Importance should also be given to tackling climate change, learning and skills, health facilities and services, childcare provisions and the provision of small shops'.

4.1.275 London Plan **Policy 8.3 Community Infrastructure Levy** outlines the Mayor will work with Government and other stakeholders to ensure the effective development and implementation of the Community Infrastructure Levy (CIL). The Mayor will bring forward a draft charging schedule in accordance with the Community Infrastructure Levy Regulations 2010 to enable him to use the CIL to fund strategically important infrastructure.

4.1.276 **Local Policies**

4.1.277 Core Strategy **Strategic Policy WCOA** seeks **'**provision of, or contributions to, transport infrastructure or improvements that are necessary to secure the regeneration of the whole area'.

4.1.278 Core Strategy **Policy CF1 Supporting Community Facilities and Services** requires 'developments that increase the demand for community facilities and services to make contributions towards, or provide for, new or improved facilities'.

4.1.279 The Core Strategy **Delivery and Monitoring** Chapter outlines 'The Council will implement the policies and proposals of the Core Strategy and seek to ensure that the necessary infrastructure is secured to support

regeneration by 'undertaking pre-application discussions with developers and involving partner organisations where appropriate, and through development management powers, including negotiating S106 obligations'.

OTHER MATERIAL CONSIDERATIONS

4.1.280 **PPG 8: Telecommunications (2001)** outlines the types of radio interference, for example, electrical and physical, that may arise from proposed developments.

4.1.281 Paragraph 103 further outlines that Local Planning Authorities may grant planning permission subject to a condition that, before development commences, the developer will ensure that the quality of any reception affected by the development will be restored.

4.1.282 Paragraph 104 states that Local Planning Authorities will need to satisfy themselves that the potential for interference has been fully taken into account in the siting and design of such developments since it will be more difficult, costly and sometimes impossible to correct after the event.

4.1.283 Paragraph 105 advises that in considering planning applications for other forms of development, planning authorities will wish to consider telecommunications issues. They should encourage prospective developers of new housing, office and industrial estates to consider with all relevant telecommunications operators how the telecommunications needs of the occupiers will be met.

Commentary

4.1.284 A telecommunications assessment within **Chapter 15** considers the likely direct effects of the proposed development in relation to the reception of analogue terrestrial television, satellite television and radio services (sensitive receptors) and the resulting secondary effect at properties in the surrounding areas that make use of these services.

White City Opportunity Area Planning Framework

4.1.285 The site falls within the White City Opportunity Area Planning Framework (OAPF) which has been prepared by LBHF and the GLA. The first round of consultation expired on 10th June 2011. The second draft of the OAPF will be issued for consultation in early 2012, which will provide greater certainty in terms of policy and planning priorities for the OAPF Adoption of the document is anticipated in Spring 2012.

4.1.286 The White City Opportunity Area covers approximately 110 hectares (272 acres) on the eastern edge of the LBHF, along the boundary with RBKC.

4.1.287 The White City Opportunity Area Planning Framework is a spatial planning document which takes strategic and design-led approach to delivering comprehensive social, economic and environmental regeneration on key development sites in the White City Opportunity Area. The OAPF is a key document informing many of the design initiatives and proposals coming forward within OA.

4.1.288 The document sets out a comprehensive framework for the WCOA, including a land use strategy, estimates of development capacity, a package of transport interventions, public realm and tall buildings strategies and an energy master plan.

4.1.289 Key elements of the framework are:

- § A mixed use commercial development focused on creative, media, biomedical research and development;
- § Strengthened metropolitan town centre in Shepherd's Bush Market and north of Westfield;
- § 10,000 new jobs;
- § 4,500 new homes east of Wood Lane, in a broad range of tenures, house sizes and affordability;
- § Social infrastructure and community facilities to support the expanded population, promote social inclusion, tackle deprivation and improve access and equality;
- § High quality public and private realm, including a major new strategic open space and links to nearby communities;
- § Insistence on sustainable design and construction, efficient and sustainable use of resources;
- § Strategies to limit highway congestion, improve public transport, walking and cycling connections.

4.1.290 The building height strategy elaborates the appropriate range of building heights and types across the OA, with an emphasis on West London building types such as modern mansion blocks of 6-9 storeys and terraces of 4-6 storeys, and also identifies the potential for a limited number of taller buildings along the Westway/A40 and around the creative and commercial hub.

4.1.291 Paragraph 4.4.2 sets out 'Tall buildings are generally defined as those that are significantly higher than their neighbours or that have a significant impact on the skyline. In the case of the WCOA, this corresponds to buildings over 15 storeys. Well-designed taller buildings can make positive contributions to townscape and can play a valuable role in place shaping. They can provide variety and interest, articulate positively a point of significance for the wider borough and neighbouring boroughs, such as deliberately framed views and specific vistas, highlight regeneration areas and help people find their way by identifying key transport interchanges and local landmarks. Tall buildings can also present opportunities to use sites to their full potential'.

4.1.292 A development capacity study has analysed the spatial implications of various growth scenarios in the east of the OA in terms of their potential to deliver a high quality place, as well as impact on social infrastructure, the local environment, open space and transport networks. The preferred option for White City East, subject to meeting the parameters set out in the urban design strategy, provides for 4,500 new homes of different types (including family houses), an additional 1,260 student units, and 320,000 square metres of floorspace for commercial office, retail, community and leisure uses that could potentially result in 10,000 new jobs.

4.1.293 Paragraph 4.5.6 Across the West Cross Route: East-West links to RBKC sets out that **'**Crossing point 2: from the Imperial College Site to the Westway Leisure Centre a shallow subway should be introduced to the north of the A40 Westway for pedestrians and cyclists beneath the existing West London Rail line, linking the Imperial College London site with RBKC near the Westway Sports Centre. This crossing would link into the Westway Trust's cycle and pedestrian route and allow the route to connect to other cycle and recreation facilities to the West. It will require two new areas of public space at the eastern and western exists to create an inviting environment for users, and signposting on either end to assist wayfinding. The Imperial College London masterplan will need to integrate this proposal, and the proposals for Reith Row and the Wormwood Way Green Link, into its designs. The design of the link should minimize the extent of ramps and stairs, ensure it limits the sense of enclosure and creates a sense of safety and security, incorporating CCTV and lighting if necessary'.

4.1.294 A Development Infrastructure Funding Study, undertaken in collaboration with local authorities and landowners, will inform the strategy by examining the likely cost of infrastructure needed to support the proposed levels of development, and establishing a reasonable level of financial contributions that can be expected from private development, taking into account the role and scope of any future Mayoral or borough-wide Community Infrastructure Levy. A planning obligations strategy will be informed by the outcome of this study, which will be consulted on as part of the second stage consultation for the framework.

Commentary

4.1.295 The draft WCOAPF is a key document informing many of the design initiatives and proposals coming forward within the White City Area. This document has been a key reference in the development of the proposals for the Imperial West site.

National Planning Policy Framework

4.1.296 The draft National Planning Policy Framework has been published for consultation until the 17 October 2011. The National Planning Policy Framework sets out the Government's economic, environmental and social planning policies for England. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

4.1.297 For the planning system delivering sustainable development means:

- § “planning for prosperity (an economic role) – use the planning system to build a strong, responsive and competitive economy, by ensuring that sufficient land of the right type, and in the right places, is available to allow growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

- § planning for people (a social role) – use the planning system to promote strong, vibrant and healthy communities, by providing an increased supply of housing to meet the needs of present and future generations; and by creating a good quality built environment, with accessible local services that reflect the community’s needs and supports its health and well-being”.

4.1.298 Paragraph 13 regarding a presumption in favour of sustainable development states: “the Government is committed to ensuring that the planning system does everything it can to support sustainable economic growth. A positive planning system is essential because, without growth, a sustainable future cannot be achieved. Planning must operate to encourage growth and not act as an impediment. Therefore, significant weight should be placed on the need to support economic growth through the planning system”.

4.2 SUMMARY

4.2.1 The planning application proposals have been developed in the context of an extensive and complex matrix of national, regional and local policies – both established and emerging – together with a number of material considerations. These have provided information and a framework for the assessment of environmental effects and for individual technical assessments recorded in this Statement.

4.2.2 It is not appropriate, or the purpose of this Section, to comment on the compliance or otherwise of the proposed development in relation to the various policies but to indicate in broad terms the policy context within which the proposals have been progressed and the environmental effects assessed.

5 Built Heritage

5.1 INTRODUCTION

5.1.1 This Chapter addresses built heritage issues in order to consider the likely effects of the proposed development 'Imperial West W12' on features of heritage interest. This Chapter details the policy context, describes the methods used to establish baseline conditions, the methodology used to determine potential effects and the mitigation measures required to prevent, reduce or offset (where possible) any significant adverse effects. The likely residual effects after these measures have been implemented are presented and their significance assessed.

5.1.2 The full built heritage baseline assessment is reproduced in **Technical Appendix 5.1**. This document should be referred to for details regarding the surrounding historic environment. This Chapter therefore summarises the built heritage assets identified by the baseline report.

Assessment Methodology and Significance Criteria

5.1.3 The Built Heritage Baseline report at **Technical Appendix 5.1** examined the following issues:

§ Policy Framework

- PPS 5 Planning for the Historic Environment
- The London Plan
- The London Borough of Hammersmith and Fulham (LBHF) saved policies of the Unitary Development Plan (UDP) adopted August 2003 and relevant policies of the Core Strategy adopted 19 October 2011.
- The Royal Borough of Kensington and Chelsea (RBKC) saved policies in the UDP and adopted policies of the Local Development Framework as well as the Core Strategy adopted December 2010.

§ Historical and Architectural Background

- The Greater London Sites and Monuments Record was consulted and the listed buildings, conservation areas and registered parks and gardens within 1km of the site boundary were identified. LBHF identified buildings of merit within a 1km search area of the site.
- A full review of historic maps and documents, including published works, was undertaken at the British Library and the Hammersmith and Fulham Local Studies Library

§ Site Conditions and Effects of Previous Development

- The Site and historic maps have been inspected to determine the effect on any heritage asset.

§ Site Visits

- The Site was visited to inspect the current site conditions. The surrounding heritage assets were visited on a clear, sunny day in December 2011.

§ Consultation

- The LBHF has been consulted throughout the assessment process.
- CABE has been consulted and responded to pre-application development proposals.

Significance Criteria

5.1.4 The significance of the predicted effect is dependant on:

§ the significance of the heritage asset or its setting; &

§ the magnitude of the effect on that significance.

5.1.5 The consideration and forecasting of potential effects is based upon a professional assessment of data relating to heritage resources and historic land-use, undertaken by professionals with extensive desk and field-based experience in the identification, assessment and mitigation of development-related effects on the historic environment.

5.1.6 The significance of any effect on built heritage assets can be determined by undertaking an assessment of the importance (significance) and sensitivity of the receptor and establishing the magnitude of the effect.

5.1.7 Professional judgement must be used in order to identify the special interest of a listed building and its setting and its sensitivity to change. The character and appearance of a Conservation Area requires assessment as well as its setting.

5.1.8 The criteria for establishing the importance and sensitivity of a heritage asset is set out in Table 5.1 below.

Table 5.1: Assessment of Importance of Heritage Asset

Sensitivity	Criteria
High	Heritage assets with international/national designations of more than local significance (Statutorily listed buildings, World Heritage Sites)
Medium	Heritage assets of local and/or regional significance (Conservation Areas and undesignated heritage assets)
Low	Assets with limited heritage value in local context
Negligible	Other assets with little or no heritage value

5.1.9 The magnitude of effect will be determined as the predicted change to the existing baseline environment during and following the construction of the proposed development. Effects are described both qualitatively and quantitatively as appropriate.

Table 5.2: Criteria Used to Assess the Magnitude of Effect

Magnitude	Criteria
Major Beneficial	Significant enhancement to physical fabric and/or setting, such that post development the heritage values of the asset would be revealed to a significantly greater degree. Significant enhancements to views.
Moderate Beneficial	Partial enhancement to physical fabric and/or setting, such that post development the heritage values of the asset will be revealed to a greater degree. Partial enhancement of views.
Minor Beneficial	Minor enhancement to physical fabric and/or setting, such that post development the enhancement would be discernible but underlying heritage value of asset would be similar to baseline. Minor enhancement to views.
Negligible/nil	Very minor alteration to physical fabric and/or setting, but such that change will be barely discernible and approximate to no change. Visual effect on view would be barely discernible / approximate to no change.
Minor Adverse	Minor loss or alteration to physical fabric and/or setting, such that post development harm would be discernible but underlying heritage value of the asset would be similar to baseline. Minor harm to views.
Moderate Adverse	Partial loss or harmful alteration to physical fabric and/or setting resulting in a material loss of heritage value. Less than substantial loss or harm to views
Major Adverse	Significant or total loss or major harm to the heritage values of an asset. Significant loss or harm to views.

5.1.10 The significance of the effect will derive from the sensitivity of the receptor and the magnitude of the effect.

Table 5.3 Matrix for Calculating the Significance of Effects

Magnitude• Sensitivity •	High	Medium	Low	Negligible
Major Beneficial	Major Beneficial	Moderate Beneficial	Moderate Beneficial	Negligible/ Nil
Moderate Beneficial	Moderate Beneficial	Minor/ Moderate Beneficial	Minor Beneficial	Negligible/ Nil
Minor Beneficial	Minor Beneficial	Minor Beneficial	Negligible	Negligible/ Nil
Negligible/nil	Negligible/ Nil	Negligible/ Nil	Negligible/ Nil	Negligible/ Nil
Minor Adverse	Minor Adverse	Minor Adverse	Negligible	Negligible/ Nil
Moderate Adverse	Moderate Adverse	Minor/ Moderate Adverse	Minor Adverse	Negligible/ Nil
Major Adverse	Major Adverse	Moderate Adverse	Moderate Adverse	Negligible/ Nil

5.2 EXISTING BASELINE CONDITIONS

5.2.1 The built heritage baseline report (see **Technical Appendix 5.1**) details the surrounding historic built environment in order to identify the extent of any built heritage assets on or near the site. Accordingly, this section summarises the findings of the study.

5.2.2 The study site lies within the London Borough of Hammersmith and Fulham. The historic centre of Hammersmith is located to the south of the site and during the nineteenth century the area surrounding the site was mostly occupied by agricultural land. Wood Lane was in existence by 1812 and led to a cavalry exercise area at Wormwood Scrubs Prison to the north of the site.

5.2.3 The West London Railway opened between Shepherds Bush and Wormwood Scrubs in May 1844 and forms a strong visual presence within the built environment.

5.2.4 Towards the end of the nineteenth century the southern part of the site was used as brickfields. Housing in the area was constructed between 1820 and 1880 in North Kensington to the east of the site and later development in the early twentieth century took place to the west. To the north of the site houses on Shinfield Street were being built by 1914.

5.2.5 The site itself was occupied during the nineteenth and twentieth centuries by railway sidings and associated buildings whilst the surrounding area was continually developed for residential purposes.

5.2.6 The Westway, an elevated multi-lane road running from Marylebone to East Acton on the southern boundary of the site, was constructed 1964-1970, to ease traffic congestion through West London. This structure had a significant effect on the surrounding built environment – cutting through residential streets and dividing suburbs north and south.

5.2.7 There are 20 listed buildings within 1km of the site boundary, 18 of which are grade II and two grade II* - some of which are located within RBKC. The closest listed building is the Burlington Dane School and attached Caretaker's House, grade II, to the north on Wood Lane. Other large listed buildings in the area include HMP Wormwood Scrubs to the west of the site and the BBC Television Centre to the south. The listed buildings surrounding the site include churches, a school, houses and telephone boxes.

5.2.8 There are four Conservation Areas within 1km of the study site:

- Old Oak and Wormholt;
- Wood Lane;
- Oxford Gardens and St Quintin (RBKC); &
- Avondale Park Gardens (RBKC).

5.2.9 The boundaries of Wood Lane and Oxford Gardens and St Quintin Conservation Areas lie close to the south and eastern edges of the site, albeit physically separated by the Westway and the raised railway line.

5.2.10 There are five buildings which LBHF have designated as 'buildings of merit'. These include buildings associated with Wormwood Scrubs, Hammersmith Hospital and White City Underground Station Building and are all classed as medium sensitivity.

5.2.11 There are no registered parks and gardens within 1km of the site. However just outside of the study area, to the north-east is Kensal Green Cemetery, a designated Registered Park and Garden and Conservation Area. Additionally, to the south east are the Norland and Ladbroke Grove Conservation Areas.

Policy Framework

5.2.12 A full policy framework is set out at **Technical Appendix 5.1** and summarised below.

National Policy

5.2.13 The national policy framework applicable to the historic built environment is contained in Planning Policy Statement 5 (PPS5), "Planning for the Historic Environment," issued in March 2010. PPS5 is supported by the Historic Environment Planning Practice Guide (HEPPG), both issued in March 2010. PPS5 refers to listed buildings, Conservation Areas and scheduled monuments as Designated Heritage Assets for the purposes of national policy.

5.2.14 PPS5 sets out the Government's objectives in paragraph 7 as being (in summary) to:

- deliver sustainable development;
- conserve England's heritage assets in a manner appropriate to their significance; &
- contribute to our knowledge and understanding of our past (this applies in particular to excavation of archaeological sites and to demolition of buildings).

5.2.15 Policies HE6-HE12 set out development management. The emphasis within these policies is based on the need to first;

(i) identify those elements of the setting that make a positive contribution to the significance of the heritage asset, and secondly to;

(ii) assess the extent of any negative effects.

5.2.16 Consultation has recently ended on the Draft National Planning Policy Framework (NPPF), issued on 25 July 2011. Paragraphs 176-191 relate directly to the management of the Historic Environment. While the document carries limited weight at the present time, adoption of the NPPF would replace PPS5 as the primary, national policy framework for the historic environment and it is therefore identified as a material consideration for the present application

Strategic Policy

5.2.17 The London Plan contains Policy 7.8 Heritage Assets and Archaeology which is of relevance and Policy 7.7 concerning Tall Buildings.

Local Policy

5.2.18 Saved policies from the LBHF Unitary Development Plan forms the local policy context for the site. This includes the following policies:

- Saved Policy EN3: Listed Buildings; &
- Saved Policy EN2B: Effect of Development on the Setting of Conservation Areas and Views in and out of them.

5.2.19 Furthermore the Draft White City Opportunity Planning Framework Public Consultation (OAPF) published 2011 must be considered, including its technical appendices:

- TA03 Built and Heritage Context; &
- TA04 Views Assessment.

5.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Demolition & Construction Phase

5.3.1 The, indirect, short term, effects on the surrounding built heritage assets resulting from construction and demolition are limited to effects such as noise, dust and vibration. In some cases vibration has been known to cause cracks in surrounding buildings however through the careful control of levels of these effects, there are unlikely to be any significant effects on the surrounding structures. The nearest listed building, located c.300m from the site, is a robust brick structure. Vibration has been considered in detail within Chapter 10 Noise and Vibration which assesses the effects of noise and vibration on the surrounding environment.

5.3.2 Another effect of construction activity is the effect on views to and from the closest Conservation Areas, namely the Wood Lane, Oxford Gardens and St Quintin and Old Oak and Wormholt Conservation Areas. Other Conservation Areas will also experience a change in setting. Changes to views within the areas looking out towards the development site will be affected by the presence of construction equipment (cranes etc.) in the short term. However, construction activity is not uncommon in the area, and development activities are a familiar feature within London. This effect is therefore assessed as not significant as it is short term and limited in nature.

Operational Phase

5.3.3 The proposed development will have no direct effects on any designated heritage assets. The effects assessed below are indirect and based upon the effect the proposed development could have upon the setting of an asset or on any key views to or from it, which therefore may affect its significance. All listed buildings are classed as high sensitivity receptors for their importance in national context, whilst Conservation Areas are classed as medium sensitivity receptors.

5.3.4 A series of viewpoints were agreed with LBHF during the EIA process, to inform the townscape assessment. These viewpoints have been used as an aid to the assessment of heritage effects where relevant and are referred to within the text below.

Listed Buildings

1) Burlington Dane School and attached Caretaker's House, Grade II

5.3.5 The setting of the building has been identified as being made up of roads, open land to the south and houses to the north – the heritage asset lies in an urban context. The existing buildings on the development site make no appreciable contribution to the setting of the building. The significance of the heritage asset is largely aesthetic and historic, as well as having some communal value through its function as a school. The application site does not make a contribution to the setting or significance of the listed building and is not directly relevant in one's experience of the asset, which is best appreciated at close quarters.

5.3.6 The operational effect of the proposed development is considered to have a very limited indirect visual effect on the significance of the building. The proposed buildings will be visible in a number of views from the heritage asset when looking south from the upper levels of the building itself. These views are not considered to be key to the significance of the asset or its setting, which is experienced in an urban context with other tall buildings in the wider area. The proposed development will not be visible in street level views of the building or from the building. The change will be of a negligible magnitude resulting in a negligible effect.

2-6) Harrow Club, Building Adjoining Harrow Club, and Buildings of Thomas Jones Primary School, Freston Road, all Grade II

5.3.7 This group of heritage assets lies to the south of the development site, south of the raised section of the Westway and alongside West Cross Road. The surrounding area is urban in nature with large residential tower blocks to the east.

5.3.8 The proposed development will be visible from this group of assets from the street, particularly Buildings D and E (View 22). The other parts of the development are likely to be screened by intervening buildings and the Westway. The site does not form a meaningful part of the setting of the heritage assets and the current buildings on the site make no contribution to the setting or significance of the assets. The views toward the site are restricted by the Westway and the presence of new buildings would enhance views currently compromised by the Westway. The proposed scheme could improve the outlook from the listed buildings and therefore the magnitude of change is judged as minor beneficial, resulting in a minor beneficial effect.

7) BBC Television Centre, including main circular range, excluding the spur, the original scenery block and the former canteen, Grade II

5.3.9 The significance of this heritage asset is bound up with its historical value and associations with the BBC. Its function and to a certain extent its aesthetic value. The Wood Lane Conservation Area was originally designated to protect the BBC Centre from unwanted development (prior to parts of the building being listed in 2009). The boundary of this area does not extend to the development site but stops at the Westway. Viewpoint 2 is taken from outside BBC TV Centre, on Wood Lane looking from within the Conservation Area and outside the listed building. In this view parts of the BBC TV centre are visible but these parts are not listed (being later additions).

5.3.10 The proposed buildings will be situated on land which is not considered to make any meaningful contribution to the setting or significance of the heritage asset which is best experienced when standing on land immediately around it. The front of the BBC building is best viewed when facing away from the development site and as such this key view will remain unaffected.

5.3.11 Viewpoint 2 demonstrates that Building F will be visible and only the tops of the other proposed buildings are also likely to be evident, when the trees are not in leaf, when looking north up Wood Lane. As such the effect is judged as one of a negligible adverse magnitude, resulting in a negligible adverse effect**.**

8) Silchester Leisure Centre (Baths) Grade II

5.3.12 This building is no longer standing (it could not be identified on the site visit and online research suggests it has been demolished) and as such the site has a negligible value as a heritage asset. The development will make no change to the baseline condition. The magnitude of the effect will be negligible, being neither beneficial nor adverse and will therefore have negligible effect.

9) Red Telephone Box on St Charles Square, Grade II

5.3.13 This structure has a very limited setting and has a value centred on historical and inherent aesthetic value based on its design and much less on its surroundings. There is no intervisibility between the heritage asset and the site and no effect on the setting or significance of the asset. There will be a negligible magnitude of change resulting in a negligible effect.

10) Nos. 1and 2 Whitchurch Road, Grade II

5.3.14 This heritage asset is experienced in an urban setting with a large scale housing development adjacent to it. The building is approached from both the south and west. The site is not visible from the designated heritage asset (except the possibility of views from the upper floors). The setting and significance therefore will remain intact and there will be a negligible magnitude of change resulting in a negligible effect.

11) St Clements Church, Treadgold Street, Grade II

5.3.15 Similarly with this listed building the site is not visible from the immediate surroundings and does not form part of the experience of the asset which is understood and appreciated at much closer quarters. The setting and significance will remain intact and there will be a negligible magnitude of change resulting in a negligible effect.

12) Dimco Machine Tools, Former Electricity Generating Station, Wood Lane, grade II

5.3.16 There will be limited opportunity to see the propose buildings in views of or from the listed sheds, although views of the upper floors particularly of Building F are likely to be achievable from the sheds projecting above nearby development. The sheds are best viewed when turned away from the site and do not come into view until past the new Westfield shopping centre. These buildings are surrounded by modern development in an urban context which will remain largely unchanged as a result of the proposed buildings on the site. Therefore the magnitude of change will be negligible resulting in a negligible effect.

13-14) Pillar Boxes outside No.49 Tunis Road and No.59 Wood Lane, Grade II

5.3.17 Whilst neither of these pillar boxes are visible from the site the one on Wood Lane can be seen in views looking north along Wood Lane, with the railway bridge south of the underground station visible in the distance. At present the current buildings are not visible and at the distance involved it is likely that only obscured distance views of Building F will be achievable. The pillar box is experienced in a residential setting (albeit with the shopping centre opposite). It is understood and appreciated at close quarters and the visibility of some of the proposed buildings will not change the significance or setting of it. Therefore the magnitude of change will be negligible, resulting in a negligible effect.

15-17) HMP Wormwood Scrubs – Cell Blocks (Grade II), Chapel (Grade II*) and Gatehouse (Grade II*), Du Cane Road

5.3.18 As the baseline assessment states this heritage asset is best viewed from the south, looking toward the gatehouse with the site to the east, out of the view. Given the distance between the building and the site, it is unlikely that the proposed buildings will be visible over the top of the prison in views from the surrounding streets. Even if they were, on streets such as Stokesley Street where the sloping roofs of the prison are visible over the top of lower residential development in the foreground of the view, the appearance of modern buildings would not compromise the significance of the prison. At present the prison is inward looking (for obvious reasons) and does not address the wider area in any formal way with the exception of the gatehouse to the south and the formal entrance to the prison complex on Du Cane Road. Therefore the magnitude of change is negligible, resulting in a negligible effect.

18) No.85 Barlby Road, Ladbroke Hall (former car factory), Grade II

5.3.19 This building is located to the north east of the site and is not readily visible from the site at present. The building is best viewed from the south, directly outside it and also from the south east and south-west with the site behind the viewer. The development will not be readily visible from the building which is best experienced within the residential context surrounding it. The magnitude of change is assessed as negligible with a negligible effect.

19) St Charles's Hospital, Exmoor Street, Grade II

5.3.20 As with Ladbroke Hall above, this building is experienced within the urban context of the immediately surrounding streets. The magnitude of change is assessed as negligible with a resulting negligible effect on the heritage asset.

Conservation Areas

Old Oak and Wormholt Conservation Area

5.3.21 This designated heritage asset is one of the closest to the site and is in stark contrast to the proposed development in terms of height, bulk and urban grain. The Conservation Area covers development of a particular period in time and is surrounded by larger residential and commercial development of the twentieth century, most notably the buildings of the BBC to the south east. The site lies within the wider setting of the Conservation Area and is visible from within the area in views looking east. Viewpoint 7 is taken from Betworth Road, within the area looking directly east to the site.

5.3.22 The proposed buildings will be visible from the Conservation Area to varying degrees with Building F making a prominent appearance in View 7. The uniformity of the building and plots within the area is a strong characteristic and the view portrayed in Viewpoint 7 is generally representative of the character and appearance of the Area.

5.3.23 The proposed development is assessed to cause a moderate adverse magnitude of change to the baseline conditions as the proposals will not greatly diminish an experience of the significance of the Conservation Area. The high quality new development will complement the general townscape of the area. The moderate magnitude of change combined with the medium sensitivity of the asset will result in a minor/moderate adverse effect.

Wood Lane Conservation Area

5.3.24 This Conservation Area was designated solely to protect the landmark BBC TV Centre on the west side of Wood Lane (part of which was listed in 2009). The Conservation Area boundary does not include the site which is visually separated from it at present by the elevated section of the Westway. The prevailing character of the area is of large scale, twentieth century buildings and the northern section closest to the site has low townscape value and does not make a positive contribution to the setting of the BBC TV Centre in any way. Viewpoint 2 demonstrates how visible the proposed buildings will be from within the area. During the summer months trees are likely to screen some views. However during the winter Buildings D, E and F, will be visible over the top of the Westway.

5.3.25 The proposed buildings will be visible (albeit screened to some extent at lower levels by the Westway) from within the Conservation Area. Views into the area from the north are truncated by the Westway and the topography. This area is robust in character, which is akin to large scale development proposed on the site. The change to the setting of the Conservation Area is judged to be of a negligible magnitude as the experience and understanding of the asset will not be altered or harmed. Additionally the new buildings will offer improvements to views currently dominated by the Westway. This will result in a negligible effect.

Oxford Gardens and St Quintin Conservation Area

5.3.26 The site at present is visible from within the south west corner of the Conservation Area, by the virtue of the construction of Wood Lane Studios, which feature above the rooflines of properties on the west side of Highlever Road. Due to the prevailing scale of the built environment and given the height of the proposed buildings, views of the site from a number of points within the area will be achievable.

5.3.27 One of the more sensitive views is that looking south west toward the site from St Quintin Gardens looking toward three sets of semi detached, four storey villas (Viewpoint 19). This is an attractive area with period housing, green open space and mature trees screening some views and is identified as a focal point within the Conservation Area. Viewpoint 19, taken from this area looking toward the development site, demonstrates that the proposed buildings will not be visible as they are screened by the existing buildings in the foreground and trees. Due to their distance, the proposed buildings will not visually dominate this area or cause any harm to the appreciation or understanding of the character and appearance of the area.

5.3.28 Other views within and out of the area run down long tree lined streets. This includes the view down Basset Road and Oxford Gardens looking west, over the tops of the houses on St Helen's Gardens (runs north-south). These views would not change in any major way, although oblique views of the tallest building, Building F, will be attainable (View 26). At present, Wood Lane Studios, although visible, does not form a dominating feature and does not greatly detract from the underlying character of the area bound up in the houses, trees, townscape and uniformity of the plots – it appears as a separate contemporary entity.

5.3.29 Other roads running east west and north south will experience moderate to significant changes to views with the presence of modern, tall buildings (the upper floors only) within views to the west. These are demonstrated by Viewpoints 3, 4 and 11- 16. Additional photographs included within the application package also demonstrate the appearance of the proposed buildings from the residential streets in the area including views from Oxford Gardens, Highlever Road, Wallingford Avenue, Kingsbridge Road, Kelfield Gardens and Latimer Road (most of which is not within the Conservation Area).

5.3.30 It should be noted that modern residential developments beyond the Conservation Area directly to the south and beyond of the Westway are visible over the tops of some of the houses in the area. This arises from the fact that beyond the confines of the Conservation Area there is an urban and semi-industrial environment with brutalist 1950s and 60s developments of significant height. The underlying character of area has not been significantly eroded by the intermittent visibility of development which is clearly separate in both style and scale.

5.3.31 The western edge of the Conservation Area will be the closest to the development site where most of the proposed buildings will be visible over the top of the properties on Highlever and Latimer Road. Whilst the

overriding character of the Conservation Area will be preserved by the development there will be some areas, predominately to the southwest, where the new buildings will have a significant effect on the setting and views within the area. The overriding significance of the area, derived from its essential residential character, will not be compromised by the proposed development. However, a concentrated 'pocket' of residential streets to the south-west form a sub-character area with a defined character and appearance. The close proximity of the site and its large scale will have result in a significant magnitude of change to their setting and views from within the Area. However the magnitude of change occurring to the Conservation Area as a whole is assessed as moderate adverse, therefore the effect on the Conservation Area as a whole is assessed as experiencing **a** minor adverse effect.

Avondale Park Gardens Conservation Area

5.3.32 There is unlikely to be any intervisibility between this heritage asset and the proposed buildings. It is an inward looking square surrounded by urban development of a variety of periods and heights. The magnitude of change will be negligible resulting in negligible effect.

LBHF Buildings of Merit

White City Underground Station, Wood Lane

5.3.33 This building lies within the Wood Lane Conservation Area and within the setting of the listed BBC TV Centre. It is typical of other underground stations in style and materials and has a commercial and industrial setting and context. The proposed development will not change the way in which this building is experienced or its understanding. Views from the south on Wood Lane will experience a change of negligible magnitude resulting in negligible effect to this building**.**

Hammersmith Hospital main entrance building and Wolfson Institute, Du Cane Road

5.3.34 The setting of these two buildings does not extend to the site and there are no key views identified as part of the baseline assessment that include buildings on the site. There will be a negligible change to the significance of this asset resulting in negligible effect.

Former Warder's Homes/Prison Officer's Club and railings along street frontage, 154-168 and 174-180 Du Cane Road

5.3.35 Similarly these buildings are located at distance from the site with much development between the site and the buildings. This is an urban area and the development of buildings on the site will not compromise or diminish ones understanding of the assets or experience or understanding of them. Some views may change slightly but this will not affect the significance. There will be negligible change to the significance of this asset resulting in negligible effect.

Other Heritage Assets

5.3.36 Kensal Green Cemetery is a Registered Park and Garden and a Conservation Area to the north of the site. The asset is located at a considerable distance from the site with intervening buildings of varying quality, set within an urban and semi-industrial environment. Viewpoint 9 demonstrates the likely visibility of the proposed development which will be visible over the top of the existing vegetation at the boundary of the cemetery and intervening buildings. The experience of this park and garden is derived from the value of the layout of the monuments, paths and buildings. The significance of the asset will not be significantly compromised by the presence of new development However views south from within the cemetery will be subject to moderate change, resulting in a moderate/ minor adverse effect.

5.3.37 The Norland and Ladbroke Grove Conservation Areas lie over a kilometre to the south east of the site in dense urban settings. The significance of the Conservation Areas lies in the layout of the streets and the development of the nineteenth century houses. The settings of these Areas include tall residential towers of varying quality. The change to some views which are not of importance to experience the asset will result in a negligible magnitude of change and will therefore have a negligible effect.

5.4 EVALUATION OF SIGNIFICANCE

Table 5.4: Summary Table of Significance of Effects on the Built Heritage Resource during the demolition and construction phase

Nature of Effect	Designated Heritage Asset	Importance of Receptor	Magnitude of Effect	Potential Significance of Environmental Effect
Visual	Listed Buildings	National Importance	Negligible	Negligible-
Visual	Conservation Areas	Regional Importance	Negligible	Negligible
Visual	Buildings of Merit	Local Importance	Negligible	Negligible
Visual	Registered Parks and Gardens	National Importance	Negligible	Negligible

Table 5.5 Summary Table of Significance of Effects on the Built Heritage Resource during the operational phase

Nature of Effect	Designated Heritage Asset	Importance of Receptor	Magnitude of Effect	Potential Significance of Environmental Effect
Visual	Listed Buildings	National Importance	Negligible Minor Beneficial	Negligible-Minor Beneficial
Visual	Conservation Areas	Regional Importance	Negligible – Moderate adverse	Negligible-Minor Adverse
Visual	Buildings of Merit	Local Importance	Negligible	Negligible
Visual	Registered Parks and Gardens	National Importance	Moderate Adverse	Moderate Adverse

5.5 SCOPE FOR MITIGATION

5.5.1 Wherever possible, excess vibration, traffic and dust created by construction activity will be reduced to enable the least amount of disruption to the surrounding historic built environment.

5.5.2 The proposed buildings will be of a high quality, modern design, improving on the existing general townscape of the area to the west and south.

5.5.3 The effects identified in Section 5.3, principally to the Oxford Gardens and the Old Oak and Wormholt Conservation Areas, are considered to cause less than substantial harm resulting in minor adverse effects.

5.6 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

5.6.1 **Table 5.5: Summary Table of Significance of Effects on the Built Heritage Resource post-mitigation**

Nature of Effect	Designated Heritage Asset	Importance of Receptor	Magnitude of Effect	Potential Significance of Environmental Effect
Visual	Listed Buildings	National Importance	Negligible Minor Beneficial	Negligible-Minor Beneficial
Visual	Conservation Areas	Regional Importance	Negligible – Moderate adverse	Negligible-Minor Adverse
Visual	Buildings of Merit	Local Importance	Negligible	Negligible
Visual	Registered Parks and Gardens	National Importance	Moderate Adverse	Moderate Adverse

5.7 MONITORING

5.7.1 Given the nature and permanence of effects no monitoring is required.

REFERENCES

Ref 5.1: Communities and Local Government (2010) Planning Policy Statement 5: Planning for the Historic Environment & Historic Environment Planning Practice Guide

Ref 5.2: English Heritage (2008) Conservation Principles: Polices and Guidance for the sustainable management of the historic environment.

Ref 5.3: English Heritage (2011) Seeing The History in The View.

Ref 5.4: English Heritage (2011)The Setting of Heritage Assets.

Ref 5.5: English Heritage, (1987) Registered Park and Garden Description for Kensal Green Cemetery.

Ref 5.6: The Royal Borough of Kensington and Chelsea (1990) Oxford Gardens St. Quintin Conservation Area Proposals Statement

Ref 5.7: The Royal Borough of Kensington and Chelsea (1989) Ladbroke Conservation Area Proposals Statement

Ref 5.8: The Royal Borough of Kensington and Chelsea (1979) Norland Conservation Area Policy Statement

Ref 5.9: London Borough of Hammersmith and Fulham (1998) Wood Lane Conservation Area Character Profile

6. Archaeology

6.1 INTRODUCTION

6.1.1 This chapter of the Environmental Statement provides an assessment of the effects of the proposed development in respect of the likely survival of 'below ground' archaeological remains.

6.1.2 It describes the methods used to establish existing baseline conditions existing on the site, the methodology used to determine potential effects, and any relevant mitigation measures required to prevent, reduce or offset (where possible) any significant adverse effects. In addition, the likely residual effects after these measures have been implemented are presented and their significance assessed.

6.1.3 This chapter has been written by CgMs Consulting, by a professional archaeologist who is a Member of the Institute for Archaeologists (IfA), in accordance with relevant standards and guidance, including that supplied by the IfA, EIA regulations, local, regional and national planning policy and guidance, and relevant English Heritage guidance.

Assessment Methodology and Significance Criteria

6.1.4 In accordance with relevant standards and guidance (see 6.1.3 above) the below ground archaeological desk based assessment was prepared for the site to support a planning application.

6.1.5 The full archaeological desk based assessment for the site is attached at **Technical Appendix 6.1**. This document should be referred to for details regarding the below ground archaeology at the site and its surrounding area. This chapter therefore summarises the desk based assessment.

6.1.6 The preparation of the baseline assessment included consideration of the following:

- § data on the Greater London Historic Environment Record (GLHER) within a 1km radius of the study site;
- § a comprehensive map regression exercise dating from the middle of the eighteenth century until the present day;
- § an examination of cartographic and documentary evidence for the site in the Hammersmith & Fulham Archives and Local History Centre;
- § the results of geotechnical investigation work carried out at the site in 2007, 2010 and 2011;
- § the results of archaeological evaluation on the Imperial West at Wood Lane Studios at Imperial West site, immediately to the north;
- § planning policy framework;
- § the geology and topography of the application site, including site specific geotechnical survey data;
- § the archaeological and historical background of the application site;
- § site visits;
- § British Library records;
- § the Greater London Sites and Monuments Record (the results of a 750m radius search of the centre of the study site was analysed); &
- § Hammersmith & Fulham Local Studies Library.

6.1.7 The consideration and forecasting of potential effects is based upon a professional assessment of data relating to heritage resources and historic land-use, undertaken by professionals with extensive desk and field-based experience in the identification, assessment and mitigation of development-related effects on archaeological resources.

6.1.8 The significance of any effect on buried archaeological receptors can be determined by undertaking an assessment of the importance and sensitivity of the receptor and establishing the magnitude of the effect.

6.1.9 The criteria for establishing the importance and sensitivity of archaeological receptors are set out in Table 6.1 below:

Table 6.1: Assessment of importance of archaeological receptor

Importance Scale	Example of receptor
International (High Sensitivity)	World Heritage Site/ undesignated feature of international importance
Nationally Important (High Sensitivity)	Scheduled Ancient Monuments, Sites of Special Scientific Interest, Undesignated feature of landscape of national importance and value
Regional (High Sensitivity)	Designated or undesignated features of regional importance
Local (Low Sensitivity)	Undesignated feature or landscape of local importance and value; sites so badly damaged that too little remains to justify inclusion into a higher grade. The receptor is tolerant of change without detriment to its character
Not important	Site with no surviving heritage component

6.1.10 The magnitude of effect will be determined as the predicted change to the existing baseline environment during the end of demolition of the existing buildings at the study site, followed by construction of the proposed new development. Effects are described both qualitatively and quantitatively as appropriate

Table 6.2: Magnitude of Effect

Magnitude of Effect	Criteria
High	Significant damage to baseline conditions, or causing breach of legislation or statutory objectives
Moderate	Moderate change to baseline conditions
Low	Slight change to baseline conditions
Negligible	Negligible change to baseline conditions
Nil	No discernable change to baseline conditions

6.1.11 The significance of the effect will derive from the sensitivity of the receptor and the magnitude of the effect::

Table 6.3: Significance of Effects

	Sensitivity of Receptor					
Magnitude of Effect		International (High Sensitivity)	Nationally Important (High Sensitivity)	Regional (High Sensitivity)	Local (Low Sensitivity)	Not important
	High	Major Negative Effect	Major Negative Effect	Major Negative Effect	Moderate negative effect	Neutral
	Moderate	Major Negative Effect	Major Negative Effect	Major Negative Effect	Moderate negative effect	Neutral
	Low	Major Negative Effect	Major Negative Effect	Major Negative Effect	Minor Negative effect	Neutral
	Negligible	Neutral	Neutral	Neutral	Neutral	Neutral
	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

Key Policy Considerations

6.1.12 In March 2010 Planning Policy Statement 5: Planning for the Historic Environment (PPS5) was published, providing national guidance for planning authorities, property owners, developers and others on the conservation, preservation and enhancement of Heritage Assets.

6.1.13 The relevant Strategic Development Plan Framework is provided by the London Plan, published 22 July 2011. Policy 7.8 Heritage Assets and Archaeology concerns Archaeology, and supports the protection of Heritage Assets.

6.1.14 The relevant local plan policy is provided by the London Borough of Hammersmith & Fulham Unitary Development Plan saved policy EN6, which sets out the Borough's requirements for the preservation, mitigation and understanding of the buried archaeological resource.

6.2 EXISTING BASELINE CONDITIONS

6.2.1 The archaeological desk based assessment (**Technical Appendix 6.1**) identifies the geological, topographical, archaeological and historical baseline in detail. Accordingly this section summarises the findings of this study.

6.2.2 In terms of designated heritage assets as defined in PPS5, no World Heritage Sites, Scheduled Ancient Monuments, Historic Battlefields or Historic Wreck sites lie within the study site or its immediate vicinity, nor does the site lie in an Area of Archaeological Priority.

6.2.3 The study site has recently been cleared of all buildings save for those on the eastern boundary. It was formerly occupied by an office complex of up to four storeys constructed 1979-1981.

Geology and Topography

6.2.4 Geological mapping indicates that the site lies in an area of Langley Silt brickearth which overlie river terrace gravels and the London Clay solid geology.

6.2.5 Geotechnical investigations undertaken in 2007, 2010 and 2011 revealed substantial quantities of made ground, above brickearth, river terrace gravels and the London Clay.

6.2.6 Topographically the study site lies c.1m lower than the line of Wood Lane to the west and Shinfield Street to the north. The southeastern corner of the site is c.2m lower than the rest of the site.

Archaeological and Historical Background

6.2.7 Very few archaeological findspots have been identified within a 1km radius of the study site.

6.2.8 The site is considered to have a generally low archaeological potential for all past periods of human activity.

6.2.9 The map regression exercise indicates that the site remained undeveloped until at least 1871. The 1893 Ordnance Survey shows features associated with brickearth extraction on the southern part of the site. By1935 the site was occupied by railway sidings and associated buildings, with further substantial industrial buildings added later in the twentieth century. The buildings formerly occupying the study site comprised a former BBC facility at the site constructed 1979-1981 and recently demolished. Two buildings remain on the eastern boundary. The full map regression exercise is included in **Technical Appendix 6.1**.

6.2.10 Recent archaeological evaluation at the Wood Lane Studios at Imperial West site, immediately north of the application site, in an area of perceived little previous development, revealed no archaeological finds or features, and substantial truncation of naturally occurring geological horizons. The full report on this work is reproduced at **Technical Appendix 6.1**.

6.2.11 Past post-depositional effects within the study site from the mid nineteenth century onwards are therefore considered to have had a significant detrimental impact on any archaeological deposits which may be present.

6.2.12 This effect, together with the perceived low archaeological potential, is considered significant enough to conclude that the redevelopment proposals are not likely to have a significant or widespread archaeological effect.

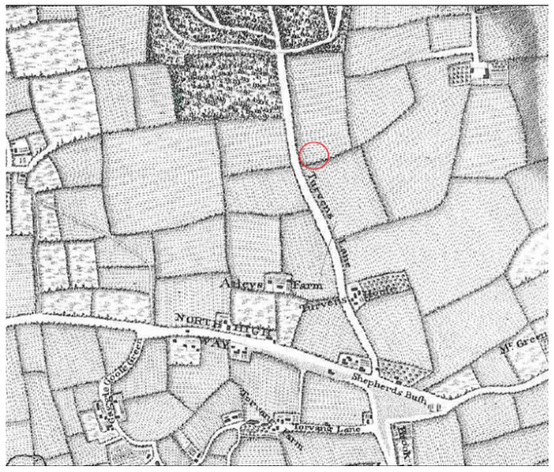


Figure 6.1:Map 1745 John Rocque

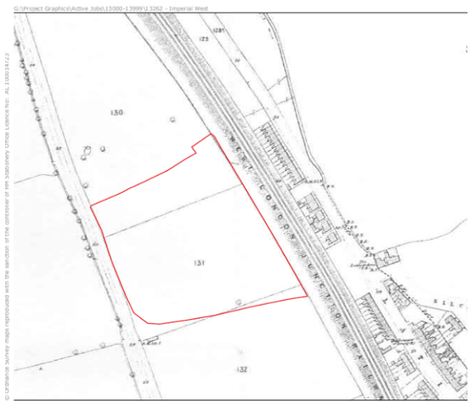


Figure 6.2: 1871 Ordnance Survey

Figure 6.3: 1955 Ordnance Survey

6.3 IDENTIFICATION & EVALUATION OF KEY EFFECTS

Construction Phase

6.3.1 The construction of the Imperial West development could potentially have adverse effects on archaeological remains through works associated with construction, specifically the demolition of existing buildings, the excavation of basements, the cutting of foundations and services, and the insertion of piles, pile caps and ground beams.

6.3.2 However, due to the application site's perceived low archaeological potential combined with the impact of nineteenth and twentieth century development, there is no effect upon archaeological deposits predicted during the construction phase of the development.

Operational Phase

6.3.3 Due to the application site's perceived low archaeological potential combined with the impact of nineteenth and twentieth century development, there is no effect upon archaeological deposits predicted during the operational phase of the development.

6.4 EVALUATION OF SIGNIFICANCE

6.4.1 Given the site's perceived low archaeological potential and the impact of historical development, as established above, it is considered that the application site has no significance below ground archaeology.

Table 6.4: Summary Table of Significance of Effects on the archaeological resource during the construction phase

Nature of Effect	Potential Archaeological Resource	Importance of Receptor	Magnitude of Effect	Significance of Environmental Effect
Grubbing out of foundations and basements	Palaeolithic Deposits	Regional Importance	Adverse (low)	neutral
Excavation for new basement areas	Palaeolithic Deposits	Regional Importance	Adverse (low)	neutral
Pile probing, Excavation of pile caps and ground beams	Palaeolithic Deposits	Regional Importance	Adverse (low)	neutral
Cutting of other foundations, footings and services	Palaeolithic Deposits	Regional Importance	Adverse (low)	neutral

6.5 SCOPE FOR MITIGATION

6.5.1 Given the site's perceived low archaeological potential combined with the impact of previous development, no significant archaeological effects have been identified and mitigation measures are not therefore considered necessary.

6.6 (EVALUATION OF) SIGNIFICANCE OF RESIDUAL EFFECTS

6.6.1 In the absence of any significant effect upon archaeology and any consequent requirement for mitigation there will be no residual effects relating to 'below ground' archaeology.

6.7 MONITORING

6.7.1 Due to the low potential for the survival of archaeological remains, the absence of any identified remains following investigations pursuant to the development of the Wood Lane Studios at Imperial West and this assessment concluding that no significant effects would be likely, monitoring is not required.

7. Transport

7.1 INTRODUCTION

7.1.1 This Chapter identifies and assesses the transport strategy for, and the transport effects of the proposed development. The Chapter also outlines the scope of the proposed Workplace and Residential Travel Plans and Delivery and Servicing Plan for the development. Full details of the supporting materials are presented in a number of appendices namely Technical Appendix 7.1 - the full Transport Assessment (TA), 7.2 – a Delivery and Servicing Plan and 7.3 – the Workplace and Residential Travel Plans.

Scope of the Transport Assessment (TA)

7.1.2 The proposed development when completed seeks to provide a mixed use urban quarter to include new facilities for Imperial College within the wider White City Opportunity Area. The masterplan encompasses Imperial College's strategy to provide a range of uses for its own purposes at the site including postgraduate student accommodation (not part of the current application but delivered as part of the Imperial Studios at Wood Lane development currently under construction); academic and technology transfer space; administrative support facilities; new flexible teaching and conference space; and various support facilities.

7.1.3 Due to the scale of the site, the masterplan also proposes a wide range of other non-academic and commercial uses including key worker and private residential accommodation; offices; hotel; convenience retail; and other support facilities. Such facilities include a fitness centre; an 'early years' nursery; a Health Centre; and a range of café/restaurant spaces generally around a new 'urban square' located at the heart of the development.

7.1.4 In total, the masterplan will comprise approximately 114,324 sq m GEA (1.23 million sq ft) divided amongst a series of buildings as illustrated in the Master Plan at Figure 7.1.

7.1.5 The proposed buildings and their uses are as follows:

- Building A - Imperial academic and office uses and ancillary retail uses;
- Building B – (consented) Wood Lane Studios at Imperial West - postgraduate student accommodation;
- Building C – Building C Biomedical and Health research facilities; an education faculty, publicly accessible café, restaurant, day nursery and health centre;
- Building D - Building D New Business Incubator and Offices;
- Building E – a hotel use with ancillary conferencing facilities, gym, restaurant and bar;
- Building F - Building F Residential building with ground floor retail /café / restaurant uses;
- Building G - Imperial academic and office uses and ancillary retail uses; &
- Building J (consented) 9 residential units.

7.1.6 In 2010 a planning application was sought for the initial phase of the Imperial West development (then termed Woodlands). This comprised of Building B – postgraduate accommodation for 606 students and Building J – 9 residential units, now termed Wood Lane Studios at Imperial West. Planning permission was granted and these buildings are currently under construction. A hybrid planning application is now made comprising detailed planning application Buildings C, D and F and outline permission for E, G and A.

Figure 7.1: Illustrative Master

Transport Policy Context

7.1.7 Key policies which have provided the framework for the Imperial West transport strategy are:

- PPG13 Planning Policy Guidance (PPG 13)[1] – PPG13 promotes, inter alia, development within urban areas which can be made accessible by means other than the private car. It also seeks to limit parking provision and discourage reliance on car use for journey to work where there are adequate alternatives;
- PPS4 – Policy for Sustainable Economic Growth[2] in which policies EC8 and EC18 state that parking limits should be set (consistent with access and local policies) and supports the PP13 approach;
- Draft National Planning Policy Framework, 2011- The draft National Planning Policy Framework (NPPF) published for consultation in July 2011 sets out the Government's economic, environmental and social planning policies for England. The NPPF brings together in a single document all previous national planning policy advice and documents. The NPPF provides a new framework that can produce distinctive plans that reflect the unique requirements of local communities. An important measure to facilitate this policy will be production of Travel Plans. All developments which generate significant amounts of movement, as determined by local criteria, should be required to provide a Travel Plan. As a mixed use development Imperial West supports this policy and it has both workplace and residential travel plans.
- The London Plan, which sets out the Mayor's spatial strategy for London and gives guidance on, inter alia, transport policies;
- The Mayor's Transport Strategy[5] reflects the principles of PPG13, integrates transport policies with those in the London Plan but provides more specific transport proposals including mode details such as the tube enhancement programme and the proposed Cycle Superhighway; and stresses the need for new developments to possess good access by public transport, foot and cycle;
- The London Borough of Hammersmith and Fulham (LBHF) Unitary Development Plan[6] shares the same general transport policy directions as the Mayor's Draft Transport Strategy, the London Plan and PPG13 and provides a framework for a safe, efficient, integrated and environmentally sustainable transport system for people and good; and
- The White City Opportunity Area Framework (OAPF) plan which puts forward a strategy for the regeneration of the area. While the OAPF is subject to the results of public consultation, it has provided a framework within which Imperial West has been planned.

7.1.8 The key themes which emerge from interpretation of the national and local transport strategy policy guidance (noted above) and which are recognised in the Imperial West transport strategy are:

- New developments generating significant trips should be located where sustainable modes – notably public transport – can be accessed and encourage reduced car use;
- Parking controls will be required as one mechanism to reduce dependence on private cars;
- Where possible, developments should seek to minimize travel such as through the provision on "on site" facilities; and
- Developments should seek to encourage the use of sustainable modes of walking, cycling and public transport.

7.1.9 The Transport Assessment describes how Imperial West complies with these policy directions and assesses its effects on travel in the local area.

7.2 EXISTING BASELINE CONDITIONS

Site Context - General

7.2.1 The site previously accommodated approximately 28,000 sq m of principally office floorspace but also a gym/sports centre, nursery, catering and plant rooms; the site had approximately 240 car parking spaces.

7.2.2 The site is bounded on the north by Shinfield Street, on the west by Wood Lane, on the south by Westway and on the east by the West London rail line, shown in Figure 7.2.

7.2.3 The site was accessed by a priority junction off Wood Lane and all in-out traffic movements were permitted. On site, a vehicle access existed around the west and southern perimeter of the site and connected to a route under Westway; while this provided an access to the area south of Westway, the road was gated where it passed beneath Westway.

7.2.4 Wood Lane/Du Cane Road and Wood Lane/Westway slip road junctions are signal controlled junctions. Wood Lane is 2+2 lane road with one lane in the northbound direction given over to a northbound AM peak only bus lane, with a set back, on the approach to Du Cane Road. In the southbound direction, there is centrally located cycle lane (to eliminate conflict with cyclists for left turn traffic to Westway) on the approach to Westway junction. Shinfield Street is closed to vehicles at its junction with Wood Lane but is a signed cycle route.

Context - Traffic

7.2.5 The Transport Assessment (**Technical Appendix 7.1**) considers the effect of the proposed development of traffic in the surrounding area. Base traffic flows were derived from the 2009 VISSIM White City traffic base model developed (and calibrated and accepted) by TfL. The 2009 traffic flows were increased to future years (to correspond to key stages in the development of Imperial West) by use of local Department for Transport Trip End Model Presentation Programmme (TEMPRO) factors. Subsequently, traffic generated specifically by Imperial West was determined mainly by use of TfL's Trip Rate Assessment Valid for London (TRAVL) data base but car borne trips have been constrained to the limited parking supply proposed on site. Estimates were made for each use within each building and added to the future year base flows. Data were also obtained from traffic surveys, undertaken in 2010, to support the initial planning application (for Buildings B and J) for the Wood Lane Studios at Imperial West development. Data from these surveys (Automatic Traffic Counter records, pedestrian and cycle surveys) have been recognized in the assessment. .

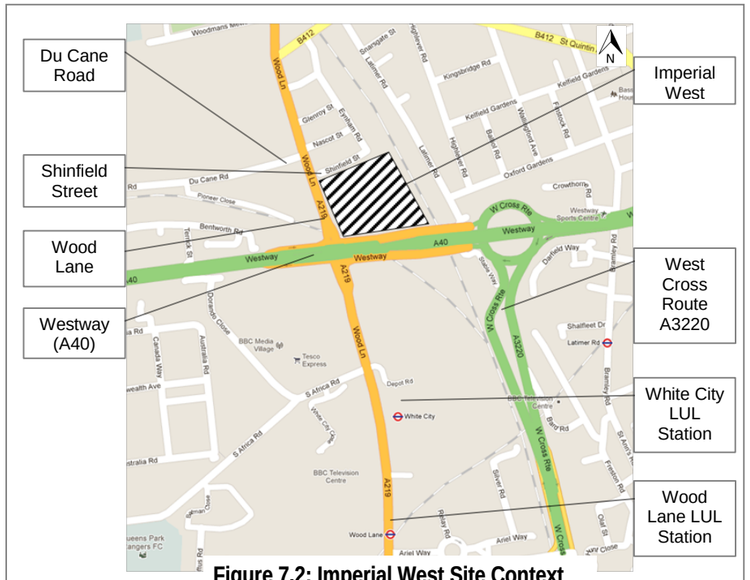


Figure 7.2: Imperial West Site Context

Context - General Connectivity

7.2.6 The site is well served by public transport services and also has good road connections. Key transport connectivity includes:

§ Road connections with Wood Lane and close to the junction of Wood Lane and A40/Westway - a link in the strategic the Transport for London Road Network (TLRN). The site is within walking distance of Wood Lane (Hammersmith and City Line) and White City (Central Line) Underground Stations with the following services:

Table 7.1: London Underground Services

LU Station	Services	Headway	Distance from site
White City	Central Line	4 min	490 m
Wood Lane	Hammersmith and City Line	10 min	740 m
Wood Lane	Circle Line	9 min	740 m

§ The site has close connections to nearby bus stops and numerous bus services on Wood Lane and Du Cane Road, namely:

Table 7.2: Bus Services

Service No.	Route	Headway (mins)	Distance from Site (m)
72	Alton Estate - Roehampton - Barnes Common - Hammersmith - Shepherd's Bush – **Wood Lane** - East Acton	10	115
220	Harlesden – **Wood Lane** - Shepherd's Bush - Hammersmith - Putney Bridge - Wandsworth	7	115
272	Chiswick (Grove Park) - Turnham Green - Acton Green - Emlyn Road - Acton Vale - East Acton – **Wood Lane** - Shepherd's Bush	15	115
283	East Acton – **Wood Lane** - Shepherd's Bush - Hammersmith - Castelnau - Barnes Pond	8	115
7	East Acton – **Wood Lane** - North Kensington - Paddington - Oxford Street - Great Russell Street - Russell Square	9	270
70	Acton - East Acton – **Wood Lane** - North Kensington - Ladbroke Grove - Westbourne Park - Kensington - South Kensington	10	270
95	Southall - Somerset Road - Greenford - Perivale - Western Avenue – **South Africa Road White City** - Shepherd's Bush	11	270
228	Central Middlesex – Harlesden – Willesden Junction – East Acton – **White City** – Shepherds Bush – Ladbroke Grove – Maida Vale	12.5	490
	TOTAL	**49 bus/hr**	

§ The site is about 1.8km to the north of Shepherd Bush station which is located to the east of the new Shepherds Bush Interchange. It is served by both London Overground and other Network Rail Services (Southern Train Services) as well as the Central Line.

7.2.7 The Public Transport Accessibility Level (PTAL) for the site has been calculated using published ratings of transport services (frequencies) and in accordance with TfL Transport Assessment Best Practice. This resulted in a PTAL Value of 5 (Very Good). A marginally higher PTAL can be obtained by varying assumptions over walk routes.

Existing Vehicle Parking

7.2.8 When previously occupied the site contained approximately 240 off street spaces.

7.2.9 The roads in the areas surrounding the site are within Controlled Parking Zones (CPZs). Generally, along Du Cane Road and Shinfield Street kerbside resident/permit holder parking is permitted plus public parking for a maximum of 8hrs between 9am and 5pm Monday to Friday at a charge of £1.80 per hour.

Pedestrian Facilities:

7.2.10 Pedestrian facilities close to the site are:

§ Footways along Wood Lane are a minimum of 3m wide adjacent to the site and on the east side, increases to more than 4+m near its junction with Wood Lane A40 Westway. North of Shinfield Street, the east footway reduces to about 2m;

§ Pedestrian crossing facilities are provided, within the junction signal controls, at (i) Wood Lane/A40 and (ii) Wood Lane/Du Cane Road; &

§ A refuge is provided just north of the site entrance which assists pedestrians to cross Wood Lane close to the bus stops.

Cycle Facilities:

7.2.11 Cycle facilities close to the site are:

§ A designated cycle route and advisory cycle lanes along Shinfield Street;

§ A southbound cycle lane on Wood Lane on the approach to Westway – located between the straight ahead traffic lane and the left turn traffic lane to eliminate conflicts between left turn traffic to Westway and straight ahead cycle movements

§ Cycle lanes continue (both northbound and southbound) both through and south of the Westway junction along Wood Lane until they are merged with bus-cycle lanes some 50m from the Westway junction; and

§ Advisory cycle lanes are provided (i) on both sides of Du Cane Road and (ii) on Wood Lane north of the Du Cane Road junction.

Traffic, Pedestrian and Cycle Flows

7.2.12 Traffic, pedestrian and cycle flows were surveyed, including 24 hour ATC for week long periods in November 2009 and February 2010 and various sample turning counts at junctions, cycle and pedestrian volumes along links and at junctions. The traffic data have been used to provide AADT data for the noise and vibration assessments and to qualify model outputs by indentifying, for example, daily traffic flow variations.

7.2.13 Key points to emerge from the data include:

§ The November 2009 and February 2010 traffic counts show little overall difference – there appears to be little seasonal variation in flows;

§ Weekday daily variation in traffic flows ranges between 14% and, in some cases 50%; as will be demonstrated in subsequent sections, the traffic generated by the development is significantly less than the daily variation;

§ Cycle flows on Wood Lane are between 50 and 60 per hour in the AM peak. About 50% (30 per hour) of the southbound flow arrives from Shinfield Street; in the PM peak, cycle flows are considerably lower with only 4 per hour turning to Shinfield Street – possibly because difficulty of right turn through heavy traffic; &

§ The results of the pedestrian survey carried out on the 16th of March 2010 show that the section of road outside the development was found to have the highest number of pedestrians, followed by the junction of Du Cane Road. Reviewing the busiest period of the survey data, the pedestrian movements along Wood Lane on the west side of the road in both direction total 391 people in the AM peak hour. The TfL comfortable carrying capacity is 780 people per hour per metre of footway. Scaling this flow to account for the existing approximately 3.5m footway on the west side of Wood Lane would allow an acceptable capacity of 2,730; this means the street currently operates at 14.3% of its acceptable capacity.

Accident Levels

7.2.14 Road accident data have been collected for the last 3 years for the roads and junctions surrounding the site. The Wood Lane/Shinfield Street junction shows lower accident levels than predicted from standard COBA assessments. As the development will generate very low traffic flows it will not affect the accident levels on the surrounding roads.

7.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

7.3.1 Chapter 3 provides details of the proposed development but a summary, to provide the context of the assessment of the transport effects is provided in Table 7.3

Table 7.3: Schedule of Accommodation

Building	Use	GIA (m²)	Notes
A	**Offices**	**5,723**	
B	Postgraduate Accommodation (consented)	Accommodation for 606 students (19,562 sq m). Planning permission obtained 2010 – building currently under construction	
C	Teaching/ Admin/ Labs/ Office	16,464	The crèche will primarily be used by workers on site but will be available for the local area
	Health Centre	2,318	
	Nursery	1,029	
	Cafe-Restaurant	2,127	
	Total	**21,939**	
D	Teaching/ Admin/ Labs/ Office/ Small Business Units	18,755	
	Retail etc	77	
	Café	313	
	Total	**19,145**	
E	Hotel	11,570	200 bedrooms
	Gym	850	
	Café/Restaurant/Bar	1,080	
	Conference	268	
	Total	**13,775**	
F	Residential (192 units including 59 for key workers)	17,769	192 residential units including 59 for key worker
	Restaurant	319	
	Total	**18,088**	
G	Office	5,705	
	Café	600	
	Total	**6,305**	
J	9 Residential units – building currently under construction	**1,035**	
	Total development area	**105,572**	

Proposed Transport Strategy

7.3.2 The transport strategy for Imperial West seeks to respond to, and comply with national, regional and local guidance described in the following sections. Key points are:

§ Over 95% of trips to the development will be by sustainable and public transport modes;

§ The site has excellent public transport links and will have limited car parking which will discourage car trips;

§ New pedestrian and cycle routes and linkages will connect the development to other local areas and should not only provide benefit for the development, but also the local people;

§ The development will provide a range of local services which will reduce the need to travel for staff, residents and visitors to the site, but also residents in the local area; and

§ Parking policy will seek to encourage non car made travel.

7.3.3 In assessing the transport strategy, three "assessment cases or stages" have been considered to represent significant changes in the scale of development. These have been attributed to years although actual implementation may vary around those years. The assessment stages or cases are:

§ "Assessment Stage 1" - 2015 - Buildings B, C, D and E completed including the basement car park;
§ "Assessment Stage 2" 2017 - Buildings B, C, D, E, F and G completed; and
§ "Assessment Stage 3" 2018 - Buildings B, C, D, E, F, G and A completed.

Vehicle Parking

7.3.4 The number of spaces within the Imperial West site will remain at a similar level to those when the site was previously occupied. As the proposed development will be a more intense use of the site use, this is in effect, a greatly reduced parking ratios (per occupier).

7.3.5 The provision of parking by Building/use is detailed in Table 7.4. The parking provision generally meets, or is less than, the levels and standards set out by the Greater London Assembly (GLA), LBHF and the WCOAPF although commercial development viability must be recognized in the case of the hotel. It is noted that if the car parking standards set out in LBHF guidance (see TA) were fully applied, parking space numbers would greatly exceed the number proposed.

7.3.6 Minimal car parking spaces (about 8% of the total) will be located at ground level within the site and will be for disabled use, car club and servicing and loading. Parking will be monitored and parking will be restricted to designated areas. The majority of car parking (about 92%) will be located in a two level basement underneath the main square/ and user access will be linked directly with Buildings E, F and G. Parking both at ground level and within the basement car park will be strictly managed. To ensure the efficient use of spaces and that disabled users have priority for parking spaces, additional space could be found within the site if site management find there is the demand for extra disabled parking spaces.

Within the parking strategy, there will be the provision of car club spaces. Currently there are 2 parking spaces as part of the Building B/J development that are already allocated to car club spaces, in addition to this number up to 2 new spaces will be made available to car clubs if there is the demand.

7.3.7 Table 7.4: Proposed Parking Numbers

Use	Building	Area (GIA)	Proposed All Parking	Proposed Disabled Parking
Offices/ Accelerator/ Incubator	A	5,723	**6**	**2**
	C	16,464	**18**	**2**
	D	18,755	**20**	**2**
	G	5,705	**6**	**2**
Residential *consented	F	192 Units	**77**	**7**
	B*	20,069	**16**	**6**
Hotel	E	200 rooms	**67**	**7**
Conferencing	E	298		
Gym	E	850	**12**	**1**
Health Centre	C	2,318	**2**	**1**
Crèche	C	1,029	**2**	**1**
Café/ Restaurant/ Bar	C	2,127	**6**	**1**
	D	313		
	E	1,080		
	F	319		
Retail	D	77	**5**	**1**
	G	576		
Car Club			**2**	**-**
Total			**239**	**33**

Cycle Parking

7.3.8 Cycle parking provision meets the standards laid out by TfL, LBHF and BREAAM. The development will provide high quality cycle facilities. This includes safe/secure/in-building cycle parking for the staff and occupants of each building with showers, lockers and drying areas located either at grade or within the basement. Separate visitor and cycle parking will be provided for each building. Visitor cycle parking will be located at ground level near to each of the buildings entrances and will be safe, secure and covered by CCTV. The site will make an area available for the Barclays London Cycle Hire once the scheme extends to the general White City area.

Pedestrian Policy

7.3.9 Walking Circulation – site wide, a shared surface is proposed to indicate priority to pedestrians (and cycles) and not vehicles. All internal routes within the site will be designed as high quality, shared surface with a low vehicle design speed. Access to the site for vehicles will be controlled (although not gated) and a large part of the development will be pedestrianised and available to cyclists and have street activity. The site is pedestrian permeable with new and enhanced connections to surrounding areas. Key points of pedestrian strategy are:

- § The development is designed to be as car free as possible, with the main vehicle movements limited to a spine road, designed for low speeds and surfaced and designed to act as shared surfaces;
- § Provision to accommodate a new route will be opened under the West London Line to provide good connections to-from the east; this underpass is anticipated to be completed by 2015;
- § The existing route (currently closed) beneath Westway will be made available for pedestrians and cycles (as well as vehicles) to connect to future developments to the south of the WCOAPF area and LUL stations etc; although the timing will depend on the development of those other schemes;
- § New linkages-integration for pedestrians and cycles would be created (i) to Shinfield Street which will connect to the site by a route between Buildings A and B and (ii) to Wood Lane (in addition to existing site access) by creating a main pedestrian-cycle access at the junction with Westway with wide approaches and accessible levels; this will provide good linkage with the local area at the junction of Wood Lane and Westway;
- § To provide access to facilities on site. The development will provide a range of services such as the gym, small retail units, crèche and cafes which will primarily be used by those on site and those within the local area. The opening up of new attractive pedestrian routes will encourage those in the local area to reach the site on foot and will potentially provide these services at a more walkable distance for local residents than is available currently; To enhance the quality of the existing pedestrian facilities in the surrounding area through the minor works identified in a PERS audit to enhance the condition of the already good connections along Wood Lane to White City and Wood Lane underground stations and bus stops; &
- § The development will be subject to a Residential Travel Plan (R12359T321) and a Workplace Travel Plan (Ref R12359T322) which will extend to all the occupied buildings and includes a walking strategy and targets to encourage walking.

Cycle Policy

Good cycle facilities are essential to support sustainable travel and the strategy proposes to include good conditions for cycle circulation, connection to existing surrounding facilities for cycles and cycle parking.

7.3.10 Cycle Circulation – will be similar to that for pedestrians as most facilities are shared and within the site, circulation routes will be designed as high quality shared surfaces with a low vehicle design speed. In summary key points are:

- § Permeability is similar to that for pedestrians with new connections to the north (Shinfield Street linkage), to the south and west at the new major access at Wood Lane/Westway which will be available to cycles as well as pedestrians and to the south, when the area south of Westway is developed via the enhanced underpass beneath Westway; the Master plan makes provision for connection to the east beneath the West London Line; and
- § connection to existing facilities – the new linkages will connect to the cycle lanes southbound in Wood Lane (north of Westway) and the signed cycle route through Shinfield Street and, when the design is finalised by TfL, the Cycle Superhighway Route 10;and

7.3.11 Cycle Parking – described above and summarised in Table 7.5. by likely phase.

Table 7.5: Proposed Cycle Strategy

Measures
Site Permeability Assessment Stages 1 and 2- implementation of • the Workplace and Residential Travel Plans as appropriate; these apply to all occupied buildings within any phase and contain binding targets to encourage cycling • the anticipated new east-west link beneath the West London Line • the new access at Wood Lane/Westway junction. Assessment Stage 3 – • dependent on progress on sites south of Westway, implementation of the enhanced underpass beneath Westway
Cycle Parking for Assessment Stage 1 (Buildings C, D and F): **Building C -** Cycle Parking- • Total of 265 cycle parking spaces consisting of: o London Plan/ LBHF standard of: 1 space per 8 visitors of the Academic Space providing 194 spaces; o LBHF standard of: 1 spaces per 5 staff/ visitors in Polyclinic to giving 17 spaces; o London Plan standard of: 1 spaces per 10 occupants in nursery to providing 17 spaces; and o BREEAM standard of: 1 space per 10 occupants of the cafe/ restaurant providing 37 spaces. • 20 cycle parking spaces will be provided for visitors. • Cycle parking located in basement • Access to cycle parking- through the use of a dedicated staircase with rill or via a lift from main entrance. **Building D** - Cycle Parking- • Total of 206 cycle parking spaces consisting of: o BREEAM office standard based on occupancy of the building providing 109 spaces; o London Plan/ LBHF standard of: 1 space per 8 visitors of the Imperial College facilities providing 83 spaces; and o BREEAM standard of: 1 space per 10 occupants of the cafe/ restaurant

Measures
providing 14 spaces. • 20 cycle parking spaces for visitors. • cycle parking located in basement • access to cycle parking via a dedicated ramp accessed from the new east/ west link. **Building F** - **Cycle Parking-** • Total of 329 cycle parking spaces consisting of: o BREEAM standard of 1 space per studio and 1 bedroom units and 2 spaces per 2 and 3 bedroom units providing 314 spaces; and o BREEAM standard of: 1 space per 10 occupants of the cafe/ restaurant providing 15 spaces. • 20 cycle parking spaces for visitors. • cycle parking located within the basement • Access to cycle parking- located via dedicated lifts The total cycle parking within this phase of the development will include 800 staff/ resident cycle parking and 60 visitor cycle parking
Cycle Provisions for Assessment Stage 2 (Buildings E and F): **Building E -** Cycle Parking • When the number of staff is confirmed, cycle parking will be provided at the London Plan standard of 1 space per 10 staff. • 20 cycle parking spaces for visitors. • As Building E is submitted for outline planning, the exact location of the cycle parking might change; currently the proposed location for staff cycle parking is located in the basement of the hotel. **Building G -** Cycle Parking • Total of 66 cycle parking spaces consisting of: o BREEAM office standard based on occupancy of the building providing 61 spaces; and o London Plan/ LBHF standard of: 1 space per 125m^2 of retail space providing 5 spaces. • 30 cycle parking spaces for visitors. • As Building G is submitted for outline planning, the exact location of the cycle parking might change; currently the proposed location for staff cycle parking is located in the basement. The total cycle parking within this phase of the development will include an appropriate level of staff cycle parking and 50 visitor cycle parking.
Cycle Provisions for Assessment Stage 3 (Building A): **Cycle Parking** • Total of 56 cycle parking spaces consisting of: o BREEAM office standard based on occupancy of the building providing 56 spaces; and • 20 cycle parking spaces for visitors. • As this planning application is currently in the outline stage the exact location of the cycle parking might change; currently the proposed location for staff cycle parking is located in the basement. The total cycle parking within this phase of the development will include around 56 staff cycle parking and 20 visitor cycle parking.
Off Site Cycle Facilities Cycle lanes (Wood Lane southbound and within the bus lane northbound), advisory cycle lanes (Du Cane Road) and cycle routes (Shinfield Street) surround the Site; furthermore, the Site is adjacent to a proposed TfL Cycle Superhighway (CS10 – Park Royal to Hyde Park; scheduled for delivery by 2015). While the CS10 scheme has not yet been defined in detail, Imperial College London will make every effort to integrate with the scheme.
Cycle Hire The TfL Cycle Hire scheme cycle docking stations are not programmed to extend westwards of Earls Court Road at this stage. If and when the scheme is extended westwards from Central London, Imperial College undertakes to make space available for cycle docking facilities, in line with the Mayor's Transport aspirations.

Public Transport

7.3.12 The site is well served by public transport facilities with a Public Transport Accessibility Level (PTAL) estimated at 5 (excellent) and no additions are proposed to train or bus services.

7.3.13 It is however noted that (i) Imperial operates its own shuttle bus between its various campuses and this service will enter the site and be available for Imperial staff and students and (ii) various public transport improvements are in TfL and other programmes which will further enhance public transport opportunity and non car travel for the site and include the tube upgrade programme (committed in the Mayor's strategy), the Cycle Superhighway and the possible connections to Crossrail and the ideas for a strategic rail route to the midlands with connections at Old Oak Common.

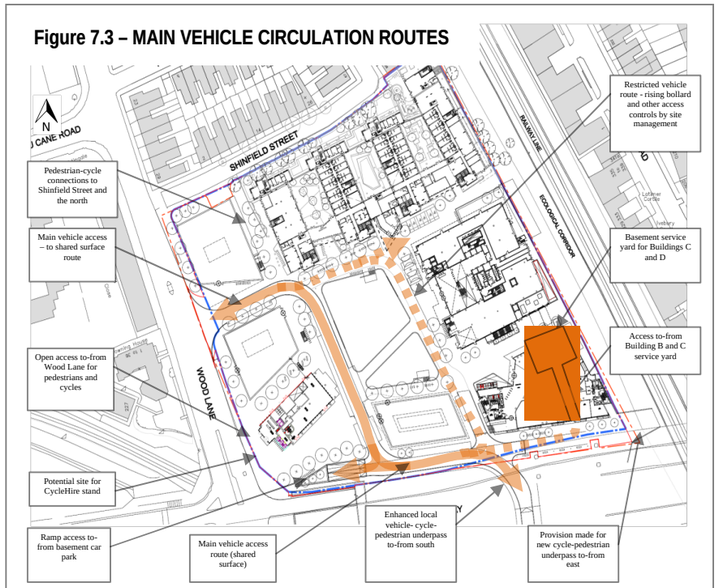
Vehicle Circulation

7.3.14 Key points within the access and circulation strategy are as follows (see Figure 7.3) :

Table 7.6: Vehicle Circulation Strategy

Aspect	Measures and Operation
Main Site Access	The main access to and from the development for vehicles will be via Wood Lane. The geometric design of the access permits any vehicle of any legal size entering the site and, at the immediate entrance/ exit off Wood Lane, an entering vehicle has the space to pass another vehicle waiting to leave the site.
Geometric Layout of Vehicle Routes	The main two way route through the site will lead from the main entrance on Wood Lane, run between Buildings E and F, run alongside the West Way and then under the West Way as areas to the south develop. The main route will also lead between Buildings C and E to a turning area. Access to Buildings B and C will be accessed controlled through the use of barriers located between Buildings C and D.
Vehicle Access for Parking	Access to the basement car park is off the main route to a two way ramp on the south side of Building F.
Vehicle Access for Disabled	The bulk of disabled parking bays located will be located at ground level, however the disabled parking for Buildings E, F and G will be located within the basement car park.
Coaches	It is not expected that coaches would access the Site regularly. However, a coach drop off point is provided on the western side of the square and a coach parking area is located on the south side of Building E. In leaving the site coaches would drive around the square by Buildings C and D.
Emergency Vehicles	Emergency vehicle access around the development would be possible on all routes. The Transport Assessment demonstrates the swept paths for vehicles.
Access under A40	The vehicle route under the Westway will not be a main site access; it will not be adopted and its use is anticipated as a local access route to the sites to the south of the Westway as they develop. The geometry of the main route, the speed limit, the access control and the design as a shared surface will make the route unattractive to any through traffic.
Access Management	The roads and circulation areas will not be adopted public highway but it is not proposed to 'gate' the site as access will be required for service and deliveries and to integrate with the local area for pedestrians and cycles. The restricted parking on site will be managed by Imperial or its agents (management company) and this is deemed to offer adequate control over access. Access will be managed to restrict the use of the route adjacent toBuildings B, C and D in doing so restrict the vehicles to the main route through the development.

Figure 7.3 – MAIN VEHICLE CIRCULATION ROUTES



7.4 EVALUATION OF SIGNIFICANCE OF TRANSPORT EFFECTS

7.4.1 The Transport Assessment for Imperial West has been prepared to support planning applications to the LBHF. However, as the development is a "large-scale development", the transport effects must be acceptable to TfL as well as to LBHF. Therefore the TA addresses the scope defined in the TfL "Transport Assessment Best Practice – Guidance Document[7], May 2006 (the Guidance) and the Travel Plans follow the TfL "Guidance for Workplace Travel Planning for Development[8]" and TfL "Guidance for Residential Travel Planning in London[9]".

Trip Generation by the Development

7.4.2 The travel estimates generated by the different land uses for the each of the land uses/buildings have been estimated, assigned to modes and, where appropriate, distributed to the transport system networks.

7.4.3 The procedures employed for trip generation forecasts have been determined mainly by use of the TRAVL (see 7.2.5) data base but constrained to the limited parking supply proposed on site for each use within each building and added to the future year base flows. The trip rates have been combined with the proposed building uses and the GEAs to determine travel to-from the site by mode. The trips to and from the development are presented in full in the TA. Trip rates for similar scale developments reflect more vehicle parking than is to be provided for Imperial West and therefore, while trip numbers have been retained, car borne trips base have been constrained to the limited parking supply proposed on site.

Traffic Effects

7.4.4 Traffic flows generated by the Imperial West are low in the context of existing and future flows on Wood Lane. The traffic flows arriving and leaving the development in AM (08:00-09:00) and PM (17:00-18:00) peak are summarised in Table7.7. The traffic volumes are presented in passenger car units (pcu's) and include cars, taxis and HGVs in order to combine with the traffic flows from VISSIM. As noted above, the traffic flows were divided to three "assessment cases or stages".

Table 7.7: Traffic Generation to Imperial West

Flows TO the development (PCU per hour)			
Peak	**Assessment Stage 1**	**Assessment Stage 2**	**Assessment Stage 3**
AM	30	42	46
PM	19	30	31
Flows FROM the development (PCU per hour)			
Peak	**Assessment Stage 1**	**Assessment Stage 2**	**Assessment Stage 3**
AM	28	42	45
PM	17	28	31

7.4.5 As Imperial West is a new development assumptions were necessary to distribute generated traffic to the network. Therefore, traffic flows to and from the development were assigned to north and south directions in proportion to Wood Lane traffic flows. The development traffic flows at Wood Lane/Westway and Wood Lane/Du Cane Road junctions were then assigned with turning proportions of the background traffic at the junctions.

7.4.6 Future year traffic flows (for assessment stages in 2015, 2017 and 2018) have been derived by the application of local TEMPRO factors to the 2009 TfL VISSIM model outputs. Imperial West trip generations, from TRAVL and other data, with car trips constrained to the parking supply on site (as no on street parking is realistic due to the CPZ/charging regime on surrounding streets) have been converted to traffic flows and added to the future year flows.

7.4.7 As a result of the limited parking provision of 239 spaces (it is noted of which of which 28% is for a hotel and this will generate few peak trips), peak hour traffic flows generated by full development of Imperial West are low in the context of existing and future flows on Wood Lane. Traffic flows to-from Imperial West are estimated at a maximum of some 50 vehicles/direction in the AM peak hour. The proportion of Imperial West traffic is assessed at some 3% - 5% of average flows; this low proportion of Wood Lane traffic is considerably less than the variation experienced from day-to-day.

7.4.8 Junctions control urban traffic capacity. Junction capacities have been assessed using industry standard software/procedures - PICADY and LINSIG. The results in the TA for junctions in the immediate area using show.

- § The future Access/Wood lane "junction" access to-from the site will operate within capacity.
- § The Wood Lane/Westway signal controlled junction analysis indicates that Imperial West traffic makes very small impact and the junction can operate effectively; and
- § The Wood Lane/Du Cane Road signal controlled junction analysis indicates that the junction is reaching capacity but Imperial West traffic makes virtually no impact; and
- § Imperial West traffic makes virtually no impact on the A40/A3220 junction, particularly now that the western extension of the Congestion Charge Zone has been removed.

7.4.9 Evaluation of Significance of Traffic Flow Changes - The IEMA (Institute of Environmental Management and Assessment) conventional guidelines seek to relate the magnitude of traffic flow changes to the sensitivity of receptors to those changes. Broadly:

- § effects are significant where traffic flows increase by more than 30%;
- § effects may be significant in specifically sensitive areas if traffic flows increase by more than 10%; sensitive areas can include congested junctions, hospitals, accident blackspots etc; &
- § if traffic flow increases are below 10%, effects are considered insignificant in that daily variations in background traffic are likely to vary by this amount; therefore, changes below the 10% are usually assumed to result in no discernable environmental effect.

7.4.10 In systematic terms, the guidelines applied to the proposed development are as shown in Table 7.8.

Table 7.8: Magnitude of Effect

Magnitude of Effect	Description
High	Where there is greater than 100% change in traffic flow levels, effects are **substantial and significant**
Medium	Where there is a 30% to 100% change in traffic flow levels, effects are **significant at the local scale**
Low	Where there is a 10% to 30% change in traffic flow levels, effects are slight and of low importance and of **no significance** to planning decision making.
Negligible	Where there is less than 10% change in traffic flow levels, effects are **negligible** are of no importance to planning decision making

7.4.11 The effect of traffic flow changes is perceived differently by system users and those close to schemes and are categorised in Table 7.9

Table 7.9: Sensitivity of Receptor to Traffic Effects

Sensitivity of Receptor	Description/example.
Very High	Schools/colleges, playgrounds, accident blackspots, retirement homes etc.
High	Congested junctions, doctors surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycle-ways, community centres, parks etc
Medium	Places of worship, public open space, nature conservation areas, listed buildings, tourist attractions, residential areas with adequate footways etc
Low	Areas sufficiently distant from affected road and junctions

7.4.12 Applied to roads serving the proposed development, the significance of changes in traffic flow is as shown in Table 7.10

Table 7.10: Significance of Traffic Effects

Location	Sensitivity of Receptor (to changes in traffic flow)	Predicted increases in traffic flows as a result of Imperial West	Magnitude of Effect	Significance
Wood Lane – east side	High	Less than 10% of existing flows	Negligible	No significance
Wood Lane - west side	High	Less than 10% of existing flows	Negligible	No significance
Westway – south	High	Less than 10% of existing flows	Negligible	No significance
Du Cane Road	High	Less than 10% of existing flows	Negligible	No significance

7.4.13 It is concluded that the effect on the surrounding highway network of traffic generated by the proposed development will be negligible.

7.4.14 Pedestrian Effects The number of walking trips in the AM peak hour for the completed development is assessed at maximum of the order of 1700 persons/hour (including Building B). The existing pedestrian flow on Wood Lane is of the order of 300 pedestrians per hour and thus a "worst case" – assuming all pedestrians from Imperial West walk south along the west (narrower) footway of Wood Lane is estimated at 2000 pedestrians using the footway in the AM peak hour. This "worst case" is still under the TfL comfortable carrying capacity, as it indicates that the footway would operate at 73% of acceptable capacity. However, it is stressed that this "worst case" example uses pedestrian flows concentrated into a single movement and the exaggerated case indicates that the footways adjacent to the development have the capacity to cope with large increases in the volumes of pedestrians

7.4.15 Imperial West will have excellent pedestrian connectivity in all directions via a new linkage to Shinfield Street, a proposed new underpass beneath West London Line, an improved underpass beneath Westway and the wide approaches to link with the local area at the junction of Wood Lane and Westway. The site is designed to assist pedestrians and to be as car free as possible, with main vehicle movements limited to a spine road, itself designed for low speeds with a high quality "shared surface". It has been assessed that footways in the surrounding area will provide good Pedestrian Comfort Levels and minor works identified by a PERS audit will enhance that condition.

Public Transport Effects

7.4.16 The Site has a PTAL of 5 - it is within accessible distance from 2 tube, 10 or more bus routes and accessible to surface rail. Without an area wide public transport operational model, it is not possible to attribute passenger

estimates to specific public transport routes/services. However, it is considered that the demand is not significant within the capacity of the surrounding public transport services. With full development, initial assessments of maximum bus passenger volumes are about 381 arriving passengers per AM peak hour. There are 49 buses per hour past the site in the peak hour and thus, even if all passengers travelled in the same direction, this would equate to an average of 8 passengers per bus; this would, in practice be less as there would be a directional split of travel.

7.4.17 Similarly, underground demand is assessed at a maximum of 220 passengers per PM peak hour. Underground services at stations near the site offer some 30 trains per hour on three lines; again if there was no directional or modal split in demand, this would result in an average increase of 7 passengers per train and this is not regarded a capacity issue.

7.4.18 The estimates of future public transport demand are summarized above. The site has a PTAL of 5 and is within accessible distance from two tube stations, numerous bus routes and within reasonable distance of surface rail. Without an area wide model, it is not possible to attribute the public transport demand estimates to specific public transport routes or services. However, the generated demand is not significant within the capacity of the surrounding public transport services.

Summary of Transport Conclusions

7.4.19 Although the development involves considerable built floor space, the traffic and transport effects are not adverse – this is particularly the case for traffic effects since due to the planning and transport strategy for the development, the development does not result in car-borne trip generation. The public transport demand is high but given the tube, rail and bus services close to the site, and the measures taken to increase connectivity for pedestrians and cyclists and the on site facilities, the demand will not result in an unacceptable issues. Table 7.11 summarises qualitatively the key transport effects on sectors/users of the local transport system for the three assessment phases of development and should be read in conjunction with Table 7.10 which summarizes traffic effect significance.

Table 7.11: Summary of Effects - Imperial West Assessment

Effects	Assessment Stage 1	Assessment Stage 2	Assessment Stage 3
Increase traffic on roads and junctions (2)	Neutral -	Neutral	Neutral
Changes in road traffic accidents and traffic safety	Neutral	Neutral	Neutral
Ensure off road delivery and servicing	Positive	Positive	Positive
Encourage rail and underground patronage (1)	Positive	Highly Positive	Highly Positive
Encourage bus patronage (1)	Positive	Highly Positive	Highly Positive
Encourage cycling - provide cycle connectivity (3)	Positive	Highly Positive	Highly Positive
Encourage cycling - provide on site cycle facilities	Highly Positive	Positive	Highly Positive
Encourage walking - provide pedestrian connectivity (3)	Neutral	Positive	Highly Positive

Notes

1. Given the constraints on private vehicle parking, and therefore vehicle use, there will be a new demand for public transport services. The volumes will not be an overwhelming increase in rail and bus patronage and is regarded as a positive effect in that (i) it limits car use and (ii) it results in increase revenue/fares through increased patronage and (iii) sends appropriate "signals" to other developments
2. The volume of road traffic generated by the development will be extremely small and will be insignificant in relation to normal daily variation in flows on surrounding roads and have virtually no effect on capacity or operations (see section 7.4.9 on Significance).
3. The development will provide measures to assist both cyclists and pedestrians including shared surface within the site, extensive cycle parking for residents and visitors and will facilitate new links underneath both the Westway and underneath the West London Line.

7.5 SCOPE FOR MITIGATION

Construction Traffic

7.5.1 A Construction Plan (CP) for traffic access and movement acceptable to both the LBHF and TfL Network Assurance will be an obligation of the contractor under the contracts for construction. The CP will ensure the effect on existing traffic movement, the road network and the effect on the local environment is minimal.

Travel Plans

7.5.2 As previously noted; (i) a full Residential Travel Plan (TP) has been prepared for Building F and, (ii) a full workplace Travel Plan has been prepared for Buildings C and D – both in accordance with TfL Guidelines.

7.5.3 The objectives of the Residential Travel Plan for Building F are to minimize car trips to/from the application site and to encourage the use of more sustainable modes of travel such as walking, cycling and public transport; the specific objectives are:

- **Objective 1** - To ensure a minimum number of car based trips by residents and visitors to/from the site;
- **Objective 2** - To encourage walking and cycling trips to/from the site as a sustainable and healthier mode of transport;
- **Objective 3** - To contribute to the reduction of congestion and pollution as well as minimize traffic effects in the White City Opportunity Area through reduced car use; and
- **Objective 4** - To monitor and review the evolution of the sustainable transport initiatives outlined in the Travel Plan to increase resident awareness of the advantages using sustainable modes and adapt it to meet the changing needs of visitors and residents.

7.5.4 The objectives of the Workplace Travel Plan for Buildings C and D are to minimize car trips to/from the site and to encourage the use of more sustainable modes of travel such as walking, cycling and public transport; the specific objectives are

- **Objective 1** - To ensure a minimum number of car based trips by staff employed by occupiers of the site;
- **Objective 2** - To encourage walking and cycling trips to/from the site as a sustainable and healthier mode of transport;
- **Objective 3** - To contribute to the reduction of congestion and pollution as well as minimize traffic effects in the White City Opportunity Area through reduced car use; and
- **Objective 4** - To monitor and review the evolution of the sustainable transport initiatives outlined in the Travel Plan to increase occupier awareness of the advantages using sustainable modes and adapt it to meet the changing needs of staff, occupiers and visitors

Delivery and Servicing Plan

7.5.5 A detailed Delivery and Servicing Plan has been prepared for buildings C, D and F. The report sets out the strategy for the servicing, deliveries and waste collection for the buildings. Loading or deliveries from the proposed development will take place from the public highway – all will be contained within the Imperial West site. The average number of service/operational vehicles in the worst hour is 5 which will have no effect upon traffic operations.

7.5.6 The loading and deliveries arrangements for Buildings C and D are:

- § The two buildings will share a common loading-service vehicle area;
- § The service area will be at basement level and is located so that each building has direct access;
- § The service area will be used for all major functions including deliveries, refuse and recycling collection, restaurant deliveries etc. Refuse and recycling stores will be located with level access to refuse vehicles; couriers may access the main entrances;
- § Access to upper floors to-from the service area will be via lift dedicated to each building;
- § The service area will accommodate approximately 3 large vehicles at any one time but a larger number of smaller vehicles;
- § The limiting vertical clearance will be 4.5m which is adequate for most vehicles and refuse vehicles;
- § Vehicle access to-from the service area will be via a ramp with a gradient of between 1:10 and 1:12;
- § The access ramp is of adequate width to accommodate two way vehicle movements;
- § To economise on space, a turntable will be provided in the service area to ensure access by larger vehicles (10.5m is proposed as a maximum – in the very rare cases where larger vehicles are required, special arrangements will be made with site management for loading at ground level);
- § Vehicle access to-from the ramp will be from the shared surface parallel to Westway;
- § Access to-from the service area ramp will be managed by building management personnel located in the security office on the south east corner of Block D, close to the entry – exit. As noted above, although the ramp is adequate for two way traffic, signal control will be provided at the "junction" with the access road and will be operated by site management to ensure safety at the entry point; and
- § In the event that a more-than-predicted vehicle demand occurs, there is adequate space for vehicles to wait on the two way access road, parallel to Westway and to the south of Building D.

7.5.7 The loading and deliveries arrangements for Buildings F are

- § Service and delivery vehicles will have access to 4 kerbside parking-loading spaces - 2 on each side of the access road to the east side of Building F. These will be used for deliveries, refuse and recycling collection, etc;
- § The refuse store for Building F is located at ground level on the south east corner of the building within easy access of the 4 parking bays;
- § By special prior arrangement with site management appropriately sized vehicles (up to 2.3m height) will be permitted access to the basement car park. For example, this could apply to vehicles which require long stay for operations such as lift servicing, repairs to utilities etc; &
- § Building F will have a concierge system and be able to accept and store routine deliveries (couriers, post, etc) to avoid the need for redeliveries for residents to travel to depots to collect goods.

7.6 SIGNIFICANCE OF RESIDUAL EFFECTS

7.6.1 Recognizing the scale of the Imperial West development, the transport strategy will ensure that any adverse traffic effects in the surrounding area are minimised. Following full development of Imperial West, from a transport standpoint, the residual effects which have been detailed in the foregoing sections may be summarized as:

- § the traffic effects on capacity or delays on the road network and on key junctions surrounding the development will be negligible;
- § the configuration of the road network permits access to-from the OAPF development areas to the south of Westway without encouraging through traffic;
- § while car parking spaces are limited and will be carefully controlled/managed, a high proportion of all spaces will be provided with electric charging points to promote the use of "clean cars";
- § car club parking spaces will be provided which will assist in ensuring that private vehicles are used efficiently;
- § the cycle and pedestrian facilities proposed increase permeability of the site and will be advantageous to both residents, occupiers and local residents alike;
- § the cycle parking facilities on-site for visitors and for occupiers of each Building will promote the cause of cycling as a sustainable mode and will contribute to ensuring that the low car travel generation is maintained;
- § provision will be made for cycle parking for the TfL Cycle Hire scheme if and when it is extended to West London and will promote the cause of cycling as a sustainable mode;
- § the Travel Plans inherent in the transport strategy will ensure that there is no "creep" towards private car travel; &
- § the Delivery and Service Plan will minimize vehicle trips and will ensure that there is no spill over of parked-waiting vehicles onto local or strategic roads occurs.

7.7 MONITORING

7.7.1 The Residential and Workplace Travel Plans have defined targets for mode share. The targets have been devised in accordance with the policies outlined in Section 7.1.4 and seek to minimise car travel through (i) the limitation of car parking provision (ii) the limitation to travel generally (by recognizing the support facilities on site (polyclinic, crèche, small retail, gym etc) which reduce travel by on-site occupants and local area residents and (iii) by providing facilities to encourage the use of sustainable modes (walk, cycle, public transport). To ensure that these aims are achieved, the effects of the development will be monitored through survey programmes which are inherent in each of the Travel Plans.

7.7.2 The monitoring surveys will comprise initial surveys taken a short time after occupancy (when travel habits have been established) and then periodically (at year 3 and 5 after each occupation) to ensure that targets are achieved, sustainable travel characteristics maintained and modifications made to Travel Plans if necessary. The monitoring surveys will be undertaken as iTrace compliant surveys.

REFERENCES

Ref 7.1: Department for Communities and Local Government: Planning Policy Guidance 13

Ref 7.2: Department for Communities and Local Government: Planning Policy Statement 4

Ref 7.3: Adopted London Plan

Ref 7.4: London Plan July 2011

Ref 7.5: The Mayor's Transport Strategy May 2010

Ref 7.6: London Borough of Hammersmith and Fulham (LBHF) Unitary Development Plan

Ref 7.7: Transport Assessment Best Practice – Guidance Document, May 2006 - TfL

Ref 7.8: Guidance for Workplace Travel Planning for Development" TfL

Ref 7.9: Guidance for Residential Travel Planning in London – TfL

Parking Standards (i) London Plan and (ii) LBHF Guidelines

Design Manual for Roads and Bridges v.13 COBA

8. Noise and Vibration

8.1 INTRODUCTION

8.1.1 This chapter assesses the noise and vibration effects of the proposed development. It describes the methods used to assess the effects; the baseline conditions currently existing at the application site and within the surrounding areas together with the potential direct and indirect noise and vibration effects arising from construction activities, road traffic and the operation of service plant such as air conditioning and ventilation fans.

8.1.2 Any mitigation measures required to prevent, reduce or offset the effects are outlined, and the residual effects subsequently described.

8.1.3 A Planning Policy Guidance 24 (PPG24) assessment is also provided within Technical Appendix 8.1 of this section.

Assessment Scope

8.1.4 The scope of the assessment is as follows:

§ The identification of the appropriate legislation, standards and guidance for the assessment of noise and vibration effects;

§ a review of the existing noise climate at the application site and at locally potentially sensitive properties;

§ a qualitative assessment of noise and vibration effects at local potentially sensitive receptors during the construction phases of the three phases of development;

§ an assessment of noise and vibration effects from fixed plant and other noise sources at local potentially sensitive receptors during the operational phases of the three phases of development;

§ an assessment of noise levels at a selection of receptors which have the potential to be affected by an increase in noise level in future years as a result of the development using Calculation of Road Traffic Noise (CRTN) and Design Manual for Roads and Bridges (DMRB) methodologies. The assessment uses the specified methodologies in order to predict noise level specifically due to road traffic; &

§ provision of mitigation measures, as considered appropriate, in order to minimise any potential effects arising from the development.

Policy Framework

National Planning Policy

8.1.5 Planning Policy Guidance Note 24 (PPG24) – Planning and Noise

8.1.6 PPG 24 provides guidance for planners and developers as to how the planning system can be used to minimise the effects of noise from developments. Advice is given on achieving separation between noisy developments and sensitive receptors and also mitigation measures to reduce noise effects.

Regional and Local Planning Policy

8.1.7 This assessment takes into account London Borough of Hammersmith and Fulham Policy EN20B: Noise Pollution, Policy EN21: Environmental Nuisance and the overarching requirements and the aspirations of The London Plan.

Assessment Methodology and Significance Criteria

Assessment Methodology

8.1.8 Predictions are necessary when forecasting future effects. Established good practice methods from the guidelines and standards as listed below are used throughout this assessment to ensure that these predictions are as accurate as possible. Particular reference is made to Calculation of Road Traffic Noise and Guidelines for Noise Impact Assessment.

8.1.9 The following documents have been consulted in the preparation of this report:

§ Guidelines for Noise Impact Assessment (Draft) – Institute of Acoustics & Institute of Environmental Management & Assessment, 2002;

§ Calculation of Road Traffic Noise (CRTN) – Department of Transport, 1988;

§ Design Manual for Roads and Bridges (DMRB), 1994;

§ British Standard BS 5228 Noise and Vibration Control on Construction and Open Sites, 1997;

§ British Standard BS7385 Evaluation and Measurement for Vibration in Buildings, 1990/1993;

§ British Standard BS6472 Guide to Evaluation of Human Exposure to Vibration in Buildings, 2008;

§ British Standard BS 4142 Method for rating industrial noise affecting mixed residential and industrial areas, 1997;

§ World Health Organisation – Guidelines on Community Noise Levels, 2000; and

§ British Standard BS 8233 Sound insulation and noise reduction for buildings – Code of Practice, 1999.

§ London Borough of Hammersmith and Fulham, Policy EN20B: Noise Pollution.

§ London Borough of Hammersmith and Fulham, Policy EN21: Environmental Nuisance.

Significance Criteria

8.1.10 The effect of the development on noise levels has been assessed with reference to the baseline environment. In terms of general perception of sound, the noise level changes in Table 8.1 can be referenced to give the magnitude or scale of effect.

Table 8.1: General Methodology for Assessing Scale of Effect

Scale of Effect	Noise Level Change in dB (A)
Substantial Adverse	6 – 10
Moderate Adverse	3 – 6
Slight Adverse	1 – 3
Negligible	< 1

8.1.11 The above noise level changes do not take into account the timescales over which they might operate. It should be noted that the magnitude of effect will vary according to the character of the noise source and the timescales over which the noise source operates. For example, noise level changes due to road traffic may only occasionally reach high levels (6 – 10dB (A)) whilst construction noise may more frequently result in noise level increases of >10dB (A) operating over shorter timeframes.

8.1.12 It is recognised that environmental effects can operate over a range of geographical areas. However, the geographical scale should be taken into account in the assessment of the scale/magnitude of the effect, as well as the receptor.

8.1.13 Receptors such as individual properties and communities are generally considered to have Local importance. It is rare for noise effects to be experienced on a wider scale and effects on receptors of more than local importance are generally only due to developments such as large scale road and rail schemes and large airports.

8.1.14 The interaction of the scale and the importance produces the effect significance. Table 8.2 overleaf shows the significance of effects upon receptors which have Local importance:

Table 8.2: Effect Significance Matrix

Resource Value (Importance)	Scale of Effect Upon Receptor			
	Substantial	Moderate	Slight	Negligible
Local	Moderate-Minor	Minor	Minor	Neutral

8.1.15 The significance of an effect is generally scaled as follows:

- § Major beneficial (positive) effect;
- § Moderate beneficial (positive) effect;
- § Minor beneficial (positive) effect;
- § Neutral effect,
- § Minor adverse (negative) effect;
- § Moderate adverse (negative) effect; and
- § Major adverse (negative) effect.

8.1.16 The scale of noise effects upon local receptors is nearly always deemed to be minor whenever the resource is valued as being of local importance, as shown in Table 8.2. This could be unrealistic on some occasions because effects occur on a continuous scale. The above matrix simplifies reality and places effects in a discontinuous scale. Therefore, significance should always be qualified. For example, it is noted that in certain cases an effect of minor significance, whether adverse or beneficial, can be very important for local residents, and deserves attention in the assessment, i.e. through mitigation.

8.1.17 The effect prediction confidence is scaled in accordance with Table 8.3 below.

Table 8.3: Effect Prediction Confidence

Confidence Level	Description
High	The predicted effect is either certain, i.e. a direct impact, or believed to be very likely to occur, based on reliable information or previous experience.
Low	The predicted effect and it levels are best estimates, generally derived from first principles of relevant theory and the experience of the assessor. More information may be needed to improve the level of confidence.

8.1.18 Potential vibration effects from the construction phase of the development have been assessed on a qualitative basis only. No specific significance criteria have therefore been used.

8.2 EXISTING BASELINE CONDITIONS

Existing Noise Sources and Sensitive Receptors

8.2.1 Ambient noise in the area is generally dominated by traffic on the surrounding roads (A40 and Wood Lane), main line railway track on the eastern boundary and nearby over ground section of the London Underground.

8.2.2 Existing noise sensitive receptors are predominantly the residential properties in Shinfield Street and the several apartment blocks opposite the development site on the other side of Wood Lane. The recently erected buildings at the north east of the site (Buildings B1, B2, B3 and B4) effectively screen the eastern half of Shinfield Street and properties in Eynham Road.

8.2.3 The closest properties to the proposed development are those at the Western end of Shinfield Street. The properties along Eynham Road not backing on to the railway presently experience some of the lowest day and night time noise levels but will be screened from the site by existing buildings and their geographical location. The buildings directly opposite the west boundary of the site along Wood Lane will be exposed to virtually all the demolition/construction and operational noise from the development and are chosen for that reason to be included in the assessment.

8.2.4 A baseline noise and vibration survey which was carried out during April 2010. The results of the survey are still considered to be relevant for the purposes of this assessment, the noise sources still being predominantly the road traffic and other transport modes. The traffic forecasts for 2010, 2011 and future years will be referred to and factored in to the noise figures if they indicate a sufficient increase in traffic levels to affect the noise environment.

Measurement Locations

8.2.5 Based on the above identified noise sources and receptors, eight (8no.) noise monitoring locations were selected for the baseline survey. These are described below and shown in Figure 8.2. NB - The Block identifications below are those of the original buildings on the site which have been mostly demolished but remain relevant and appropriate to the assessment of baseline conditions.

- § Position 1 – Roof top level on the southern 2-storey extension to Block A. This was an unattended measurement location and represents one of the noisiest areas of the site, exposed to the elevated section of the A40, the railway line to the east and the underground railway to the south west. Continuous measurements taken from 16:30 on 12th April 2010 to 10:00 on the 13th April 2010.
- § Position 2 – Roof top level on the western façade of Block E. This was an unattended measurement location and was exposed to mainly to traffic noise from busy Wood Lane. Continuous measurements taken from 10:25 on 13th April 2010 to 12:26 on the 14th April 2010.
- § Position 3 – Ground level measurement location at the nearest domestic property for Phase 1 development (corner of Shinfield Street and Eynham Road). Measurements taken from 9:10 to 10:38 on 13th April 2010 and from 01:07 to 01:37 on 14th April 2010.
- § Position 4 – Ground level measurement location on the apron of the short entrance road on Wood Lane. Measurements taken from 11:00 to 11:52 on 13th April 2010 and from 01:45 to 02:15 on 14th April 2010.
- § Position 5 – Ground level measurement location at the end of Shinfield Street at its junction with Wood Lane (only pedestrian and cycle traffic can use this junction). Measurements taken from 12:38 to 13:10 on 13th April 2010 and from 02:22 to 02:44 on 14th April 2010.
- § Position 6 – Ground level measurement location in the roadway in Eynham Road outside no 63 (daytime) and no 55 (night time). Measurements taken from 13:13 to 13:35 on 13th April 2010 and from 02:50 to 03:05 on 14th April 2010.
- § Position 7 – Ground level measurement location within the car park on the south west corner of the site. Measurements taken from 09:18 to 10:51 on 14th April 2010.
- § Position 8 – High level measurement location on external open stairway on eastern side of site adjacent to railway track. Approx 4.4m above ground level at approximately the same level as the railway track. Measurements taken from 10:55 to 11:56 on 14th April 2010.

Measurement Equipment and Condition

8.2.6 On the three monitoring dates (12-14th April 2010) weather conditions were dry (except for very light rain on the early morning of 14th – insufficient to wet the road surfaces). Wind conditions were variable, ranging from very light to occasional gusts.

8.2.7 Measurements were obtained using 2no. calibrated Norsonic Integrating Sound Level Meters Type 140, both fitted with GRAS 41AL external microphones.

8.2.8 Instrument 1 – serial no. 1402871 with GRAS41AL serial no. 42111 was used at unattended monitoring locations 1 and 2.

8.2.9 Instrument 2 – serial no. 1403329 with GRAS41AL serial no. 16205 was used at attended monitoring locations 3, 4, 5, 6, 7 and 8.

8.2.10 The sound level meters were appropriately calibrated using a Norsonic Type 1251 calibrator – Serial no. 30794. At all locations the microphone

was mounted on a tripod of height 1.2m and the ground condition at all locations could be classified as "hard, reflective ground". The instruments were configured with the time response set to fast. Measurements were obtained with 'A' weighting for $L_{Aeq,T}$ L_{Amax}, $L_{A90,T}$, and $L_{A10,T}$ at one minute intervals.

8.2.11 The noise and vibration measurements were carried out by Philip Rossiter MIOA.

Table 8.4: Baseline Noise Survey Results

Measure-ment Position	Date	Time	Average L_{Aeq} (dB)	Min. L_{A90} (dB)	Comments
1	12/4/10 13/4/10 12-13/4/10	16:30 – 22:00 07:00 – 10:00 22:00 – 07:00	 64.8 60.6	 54.9 43.2	Road traffic, railway traffic and underground all contribute. Also some noise from scrap yard.
2	13/4/10 14/4/10 13/4/10	10:25 – 22:00 07:00 – 12:26 22:00 – 07:00	 65.5 60.6	 51.7 42.1	North west corner of site – mostly road traffic
3	13/4/10 14/4/10	09:10 – 10:38 01:07 – 01:37	54.9 48.1	48.6 39.7	North east of site adjacent to closest domestic property – local road traffic and railway
4	13/4/10 14/4/10	11:00 – 11:52 01:45 – 02:15	67.1 58.6	57.7 44.4	At main site entrance on Wood Lane mostly road traffic
5	13/4/10 14/4/10	12:38 – 13:10 02:22 – 02:44	70.4 61.8	58.2 40.7	On Wood Lane at end of Shinfield Street – road traffic noise
6	13/4/10 14/4/10	13:13 – 13:35 02:50 – 03:05	50.8 38.9	44.6 32.2	Quiet surburban road – local road traffic and some railway traffic
7	14/4/10	09:18 – 10:51	64.9	58.8	Road traffic, railway traffic and underground all contribute. Also some noise from scrap yard.
8	14/4/10	10:55 – 11:56	61.6	54.6	Some road traffic, mostly railway traffic

Existing Vibration Sources

8.2.12 Vibration monitoring was carried out at two locations on the site.

8.2.13 Location 1 was within the underground car park beneath the Sports Centre on the application site nearest the railway track. This location was monitored from 17:40 on 12th April 2010 till 13:40 on 13th April 2010.

8.2.14 Location 2 was at the northern end of the site adjacent to the north façade of Block D. This location was monitored from 19:13 on 13th April 2010 till 10:17 on 14th April 2010.

8.2.15 The equipment used was a Vibrock V901 Digital Seismograph, s/n 1098, fitted with two vibration transducers (VDV and PPV). The results of the vibration monitoring are shown below in Table 8.5.

Table 8.5: Vibration Monitoring Results

Location	Period	Max PPV (peak particle velocity) mm/s
1	12/4/2010 (17:40-0:00) 13/4/2010 (0:00-13:40)	0.200 (at 23:28) 0.550 (at 08:31)
2	13/4/2010 (19:13-0:00) 14/4/2010 (0:00-10:17)	0.400 (at 19:13) 0.475 (at 09:00)

Location	Period	VDV (Vibration Dose Value) $ms^{-1.75}$		
		X	Y	Z
1	12/4/2010 (17:40-23:00) (16hour) (23:00-07:00) (8hour) 13/4/2010 (07:00-13:40) (16hour)	0.031 0.028 0.033	0.027 0.022 0.026	0.03 0.024 0.029
2	13/4/2010 (19:13-23:00) (16hour) (23:00-07:00) (8hour) 14/4/2010 (07:00-10:20) (16hour)	0.033 0.029 0.034	0.026 0.022 0.026	0.03 0.024 0.029

Importance and Sensitivity of Affected Receptors

8.2.16 All receptors potentially affected by the development can be considered to be of local importance.

8.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

8.3.1 It is proposed to demolish all the remaining existing original buildings, namely the two buildings at the south eastern corner.

8.3.2 Wood Lane Studios at Imperial West, at the northern boundary adjacent to Shinfield Street has been completed. The construction of Imperial West W12 is expected to begin in 2013 and take approximately 5 years to complete.

8.3.3 At this stage, the precise timetable and location of the demolition/construction plant and processes are not known. Due to the size of the development and the proximity of noise sensitive premises there exists a number of possible worst case scenarios of demolition/construction noise effects.

8.3.4 It is not possible that all demolition/construction processes would occur simultaneously and operate continuously. Also, different processes would occur at different areas of the construction site. Additionally, the normal hoarding around the development will provide a line of sight screening to some receptor points.

Vehicle Movements

8.3.5 The exact number of vehicle movements associated with the demolition and construction works i.e. deliveries, removal of waste, construction staff vehicles etc. can not be determined at this stage. However, Wood Lane adjacent to the main site entrance, which is most likely to be used by the construction traffic, has an average annual daily traffic (AADT) flow in excess of 26,000 vehicles (2010 figures). DMRB guidance suggests that a 25% increase in traffic levels is needed to produce a 1 dB increase in noise levels which equates to at least 3,750 vehicle movements daily. It is considered very unlikely that construction traffic will generate this extra number of vehicles per day and therefore effects due to vehicle movements during demolition and construction are likely to be neutral.

8.3.6 However, construction traffic is likely to increase the number of HGV movements along these roads and it is considered therefore that the worst case effect upon local traffic levels and HGV percentages, and therefore noise levels, is slight adverse direct, short term and reversible.

Demolition/Construction

8.3.7 It is currently envisaged that demolition of the remaining buildings will take place over a 4 month period. During the demolition it is expected that there will be noise generated by a range of equipment and vehicles that will include crushers, loading backactors, bulldozers, pneumatic drills and trucks.

8.3.8 It is also envisaged that the main construction activities likely to generate noise will comprise ground preparation, excavations for foundations and for basement construction, construction of new roads and buildings and the offloading of materials.

8.3.9 Piling will be required for the new development. It is envisaged that the piles will be cast in situ and that this activity will require augers to remove the cores of material.

8.3.10 Details of the precise construction methodologies to be adopted, plant to be used, when (at what stage and at what times of the day), and where (at what stage of the construction process, location on site, time of day etc.) are not presently available. Common construction methods and activities are nevertheless anticipated. The assessment therefore assumes, on a precautionary basis potential worst-case noise levels at receptors identified near to the application site, in accordance with BS 5228: "Noise and vibration control on construction and open sites". This prediction technique takes into account such details as; types and number of plant; percentage of the time each item of plant is working during a given period; distance between noise source and receptor; and the presence of any screening between source and receptor.

8.3.11 Table 8.6 below presents a list of common plant which may be used during the demolition/construction works with corresponding worst-case noise levels taken from BS 5228.

Table 8.6: Potential Noise Levels of Demolition/Construction Plant

Plant	Sound Power Level (dB L_{WA})	Sound Pressure Level at Varying Distances (dB L_{Aeq})					
		10m	20m	50m	100m	200m	300m
Crusher	-	92	86	78	72	66	62
Rotary bored piling rig	-	83	77	69	63	57	49
Dozers	118	90	84	76	70	64	60
Dump Trucks	110	82	76	68	62	56	52
Excavators	118	90	84	76	70	64	60
Delivery Trucks	105	77	71	63	57	51	47
Vibrating Rollers	106	78	72	64	58	52	48
Road Roller	101	73* (5)	67* (5)	59* (5)	53* (5)	47* (5)	43* (5)
Concrete Delivery Lorry	109	81	75	67	61	55	51

*Drive by maximum sound pressure level, $L_{pA\ (max)}$, with speed in kmph shown in brackets.

8.3.12 The overall contribution to average noise levels at any receptor due to noise from demolition and construction plant is difficult to predict as the plant is mobile and operation times vary. Whilst it is not possible to exactly quantify the effect of demolition and construction noise, Table 8.7 below shows predicted noise levels at identified sensitive receptors generated by the two noisiest items of plant (i.e. crusher & dozer) operating simultaneously.

8.3.13 It is very unlikely that these items will operate simultaneously at the site boundary. Therefore a typical distance of 10m from the site boundary will be used to predict a 'worst case' noise level at the receptors during demolition/construction. Given the location of the buildings to be demolished this is a very conservative distance.

8.3.14 The sensitive receptors selected for the development are:

A. The retail units on the western side of Wood Lane and the apartments above – directly opposite the site boundary adjacent to proposed building A (façade is 25m from the site boundary).

B. Side (southern) elevation of No 29 Pavillion Terrace (Monitoring position 5). (Façade is 14m from the site boundary).

C. Browning House on Wood Lane - directly opposite the site boundary adjacent to proposed building C (façade is 29m from the site boundary).

D. The southern elevation of existing Building B4 which will be exposed to the closest potential demolition location, as well as construction and vehicle movements of the proposed development. (Existing ambient noise level representative of monitoring position 8.)

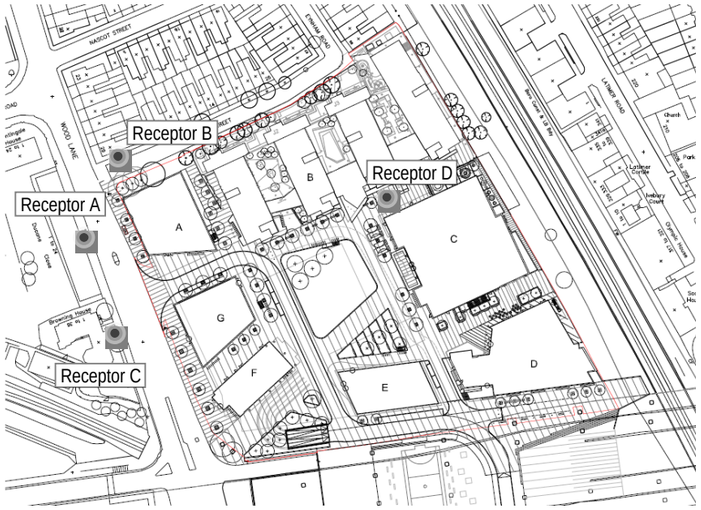


Figure 8.1: Sensitive Receptor Locations

Table 8.7: Predicted worst case noise levels due to demolition/ construction plant at sensitive receptors

Sensitive Property No	On-site location	Distance from source to receiver (m)	Average measured background daytime noise level L_{Aeq} (dB(A))	Predicted worst case noise level at receiver (dB(A))	Predicted change in noise level (dB(A))
A	10m from site boundary	25	70	86	+16
B	10m from site boundary	24	70	87	+17
C	10m from site boundary	39	67	82	+15
D	10m from southern façade of B4	10	62	94	+32

8.3.15 From the predicted noise levels in Table 8.7 and the criteria in Table 8.1 it can be seen that the effect of demolition and construction noise without mitigation is substantial adverse at all four locations.

Demolition/Construction Vibration

8.3.16 BS7385 – Evaluation and Measurement for Vibration in Buildings, 1990/93, looks at the potential for damage to buildings from ground borne vibration. It categorises the damage into three levels; cosmetic, minor and major. The standard defines cosmetic as : "The formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in mortar joints of brick/concrete block construction". It provides guide values for cosmetic damage for residential or light commercial type buildings as being 15-20 mm/s peak component particle velocity for low frequency `vibrations (4-15 Hz) and 20 mm/s for medium low frequency vibrations (15-40 Hz) and 50mm/s above 40Hz.

8.3.17 The demolition/construction phase of the The Imperial West development is not expected to produce ground borne vibrations of a magnitude which will result in any cosmetic effects to surrounding properties. There is to be no impact piling as part of the building foundation design. Localised ground improvement may be undertaken e.g. for road construction but this is considered unlikely to constitute a significant vibration source. Therefore the effect of construction vibration from the development is considered to be negligible.

8.3.18 However, it is intended to provide vibration monitoring around the boundary of the site during the demolition period. The precise locations will be chosen to reflect the conditions on site but will provide 'worst case' vibration readings at the most sensitive receptors.

Effects during Operation

8.3.19 The potential exists for noise from the completed development to affect nearby sensitive receptors. The likely sources of noise within the development are:

§ fixed plant – heating, ventilation, air conditioning or refrigeration plant (HVAC);

§ vehicles within and around the site, including areas of car parking; &

§ delivery vehicles.

Fixed Noise Sources

8.3.20 Detailed information concerning the exact position and orientation of any HVAC plant and delivery times/frequency is currently unavailable. The assessment therefore assumes on a precautionary basis a worst-case approach and has assumed that HVAC plant is un-attenuated and located in close proximity to and facing sensitive receptors.

8.3.21 The methodology of British Standard BS 4142: Method for Rating Industrial Noise Affecting Mixed Residential and Industrial areas has been used in part, along with reference to Table 8.1, to assess the effects of operational noise sources from the development. Referring to the Imperial West building layout and assuming noise sources are point sources e.g. air conditioning unit etc., located on the wall of the nearest building, then an estimated noise level at the sensitive receptors already identified can be calculated.

8.3.22 A reasonable assumption of a worst case sound power level (L_w) for operational noise, e.g. HVAC units etc. is approximately 70 dB(A). It can also be assumed that the noise source will emanate noise in all directions at the same intensity. With the noise source on the wall of the nearest

new building and with 3 units operating simultaneously, this equates to a noise source of 75dB(A). The standard formula for attenuation with distance ($L_p = L_w - 20\log r - 8$, where L_p is Sound Pressure Level at receiver, L_w is Sound Power Level of source and r is distance from source to receiver) can then be used to predict noise levels. Adding a character correction of +5 dB, as recommended in BS 4142, to the calculated noise levels gives predicted noise levels at each of the receptors as described in Table 8.8 below:

Table 8.8: Predicted Noise Levels from Fixed Plant Noise Sources

Location	Distance (m)	Average measured background night-time noise level L_{A90} (dB(A))	Predicted worst case noise level at receiver (dB(A))	Predicted difference in noise level (dB(A))
A	25	40	44	+4
B	20	40[1]	46	+6
C	25	41	44	+3
D	15	40[2]	48	+8

[1]Taken as L_{A90} figure from measurement position 3 – typical of the background levels in Shinfield Street away from the immediate influence of Wood Lane.
[2]Taken as the L_{A90} figure from measurement position 3 – typical of the background levels on the eastern edge of the site during night time.

Other Noise Sources

8.3.23 It is considered that the main noise sources at the application site other than fixed plant are HGV movements during deliveries etc. Referring to the proposed site layout , HGVs will enter and leave the site via the existing site entrance on Wood Lane. There may also be some movements via the proposed entrance on the southern boundary, but these are not likely to affect the identified sensitive receptors.

8.3.24 For HGV movements data is available for the typical sound pressure level at 3 metres (measured at 67 dB) and therefore the equation LP2 = LP1 – 20log(r2/r1) (where LP1 and LP2 are the sound pressure levels at distances r1 and r2 from the source) can be used, which gives predicted noise levels as summarised in Table 8.9 below:

8.3.25 This assessment also assumes that the worst position for HGV is at the point of entry to the site, i.e. on the apron of the entrance road on Wood Lane.

Table 8.9: Predicted Noise Levels from HGV Deliveries

Location	Distance (m)	Average measured background night-time noise level L_{A90} (dB(A))	Predicted worst case noise level at receiver (dB(A))	Predicted difference in noise level (dB(A))
A	35	44	46	+2
B	70	41	40	-1
C	35	44	46	+2
D	150	40	33	-7

Cumulative Operational Noise

8.3.26 Referring to Tables 8.8 and 8.9, this assessment would suggest that under the above scenario the scale of effect on nearby receptors from operational noise sources (combined effect from fixed plant and HGV movements) ranges from substantial adverse (at location D) to negligible.

Road Traffic Noise

8.3.27 Any development has the potential to increase noise levels locally by increasing the amount of traffic on local roads. An assessment was carried out using the Design Manual for Roads and Bridges (DMRB) methodology to determine the likely effect of the development upon traffic levels on the local road network and therefore its effect upon noise levels due to road traffic. Data on traffic levels has been provided by Pell Frischmann, giving AADT data both with and without the development for 2015, 2017 and 2018. DMRB guidance suggests that to increase noise levels by 1 dB a 25% increase in traffic levels is necessary.

8.3.28 CRTN specifies a method for predicting future noise levels from traffic by measuring existing 18 hour L_{10} noise levels and using existing and forecast traffic level data to calculate future 18 hour L_{10}. The traffic data required for the calculation is current and predicted 18 hour AAWT, percentage of HGV and speed of vehicles. NB - the percentage change using AADT traffic flows is identical to the percentage change using AAWT traffic flows,

8.3.29 For each link in the road traffic model for the local road network the flow with and without the development were compared for the future years of 2015, 2017 and 2018. For the Imperial West development it was found that for each future year, links in the local road network experienced a maximum of a 2% increase in vehicle movements per day which is imperceptible to the human ear. This would suggest that, with reference to Table 8.1, the effect of changes in road traffic noise as a result of the development is negligible at all locations.

8.3.30 There will be an increase in traffic flow on the short roadway into the site. However, the traffic flow is at a level which is insignificant compared with that of the busy A40 and Wood Lane. For the three future years, 2015, 2017 and 2018, the site traffic accounts for a maximum of 5% of the predicted road traffic on Wood Lane (north of the A40). Its contribution to the local noise environment is therefore considered to be negligible.

Road Traffic Vibration

Once the development is operational, only a small proportion of vehicles visiting Imperial West are likely to be HGVs. The total increase in vehicle movements associated with the development is not predicted to be significant in comparison to existing traffic on the local network. Therefore the potential for increased vibration levels is minimal and it is considered that the scale of effect of increased vibration levels is negligible.

8.4 EVALUATION OF SIGNIFICANCE

Table 8.10: Significance of Environmental Effects before Mitigation

Environmental Effect	Sensitivity	Magnitude	Nature	Duration	Significance
Demolition and Construction noise	Local	Substantial	Adverse Direct	Short term	Moderate-Minor
Road traffic noise during construction		Slight	Adverse Direct	Short term	Minor-Neutral
Construction vibration		Negligible		Short term	Neutral
Operational Noise		Substantial		Long term	Moderate-Minor
Operational road traffic noise		Slight – negligible	Adverse Direct	Long term	Minor-Neutral
Vibration during operation		Negligible		Long term	Neutral

8.5 SCOPE FOR MITIGATION

Effects during Construction

8.5.1 Construction works are often subject to control by planning conditions. If complaints are received by the Local Authority regarding construction noise then notices under Part III of the Environmental Protection Act 1990 (Ref 10.9) or Section 60 of the Control of Pollution Act 1974 (Ref. 10.10) can be served which can restrict construction works. The following measures will be used to control and minimise noise effects from the construction activities proposed for the Imperial West development.

8.5.2 Given the absence of detailed information regarding construction methods and programmes, it is recommended that Best Practicable Means should be employed to minimise construction effects and should be incorporated into the Construction Environment Management Plan (CEMP). These are the minimum standards that should be achieved during construction:

- § careful selection of working methods and programme;
- § agreement of construction traffic routes with London Borough of Hammersmith and Fulham to minimise disruption and disturbance;
- § siting equipment behind physical barriers, i.e. existing features, hoarding etc and where practicable doors and gates should be located away from

- § provision of lined and sealed acoustic covers for equipment that could potentially contribute to a noise nuisance;
- § directing noise from plant e.g. exhausts or engines away from sensitive locations;
- § ensuring that regularly maintained and appropriately silenced equipment is used;
- § shutting down equipment when not in use i.e. maintain a 'no idling policy';
- § avoiding waiting or queuing on the public highway with engines running;
- § handling all materials in a manner which minimises noise;
- § switching all audible warning systems to the minimum setting required by the Health and Safety Executive;
- § restricting hours of site operation;
- § employing best practices and follow the guidance of BS 5228 (Parts 1 & 2) 1997; &
- § the appointed contractors will apply to the Local Authority for consents under section 61 of the Control of Pollution Act 1974.

Effects during Operation

8.5.3 Operational noise effects can be significantly mitigated by attention to building materials, location of individual noise sources and use of screening and attenuation to control noise emissions. A summary of the mitigation measures which will be adopted during the detailed design of Imperial West W12 is detailed below:

- § careful siting of noise sources;
- § choice of HVAC and refrigeration plant;
- § the provision of screening to delivery areas and HVAC plant;
- § choice of construction materials & sound insulation for the buildings;
- § agreement of delivery hours with the local authority; &
- § agreement with LBHF on opening hours of A1/A3 premises within the development.

8.6 EVALUATION OF SIGNICANCE OF RESIDUAL EFFECTS

Table 8.11: Significant Environmental Effects

Environmental Effect	Sensitivity	Magnitude	Nature	Duration	Mitigation	Residual Significance	Level of Certainty	Rationale
Demolition and Construction noise	Local	Substantial	Adverse Direct	Short term	Restriction of working hours, use of correct working practices	Moderate – minor	High	Noise levels are high and difficult to effectively mitigate, however, construction works are short term and are restricted to typical working hours. Remaining buildings to be demolished are at the south eastern corner of the site, furthest from sensitive receptors.
Road traffic noise during construction		Slight	Adverse Direct	Short term	Not applicable	Minor	High	Construction traffic flows are not currently available but local traffic levels are already high
Construction vibration		Negligible		Short term	Not applicable	Neutral	High	Piling to be auger bored and cast in situ. On-site vibration monitoring to be provided during demolition period.
Operational Noise		Substantial		Long term	Design of site and planning conditions	Neutral	High	Limited information is available specifying noise levels generated by the development; a possible scenario has been attributed. Mitigation measures will be very effective in reducing effects.
Operational road traffic noise		Slight – negligible	Adverse Direct	Long term	Not applicable	Minor-Neutral	High	The increase in road traffic due to the development will give only a negligible increase in noise levels on the majority of local roads
Vibration during operation		Negligible		Long term	Not applicable	Neutral	High	It is considered that no vibration will be caused from the development

8.6.1 The above table provides a summary of the environmental effects of the development after mitigation.

8.6.2 Mitigation and enhancement measures are proposed, for both the construction and operational phases of the developments. The residual environmental effects, after mitigation, are considered to be moderate adverse to negligible during construction, and minor adverse to negligible during operation.

REFERENCES

Ref 8.1: Guidelines for Noise Impact Assessment (Draft) – Institute of Acoustics & Institute of Environmental Management & Assessment, 2002;

Ref 8.2: Calculation of Road Traffic Noise (CRTN) – Department of Transport, 1988;

Ref 8.3: Design Manual for Roads and Bridges (DMRB), 1994;

Ref 8.4: British Standard BS 5228 Noise and vibration control on construction and open sites, 1997;

Ref 8.5: British Standard BS7385 Evaluation and Measurement for Vibration in Buildings, 1990/1993;

Ref 8.6: British Standard BS6472 Guide to Evaluation of Human Exposure to Vibration in Buildings, 2008;

Ref 8.7: British Standard BS 4142 Method for rating industrial noise affecting mixed residential and industrial areas, 1997;

Ref 8.8: World Health Organisation – Guidelines on Community Noise Levels, 2000; and

Ref 8.9: British Standard BS 8233 Sound insulation and noise reduction for buildings – Code of Practice, 1999.

Ref 8.10: London Borough of Hammersmith and Fulham, Policy EN20B: Noise Pollution.

Ref 8.11: Planning Policy Guidance Note 24 (PPG24) – Planning and Noise.

Ref 8.12: London Borough of Hammersmith and Fulham, Policy EN21: Environmental Nuisance.

Ref 8.13: London Borough of Hammersmith and Fulham, Policy EN20B: Noise Pollution.

Figure 8.2: Noise Monitoring Locations

9. Air Quality

9.1 INTRODUCTION

9.1.1 This Chapter describes the likely air quality effects associated with the proposed mixed-use development at the application site.

9.1.2 The development has the potential to affect air quality by generating dust emissions during the demolition and construction phase and by changing traffic flows on the local road network during the operational phase. The assessment therefore includes the following key elements:

- the identification of relevant air quality legislation and policy;
- a review of existing air quality conditions in the area;
- a qualitative assessment of potential effects during construction;
- a quantitative assessment of potential effects from emissions during operation;
- the identification of mitigation measures required to prevent, reduce or offset the effects; &
- the identification of any residual air quality effects.

Assessment Scope

9.1.3 The application site lies in the north east of the London Borough of Hammersmith and Fulham, close to the boundary with the Royal Borough of Kensington and Chelsea to the east and a short distance from the boundary with the London Borough of Brent to the north. It lies within a mixed residential, commercial and light industrial area, and is bounded to the south by an elevated section of the A40, to the west by Wood Lane, to the east by railway lines and to the north by existing residential properties.

9.1.4 The proposed development will include offices, residential apartments, academic uses, a hotel, retail units, leisure and conference facilities and open space. The proposals are described in detail in Chapter 3. The application site lies within the 'whole borough' Air Quality Management Area (AQMA) declared by the London Borough of Hammersmith and Fulham for exceedences of the annual mean nitrogen dioxide and the daily mean PM_{10} objectives. The Royal Borough of Kensington and Chelsea and London Borough of Brent have also declared AQMAs for the same pollutants.

9.1.5 The development will lead to a small increase in traffic on the local roads, which may affect air quality at existing residential properties in the AQMAs of the three boroughs. The new residential properties will themselves be subject to the effects of road traffic emissions from the adjacent road network, as well as emissions from the adjacent railway line. The main air pollutants of concern related to traffic emissions are nitrogen dioxide and particulate matter (PM_{10} and $PM_{2.5}$), whilst those from railway lines are nitrogen dioxide and sulphur dioxide.

9.1.6 There is also the potential for the construction activities to affect both existing and new properties. The main pollutants of concern related to construction activities are dust and PM_{10}.

9.1.7 The proposed development also includes an energy centre which includes gas-fired CHP units and gas boilers. The effects of emissions from the energy centre on existing and proposed residents are assessed as part of an addendum to this Chapter.

9.1.8 This report describes existing local air quality conditions (2010), and the predicted air quality in the future assuming that the proposed development does, or does not proceed. The assessment of traffic-related effects focuses on the assumed opening year of the residential phase of the development (2018). The assessment of construction dust effects focuses on the anticipated duration of the works. These assumptions are informed by the Construction Management Plan at Chapter 16.

9.1.9 This Chapter has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with the London Borough of Hammersmith and Fulham. It also takes into consideration comments received from the Environmental Health Officer at the Royal Borough of Kensington and Chelsea.

Policy Framework

Air Quality Strategy

9.1.10 The Air Quality Strategy (Ref 9.1) published by the Department for Environment, Food, and Rural Affairs (Defra) provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Planning Policy

National Policy

9.1.11 National policy on air quality and planning is set out in Planning Policy Statement 23: Planning and Pollution Control (PPS23) (Ref 9.2). This contains advice on when air quality should be a material consideration in development control decisions. Existing, and likely future, air quality should be taken into account, as well as the presence of any AQMAs. PPS23 notes that the findings of local authority air quality reviews and assessments will be important, as they will identify local air pollution problems, which may in turn influence the siting of certain types of development. The need for compliance with any statutory environmental quality standards or objectives, including the air quality objectives prescribed by the Air Quality Regulations 2000, Statutory Instrument 928 (Ref 9.3) and Amending Regulations 2002 (Ref 9.4), will also be a factor in determining whether air quality is a material consideration. PPS23 also explains that loss of amenity can occur without there being a statutory nuisance.

9.1.12 Further emphasis is given to the importance of air quality objectives and AQMAs in the Appendices to PPS23. The impact of a development on air quality is likely to be particularly important:

- where the development is proposed inside, or adjacent to an AQMA;
- where the development could in itself result in the designation of an AQMA; and
- where to grant planning permission would conflict with, or render unworkable, elements of a LA's air quality action plan.

9.1.13 PPS23 states clearly that not all planning applications for developments inside or adjacent to AQMAs should be refused, even if the development would result in a deterioration of local air quality, as such an approach could sterilise development.

Local Policies

9.1.14 The London Borough of Hammersmith and Fulham has recently adopted a Core Strategy Development Plan Document (DPD) (October 2011). The Core Strategy forms part of the Local Development Framework (LDF) (Ref 9.5), one of a portfolio of planning documents known as Local Development Documents, which will deliver the spatial development strategy for the Borough.

9.1.15 Alongside the core strategy, the Council still uses its Unitary Development Plan (UDP) (Ref 9-6), which was adopted in August 2003. Parts of the UDP have been superseded by the formal adoption of the Core Strategy. Policies within the UDP that have not been superseded continue to be used alongside the Core Strategy until they are replaced by the emerging Development Management DPD (expected to be adopted in late 2012).

9.1.16 The Core Strategy contains Borough Wide Strategic Policy CC4 for 'Protecting and enhancing environmental quality', which states:

"The council will support measures to protect and enhance the environmental quality of the borough including harmful emissions to land, air and water and the remediation of contaminated land. It will work with partner organisations to help deliver this. In particular, measures will be

taken to...reduce levels of local air pollution and improve air quality in line with the national air quality objectives and the council's Air Quality Action Plan…;

The London Plan

9.1.17 The London Plan 2011 (Ref 9.7) sets out the spatial development strategy for London. It brings together all relevant strategies, including those relating to air quality.

9.1.18 Policy 7.14, 'Improving Air Quality', addresses the spatial implications of the Mayor's Air Quality Strategy and how development and land use can help achieve its objectives. It recognises that Boroughs should have policies in place to reduce pollutant concentrations, having regard to the Mayor's Air Quality Strategy. With respect to planning decisions, it states that:

"Development proposals should:

a) minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within AQMAs or where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3);

b) promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils "The control, of dust and emissions form construction and demolition";

c) be at least "air quality neutral" and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs));

d) ensure that where provision needs to made to reduce emissions from a development, these usually are made on site. Where it can be demonstrated that on-sire provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches;

e) where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified."

The Mayor's Air Quality Strategy

9.1.19 The revised Mayor's Air Quality Strategy (MAQS) was published in December 2010 (Ref 9.8). The overarching aim of the Strategy is to reduce pollution concentrations in London to achieve compliance with the EU limit values as soon as possible. The Strategy commits to the continuation of measures identified in the 2002 MAQS, and sets out a series of additional measures, including:

Policy 1 – Encouraging smarter choices and sustainable travel;

- *Measures to reduce emissions from idling vehicles focusing on buses, taxis, coaches, taxis, PHVs and delivery vehicles;*
- *Using spatial planning powers to support a shift to public transport;*
- *Supporting car free developments.*

Policy 2 – Promoting technological change and cleaner vehicles:

- *Supporting the uptake of cleaner vehicles.*

Policy 4 – Reducing emissions from public transport:

- *Introducing age limits for taxis and PHVs.*

Policy 5 – Schemes that control emissions to air:

- *Implementing Phases 3 and 4 of the LEZ from January 2012*
- *Introducing a NO_x emissions standard (Euro IV) into the LEZ for Heavy Goods Vehicles (HGVs), buses and coaches, from 2015.*

Policy 7 – Using the planning process to improve air quality:

- *Minimising increased exposure to poor air quality, particularly within AQMAs or where a development is likely to be used by a large number of people who are particularly vulnerable to air quality;*
- *Ensuring air quality benefits are realised through planning conditions and section 106 agreements and Community Infrastructure Levy.*

Policy 8 – Creating opportunities between low to zero carbon energy supply for London and air quality impacts:

- *Applying emissions limits for biomass boilers across London;*
- *Requiring an emissions assessment to be included at the planning application stage.*

Low Emission Zone (LEZ)

9.1.20 A key measure to improve air quality in Greater London is the Low Emission Zone (LEZ). This entails charges for vehicles entering Greater London not meeting certain emissions criteria, and affects older, diesel-engined lorries, buses, coaches, large vans, minibuses and other specialist vehicles derived from lorries and vans. The LEZ was introduced on 4th February 2008, and will be phased in through to January 2012. The timescale for implementation was 2008 for diesel HGVs, coaches and buses and 2010 for the heaviest, most polluting large vans and minibuses (a standard of Euro III). From January 2012 a standard of Euro IV will be implemented for lorries over 12 tonnes, buses and coaches. Cars and lighter Light Goods Vehicles (LGVs) are excluded. The third phase of the LEZ, which was to apply to vans and minibuses from October 2010, has been deferred by the Mayor until January 2012. As set out in the 2010 MAQS, a NO_x emissions standard (Euro IV) will be included into the LEZ for HGVs, buses and coaches, from 2015.

Assessment Criteria

Health Criteria

9.1.21 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality Regulations 2000 (Ref 9.9) and the Air Quality (England) (Amendment) Regulations 2002 (Ref 9.10).

9.1.22 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below 60 $\mu g/m^3$ (Ref 9.11). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level.

9.1.23 The European Union has also set limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$. Achievement of these values is a national obligation rather than a local one (Directive 2008/50/EC) (Ref 9.12). The limit values for nitrogen dioxide are the same levels as the UK objectives, but applied from 2010 (The Air Quality Standards Regulations 2010 (No. 1001) (Ref 9.13)). The limit values for PM_{10} and $PM_{2.5}$ are also the same level as the UK statutory objectives, but applied from 2005 for PM_{10} and will apply from 2015 for $PM_{2.5}$. As the latter is more stringent than the UK objective (as it applies from 2015 rather than 2020) it is used as the relevant assessment criterion in this assessment.

9.1.24 The relevant air quality objectives for this assessment are provided in Table 9.1.

Table 9.1: Air Quality Objectives for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour mean	200 μg/m³ not to be exceeded more than 18 times a year
	Annual mean	40 μg/m³
Particulate Matter (PM_{10})	24-hour mean	50 μg/m³ not to be exceeded more than 35 times a year
	Annual mean	40 μg/m³
Particulate Matter ($PM_{2.5}$) [a]	Annual mean	25 μg/m³

[a] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it. The EU limit value is the same, but is to be met by 2015.

Construction Dust Criteria

9.1.25 There are no formal assessment criteria for dust. In the absence of formal criteria, a set of distance based criteria has been developed (Table 9.2). These criteria are based on the professional experience of the consultants, drawn from many years of involvement with assessments of different types of project, together with discussions with practitioners in the field, and consideration of a range of published reports.

9.1.26 It should be noted that no beneficial effects are expected during the construction phase as it is unlikely that there will be a reduction in emissions compared to baseline conditions. Therefore only negligible and adverse impacts are described.

Table 9.2: Assessment Criteria for Dust from Construction Activities

Source		Potential Distance for Significant Effects (Distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}[a]**	**Vegetation effects**
No Mitigation				
Major	Large construction sites, with high use of haul routes	500 m	100 m	100 m
Moderate	Moderate sized construction sites, with moderate use of haul routes	200 m	50 m	50 m
Minor	Minor construction sites, with limited use of haul routes	100 m	25 m	25 m
With Standard Mitigation				
Major	Large construction sites, with high use of haul routes	100 m	50 m	25 m
Moderate	Moderate sized construction sites, with moderate use of haul routes	50 m	30 m	15 m
Minor	Minor construction sites, with limited use of haul routes	25 m	20 m	10 m

[a] Significance based on the 2004 objective, which allows 35 daily exceedences/year of 50 μg/m³

9.1.27 There is also the possibility of dust being tracked out of the site along roads. Table 9.3 sets out the assessment criteria in terms of distance from the site to which significant dust may be tracked out and the potential distance from the roadside for significant effects.

Table 9.3: Assessment Criteria for Construction Dust Track-Out

Source		Potential Distance from roadways for Significant Effects (Distance from edge of road)		
Scale	**Distance along roadways that dust might be tracked**	**Soiling**	**PM_{10}**	**Vegetation effects**
No Mitigation				
Major	1000 m	200 m	50 m	50 m
Moderate	400 m	100 m	25 m	25 m
Minor	100 m	50 m	15 m	15 m
With Standard Mitigation				
Major	250 m	50 m	30 m	15 m
Moderate	100 m	25 m	20 m	10 m
Minor	25 m	15 m	10 m	5 m

9.1.28 The GLA (Ref 9-14) sets out additional criteria as guidelines for site evaluation. These guidelines, which are set out in Table 9.4, can be used to define the level of dust mitigation that is likely to be required.

Table 9.4: GLA Site Evaluation Guidelines

Category	Description
Low Risk Sites	Developments of up to 1,000 m² of land and; Developments of 1 to 10 properties and; Potential for emissions and dust to have an infrequent impact on sensitive receptors.
Medium Risk Sites	Developments of between 1,000 m² and 15,000 m² of land and; Developments of 10 to 150 properties and; Potential for emissions and dust to have an intermittent or likely impact on sensitive receptors.
High Risk Sites	Developments of over 15,000 m²; Developments of over 150 properties or; Major developments referred to the Mayor and/or the London Development Agency, or; Major Development defined by the London borough or; Potential for emissions and dust to have a significant impact on sensitive receptors.

Descriptors for Air Quality Effects and Assessment of Significance

9.1.29 There is no official guidance in the UK on how to describe air quality effects nor to assess their significance. The approach developed by the Institute of Air Quality Management[1] (Ref 9-15), and incorporated in Environmental Protection UK's (EPUK) guidance document on planning and air quality (Ref 9-16), has therefore been used. This involves three distinct stages: the application of descriptors for magnitude of change; the description of the effect at each sensitive receptor; and then the assessment of overall significance of the scheme.

9.1.30 The definition of effect *magnitude* is solely related to the degree of change in pollutant concentrations, expressed in micrograms per cubic metre, but originally determined as a percentage of the air quality objective. *Effect description* takes account of the effect magnitude and of the absolute concentrations and how they relate to the air quality objectives or other relevant standards. The descriptors for the magnitude of change due to the scheme are set out in Table 9.5, while Table 9.6 set out the effect descriptors. These tables have been designed to assist with describing air quality effects at each specific receptor. They apply to the pollutants relevant to this scheme and the objectives against which they are being assessed.

Table 9.5: Definition of Effect Magnitude for Changes in Ambient Pollutant Concentrations

Magnitude of Change	Annual Mean NO_2/PM_{10}	No. days with PM_{10} concentration greater than 50 μg/m³	Annual Mean $PM_{2.5}$
Large	Increase/decrease > 4 μg/m³	Increase/decrease > 4 days	Increase/decrease > 2.5 μg/m³
Medium	Increase/decrease ≥ 2 ≤ 4 μg/m³	Increase/decrease ≥ 2 ≤ 4 days	Increase/decrease ≥ 1.25 ≤ 2.5 μg/m³
Small	Increase/decrease ≥ 0.4 < 2 μg/m³	Increase/decrease ≥ 1 < 2 days	Increase/decrease ≥ 0.25 < 1.25 μg/m³
Imperceptible	Increase/decrease < 0.4 μg/m³	Increase/decrease <1 day	Increase/decrease < 0.25 μg/m³

Table 9.6: Air Quality Effect Descriptors for Changes to Annual Mean Nitrogen Dioxide, PM_{10} and $PM_{2.5}$ Concentrations at a Receptor

Absolute Concentration [a] in Relation to Objective/Limit Value	Change in Concentration [b]		
	Small	**Medium**	**Large**
Above Objective/Limit Value [c]	Slight	Moderate	Major
Just Below Objective/Limit Value [d]	Slight	Moderate	Moderate
Below Objective/Limit Value [e]	Negligible	Slight	Slight
Well Below Objective/Limit Value [f]	Negligible	Negligible	Slight

a The 'Absolute Concentration' relates to the 'With-Scheme' air quality where there is an increase in concentrations and to the 'Without-Scheme' air quality where there is a decrease in concentrations.

[1] The IAQM is the professional body for air quality practitioners in the UK

b Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible.
c Above: > 40 µg/m^3 annual mean NO_2 or PM_{10}, > 35 days with PM_{10} greater than 50 µg/m^3, > 25 µg/m^3 annual mean $PM_{2.5}$,
d Just below: ≥ 36 ≤ 40 µg/m^3 annual mean NO_2 or PM_{10}, ≥ 32 ≤ 35 days with PM_{10} greater than 50 µg/m3, ≥ 22.5 ≤ 25 µg/m^3 annual mean $PM_{2.5}$
e Below: ≥ 30 < 36 µg/m^3 annual mean NO_2 or PM_{10}, ≥ 26 < 32 days with PM_{10} greater than 50 µg/m^3, ≥ 21.25 < 22.5 µg/m^3 annual mean $PM_{2.5}$
f Well below: < 30 µg/m^3 annual mean NO_2 or PM_{10}, < 26 days with PM_{10} greater than 50 µg/m^3, < 21.25 µg/m^3 annual mean $PM_{2.5}$

9.1.31 The IAQM (Ref 9.15) guidance is that the assessment of significance should be based on professional judgement, with the overall air quality effect of the scheme described as either, 'insignificant', 'minor', 'moderate' or 'major'. In drawing these conclusions, the factors set out in Table 9.7 should be taken into account.

Table 9.7: Factors Taken into Account in Determining Air Quality Significance

Factors
Number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance.
The number of people exposed to levels above the objective or limit value, where new exposure is being introduced.
The magnitude of the changes and the descriptions of the effects at the receptors i.e. using the findings based on Tables 9-5 and 9-6.
Whether or not an exceedence of an objective or limit value is predicted to arise in the study area where none existed before or an exceedence area is substantially increased.
Whether or not the study area exceeds an objective or limit value and this exceedence is removed or the exceedence area is reduced.
Uncertainty, including the extent to which worst-case assumptions have been made
The extent to which an objective or limit value is exceeded, e.g. an annual mean NO_2 of 41 µg/m^3 should attract less significance than an annual mean of 51 µg/m^3

Assessment Methodology

9.1.32 The assessment follows a methodology agreed with the London Borough of Hammersmith and Fulham (LBHF) via a telephone discussion between Paul Barker (Environmental Health Officer at LBHF) and Suzanne Hodgson (Air Quality Consultants) held on 1st November 2011.

Existing Conditions

9.1.33 Existing sources of emission within the study area have been defined using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Ref 9.17). Local sources have also been identified through discussion with London Borough of Hammersmith and Fulham's Environment Services Department, as well as through examination of the Council's air quality Review and Assessment reports.

9.1.34 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites, the latter being used to provide context for the assessment. The background concentrations across the study area have been defined using the national pollution maps published by Defra (Ref 9.18). These cover the whole country on a 1x1 km grid.

Road Traffic Effects

Sensitive Locations

9.1.35 Concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been predicted at a number of worst-case locations both within, and close to, the proposed development. Receptors have been selected to represent these worst-case locations. Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, sensitive receptors will generally be residential properties, schools, nursing homes, etc.. When selecting these receptors, particular attention has been given to assessing effects close to junctions, where traffic may become congested, and where there is a combined effect of several road links.

9.1.36 Nine existing residential properties have been identified as receptors for the assessment. This includes residential properties on Phase 1 of Imperial West. Existing locations are described in Table 9.8 and shown in Figure 9.1.

Table 9.8: Description of Existing Receptor Locations

Receptor	Description
Receptor 1	165 Wood Lane
Receptor 2	1 Dorando Close
Receptor 3	303 Westway
Receptor 4	323 Westway
Receptor 5	Women's Pioneer Housing, 227 Wood Lane
Receptor 6	Cavell House, 243 Wood Lane (flats above retail unit)[a]
Receptor 7	Nightingale House, Du Cane Road
Receptor 8	23 Pavilion Terrace, Wood Lane
Receptor 9	29 Pavilion Terrace, Wood Lane

[a] Receptor modelled at a height of 4.5 m to represent first floor level

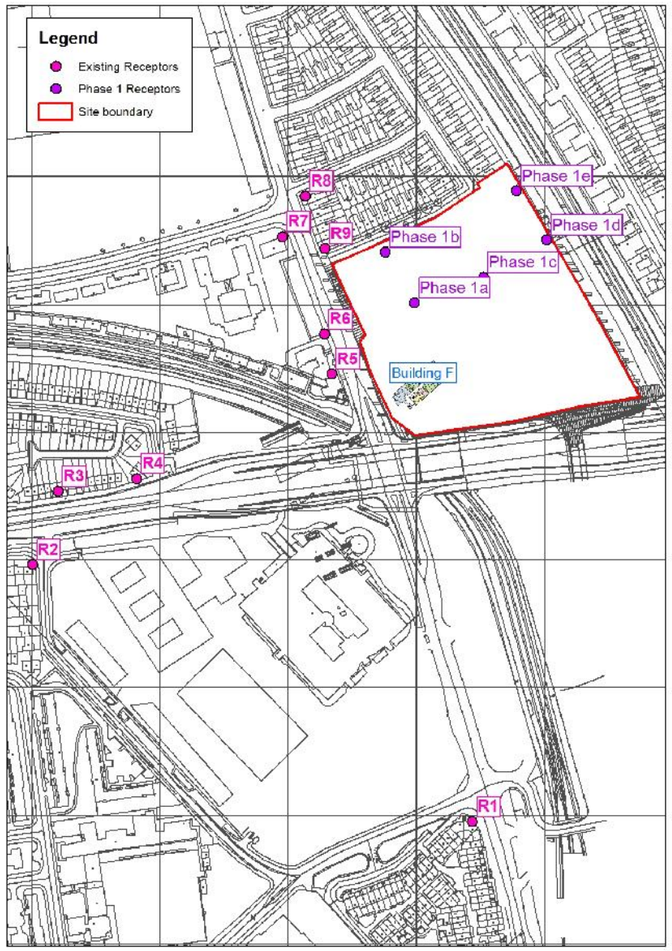


Figure 9.1: Existing and Wood Lane Studios Receptor Locations

9.1.37 Additional receptor locations have been identified within the proposed development of Building F representing the worst-case exposure within each block to existing sources. These proposed locations are shown in Figure 9.2. Concentrations have been predicted for receptors within Building f at a number of heights, representing the ground-floor mezzanine (6 m), first (9 m), second (12 m), third (15 m), fourth (18 m) and fifth (21m) floor exposure. There are no residential properties on the ground floor. Concentrations have also been predicted at the Westway diffusion tube monitoring site located at the junction of Westway and Bloemfontein Road in order to verify the modelled results (see **Technical Appendix 9.1** for verification method).

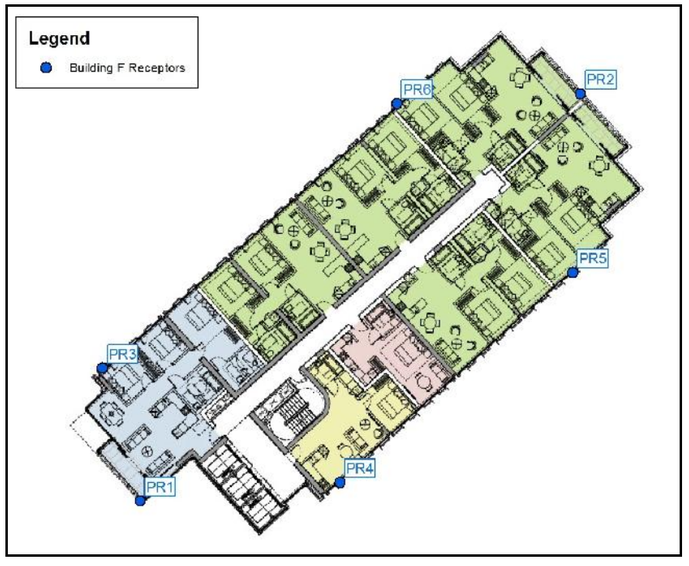


Figure 9.2: Building F Receptor Locations (based on Typical Floor Plan)

Effect Predictions

9.1.38 Predictions of nitrogen dioxide, PM_{10} and $PM_{2.5}$ concentrations have been carried out for a base year (2010), and the proposed year of opening of the development (2018). For 2018, predictions have been made assuming both that the development does proceed (With Scheme), and does not proceed (Without Scheme). A further 2018 sensitivity test has been carried out for nitrogen dioxide that involves assuming no reduction in emission factors for road traffic from the baseline year. This is to address the issue recently identified by Defra (Ref 9.21) that road traffic emissions have not been declining as expected (see later section on uncertainty). Nitrogen dioxide concentrations in 2018 with and without the scheme are thus presented for two scenarios: 'With Emissions Reduction' and 'Without Emissions Reduction'.

9.1.39 Predictions have been carried out using the ADMS-Roads dispersion model (v3). The model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the proportion of heavy duty vehicles (HDVs), road characteristics (including road width), and the vehicle speed. Vehicle emissions are calculated within ADMS-roads (v3) based on vehicle flow, composition and speed using the same emission factors as published within the EFT, version 4.2.2 (Ref 9.19). For nitrogen dioxide future-year concentrations have been predicted once using year-specific emission factors from the EFT and once using emission factors for [2010] [2] which is the year for which the model has been verified.

[2] i.e. combining current-year emission factors with future-year traffic data.

9.1.40 It is also necessary to input background pollutant concentrations. These have been derived from the national maps discussed in the section on Existing Conditions.

9.1.41 The model has been run using the most recent full year of meteorological data (2010) from the monitoring station located at Heathrow Airport, which is considered suitable for this area. It is necessary to use 2010 meteorological data for the base year (2010) for verification purposes. A comparison of wind rose data for five years of meteorological data for Heathrow suggests that 2010 was not a typical year for wind direction and wind speed, which could affect the prediction of pollutant concentrations for future years by ADMS-Roads. A sensitivity test using the latest three years of meteorological data has therefore been carried out.

9.1.42 AADT flows, and the proportions of HDVs for each scenario have been provided by Pell Frischmann (see Chapter 7 for further details). Traffic data for Westway (A40) have been taken from the London Atmospheric Emissions Inventory (LAEI) (Ref 9.20). Traffic speeds were based on those presented in the LAEI, local speed restrictions and taking into account the proximity to a junction. Traffic data used in this assessment are summarised in **Technical Appendix 9.2**. The development will generate some traffic movements. However, within the context of total traffic flow on Wood Lane, the development flow is small and represents less than about 5% of total traffic. It is also noted that development traffic flows are less than the daily variations of traffic flow on Wood Lane.

Railway Effects

9.1.43 Diesel or coal fired stationary locomotives can give rise to elevated levels of sulphur dioxide close to the point of emission. Large numbers of moving diesel locomotives can give rise to high levels of nitrogen dioxide close to the track (Ref 9.11).

9.1.44 Defra guidance (Ref 9.11) outlines an approach to assess the potential for exceedence of the nitrogen dioxide and sulphur dioxide objectives as a result of emissions from diesel and steam locomotives. Outdoor areas within 15 m of railway lines where trains may be stationary for 15 minutes or more may result in elevated sulphur dioxide concentrations. Residential properties within 30 m of railway lines where there are large numbers of diesel locomotive movements (identified in the guidance), and where backgrounds nitrogen dioxide concentrations are greater than 25 $\mu g/m^3$, may be at risk of elevated nitrogen dioxide concentrations. Only locations which meet these criteria require further assessment. There are no proposed residential receptors within 30 m of the railway line and therefore further assessment is not required.

Demolition and Construction Effects

9.1.45 Locations sensitive to dust emitted during demolition and construction will be places where members of the public are regularly present. Residential properties and commercial operations close to the site will be most sensitive to construction dust. Any areas of sensitive vegetation or ecology that are very close to dust sources may also be susceptible to some negative effects.

9.1.46 It is very difficult to quantify emissions of dust from construction activities. It is thus common practice to provide a qualitative assessment of potential effects, making reference to the assessment criteria set out in Table 9.2 and Table 9.3.

9.2 EXISTING BASELINE CONDITIONS

9.2.1 The proposed development site lies in the north east of the London Borough of Hammersmith and Fulham, close to the boundary with the Royal Borough of Kensington and Chelsea to the east and a short distance from the boundary with the London Borough of Brent to the north. It lies within a mixed residential, commercial and light industrial area, and is bounded to the south by an elevated section of the A40, to the west by Wood Lane, to the east by a railway line and to the north by existing residential properties.

9.2.2 A search of the UK Pollutant Release and Transfer Register website (Ref 9.17) did not identify any industrial or waste management sources within 1 km of the proposed development. Other than road traffic, no other sources have been identified.

9.2.3 The London Borough of Hammersmith and Fulham has investigated air quality within its area as part of its responsibilities under the local air quality regime. In 2000, a whole borough Air Quality Management Area (AQMA) was declared for both nitrogen dioxide and PM_{10}. Subsequent reports have confirmed the AQMA designation as appropriate. AQMAs, for the same pollutants, have also been declared in the neighbouring London boroughs of Kensington and Chelsea and Brent. Monitoring data have been obtained from the London Air Quality Network (Ref 9.22).

9.2.4 Two automatic monitoring stations were operated within the London Borough of Hammersmith and Fulham area until January 2009. Neither were in close proximity to the proposed development site. The closest automatic monitors are at John Keble Primary School, a roadside site located in the London Borough of Brent approximately 3 km northwest of the proposed development site and the North Kensington site, an urban background site located in the Royal Borough of Kensington and Chelsea less than 1 km north east of the proposed development site.

9.2.5 The London Borough of Hammersmith and Fulham also operates a number of diffusion tubes, prepared and analysed by Gradko (50% TEA in acetone). These include one deployed alongside the A40 Westway, approximately 700 m west of the proposed development site. Diffusion tube data have been provided by the London Borough of Hammersmith and Fulham. Data for the automatic monitors and diffusion tubes are presented in Table 9.9.

Table 9.9: Summary of Nitrogen Dioxide (NO_2) Monitoring (2006 - 2010) [a]

Location	Site Type[a]	Annual Mean (µg/m³) [b]				
		2006	2007	2008	2009	2010
Automatic Monitors - Annual Mean (µg/m3) [b c]						
John Keble Primary School	R	**43**	**52**	**47**	**56**	**54**
North Kensington	UB	38	39	33	33	37
Automatic Monitors - No. of Hours > 200 µg/m³						
John Keble Primary School	R	0	16	1	8	12
North Kensington	UB	0	17	0	1	0
Diffusion Tubes [d]						
Bryony Road	UB	35	39	36	35	35
Westway A40	R	**66**	**76**	**68**	**69**	**70**
Wulfstan Road	UB	**43**	**44**	**45**	**42**	38
Objective		**40**				

[a] R = Roadside, UB = Urban Background
[b] Exceedences in bold.
[c] Data downloaded from the London Air Quality Network website (www.londonair.org.uk)
[d] Data have been bias adjusted by the Council using the national factor.

9.2.6 Annual mean concentrations at the roadside continuous monitor have exceeded the objective over the last five years, although the short-term objective has been achieved. Trend analysis shows that annual mean concentrations have been steadily increasing. The diffusion tube located alongside the A40 exceeded the annual mean objective in the last two years and concentrations have been in excess of 60 µg/m³, which suggests that the hourly mean objective may also be exceeded at this location (Ref 9.11).

9.2.7 At urban background monitors, concentrations have exceeded or been close to exceeding the annual mean objective over the last five years. There are no clear trends in monitoring results at urban background sites for the past five years. This and the steady increase in roadside concentrations contrasts with the expected decline due to the progressive introduction of new vehicles operating to more stringent standards. The implications of this are discussed later in paragraphs 9.3.7 to 9.3.11.

9.2.8 The John Keble Primary School automatic monitor also measures PM_{10} concentrations, using a TEOM[3]. The North Kensington automatic monitor measures PM_{10} and $PM_{2.5}$ concentrations, using a FDMS[4]. Data are presented in Table 9.10.

Table 9.10: Summary of PM_{10} and $PM_{2.5}$ Monitoring [a]

Year	PM_{10}				$PM_{2.5}$
	Annual Mean (µg/m³)		No. Days >50 µg/m³		Annual Mean (µg/m³)
	John Keble School (R)	North Ken (UB)	John Keble School (R)	North Ken (UB)	North Ken (UB)
2006	25	23	1	13	-
2007	25	22	20	19	-
2008	24	21	9	12	18
2009	23	21	7	7	14
2010	26	20	8	3	14
Objectives	40		35		25

[a] Reference equivalent. Data.

9.2.9 Measured PM_{10} and $PM_{2.5}$ concentrations are all below the objectives.

9.2.10 In addition to these locally measured concentrations, estimated background concentrations in the study area have been obtained from the national maps for 2010 and the opening year, 2018 (Table 9.8). In the case of nitrogen oxides and nitrogen dioxide, the 2010 backgrounds have been derived from the 2008 calibrated maps projected forwards to 2010 assuming no reduction in the traffic emissions. This recognises that emissions for new vehicles have not been declining as expected (see paragraphs 9.3.7 to 9.3.11). The study area covers more than one grid square and thus a range is provided. Details of the method used to derive current and future year baseline nitrogen dioxide concentrations are provided in **Technical Appendix 9.3**.

Table 9.11: Estimated Annual Mean Background Pollutant Concentrations (µg/m³)

Year	NO_2	PM_{10}	$PM_{2.5}$
2010	30.4 – 39.3	19.4 – 20.8	13.3 – 14.2
2018 – Without Reductions in Traffic Emissions [a]	27.4 – 36.5	n/a	n/a
2018 – With Reductions in Traffic Emissions [b]	22.3 – 27.6	17.9 – 19.3	11.9 – 12.6
Objectives	**40**	**40**	**25 [c]**

n/a = not applicable
[a] This assumes vehicle emission factors in 2018 remain the same as in 2010.
[b] This assumes vehicle emission factors reduce into the future at the current 'official' rates.
[c] There are no objectives for $PM_{2.5}$ that apply during these years, however the European Union limit value of 25 µg/m³ is to be met by 2015.

9.2.11 Baseline concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been modelled at each of the existing receptor locations (see Figure 9.1 and Table 9.8). The results, which cover both existing (2010) and future year (2018) baseline (Without Scheme), are set out in Table 9.12 and Table 9.13. The future baseline for nitrogen dioxide covers the two scenarios: with the official reductions in vehicle emission factors and without these reductions.

Table 9.12: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide [a]

	Annual mean NO_2 (µg/m³)		
	2010	2018 (Without Reductions) [a]	2018 (With Reductions) [b]
R1	**62.8**	**62.1**	**40.3**
R2	**57.1**	**55.9**	37.7
R3	**53.9**	**52.9**	35.4
R4	**52.4**	**51.3**	34.3
R5	**60.8**	**60.0**	38.4
R6	**59.9**	**59.0**	37.7
R7	**66.7**	**66.2**	**41.7**
R8	**69.5**	**69.1**	**43.4**
R9	**69.6**	**69.4**	**43.5**
Obj.	**40**		

a This assumes vehicle emission factors in 2018 remain the same as in 2010.
b This assumes vehicle emission factors reduce into the future at the current 'official' rates.

Table 9.13: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide, PM_{10} and $PM_{2.5}$ [a]

	PM_{10} (µg/m³)				$PM_{2.5}$ (µg/m³)	
	Annual mean		Days with PM_{10} > 50 µg/m³		Annual mean	
	2010	2018	2010	2018	2010	2018
R1	24.8	22.2	12	7	17.0	14.3
R2	25.4	23.0	13	8	17.3	14.8
R3	25.2	22.7	13	8	17.3	14.7
R4	24.6	22.2	11	7	16.9	14.4
R5	25.8	23.0	14	8	17.9	14.9
R6	25.6	22.8	14	8	17.7	14.8

[3] Data have been adjusted using the Volatile Correction Model to approximate reference equivalent values

[4] FDMS data is reference equivalent

	PM_{10} (µg/m³)				$PM_{2.5}$ (µg/m³)	
	Annual mean		Days with PM_{10} > 50 µg/m³		Annual mean	
	2010	2018	2010	2018	2010	2018
R7	26.6	23.4	17	9	18.5	15.1
R8	27.2	23.8	18	10	18.9	15.4
R9	27.2	23.9	18	10	18.9	15.4
Obj.	40		50		25	

[a] The numbers of days with PM_{10} concentrations greater than 50 µg/m³ has been estimated from the relationship with the annual mean concentration described in Defra (Ref 9-11).
b There are no objectives for $PM_{2.5}$ that apply during these years, however the European Union limit value of 25 µg/m³ is to be met by 2015.

9.2.12 The predicted annual mean concentrations of nitrogen dioxide all exceed the objective in 2010. Assuming that the road traffic emissions decline, the objective will be achieved at approximately half of the receptors by 2018. If there is no reduction in road traffic emissions beyond 2010, the objective will continue to be exceeded at all receptors, as predicted in 2010.

9.2.13 All of the predictions for PM_{10} and $PM_{2.5}$ are below the objectives in both 2010 and 2018.

9.2.14 These results are consistent with the conclusions of the London Borough Hammersmith and Fulham in the outcome of its air quality review and assessment work.

9.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Road Traffic Effects

Effects of Development on Existing Receptors

9.3.1 Predicted annual mean concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$, as well as days with PM_{10} greater than 50 µg/m³, are set out in Tables 9.14, 9.15 and 9.16 for both the "Without Scheme" and "With Scheme" scenarios, for existing receptors and Phase 1 residential receptors These tables also describe the effects at each receptor using the impact descriptors given in Table 9.5 and Table 9.6. For nitrogen dioxide, results are presented for two scenarios to reflect current uncertainty in Defra's future-year vehicle emission factors.

Table 9.14: Predicted Effects on Annual Mean Nitrogen Dioxide Concentrations in 2018 (µg/m³)

	Annual Mean Nitrogen Dioxide Concentrations (µg/m³)					
	Without emissions reductions			With emissions reductions		
	Without Scheme	With Scheme	Impact Descriptor	Without Scheme	With Scheme	Impact Descriptor
R1	**62.1**	**62.2**	Negligible	**40.3**	**40.4**	Negligible
R2	**55.9**	**55.9**	Negligible	37.7	37.7	Negligible
R3	**52.9**	**52.9**	Negligible	35.4	35.4	Negligible
R4	**51.3**	**51.3**	Negligible	34.3	34.4	Negligible
R5	**60.0**	**60.1**	Negligible	38.4	38.5	Negligible
R6	**59.0**	**59.1**	Negligible	37.7	37.9	Negligible
R7	**66.2**	**66.4**	Negligible	**41.7**	**41.8**	Negligible
R8	**69.1**	**69.3**	Negligible	**43.4**	**43.6**	Negligible
R9	**69.4**	**69.5**	Negligible	**43.5**	**43.7**	Negligible
Phase 1 – Ground Floor						
1	**45.5**	**45.8**	Negligible	31.0	31.2	Negligible
2	**46.1**	**46.2**	Negligible	31.2	31.3	Negligible
3	**40.5**	**40.6**	Negligible	28.8	28.9	Negligible
4	38.2	38.2	Negligible	27.8	27.8	Negligible
5	37.7	37.8	Negligible	27.6	27.6	Negligible
Obj.	40			40		

Table 9.15: Predicted PM_{10} Effects in 2018 (µg/m³)

	Annual mean PM_{10} (µg/m³)			Days with PM_{10} > 50 µg/m³		
	Without Scheme	With Scheme	Impact Descriptor	Without Scheme	With Scheme	Impact Descriptor
R1	22.2	22.3	Negligible	7	7	Negligible
R2	23.0	23.0	Negligible	8	8	Negligible
R3	22.7	22.7	Negligible	8	8	Negligible
R4	22.2	22.2	Negligible	7	7	Negligible
R5	23.0	23.0	Negligible	8	8	Negligible
R6	22.8	22.8	Negligible	8	8	Negligible
R7	23.4	23.4	Negligible	9	9	Negligible
R8	23.8	23.9	Negligible	10	10	Negligible
R9	23.9	23.9	Negligible	10	10	Negligible
Phase 1 – Ground Floor						
1	21.4	21.5	Negligible	5	5	Negligible
2	21.4	21.4	Negligible	5	5	Negligible
3	21.0	21.0	Negligible	5	5	Negligible
4	20.8	20.8	Negligible	4	4	Negligible
5	20.7	20.7	Negligible	4	4	Negligible
Obj.	40			50		

Table 9.16: Predicted $PM_{2.5}$ Effects in 2018 (µg/m³)

	Annual mean $PM_{2.5}$ (µg/m³)		
	Without Scheme	With Scheme	Impact Descriptor
R1	14.3	14.3	Negligible
R2	14.8	14.8	Negligible
R3	14.7	14.7	Negligible
R4	14.4	14.4	Negligible
R5	14.9	14.9	Negligible
R6	14.8	14.8	Negligible
R7	15.1	15.2	Negligible
R8	15.4	15.4	Negligible
R9	15.4	15.5	Negligible
Phase 1 – Ground Floor			
1	13.9	14.0	Negligible
2	13.9	13.9	Negligible
3	13.7	13.7	Negligible
4	13.6	13.6	Negligible
5	13.5	13.5	Negligible
Obj.	25		

9.3.2 In 2018, the annual mean nitrogen dioxide concentrations are above the objective at all receptors, without emissions reductions. The objective is also exceeded at four out of nine of the modelled receptors with emissions reductions. These receptors are all within the AQMA. The impacts are negligible at all receptors for both emissions scenarios.

9.3.3 In terms of PM_{10} and $PM_{2.5}$, no exceedences of the objectives are predicted and all of the impacts are negligible.

9.3.4 With respect to the receptors on Phase 1, the results have been presented for ground floor receptors only. Total concentrations and impact will be greater at the ground floor, and so will be lower still on all floors above.

9.3.5 Results are presented using the 2010 meteorological data. Predicted total annual mean nitrogen dioxide concentrations increase by up 7% and decrease by up to 4 % when using 2008 and 2009 meteorological data. This difference is not expected to affect the conclusions of this assessment, with respect to total predicted concentrations or effect.

Effects of Existing Sources on the Development

9.3.6 The modelled effects of the existing traffic sources on air quality conditions for residents occupying the new residential units in the proposed development in 2018 can be assessed from the model results for Proposed Receptors 1 to 6 (see Figure 9.2 and Tables 9.17, 9.18 and 9.19).

Table 9.17: Predicted Concentrations of Nitrogen Dioxide (NO_2) in 2018 – Without emission reductions

Receptor Number	Annual mean NO_2 ($\mu g/m^3$) – Without reductions [a]					
	GM*	1st	2nd	3rd	4th	5th
PR1	54.9	49.9	46.0	43.1	40.9	39.1
PR2	45.9	44.6	43.2	41.6	40.2	38.8
PR3	52.7	48.7	45.3	42.6	40.5	38.8
PR4	50.4	48.2	45.8	43.5	41.3	39.5
PR5	46.7	45.4	43.9	42.3	40.7	39.2
PR6	46.8	45.2	43.5	41.8	40.1	38.7
	40					

* Ground-floor mezzanine

[a] This assumes vehicle emission factors in 2018 will remain the same as in 2010.

Table 9.18: Predicted Concentrations of Nitrogen Dioxide (NO_2) in 2018 – With emission reductions

Receptor Number	Annual mean NO_2 ($\mu g/m^3$) – With reductions [a]					
	GM*	1st	2nd	3rd	4th	5th
PR1	35.8	33.3	31.5	30.1	29.1	28.3
PR2	31.3	30.7	30.1	29.4	28.7	28.1
PR3	34.6	32.7	31.1	29.8	28.9	28.2
PR4	33.6	32.5	31.4	30.3	29.3	28.5
PR5	31.8	31.2	30.5	29.7	29.0	28.3
PR6	31.8	31.0	30.2	29.4	28.7	28.1
	40					

* Ground-floor mezzanine

[a] This assumes vehicle emission factors reduce into the future at the current 'official' rates.

Table 9.19: Predicted Concentrations of PM_{10} and $PM_{2.5}$ in 2018

	PM_{10} ($\mu g/m^3$)		$PM_{2.5}$ ($\mu g/m^3$)
	Annual mean	Days with PM_{10} > 50 $\mu g/m^3$	Annual mean
Ground Floor			
PR1	22.6	7	14.7
PR2	21.6	6	14.1
PR3	22.3	7	14.5
PR4	22.2	7	14.4
PR5	21.8	6	14.2
PR6	21.7	6	14.1
Obj.	40	50	25

[a] The numbers of days with PM_{10} concentrations greater than 50 $\mu g/m^3$ have been estimated from the relationship with the annual mean concentration described in LAQM.TG (09) (Defra, 2009).

[b] There are no objectives for $PM_{2.5}$ that apply during these years, however the European Union limit value of 25 g/m³ is to be met by 2015.

9.3.7 In 2018, The predicted annual mean concentrations of nitrogen dioxide exceed the objective at all modelled receptors on Building F from the ground-floor mezzanine to the fourth floor, without emissions reductions. With emissions reductions the objective is predicted to be achieved. These high concentrations are not unexpected for the building's location adjacent to the busy Wood Lane and Westway.

9.3.8 The predicted annual mean concentrations of PM_{10} and $PM_{2.5}$ are below the objectives on the ground-floor mezzanine and will be lower still on all floors above. The numbers of days with PM_{10} concentrations above 50 $\mu g/m^3$ are also below the objective at all receptor locations.

Uncertainty in Road Traffic Emissions

9.3.9 There are many components that contribute to the uncertainty of modelling predictions. The model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as the model is required to simplify real-world conditions into a series of algorithms. An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see Technical Appendix 9-1). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of current year (2010) concentrations.

9.3.10 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections as to what will happen to traffic volumes, background pollutant concentrations, and vehicle emissions. Recently however, a disparity between the road transport emission projections and measured annual mean concentrations of nitrogen oxides and nitrogen dioxide has been identified by Defra (Ref-9-21). This applies across the UK, although the effect appears to be greatest in inner London; there is also considerable inter-site variation. Whilst the emission projections suggest that both annual mean nitrogen oxides and nitrogen dioxide concentrations should have fallen by around 15-25% over the past 6 to 8 years, at many monitoring sites levels have remained relatively stable, or have even shown a slight increase. This pattern is mirrored in the monitoring data assembled for this study, as set out in paragraph 9.2.6.

9.3.11 The precise reason for this disparity is not known, but is thought to be related to the actual on-road performance of diesel vehicles when compared to the calculations based on the Euro standards. It may therefore be expected that nitrogen oxides and nitrogen dioxide concentrations will not fall as quickly in future years as the current projections indicate. However, at this stage, there is no robust evidence upon which to carry out any revised predictions.

9.3.12 The implications for this assessment are that the absolute nitrogen dioxide concentrations predicted in 2018 may be higher than shown, when based on the official emissions reduction forecasts. To account for this uncertainty in the projections, a sensitivity test has been conducted assuming that the future (2018) road traffic emissions per vehicle are unchanged from 2010 values. The predictions within this sensitivity test are likely to be over-pessimistic, as new vehicles meeting more stringent standards will be on the road from 2013/14 (Ref 9.21).

9.3.13 It must also be borne in mind that the predictions in 2018 are based on worst-case assumptions regarding the increase in traffic flows, such that all committed developments and the Proposed Development, are assumed to be fully operational. This will have overestimated the effects, which will, in part, offset any potential underestimation as described above.

Demolition and Construction Effects

9.3.14 The site includes buildings which will require demolition which will require demolition prior to redevelopment. The greatest potential for construction effects is likely to be from the initial phase of demolition and site preparation, and from the passage of vehicles travelling across unpaved ground during periods of dry weather. There is also the potential for dust emissions during the handling of dusty materials and the cutting of stone/concrete. Dust may also be tracked out of the site onto the adjoining road network. Any effects would be of a localised and temporary nature.

9.3.15 The construction site is considered to be "High" risk based on the criteria outlined in Table 9.4. Consequently, the construction activities are judged to be "Major" in scale. Based upon the criteria defined in Table 9.2, and assuming that no mitigation measures are applied, significant dust-soiling effects could therefore occur within a distance up to 500 m from the source, whilst PM_{10} and vegetation effects could extend out to 100 m.

9.3.16 In addition, any new properties occupied prior to completion of construction would also be at risk of dust-soiling and increased PM_{10} concentrations, respectively.

9.3.17 Dust can be tracked out of construction sites onto neighbouring roads. This can then be raised as airborne dust by passing vehicles. With no mitigation measures in place, it is considered that there is a potential for significant dust to be found along off-site roads up to 1000 m from the site entrance, with dust-soiling effects potentially extending up to 200 m and elevated PM_{10} and vegetation effects potentially extending up to 50 m, either side of these roads. This represents a significant area surrounding the site, including commercial and residential properties as far north as Dalgarno Gardens, east to Bramley Road, west to Maurice Street and south to the BBC Television Centre. It also has the potential to effect the railway embankment habitat.

9.4 EVALUATION OF SIGNIFICANCE

Road Traffic Effects

9.4.1 The key air quality effects of the development on existing receptors are judged to be insignificant. This professional judgement is made in accordance with the methodology set out in paragraph 9.1.29, taking into account the factors set out in Table 9.20.

9.4.2 On the other hand, the key air quality effects of existing pollution sources on the new residential properties within the development are judged to be moderate adverse, without mitigation. This professional judgement is made in accordance with the methodology set out in paragraph 9.1.29, taking into account the factors set out in Table 9.20, and also taking into account the uncertainty over future projections of traffic-related nitrogen dioxide concentrations, which may not decline as rapidly as currently projected (see paragraph 9.3.9). The latter has been addressed by giving consideration to both sets of modelled results for nitrogen dioxide; those with and without reductions in traffic emissions. It is to be expected that concentrations will fall in the range between the two sets of results, although by 2018 the impacts are likely to be closer to the 'with reduction' results than the 'without reduction' results. In particular this judgement takes account of the assessment that concentrations within the new development are likely to be above the objective, certainly at the lower floors; they are predicted to lie between 36 µg/m^3 and 55 µg/m^3 on the ground-floor mezzanine.

Table 9.20: Factors Taken into Account in Determining the Overall Significance of the Scheme on Local Air Quality Without Mitigation

Factors	Outcome of Assessment
Number of people affected by increases in concentrations and a judgement on the overall balance.	The maximum predicted effect of the development on existing air quality is imperceptible in magnitude at all modelled, worst-case receptors. Within the new development the occupants of up to 35 flats (i.e. up to the 4th floor) would potentially be exposed to concentrations above the annual mean nitrogen dioxide objective.
The magnitude of the changes and the descriptions of the impacts at the receptors	The effects at the all modelled existing receptors are negligible. The effects at the new receptors would be moderate adverse, especially at the lower floors.
Whether or not an exceedence of an objective is predicted to arise in the study area where none existed before or an exceedence area is substantially increased.	No new areas of exceedence of the objectives are predicted in the surrounding area. The annual mean nitrogen dioxide objective is exceeded by a large amount in the without emissions reduction scenario, on all facades of Building F from ground-floor mezzanine to the fourth floor.
Uncertainty, including the extent to which worst-case assumptions have been made	By assuming that all the development traffic is on the roads in the year of opening the assessment will have exaggerated the early impacts. The inclusion of the two scenarios for nitrogen dioxide covers the uncertainty over vehicle emission factors. The actual concentrations are likely to lie between the two scenarios. The actual concentrations in 2018 are likely to be closer to the with emissions reduction scenario.
The extent to which an objective is exceeded at new residential receptors	The annual mean nitrogen dioxide objective is not exceeded at any receptors on Building F in the with emissions reductions scenario, but is exceeded by a large amount in the without emissions reduction scenario, on all facades of Building F from ground-floor mezzanine to the fourth floor.

Demolition and Construction Effects

9.4.3 The key demolition and construction effects are considered to be major adverse without mitigation. This is based on the site being categorised as "High" risk, as outlined in Table 9.4.

9.5 SCOPE FOR MITIGATION

Road Traffic Effects

9.5.1 With respect to the effect of the development on existing receptors, the assessment has demonstrated that the scheme would not cause any exceedences of the air quality objectives in areas where they are not currently exceeded and that the effect of the development is insignificant.

9.5.2 The assessment has demonstrated that the key effects of pollution sources on new residential properties within the development would be moderate adverse, as concentrations of nitrogen dioxide are expected to exceed the annual mean nitrogen dioxide objective in 2018.

9.5.3 Mitigation measures to reduce pollutant emissions from road traffic are principally being delivered by the introduction of more stringent emissions standards, largely via European legislation. The Mayor's Air Quality Strategy and the London LEZ also go a further step to improve emissions from vehicles, the main source of pollution.

9.5.4 It is recommended that the lower residential units are supplied with mechanical ventilation drawing cleaner air from the top of the building. The exact floors requiring ventilation can be determined nearer to the time, when progress on reducing emissions from motor vehicles is understood better.

Demolition and Construction Effects

9.5.5 Measures to mitigate dust emissions would be required during the construction phase of the development in order to reduce effects upon nearby residential properties.

9.5.6 The site has been identified as a 'High Risk' site based on the criteria set out in the GLA Best Practice Guidance (Ref 9-20). The following measures, which are based on the Best Practice Guidance, will be employed to reduce the effect of the site to a low risk site:

Site Planning

- Erect solid barriers to site boundary;
- No bonfires;
- Plan site layout – machinery and dust causing activities should be located away from sensitive receptors;
- All site personnel to be fully trained;
- Trained and responsible manager on site during work times to maintain logbook and carry out site inspections;
- Hard surface site haul routes;

- Put in real-time dust monitors across site.

Construction Traffic

- All vehicles to switch off engines – no idling vehicles;
- Effective vehicle cleaning and specific wheel-washing on leaving site and damping down of haul routes;
- All loads entering and leaving the site to be covered;
- No site runoff of water or mud;
- On-road vehicles to comply to set emission standards;
- All non road mobile machinery (NRMM) to use ultra low sulphur tax-exempt diesel (ULSD) where available and be fitted with appropriate exhaust after-treatment from the approved list;
- On-road vehicles to comply with the requirements of the Low Emission Zone (LEZ) as a minimum;
- Minimise movement of construction traffic around site;
- Hard surfacing and effective cleaning of haul routes and appropriate speed limits around site.

Demolition Works

- Use water as dust suppressant;
- Cutting equipment to use water as suppressant or suitable local extract ventilation;
- Use enclosed chutes and covered skips;
- Erect solid barriers / hoardings to demolition areas.

Site Activities

- Minimise dust generating activities;
- Use water as dust suppressant where applicable;
- Cover, seed or fence stockpiles to prevent wind whipping;
- Re-vegetate earthworks and exposed areas;
- If applicable, ensure concrete crusher or concrete batcher has a permit to operate

9.5.7 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

9.6 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

Road Traffic Effects

9.6.1 With respect to the effect of the development on existing receptors, the assessment has demonstrated that the scheme would not cause any exceedences of the air quality objectives in areas where they are not currently exceeded and that the effect of the development is insignificant.

9.6.2 With the mitigation suggested in Section 9.5, air supplied to the lower residential units of Building F, will have an annual mean nitrogen dioxide concentration less than 40 µg/m^3. Taking this into account, the residual effects are assessed as insignificant.

9.6.3 Demolition and Construction Effects

9.6.4 Assuming that the mitigation measures set out above are adhered to, the number of residential and commercial properties potentially affected by demolition and construction effects would be significantly reduced. There would through still be a risk that significant soiling effects could extend out to 100 m from the dust source, while PM_{10} and vegetation effects might extend out to 50 m and 25m, respectively. The railway embankment habitat is located within 25 m of the site boundary.

9.6.5 In addition, any new properties occupied prior to completion of construction would also be at risk of dust-soiling and increased PM_{10} concentrations, respectively.

9.6.6 As for every construction site, even with mitigation measures in place, there remains a risk that dust will be tracked out of the site onto neighbouring roads. This can then be raised as airborne dust by passing vehicles. With mitigation measures in place, it is considered that there is a potential for significant dust to be found along off-site roads up to 250 m from the site entrance, with dust-soiling effects potentially extending up to 50 m and elevated PM_{10} effects potentially extending up to 30 m, either side of these roads.

9.6.7 The areas potentially at risk from dust and PM_{10} effects, with mitigation measures in place, are presented in Figures 9-2 and 9-3.

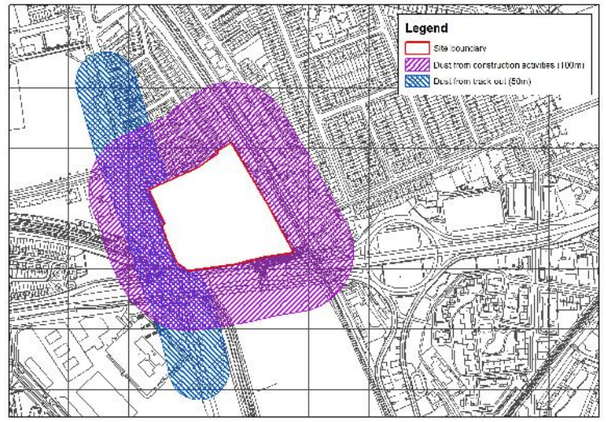


Figure 9.2: Combined Area of Potential Construction Dust Soiling Effects from both Construction and Trackout, with Mitigation in Place Contains Ordnance Survey data © Crown copyright and database right [2011]

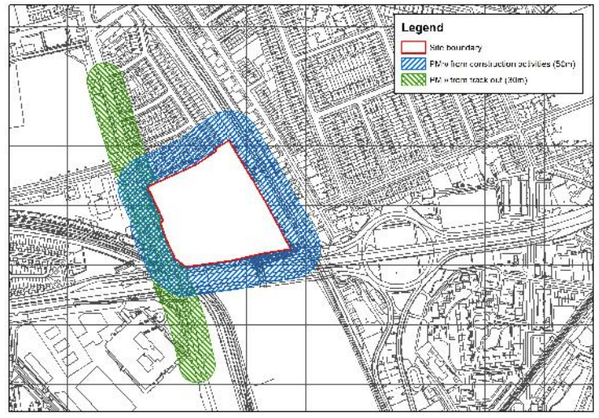


Figure 9.3: Combined Area of Potential Elevated PM_{10} effects from both Construction and Trackout, with Mitigation in Place Contains Ordnance Survey data © Crown copyright and database right [2011]

9.6.8 Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. Such conditions would only arise occasionally during the construction period, further limiting the potential for any effects.

9.6.9 Based on professional judgement, it is considered there is a risk that the residual demolition and constructions effect of the proposed development will be minor adverse.

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Ref 9.16: Environmental Protection UK (2010) Development Control: Planning for Air Quality, EPUK.

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10. Ground Conditions

10.1 INTRODUCTION

10.1.1 This Chapter describes the current ground conditions at the application site and considers the potential effects relating to the existing ground conditions and the proposed development. It is considered that ground conditions encompass the site's setting and history, the underlying strata and its potential contaminative characteristics.

10.1.2 In the production of this Chapter, the following reports were reviewed and relevant data from these reports have been relied upon for this assessment.

- § RPS Environmental Risk Assessment (REF10.1);
- § RPS Environmental Site Investigation (REF 10.2);
- § RPS Historic Ordnance Desk Study (REF 10.3);
- § Pell Frischmann Ground Conditions Desk Based Assessment (REF 10.4);
- § Geotechnics Ground Investigation Report, March 2010 (REF 10.5);
- § Pell Frischmann Land Contamination Assessment Report (REF10.6);
- § Geotechnics Ltd Factual Report, 2011 (REF 10.7)
- § Consultation with the Environmental Health Officer at London Borough of Hammersmith and Fulham reported in a letter dated 24 October 2011 (included as **Technical Appendix 10.1**)
- § Geotechnics Ground Investigation Report, August 2011 (**Technical Appendix 10.2**);

10.1.3 A number of data sources are presented within these reports which have been relied upon within this assessment. These include but are not limited to British Geological Survey data, Environment Agency data, environmental data searches produced by Landmark, geotechnical test results and geochemical analysis results.

Policy Framework

National Policy

10.1.4 The key policies and guidance relevant to this chapter are those relating to the investigation and assessment of land affected by contamination. The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 1990 (EPA). Part 2A was implemented to deal with the substantial legacy of land contamination but is not directed to assessing risks in relation to a future use of the land.

10.1.5 The control of development and land use in the future is the responsibility of the planning system. Therefore the guidance relating to planning system has been the main focus of the assessment of land contamination with regards to the Imperial West site. A fundamental principle of sustainable development is that the condition of land, its use and its development should be protected from potential hazards. Planning Policy Statement (PPS) 23 Planning and Pollution Control details the process by which Local Planning Authorities should take decisions on applications in relation to development on land affected by contamination. PPS 23 states that the assessment of land affected by contamination requires a risk assessment that identifies sources, pathways and receptors as part of a conceptual site model (CSM)

10.1.6 Another key piece of guidance is the Environment Agency's (EA) Model Procedures; Contaminated Land Report 11 (CLR11), which indicates that the CSM should identify those contaminants, pathways and receptors which are 'likely' to represent an 'unacceptable' risk either to human health or the surrounding environment.

10.1.7 The investigation of contaminated land is predominantly guided by Eurocode 7 (which has recently replaced BS5939 and BS10175).

Regional and Local Planning Policy.

10.1.8 The 2011 London Plan is the spatial development strategy for Greater London, which sets out an integrated social, economic and environmental framework for the development of London to 2031. A key aim of the London Plan is to bring brownfield sites, including those affected by land contamination back into new beneficial uses.

Local Planning Policy

10.1.9 This assessment takes into account the London Borough of Hammersmith and Fulham Policy EN20A: Control of Potentially Polluting Uses from the Unitary Development Plan. Further consideration of the planning policy framework in respect of ground conditions and contamination is provided in **Chapter 4 – Planning Policy**.

10.1.10 The London Borough of Hammersmith and Fulham have compiled a Contaminated Land Strategy to identify remaining sites in the Borough that may have contamination issues than can be remediated and made suitable for use. If the Council suspects that contamination may be present on a site a site investigation and remediation will be a condition of any planning permission. The Council is also responsible for keeping a register of contaminated land in the Borough.

Assessment Methodology and Significance Criteria

Assessment Methodology

10.1.11 The assessments undertaken and utilised for this Chapter include a generic risk assessment relating to soil contamination and human health, a generic groundwater risk assessment assessing the risk to controlled water, an assessment of ground gas and human health and a risk assessment relating to soil contamination and ecological receptors . The assessments are undertaken by firstly indentifying the relevant sources of contamination, pathways for mitigation and significant receptors. Following this a quantitative assessment of contamination is undertaken by comparing relevant geochemical data with appropriate assessment criteria. In the first instance, these criteria are generic.

10.1.12 The methodology for human health risk assessment adopted for this Chapter is consistent with the EA Model Procedures (CR11) CL:AIRE statistics guidance and other relevant guidance (including SR3, BS10175:2001 and PPS 23). The contaminated land industry is reaching the end of a transition phase. The Contaminated Land Exposure Assessment (CLEA) model, used to asses risks to human health, with associated documentation (CLE7 to CLR10) released in 2002 has been withdrawn. A new model, CLEA V1.06 has been released with associated guidance. For the assessment of soil geochemical data at the application site the CLEA V1.06 model has been used to derive generic assessment criteria (GAC) for a 'residential without homegrown produce' end use. These GAC have been statistically compared to geochemical data in accordance with the CL:AIRE statistic guidance using the ESI statistics calculator to assess whether a potentially significant risk exists.

10.1.13 The assessment methodology with respect to soil contamination and buildings/structures is undertaken in accordance with BRE Special Digest 1: Concrete in Aggressive Ground.

10.1.14 The assessment methodology for controlled waters adopted in this Chapter is consistent with CLR11 and the Environment Agency's Remedial Target Methodology: Hydrogeological Risk Assessment for Land Contamination. In order to assess whether a potentially significant risk exists to controlled waters, groundwater geochemical data has been directly compared to generic assessment criteria. The generic assessment criteria used for the application site are Environmental Quality Standards (EQS) as a priority with UK Drinking Water Standards (DWS) and World Health Organisation (WHO) standards where EQS are not available.

10.1.15 The assessment methodology for ground gas has involved undertaking a number of gas monitoring visits. The maximum concentrations are used to calculate a Characteristic Situation as defined in CIRIA C665: Assessing risks posed by Hazardous Ground Gases to Buildings.

10.1.16 The assessment methodology with regard to soil contamination and ecological receptors is guided by the EA's Ecological Risk Assessment Framework, which sets out a tiered risk assessment approach similar to that followed for assessment of risks to human health

Significance Criteria

10.1.17 The effect of the proposed development on ground conditions has been assessed with reference to the baseline environment..

10.1.18 It is recognised that environmental effects can operate over a range of geographical areas. However, the geographical scale should be taken into account in the scale/magnitude of the effect, as well as the receptor.

10.1.19 Receptors such as workers and future site users are generally considered to have Local importance; whilst Controlled Waters have a regional importance given their use in potable water supply. However, it is rare for contamination to be experienced on a wider scale and effects on receptors of more than local importance are generally only due to developments which could have significant potential for pollution (e.g. Schedule 1 facilities).

10.1.20 The interaction of the scale and the importance produces the effect significance. Table 10.1 shows the significance of effects upon receptors which have Local importance:

Table 10.1: Effect Significance Matrix

Resource Value (Importance)	Scale of Effect Upon Receptor			
	Substantial	Moderate	Slight	Negligible
Local	Moderate-Minor	Minor	Minor	Neutral

10.1.21 The significance of an effect is generally scaled as follows:

- Major beneficial (positive) effect;
- Moderate beneficial (positive) effect;
- Minor beneficial (positive) effect;
- Neutral effect;
- Minor adverse (negative) effect;
- Moderate adverse (negative) effect; &
- Major adverse (negative) effect.

10.1.22 The scale of effects upon local receptors is nearly always deemed to be 'minor' whenever the resource is valued as being of local importance, as shown in Table 10.1. This could be unrealistic on some occasions because effects occur on a continuous scale. The above matrix simplifies reality and places effects in a discontinuous scale. Therefore, significance scores should always be qualified. For example, it is noted that in certain cases an effect of minor significance, whether adverse or beneficial, can be very important for local residents, and deserves attention in the assessment, i.e. through mitigation. In general an exceedance of the relevant generic assessment criteria detailed in Report Ref 10.6 will be considered to have a 'moderate adverse effect'. The prediction confidence is scaled in accordance with Table 10.2 below.

Table 10.2: Impact Prediction Confidence

Confidence Level	Description
High	The predicted effect is either certain, i.e. a direct effect, or believed to be very likely to occur, based on reliable information or previous experience.
Low	The predicted effect and its levels are best estimates, generally derived from first principles of relevant theory and the experience of the assessor. More information may be needed to improve the level of confidence.

10.2 EXISTING BASELINE CONDITIONS

10.2.1 The baseline conditions have been established from the desk study information and site investigations undertaken to date (Ref 10-1 to Ref 10-7). Consultation has also been undertaken with the Environmental Quality Manager at London Borough of Hammersmith and Fulham, which has been reported in a letter dated 24 October 2011 (included as Appendix 10-1). Relevant details of historic land uses identified by the Council have been recorded in Section 10.4.3.

10.2.2 The following presents a summary of the baseline conditions.

Historical Information

10.2.3 Historical maps indicate that the site has been occupied by a number of potentially contaminative land uses. Those specifically located within the application site include excavations of a brick fields, railway lines, engineering works, a fire fighting apparatus factory and tanks, a perfumery, a metal casting works and electricity sub-station. The historical maps also indicate that there has been a history of industrial land uses in the surrounding area. (Ref 10-1, Appendix 10-2).

10.2.4 The site is considered to have a low risk with regard to historic ordnance contamination. (Ref 10-3).

Geology, hydrogeology and hydrology

10.2.5 The geological map indicates that the site is underlain by the Langley Silt, described as sandy clay and silt, which is in turn underlain by the London Clay Formation. Due to the nature of the historic development at the site and information gathered from site investigations, it is anticipated that a significant thickness of Made Ground will be encountered overlying the Langley Silt.

10.2.6 The strata underlying the site are classified as a Non Aquifer (Negligibly Permeable), which would be expected of the London Clay Formation. Ten water abstraction licenses for groundwater have been recorded for Hammersmith Hospital with water abstracted for 'general use' located approximately 702m west north west of the site.

10.2.7 The nearest surface water course to the site is a shallow unnamed drain adjacent to the north eastern corner of the site, between the site and the railway line located at the toe of the railway embankment. The Grand Union Canal – Paddington Branch is shown approximately 1km north of the site. (Ref 10.1).

Proven Strata

10.2.8 Two phases of intrusive site investigation (Ref 10.2, and Ref 10.5) have previously been undertaken for the site. An additional investigation was undertaken by Geotechnics in 2011 (Ref 10.7) following demolition of the site buildings which included the excavation of nine trial pits and subsequent soil sampling. These three phases of investigation generally encountered a sequence of Made Ground over superficial clay deposits, believed to be the Langley Silts, over the London Clay Formation. In the south of the site a layer of sand and gravel, believed to be the Lynch Hill Gravel was also encountered overlying the London Clay Formation (beneath the Langley Silts).

10.2.9 A generalised summary of the proven strata encountered during the Pell Frischmann site investigation undertaken in January 2010 (Ref 10.5 and Ref 10.6) and further site investigations undertaken by Geotechnics in 2011 on cleared areas of the application site (Ref 10.7) is provided below.

Table 10.3: Summary of proven ground conditions

Stratum	Typical description	Depth to base m (avg.)	Thickness m (avg.)
Made Ground and possible Made Ground	Variable; varying proportions of sand gravel and clay. Comprising flint, quartz, quartzite, limestone, siltstone, brick, concrete, clinker, ash, plastic, ceramic, glass and coal. Hardstanding in the form of concrete and tarmac was also encountered in some holes.	0.5 – 4 (1.6) Not Proven in TP3 & WS2	0.5 – 4 (1.6)
Langley Silts (previously called Brickearth)	Firm to stiff gravelly/sandy brown clay. Gravel comprises flint and limestone. Blue grey veins, root tracks, black organic inclusions, gypsum and black rootlets also recorded in some holes.	2 – 7.5 (4.6) Not Proven in TP5, TP6, WS3, WS4 & WS5	1.1 – 5 (2.88)
Lynch Hill Gravel	Brown/grey gravelly sand or sandy gravel with varying proportions of silt. Gravel comprises flint and quartzite. (Referred to as River Terrace Gravels in Ref 17-6).	4 – 10.5 (7.7) Not Proven in TP4	0.5 – 3.5 (2.2)

Stratum	Typical description	Depth to base m (avg.)	Thickness m (avg.)
London Clay	Stiff to very stiff fissured/laminated greyish brown/brownish grey clay. Occasional coarse sand to medium gravel sized gypsum recorded in some holes.	Not proven	0.1 – 24.5 (8.4)

Groundwater Conditions

10.2.10 The following ground water levels were recorded during monitoring visits between 28 January 2010 and 24 February 2010 (Ref 10.2):

Table 10.4: Summary of recorded groundwater conditions

Borehole	Depth to water (m bgl)		Water Level (m aOD)	
	Minimum	Maximum	Minimum	Maximum
BH1	2.76	4.38	6.32	4.7
BH1 (RPS)	4.58	4.94	-	-
BH4	0.78	1.38	7.99	7.61
BH5	4.15	4.62	4.62	4.15
BH6B	3.92	4.51	4.72	4.13
BH7	4.34	4.68	4.61	4.27
BH8	2.64	3.1	4.46	4

10.2.11 The groundwater monitoring results indicate that shallower groundwater was encountered in the north of the site compared to the south. In the north of the site the groundwater appears to be located within the base of the Made Ground and into the top of the Langley Silt Formation. Whereas the groundwater in the south of the site appears to be located towards the base of the Langley Silt Formation above the Lynch Hill Gravel. The groundwater levels indicate that the groundwater is flowing from the north east to the south west of the site.

Land Quality

10.2.12 The most recent intrusive site investigations were undertaken in January 2010 (Ref 10-5 to Ref 10-6) and a further phase between December 2010 and July 2011 (Appendix 10.2) which identified the following potential contaminants of concern within the Made Ground (through statistical analysis), which without mitigation could pose a potentially significant risk to the human health of future sites users:

- Chromium (total);
- Chromium VI;
- Mercury;
- Copper (hotspot)
- Lead (hotspot)
- Naphthalene;
- Benzo(a)anthracene;
- Benzo(b)fluoranthene;
- Benzo(a)pyrene; &
- Dibenzo(a)anthracene.

10.2.13 It should be noted that contaminants were not identified within the natural strata (i.e. the Langley Silts, Lynch Hill Gravel or London Clay) during the investigation and assessment.

10.2.14 Groundwater sampling and analysis was undertaken as part of the January 2010 investigation. This analysis identified the following elevated concentrations of contaminants from a total of five groundwater samples:

- Barium (2 samples)
- Boron (1 sample)
- Selenium (1 sample)
- Total Petroleum Hydrocarbons (2 samples)
- Benzo(a)pyrene (4 samples)
- Polycyclic Aromatic Hydrocarbons – Sum of 4 (3 samples)

10.2.15 It should be noted that the assessment of hydrocarbons with respect to groundwater relies upon Drinking Water Standards, which are considered to be conservative. In addition, the Environment Agency (letter ref: NE/2011/113329/01-L01, dated 31 October 2011) have indicated that:

"the controlled waters at this site are of low environmental sensitivity, therefore we will not be providing detailed site-specific advice or comments with regards to land contamination issues for this site"

10.2.16 Gas monitoring was undertaken at seven boreholes across the site on five separate visits between January and February 2010. The monitoring results indicated that detectable concentrations of methane were not recorded in any of the boreholes and the maximum carbon dioxide concentration recorded as 1.7%. Reasonably low flow readings were recorded with a maximum flow rate of 2.3 litres per hour. Therefore the site can be classified as being Characteristic Situation 1 in accordance with CIRIA report C665. Based on this characteristic situation, special gas protection measures are not required.

10.2.17 Ecological risk assessment has not been undertaken because ecological receptors (as defined by the ERA guidance) have not been identified within the site. Ecological Assessments of the site have been undertaken and are presented within **Chapter 15 – Ecology/Biodiversity.** This Chapter confirmed that there are no statutory designated sites of ecological interest in the immediate area of the site that could be directly affected by redevelopment activity on it.

10.2.18 The site investigations undertaken to date have been limited to accessible areas of the site and have been constrained by the remaining buildings and infrastructure (buildings B&F and the sports centre). Although considered unlikely, further sources of potential contamination may therefore exist on-site that have not been identified due to these limitations and constraints. In particular, it is recommended that further investigation be undertaken in the vicinity of the above ground storage tank and boiler house adjacent to the eastern site boundary. In addition, once the buildings have been demolished and the underlying strata exposed further investigation within the foot print of buildings B&F and the sports centre.

10.3 IDENTIFICATION & EVALUATION OF KEY EFFECTS

Potential Effects of the land upon the Development

10.3.1 The initial conceptual model developed during the desk study assessment (Ref 10-4) identified potential risks to both human health and buildings/structures relating to potential contaminants on-site and the potential migration and accumulation of vapours.

10.3.2 The subsequent site investigations and risk assessments (undertaken in accordance with current guidance) identified potential contaminants as detailed in Sections 10.4.12 to 10.4.16.

10.3.3 Therefore, if left unmitigated, it is considered that soil contaminants identified could pose a potentially significant risk to the future site users of the development. Without mitigation this would amount to a moderate adverse effect as concentrations are recorded above the relevant generic assessment criteria. Given the continued presence of buildings on site and the consequent limitations on intrusive site investigations in those areas it would be prudent to commission post demolition investigations to confirm the understanding of site conditions, anticipated contamination and if necessary adjustments to remediation and mitigation measures to address previously unidentified contamination.

10.3.4 The potential risk to and effect upon the proposed buildings and structures is assessed in accordance with the BRE guidance, which assess risks to concrete from aggressive soils. The chemical results detailed in Ref 10-6 indicate that there is a potential risk to buried concrete from the ground conditions encountered on-site. The table below summarises the Design Sulphate Class and Aggressive Chemical Environment for Concrete (ACEC) Class for each of the proven strata.

Table 10.5: Concrete classification per strata

Proven Strata	Design Sulphate Class	ACEC Class
Made Ground	DS-2	AC-2
Langley Silt	DS-1	AC-2
Lynch Hill Gravel	DS-1	AC-2
London Clay	DS-3	AC-3

10.3.5 It should also be noted that the ground conditions and identified contamination could pose a risk to new potable water supplies for the proposed development.

10.3.6 With respect to the identified groundwater contamination it is considered unlikely that this would have a significantadverse effect upon local watercourses (the nearest is an unnamed drain adjacent to the north east corner of the site) due to the direction of groundwater flow and the site's setting. It should also be noted that the underlying London Clay is a Non Aquifer. The effect is therefore assessed to be a potential minor adverse effect.

10.3.7 The assessment identified the application site to be classified as 'Characteristic Situation 1' with regard to ground gas. Therefore it is considered that there should be no adverse effect with regard to ground gas and the human health of future site users or ground gas and buildings/structures. The effect is therefore assessed to be neutral.

10.3.8 It should also be noted that, without mitigation, the ground conditions and identified soil and groundwater contaminants could also pose a risk to the human health of construction workers during development. The effect is assessed to be minor adverse.

Potential Effects of the Development upon the land

10.3.9 The assessment of potential effects that the development may have upon the land in respect of the near surface soils and underlying strata via erosion, disaggregation, compaction and pollution. The assessment primarily considers impacts during construction but also occupation of the proposed development.

10.3.10 During the construction phase it is envisaged that the main effect will be the removal and redistribution of in-situ soils and the underlying strata in order to level the balance of the site to provide an appropriate building platform. Mass movement of soil has an effect on vegetation and can result in increased soil erosion through wind and water. Stockpiles of soil and any unvegetated temporary or permanent slopes are particularly prone to erosion. Soil erosion can result in nutrient loss and the loss of fine soil particles, which can impact upon local watercourses. In addition, increased soil erosion can also result in an increase of airborne dust.

10.3.11 Disaggregation generally occurs during the excavation phases of construction resulting in the mixing of soils and different strata. This can alter the physical and chemical properties of the soil, which can be problematic when trying to re-establish vegetation. It could also result in contaminants, previously identified in the Made Ground only, being introduced to other strata previously identified as uncontaminated.

10.3.12 Large construction projects, especially where earthworks are required to level the site, can result in the compaction soils as a consequence of heavy plant movements. This can result in reducing the ability of plants to form roots and reducing the capacity for water infiltration. Compaction can result in the hardening of the soil surface, which can lead to increased runoff, erosion and surface water ponding.

10.3.13 During construction, construction plant and materials are introduced to the site, which can if poorly controlled and in poor condition result in soil contamination via the uncontrolled release of solid or liquid compounds (e.g. hazardous construction materials, wastes, fuels etc).

10.3.14 It is considered that the proposed buildings, hardstanding and site drainage will minimise the amount of infiltration able to penetrate the ground. This will have the positive impact of limiting the amount of leaching of soil contaminants that could occur and subsequently enter the groundwater.

10.3.15 It is proposed that the application site buildings will be founded on cast insitu piles, placed in the London Clay. As such it is not considered likely that preferential pathways for contamination will be introduced. A summary of the significance of effects is presented in the table below.

Table 10.6: Summary of the significance of effects

Environmental Effect	Potential receptor	Importance of Receptor	Scale/ magnitude of Effect	Significance of Environmental Effect
Soil contamination	Human health – future site users	Local	Substantial	Moderate Adverse
	Buildings and structures	Local	Slight	Minor adverse
Groundwater contamination	Local water course	Local	Moderate/ slight	Minor adverse
Soil and groundwater contamination	Construction workers	Local	slight	Minor adverse
Ground gas	Human health – future users of the site	Local	Slight/ negligible	Neutral

10.4 SCOPE FOR MITIGATION

10.4.1 Mitigation measures have been proposed in order to avoid, offset or reduce the adverse effects of the proposed development.

Mitigation of the effects of the land upon the development

10.4.2 The investigations undertaken to date have identified soil contamination within the Made Ground that could pose a potentially significant risk to the human health of the future users of the site. Therefore mitigation is required to address this.

10.4.3 It is considered that the most appropriate method of mitigating the risk from soil contamination is by breaking the pollutant linkage between the future site users and the contamination. It is considered that the proposed buildings and hardstanding will act as a sufficient pathway break to mitigate the effect. However in landscaped areas it is recommended to use either 300mm of clean cover soil or a reduced thickness in conjunction with a geotextile membrane to mitigate the effect.

10.4.4 The Contractor will provide documentary evidence that each batch of materials delivered to site complies with the requirements of the Specification, either by way of manufacturers' test certificates or laboratory test results and that the material will be suitable for use as the surface in landscape areas.

10.4.5 There is potential that previously unidentified contamination may be present at the site due to the presence of two remaining buildings limiting the extent of investigation in those areas. A post demolition site investigation is recommended as a prudent approach to address this uncertainty. The scope and extent of this additional investigation will be agreed with the LBHF Environmental Quality Manager.

10.4.6 In order to mitigate the identified risks to the proposed buildings/structures from the identified soil contamination the appropriate Design Sulphate class and ACEC class should be used by the design engineers. To mitigate the risks to potable water supplies it is anticipated that protective pipework may be required.

10.4.7 The identified risk to construction workers from soil and groundwater contamination, both during development and during future maintenance work (particularly involving excavation) requires mitigation. In order to mitigate the risk, construction workers should be made aware of the contaminants to inform their method statements and risk assessments. In addition, appropriate personal protective equipment (PPE) should be used.

Mitigation of the effects of the development upon the land

10.4.8 In order to mitigate the identified effects of the development upon the land it is proposed that the following measures would be employed.

- § best practice procedures for the storage and handling of all hazardous materials, construction wastes and fuels should be used;
- § spill response kits should be available on-site;
- § large areas of bare soil should not be left exposed to wind erosion;
- § soil is excavated in order of horizons and Made Ground should be kept separately;
- § the damping down during heavy plant movement during dry weather to reduce airborne dust; &

§ any fuel storage on-site during will be bunded.

10.5 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

10.5.1 The following table provides a summary of the residual environmental effects. The assessment of effects, as informed by site investigations, assumes conventional and established mitigation measures are implemented – the detail of which will be determined in accordance with the local planning authority in conjunction with a prudent programme of supplementary investigation following demolition of the remaining buildings on site.

Table 10.7: Residual Environmental Effects

Environmental Effect	Sensitivity	Magnitude	Nature	Duration	Mitigation
Risk to end users	Local	Substantial	Adverse	Long Term	Break pathway through hardstanding and imported soils in landscaping
Risk to workers	Local	Slight	Adverse	Short Term	Use of PPE
Gas risk to End users	Local	Negligible		Long Term	Not required
Risk to Controlled Waters	Regional	Negligible		Long Term	Not required
Risk to Buildings	Local	Slight	Adverse	Long Term	Use of resistant concrete

10.6 MONITORING

10.6.1 It is not anticipated that monitoring will be required following completion of the development. However, it is recommended that during demolition and construction, environmental monitoring (eg. dust, noise, ecology) be undertaken as detailed in the Construction Management Section of this Environmental Statement.

REFERENCES

Ref 10.1: 'Phase 1 – Environmental Risk Assessment for Helical Bar. HLL1313/01R.' RPS, August 2006.

Ref 10.2: 'Phase 2 – Environmental Site Investigation Report for Helical Bar. HLL1685/009R.' RPS, March 2006.

Ref 10.3: 'Desk study for potential Historic Ordnance Contamination. JER3543R.' RPS, January 2007.

Ref 10.4: 'Woodlands, Wood Lane. Ground Conditions Desk Based Assessment. R12359G001/B.' Pell Frischmann, October 2009.

Ref 10.5: 'Ground Investigation at Woodlands, 80 Wood Lane, London. Factual and Interpretative Report. PC094098.' Geotechnics Ltd, March 2010.

Ref 10.6: 'Woodlands, Wood Lane. Land Contamination Assessment. R12359G002/B.' Pell Frischmann, March 2010.

Ref 10.7: Geotechnics Ltd Factual Report, 2011.

Appendices

App 10.1 Consultation with the Environmental Health Officer at London Borough of Hammersmith and Fulham reported in a letter dated 4 August 2011 (also included as Appendix 10.1).

App 10.2 Geotechnics Ltd Ground Investigation Report August 2011

11. Flood Risk

11.1 INTRODUCTION

11.1.1 This chapter presents the findings of a Flood Risk Assessment (FRA) undertaken for the site and considers the potential impacts relating to the development. It is based on information included in **Technical Appendix 11.1 Flood Risk Assessment**, A12359Y201-B which has been developed for submission to the Environment Agency (EA) in their role as statutory consultees in relation to flooding.

Assessment Methodology and Significance Criteria

Assessment Methodology

11.1.2 The environmental impacts in relation to flood risk have been considered in accordance with the legislation set out in PPS25, Development and Flood Risk. This designates that sites located in Flood Zones 2 or 3 are at a significant risk of flooding. The proposed development is located in Flood Zone 1 and therefore is at low risk of flooding from tidal or fluvial sources.

11.1.3 A second assessment is considered in relation to the local and regional flood risk associated with the site's surface water runoff regime. Outline agreement has been reached with Thames Water over acceptable discharge rates to limit flood risk. This is considered to be an appropriate indicator that the site will have a positive impact on the flood regime within its local area.

Significance Criteria

11.1.4 The impact of the development on the regional flood regime is considered to be minimal and has not been assessed further. The impact of the development on the local surface water flood regime is assessed as identified below. The proposed mitigation in the form of Sustainable Drainage Systems (SuDS) improves upon the existing drainage systems and will lead to a significant reduction in flood risk downstream of the development. Pressure on the downstream sewer will be reduced as peak flows from the site shall be maintained at rates agreed with Thames Water to ensure a suitable discharge criteria is met.

11.2 EXISTING BASELINE CONDITIONS

Site Description

11.2.1 The site is located off Wood Lane, in the London Borough of Hammersmith and Fulham and is approximately 2.31 hectares in size. It is bound to the north by Shinfield Street and residential properties; to the east by an over ground railway line; to the south by the elevated A40 Westway and to the west by Wood Lane. Levels on site range from approximately 8-9 m AOD, with a localised low point of approximately 7 m AOD, and it is centred upon NGR TQ 232 811.

Flood Risk, Geology and Groundwater

11.2.2 The site is located within Flood Zone 1, an area at low risk of flooding. This is identified as not at risk from fluvial or tidal flooding during the 1 in 1000 year event. In terms of flood risk, all types of development are considered suitable within Flood Zone 1. Under BREEAM Multi-Residential, credits are awarded for developments located within Flood Zone 1.

11.2.3 The nearest above ground watercourse to the site is an unnamed drain located at the base of the railway embankment adjacent to the north eastern corner of the site, between the site and the railway line. The Grand Union Canal – Paddington Branch is identified approximately 1 km north of the site.

11.2.4 The geological map indicates that the site is underlain by the Langley Silt, described as sandy clay and silt and previously called Brickearth, which is in turn underlain by the London Clay Formation. Due to the nature of the historic development at the site, it is anticipated that a significant thickness of Made Ground will be encountered overlying the London Clay.

11.2.5 BGS borehole records indicate that the area surrounding the site is underlain by a sequence of Made Ground, Clay/Silt (possibly Langley Silt), Sand/Gravel (possibly Lynch Hill Gravel) and the London Clay Formation.

11.2.6 The strata underlying the site are hydrogeologically classified as a Non Aquifer (Negligibly Permeable), which would be expected of the London Clay Formation. Ten water abstraction licenses for groundwater have been recorded for Hammersmith Hospital with water abstracted for 'general use' located approximately 702 m west north west of the site.

11.2.7 Detailed ground investigations have been undertaken on site as identified in **Technical Appendix 10.2** Land Contamination Report. Groundwater levels are identified as ranging between 2.64 - 4.68 m bgl.

11.2.8 The above data indicates that above ground flooding from groundwater is unlikely to occur on site.

Annual Rainfall

11.2.9 Rainfall data for the site has been taken from the Wallingford Maps of Annual Average Rainfall (SAAR). These maps identify the average annual rainfall based on data from 1941 to 1970. The data can be used to assess the site's storm runoff and is termed the SAAR value. The SAAR value for the site is 600 mm/yr.

Existing Impermeable Areas

11.2.10 The site's existing impermeable areas are assessed as being those present prior to development commencing. A number of buildings were demolished as part of the Wood Lane Studios development and the site's existing impermeable areas prior to the demolitiont are demonstrated in the photograph below (Figure 11.1). It is considered that no more than 5% of the site prior to development commencing was made up of permeable surfaces (planting and grass). Therefore, 95% of the site is identified as impermeable.

Figure 11.1: Aerial photo of site undertaken prior to commencement of the Wood Lane Studios development

11.2.11 Figure 11.2 below presents the site layout prior to Imperial West development commencing.

Figure 11.2: Photo of site undertaken prior to commencement of the Imperial West development

Policy Framework

11.2.12 The FRA has been developed in accordance with the requirements set out in PPS25 Development and Flood Risk. Further to this, specific regional guidance has been reviewed from the Royal Borough of Kensington and Chelsea and London Borough of Hammersmith and Fulham Strategic Flood Risk Assessment (SFRA).

Review of the Strategic Flood Risk Assessment – Identification of Appropriate Design Standards for Surface Water Runoff.

11.2.13 The site is located within the area covered by the Royal Borough of Kensington and Chelsea and London Borough of Hammersmith and Fulham Strategic Flood Risk Assessment (SFRA). This document pulls together information from other available sources. A review of the relevant information from this report, including latest updates, is undertaken below.

Sustainable Design and Construction: The London Plan (July 2011)

11.2.14 Surface water runoff rates and volumes from the site must be managed in accordance with the London Plan (July 2011), which sets higher standards than PPS25 for the control of surface water run-off.

11.2.15 Policy 5.13 Sustainable drainage (page 155) of the London Plan states that: Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield runoff rates and ensure that surface water runoff is managed as close to its source as possible in line with the following drainage hierarchy:

1. Store rainwater for later use
2. Use infiltration techniques, such as porous surfaces in non-clay areas
3. Attenuate rainwater in ponds or open water features for gradual release to a watercourse
4. Attenuate rainwater by storing in tanks or sealed water features for gradual release
5. Discharge rainwater direct to a watercourse
6. Discharge rainwater to a surface water sewer/drain
7. Discharge rainwater to the combined sewer.

11.2.16 Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation.

The London Plan Supplementary Planning Guidance

11.2.17 The Supplementary Planning Guidance (SPG) on Sustainable Design and Construction published in May 2006 provides further detail on the London Plan policies. Section 2.4.4 Water Pollution and Flooding (page 47) outlines the following essential standards:

- Use of Sustainable Drainage Systems measures, wherever practical;
- Achieve 50% attenuation of the undeveloped site's surface water runoff at peak times.

11.2.18 However, the SPG identifies that the Mayor's preferred standard is to achieve 100% attenuation of the undeveloped site's surface water runoff at peak times.

Summary of SFRA Information

11.2.19 The above guidance has been considered in the design of the site. The development has been designed to maximise green space and natural attenuation. Tanked storage will be utilised on site as required to ensure surface water runoff rates are controlled in accordance with the EA's requirements.

11.2.20 Future detailed design will be undertaken in line with the requirements of The London Plan 2011.

11.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Fluvial / Tidal Flooding

11.3.1 The site is identified as at low risk from fluvial or tidal flooding. The development will not impact upon any fluvial regimes and no mitigation is proposed in respect of this item.

Surface Water Flooding

11.3.2 The existing site is identified as made up of approximately 95% impermeable surfaces. Consequently, the existing site has a high peak surface water discharge rate during storm events with an increased probability of surface water flooding.

11.3.3 PPS25 encourages the use of SuDS to ensure the proposed development continues to discharge surface water at or below the existing runoff rate. SuDS have been incorporated within the development to ensure the proposed peak runoff rates from the development do not increase the risk of flooding on site or elsewhere.

11.3.4 The site will have a positive impact on the downstream flood regimes as a reduced discharge to the combined sewer will be achieved. This will reduce the probability of CSO spills in the downstream sewer network. Consequently, there will be a positive impact on the downstream watercourses as pollution events will be reduced in number and quantity.

11.3.5 SuDS devices will lead to a reduction of untreated surface water leaving the site. Again the proposals will result in a positive environmental impact as the mitigation incorporated into the design of the development will result in water quality improvements as surface water is treated by green roof areas and attenuated prior to discharge from the site.

11.3.6 Pollution of groundwater may occur during the construction phase as heavy machinery will potentially mobilise contaminants and allow them to infiltrate into the groundwater. Methods will be implemented to ensure pollution of groundwater does not occur.

11.3.7 No negative environmental impacts are anticipated in relation to flooding and surface water runoff once the development has been constructed.

Climate Change Impacts

11.3.8 The potential impact of climate change is expected to cause an increase in the magnitude and frequency of extreme weather events. The proposed development should seek to mimic the existing drainage situation through the use of SuDS where practicable and an allowance for climate change will be included. No negative environmental impacts are anticipated in relation to increased rainfall intensity associated with climate change.

Proposed Impermeable Areas

11.3.9 The proposed development covers an area of approximately 2.31 hectares. There will be a significant reduction in impermeable surfaces on site as there will be new green spaces incorporated into the development. This will provide environmental benefit as it will reduce the overall site runoff providing a reduction in flows to the downstream sewer system.

11.3.10 Biodiversity on site will be increased as a result of the green roofs proposed as part of the SuDS proposals. The result will be improved habitats for flora and fauna in this urban location.

11.4 SCOPE FOR MITIGATION

11.4.1 As identified above, the development will lead to a reduction in impermeable surfaces on site thanks to designs of SuDS being integrated into the proposals. These are identified as mitigation measures to further reduce the probability of flooding downstream of the site. An agreement has been reached with Thames Water to ensure the proposed combined peak discharge rate from the site does not exceed the current combined peak site discharge estimated as 268 l/s. The following proposals consider available mitigation measures to provide positive mitigation by controlling surface water discharge rates;

Sustainable Drainage Systems

SuDS provide mitigation against surface water flooding as they capture, store and release surface water at new developments in a sustainable manner and are designed to replicate predevelopment discharge rates and volumes as far as practicable.

Surface Water Infiltration

11.4.2 The site is underlain by Made Ground, silts, gravels and then impermeable London Clay. To the south of the site, the gravel layer is thick enough for

surface water discharge to be viable. However, the gravel and silt layers are located below the water table and are therefore not suitable for soakaways.

11.4.3 The Made Ground is identified as having low levels of contamination throughout much of the site. Infiltration systems above the water table are not considered to be appropriate as they would potentially provide a pathway to mobilise the contaminants.

11.4.4 In summary, surface water disposal using soakaways is not likely to be an appropriate mitigation measure due to the risk of mobilising contaminated materials. This technique is therefore not proposed to be implemented.

Green Roofs

11.4.5 Green roofs are proposed throughout the proposed development. At this stage it has been estimated that these will cover approximately 0.38 hectares of the site.

11.4.6 The green roofs provide many benefits to the development as they act as insulation, intercept and store rainwater whilst providing increased biodiversity. Rainwater storage will reduce the peak runoff rate from the site and transpiration will reduce the total volume of surface water discharge from these areas.

Storage Tanks / Oversize Pipes

11.4.7 Where additional storage is required for the development, it is proposed to incorporate storage devices in the form of below ground tanks with hydrobrake flow controls.

EA Requirements

11.4.8 The EA requires the peak surface water discharge rate from the site to be limited to 50% of the existing peak surface water discharge rate (256 l/s). The letter from the EA, confirming this discharge rate, in included as Appendix D2 in **Technical Appendix 11.1**.

11.4.9 In order to consider storage requirements in this scenario (with a peak site runoff of 128 l/s during the 1 in 100 year rainfall event including a 20% allowance for climate change), storage tanks would be necessary to accommodate approximately 410 m^3 of storage in strategic locations on the site.

11.5 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

11.5.1 The mitigation in the form of the SuDS identified above will provide a range of environmental benefits to the development. Quantitative consideration of the proposed discharge rates from the site has been modelled using Micro Drainage to illustrate the future discharge rate from the proposed development with the mitigation options implemented. This shows a significant reduction in peak site runoff rates can be achieved as a result of the development.

11.5.2 No compensation options are considered necessary in relation to flooding. The mitigation measures proposed as SuDS in this Chapter are incorporated into the development plans.

11.6 MONITORING

11.6.1 The SuDS proposals to be incorporated in the development will not require any environmental monitoring to be implemented. A maintenance plan will be implemented to ensure they operate as designed for the lifetime of the development.

12. Sunlight, Daylight and Overshadowing

12.1 INTRODUCTION

12.1.1 Reductions in the availability of sunlight and / or daylight and increases in overshadowing as the result of introducing new buildings to an existing environment can potentially affect people and their living conditions. This Chapter of the Environmental Statement (ES) assesses the potential effect of the proposed development upon sunlight, daylight, and overshadowing. The potential effects are assessed with respect to relevant target criteria. The planning policies and guidance relating to this assessment and the methods used are described below.

12.1.2 The sunlight, daylight and overshadowing assessments have considered the likely significant effects of the proposed development on to the neighbouring residential properties and the existing amenity areas. The assessment also considers the effect of the proposed buildings on the Wood Lane Studios at Imperial West development which is currently under construction. The structure of this Chapter is adapted from the generic approach set out in **Chapter 1 Introduction** to assist the interpretation of the assessments.

Relevant Planning Policy

12.1.3 This section reviews the National, Regional and Local planning policies relevant to the sunlight and daylight effects of the proposed development.

National Planning Policy

12.1.4 There is no current specific National Planning Policy relating to new developments and their potential effects on sunlight, daylight and overshadowing. However, guidance is given within the English Heritage/Commission for Architecture and the Built Environment (CABE) Guidance on Tall Buildings (March 2003). Paragraph 4.6(vi) of this guidance recommends that consideration be given to 'the effect on the local environment, including microclimate, overshadowing, night-time appearance, vehicle movements and the environment and those in the vicinity of the building'.

Regional Planning Policy

12.1.5 Planning Policy is currently outlined in the London Plan 2011. However, the London Plan makes no reference to the control of development in relation to sunlight and daylight and sunlight availability at existing surrounding properties and overshadowing of existing amenity areas.

Local Planning Policy

12.1.6 There is an absence of any specific reference to sunlight and daylight standards in London Borough of Hammersmith and Fulham (LBHF) Local Development Framework Core Strategy (LDFCS) adopted in 2011.

12.1.7 This Chapter assesses sunlight and daylight against both British Standard BS 8206-2 'Code of Practice for Daylighting' (Ref. 11-4) 2008 and the Building Research Establishment (BRE) criteria set out in 'Site Layout Planning for Daylight and Sunlight' published by the BRE in 2011. This is the latest industry recognised document available on the subject. The document refers both to particular amounts of sunlight and daylight, along with a method for setting alternative target values for skylight, and provides discretionary guidance levels for sunlight, daylight and overshadowing in relation to new developments. We are not aware of the LBHF setting such alternative target values.

12.2 EXISTING BASELINE CONDITIONS

12.2.1 The existing baseline conditions are recorded in broad terms in Chapter 2 Site & Surroundings. Of most relevance to the assessment of sunlight, daylight and overshadowing effects is the largely cleared application site with the exception of two buildings along the eastern boundary – a sports hall and an office - and the Wood Lane Studios at Imperial West development to the northern boundary which is substantially structurally complete and this regard the mass of those buildings forms part of the baseline environment and a part cumulative consideration.

12.2.2 Further consideration of baseline conditions is otherwise embodied in the assessment of effects as set out below.

12.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

12.3.1 The assessment methodology used in the assessment of sunlight, daylight and overshadowing is based upon the BRE 2011 publication 'Site Layout Planning for Daylight and Sunlight: a guide to good practice' (hereinafter referred to as the BRE Guide).

12.3.2 This guidance is accepted by local planning authorities, including LBHF, as the most appropriate means of assessing the effects of sunlight, daylight and overshadowing in relation to adjacent existing residential properties. In general and specifically in accordance with the LBHF Core Strategy, sunlight and daylight is not a policy issue in relation to non-residential properties including offices, shops, and retail and leisure premises. However, overshadowing is assessed in relation to all amenity areas including those associated with non-residential properties.

12.3.3 The analysis expressed within this Chapter and the calculations within Technical Appendix 12 of this Statement are based upon the BRE Guide. The BRE Guide does not contain mandatory requirements, instead the document states in its own introduction on page 1 that: 'The advice given here is not mandatory and this document should not be seen as an instrument of planning policy'.

12.3.4 The BRE Guide provides discretionary guidance levels for sunlight and daylight which should be interpreted flexibly as natural lighting is only one of many factors considered in site layout design. In special circumstances the developer or planning authority may wish to use different target levels (e.g., in an historic city centre, a high degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings). In brief, the definitions of sunlight, daylight and overshadowing in the context of this Chapter are:

- **Daylight** - diffused light received from the sky between the hours of sunrise and sunset, but excluding light received directly from the sun, as daylight is assumed to be received from an overcast sky.
- **Sunlight** - light received directly from the sun and subject to significant variation due to time of day, season, atmospheric conditions, aspect and the built environment.
- **Overshadowing** - an area of no sunlight, either permanently or temporarily, due to an obstruction created by the built environment or screening caused by fencing, evergreen trees or similar.

Chapter Terminology

12.3.5 For the purposes of this Chapter, the following terminology has been used to describe the assessment of potential effects upon daylight, sunlight and overshadowing.

12.3.6 **Existing Residential Receptors** - Identifies the existing baseline conditions for daylight and sunlight for residential properties surrounding the proposal site.

12.3.7 During Demolition and Construction – assessment of the daylight and sunlight effects of the proposed development on the residential receptors surrounding the site during the demolition and construction phases.

12.3.8 During Operation – assessment of the daylight and sunlight effects of the proposed development during the operational phase (i.e., completed development) on the residential receptors surrounding the site.

12.3.9 Overshadowing – assessment of the potential overshadowing effects of the proposed development on the existing amenity areas for residential receptors surrounding the site and on itself following completion.

12.4 EVALUATION OF SIGNIFICANCE FOR DAYLIGHT AND SUNLIGHT

12.4.1 The criteria given in the BRE Guide have been used as the basis to assess the development's potential effects. As such, the criteria in Table 12.1 have been used in this assessment. Again it should be noted that the BRE Guide applies to residential properties and there are no quantitative criteria for the assessment of daylight and sunlight effects to existing commercial properties.

Table 12.1: Daylight and Sunlight Significance Criteria

Issue	Significance Criteria
Daylight	A window is considered to be adversely affected if the VSC measured at the centre of the window is less than 27% and less than 0.8 times its former value or It is also considered to be adversely affected if the Average Daylight Factor readings less than 1% in the case of a bedroom, 1.5% in the case of living rooms and 2% in the case of kitchens or kitchen/living room combined.
Sunlight	A window is considered to be adversely affected if a point at the centre of the window receives in the year less than 25% of the APSH, including at least 5% of the APSH during the winter months (21 September to 21 March) and less than 0.8 times its former sunlight hours during either period, and if the reduction to the total annual sunlight hours is reduced by 4%. Sunlight is relevant to main living rooms (i.e., habitable rooms) of dwellings if they have a window facing within 90 degrees of due south. Kitchens should not be assessed, however bedrooms are considered less important.

12.4.2 In addition, reference is made within the BRE Guide to various methods of assessing the effect that the proposed development would have on diffused daylight. However, the simplest methods are not appropriate in a central urban location, where the built environment is invariably complex. Accordingly, the 'Vertical Sky Component' (VSC) and 'Annual Probable Sunlight Hours' (APSH) are the calculations most readily adopted, as the principles of calculation can be established by relating the location of any particular window to the existing and proposed built environment.

12.4.3 It is also appropriate in many instances to review daylight with reference to Appendix C of the BRE Report 2011 which combined with the 'Average Daylight Factor' (ADF) calculations provides a better indication of the light available within a subject room.

12.4.4 When assessing the daylight effects of the proposed development on to the existing surrounding properties it is appropriate to carry out this more detailed combined daylight assessment.

12.4.5 Guidance for sunlight has a number of exceptions to the general rules provided in Table 12.1, so care is needed in applying the guidelines as follows:

- the total effect of successive extensions to a single building should be assessed.(This exception is not relevant to this project.);
- if the existing building stands unusually close to the common boundary with a new development, then a significant reduction in sunlight may be unavoidable. (This exception is not relevant to this project);
- the guidelines are purely advisory and planning authorities may wish to use different criteria.

Overshadowing

12.4.6 The BRE Guide recommends that for an amenity area to appear adequately sunlit throughout the year, at least 50% of the area should receive 2 hours of sun on 21st March. If as a result of a new development an existing amenity area does not meet the above and the area which can receive 2 hours of sun on 21st March is less than 0.8 times its former value (reduces by more than 20%), then the loss of sunlight is likely to be noticeable. If a detailed calculation could not be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21st March.

12.4.7 'Garden and amenity areas' for residential property excludes driveways, hard standing and small front gardens; and sunlight at an angle of 10º or less should be discounted.

Uncertainty and Assumptions

12.4.8 The assessments set out above are those generally carried out for sunlight and daylight analysis in England and Wales at design and assessment stage. The 'sunlight at a building' assessment and the internal daylight assessment are based on two theoretical concepts. One is the concept of probable hours of sunlight. In actual fact in any given year there is likely to be wide variation between the actual hours of sunshine at a given point and the theoretical figure of 1486 hours at 51.5 degrees north. The assessment therefore reports a percentage of probable hours rather than a number of hours.

12.4.9 The other concept is that of the CIE Standard Overcast Sky. This is a widely used concept but does not report 'real weather' conditions. However both concepts are well understood in the industry and therefore serve as good bases for comparative analysis.

12.5 BASELINE CONDITIONS AND ASSESSMENT OF EFFECTS

12.5.1 The identification of baseline conditions and effects related to the proposed development has been combined into one section for the specific purposes of this Chapter. Combining the baseline and assessment of effects sections allows for a direct comparison of existing and proposed conditions for the proposed development, and allows clearer interpretation of the results.

12.5.1 The following text provides a summary of the comparison between existing and proposed developments for daylight, sunlight and overshadowing. Further details of the site and surroundings are provided in Chapter 2 - Site & Surroundings.

12.5.2 The window location plans at Appendix 12-3 of Technical Appendix 12 identify the potential sensitive receptors (i.e. existing residential buildings with habitable rooms and the Wood Lane Studios buildings). The sunlight and daylight levels at these locations have been tested with baseline conditions and with the proposed development in place. When assessing the effect on to existing dwellings the studies have therefore included the Wood Lane Studios buildings as they are already substantially complete.

12.5.3 The results of the sunlight studies carried out at existing dwellings with the baseline conditions concludes that there are varied levels of sunlight reaching the majority of dwellings tested. Many existing surrounding properties currently do not receive good sunlight levels. The daylight results for the baseline conditions conclude that there would be good levels of daylight reaching all of the existing residential receptors we have tested.

12.5.4 The results of the sunlight studies carried out at Wood Lane Studios postgraduate bedrooms with the baseline conditions concludes that there are varied levels of sunlight reaching the majority of bedrooms we have tested. Many of the postgraduate bedrooms do not receive good sunlight levels.

12.5.5 These rooms are essentially study bedrooms for sleep and work. The postgraduate communal facilities are located in well lit south facing spaces affording the opportunity for significant sunlighing. In our opinion in a constrained urban area this is a good solution to affording sunlight to all those occupants who seek it.

12.5.6 The daylight results for the baseline conditions at Phase 1 buildings conclude that there would be good levels of daylight reaching all of the postgraduate buildings we have tested at lowest levels.

DAYLIGHT

Daylight to Existing Residential Receptors

12.5.7 The potential daylight effects of the proposed development on existing residential receptors surrounding the development have been tested. Only ground and first floor windows were measured, being the lowest residential levels at these properties which provide a worst case. Windows located above the tested floors will receive even greater levels of daylight.

12.5.8 The daylight conditions for the existing residential dwellings surrounding the site have been tested at the lowest residential levels - this being ground and first floor level. The tests assessing the effects of the proposed development on to the surrounding dwellings have included the effect of the Wood Lane Studios buildings to the north of the application site.

12.5.9 The Wood Lane Studios at Imperial West comprise four buildings of postgraduate accommodation with study bedrooms. These buildings are not considered as residential dwellings. However, for completeness we have also tested the effect of the proposed development on to each of the Phase 1 buildings. The effects of the proposed development on to ground and first floor level study bedrooms have been assessed.

12.5.10 The lowest residential levels, or lowest level study bedrooms in the Wood Lane Studios' buildings are considered 'worst case' locations where potential effects could occur.

12.5.11 The results of the daylight analysis for the existing residential dwellings are contained within Table 12.2 in the Technical Appendix. The locations are shown on Figure 12.1-12.9 at Technical Appendix 12.

12.5.12 The results of the daylight analysis carried out for the Wood Lane Studios buildings is shown as Table 12.4, the and the locations are shown on Figure 12.10 and 12.11 at Technical Appendix 12.

Completed Development Effect on Existing Buildings

12.5.13 The results of the daylight studies carried out at existing dwellings with the proposed buildings in place and including the Wood Lane Studios buildings identify that there would be good levels of daylight reaching almost all of the buildings we have tested. The daylight levels reaching almost all of these dwellings would also meet the BRE Average Daylight Factor (ADF) criteria for the specific room type tested.

12.5.14 The results of the daylight studies carried out to the Wood Lane Studios buildings show that following development there would be no adverse effect on daylight levels to the postgraduate study bedrooms. These bedrooms would continue to receive levels of daylight that meet the BRE recommendations.

Note: Only ground and first floor windows were measured, being the lowest residential levels at these properties, which provide a worst-case. Windows located above the tested floors will receive even greater levels of daylight.

During Demolition and Construction

12.5.15 The demolition of the site would give rise to no significant effects on the surrounding land in terms of daylight or the existing residential receptors.

During Operation

12.5.16 The existing residential buildings are generally some considerable distance away from the proposed development. There would be a negligible effect from the proposed development on to the existing residential properties following completion of the development.

12.5.17 There would be no significant effect on the postgraduate study bedrooms of buildings within the Wood Lane Studios.

SUNLIGHT

Sunlight to Existing Residential Receptors

12.5.18 We have tested the likely sunlight effects of the proposed development on to existing residential dwellings surrounding the application site. These dwellings are situated in Wood Lane, Eynham Road, Shinfield Street and Latimer Road. The sunlight conditions for the existing residential receptors have been tested at the lowest residential levels - this being ground and first floor level - at the same locations as the daylight tests. The lowest residential levels of these buildings are considered the locations where the most significant effects could occur.

12.5.19 The results of this analysis are contained within Table 12-1, and the locations are shown on Figures 12.1-12.9 all set out in detail at Technical Appendix 12. This table in the Technical Appendix compares the difference between the before condition (existing baseline conditions) and the after condition (with proposed development including Wood Lane Studios).

12.2.1 The sunlight effects of the proposed development on to the Wood Lane Studios buildings have been tested. The graduate accommodation buildings are study bedrooms... Therefore these buildings are not considered as residential dwellings. Again, for completeness we have also tested the impact of the proposed development on to each of the Phase 1 buildings.

12.5.20 The results of the daylight analysis carried out on the Wood Lane Studios buildings is shown as Table 12.3, and the locations are shown on Figures 12.10 and 12.11 at Technical Appendix 12.

Completed Development Effect on Existing Buildings

12.5.21 Following development at Imperial West there will be negligible effect on sunlight reaching existing residential dwellings north, east and west of the site. Almost all of existing buildings that have been tested will meet and exceed the BRE discretionary guidance for sunlight.

12.5.22 The results of the sunlight studies carried out at Wood Lane Studios' bedrooms with the baseline conditions concludes that there are currently varied levels of sunlight reaching the majority of bedrooms we have tested. Many of the postgraduate bedrooms would continue to receive varied sunlight levels following development, and many would continue to receive low levels of sunlight following development at Imperial West.

12.5.23 The Wood Lane Studios development has been designed to include well lit south facing communal spaces for the students. The study bedrooms provide quiet sleeping and study areas while the communal facilities provide eating and relaxation spaces. In our opinion thjs is a good solution to sunlight on constrained urban sites.

During Demolition and Construction

12.5.24 The demolition and clearance of the application site will have no material effect in terms of sunlight on the surrounding land. Therefore, with regard to sunlight, the effect is considered to be minor and over a short term, and with no significant effect predicted for the residential receptors. Negligible effects on sunlight are concluded during the demolition and construction phases of the proposed development at Imperial West.

During Operation

12.5.25 The existing residential buildings are generally some considerable distance away from the proposed development. Therefore, there would be negligible effects from the proposed development on sunlight to the existing residential properties.

12.6 SUNLIGHT AND DAYLIGHT TO PROPOSED BUILDING F DWELLINGS

12.6.1 The sunlight and daylight levels at the lowest residential floors, these being the mezzanine level and the first floor level, have been tested as 'worst case' locations and with all buildings in place including the Wood Lane Studios buildings.

12.6.2 The results of the sunlight studies demonstrate that there will be good levels of sunlight reaching all of the proposed dwellings. Of the 65 windows tested, only three would fall below the BRE recommendations. However, these windows serve rooms which have other windows that would exceed the BRE criteria. Therefore, each room tested at mezzanine and first floor level would achieve levels of sunlight that meet the BRE recommendations. The upper floors would receive greater levels of sunlight, and therefore would also meet the BRE standards.

12.6.3 The results of the daylight ADF studies show that following development, there would be good levels of daylight within the majority of proposed dwellings. Of the 28 rooms tested only 3 living rooms would receive daylight levels below the BRE recommendations. Three bedrooms would also receive slightly low daylight levels, however these reductions are minor and bedrooms are considered the least important of the habitable rooms.

12.6.4 The three living rooms represent a very small proportion of the total of 187 in the building. The discretionary guidance provided by the BRE does not require every dwelling to be lit to the levels advised. Indeed in major urban developments this is unlikely. The daylighting standards to

be achieved overall at Imperial West are in our opinion more than acceptable and represent a good level of daylighting.

12.6.5 The sunlight and daylight results for the assessments to proposed Building F are shown on Table 12.5 and 12.6 at Appendix 2, and the location of the assessments are shown on Figure 12.12 and 12.11 at Appendix 3 of Technical Appendix 12.

12.7 OVERSHADOWING

Overshadowing to Existing Amenity Areas

12.7.1 This considers the overshadowing effect of the proposed development on to the existing amenity areas surrounding the site, including the amenity areas within the Oxford Gardens & St Quintin Conservation Area in RBKC to the east of the site. The overshadowing effect upon the amenity areas surrounding the Wood Lane Studios buildings has been considered and the cumulative overshadowing effect on to the existing surrounding amenity areas which includes the Wood Lane Studios has also been tested.

12.7.2 A series of plans are included at Technical Appendix 12 which shows the effect of shadows at 1 hour intervals on the 21st March, the set day for testing overshadowing in accordance with the recommendations set out in the BRE Guide.

12.7.3 The effect of shadows is subjective and to some extent fleeting. This is a dynamic process and of course shadows are much reduced or extinguished according to cloud cover. The shadows of the taller elements would extend for some distance at low sun angles.

12.7.4 The shadow path analysis demonstrates that there will be no adverse overshadowing to the existing amenity areas of residential properties surrounding the development site or to the existing amenity areas within the Oxford Gardens & St Quintin Conservation Area. There will also be no adverse effect to the amenity areas surrounding the Wood Lane Studios buildings.

12.7.5 There will also be no adverse overshadowing effect to the existing surrounding amenity areas from the cumulative effect with the Wood Lane Studios buildings. In addition, there will be no adverse overshadowing effect to amenity areas within the Wood Lane Studios development or amenity areas within the Oxford Gardens & St Quintin Conservation Area to the east of the site.

12.8 SCOPE FOR MITIGATION

Daylight

12.8.1 The assessment of potential daylight impacts to existing residential receptors surrounding the development site concludes that negligible impacts are anticipated. As such, no mitigation will be required.

Sunlight

12.8.2 The assessment of likely significant sunlight effects upon the existing residential receptors surrounding the development site concludes that negligible effects are anticipated. As such, no mitigation will be required.

Overshadowing

12.8.3 The assessment of the likely significant effects of the proposed development upon overshadowing to existing amenity areas demonstrates that the development would present a **Negligible** effect. As such, no mitigation will be required.

12.9 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

12.9.1 No significant effects on daylight, sunlight and overshadowing have been identified as a result of the proposed development. As such, no mitigation measures are considered necessary, and no residual impacts are likely to result for the proposals.

12.10 MONITORING

12.10.1 Given the absence of residual effects there is no requirement for any effects to be monitored post construction.

Full technical details tables and supporting images are presented in Technical Appendix 12 of this Statement.

REFERENCES

Ref. 12.1: The London Assembly, London Planning Advisory Committee, (1999); Supplementary Planning Advice on High Buildings and Strategic Views in London.

Ref. 12.2: The London Plan, (2011); Greater London Authority.

Ref. 12.3: London Borough of Hammersmith and Fulham (LBHF) Local Development Framework Care Strategy adopted in 2011.

Ref. 12.4: The Royal Borough of Kensington and Chelsea, Core Strategy adopted 2010, Policy CL5 (Amenity).

Ref.12.5: British Standard (BS), (2008); BS8206 Part 2, Lighting for Buildings, Code of practice for Daylighting, British Standards Institute.

Ref. 12.6: Building Research Establishment, (2011); Site Layout Planning for Daylight and Sunlight (the 'BRE Guide' as annotated in this Chapter).

13. Wind

13.1 INTRODUCTION

13.1.1 This Chapter assesses the likely significant effects of the proposed development on the local wind microclimate. The comfort of people can be affected by turbulence created by air flows around buildings and particularly by tall buildings deflecting high level winds to pedestrian level. This assessment considers in particular the effect of the development on pedestrian comfort and strong winds. The Chapter is supported by a technical report attached at Technical Appendix 13.1.

13.1.2 This Chapter describes the existing wind climate at the site and its immediate surroundings and the methods used to assess the effects of the development upon the local wind environment. The potential effects of the development are assessed and, where appropriate, mitigation measures are described. The assessment is based upon the results of a wind tunnel test.

Legislation and Planning Policy Context

National Planning Policy

13.1.3 There are no national planning policies directly relating to wind microclimate issues.

13.1.4 The Lawson Comfort Criteria are used to benchmark the wind microclimate which are established in the UK for the assessment of wind effects.

Regional Planning Policy

The London Plan: Spatial Development Strategy for Greater London, July 2011

13.1.5 The planning guidance contained within the London Plan[1] places great importance on the creation and maintenance of a high quality environment for London. Policy 7.6B 'of the London Plan states that:

"Building and structures should…not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and microclimate. This is particularly important for tall buildings…'

13.1.6 In addition, Policy 7.7 'Location and Design of Tall and Large Buildings' of the London Plan states that tall buildings:

" 'should not affect their surroundings adversely in terms of microclimate, wind turbulence…'.

13.1.7 Wind microclimate is therefore an important factor in achieving the desired planning policy objective. Although no specific reference to the wind microclimate is made in Policy 5.3 'Sustainable Design and Construction', Policy 6.10 'Walking', Policy 7.4 'Local Character' and Policy 7.5 'Public Realm' of the London Plan, these policies suggest the inclusion of wind as a factor for assessing levels of comfort within London's external spaces.

SPG Sustainable Design and Construction

13.1.8 The London Plan's Supplementary Planning Guidance makes provisions for the wind microclimate in the essential standard. The SPG Sustainable Design and Construction's Essential Standard states in 2.4.5 Microclimate to:

"Mitigate any negative impact on the microclimate of existing surrounding public realm and buildings to meet the Lawson criteria for wind comfort and safety".

Local Planning Policy

LB Hammersmith and Fulham Unitary Development Plan, 2007

13.1.9 Policy EN9 of the adopted UDP (Ref. 13-3) on tall buildings states that, "A new building significantly higher than most of the surrounding buildings or in excess of 20 metres should not be likely to cause an unacceptable increase in ground level wind-speeds in the vicinity."

13.1.10 Policy EN9 has since expired with no replacement or extension provided within the UDP.

13.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Assessment Methodology

13.2.1 The following section summarises the methodology employed in boundary layer wind tunnel assessments of the pedestrian level wind environment. The wind tunnel tests enable the pedestrian level wind microclimate at the site to be quantified and classified in accordance with the widely accepted Lawson Comfort Criteria[2]. The wind tunnel tests deliver a detailed assessment of the wind environment around the application site in terms of the pedestrian comfort and provide a basis to assess the effects relative to the existing site conditions. The assessment provides a detailed breakdown of the wind microclimate based upon mean and gust wind speeds for all wind directions. The assessment of significance is primarily based upon the suitability of the site for the planned/desired pedestrian use.

Wind Tunnel Testing

Simulation of Atmospheric Winds

13.2.2 Wind is unsteady, or gusty, and this 'gustiness' or turbulence, varies depending upon the site. Modelling these effects is achieved by a series of grid, barrier and floor roughness elements to create a boundary layer that is representative of urban or open country conditions, as appropriate. The detailed proximity model around the site is used to fine-tune the flow and create conditions similar to those expected at full scale.

Measurement Technique

13.2.3 Wind speed measurements are made using 'Irwin probes' to measure the wind speed at a scaled 2m height above ground. For pedestrian comfort studies, both the mean and peak wind speeds are determined at each measurement location.

Meteorological Data

13.2.4 The Meteorological (Met) Office supply joint frequency tables of wind speeds divided into ranges of the Beaufort scale (Table 13.1) and direction on a monthly and annual basis. The frequency tables are fitted by standard Weibull curves. In this way the data are smoothed and converted into a format more suitable for analysis. These data have been corrected to standard conditions of 10m above open flat level country terrain at sea level.

13.2.5 The presentation of meteorological data is for annual and seasonal data for London defined as spring (March, April, May), summer (June, July and August), autumn (September, October, November) and winter (December, January, February) (see Figure 13.1).

13.2.6 The meteorological station data is adjusted to the site conditions using the software package BREVe3. This package contains a database of Ordnance Survey information and where additional information on the terrain is available from the design team this is entered into BREVe3 to fine-tune the analysis.

13.2.7 The effect of terrain roughness is conveniently described by the mean factor, which is the ratio of mean wind speed above the site at the stated height to the wind speed at 10m above, flat level open country terrain. A mean factor greater than 1.0, at a height of 10m above ground level, indicates that the site is windier than open countryside, whereas a mean factor less than 1.0 implies that the exposure is more sheltered than open countryside. The mean factors (see Table 13.2) at 10m above the site therefore provide a measure of the wind conditions relative to those in the open country situation. It is apparent that for the application site the exposure at 10m is fairly uniform, however the effect of the open space of Wormwood Scrubs, which reduces the terrain roughness directly upwind of the site, is evident from 300º.

[1] Greater London Authority, The London Plan, Spatial Development Strategy for Greater London, July 2011'

[2] 'Building Aerodynamics.' Lawson T.V., Imperial College Press, April 2001.

Table 13.1: The Beaufort Scale for Wind on Land

Beaufort Force	Hours Average Wind Speed (m/s)	Description of Wind	Noticeable Wind Effect
0	< 0.45	Calm	Smoke rises vertically
1	0.45 - 1.55	Light Air	Direction shown by smoke drift but not by vanes
2	1.55 - 3.35	Gentle Breeze	Wind felt on face; leaves rustle; wind vane moves
3	3.35 - 5.60	Light Breeze	Leaves & twigs in motion; wind extends a flag
4	5.60 - 8.25	Moderate Breeze	Raises dust and loose paper; small branches move
5	8.25 – 10.95	Fresh Breeze	Small trees, in leaf, sway
6	10.95 - 14.10	Strong Breeze	Large branches begin to move; telephone wires whistle
7	14.10 - 17.20	Near Gale	Whole trees in motion
8	17.20 - 20.80	Gale	Twigs break off; personal progress impeded
9	20.80 - 24.35	Strong Gale	Slight structural damage; chimney pots removed
10	24.35 - 28.40	Storm	Trees uprooted; considerable structural damage
11	28.40 - 32.40	Violent Storm	Damage is widespread; unusual in the U.K.
12	> 32.40	Hurricane	Countryside is devastated; only occurs in tropical countries

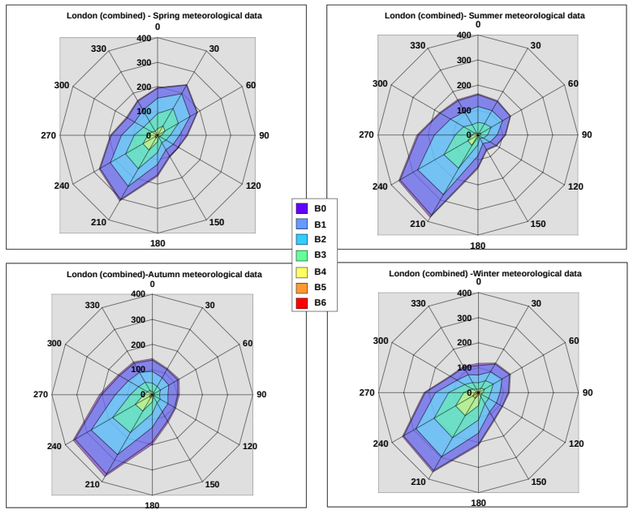

Figure 13.1: Seasonal Wind Data for London (in Beaufort Force)

Table 13.2: Site Meteorological Data Adjustment for the Proposed Development

Direction	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
Mean Factor at 2m	0.44	0.44	0.45	0.45	0.43	0.43	0.45	0.45	0.44	0.43	0.58	0.43
Mean Factor at 10m	0.80	0.81	0.82	0.81	0.76	0.77	0.80	0.80	0.78	0.77	0.87	0.83

13.2.8 The combination of meteorological data, site location and velocity ratios permits the percentage of time that wind speeds exceed each level within the comfort criteria to be determined.

Comfort Criteria

13.2.9 In this Chapter, the likely wind conditions have been described as 'tolerable' or 'unacceptable' in accordance with the Lawson Comfort Criteria. These criteria give threshold values of wind speeds for different pedestrian activities and are a well established benchmark for building developments throughout the UK. The criteria reflect the fact that sedentary activity, such as sitting, requires a low wind speed whereas, for more transient activity (such as walking), pedestrians will tolerate stronger winds. The pedestrian activities covered by the Lawson Comfort Criteria are defined as follows:

§ 'sitting': appropriate for long-term sitting, for example, sitting outside a café;

§ 'entrance' doors:appropriate for pedestrians entering/leaving a building;

§ 'standing': appropriate for waiting at bus-stops, window shopping etc;

§ 'leisure walking': appropriate for strolling;

§ 'business walking': appropriate for more 'purposeful' walking or where, in a business district, pedestrians may be more tolerant of the wind because their presence on Site is required for work; &

§ 'roadways'/car parks: appropriate for more open areas where pedestrians are not expected to linger.

13.2.10 For each pedestrian activity an upper threshold level is defined, beyond which conditions are unacceptable for the stated activity. If the conditions are below the threshold then they are described as tolerable, or suitable, for the stated activity. Table 13.3 identifies the threshold values for each pedestrian activity.

Table 13.3: Threshold Values of the Lawson Criteria

Prescribed Usage	Upper Threshold of Wind Speed
Road and car parks	6% > Beaufort Wind Scale 5 (B5)
Business walking	2% > B5
Leisure walking	4% > B5
Pedestrian standing / Entrance Doors	6% > B3
Sitting	1% > B3

Stronger Winds

13.2.11 In considering stronger winds if the wind speed exceeds Beaufort Force 6 (i.e. a strong breeze, where large branches are in motion), then there is the potential for walking to be impeded. The significance of exceeding the Beaufort 6 wind speed should take account of the likelihood of elderly or very young pedestrians being at a particular location on site on the windiest days of the year. Strong winds are also reported in this assessment.

Significance Criteria

13.2.12 Since a new development can alter the pedestrian activity on site, a comparison of the original wind conditions with those on the developed site can be misleading. For example, wind conditions currently suitable for pedestrian walking and which remain suitable for pedestrian walking after development leads to the conclusion that there is no effect due to the development. However, if there is a change in pedestrian activity from thoroughfare to entrance then mitigation would be required. This is an important consideration when defining and applying baseline conditions.

13.2.13 The significance criteria used in the assessment of potential and residual effects is based upon the relationship between the desired pedestrian use (as defined by the Lawson Comfort Criteria) of a particular area of the application site in relation to the pedestrian conditions predicted within that area. The following scale has been applied within this assessment:

§ Substantial Beneficial: expected wind conditions are 3-steps calmer than desired;

§ Moderate Beneficial: expected wind conditions are 2-steps calmer than desired;

§ Minor Beneficial: expected wind conditions are 1-step calmer than desired;

§ Negligible: expected wind conditions are tolerable for desired use;

§ Minor Adverse: expected wind conditions are 1-step windier than desired;

§ Moderate Adverse: expected wind conditions are 2-steps windier than desired; &

§ Substantial Adverse: expected wind conditions are 3-steps windier than desired.

13.2.14 An adverse effect implies that an area is unsuitable for the intended pedestrian use and will therefore require mitigation. Beneficial effects imply wind conditions which are calmer than desired.

13.2.15 Wind effects are generally considered to be long term, permanent and local, once the development is fully operational because the wind microclimate will be fixed by the building massing and the prevailing meteorological conditions for the region.

13.3 EXISTING BASELINE CONDITIONS

General Meteorological Conditions

13.3.1 Figure 13.1 shows that the prevailing winds are from the southwest. This is typical of much of the southern part of the UK. The prevailing winds typically account for around 45% of all wind in this region. There is a cold, secondary wind from the north east, typically during late spring.

Existing Conditions at the Site

13.3.2 The baseline conditions at the application site prior to the demolition of some of the buildings, established from the wind tunnel testing, are shown in Figure 13.2 (wind conditions during the windiest season, which is usually the winter) and Figure 13.3 (wind conditions during the summer months). These figures show that , a relatively calm wind microclimate predominantly suitable for 'sitting' or 'standing'/'entrance' use throughout the year. There is one location where the wind microclimate is classified as suitable for 'leisure walking' during the windiest season. The wind speed at location 78 also exceeds Beaufort Force 6 for 2.5 hours per annum.

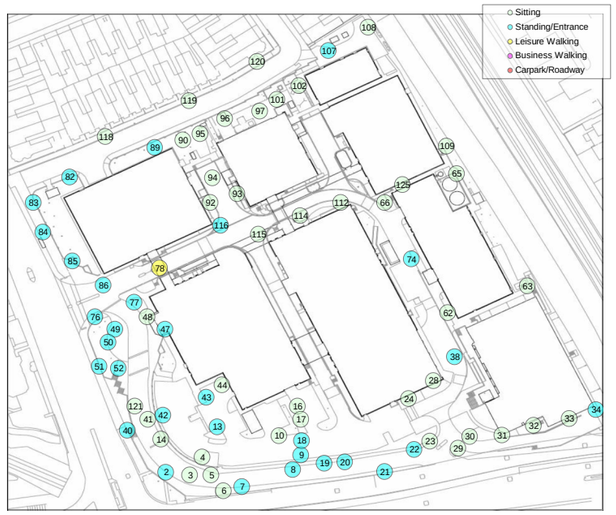

Figure 13.2: Baseline Condition – Worst-case season

Figure 13.3: Baseline Condition – Summer Case

13.4 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

13.4.1 This section summarises the results of the wind tunnel testing of the proposed development in terms of the worst case and summer season winds relative to the desired pedestrian use of the site. Comparison of the measured wind conditions with the desired pedestrian use takes into account potential changes in pedestrian activity due to the proposed development.

Demolition & Construction Effects

13.4.2 The likely effects during demolition and construction were assessed using professional judgement.

13.4.3 After the existing site is completely cleared there would be potential for wind to blow into the open construction site. In particular, the predominance of the south westerly winds would imply that the existing buildings to the north east of the site would be most affected by the reduction in shelter created by the removal of the existing buildings. However, as the baseline wind conditions are relatively calm, this is not expected to create significant issues and the potential effect of the demolition works would therefore be negligible.

13.4.4 As construction of the proposed development proceeds, the wind conditions at the site would gradually adjust to those of the completed proposed development. These are described in the following sections.

Proposed Development with Existing Surrounds

13.4.5 Figures 13.4 to 13.7 show the results of the assessment for both the worst case and summer season at ground level and terraces within the proposed development.

13.4.6 During the windiest season (i.e. winter) the conditions at ground level would be suitable for 'leisure walking', 'standing' or 'sitting' at the majority of locations which implies that most of the site is suitable as a public thoroughfare throughout the year. There is one location (45) where there are windier conditions, suitable for 'business walking', during the windiest season. For a mixed-use development such as that proposed , location 45 is one category windier than desired for a thoroughfare which implies a minor adverse effect in terms of the desired pedestrian use of the site. With the exception of location 45, the range of effects on the pedestrian thoroughfares is negligible (where conditions are suitable for 'leisure walking') to moderate beneficial**,** (where conditions are suitable for 'sitting'). The negligible effects tend to occur between buildings along the west and south boundaries of the site.

13.4.7 At entrances around the development the 'leisure walking' conditions at locations 17, 18 and 19 represent a minor adverse effect whereas 'standing'/'entrance' or 'sitting' conditions at the other entrances imply negligible to minor beneficial effects. Locations 17, 18 and 19 would benefit from additional shelter to reduce the wind speeds immediately outside the entrances during the windiest season.

13.4.8 Public amenity spaces are assumed to be more frequently used during the summer season and so the summer time results are the focus of any assessment made in these areas. The majority of locations are suitable for 'sitting' during the summer. However, locations 40, 77 and 78 are suitable for 'standing', which is one category windier than desired if people are likely to sit in these areas. These results represent negligible to minor adverse effects on the basis that the target wind conditions are suitable for 'sitting'. However, for such a large, open space the mixed microclimate can be justified as acceptable with people being able to sit in the areas classified as suitable for 'standing' on calmer days.

Terraces

13.4.9 As with ground level public amenity spaces, 'sitting' conditions are desired during the summer months. Whilst the majority of terrace locations are suitable for 'sitting', locations 138, 140, 141, 143 and 145 are suitable for standing during the summer. These results represent negligible to minor adverse effects where conditions are suitable for 'sitting' and 'standing' respectively.

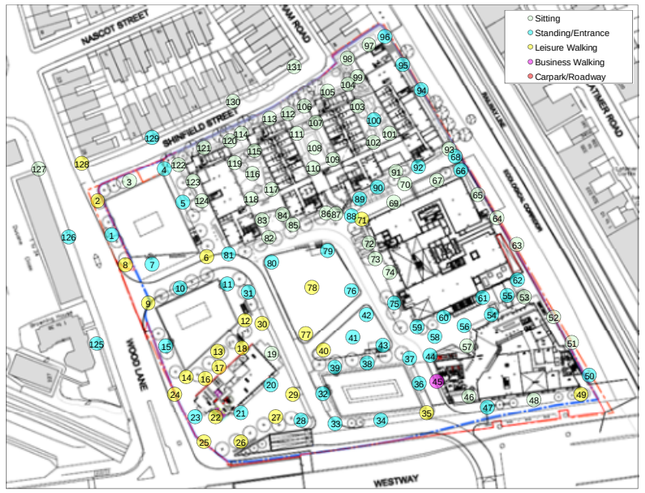

Figure 13.4: Proposed Development – Ground Level - Worst-case season

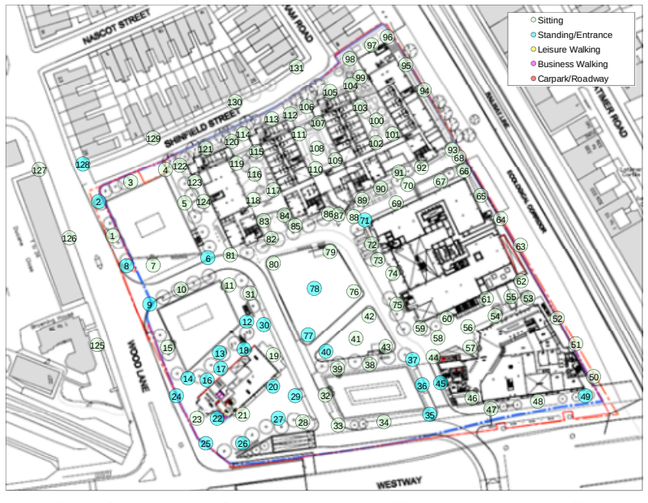

Figure 13.5: Proposed Development – Ground Level – Summer Case

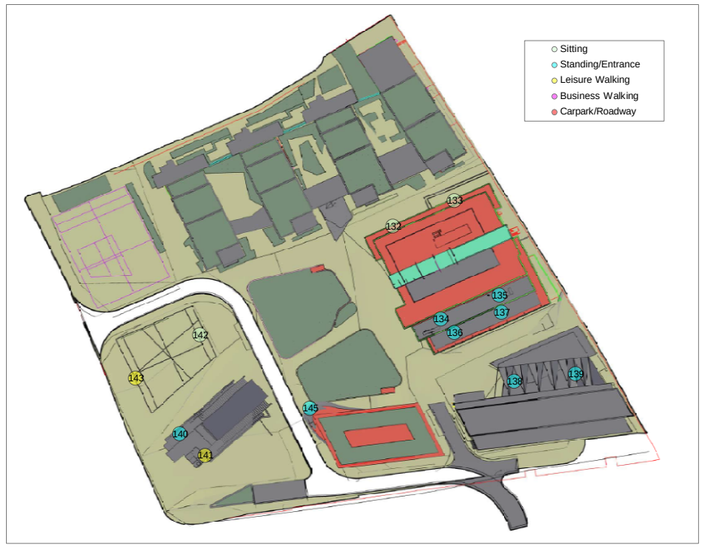

Figure 13.6: Proposed Development – Terrace Levels - Worst-case season

Figure 13.7: Proposed Development – Terrace Levels – Summer Case

Stronger Winds

13.4.10 There are nine locations where the wind speed exceeds Beaufort Force 6 during the year and one location where the wind speed exceeds Beaufort Force 7 on occasion. These are listed in Table 13.4.

13.4.11 For locations where the wind speed exceeds Beaufort Force 6, and which occur on a pedestrian thoroughfare, the results are unlikely to generate nuisance to pedestrians. However, at location 45, where the wind speed exceeds Beaufort Force 7, walking is likely to be impeded on the windiest days of the year.

Table 13.4: Annual Exceedance of Beaufort Force 6, 7 and 8 (& Most Frequent Wind Direction)

Location	Beaufort Force Exceedance	Direction	Hours per Annum
Baseline			
78	B6	190	2.5
Proposed Development			
6	B6	190	2.6
9	B6	190	2.9
13	B6	190	3.4
40	B6	240	3.6
49	B6	60	2.5
77	B6	190	5.4
141	B6	210	2.6
143	B6	190	1.3
45	B7	190	1.8

13.5 EVALUATION OF SIGNIFICANCE

Table 13.5: Significance Criteria

Description	Effect prior to Mitigation	Geographic Scale
Wind effect near potential entrances	Minor adverse to Minor Beneficial	Local
Wind effect along pedestrian thoroughfares.	Minor adverse to Moderate Beneficial	Local
Wind effect within public amenity spaces. (summer)	Negligible to Minor Adverse.	Local
Wind effect at terraces (summer)	Negligible to Minor Adverse	Local

13.6 SCOPE FOR MITIGATION

13.6.1 The wind tunnel model was tested in the absence of any planting or screening in order that the wind environment due to the building massing was clearly represented. In this configuration the results are also expected to represent a worst case scenario with the streets around the development being relatively windy.

Entrances

13.6.2 For entrances in areas suitable for 'leisure walking' during the windiest season (locations 17, 18 and 19), previous experience has shown that localised details such as recessing the entrances, adding vertical screens and/or soft landscaping will create additional shelter. This shelter creates a buffer zone near the entrance, which allows the pedestrians time to acclimatise, in an area where the wind microclimate is suitable for an entrance. These issues will need to be addressed at detailed design to ensure that the entrances are not too windy during the winter months.

Public Thoroughfares

13.6.3 Location 45 is classified as suitable for business walking and the wind speed also exceeds Beaufort Force 7 on occasion at this location. Mitigation could take the form of local vertical screens and/or soft landscaping or canopies, with the aim of achieving a target wind microclimate that is suitable for 'leisure walking'.

Public Amenity Spaces

13.6.4 The amenity spaces in the central square of the proposed development have a wind microclimate that is suitable for 'sitting' or 'standing'. With no landscape planting included on the wind tunnel model the wind microclimate in the amenity spaces is expected to be suitable for the intended pedestrian use when the landscape plan is in situ.

13.6.5 Mitigation in the form of wider scale landscaping (trees/soft/hard landscaping), or more localised screening and landscaping depending on the exact use of the space will be enhance the wind microclimate and, based upon professional judgement, is considered to achieve a larger area that would be suitable for sitting.

Terraces

13.6.6 On the terraces, locations 140, 141, 143 and 145 are suitable for 'standing' during the summer months, one category windier than desired. Mitigation in the form of parapets, hard or soft landscaping or screening should be used to improve shelter at these locations and improve conditions to 'sitting' during summer.

13.7 (EVALUATION OF) SIGNIFICANCE OF RESIUDAL EFFECTS

13.7.1 With the mitigation measures identified above assumed to be implemented, the residual effects at all locations are assessed to range from negligible to moderate beneficial.

13.7.2 Table 13.6 summarises the residual effects of the proposed development on the wind microclimate.

Table 13.6 Summary of Residual Effects

Description	Effect prior to Mitigation	Geographic Scale	Recommended Mitigation	Residual Effect
Wind effect near potential entrances	Minor adverse to Minor Beneficial	Local	Vertical side screening, landscaping or recessing at the entrance.	**Negligible to Minor Beneficial**
Wind effect along pedestrian thoroughfares.	Minor adverse to Moderate Beneficial	Local	Vertical screening and/or landscaping.	**Negligible to Moderate Beneficial**
Wind effectwithin public amenity spaces. (summer)	Negligible to Minor Adverse.	Local	Additional landscaping around proposed seating areas.	**Negligible**
Wind effect at terraces (summer)	Negligible to Minor Adverse	Local	Additional Parapets, screening and/or landscaping.	**Negligible**

13.8 MONITORING

13.8.1 In the context of the predicted negligible to minor and moderate beneficial effects no requirement for the monitoring of the wind microclimate is considered necessary.

REFERENCES

Ref 13.1: 'Greater London Authority, (2008); 'The London Plan – Spatial Development Strategy for Greater London – Consolidated with Alterations since 2004.'

Ref 13.2: London Plan, (2005); 'Sustainable Design & Construction, Draft Supplementary Planning Guidance'

Ref 13.3: London Borough of Hammersmith and Fulham, (2003); '.Adopted Unitary Development Plan.'

14. Socio-Economic Effects

14.1 INTRODUCTION

14.1.1 This assessment identifies the current socio-economic conditions of the application site and the surrounding area in terms of employment, demographics, housing and community facilities, education and health care. The likely effects of the proposed development on the existing socio-economic conditions are assessed for the demolition, construction and operational phases. The Chapter describes the socio-economic policy context, the methods used to assess the potential effects; the baseline conditions; the socio-economic effects; and any appropriate mitigation measures. The residual effects of the proposed development are then summarised.

14.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Assessment Methodology

14.2.1 Information has been obtained from a number of sources to provide the baseline conditions to inform assessments of the likely effects. These sources are referred to in the relevant sections and then listed as References at the end of this chapter, and include, amongst others, Office of National Statistics, LBHF documents, Hammersmith & Fulham NHS PCT, GLA Intelligence Updates, ODPM / DCLG, Arup Economics, English Partnerships, and Wandsworth New Housing Survey.

14.2.2 The proposed development has been considered in terms of maximum floorspace by use as provided in the planning application; and as illustrated on the illustrative masterplan and the plot development design guidelines.

14.2.3 The socio-economic indicators which are assessed in this chapter include:

- § population
- § housing profile and housing need
- § employment
- § education and learning
- § health care
- § open space, cultural and sports facilities
- § community safety and crime

Significance Criteria

14.2.4 No formalised technical guidance or criteria are available in relation to the significance of socio-economic effects.

14.2.5 The significance of socio-economic effects has, therefore, been considered in terms of their overall effect on the immediate surroundings and the wider neighbourhood in the context of policy guidance and baseline conditions and by the application of professional judgment. Effects have been quantified wherever possible.

14.2.6 For each of the indicators, the effect has been assessed as follows:

- § long / short term (the duration of the effect);
- § direct / indirect (the intensity of the effect);
- § local / regional (the geographical context of the effect);
- § major / moderate / minor – defined as:
  - Major: considerable effect by magnitude, duration, reversibility, value, and sensitivity of receptor, which may be of more than local significance or lead to a breach of a recognised environmental threshold, policy, legislation or standard;
  - Moderate: considerable effect by magnitude, duration, reversibility, value, and sensitivity of receptor, which may be of more than local significance or lead to a breach of a recognised environmental threshold, policy, legislation or standard; or
  - Minor: slight, very short or highly localised effect;
- § beneficial / neutral / adverse (the nature of the effect).

14.2.7 Limitations and Assumptions

14.2.8 As set out below, no technical significance criteria relating to the assessment of socio-economic effects are available. The assessment of effects is carried out against a benchmark of current socio-economic baseline condition prevailing at, and around, the site. As with any dataset, baseline data will change overtime. The most recent published data sources have been used in this assessment, however the limitations of some data should be noted. For example, the latest available census data is from 2001.

14.2.9 The assessment has been based on information received from a number of parties including the applicant, and it is assumed that the information is accurate. The assessment of effects assumes that the development would be realised as per the plans and proposals being applied for.

14.3 EXISTING BASELINE CONDITIONS

14.3.1 This section summarises the current characteristics of the local area within which the site is located and the wider area surrounding the site.

Population

14.3.2 The Borough of Hammersmith & Fulham is situated on the western edge of Inner London in a strategic location on the transport routes between the City and Heathrow. It is an area of contrasts; of wealth and poverty, and of attractive environments and areas that need improvement (Ref 14.1).

14.3.3 The Borough is densely built up; according to the LBHF AMR 2009/10 it has the eighth highest population density of any local authority in the country. At the time of the 2001 the population density of the Borough was 101 persons per hectare, compared to 46 persons per hectare for London (Ref 14.29).

14.3.4 The population of the LBHF has expanded from 169,374 in mid-2001 to 169,729 in 2009 (Ref 14.1) representing a 0.2% increase. This is a lower increase in comparison with London which experienced a 5.9% increase.

14.3.5 The Borough has some of the highest average house prices within London but it is also high in the national league table in measures of deprivation (Ref 14.1). According to the Government's Indices of Deprivation 2010, LBHF is the 71st most deprived Borough in England (Ref 14.4 and Ref 14.5).

14.3.6 Income levels are highly polarised in the LBHF with 35% earning less than £10,000 and 15% more than £60,000. The median income is £19,500. In terms of savings this is also polarised, with 57% of households having less than £1,000 and 23% having savings of over £10,000 (Ref 14.6).

14.3.7 The site is located towards the north of the Borough, in College and Old Oak Ward.

Housing Profile and Housing Need

14.3.8 The GLA projects that LBHF's annual average housing provision target for 2011/12 to 2020/21 is 615 (Ref 14.7).

14.3.9 It states that between 2011 and 2031, London's population is projected to increase by 1.08 million persons (14%) and households are expected to increase by almost 670,000 (20%) – the difference in rates of change is a reflection of the 5% decline in average household size. It notes that by 2031, LBHF's population might be up to 189,800 resulting in a total of 94,400 households (Ref 14.7).

14.3.10 LBHF considers that population growth is in part driven by a higher number of births (2,800 annually) than deaths (800 annually), and that inward migration is also a factor (Ref 14.4). This is supported by the fact that the Borough has a young population (with 45% in their 20s and 30s compared to London average of 35%), high mobility (7th highest mobility rate in England with 1 in 5 people moving address each year) and small households (40% are 1 person households, 30% couples, 10% lone parents and 20% are families with one or more dependent children) (Ref 14.4). 8% of households are overcrowded, 20% under-occupied (Ref 14.6).

14.3.11 LBHF's Housing Strategy (2007-2014) (Ref 14.8) states that 'demand for housing is outstripping supply and too many people are being forced to leave the Borough because they can no longer afford to live here due to high house prices'. There are areas in the Borough, concentrated on the larger social housing estates, with continuing high levels of deprivation and many local people who have great aspirations but believe "the ladder of opportunity" has slipped away.

14.3.12 The most recent LBHF Housing Needs Survey (published 2004) provides an estimate of the need for affordable housing which concludes that there is a current shortfall some 4,437 dwellings comprised of 2,060 x 1 bed, 1,214 x 2 bed, 574 x 3 bed and 589 x 4 bed). The analysis shows that 34%

of the affordable housing requirement could be met through intermediate housing (Ref 14.6).

14.3.13 It is felt that difficulties of securing appropriate accommodation are most acute for growing families, those with particular supported needs, key workers and those from Black and Minority Ethnic groups (Ref 14.6).

14.3.14 The tenure profile of LBHF is as follows:

Table 14.1: Summary of tenure of LBHF households (Source: Housing Needs Survey (Ref 14.6))

Tenure	% of households
Owner Occupied (no mortgage)	19.3%
Owner Occupied (with mortgage)	24.9%
Council	17.7%
RSL	16.0%
Private Rented	22.2%
Total (76,206)	**100%**

14.3.15 The Housing Needs Survey (Ref 14.6) also provides a general overview of the LBHF profile comparison with existing secondary data sources:

- § lower levels of owner-occupation and higher levels of private rented housing when compared with both national and regional estimates;
- § a much higher incidence of flat dwellings (71% compared to London average of 49%); &
- § a decline in the Council rented sector and an increase in RSL rented sector, with owner-occupation and private rented sectors remaining relatively stable.

Economic

14.3.16 In 2008 there were 117,823 employee jobs in Hammersmith & Fulham. During the last growth cycle in London the Borough expanded rapidly as an employment location. Total employment in Hammersmith & Fulham grew by 36% over the period 1998-2008 compared to 8% in London as a whole, 11% in West London and 17% in Inner London.

14.3.17 There are a number of specialist employment sectors within the Borough. Media sectors are dominant, as are specialist retail and leisure sectors which provide services for the resident population. Another sector of note is "Other research and experimental development on natural sciences and engineering". In 2010 there were nearly 1,500 people employed in this sector in Hammersmith & Fulham. The Borough is also over-represented in terms of research and experimental development.

14.3.18 Hammersmith & Fulham has a strong representation in the office sector. Office jobs were estimated at approximately 51,700 in 2008, or 44% of total employment. This presents a very different profile to West London where they account for 28% of total employment. It is also higher than the proportion for London which is 35%.

14.3.19 The nature of office employment in Hammersmith & Fulham is also of a very different structure to the rest of London. It is much more dominated by creative and media sectors which account for a third of all office jobs in the Borough compared to 13% in West London

14.3.20 Monitoring data published by LB Hammersmith & Fulham in their Annual Monitoring Report (AMR) calculates that there are some 160,000 sq m of office floorspace with outstanding consents. However in recent years the number of new office developments started has been very modest. The AMR data on office developments under construction presents the picture of a relatively flat market with few offices under construction.

14.3.21 LBHF identifies 5 Regeneration Areas in its Core Strategy, and notes that these areas could provide 25,000 jobs during the period 2012-2031.

Education and Learning

14.3.22 In 2009, there were estimated to be 32,738 children and young people aged up to 18 living in LBHF and by 2020, estimates suggest the number will grow by 5.7% to 34,612 (Ref 14.9).

14.3.23 The education provision in LBHF as set out in Table 14.2 below has been gathered from the LBHF website and OFSTED (Ref 14.10) and the Department for Education (Ref 14.11):

Table 14.2: LBHF School Provision

Provision	Count	Total pupils on roll (LBHF & ofsted)	Total according to DfF (Jan. 2011)
Nursery Schools and Early Years Centres	5	625	312
Primary	37	6,823	10,083
Secondary	8	6,233	7,229
Sixth Form Provision	6	3,651	
Special Schools	5	271	299
Short Stay Schools (pupil referral)	2	150	-
Further Education (Ealing Hammersmith and West London College)	1	-	-
Independent Private schools	10	N/A	6,267

14.3.24 LBHF also offers other extra-curricular activities including music for children, play projects, walking bus, Duke of Edinburgh's award, library service for children, junior youth and youth services (Ref 14.10).

Health Care

14.3.25 Regarding the general health of LBHF residents, the Primary Care Trust (PCT) notes that overall, life expectancy in the Borough has been increasing in line with national trends but that the figures for the whole Borough mask an increasing gap between the best and worst off wards. On average, men living in the most deprived areas of LBHF die nearly 8 years earlier than men in the most affluent areas (Ref 14.15).

14.3.26 The PCT's overarching aim is to improve the health of the local population (Ref 14.15 and Ref 14.16). In doing so, it wants to:

- § "enable and support health, independence and well-being;
- § give people more control over their own health and healthcare;
- § offer timely and convenient access to quality, cost-effective care; &
- § proactively tackle health inequalities".

14.3.27 LBHF Primary Care Trust serves the population of LBHF and currently has 31 General Practitioner (GP) Practices (Ref 14.16). The nearest GP Practice is the White City Health Centre on Australia Road which is located 1km from the site.

14.3.28 There are 164 GPs in the PCT (Ref 14.18). The standard level of provision assumed by the NHS and DoH planners is 1 GP per 1,700 residents (Ref 14.18). Assuming the 2008 population of 172,200 (Ref 14.3), 164 GPs is the equivalent of 1 GP per 1,050 residents and as such falls slightly below that recommended ratio.

14.3.29 The LBHF PCT information sheet (Ref 14.19) notes that the PCT has 4 Hospitals (with Chelsea & Westminster Healthcare NHS Foundation Trust located just outside the boundary but is used by many residents in the south of the Borough as their local hospital (Ref 14.15)), 4 PCT Offices, 6 Health Centres, 4 Walk In Centres, 16 Opticians, 28 Dentists and 39 Pharmacies.

14.3.30 The nearest hospital is Hammersmith Hospital on Du Cane Road, which is located under 1km from the site. The Hammersmith Hospital also offers the nearest GP and the nearest 'drop in' services to the application site.

There is a second walk-in-centre in the vicinity located on Exmoor Street which is the Minor Injuries Unit of St Charles Hospital. This is approximately 1.8km from the site.

14.3.31 The nearest dentist is the Canberra Centre for Health, located on South Africa Road which is 1km from the site and the nearest pharmacies are located at 59 South Africa Road and 73 Bloemfontein Road, both of which are also within 1km walking distance from the site.

14.3.32 In 2010/11, the PCT spent over £362.5m on healthcare and ended the year with a £3.5m surplus (the original annual budget was £366m). NHS Hammersmith & Fulham opened its first polyclinic in April 2009 which put an extra GP clinic in the north of the Borough offering people 7 days a week access to Doctors (Ref 14.16). A further polyclinic was opened in 2010 according to the LBHF PCT Strategic Plan for 2009-2014 (Ref 14.15). This document also suggests a number of areas that should be focused on in order to provide better healthcare services across the Borough.

Open Space, Cultural and Sports Facilities

14.3.33 The London Plan sets out a public open space hierarchy that provides a benchmark for the provision of open space. The GLA's Open Space Strategies Best Practice Guidance (Ref 14.20) further refines the hierarchy as illustrated in Table 14.3 below, which is populated in line with LBHF Parks and Open Space Strategy 2008-2018 (Ref 14.21).

Table 14.3: GLA Best Practice and open space provision in LBHF

Open Space categorisation	Size guideline	Distance from homes	No. in LBHF
Regional parks	400ha	3.2 – 8km	0
Metropolitan parks	60ha	3.2km	1 (Wormwood Scrubs)
District parks	20ha	1.2km	1 (Ravenscourt, Bishops Parks)
Local parks and open spaces	2ha	400m	17
Small open spaces	<2ha	<400m	18
Pocket Parks	<0.4ha	<400m	56
Linear open spaces	Variable	Wherever feasible	2

14.3.34 Table 14.3 does not account for the reasonable assumption that some LBHF residents might live in areas where their closer provision is located in another London Borough.

14.3.35 LBHF is a small, densely populated Borough where parks and opens spaces are fundamental to residents' quality of life. LBHF's Parks and Open Space Strategy defines open space as including parks, playing fields and sports pitches, allotments, nature conservation sites, cemeteries and churchyards, ecological corridors, public squares and streetscapes, play areas, and housing open spaces (Ref 14.21).

14.3.36 Table 14.4 below provides a summary of open space provision in the Borough (Ref 14.21):

Table 14.4 Overview of Open Space Provision in LBHF

Total	386ha
Publicly accessible open spaces (53).	231ha (60% of total)
Within housing estates, sports clubs, school grounds, or areas such as railway sidings.	155ha
Parks (34).	159ha
Amenity Green Spaces (188).	60.5ha
Cemeteries and churchyards.	52.5ha
National Playing Field Association Target Provision of 1.6ha / 1000 population.	LBHF 1.35ha / 1000 population

14.3.37 In its assessment of deficiency (Ref 14.21), LBHF has identified no deficiency of access to regional or metropolitan sized parks. Access to local parks and small local parks is very good, and there are only small areas of the Borough where residents are more than 400m from publicly accessible local parks and small local parks. However, many areas of the Borough are more than 400m from local parks with a good range of facilities (play areas, pitches, seating etc).

14.3.38 Figure 14.1 shows the site as being just within an area of Open Space Deficiency (Ref 14.22), Map 1C of LBHF's Parks and Open Space Strategy (Ref 14.21) illustrates that there are a significant number of facilities surrounding the site, as follows:

- Metropolitan Park: Wormwood Scrubs at 1km away from site;
- Local Parks: Little Wormwood Scrubs (1km) and Hammersmith Park (0.7km);
- Small Local Park: BBC media village park (0.2km);
- Pocket Parks: Pioneer Way Open Space (0.1km), North Pole Open Space (0.35km), and Bentworth Road Open Space (0.4km);&
- Linear Open Park: BBC Dorando Space (0.2km);

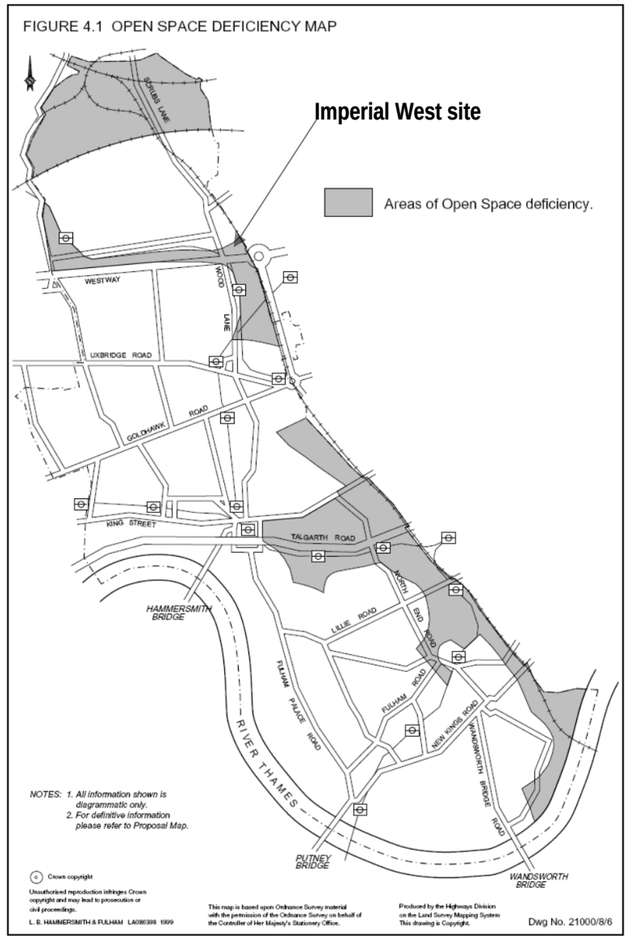

Figure 14.1 Open Space Deficiency in LBHF

14.3.39 Therefore, the site is within the GLA Best Practice Guidance for all categories apart from District Park (with the closest being Ravenscourt Park which is 2.4km from the site) and Regional Park.

14.3.40 LBHF has a number of other cultural and sports facilities, including:

- local arts venues including Bush Hall, Bush Theatre, Hammersmith Apollo, LAMDA, Lyric Hammersmith, Riverside Studios, Shepherds Bush Empire;
- sports centres including LBHF facilities Fulham Pools, Hammersmith Fitness and Squash Centre, Lillie Road Fitness Centre, Phoenix Sports & Fitness Centre, Janet Adegoke Swimming Pool and Linford Christie Outdoor Sports Centre, and other private health and fitness centres;

- § other cultural facilities including museums and galleries such as Museum of Fulham Palace, William Morris Society, 20th Century Gallery, Olympia;
- § libraries in Shepherds Bush, Hammersmith and Fulham; &
- § various restaurants, pubs and bars across the Borough and specifically within the town centre areas of Fulham, Hammersmith and Shepherds Bush.

14.3.41 There are also a number of facilities that are accessible to residents of LBHF which fall in adjacent Boroughs.

Community Safety and Crime

14.3.42 There are 3 police stations in LBHF. Hammersmith and Fulham Police Stations are open 24 hours a day, Fulham Police Station is open 24 hours a day amd Shepherds Bush Police Station is open 0700-2200 daily. (http://content.met.police.uk/Borough/Hammersmith).

14.3.43 The Metropolitan Police Force provides policing in LBHF. Table 14.5 below provides a breakdown of the latest statistics of crimes in LBHF and the London Metropolitan Area in the 12 months to March 2009 and 12 months to March 2010 (Ref 14.23) which shows an overall reduction in total crime:

Table 14.5: Summary of crime figures

Offences	LBHF	London Metropolitan Area	LBHF	London Metropolitan Area
	12 Months to September 2010		12 Months to September 2011	
Total Crimes	23,483	827,978	23,758	815,788
Violence against the person	4,882	173,523	4,574	156,706
Robbery	803	34,271	841	38,728
Burglary	2,506	96,137	2,175	89,451
Motor Vehicle Crime	3,284	100,219	2,789	98,708

14.3.44 LBHF has a Crime Reduction Partnership Plan 2008-2011, which outlines the ways in which the Borough will seek to target certain areas of crime. It is based on volume, performance, trends, seriousness, generator presence, public perception (Ref 22-24). The 10 priorities are:

1 residential burglary;
2 street crime (personal robbery and snatch theft);
3 theft from motor vehicles;
4 drug misuse;
5 Antisocial behaviour;
6 violence against the person (focus on ABH and knife enabled crime);
7 young people as victims and offenders;
8 alcohol misuse and related crime and disorder;
9 fires (accidental fires in dwellings); &
10 preventing terrorism and building community resilience against extremism.

14.4 POLICY FRAMEWORK

14.4.1 The overall planning policy framework is set out in Chapter 4 of this Statement.

14.4.2 However, with specific reference to socio-economic considerations related to the proposed development, the following are of note:

Planning Policy Statement 1: Delivering Sustainable Development (January 2005)

14.4.3 PPS1 contains general guidance on development principles. It promotes pre-application discussions with local planning authorities and seeks to ensure that development supports existing communities and contributes to the creation of safe, sustainable, liveable and mixed communities with good access to jobs and key services for all members of the community. PPS1 also supports the best and most optimal use of land compatible with the local context and amenity.

14.4.4 Mixed used developments are valued because they offer opportunities to deliver "urban… regeneration to improve the well being of communities, improve facilities, promote high quality and safe development and create new opportunities for the people living in those communities" and in doing so create "more vibrant places". Local Authorities are therefore encouraged to "bring forward sufficient land of a suitable quality in appropriate locations to meet the expected needs for housing …for retail and commercial development, and for leisure and recreation".

Planning Policy Statement 4: Planning for Sustainable Economic Growth (December 2009)

14.4.5 PPS4 provides the government's national policies on economic development, which includes uses which provide employment opportunities, generates wealth, or produces an economic output. The Government's overarching objective is sustainable economic growth, by building prosperous communities, reducing the gap in economic growth rates between regions, and delivering sustainable patterns of development.

14.4.6 Policy EC10 notes that LPAs should adopt a positive and constructive approach towards planning applications for economic development and that planning applications that secure sustainable economic growth should be treated favourably.

The London Plan (July 2011)

14.4.7 The London Plan (July 2011) has six overarching objectives which the Mayor seeks to implement by working with strategic partners and in exercising his planning functions. Of these, Objective 2, ensuring London is "an internationally competitive and successful city"; Objective 3 "a city of diverse, strong, secure and accessible neighbourhoods" and Objective 6 "a city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities" are of specific note in the context of the Imperial West development.

14.4.8 Of particular relevance to the application site is the strategic imperative that the most efficient use be "made of London's limited reserves of land, identifying places with the potential for development on a strategic scale, and ensuring policies are in place to enable this to happen".

14.4.9 Policy 2.13 identifies White City as an Opportunity Area in LBHF. It states that developments in the area should "seek to optimise residential and non-residential output and densities, provide necessary social and other infrastructure to sustain growth, and, where appropriate, contain a mix of uses". The White City Opportunity Area is 110ha in size and Table A1.1 identifies the Area as having an indicative employment capacity of 10,000 and a minimum homes target of 5,000 for the period 2001 to 2026.

14.4.10 The WCOAPF is intended to create an area which is "a model of high quality urban design, sustainable architecture and construction situated within a first class, permeable and inclusive public realm to encourage walking and cycling". It is anticipated that "many people will choose to both live and work in the area, reducing the need for commuting and demand on the public transport and road network. The majority of new trips in and out of the area will be made by public transport, walking and cycling, to avoid adding to road congestion. Outstanding environmental performance will be achieved by the use of low and zero carbon technologies, including renewable energy sources, a district heat network and combined heat and power".

14.4.11 Policy 2.14 identifies the Imperial West site as being located in an Area for Regeneration. The London Plan recognises that where regeneration areas fall within Opportunity Areas "regeneration action should be co-ordinated with development frameworks and other policies for the area concerned".

14.4.12 Within the Areas for Regeneration "the Mayor will work with strategic partners and local partners to co-ordinate their sustained renewal by prioritising them for action and investment".

14.4.13 The White City Opportunity Area Framework for Development (OAPF) was adopted as Supplementary Planning Guidance (SPG) to the Borough's UDP in July 2004. The framework identifies objectives and principles for development within the area of land which forms the White City Opportunity Area. The intention is to maximise "physical, economic, social and environmental regeneration benefits in the Borough and West London".

Other material considerations

14.4.14 LBHF Community Strategy 2007 – 2014 states that the Borough's key priorities are to:

- § "provide a top quality education for all;
- § tackle crime and antisocial behaviour;
- § deliver a cleaner, greener Borough;
- § promote home ownership;
- § set the framework for a healthy Borough;
- § deliver high quality, value for money public services; &
- § regenerate the most deprived parts of the Borough".

14.4.15 The Strategy notes that "the White City Opportunity Area will offer many new employment opportunities in the construction, commercial, retail and leisure industries over the coming years. In order to ensure that all sections of the local community benefit from this projected growth we need to provide them with the opportunity to access the necessary education, training and development that will fill emerging skills gaps". It goes on to state that "the White City Opportunity Area is an important development area in the Borough. The new Westfield retail centre on site is due to open in 2008 (sic) and further major developments are expected further north along Wood Lane. These developments will bring thousands of homes and jobs to the area over the coming years. This represents a tremendous opportunity to help regenerate the north of the Borough providing home ownership opportunities for those living in social rented stock in the area and first time buyers and jobs for local residents**"** (Ref 14.30).

14.4.16 The Core Strategy Options (Ref 14.28) then begins to translate this Community Strategy into planning policy. The 'Regeneration Area Strategy' for the Wider White City Opportunity Area (which the site is within) provides the following vision:

"The vision is for a vibrant and creative place with a stimulating, high quality, accessible and inclusive environment where people will want to live, work, shop and spend their leisure time. Anchored by the BBC, Imperial College and one of London's best retail offers in a reinvigorated metropolitan town centre, the area will provide a unique and distinctive quarter. Many other world-leading, global creative, media and entertainment businesses will be attracted to the area which will be a nationally known creative hub in London. Creative and media businesses will combine with schools, colleges and universities elsewhere to provide cutting edge educational links that will inspire young people…. The area will be a model of high quality urban design, sustainable architecture and construction situated within a first class permeable, accessible and inclusive public realm. …Tall buildings of exceptionally good design may be acceptable close to the A40 and A3220".

14.4.17 The Core Strategy notes that the land to the north of Westfield on the east side of Wood Lane 'is the most substantial opportunity for early regeneration in the Borough and key to the Council's spatial vision.'

14.5 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

The assessment of effect has been undertaken using the methods detailed in the Assessment Methodology above.

Population and Housing

14.5.1 As previously noted, LBHF Core Strategy and the London Plan housing policy objectives state a target of 615 homes per year between 2011/12 to 2020/21 (Ref 14.6 and 14.31).

14.5.2 LBHF identifies 5 Regeneration Areas in its Core Strategy, and notes that the spatial options indicate that there is the potential to deliver an additional 13,200 additional dwellings during the period 2012-2031. As outlined above, PPS3 notes that the planning system should deliver a sufficient quantity of housing taking into account need and demand and seeking to improve choice (ref: 14.31).

Table 14.6 below provides the breakdown of units proposed as part of the hybrid planning application.

Table 14.6: Breakdown of Units proposed as part of the 'hybrid' planning application, including Number of Habitable Rooms

Type of Unit	Number of Units	Number of Habitable Rooms
Studio [market]	10	10
1 bed flat (assumes 2 habitable rooms) [market]	37	74
2 bed small flat (assumes 3 habitable rooms) [market]	24	72
2 bed large flat (assumes 4 habitable rooms) [market]	42	168
3 bed flat (assumes 5 habitable rooms) [market]	18	90
Pent House (assumes 8 habitable rooms) [private]	2	16
Sub-Total Residential	**133**	**430+**
Studio [key worker]	7	7
1 bed flat (assumes 2 habitable rooms) [key worker]	16	32
2 bed small flat (assumes 3 habitable rooms) [key worker]	6	18
2 bed large flat (assumes 4 habitable rooms) [key worker]	23	92
3 bed flat (assumes 5 habitable rooms) [key worker]	7	35
Pent House [key worker]	0	**0**
Sub-Total Residential	**59**	**184**
Total	**192**	**614**

14.5.3 The development would contribute to meeting this annual housing target by adding 192 units to the housing stock. The range of housing proposed would help to achieve the requirement for mixed and balanced communities as required by various policy guidance explored in Chapter 4 (Planning Policy) of this Statement.

14.5.4 With specific reference to the need to provide affordable housing as part of the proposed development, the scheme will deliver 31% of the 192 proposed residential units as key worker intermediate accommodation for Imperial or Imperial College Healthcare NHS Trust workers.

14.5.5 The rational for making 31% of the housing available to a local housing group in need (key worker families) is as follows:

- § attracting and developing research and teaching staff is at the core of Imperial's academic mission;
- § research assistants, frequently at the start of their academic careers, make a particularly important contribution to the work of College - currently, the College employs 354 research assistants on an average, annual salary of £29,000;
- § however, a key difficulty for these staff is the acute lack of affordable accommodation in London (especially for those with families) and the fact they are not covered by the GLA's definition of a key worker;
- § the application would make a real difference by creating 59 key worker units (of which 27 would be family units) which would be ideally suited to the University research staff; &

§ these units would be covered by the comprehensive site management plan that Imperial will implement across the application site, ensuring that the long-term upkeep and security of the properties will be protected and maintained to the highest standard.

14.5.6 Additionally, providing these units for key workers will relieve pressure on other existing affordable housing stock in the Borough. The creation of affordable housing units would free-up accommodation for other people in housing need in the Borough.

General Population

14.5.7 Table 14.7 below estimates the population of the development based on the unit mix provided in Table 14.6 above. To estimate the number of residents at the development, the occupancy rate has been derived from the Wandsworth New Housing Survey (Ref 14.25). It is considered that this is a relevant dataset to use because the housing is new, high density and in an inner London location where this approach is accepted as best practice. Assumptions have been made on the unit size as being indicative of the layout proposed.

14.5.8 The tenure of the scheme is not fixed and as such for completeness' sake, average totals from Table 6.10 of Ref 14.25 have been used for the multipliers (X), which includes all owner occupied, housing association and private rented. Numbers are rounded up to calculate total population.

Table 14.7: Estimated population yield of development

Type of Unit	Number of Units	Number of Hab Rooms	Multipliers	Total Population
Studio	17	17	1.33	23
1 bed flat (assumes 2 habitable rooms)	53	106	1.43	152
2 bed small flat (assumes 3 habitable rooms)	30	90	1.83	165
2 bed large flat (assumes 4 habitable rooms)	65	260	2.38	619
3 bed flat (assumes 5 habitable rooms)	25	125	2.61	327
Pent House (assumes 8 habitable rooms)	2	16	3.65	59
Total	**192**	**614**	**n/a**	**1345**

14.5.9 **Assessment of effect:** It is considered that the provision of private and key worker housing will have a long term, direct, local, minor beneficial effect on the mix and quantum of private housing.

Employment Profile and Business

14.5.10 The economic benefits of the proposed development will come about through a number of mechanisms. This section considers the employment effects generated by the construction and operation of the proposed development on Hammersmith & Fulham and on London as a whole. It assesses both direct employment on site and the indirect employment generated through the spending of businesses, employees and residents on goods and services.

14.5.11 The calculations are based upon the development scenario presented by the client.

14.5.12 The estimates are guided by HM Treasury's 'Green Book', which sets out the standard approach to economic impact assessments and informed the Town and Country Planning Environment Impact Assessment Regulations; combined with the most up-to-date specifications about the development with Government ready reckoners and benchmarks, and information from Imperial and LBHF in order to produce the most robust estimates possible.

Construction Phase

14.5.13 The estimated employment yield that will result from the proposed development is summarised below. This section assumes that the site would remain vacant if the project did not go ahead and that there is no employment on site at present. This means that any jobs created by the construction of the development can be considered 'net' additional.

14.5.14 Direct employment estimates are based on broad construction cost figures. A standard approach is to apply a ratio of turnover per employee in the construction industry in order to derive the number of job years associated with a given investment level. This figure is then translated into a job equivalent under the assumption that 10 job years equate to one permanent job.

14.5.15 Aside from the jobs on site, construction activity generates and supports other jobs amongst the suppliers (indirect jobs) and through employees' spend on local goods and services (induced jobs). However, all jobs are not going to go residents of the Borough (leakage) and some will merely relocate from other parts of the Borough (displacement). The latest guidance from English Partnerships and the Department for Business, Innovation & Skills is considered in order to estimate these effects.

14.5.16 Overall, it is estimated that the construction of the proposed development could support the equivalent of around 20-30 net new jobs in the Borough and 60-70 in London as a whole over 2013-2018.

14.5.17 Turnover per head in construction was around £161,440 in 2011. This means that the construction could support approximately 1,239 job years, an equivalent of 124 jobs.

14.5.18 The development programme is estimated to start with buildings C, D and E between 2013-2015, followed by buildings F and G up to 2017 and finishing with Building A. The number of jobs on site will therefore be spread over this whole period.

14.5.19 Table 14.8 summarises the net additional employment effect from the construction phase. Quite a low level of displacement (25%) is estimated at the Borough level as contractors are likely to come from all around London and further afield rather than just from the Borough. However this also means that a very high proportion of the jobs (75%) are unlikely to go to Hammersmith & Fulham residents: contractors often bring their own workforce and commuting patterns for the Borough show a very high reliance on workers from other parts of London. The reverse is true at London level with higher displacement (50%) and low leakage (25%).

Table 14.8: Employment effects on the Borough – Construction Phase

	Hammersmith & Fulham	London
Direct Jobs	124	124
Minus displacement	92	62
Minus Leakage	**23**	**46**
Net direct local jobs	23	46
Multiplier Effect	6	19
Total additional local jobs	**29**	**65**

Operational Phase

14.5.20 During the operational phase, employment effects will stem from the new commercial floorspace created at Imperial West, the academic buildings, jobs in the university's supply chain and jobs supported by the "spend" of residents from the development.

Methodology

14.5.21 The number of direct jobs is estimated using different methods depending on their source:

- for commercial uses, reliance is placed on the floorspace figures by type of use provided as part of the planning application and job density ratios drawn from the latest guidance from the Homes & Communities Agency (2010) are applied. For the incubator unit, this is modified to take into account Imperial's information on this facility and the likely job density;

- for academic space, Imperial's own estimates about the likely job content in terms of teaching and administrative staff have been used. Imperial also provided information about the likely level of displacement of staff from other campuses;

- leakage and displacement factors from The Department of Business, Innovation and Skills (BIS) are applied to calculate the retention of jobs in the Borough;

- indirect and induced employment impacts are estimated through the use of multipliers; 1.25 for the Borough and 1.4 for London; &

- "spend" from the proposed development's residents is estimated using average expenditure figures per household from the latest 2009 Living Costs and Food Survey. Turnover per job in the relevant sectors of expenditure is then applied in order to translate it into employment.

Employment effects: Commercial uses

14.5.22 Based on the commercial floorspace figures, direct job numbers are estimated by applying job density ratios, following HCA guidance, except for offices where the density ratio of 12 sq m per worker used in the London Office Policy Review (LOPR) is applied.

14.5.23 Taking into consideration displacement (estimated to be quite low at Borough level (10%) as this is new space created in the Borough) and leakage (assumed to be very high (75%) for the more highly qualified jobs in offices and the small business unit and high (50%) for the other jobs in retail and hospitality), the commercial space at the proposed development is expected to accommodate approximately 2,200 gross jobs, generating and supporting around 700 net additional jobs in Hammersmith & Fulham and just over 1,800 at London level.

Employment effects: Academic premises

14.5.24 Direct job estimates have been provided by Imperial. Imperial estimate that the academic premises will accommodate around 900 jobs.

14.5.25 With regard to additionality the following assumptions have been made:

14.5.26 Imperial estimate that, as a result of the move to the new development, the number of jobs in the academic building would expand from 600 currently to 900. This means that while there will be no displacement at Borough level at London level 600 jobs will be displaced.

14.5.27 Leakage is assumed to be very high (75%) at Borough level because a large proportion of the staff is likely to come from other Boroughs in London and other parts of England. At London level on the other hand a low level of leakage (25%) is assumed.

14.5.28 From this, it is estimated that the new academic space will support a total of 900 gross direct jobs, generating around 506 new jobs in the Borough. Taking into account the displacement of employment from existing Imperial campuses the development is expected to support 540 new jobs in London. These calculations do not however take into account that the proposed development will free up existing space in other campuses, which in turn will allow existing departments to expand and new institutes to set up.

Employment effects: Community uses

14.5.29 Based on Imperial's assumptions on occupancy levels, combined with NHS information, it is assumed that the fitness centre, day nursery, academic health care facility and (in the Wood Lane Studios at Imperial West development) a community centre, will accommodate approximately 59 gross direct jobs, leading to around 30 additional jobs for the Borough and 50-60 for London.

14.5.30 **Assessment of effect:** It is considered that the proposals will have a temporary, direct, local, minor beneficial effect on the provision of construction employment and a long term, direct, minor beneficial effect on the provision of employment.

Residential Expenditure effects

14.5.31 Based on the latest data on household expenditure in London and average turnover per employee by broad sector in the UK, the development's new residents are likely to spend approximately £2.2m a year excluding mortgages and holidays. In order to estimate the likely spend in the area around the site (this is likely to largely benefit Westfield) assumptions have been made on the level of retention of spend within the Borough (high i.e. 75%, medium i.e. 50% or low i.e. 25%) by type of expenditure.

14.5.32 A proportion of the residents moving into the development will come from other parts of Hammersmith & Fulham merely producing a displacement of expenditure. Their effect should therefore not be attributed to the development. It has been assumed that 25% of residents will be existing Borough residents. This means that £1.71m spent in Hammersmith & Fulham by the development's residents can be considered additional. This would support 20-25 jobs in retail, restaurants, cafes, and personal services (e.g. hairdressers).

14.5.33 At London level, leakage of expenditure is likely to be very low. On the other hand, displacement will be very high. These combined effects would result in an additional 11 jobs in London from the spend of the development's residents.

Conclusion

14.5.34 Based on the information provided and the assumptions described in this chapter, it is estimated that the development could accommodate a total of around 3,200 jobs, nearly one third of the total jobs target for the White City Opportunity Area. Taking into account additionality and multiplier effects, the proposed development could support 1,250 new jobs in Hammersmith & Fulham and 2,400 in London.

14.5.35 **Assessment of Effect:** It is considered that the proposals will have a long term, direct, minor beneficial effect on the local economy.

Education and Learning

14.5.36 The development will result in an increased demand for education in relation to the baseline if any households with children occupy the residential units. By applying child yield multipliers to the housing schedule, an age profile of the children expected to reside in the proposed development can be determined.

14.5.37 GLA DMAG (Ref 14.28) child yield briefing contains a survey of new build flats and houses in Wandsworth, which calculates child occupancy rates for such developments. These rates are applicable to other new build, high density inner London developments. An average rate combining owner occupied, social rented and private rented (based on Table 2) has been assumed, to produce the following average child yield shown in Table 14.9 which then taking into account the anticipated number of habitable rooms produces the estimated child yield in Table 14.10.

Table 14.9: Average Child Yield (per habitable room basis)

Age	Average Child Yield per habitable room basis					
	1	**2**	**3**	**4**	**5**	**6**
0-4	0	0.023	0.04666	0.13666	0.15333	0.18666
5-10	0	0	0.02	0.14666	0.22	0.21
11-15	0	0	0.01	0.07666	0.20333	0.20666

Table 14.10: Estimated Child Yield

	Child Yield						
Habitable Rooms	**1**	**2**	**3**	**4**	**5**	**6+**	**Total**
No of Units	17	53	30	65	25	2	**192**
0-4	0	2	2	9	4	1	**18**
5-10	0	0	1	10	6	1	**18**
11-15	0	0	1	5	6	1	**13**
Total Child	0	2	4	24	16	3	**49**

14.5.38 There are a number of assumptions that must be borne in mind when considering this child yield and the subsequent effect on schools:

- § figures have been rounded up, which provides the worst-case scenario;
- § using the overall average of owner occupied, social rented and private rented is likely to give an artificially high child yield, because it is anticipated that the scheme will not deliver an equal share of all tenures;
- § not all children aged 0-4 will attend nursery and the number of hours attended will vary;
- § secondary school children tend to travel further and it is appropriate to consider education provision on a Borough-wide basis; &
- § there is likely to be some leakage of pupils out of LBHF's maintained school system to other London Boroughs and also to the independent sector.

14.5.39 The school capacity ONS statistics for 2010 showed that there was a surplus of 459 places at Local Authority maintained primary schools in LBHF and 353 surplus places at LA maintained secondary schools within the Borough (ref 14.32). Therefore there is significant capacity within primary and secondary schools for the estimated additional children which will be resident as a result of this development. In relation to the pre-school early years education, this is a constantly changing situation and it would be very difficult to assess whether there is capacity for 2 additional children however given that the number of children is so low it is deemed reasonable to assume that there would be an insignificant effect on this provision.

14.5.40 **Assessment of effect:** It is considered that the proposals will have a long term, direct, local, minor beneficial effect on education and learning.

Health Care

14.5.41 The current baseline illustrates that LBHF is currently slightly below the target of one GP catering for 1,700 patients.

14.5.42 Based on the accommodation schedule, it is estimated that 1,345 people will become residents in the development. Taking into account the current existing population, and the fact that the Imperial West scheme introduces a new health centre on the site; it is reasonable to assume that there will be no adverse effect on local health care.

14.5.43 **Assessment of Effect:** Given the provision on site of a range of facilities it is considered that the proposals will have a long term, direct, local, minor beneficial effect on the provision of healthcare.

Open Space, Cultural and Sports Facilities

14.5.44 Landscape concepts for the development are set out in the landscape sections of the Design and Access Statements submitted with this planning application.

14.5.45 A central public square of some 5000 sq m is proposed to be provided in the centre of the site. This is the principal public space within the development incorporating the main pedestrian circulation around and between the buildings.

14.5.46 A clear area of lawn of some 1376.6 sq m will be safeguarded within the Central Square that could accommodate a variety of playspace, informal passive and managed activities. A terraced area of some 483 sq m will be provide on the southern end of the square.

14.5.47 These are important in promoting social cohesion and positively integrating the new residential population within the wider community.

14.5.48 **Assessment of Effect:** It is considered that the proposals will have a long term, direct, local, minor beneficial effect on the provision of open space, cultural and sports facilities.

Community Safety and Crime

14.5.49 The development would provide a number of uses which would help to 'animate' the site which, aside from the construction of the Wood Lane Studios development, is currently vacant. These uses will bring vitality to the site.

14.5.50 Imperial's consultant team has worked with the Crime Prevention and Design Officer to ensure that the site functions in a safe manner. Interventions include natural surveillance, secure design, active street frontages, well-managed open spaced and public realm, all of which would be incorporated to reduce the potential for incidents of crime to occur within the development. The development will help to improve the overall real and perceived levels of crime and safety in the local community.

14.5.51 Submitted with the application is a Site Management Plan which outlines the way in which Imperial intend to manage the site. This confirms that 24hr security will be provided on site.

14.5.52 **Assessment of Effect:** It is considered that the proposals will have a long term, direct, local, minor beneficial effect on community safety and crime.

14.6 (EVALUATION OF) SIGNIFICANCE OF RESIDUAL EFFECTS

14.6.1 The proposed development would have a range of socio-economic effects as set out above. The significance of these effects is summarised here.

14.6.2 The demolition and construction phase of the proposed development would generate construction employment. Given the nature of the construction industry this would not have a significant effect at the local or district level. Therefore it is assessed that the significance of construction phase of the proposed development on construction employment would be negligible.

14.6.3 The proposed development includes the provision of 192 residential units which equates to 31% of the Borough's annual housing targets. It is therefore assessed that the proposed development would be of minor beneficial significance at the local level.

14.6.4 The residential population of the proposed development would create additional demand for community facilities, including schools, and in particular healthcare. However, given that the development proposes healthcare provision on site, it is assessed that the effect of proposed development on healthcare would be of minor benefit at the local level. It is assessed that the effect of proposed development on schools would be negligible.

14.6.5 The proposed development includes the provision of additional commercial floorspace which would generate additional employment of approximately 750 net additional jobs in Hammersmith & Fulham and 2,200 at London level. It is therefore assessed that the proposed development would be of moderate beneficial significance at the local level and of minor beneficial significance at the regional level.

14.6.6 The employees and resident users of the detailed elements of the proposed development would generate additional spending. A significant amount of this would be expected to be captured locally. It is assessed that the total indirect effect of additional spending would be of moderate beneficial significance at the local level.

14.6.7 The new residents would create a demand for open space and playspace. The proposed development includes the provision of open space and playspace in line with the policy objectives set out in the GLA's SPG and contributes to the objectives of White City OAPF in terms of open space provision for the wider area. It is therefore assessed that the effect of the proposed development on open space is of moderate beneficial significance at the local level and minor beneficial significance at the district level.

14.6.8 The proposed development has been designed to reduce the opportunity for crime and improve the perception of security. It is therefore assessed that the proposed development would be of minor beneficial significance at the local level.

14.7 SCOPE FOR MITIGATION

14.7.1 This Chapter has outlined the potential effect of the development in terms of socio-economic indicators. It has concluded that whilst scale varies across the different indicators, there will be a beneficial effect in all cases.

Demolition and Construction

14.7.2 No significant adverse socio-economic effects are predicted during the demolition and construction of the development, therefore no mitigation measures would be required.

Operational Phase

14.7.3 Beneficial effects include:

- § an increase in local employment opportunities, both direct and indirect and contribute to creating a skilled workforce;
- § economic benefits as a result of additional population and spending in the Borough and wider area;
- § improvements to public realm;
- § improvement to visual aesthetics of the scheme;
- § improvements to permeability of site for pedestrians, cyclists and other vehicles; &
- § provision of additional education, health and research facilities.

14.7.4 The assessment of all other potential socio-economic effects of the completed development shows that all other effects are either beneficial or negligible. As such, additional mitigation is not required.

14.8 EVALUATION OF RESIDUAL EFFECTS

14.8.1 The above analysis has illustrated that there will be a number of residual effects which are summarised in Table 14.12 below:

Table 14.11: Residual Effects Summary

Socio-economic Indicator	Summary
Housing Profile and Housing Need	Long term, direct, local, minor beneficial effect on the mix and quantum of private net additional housing stock and key worker provision.
Employment Profile	Temporary, direct, local, minor beneficial effect on the provision of construction employment. Long term, direct, minor beneficial effect on the provision of employment.
Local spend	Long term, direct, minor beneficial effect on the local economy.
Education and Learning	Long term, direct, local, minor beneficial effect on education and learning.
Health Care	Long term, direct, local, minor beneficial effect on the provision of healthcare.
Open Space, Cultural and Sports Facilities	Long term, direct, local, minor beneficial effect on the provision of open space, cultural and sports facilities.
Community Safety and Crime	Long term, direct, local, minor beneficial effect on community safety and crime.

14.9 MONITORING

14.9.1 Due to the beneficial nature of the effects, it is considered that specific monitoring proposals are not required.

REFERENCES

14.1 LBHF Annual Monitoring Report 2009/10

14.2 ONS Census Data

14.3 ONS Mid-Year Statistics 2009

14.4 The LBHF PCT Strategic Plan for 2009-2014

14.5 ONS Indices of Deprivation Local Authority Summaries 2010

14.6 LBHF Housing Needs Survey 2004 (this is the latest publication)

14.7 GLA Intelligence Update January 2010 DMAG Demography Team The London plan Borough Demographic Projections

14.8 LBHF's Housing Strategy (2007-2014) (this is the latest publication)

14.9 LBHF Children and Young People's Review 2009

14.10 LBHF Website: http://www.lbhf.gov.uk/Directory/Education_and_Learning/Schools_and_Colleges/General_Information_and_support/locations_and_contacts Accessed 01/11/2011 Information also retrieved from links to ofsted website.

14.11 Department for Education Local Authority Cross Border Movement January 2009

14.12 LBHF Childcare Sufficiency Assessment 2008-2011

14.13 LBHF Primary and Special schools strategy: proposals for implementation March 2007

14.14 LBHF Secondary School Strategy for Hammersmith & Fulham: A Summary (Appendix C) November 2006

14.15 The LBHF PCT Strategic Plan for 2009-2014

14.16 LBHF NHS Hammersmith and Fulham Annual Report 2010/2011

14.17 Care Quality Commission 2009

14.18 LBHF's PCT Medical Performers List 22/02/10 ?? [Update awaited AJ]

14.19 Hammersmith & Fulham NHS Primary Care Trust Your Guide to Local Health Services 2011

14.20 GLA CABE Open Space Strategies Best Practice Guidance 2009

14.21 LBHF Parks and Open Space Strategy 2008-2018

14.22 LBHF UDP Figure 4.1 Open Space Deficiency 2003

14.23 Metropolitan Police Crime Figures 12 Months to September 2010 and 12 Months to September 2011

14.24 Hammersmith & Fulham Crime Reduction Partnership Plan 2008-2011

14.25 Wandsworth New Housing Survey 2004

14.26 ONS Output and Employment in the Construction Industry Q1 2008

14.27 ONS Family Spending A report on the 2008 Living Costs and Food Survey

14.28 GLA Data Management and Analysis Group Child Yield DMAG Briefing 2005/25 August 2005

14.29 LBHF Housing 2006

14.30 LBHF Community Strategy 2007 – 2014

14.31 LBHF Core Strategy (October 2011)

14.32 DoE LA maintained secondary schools SCHOOL CAPACITY May 2010

15. Ecology / Biodiversity

15.1 INTRODUCTION

15.1.1 This Chapter considers and assesses the potential effects of the proposed development upon the biodiversity and ecological resources of the application site. The Chapter provides a description of the methods – including desk and field surveys - undertaken to inform the assessment; an evaluation of the existing baseline condition in terms of the ecological resource present on site and in the surrounding area; the identification of the principal ecological receptors in terms of habitats, flora and fauna etc; the identification of the potential effects likely to arise as a result of the development; the identification of mitigation measures and potential for enhancement; & an assessment of the residual effects following mitigation and/or enhancement. The Chapter is based upon an ecological desk study, a Phase 1 ecological survey, an arboricultural survey and bat survey. Much of the survey work involved assessment of the wider site within Imperial's ownership as this represents a more complete picture of ecological interests likely to be affected by the application site proposals.

Assessment Methodology and Significance Criteria

15.1.2 The assessment methodology involved undertaking an ecological scoping study, which identified potential risks on ecology from the redevelopment of the site and outlined the ecology assessment methodology. This consists of a desk study and biological data searches. A Phase 1 ecological survey, arboricultural study and bat survey have been carried out.

15.1.3 The impacts on ecology have been assigned significance criteria. Significance can be described in the following terms: major; moderate; minor; negligible; and none.

Phase 1[1] Ecological Survey

15.1.4 An ecological Phase 1 survey was undertaken at the site. This involved surveying the whole land area within Imperial's ownership and identifying species and habitats and assessing potential ecological risks that may affect the redevelopment and thereby inform the potential effects of the development upon ecological resources. The survey was carried out in accordance with the Joint Nature Conservation Committee Handbook for Phase 1 Habitat Surveys (Ref: 15.1). The survey was undertaken on Tuesday 27th October 2009. A further survey was undertaken on Tuesday 9th November 2011 to update the earlier survey and to take account of the development of the Wood Lane Studios at Imperial West Development. The National Grid Reference for the site is: 523243,181180.

15.1.5 Figure 15.1 shows the current site layout of the wider site and the main parts of the site that were surveyed. The Figure also shows ecological target notes, which are referred to in later sections of this chapter.

[1] Phase 1 – an Ecological Survey term not to be confused with Phase 1 of the development.

Figure 15.1: Habitat Survey and Target Notes

15.1.6 The weather conditions during the October 2009 survey were dry and mostly overcast with some sunny spells and a gentle breeze. The conditions during the November 2011 survey were mild and dry and mostly overcast with some sunny spells.

15.1.7 The site currently comprises one sports centre and one office now utilised as construction site offices, roadways, hardstanding, car park, security cabin and disturbed ground associated with site operations. The site also contains a small area of amenity grassland, and a number of scattered trees which are predominantly located on the site boundaries.

15.1.8 The site is bounded to the west by Wood Lane, which is a busy road that directs traffic south into Shepherd's Bush and onto the A40, which runs east and west and borders the site to the south. Directly to the north is a construction site Wood Lane Studios at Imperial West which is bounded to the north by the residential area of Shinfield Street. To the east is the railway line that leads south to Earls Court. There is Network Rail land on this boundary that is separated from the site by a steel palisade fence. The land includes a 20m strip of scrub embankment that has the potential to provide a habitat corridor for wildlife and has more ecologically diverse habitats along the railway line than those on the site. Although it is not anticipated that site operations would have any significant or long term residual effects on wildlife that may utilize this area, as they would be free to move in an easterly or southerly direction during the operational phase. Furthermore the site contains little of ecological value for protected species to migrate into besides the small groups of trees, which are predominantly semi mature and have potential for a limited amount of nesting bird species. The site would be better served by replacing current trees with high yield species such as oak, rowan, hawthorn and apple which would give higher net gains in terms of biodiversity. This would be achieved by creating cover and providing a food source for a broader spectrum of small passerine bird species and invertebrates.

Arboricultural Survey

15.1.9 On Tuesday 27th October 2009 a preliminary tree survey was undertaken at the wider site. The weather conditions during the survey were dry and mostly overcast with some sunny spells and a gentle breeze.

15.1.10 The purpose of the survey was to identify trees on the site and provide a rough indication of their size and condition.

15.1.11 Located mainly around the wider site boundaries are areas of planted borders and amenity grassland which contain the majority of the trees at the site.

15.1.12 During the tree survey, a simple age class assessment of the trees was undertaken, which classes trees as: "Y" young; "SM" semi mature; "M" mature; or "D" declining. This system roughly divides the lifespan of a tree into four quarters, such that a young tree would be deemed to be within the first quarter of its lifespan.

15.1.13 Measurements were also taken of trunk diameter at breast height (DBH – i.e. 1.3m above ground level), which is used to determine RPA using the following formula: $RPA = \pi(DBH \times 12)^2$

15.1.14 A general visual assessment of each tree was carried out and a recommendation made as to whether any maintenance measures might need to be considered.

15.1.15 Root Protection Areas (RPAs) were calculated using guidance in BS 5873:2005 (Ref: 15.2). The attached Figure 15.2 shows the current site layout and the locations of the trees surveyed. Each tree is identified by a number and the RPAs are shown around each tree.

Bat Inspection

15.1.16 A bat inspection was carried out on 18th February 2010 and a bat activity and dawn return survey was carried out on Thursday 13th May 2010. The bat inspection involved a desk study, internal building inspection and external building inspection. The activity and dawn return survey adopted the standard methodology described in the Bat Conservation Trust (Ref 15.3: BCT – Bat Surveys, Good Practice Guidelines, 2007). A data search was undertaken with London Bat Group for all bat records on and within 2km of the site. Further bat surveys were undertaken in 2011 on 1st July. These involved an activity survey and a dusk and dawn return survey.

15.1.17 The survey methodology followed the bat inspection guidelines recommended by the Bat Conservation Trust (Ref 15.3: BCT – Bat Surveys, Good Practice Guidelines, 2007).

15.1.18 An internal inspection of the buildings within the wider site was undertaken in which all accessible areas were searched for field signs such as bats, bat droppings, urine stains, bat feeding remains (moth wings, insect cases), bat staining, distinctive smell of bats, scratch marks and smoothing of surfaces which would indicate a roost site. An assessment of the potential of the building was also made during the survey, i.e. searching for suitable roosting crevices. High power torches (Cluson Clu-lite 500,000

candlepower), close focus binoculars and ladders were used to aid the survey.

15.1.19 An external search of each building was also undertaken, again checking for field signs of bats. Particular attention was paid to windowsills, windowpanes and ledges. The building was also assessed for potential bat roosting features.

15.1.20 The daytime internal and external inspections surveys were undertaken by Jo Bates MSc, BSc (Hons) (Natural England Licence Number 20093825) and James Segar MSc, BSc (Hons).

15.1.21 Natural England's Bat Mitigation Guidelines (2004) state that a significant bat roost can normally be determined on a single visit at any time of the year, provided that the entire structure is accessible and that signs of bats have not been removed by others (Ref: 15.4).

15.1.22 Building descriptions are provided below in Table 15.1, photographs are shown in table 15.2. The locations of the buildings are shown on Figures 15.3 and 15.4.

15.1.23 The 2011 bat surveys were undertaken by Crystal Leung BSc (Hons) (Natural England License Number 20113433) and Karl Dentith BSc (Hons).

Bat Activity and Dawn Return Survey

15.1.24 A bat activity and dawn return survey was carried out on Thursday 13th May 2010 by Jo Bates MSc, BSc (Hons) (Natural England Licence Number 20093825) and James Segar MSc, BSc (Hons). The survey began at 02:15 and finished at 04:30, sunrise was at approx. 04:20. The temperature during the survey was 13°C.

15.1.25 The survey followed standard methodology as described in the Bat Conservation Trust (2007) 'Bat Surveys Good Practice Guidelines'. The surveyors used duel heterodyne and frequency division detectors (Bat-box duet) connected to a recording device (Edirol R-09) to aid in identification, if required, using sound analysis software (BatSound).

15.1.26 The survey comprised two parts; the activity transect and the dawn return survey. The activity transect was carried out to gather information on any bat activity in the area. This information, along with the results from the bat building inspection was used to identify areas to focus the dawn return survey on.

15.1.27 Between 02:15 and 03:15 an activity transect was carried out around the entire Woodlands site. The two surveyors started at opposite ends of the activity transect and walked along the transect crossing each other half way, then returning once they reached the end. This continued at walking pace until the dawn return survey began. The plan showing the path of the activity transect is shown in Figure 15.3.

15.1.28 Between 03:15 and 04:30 the buildings on the wider site considered to have the highest potential as bat roost habitat were subject to a dawn return survey. The surveyors concentrated efforts on the buildings adjacent to the railway line running along the north eastern edge of the site, focussing particularly on building 4 (a substation) and building 6 (large boiler room present) as these buildings were the only buildings with potential as bat roost habitat. The plan showing the locations of the surveyors is shown in Figure 15.4.

15.1.29 The timing of the survey was within the optimal period for the identification of active bat roosts (May to August).

15.1.30 A bat activity and dawn return survey was also carried out on 1st July 2011 by Crystal Leung and Karl Dentith.

15.1.31 The survey followed standard methodology as described in the Bat Conservation Trust (2007) 'Bat Surveys Good Practice Guidelines'. The surveyors used duel heterodyne and frequency division detectors.

15.1.32 A bat emergence survey involving the observation of likely exit/entry points on the trees and buildings began approximately one and a half hours before sunset until an hour and a half after sunset. The dawn re-entry survey began an hour and a half before sunrise until just after sunrise in accordance with the Bat Conservation Trust - Bat Survey Guidelines.

15.1.33 After the Bat Emergence (Dusk) and Re-entry (Dawn) Surveys have been completed, activity surveys will be conducted on the remaining buildings and trees on site. The surveys will involve walking along transect routes, and recording the species, behaviour (i.e. feeding, commuting) and flight paths of any bats observed flying around the buildings.

15.2 EXISTING BASELINE CONDITIONS

15.2.1 As part of the ecological works an ecological phase 1 desk study, biological records search and bat records search were undertaken, as described below.

Ecological Phase 1 Desk study

15.2.2 A desk study was undertaken using various information resources such as Natural England and the local planning authority. Google aerial photos were also viewed to identify habitats in the surrounding areas.

15.2.3 There are no statutory designated sites of ecological interest in the immediate area of the site that could be directly affected by redevelopment activity on it. The closest designated site is the Wormwood Scrubs Local Nature Reserve (LNR) 0.5km to the north north west.

15.2.4 Railway land to the east of the application site is identified as a 'Rail Side Habitat' designated within the LBHF UDP as a Nature Conservation Area – Area of Grade I Borough-wide Importance.

15.2.5 There do not appear to be any records of bird species listed under Schedule 1 of the Wildlife and Countryside Act 1981, close to the site. There also do not appear to be any specific species of wildlife included in the London Borough of Hammersmith & Fulham's Biodiversity Action Plan (BAP) that are likely to be significantly affected by the redevelopment of the site. Black redstart is mentioned in the BAP, but only1-2 breeding pairs regularly visit the borough and this tends to be in to the south east corner away from the site.

15.2.6 Historic mapping shows that the site and surrounding area was predominantly arable fields from at least 1870. Development of the residential area north from Shinfield Street appears on maps from at least 1915. Buildings on the site do not appear on available maps until 1938. The age of the buildings currently on site appear to be from around the 1970s.

Biological Records Search

15.2.7 An Ecological Data Search was carried out by GiGL (Greenspace Information for Greater London) for the Woodlands site and surrounding land to a 1km radius

15.2.8 The report showed that there are no sites with European or National statutory designations within the search area.

15.2.9 Sites of Importance for Nature Conservation (SINCs) are non-statutory and are identified by the Greater London Authority on account of their flora and fauna.

15.2.10 GiGl currently does not hold comprehensive species data for all areas. Even where data is held, a lack of records for a species in a defined geographical area does not necessarily mean that a species does not occur there – the area may simply not have been surveyed. Below is a list of protected species and those that are National or London Biodiversity Action Plan (BAP) priority species that have bee recorded within the search radius.

- § cornflower (Centaura cyanus);
- § populus nigra (Populus nigra subsp. Betulifolia);
- § cinnabar (Tyria jacobaeae);
- § common frog (Rana temporaria);
- § common lizard (Zootoca vivipara);
- § common starling (Sturnus vulgaris);
- § house sparrow (Passer domesticus);

§ European hedgehog (Erinaceus europaeus); &

§ pipistrelle bats.

Bat Inspection

15.2.11 The data search with London Bat Group returned records of six different bat species from 1985 to 2009. Species recorded are common pipistrelle (Pipistrellus pipistrelles), soprano pipistrelle (Pipistrellus pygmaeus), Leisler's bat (Nyctalus leisleri), noctule (Nyctalus noctula), Daubenton's bat (Myotis daubentonii) and the brown long eared bat (Plecotus auritus).

15.2.12 Only one roost record was returned; a common pipistrelle (Pipistrellus pipistrellus) roost 1.25km north of the site. The only details of the roost are that it was recorded in a cemetery.

15.2.13 There are no records within 0.5km of the site and the majority of the records returned are clustered around the Grand Union Canal, over 1km north of the site in the vicinity of the recorded roost.

Survey Results

15.2.14 Below the paragraphs describe the results from the Phase 1 ecological survey, arboricultural study and bat survey.

Phase 1 Ecological Survey

15.2.15 A summary of the target notes marked on Figure 15.1 and described below is shown in the following Table 15.3.

Ecological Description of Compartments

15.2.16 A summary of the target notes marked on Figure 15.1 and described below is shown in the following Table 15.1.

Table 15.1: Habitat Survey and Target Notes

Number	Description
1	Trees
2	Railway embankment
3	Existing buildings
4	Car parking area
5	Access road
6	Bare ground

15.2.17 Amenity grass areas are present in the north west corner of the site and along the eastern boundary adjacent to the railway embankment. The trees are located in the north west and south west corners of the site and along the eastern boundary.

15.2.18 A number of common ruderal plant species were identified during the survey which generally concur with the findings of an earlier survey and are listed as follows: willowherb (Epilobium spp); dock (Rumex spp); ivy (Hedera helix); dandelion (Taraxacum officinale); buddleja (Budleja davidii); plantain (Plantago spp); creeping buttercup (Ranunculus repens); speedwell (Veronica spp); and smooth sow thistle (Sonchus oleraceus).

15.2.19 For the purposes of the survey the site has been divided into five separate areas, which are described in the following sections.

Western Area

15.2.20 This area includes a small amount of amenity grassland of low ecological value in the north west corner, which also contains a number of semi mature Norway maple (Acer platanus) these trees which have limited ecological value for a number of common bird species. The rest of this area comprises an access road, hard standing and a security cabin no ecological risks are associated with these features during the survey.

Figure 15.2: View of south west corner showing trees retained directly adjacent to the site within the zone of influence.

Southern Area

15.2.21 The southern area of the site contains car parking areas with trees and some planted borders. A small thin strip of grass runs along the southern boundary. There is also a single fruit (probably Prunus or Malus spp) tree in a wooden, box planter, which could easily be moved from site, if need be.

Figure 15.3: View looking in a north easterly direction across the central area of the site with the adjacent development in the background

Eastern Area

15.2.22 The eastern area of the site contains a small strip of mown grass, which is planted with trees along much of the northern half of the boundary. This area borders the adjacent Network Rail land, which contains a mixture of scrub and tree species including: bramble (Rubus fruticosus agg); elder (Sambucus nigra); bindweed (Calystegia sepium); willoherb (Epilobium spp); stinging nettle (Urtica dioica); and spear thistle (Cirsium vulgare). It is not anticipated that site operations adjacent to this area would pose any significant ecological risk or cause any residual impacts to the adjacent zone of influence. If trees within this area need to be removed as part of the development proposal it should be done outside of the bird breeding season March to August and the trees would need to be free from Tree Preservation Orders.

Figure 15.4: View of eastern area, looking south adjacent to the railway

Northern Area

15.2.23 The northern area of the site is currently directly adjacent to a construction site which is undergoing extensive site operations and which backs onto Shinfield Street. Besides a line of trees on the northern boundary of the adjacent site there are no ecological constraint's identified within this area.

15.2.24 The trees that are predominantly located along site boundaries have some potential for nesting birds and should not be disturbed during the breeding season from March to August inclusive, unless a suitably qualified ecologist deems them free of nests or a buffer zone is created until the young have fledged.

Central Area

15.2.25 The central area of the site is an operational construction zone and is covered in crushed concrete and is used for storage of construction materials, it is heavily used and there are no habitats within this area with the potential to support protected species, it is not anticipated that any ecological risks are associated within this area.

Figure 15.5: View of central area of site, looking north at the adjacent development site

Arboricultural Survey

15.2.26 The locations of the trees surveyed are shown on Figure 15.2. Also shown on Figure 15.2 are the RPAs of each tree. The entire, wider Woodlands site was surveyed. The application site boundary is also shown on Figure 15.2, which illustrates which trees will potentially be affected by the proposed redevelopment works.

15.2.27 Details of the trees shown on Figure 15.2 are given in the table in Appendix 15.1. This provides each tree with an identifying number that links with the numbers on Figure 15.2. It also identifies the tree species and presents the DBH, age class and category grading. Category gradings are based on guidance in BS 5873:20051, such that: Class A represents trees of high quality; Class B represents trees of moderate quality; and Class C represents trees of low quality. Class R trees are deemed to be those that are diseased, dangerous and/or are unlikely to survive the next ten or so years.

15.2.28 Correspondence with the local authority has revealed that there are no Tree Preservation Orders affecting the trees on the wider Woodlands site.

Bat Inspection

15.2.29 The only buildings with any potential as a bat roost are buildings 4 and 6, of which only building 4 is within the application site. This is due to the heat from the former sub-station and boiler room providing a stable temperature environment. However, no access for bats or evidence of bats was recorded during the bat inspection in buildings 4 or 6.

15.2.30 Although there was possible access for bats into building 8, the access points were above a number of ground floor doors and the bat roost access was limited.

15.2.31 Potential bat foraging habitat on site is limited to small areas of scrub and trees. A railway line runs along the eastern boundary of the site, the scrub covered embankment providing potential bat foraging habitat. The railway line could also act as a commuting corridor for bats, providing access to and from Wormwood Scrubs LNR located approximately 0.5km north of the site. However, the site is considered to be of low potential value for foraging or roosting bats.

15.2.32 Overall the buildings are in good condition with very few features considered suitable for use as bat roosting habitat. Along with limited roosting opportunities the wider Woodlands site also has limited foraging opportunities and therefore the site is considered to be of low value as potential bat roost habitat. During the internal inspection no evidence of bats was identified.

Bat Activity and Dawn Return Survey

15.2.33 The plan showing the path of the activity transect is shown in Figure 15.3. This covered the entire boundary of the wider Woodlands site.

15.2.34 The plan showing the results of the dawn return survey is shown in Figure 15.4.

15.2.35 A single distant indeterminate bat was recorded at 04:15; however it was not active on site. Due to the distance of the bat from the surveyors, and the short duration of the encounter, a positive species or genus identification was not possible.

15.2.36 No other bat activity was recorded during the bat activity and dawn return survey.

15.2.37 No bat activity was recorded during the 2011 dawn and dusk survey. Figure 15.5 shows the transect path walked by the surveyors.

15.2.38 No bats were observed exiting or entering any of the remaining buildings or trees on site during the emergence and re-entry surveys.

15.2.39 No bats were observed or heard flying around the site during the activity survey along the transect route, which is marked on Figure 15.5.

Policy Framework

15.2.40 The London Borough of Hammersmith and Fulham Unitary Development Plan (UDP) sets out policies to protect the environment and biodiversity.

15.2.41 The following is a list of policies from the UDP that affect ecology and are relevant to the proposed Woodlands site redevelopment.

§ Policy G3: Environment: The council will seek to conserve, protect and enhance the quality, character and identity of the borough's built and open environment; and to address wider environmental issues such as the sustainability of development and growth, global warming, and resource and energy conservation, as far as possible through local land-use and transportation planning.

§ Open Space and Nature Conservation - Policy EN28A: Permission will not be granted for development that would have a demonstrably harmful effect on a protected species, or the habitat of a protected species, unless planning conditions can be imposed, or a planning obligation is in place, to: (a) facilitate the survival of the species on site; or (b) cause minimum disturbance of the species and its habitat; or (c) sustain current levels of the species' population in an alternative location.

§ The land to the east of the site is designated as EN27 Nature Conservation Areas BI.7 rail side habitats. EN27 ensures Nature Conservation Areas are protected from development likely to cause demonstrable harm to their wildlife value.

Local Biodiversity Action Plan

15.2.42 There do not appear to be any specific species of wildlife included in the London Borough of Hammersmith & Fulham's Biodiversity Action Plan (BAP) that are likely to be significantly affected by the redevelopment of the site. Black redstart is mentioned in the BAP, but only 1-2 breeding pairs regularly visit the borough and this tends to be in the south eastern areas of the borough.

15.3 IDENTIFICATION & EVALUATION OF KEY EFFECTS

15.3.1 Described below are the potential ecological risks and effects associated with the redevelopment from the Phase 1 ecological survey, arboricultural study and bat survey.

Phase 1 Ecology Survey

15.3.2 During the site surveys no clear evidence of protected species that might be directly affecting or affected by the proposed redevelopment of the site was found. There was evidence of some large mammal activity accessing the site from the railway embankment to the east, but this is probably caused by foxes, which do not have any special protection.

15.3.3 Small parts of the site, mainly around the boundaries, contain planted borders and/or amenity grassland with young to semi mature trees (which are described in detail in the arboricultural survey). The grass and planted borders offer very little ecological value. Many of the trees provide suitable habitat for nesting birds but are otherwise without legal protection or significant ecological value. The surrounding areas and wider Woodlands site are relatively free of trees or other habitat so there is currently little scope for developing extended wildlife corridors from the site. The only area of linking habitat that could provide a corridor to more ecologically diverse areas is a thin buffer of off-site scrub that runs along the railway to the east of the site.

15.3.4 The buildings and various covered areas of the site could feasibly provide habitat for bats. However, there is little adjoining habitat in the surrounding areas that would attract foraging bats; although the railway line could provide a suitable feature for bats to navigate along, possibly from the Wormwood Scrubs LNR to the north. All of the trees at the site are too young and are without features such as ivy, cracks or rot hollows that could provide suitable bat roosts (see bat section for more details on bats).

15.3.5 With regard to other protected species risks that can sometimes affect urban sites: there is no optimal cover at or adjacent to the site for reptiles; and no evidence of badgers was found on or adjacent to the site.

15.3.6 The main ecological risks relevant to the proposed redevelopment of part of the Woodlands site are mentioned in Table 15.2 below.

Table 15.2: Recommendations for actions on potential ecological risks

Survey Area	Feature/Risk	Recommendation
All areas	Bird nesting habitat	If any trees on the site are to be removed, this should be done outside of the bird nesting season, which runs from March until August.
	Retained trees	For retained trees, Root Protection Areas (see tree survey report) should be marked out before any demolition or construction works take place.

Arboricultural Survey

15.3.7 None of the trees at the site are protected or are old enough to offer significant ecological benefit.

15.3.8 The majority of the trees are naturalised or native species, which makes them potentially more valuable for supporting biodiversity. However, they are relatively isolated at the site and do not directly link with other areas of trees and woodland.

15.3.9 None of the trees have features that might make them suitable for supporting bats. They are, however, suitable for nesting birds, which must be considered if any works are to take place to any of the trees during the nesting season, from March to August.

15.3.10 The trees that front Shinfield Street provide significant amenity to the local area.

15.3.11 It is advised that a Tree Protection Plan is produced for any trees that are proposed to be retained in order to avoid damage to roots in the suggested RPAs from intrusive ground works or from the demolition of existing structures. A method statement for the tree protection works will need to be prepared. This will then need to be approved by the local authority at the appropriate time before any works take place on the site.

Bat Inspection

15.3.12 It is considered that the demolition of the buildings on site will have a negligible effect upon the bat populations in the area. This is due to the lack of evidence of bats utilising the site as a roost, as a foraging site or for commuting. The limited suitable foraging and roosting habitat on site and the lack of bat records within 0.5km of the site supports this conclusion.

15.3.13 Although the site is considered to have a negligible potential for bats, due to the mobile nature of bats there is low potential for a small transient roost to be present on site at certain times. The size and complexity of the site also restricted the precision of all the surveys as not all areas could be checked at the same level of detail.

15.3.14 As the site is unlikely to support local bat populations, no mitigation is required with respect to bats. The demolition of the buildings on site will have a negligible impact and it is for this reason that no compensation will be required; neither will any monitoring of bat activity be required.

15.3.15 However, it is considered prudent to have a plan in place in the event a bat is discovered. Should bats be found or suspected at any time during demolition activities then, as a legal requirement, work in that area should cease immediately until further advice has been sought from Natural England and/or the scheme ecologist. The scheme ecologist, Natural England or their agents in the London area will be able to locate a licensed bat worker to remove any bats present which might be harmed during the works. If bats are exposed during the works and are vulnerable to harm, gloves or a container should be used to move them to a dark and quiet area, until a bat worker has been contacted.

Relevant Legislation Protecting Ecology

Nesting Birds

15.3.16 The Wildlife and Countryside Act 1981 gives general protection to all wild birds from: killing, injuring or taking; destroying, damaging or taking nests in use or being built; and taking or destroying eggs.

Bats

15.3.17 All bat species in the UK receive full protection under the Wildlife and Countryside Act 1981. They are also protected under the Conservation (Natural Habitats, &c.) Regulations 1994.

§ It is an offence for any person to intentionally kill, injure or take any wild bat.

§ It is an offence to intentionally damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection. This is taken to mean all bat roosts whether bats are present or not.

§ It is an offence to intentionally disturb any wild bat while it is occupying a structure or place which is used for shelter or protection.

15.3.18 A bat roost has been interpreted to mean any structure or place used for shelter or protection whether or not bats are present at the time. A bat roost may be defined as either: spring gathering roosts; maternity roosts; mating roosts; night roosts and feeding roosts; pre-hibernal roosts; and hibernation roosts.

15.3.19 The Countryside and Rights of Way Act 2000 amends the Wildlife and Countryside Act 1981 to also make it an offence to intentionally or recklessly damage, destroy or obstruct a place that bats use for shelter or protection. The term “reckless” is defined by the case of Regina v. Caldwell 1982. The prosecution has to show that a person either deliberately took an unacceptable risk, or failed to notice or consider an obvious risk.

15.4 EVALUATION OF SIGNIFICANCE

15.4.1 It is considered that the proposed development will have a minor/ negligible impact on the biodiversity at the site.

15.4.2 The removal of some of the trees on site is deemed a minor impact at a local scale. However, the proposed landscaping and future management is considered to cause an impact which is not significant and would be beneficial over the long term.

15.4.3 The clearance of vegetation within the bird breeding season could potentially cause harm to nesting birds. This is considered to be a minor impact at a local level. However, adoption of mitigation measures to carry out clearance of trees outside of the bird breeding season will reduce this impact to a degree that it is considered not significant.

15.4.4 The potential for bats to be present within buildings represents a minor impact at a local level. However, adoption of mitigation measures, mentioned earlier, will reduce this impact to a degree that is considered to be not significant.

15.5 SCOPE FOR MITIGATION (& ENHANCEMENT)

15.5.1 The potentially adverse ecological effects requiring mitigation relate to bird nesting habitats and retained trees which are proposed to be addressed as follows.

§ Where trees – and therefore bird nesting habitats – are to be removed, this should be done outside of the bird nesting season which runs from March to August.

§ Where trees are to be retained, Root Protection Areas should be marked out prior to demolition or construction.

15.5.2 The proposed redevelopment has been designed with areas of open, amenity space surrounded by buildings. Significant planting of trees in paving and landscaped areas are also proposed. These will provide foraging opportunities and habitat for insects and birds, which will also link with the adjacent railway corridor allowing wildlife access to other ecologically valuable areas such as Wormwood Scrubs. The eastern edge of the site will be planted with indigenous grasses and shrubs to extend the foraging habitat of the railway corridor. The existing trees on Shinfield Street will be retained and enhanced with indigenous hedges, planting beds and grass areas. Biodiverse roofs with indigenous wildflower species will be provided, providing further foraging and habitat opportunities for native wildlife.

15.5.3 Redevelopment of the site offers an opportunity to provide biodiversity enhancement given the current low value of the site for wildlife. Landscape planting will attract insects which in turn will provide an opportunity to create potential feeding habitat for bats, birds and other animals. Redevelopment of the site also offers the opportunity to install artificial roosting features for bats. Examples of careful design to allow access to bats include:

§ access gaps between soffits and wall (15-20mm);
§ timber cladding mounted on 20-30mm counter battens with access at bottoms or sides;
§ access to roof voids via bat tiles, gaps in masonry, soffit gaps, raised lead flashing or purpose built entrances;
§ access points over top of cavity walls by specifically constructed gaps; and
§ bat boxes erected or bat bricks installed for different species on the buildings.

15.6 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

15.6.1 It is considered that the residual effects of the proposed development on biodiversity at the site will be minor/ negligible.

15.6.2 The proposed ecological, landscape features and tree planting will provide opportunities for wildlife to use or establish at the site.

15.7 MONITORING

15.7.1 No monitoring of the residual effects of the completed development is proposed. Over and above the requirement for compliance with statutory provisions for the protection of particular species, it will be prudent to make provision prior to the commencement of any demolition for the monitoring of the presence of bird nests and bat roosts. Similarly, and notwithstanding current absence of the species, it would be appropriate to make provision for monitoring between phases and between demolition and construction for the potential colonisation and presence of black redstart on the site.

REFERENCES

Ref 15.1: Joint Nature Conservation Committee, Handbook for Phase 1 Habitat Survey – a technique for environmental audit (2007).

Ref 15.2: BS 5873:2005 Trees in Relation to Construction. British Standards Institute.

Ref 15.3: Bat Conservation Trust (2004) Best Practice Guidelines for Bat Surveys. BCT.

Ref 15.4: English Nature (2004). Bat Mitigation Guidelines. Natural England.

16. Construction Management Plan

16.1 INTRODUCTION

16.1.1 This Chapter summarises the potential effects of the development's demolition and construction presented in the other sections and presents the mitigation measures that will be employed to address these effects.

16.1.2 The Environmental Statement accompanies a hybrid planning application for the redevelopment of the site and at this stage a Principal Contractor has not been appointed. Therefore, it is proposed that a Construction and Environmental Management Plan (CEMP) be developed by the appointed Principal Contractor which will be submitted to LBHF prior to demolition commencing. Should separate contractors be employed for the demolition and construction works, then each contractor will be required to produce a CEMP for their element of work.

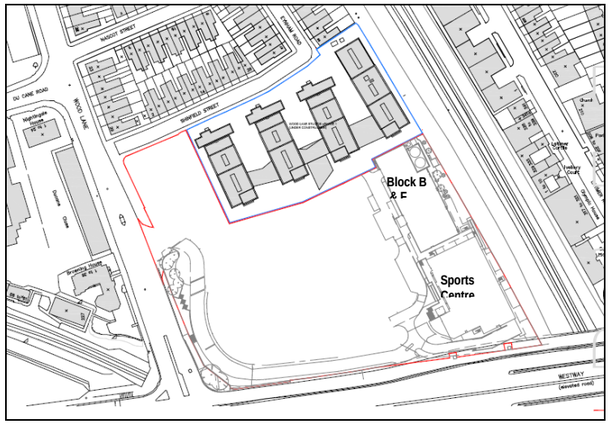

Figure 16.1: Current Site Layout including Wood Lane Studios at Imperial West Development

16.1.3 As part of the Wood Lane Studios at Imperial West development, former BBC buildings A, C, D and E have already been demolished on site. Figure 16.1 presents the current site layout.

16.1.4 It is proposed to demolish the remaining BBC buildings (B/ F and the Sports Centre) prior to construction of the proposed development. Following demolition, construction of the first phase development comprising Buildings C and D is expected to commence in early 2013. Construction of Building E is due to commence in 1st Quarter 2014, with the construction of Buildings F, G and A due to commence in mid 2015, 2016 and 2017 respectively.

ASSESSMENT METHODOLOGY

National Policy

16.1.5 The relevant assessment methodology is detailed in each individual section with this Environmental Statement and makes reference to national and regional guidance including relevant Planning Policy Guidance notes (PPG) and Statements (PPS):

- § PPS5: Planning and the Historic Environment
- § PPG13: Transport
- § PPS23: Planning and Pollution Control
- § PPG24: Planning and Noise
- § PPG25: Development and Flood Risk

16.1.6 In addition, the Strategic Development Plan Framework comprising the London Plan, Spatial Development Strategy and Local Development Plan contain policies which will also require adherence to.

16.2 EXISTING BASELINE CONDITIONS

16.2.1 The baseline conditions of the site are presented in Chapter 2 of this Statement of this Environmental Statement – The Site & Surroundings.

Figure 16.2: Proposed Phasing Plan

Programme of Works

16.2.2 Figure 16.2 presents an outline of the proposed phasing of the works also presented in the Design and Access Statement. At present, it is anticipated that the demolition and construction phase would last 5 years and a design year of 2018 has been taken to represent completion for the purpose of this Environmental Statement.

16.2.3 The demolition and construction phases of the development are programmed to commence in 2013 running until 2018. The construction of the development would begin with the demolition of the remaining buildings on site and site preparation. The construction of buildings C and D would then follow on with further developments following on a yearly basis.

Site Preparation and demolition
1st Quarter 2013 to 3rd Quarter 2013

16.2.4 Establish demolition/construction facilities and offices. Secure site perimeter with hoarding. Pre demolition checks of vegetation. Decommissioning of the above ground tank and boiler. Demolition of all existing buildings and clearance of site. Reclamation of demolition materials where possible for reuse on site. Further site investigations to be undertaken in the vicinity of historical potential contaminative site uses and in the vicinity of the above ground tank.

16.2.5 Site access will be off Wood Lane. It is anticipated that the area proposed for buildings E and F (adjacent to the southern site boundary) will be used for the site compound which will be relocated once access for construction of these buildings is required.

Buildings C & D construction
3rd Quarter 2013 to 2nd Quarter 2015

16.2.6 Construction of foundations and basement walls below both buildings using augured piling techniques. Excavation of basement and construction of sub structure and basement elements. Construction of Building C including office, day nursery, teaching facilities, wet laboratories and polyclinic. Concurrent construction of 22,000m^2 offices (Building D). Creation of access to buildings B (Wood Lane Studios) and C. Temporary landscaping to Main Square to the west of Building C. Drainage and utilities laid for Buildings C and D with additional services for later phases laid as necessary.

Car Park and Building E construction
1st Quarter 2014 to 4th Quarter 2015

16.2.7 Construction of basement walls for the car park and Buildings E and F, the access ramp and ventilation using augured piling techniques. Additional drainage and service extensions as required. Following completion of the car park area, the Contractors compound will be moved to the site of Building G to enable the construction of Building E comprising 200

bedrooms and conference facilities. Once the car park is complete a new permanent access to the site will be formed. Construction traffic and the permanent access will be separated.

Building F construction
2nd Quarter 2015 to 4th Quarter 2017

16.2.8 Construction of 35 storey residential building (Building F).

Building G construction
2nd Quarter 2015 to 4th Quarter 2017

16.2.9 Move Contractor's Compound to Block A. Completion of access between Buildings F and G. Construction of mixed use building (Building G) including office, retail and cafe.

Description of the Works

16.2.10 The exact construction methods and phasing of the application site have not been determined at this stage of writing as the Principal Contractor has not yet been appointed. In order to indentify the potentially significant effects of the demolition and construction phase and propose suitable mitigation, a series of parameters covering demolition and construction and earthworks methodology are defined within the ES. The main construction works will consist of:

- § temporary site accommodation and welfare facilities;
- § services diversions;
- § temporary and permanent utility supplies;
- § demolition works;
- § remediation (potentially and dependant on additional site investigations);
- § surface water sewers and retention tanks;
- § foul water sewers;
- § off-site highway connections/road works;
- § on-site private and adopted roads;
- § construction of buildings;
- § landscaping; &
- § basement construction.

Site Preparation

16.2.11 Prior to the commencement of the main construction works, site preparation works would be undertaken, and are likely to include the following:

- § the siting of site project offices and welfare facilities;
- § provision of any temporary electrical supplies and other required services for the duration of the construction works;
- § demolition of existing buildings, &
- § the erection of site hoardings and fencing and safeguarding routes for occupiers of existing properties that boarder the site along with members of the public. A site security system would also be provided.

16.2.12 The relatively confined nature of the site means that it is likely that there will be no additional land available for the site compound, which will therefore have to be located within the site boundary and can be expected to be required to move around the site to facilitate construction as presented in the programme of works above.

16.2.13 The site will be bound by appropriate hoarding with separate gates provided for both pedestrian and vehicular access into the site. These would be manned during working hours and securely fastened out of hours. The hoarding would be kept in good condition at all times to provide full security and safety for the general public and to promote a neat and tidy environment.

Demolition

16.2.14 The proposed scheme will involve the demolition of buildings B&F and the Sports Centre. At present a demolition contractor has not been appointed. A Type 3 Asbestos survey has been undertaken by a specialist, who confirmed the presence of asbestos which is typical for the age of the buildings. Therefore special provisions will be required during demolition. In addition, asbestos fibres may be encountered as pipework/lagging during the ground works including grubbing out of foundations, excavations for basements, foundations (excavations and piling) and general excavations for site levelling.

16.2.15 The removal and disposal of asbestos is highly regulated and it will be required to be managed by the construction supervisor as required under the Construction (Design and Management) Regulations 2007, the Control of asbestos at Work (Amendment) Regulations 2002 and the Health and Safety at Work Act etc 1974. Removal and disposal will be undertaken in accordance with these regulations.

Service Diversions and Temporary Installations

16.2.16 It is not anticipated that temporary diversions will be required as it is proposed to construct a new combined service trenches within the site which will be made available for the statutory authorities to either lay the services directly.

Earthworks Strategy

16.2.17 The site is a relatively flat site with a drop in gradient from the north boundary to the south. The proposed site levels are being amended as part of the scheme to bring the western part of the site level with Wood Lane, approximately 9m AOD across the site in order to avoid steep gradients and sudden changes in level within the site an at the site boundary with the surrounding highway.

16.2.18 There will be little opportunity for wholesale reuse the soil excavated to form the basements on the site and the majority of excavated material will be disposed of offsite.

16.2.19 Limited remediation works may be required in the vicinity of the above ground tank or below buildings where site investigations have not been possible to date. However, due to the presence of the basements, most made ground will be removed from site and this will be undertaken prior to other earthworks commencing to prevent cross contamination.

Substructure

16.2.20 The external walls of the basements will be constructed as a piled wall. This will be constructed from concrete bearing piles which will be constructed at ground level to support the floor of the basement and the buildings or sheet piles. The basement will then be excavated to allow for installation of pile caps and basement slab. After which, the ground floor slab, columns and walls will be constructed. The basement floor will be constructed by pumping concrete from the ground floor level and the wall will follow on

16.2.21 Taking into account design loads, soil conditions and the nearby properties, it is proposed that auger piling will be employed.

Superstructure

16.2.22 Tower cranes will be temporarily erected for the construction of the buildings. These will be constructed such that they meet the requirements of Network Rail and TfL with regard protection of the railway and Westway. The external walls of the buildings will be constructed within a curtain walling system which could commence when the first few storeys of the frame are complete. The tower cranes will lift the walling panels into place and they will be bolted to the frame.

16.2.23 Once the frame has been completed the internal block work or stud partition walls will be constructed and when the building has become weatherproof the internal fit-out will commence.

Plant and Equipment

16.2.24 Consideration has been given to the types of plant and equipment that are likely to be used during demolition and construction works. Until a Principal Contractor has been appointed it is not possible to give exact details of the type of equipment to be used. It is anticipated though that standard equipment will be used for these phases and it is not thought that specialist equipment/plant will be required.

Hours of Work

16.2.25 The site hours of work during the demolition and construction phase will be agreed with LBHF via condition. The standard hours of work are likely to be as follows:

- § 0800 to 1800 hours Monday to Friday
- § 0800 to 1300 hours Saturday
- § No Working on Sundays or Bank Holidays

16.2.26 In certain circumstances work may be undertaken out of hours. If required such work would be subject to prior agreement and reasonable notice with LBHF, However out of hours work is not the attention of the applicant.

Site Access, Traffic Routing

16.2.27 During demolition and construction, the site will be accessed off Wood Lane.

16.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

16.3.1 During demolition and construction, it is anticipated that a small increase in traffic movements will occur which could have an impact on air quality and noise.

16.3.2 Various methods of construction (cast in-situ, pre-cast, steel etc) could be used for the construction of Buildings A through G and this will depend on the procurement process. Thus it is difficult to predict the number of construction vehicles associated with construction. However, a number of the proposed buildings include basements and it is estimated that the most intense construction vehicle movement period is likely to occur during the excavation of those basements. This is considered to be the "worst case" for vehicle movements. .

16.3.3 It is estimated that approximately 7 vehicle movements per hour as a "worst construction vehicle case" would be required to remove the material from the basement excavations on site. This is considered insignificant within the context of the overall traffic flows on Wood Lane and represents less than 1% of peak flow. The effect on the traffic regime and noise quality is therefore considered to be insignificant as DMRB guidance suggests that a 25% increase in traffic levels is needed to produce a 1 dB increase in noise levels which equates to at least 3,750 vehicle movements daily.

16.3.4 Demolition and construction operations could also affect ground and groundwater conditions from the accidental release of oils, fuels and lubricants etc. as well as the storage of waste materials.

16.3.5 Grubbing out of foundations, excavations for basements, foundations (excavations and piling) and general excavations for site levelling have the potential to adversely affect archaeological remains. However given the site's perceived low archaeological potential and the impact of historical development, as established within **Chapter 6 Archaeology**, it is considered that the application site has no significance below ground archaeology and therefore the effect has been determined to be negligible.

16.4 SCOPE FOR MITIGATION

16.4.1 A Construction and Environmental Management Plan (CEMP) will be produced by the Principal Contractor which will detail the proposed mitigation measures to be employed during the works. However, the following summarises the general measures which will be employed.

Site Operations

16.4.2 To reduce the potential effect on neighbours from demolition and construction operations, it is proposed that normal working hours will be as required by local bylaws and as required by the London Borough of Hammersmith and Fulham.

16.4.3 Materials used in the construction process such as oil, chemicals, cement, lime, cleaning materials and paint have the potential to cause serious pollution, the impact of which would be exacerbated if a pollutant is discharged into a watercourse. The Environment Agency's Pollution Prevention Guidance that covers the storage and use of such materials will be followed at all times.

16.4.4 A bunded storage area will be located on the site for the duration of the demolition and construction period for the storage of oils, fuels, chemical and other hazardous construction materials. The base and bund walls will be impermeable to the material stored and be of adequate capacity. For those materials stored outside the bunded area, spill palettes should be used. The location of the main compound will be agreed between the Principal Contractor and the Project Manger and detailed in the CEMP prior to works commencing.

16.4.5 Spill kits should be located in storage areas along with clear written procedures on how to address a spillage if it occurs.

16.4.6 Leaking or empty oil drums will be removed from the site immediately and disposed of via a licensed waste disposal contractor

16.4.7 Plant and equipment would be stored in areas that are less susceptible to a potential pollution incident, or on dedicated hardstanding and away from sensitive receptors (e.g. housing). Plant should be refuelled in the construction compound on an impermeable surface and away from any drains or watercourses. A spill kit should be available in the event of an accident and will be kept in the refuelling area.

16.4.8 An area close to the site gate (off Wood Lane) will be designated for vehicle washing, and in order to minimise deposition of mud on the highway all construction traffic would pass through a wheel washing facility prior to leaving site. Open top vehicles will also be sheeted when on travelling on the public highway. The use of road sweepers would be implemented if required.

Waste Management

16.4.9 It is proposed to re-use/recycle as much material from the demolition works as possible on site however it is anticipated that most materials will be required to be transported off site for recycling and disposal.

16.4.10 Waste produced on site will be subject to the Duty of Care under the Environmental Protection Act (1990). Waste transported to and from the site will follow the Duty of Care requirements for ensuring waste is transported by registered carriers, taken to appropriately licensed sites and for completing and keeping appropriate waste transfer documentation.

16.4.11 Waste contractors that remove waste from site will be registered with the Environment Agency. The production, reuse and recycling of waste on site would be monitored and reported on a monthly basis to be able to identify trends in waste creation and to identify opportunities for reducing waste or increasing the rate of recycling where possible.

16.4.12 A site wide waste minimisation scheme will be implemented to encourage the reduction of waste, reuse of waste and recycling of waste. Measures which would be included in such a scheme would include:

- § Reduction of materials wastage through good storage and handling;
- § Use of modern methods of construction wherever possible, allowing significant reductions in waste and facilitating greater recycling;
- § Entering into agreements with suppliers for recovery and disposal of their products including plasterboard off cuts, insulation off cuts and timber pallets;
- § Ensuring that all suppliers of materials provide returnable or practicably recyclable packaging;
- § Providing waste minimisation induction courses for all site personnel;

- Regular toolbox talks throughout the construction phase to raise awareness of the importance of minimising, segregating and recycling wastes during the construction process;
- Ensuring adequate waste storage facilities are provided for both raw materials and waste streams generated;
- Ensuring adequate security measures are in place; and
- Agreeing appropriate waste disposal routes with the Statutory Authorities for recyclable waste streams and residual waste streams for disposal to landfill.

16.4.13 The volumes of waste which have been reduced, reused or recycled will be presented in the Site Waste Management Plan (SWMP).

Construction Traffic

16.4.14 During the Demolition Phase, traffic will be generated by the workforce and materials leaving site for recycling or disposal. Some deliveries will be made (eg. skips for waste) but it is anticipated that these will coincide with the removal of waste to minimise trips.

16.4.15 During the construction phase of the development, traffic will be generated by the workforce, delivery vehicles and construction plant. Delivery vehicles will convey various materials to/from the site depending on the progress of the construction.

16.4.16 During the initial construction stages most materials will be ordered in bulk and will be delivered to site as and when required in full HGV loads. It is proposed that all deliveries be timed such that they minimise impact on adjacent road. This would include concrete wagons that will complete regular deliveries of materials to site from batching plants in the local area on days when large concrete pours are taking place.

16.4.17 During the later stages of the construction phase, it is expected that the supply of most materials required for the fit-out of the units such as electrical, sanitary ware, decoration etc could be sourced from local businesses and merchants which will assist in mitigating the volumes of new trips on the wider road network, as well as contributing to the local economy. It is expected that the majority of these deliveries would be made by van or LGV which are not considered to present an impact of greater significance on the road network than a typical private car.

16.4.18 Waiting vehicles on surrounding roads will be prohibited – this will not be a logistical issue during 'Imperial West W12' works as, prior to construction of the buildings, all the existing buildings on the site will have been demolished and therefore there will be adequate servicing capacity on site to avoid waiting vehicles on the surrounding roads..

16.4.19 It is not considered that the development proposals for the application site present the potential for any unusual construction activities and the quantity and frequency of associated trips are not expected to be significantly different from those associated with a construction site of a similar size.

16.4.20 Other measures to minimise and control nuisance arising from construction traffic would include the introduction of onsite speed restrictions to reduce the production of noise and dust and a temporary signing strategy to ensure construction traffic utilises designated routes.

Noise

16.4.21 Practices to minimise site noise and vibration will be adopted to eliminate the potential for nuisance and disturbance to local residents. A monitoring strategy with any relevant thresholds should be agreed with the Local Authority as part of the implementation strategy prior to works on site commencing and it is recommended that a Control of Pollution Act (COPA) 1974 Section 61 Agreement be entered into between the Contractor and the Local Authority prior to works commencing.

16.4.22 The Contractor will then be responsible for ensuring the construction activities comply with the agreed noise levels, and review the method statements for each activity to ensure that best practice is employed. This should include the following measures:

- Use of low noise piling techniques where possible (for example, using bored piling with auger);
- Training of all scaffolding personnel on the importance of handling the scaffolding to maintain minimum noise levels;
- Completion of deliveries and operations within the hours of site operation;
- Prohibition of delivery or removal lorries from waiting on Wood Lane or within the site with their engines running;
- Introduction of controls on the sequencing of works and noise protection on an activity by activity basis. Examples could include the positioning of static plant away from properties and the turning off of mobile plant, when not in use;
- Completion of site hoardings as early as practical in the construction programme;
- Avoidance of the use of percussive plant where alternative non-percussive plant is available for a given task. Compressors used should be sound reduced models fitted with proprietary acoustic enclosures. All pneumatic tools should be fitted with silences or mufflers. All plant should be properly and regularly maintained and sited as far from sensitive receptors as possible to help to minimise noise;
- Restriction of the use of radios, other sound systems or tannoys on site; and
- Minimisation of cutting operations or other noisy tasks through off-site fabrication wherever practicable. Localised shielding of noisy operations could be required where there may be a risk of exceeding sound levels at the agreed monitoring points.

16.4.23 A programme of monitoring and measurement would be undertaken in accordance with the agreed implementation strategy and Section 61 Agreement to ensure that noise levels at nearby properties are within the limits agreed with the Local Authority.

Air Quality

16.4.24 During the demolition and construction phase, there will be various site clearance and construction activities undertaken that all have the potential to generate dust and particulate matter, for example:

- Haulage routes, vehicles and construction traffic;
- Materials handling, storage, stockpiling, spillage and disposal;
- Demolition and crushing;
- Site preparation and restoration after completion;
- Construction and fabrication processes; and
- Internal and external finishing and refurbishment.

16.4.25 Excessive dust levels have potential health implications for any residents living close to the site. Best practice would be employed for each demolition/construction process to minimise nuisance and potential health implications. A number of mitigation methods should be implemented during construction as follows:

- Prohibition of burning of any materials anywhere on site;
- Use of dust-suppressed tools for all activities wherever possible;
- Covering or vegetation of completed earthworks as soon as is practicable;
- Dampening of exposed soil and material stockpiles, if necessary using sprinklers and hoses, or planting if longer term exposure is envisaged;
- Locating of stockpiles of soils and materials as far as possible from sensitive receptors (i.e. residential properties), taking account of prevailing wind directions and seasonal variations in the prevailing wind;
- Minimise surface areas of stockpiles (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up;

- Storage of dusty materials away from site boundaries and away from the sensitive areas to minimise any wind dispersion;
- Positioning of wind-break netting around materials, stockpiles and vehicle loading/unloading areas, as well as exposed excavation and materials handling operations;
- Observation of wind speed and direction prior to conducting particle generating activities to determine the potential for dust nuisance to occur;
- Avoidance of particle generating activities during periods when wind direction and/or high wind speeds may carry particles into sensitive areas (i.e. residential properties);
- Any on-site cement and concrete batching to be undertaken in enclosed plant, with suitable water dowsing and wind shielding measures applied as appropriate;
- Sheeting of vehicles carrying loose aggregate or workings to and from the site to prevent materials being blown from the vehicles whilst travelling;
- Enforcement of speed limits for vehicles on unmade surfaces to minimise dust entrainment and dispersion;
- Ensuring that all construction plant and equipment is maintained in good working order and not left running when not in use;
- Use of wheel washers for vehicles leaving the site where appropriate to minimise the amount of mud and debris deposited on the roads;
- Regular inspection, and if necessary cleaning, of local highways and site boundaries to check for dust/mud deposits (and removal if necessary);
- Regular water spraying and sweeping of unpaved and paved roads to minimise dust and remove mud and debris; and
- Preparation of permanently surfaced site roads as early as possible during the development period.

16.5 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

16.5.1 The identification of potential environmental effects of demolition and construction has informed assessments of transport, noise and vibration and air quality variously considered in chapters 7, 8 and 9 respectively. It is anticipated that if the guidance presented above is employed, then the likely significant environmental effects should be mitigated to those residual effects recorded in the relevant chapters of this Statement.

16.6 MONITORING

16.6.1 The CEMP will detail the frequency and scale of monitoring to be undertaken during demolition and construction however it is anticipated that this will include noise and dust monitoring which will be agreed with the Local Authority. Some ecological monitoring will be required prior to demolition works and between demolition and construction phases.

17. Site Waste Management Plan

17.1 INTRODUCTION

17.1.1 This chapter considers the proposed development scheme in terms of Site Waste Management. It describes the methodology employed when optimising recourses and minimising waste and the environmental effects of the above during the demolition, construction and operational phases of the scheme.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

17.1.2 This assessment largely comprises a review of the existing data for the site including the following:

- § Identification of the appropriate legislation, standards and guidance in relation to the management of site waste;
- § A review of the existing site uses and existing structures present within the site footprint;
- § A review of the redevelopment proposal;
- § A review of the principles to be employed in order to minimise waste generation and maximise resource efficiency.

17.2 EXISTING BASELINE CONDITIONS

17.2.1 The application site is approximately 2.27 hectare (5.60acres) in size and is currently occupied by approximately 3,000 sq m of vacant buildings and open land. These principally comprised office space but also included a sports centre, nursery, catering and communal plant areas with car parking spaces.

17.2.2 Buildings on site are primarily comprised of brick, concrete and rows of large glass windows.

17.2.3 Figure 17.1 presents the current site layout with former BBC buildings B&F and the sports centre located along the eastern boundary and the Wood Lane Studios at Imperial West development constructed to the north of the proposed development.

17.2.4 Services including water, gas and high and low voltage electrical mains are shown to run throughout the site between buildings, although many of these were abandoned during the previous demolition works.

17.2.5 The proposed scheme will involve the demolition of the remaining former BBC buildings (Sports Centre and Buildings B&F), providing a Biomedical & Health Research facility including a day nursery, polyclinic and restaurant facilities, offices and research units and a residential tall building, along with a public square, road, car/cycle parking and additional public realm also three further buildings comprising a hotel, education, office and administrative uses.

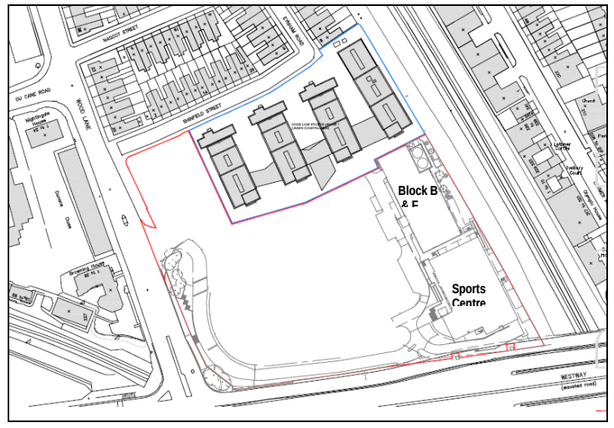

Figure 17.1: Current Site Layout

POLICY FRAMEWORK

17.2.6 The proposed redevelopment scheme will involve demolition and construction activities. The potential environmental effects of the site waste will be managed and mitigated through the application of the current waste regime (that applies to England and Wales) and the associated legislation and guidance including the following:

- § Site Waste Management Plan Regulations
- § ICE Demolition Protocol
- § Landfill Regulations
- § Hazardous Waste Regulations
- § Environmental Permitting Regulations
- § Mobile Plant Licence

Waste Hierarchy

17.2.7 The Waste Hierarchy is a useful framework that has become a cornerstone of sustainable waste management, setting out the order in which options for waste management should be considered based on environmental impact. The principles of the hierarchy are presented in the diagram below and form the basis of the waste management strategy for the scheme.

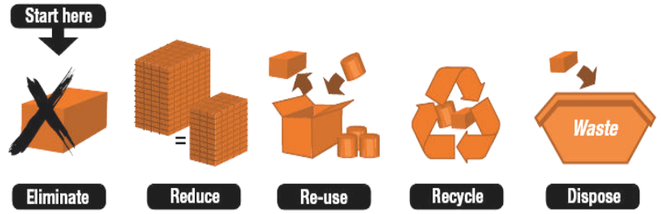

Figure 17.2: Principles of the Waste Hierarchy

Site Waste Management Plan Regulations

17.2.8 The Site Waste Management Plans Regulations came into force on the 6 April 2008. The Regulations require Site Waste Management Plans (SWMPs) to be implemented for all construction projects with an estimated project value of over £300,000.

17.2.9 The Regulations apply to all aspects of demolition and construction including preparation, excavation, demolition, maintenance, and the installation and maintenance of services. This also includes the assembly and disassembly of pre-fabricated elements.

17.2.10 The Regulations naturally reference and centre on waste; however the Regulations also place a strong focus on materials and material resource efficiency. From the earliest stages of projects, the Regulations require project teams to consider the type of materials specified and the ways in which these materials are used; to minimise waste and to divert waste away from landfill wherever possible.

17.2.11 The Regulations clearly define roles for both the Client and the Contractor. The role of the Designer is implied but not legally defined. In order to achieve the requirements of the Regulations the Client, Designer and Contractor will need to work together towards common goals of optimising material resource efficiency and minimising waste, through the implementation of a Site Waste Management Plan. The implementation of these plans during a project is like a 'relay race', with different parties taking the lead depending on the stage of the project.

17.2.12 By challenging the way in which resources are used and waste is generated, SWMPs can help to reduce costs.

17.2.13 Non-Statutory Guidance for Site Waste Management Plans was produced by DEFRA in 2008. This document offers guidance on:

- § The purpose of a SWMP;
- § How to write and implement a SWMP;
- § Regulating SWMPSs; &
- § How to save money with a SWMP.

17.2.14 This guidance has been referenced when considering the site waste management issues relating to this scheme.

ICE Demolition Protocol

17.2.15 The ICE Demolition Protocol (2008) has been implemented to aid industry in attaining the Government's 2012 target for a 50% reduction in construction and demolition waste going to landfill and the EU Waste Directive.

17.2.16 Framework Directive target for 2020, which calls for a 70% increase in the re-use, recycling and other material recovery of non-hazardous construction and demolition waste.

17.2.17 The Protocol has been widely adopted, since its launch in 2003, by a range of public and private sector projects, and is supported by the Waste and Resources Action Programme (WRAP).

17.2.18 It is now a common requirement within planning policy, tenders, contracts and voluntary agreements, and can also contribute to the provision of Site Waste Management Plans (SWMPs).

Duty of Care

17.2.19 The duty of care is a law which requires all reasonable steps to be taken to keep waste safe. If waste is passed on to someone else, you must be sure they are authorised to take it and can transport, recycle or dispose of it safely.

17.2.20 The duty of care applies to anyone who produces or imports, keeps or stores, transports, treats or disposes of waste. It also applies if you act as a broker and arrange these things.

17.2.21 All construction materials that cannot be reused or recycled will be disposed of at a licensed disposal facility in line with the duty of care. Disposal will be in accordance with the requirements of the:

§ Environmental Protection Act 1990 (as amended);

§ Environmental Protection (Duty of Care) amendments 2003;

§ The Hazardous Waste Regulations 2005;

§ Landfill Regulations 2007;

§ List of Waste Regulations 2005;

§ Environmental Permitting Regulations;

§ Pollution Prevention Control Regulations;

§ Site Waste Management Plan (England) Regulations 2008;

National Planning Policy

17.2.22 This assessment takes into account the Planning Policy Statement (PPS) 10. This details the process by which Local Planning Authorities take decisions on applications in relation to planning for sustainable waste management.

Regional and Local Planning Policy

17.2.23 This assessment takes into account Part 2, Chapter 4 of the London Borough of Hammersmith and Fulham Policy Unitary Development Plan

17.2.24 (UDP) which relates to Energy, Recycling and Environmental Protection. Policy EN19A is considered to be directly relevant and relates to the Recycling of Demolition Waste.

17.2.25 Due regard has also been made to the London Plan (2011). Policy 5.16 Waste Self Sufficiency requires waste minimisation, with recycling levels exceeding 50% for municipal waste and 70% for commercial waste by 2020. In addition, it requires recycling and re-use levels in construction, excavation and demolition waste of 95% by 2020.

17.3 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

17.3.1 The scheme comprises two main elements:

i. the demolition of existing on site structures and

ii. the construction of the new proposed buildings;

Operational Phase

17.3.2 The framework/methods to be employed for the management of waste during the two stages are to be structured around a Site Waste Management Plan taking into account the demolition protocol. This will promote:

§ Waste minimisation

§ Efficient re-use of materials

Waste Hierarchy

17.3.3 The proposed Waste Management Strategy for dealing with and managing demolition, construction and operational waste employs the principles of the waste hierarchy. This includes the following criteria for effective management of waste:

§ Avoid waste production;

§ Minimise amount of waste produced;

§ Reuse items where possible;

§ Recycle items where possible.

Dispose of items in a responsible way

17.3.4 The following points are to be considered during the scheme design to optimise resource efficiency, reduce costs and aid compliance for the project:

§ Structure/building form and shape to reduce the use of building materials;

§ Sizing of structures and components to eliminate unnecessary elements;

§ Compatibility between design specifications and market supply e.g. designing in line with standard supply measurements;

§ Flexibility in design for future amendments/expansion;

§ Life-span on design and end of life implications of design and material decisions e.g. select designs/materials that will be easier to recycle/re-use in the future;

§ Off-site manufacturing to minimise waste during construction;

§ Involving contractor and whole supply chain at pre-design and design stages in particular for larger schemes; and

§ Undertaking material evaluation in terms of their recyclability and reclamation before specifying.

17.3.5 In addition to the above, the following points are to be considered during scheme demolition and construction:

§ If the Contractor identifies alternative materials/options that would help to maximise resource and minimise waste but deviates from the design then the designers should be consulted and the possibilities explored;

§ Identify/use recycled materials in place of new materials;

§ Ensure effective storage of new and recovered materials to minimise deterioration;

§ Identify materials to be recycled/recovered/re-used;

§ Segregate wastes to improve recovery potential and minimise waste production;

§ Seek opportunities for material that may not be suitable for re-use/recycling within the scheme to be recovered and re-used in other schemes – this may include sale to a third party;

§ Explore alternatives to landfill - for example soil recovery centres; waste transfer stations; ‘black-top’ recycling companies;

§ Consider construction methodologies/options;

- Consider arranging for suppliers to 'take back' leftovers; and
- Consider using long term partnerships within supply chains to encourage standardisation to meet project/design requirements for frequently required goods/materials.

Demolition Waste

17.3.6 Waste will be generated during all stages of the demolition works. Major sources of waste within the demolition process are likely to comprise:

- Concrete;
- Masonry;
- Stone blockwork;
- Tarmac;
- Ceramics;
- Glass;
- Steel;
- Other metals (e.g. doors, window frames, pipework);
- Wood;
- Plastics;
- Gypsum based products (e.g. plasterboard).

Excavated arisings

17.3.7 Waste minimisation and good management practices will form an important part of the contractor selection process. As part of the site management team, it is expected that this will include a Logistics/ Waste Control Manager who liaises with the Authorities in regard to site waste management issues and local best practice. The Construction Manager will be encouraged to investigate his supply chain with a view to identifying and recommending possible more sustainable material alternatives than those currently specified and to minimise packaging to building materials (without compromising protection) and the retrieval of packaging on site. UK based material sources will be investigated. These considerations/ decisions will be captured in the Site Waste Management Plan.

17.3.8 At this stage it is intended that sources of waste are recycled/disposed of off site within the exception of brick and concrete, which is to be crushed and kept on site for use as general fill and piling mats. As part of the scheme, approximately 4,000 m^3 of demolition arisings are to be processed on site. It is intended that the contractor identifies the most appropriate off-site disposal options for the other waste sources. This process can be optimised by employing the on-site segregation of wastes which will be strongly encouraged by the client and project team

17.3.9 The contractor will also be responsible for obtaining the relevant permits and licences are obtained when undertaken these activities e.g. Environmental Permits and mobile Plant Treatment Licences.

Construction Waste

17.3.10 The principal to be adopted by Contractors is that waste should be minimised, with some contractors are aiming to implement a zero waste policy in the future. It should be noted that the waste targets for the proposed scheme are unknown at present. A Construction Environmental Management Plan (CEMP) will be developed by the Contractor which will detail how it is proposed to dispose of and manage the waste created during the construction phase. The implementation of the CEMP will be recorded within a Site Waste Management Plan (SWMP).

17.3.11 Waste will be generated during all stages of the construction works. Major sources of waste within the construction process are likely to comprise:

- Excavated arisings including soils from basement and service excavation
- Packaging – plastics, pallets, expanded foams etc
- Waste materials generated from inaccurate ordering, poor usage, badly stored materials, poor handling, spillage etc
- Dirty water, for example from site runoff containing silt.

17.3.12 All relevant Contractors will be required to investigate opportunities to minimise waste arisings at source and, where such waste generation is unavoidable, to maximise the recycling and reuse potential of construction materials. The main source of excess arisings for this scheme will be the excavation of basements. At this stage it is anticipated that approximately 49,202m^3 of arisings will be generated.

17.3.13 Based on the average soil conditions encountered during previous site investigations is has been estimated that of the 87,820m^3 of arisings approximately:

- 14,532 m^3 is likely to be Made Ground;
- 33,985 m^3 is expected to be Silts and Gravels; and
- 680m^3 is expected to be Clay.

17.3.14 The onsite re-use of arisings is thought to be small, therefore the Made Ground will have to be disposed of offsite, however it is anticipated that the contractor will identify off site re-use destinations for the Gravel material.

17.3.15 Again, the on-site segregation and recycling of on-site cardboard, timber, metal and plastics will be strongly encouraged by the client and project team. Recycling of plasterboard and gypsum based products will also be strongly encouraged. The segregation of polythene film waste and other plastics will also be considered and local collections investigated. Separate skips will be provided, possibly with compactors, to take the different materials. As construction progresses a series of different coloured wheelie bins will be placed for each material type at each floor level for manual loading. These bins will be transferred by trolleys to the skip storage site.

1.1.1 All construction materials that cannot be reused or recycled will be disposed of at a licensed disposal facility in line with the Duty of Care.

Operational Waste

17.3.16 A Waste Management Strategy will be preapred for the operational phase of the scheme; this has been based on principles of sustainable development, in order to protect human health and the environment by producing less waste and by using it as a resource wherever possible.

17.3.17 Through more sustainable waste management, moving the management up the 'waste hierarchy' of reduction, reuse, recycling and composting, using waste as a source of energy and only disposing as a last resort this document aims to break the link between population and economic growth and the environmental impact of waste.

17.3.18 The methods to be employed for the management of waste during the scheme will promote waste minimisation and encourage the reuse and recycling of waste.

17.3.19 The scheme development will lead to the creation of commercial and municipal waste streams; and due to the inclusion of a School of Public Health within the scheme means that there will also be the creation of clinical and potential hazardous waste, these will need to be dealt with separately.

17.3.20 The main waste streams generated are likely to be:

- mixed general household waste;
- mixed general commercial waste;
- mixed dry recyclables;
- mixed biodegradable waste; and
- clinical waste.

17.3.21 Before determining the most appropriate waste strategy for the development it is important to estimate future waste production as a result of the proposed redevelopment, Table 17.1 summarises the estimated weekly waste generated for each building within the scheme.

Table 17.1: Weekly Waste Generation

Building		Weekly Waste Generation (litres)					
		General waste	Recycling	Paper	Food waste	Clinical waste	Total
A	Office	8,850	4,130	16,520	n/a	n/a	29,500
C	School of Public Health	11,000	22,000	n/a	16,500	28,050	77,550
D	Office	23,070	10,766	43,064	n/a	n/a	76,900
	Retail	216	504	n/a	n/a	n/a	720
	Cafe	1,043	5,213	n/a	4,170	n/a	5,213
E	Hotel	14,000	42,000	n/a	14,000	n/a	70,000
F	Residential	14,815	14,845	n/a	n/a	n/a	29,630
	Cafe restaurant	1,103	5,513	n/a	4,410	n/a	11,025
G	Offices	9,750	4,550	18,200	n/a	n/a	32,500
	Retail	1,620	3,780	n/a	n/a	n/a	5,400
	Cafe	1,875	9,375	n/a	7,500	n/a	18,750

Operational Waste Mitigation

17.3.22 The following points are to be considered during the scheme design to optimise waste minimisation and recycling and aid compliance for the project (full details of the operational waste mitigation can be found in the Waste Strategy Ref 17.1):

- Internal storage space for both general waste and recyclable waste;
- Waste disposal facilities – separate waste containers for general waste and recyclable waste based on a 50/50 split between recyclable and general waste storage for residential end use and a goal of 70% recycling within the commercial end uses in order to meet national and regional targets for recycling;
- Segregation of commercial and municipal waste facilities;
- Segregation of waste streams including food waste in order to allow for better recycling achievements;
- Segregation and separate treatment of clinical waste;
- Use of compactors and balers to reduce waste volume; &
- Signage encouraging the use of recycling banks and discouraging the placing of recyclable waste into refuse bins.

17.4 EVALUATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

17.4.1 The generation of some waste will occur as a result of the proposed scheme and it will be anticipated that this will require disposal in accordance with the duty of care.

17.4.2 In addition the scheme will require the use of new material in addition to material reuse from the demolition process. This impact can be minimised be the responsible sourcing materials.

17.5 MONITORING

17.5.1 The generation and reuse/recycling/ disposal of waste is recorded in SWMP. Once construction is complete, the SWMP is reviewed including a comparison of the estimated waste quantities with the actual/final waste quantities and areas where alterations to the design could have improved resource efficiency and reduced costs. The relevant outcomes and any discrepancies will be fed back to the project teams including the Designers. This information must then be reviewed by the Designers and where appropriate should lead to the improvement and refinement of future designs and input to SWMPs i.e. using SWMPs as a Continuous Improvement Tool for Design.

References

Ref 17.1 Imperial West W12 Operational Waste Strategy, A12359/W201-A, Pell Frischmann December 2011

18. TV / Radio Interference

18.1 INTRODUCTION

General

18.1.1 This chapter presents the likely significant effects of the proposed development may have on the reception of radio and television signals.

18.1.2 Information published by the British Broadcasting Corporation (BBC) and Office of Communications (Ofcom) has been used in the assessment of the potential interference to radio and television signals caused by the proposed Imperial West development.

18.1.3 It has become a requirement for new developments to carry out radio and television interference studies to assess the potential effects of the developments on radio and television signal reception.

18.1.4 This chapter is supported by a Television and Radio Interference Assessment included at **Technical Appendix 18.1** and a Baseline Television and Radio Interference Survey included at **Technical Appendix 18.2**.

18.2 EXISTING BASELINE CONDITIONS

18.2.1 A baseline survey was undertaken on 25 October 2011 to measure ambient signal strength levels of broadcast radio, digital audio broadcast, analogue and digital terrestrial television signals in areas identified as being likely to be affected by the proposed development. A visual survey established that transmitters towards which viewers' aerials are predominantly directed are the main Crystal Palace and Croydon transmitters.

18.2.2 Field strength measurement scans for broadcast radio, digital audio broadcast (DAB) and analogue/digital television frequency bands were performed at several locations in the identified areas using professionally calibrated spectrum analysers in conjunction with receivers tuned to the main transmitters and the Kensal Town, Hammersmith and Worlds End relay transmitters.

18.2.3 The measurement equipment used in the baseline survey was mounted at the typical heights at which existing domestic aerials in the identified areas are mounted.

18.2.4 Recorded field strength levels for analogue and digital terrestrial television signals were generally found to be within recommended limits. However, analogue terrestrial television reception at all of the measurement locations highlighted existing 'ghosting' problems.

18.2.5 However, from 18 April 2012, when the digital switchover process is scheduled to be completed in London, analogue terrestrial television signals which are more susceptible to 'ghosting' will be switched off and the effect of signal 'ghosting' would be negligible as only digital terrestrial television signals which are largely immune to 'ghosting' will be available.

18.2.6 The survey indicated that signal levels for FM and DAB transmissions were sufficient for good signal reception.

18.2.7 A Baseline Television and Radio Interference Survey report summarising the measurement results at the surveyed locations is included as a **Technical Appendix 18.2**.

Sources Of Signals

Broadcast Radio

18.2.8 Broadcast radio, mainly transmitted at VHF (Very High Frequency) in Band II between 87.5 MHz and108 MHz as FM (Frequency Modulated) signals, from a network of radio transmitters.

Digital Audio Broadcast (DAB)

18.2.9 Digital Audio Broadcast (DAB) transmitted in Band III between 218 MHz and 240MHz, from the Crystal Palace and Croydon transmitters.

Terrestrial Television

18.2.10 Terrestrial analogue and digital television signals transmitted at UHF (Ultra High Frequency) from a network of high, medium and low power transmitters located around the UK, between 450 MHz and 850 MHz in Bands IV and V.

18.2.11 The main transmitters providing terrestrial television to the site and surrounding areas are:-

- § Crystal Palace (OS ref. TQ 339 712) transmitting BBC1, BBC2, ITV, Channel 4 and digital television signals from a bearing of 133° from the North; &
- § Croydon (OS ref. TQ 332 696) transmitting Channel 5 signals from a bearing of 140° from the North.

18.2.12 Relay transmitters that are potentially within the range of the area surrounding the development site are located at Kensal Town (OS ref. TQ 245 820), Hammersmith (OS ref. TQ 232 786) and Worlds End (OS ref. TQ 264 773) providing BBC1, BBC2, ITV and Channel 4 signals.

18.2.13 The digital switchover in the London TV region is scheduled to be completed by mid-April 2012 when all transmitters including the relay transmitters will cease to broadcast analogue television signals and begin to broadcast digital terrestrial television signals only.

Satellite Television

18.2.14 The vast majority of UK viewers receive satellite television signals from the Astra satellites in geo-stationary orbit above the equator which are located at a longitude of 28.2°E. To receive services from these Astra satellites, satellite dishes in the UK are oriented in a south-south-easterly direction and are required to point upwards at an angle of between 17° and 26°.

18.2.15 The elevation angle of the satellite dish is dependent on the latitude of the receiving site – an elevation angle of between 24° and 26° is required in the south of England, decreasing the further north the receiving site is located. An elevation angle of about 17° is required in the northernmost parts of Scotland.

Mobile Telephony

18.2.16 Mobile telephones and pagers transmit/receive signals via thousands of transmitters deployed throughout the country. Each transmitter provides a 'cell' for transmission/reception and mobile phones can access more than one cell in most locations.

18.2.17 The following mobile phone transmitters are located proximate to the development site.

Location: Wood Lane/North Pole Road

- § 1 No. T-Mobile GSM transmitter
- § 1 No. T-Mobile UMTS transmitter
- § 1 No. 3 UMTS transmitter

Location: Dorando Close

- § 2 No. O2 GSM transmitters

Location: Kelfield Gardens

- § 1 No. Vodafone GSM transmitter

Location: Darfield Way

- § 2 No. Vodafone GSM transmitters
- § 1 No. Vodafone UMTS transmitter

Location: Shalfleet Drive

- § 1 No. Orange GSM transmitter
- § 1 No. O2 GSM transmitter

§ 1 No. O2 UMTS transmitter

Location: Bramley Road

§ 1 No. Vodafone GSM transmitter

§ 2 No. O2 GSM transmitters

§ 1 No. O2 UMTS transmitter

Location: St Helen's Gardens

§ 1 No. Vodafone GSM transmitter

Location: Du Cane Road

§ 1 No. O2 GSM transmitter

§ 1 No. O2 UMTS transmitter

Location: Artillery Lane

§ 1 No. Orange GSM transmitter

§ 1 No. Orange UMTS transmitter

18.3 IDENTIFICATION & EVALUATION OF KEY EFFECTS

18.3.1 This section describes the assessment criteria and the identification of key effects of interference to radio and television signals as a result of the Imperial West development.

Assessment Criteria

Resources and Receptors

18.3.2 The main transmitters providing analogue and digital terrestrial television and broadcast radio to the site and surrounding areas are the Crystal Palace and Croydon transmitters and the key receptors which may be affected would mainly be viewers in residential accommodation located to the northwest of the development site; these viewers have their aerials directed towards the Crystal Palace and Croydon transmitters.

18.3.3 Key receptors for satellite television would also be viewers located to the northwest of the development site.

Prediction of Effects

18.3.4 The prediction of interference effects is based on the site plan of the proposed development; the locations, massing and heights of the proposed buildings in the development; the directions of signals broadcast from the various transmitters serving the site and surrounding areas and the application of radio transmission principles.

Evaluation Criteria for Interference Effects

18.3.5 Radio communications signals are predominantly transmitted as electromagnetic waves at high frequency. At high frequencies, electromagnetic waves travel almost in straight lines, like rays of light. This ability of high frequency signals to travel in straight lines, has the disadvantage that tall buildings could obstruct the passage of signals to buildings/users downstream of the signal or reflect the signals onto adjoining buildings/structures, impairing signal reception.

18.3.6 The magnitude of the effect of the development on the reception of radio and television signals will provide an indication of the level of interference on properties outside the development area. The impact the development would have on receptors in identified impact areas would be dependent on the sensitivity of the receptors. Sensitivity is an indication of how much a receptor with a standard aerial may be adversely affected by any signal interference effects caused by the proposed development.

18.3.7 The sensitivity of receptors will differ according to how far they are from the proposed development, for example receptors in the immediate areas of the proposed development would be more sensitive to any signal interference effects than receptors in areas farther away from the development. The likely severity of the effects will be assessed using the metrics in the table below:-

Table 18.1: Severity of Effects

Magnitude of Impact	Sensitivity of Receptor		
	Low	Medium	High
Low	1	2	3
Moderate	2	3	4
High	3	4	5

18.3.8 A descriptive meaning for each of the five points on the severity of effects scale, and the corresponding significance of the impact is detailed below:

Table 18.2: Significance Criteria

Significance Criteria			
Scale Point	**Description and examples**		**Significance**
1	Negligible Effect	-No discernable negative signal reception effects	Not Significant
2	Slight Effect	-Easily preventable, re-orientation of antennae -Minor, low-level and localised interference of off-site signal reception	
3	Minor Effect	-Easily preventable, relocation of antennae to minimise reflection effects -Localised interference; re-orient antennae to alternative signal sources	Significant
4	Moderate Effect	-Re-orientation of antennae to alternative sources in medium to large area	
5	Major Effect	-Complete loss of signal requiring alternative measures to receive signals e.g. use of cable in lieu of air signal reception	

Signal Reception Interference Mechanisms

Shadowing

18.3.9 Broadcast radio and terrestrial and satellite television signals are transmitted at radio frequencies, ranging from hundreds of kilo-hertz to thousands of mega-hertz. At the high frequencies in which the signals operate, the corresponding wavelengths of the signals are several hundred times smaller than the length of the buildings. The relative difference between the sizes of buildings and signal wavelengths means that buildings act as obstructions in the paths of the signals being transmitted. In simple terms, signals transmitted at high frequencies travel as electromagnetic waves and can be considered as travelling in straight lines, like rays of light.

18.3.10 This ability of high frequency signals to travel almost in straight lines has the disadvantage that large structures, such as tall buildings with sizeable elevations, can cause reception problems to broadcast links and television reception.

18.3.11 The main mechanisms that create these reception problems are when the development creates a reception 'shadow' by obstructing the transmitted signal from reaching other properties or causes 'reflection' whereby the development reflects incident signals onto surrounding properties.

18.3.12 In an area behind a structure, the radio/television transmitter is effectively screened from the viewer and the strength of the signal from the transmitter to a viewer in the 'shadow' zone is reduced (i.e. attenuated), as shown in Annex C of the Television and Radio Interference Assessment **Technical Appendix 18.1**.

Reflections

18.3.13 Radio frequency signals can be reflected from a structure and can result in a receiver, receiving two or more signals from the same source.

18.3.14 Annex D of the Television and Radio Interference Assessment **Technical Appendix 18.1,** shows the potential interference mechanism produced by 'reflection' or 'scattering' of the incident signal; this type of interference is caused by the combination of a direct signal which travels distance (D1) to the viewer and a signal reflected from the structure which travels a slightly further distance (D2 + D3).

18.3.15 Even though signals travel at the speed of light, the different path lengths can mean that one signal arrives at a significant delay relative to the other; this can result in a second image appearing on the viewer's screen, displaced from the other. This type of interference to television reception is known as 'ghosting' or 'delayed image'.

18.3.16 The extent of the zone and the interference within the zone is dependent on the relative strengths of the direct and reflected signals. The greater the relative strength of the reflected signal, and the longer the delay, the more subjectively intrusive the problem becomes.

18.3.17 Conducting surfaces, such as flat polished metallic structures, metal impregnated glass and such like materials tend to reflect a high proportion of radio signals. The proportion of the incident signal reflected off the buildings would therefore be dependent on the materials used to clad the exterior of the buildings.

18.3.18 The point at which the reflected (unwanted) signal is 5% of the direct signal corresponds to a difference of 26dB; this separation is used as the planning protection ratio for delayed images resulting from ghosting.

18.3.19 Analogue television signals are particularly susceptible to reflection interference; by contrast, digital television signals are largely unaffected by signal reflections.

ASSESSMENT OF KEY EFFECTS

Construction Phase

§ **Shadowing/Reflection Impacts and Effects on Digital and Analogue Terrestrial Television**

18.3.20 Works on the development site is scheduled to begin after the digital switchover, therefore, this assessment only considers terrestrial television transmissions after the digital switchover and as such, analogue terrestrial television signals are not considered.

18.3.21 Television transmissions from the Croydon transmitter will also cease after the digital switchover. This assessment is therefore only concerned with the analysis of the effects of the shadowing of digital terrestrial television transmissions from the Crystal Palace transmitter.

18.3.22 The construction of the buildings on the site would give rise to signal shadowing to the north-west of the development site, the extent of which will be dependent on the stage of construction of the buildings. The lengths of the signal shadows cast by the buildings will increase as their heights increase.

18.3.23 During the construction phase, aerials in the shadow zones would experience signal attenuation especially for properties in the immediate sections of the shadow zones.

18.3.24 Analysis of the shadowing of Crystal Palace transmissions by the buildings on the site is detailed in the Operational Phase section.

18.3.25 Temporary structures like cranes, scaffolding etc. used during the construction phase of the development may also obstruct terrestrial television signals to existing properties to the north-west of the development. However, signal shadowing by these temporary structures, is not envisaged to be significant as the structures would not have suitably large/flat surface areas to effectively block terrestrial television signals broadcast in the megahertz (MHz) frequency range to significantly attenuate the signal levels reaching aerials in properties outside the development

18.3.26 Television signals will be reflected off structures on the development site during the construction phase. However, works on the proposed development are scheduled to begin after the digital switchover and digital television signals are largely unaffected by signal reflections.

§ **Shadowing/Reflection Impacts and Effects on Satellite Television**

18.3.27 An inspection of the site and surrounding areas revealed that existing satellite dishes are oriented towards a south-south-easterly direction.

18.3.28 The location of the site and the general orientation of existing satellite dishes towards a south-south-easterly direction indicate that the buildings in the new development could obstruct the 'line of sight' between existing satellite dishes and satellites in geo-stationary orbit, in an area to the north-west of the development.

18.3.29 At the latitude of the development site, the elevation angle of 25.3° required by satellite dishes located on existing properties to maintain a 'line of sight' to Astra satellites in geo-stationary orbit, indicates that the buildings in the development may obstruct satellite signals to existing properties to the north-west of the development.

18.3.30 The construction of the proposed buildings on the site would give rise to satellite television signal shadowing to the north-west of the development site, the extent of which will be dependent on the stage of construction of the buildings. The lengths of the signal shadows cast by the proposed buildings on the site will increase as their heights increase.

18.3.31 During the construction phase, the 'line of sight' between satellite dishes in the shadow zones and the Astra satellites in geo-stationary orbit may be obstructed.

18.3.32 Analysis of the satellite television signal shadowing by the proposed buildings on the site is detailed in the Operational Phase section.

18.3.33 Although temporary structures like cranes and scaffolding, etc. used during the construction of the development do not have very large/flat surface areas, the super high frequency (SHF) range at which satellite television signals are broadcast mean that such structures may obstruct satellite television signals to existing properties to the north-west of the development.

18.3.34 Satellite dishes must be suitably relocated to ensure the 'line of sight' to the Astra satellites is not obscured by temporary structures on the site.

18.3.35 Signal shadowing by temporary structures such as cranes is difficult to assess and mitigate as the positions of cranes' jibs and their subsequent interference effects will change continuously. Properties affected by satellite television signal shadowing caused by cranes on the development site may need to be connected to cable television services on a temporary basis.

18.3.36 Satellite television signals will be largely unaffected by signal reflections as they are predominantly broadcast as digital transmissions.

§ **Shadowing/Reflection Effects and Effects on Broadcast and DAB Radio**

18.3.37 Broadcast and DAB radio signals are transmitted at much lower frequencies than those for television signals and at these lower frequencies, the signals are subject to significant diffraction effects and are less susceptible to shadowing.

18.3.38 Signal reflection is virtually absent from broadcast radio signals and 'ghosting' is therefore not an issue.

18.3.39 DAB radio signals are broadcast as digital transmissions which are largely unaffected by signal reflections.

18.3.40 The assessment indicates that the construction phase of the proposed development would not cause any significant interference to the reception of broadcast and DAB radio signals in the areas surrounding the development.

§ **Shadowing/Reflection Impacts and Effects on Mobile Telephony**

18.3.41 Mobile telephones and pagers transmit/receive signals via thousands of transmitters deployed throughout the country. Each transmitter provides a 'cell' for transmission/reception. Mobile phones can access more than one cell in most locations, making local obstructions unlikely to adversely affect reception.

18.3.42 Mobile telephony signals are transmitted as digital transmissions which are largely immune to reflection interference. Mobile phones and pagers can receive reflected signals with no perceptible interference on signals received.

18.3.43 The assessment indicates that mobile telephony reception would not be significantly affected by the proposed development during the construction phase.

Operational Phase

§ **Shadowing/Reflection Effects and Effects on Digital and Analogue Terrestrial Television**

18.3.44 Signals from the Crystal Palace transmitter would be obstructed by the completed proposed buildings on the site. The assessment of 'shadowing' from the Crystal Palace transmitter has indicated the development would create 'shadowing' to the north-west of the site towards Wembley/Brent.

18.3.45 The assessment has estimated that the following approximate shadow lengths would be created.

Table 18.3 Approximate TV Signal Shadow Lengths

Building	Building Height (m) AOD	Height of Crystal Palace Transmitter (m) AOD	Approx. Shadow Length (m) Due to Crystal Palace Signal
A	35.50	321	1813
C	50	321	2690
D	60	321	3351
E	59.7	321	3331
F	121.73	321	8905
G	44.61	321	2353

18.3.46 The shadow created by Building A due to signals from Crystal Palace would extend to the railway lines beyond Wormwood Scrubs Park but south of the Hythe Road Industrial Estate.

18.3.47 The shadow created by Building C due to signals from Crystal Palace would extend to the industrial premises northwest of Stephenson Road.

18.3.48 The shadow created by Building D due to signals from Crystal Palace would extend to the railway lines near Harlesden Tube Station.

18.3.49 The shadow created by Building E due to signals from Crystal Palace would extend to the industrial premises north of Acton Lane.

18.3.50 The shadow created by Building F due to signals from Crystal Palace would extend to Norval Road, Wembley.

18.3.51 The shadow created by Building G due to signals from Crystal Palace would extend to the industrial premises northwest of Old Oak Lane.

18.3.52 However, the assessment of 'shadow' lengths has ignored the effects of signal diffraction around the new development which when taken into consideration may considerably decrease the 'shadow' zone created by the proposed buildings on the site.

18.3.53 Annex E of the Television and Radio Interference Assessment **Technical Appendix 18.1** shows the shadow zones created by the development for signals from the Crystal Palace, superimposed on a map of the area, to show the areas which would be in the shadow zones.

18.3.54 The Wood Lane Studios development incorporates Building B which is of a similar height to Building C; and as such casts a similar shadow length. It is estimated that the shadows cast by Buildings C and D will overlay Building B, from the development site to near Stephenson Road. Annex H of the Television and Radio Interference Assessment **Technical Appendix 18.1** shows the estimated overlap of shadow zones from the Wood Lane Studios and the proposed development for signals from the Crystal Palace transmitter, superimposed on a map of the area.

18.3.55 Aerials in the shadow zones would experience signal attenuation, especially for properties in the immediate sections of the shadow zones.

18.3.56 Measures to mitigate the effects of signal shadowing would need to be implemented.

18.3.57 Subject to confirmation by a television reception survey carried out post April 2012, when DTT signal transmissions are scheduled to commence from Kensal Town, it is anticipated that the development site will be within the range of adequate signal levels from the relay transmitter at Kensal Town. The transmitter could therefore potentially serve as an alternative source of DTT transmissions for affected properties in the Crystal Palace shadow zones.

18.3.58 However, it is important to note that at digital switchover, the Kensal Town relay transmitter is not currently scheduled to broadcast the entire range of digital terrestrial television (DTT) services which are available from the main Crystal Palace transmitter. Under the current plans, the relay transmitter will only broadcast DTT services from the public service broadcasters, these DTT services will be those available on the PSB1 (BBC), PSB2 (D3&4) and PSB3 HD (BBC) multiplexes only.

18.3.59 Overall, it is envisaged that the development may have a major effect on full digital terrestrial television signal reception to properties in the area north-west of the development site bounded by Wood Lane on the west, the Wormwood Scrubs Park to the north and the railway line to the east. The properties in this zone would therefore most likely need to be connected to satellite or cable television services e.g. Freesat or Virgin Media in order receive the entire range of DTT services. However, considering that shadows cast by the phase 2 buildings C and D overlay the shadow already generated by the phase 1 (consented) building B, it is likely that some of the affected properties in this zone may not require any additional attention if these have already been addressed as part of mitigation measures under the Phase 1 development.

§ **Shadowing/Reflection Effects and Effects on Satellite Television**

18.3.60 The assessment has estimated that the following approximate shadow lengths would be created by the proposed buildings:

Table 18.4: Approximate Satellite Signal Shadow Lengths

Building	Building Height (m) AOD	Approx. Shadow Length (m) Due to Satellite Signal
A	35.5	45
C	50	75
D	60	95
E	59.7	95
F	121.73	220
G	44.61	60

18.3.61 It is estimated that the signal shadows cast by the proposed development buildings may have a major effect on the reception of satellite television signals to some residential properties along Wood Lane (between Shinfield Street and Glenroy Street) and the corner property on Shinfield Street/Wood Lane.

18.3.62 Annex G of the Television and Radio Interference Assessment **Technical Appendix 18.1** shows the 'shadow' zones created by the buildings for satellite signals broadcast from a bearing of 28.2°E above the horizon, superimposed on a map of the area, to show the areas which would be in the shadow zones.

18.3.63 The satellite dishes on the affected residential properties may have to be relocated to re-establish a line of sight to the Astra satellites. If this does not prove to be a viable solution, the affected properties may need to be connected to cable television services e.g. Virgin Media.

§ **Shadowing/Reflection Effects and Effects on Broadcast and DAB Radio**

18.3.64 Broadcast radio is transmitted at frequencies between 87.5MHz and 108MHz, a much lower frequency band than that for television signals. At these low frequencies, radio signals do not strictly travel in straight lines and the effect of diffraction is significant, with the result that it is less necessary for a receiver to have a 'line of sight' to the transmitter. Medium and long wave radio frequencies are much lower than that of FM radio and signals can be significantly diffracted, resulting in these signals being able to get round most obstructions.

18.3.65 The wide diffraction angles of these signals means that 'shadowing' is substantially reduced and becomes practically non-existent.

18.3.66 Similarly, DAB radio signals broadcast at frequencies between 218 MHz and 240 MHz are subject to significant diffraction effects and are less susceptible to shadowing. DAB signal shadowing may occur if the signal level is significantly attenuated but such instances are rare.

18.3.67 Signal reflection is virtually absent from broadcast radio signals and 'ghosting' is therefore not an issue.

18.3.68 DAB radio signals are broadcast as digital transmissions which are largely unaffected by signal reflections.

18.3.69 The assessment indicates that the proposed development would not cause any significant interference to the reception of broadcast and DAB radio signals in the areas surrounding the development during the **operational** phase.

§ **Shadowing/Reflection Effects and Effects on Mobile Telephony**

18.3.70 Mobile telephones and pagers transmit/receive signals via thousands of transmitters deployed throughout the country. Each transmitter provides a 'cell' for transmission/reception. Mobile phones can access more than one cell in most locations, making local obstructions unlikely to adversely affect reception.

18.3.71 Mobile telephony signals are transmitted as digital transmissions which are largely immune to reflection interference. Mobile phones and pagers can receive signals that have been reflected from buildings with no perceptible interference on signals received.

18.3.72 The assessment indicates that mobile telephony reception would not be significantly affected by the proposed development during the operational phase.

18.4 EVALUATION OF SIGNIFICANCE

18.4.1 The assessment of the construction and operational effects of the proposed development on radio and television reception is outlined below:

18.4.2 Effects during the Construction Phase

a) The construction phase of the development would have no significant impact on the reception of mobile telephony, broadcast and DAB radio.

b) The development may have a major effect on the reception of satellite television signals to a number of residential properties along Wood Lane (between Shinfield Street and Glenroy Street) and the corner property on Shinfield Street/Wood Lane which may have their 'line of sight' paths to the Astra satellites obscured.

Satellite dishes must be suitably relocated to ensure the 'line of sight' to the Astra satellite is not obscured by the buildings. If relocating satellite dishes does not prove to be a viable solution, the affected properties may need to be connected to cable television services.

c) The effects of satellite signal reflections from temporary structures like cranes, scaffolding etc. during the construction of the development is predicted to be negligible.

d) During the construction phases of the development, the unfinished or finished buildings on the site will cast television reception shadows over existing properties.

Aerials in the shadow zones would experience signal attenuation, especially for properties in the immediate sections of the shadow zones, affected properties would most likely need to be connected to satellite or cable television services e.g. Freesat or Virgin Media in order receive the entire range of DTT services.

Temporary structures like cranes, scaffolding etc. used during the construction phase of the development may also obstruct terrestrial television signals to existing properties to the north-west of the development. However, signal shadowing by these temporary structures, is not envisaged to be significant.

18.4.3 Operational Effects of the Completed Development

a) The completed development would have no significant effects on the reception of mobile telephony, broadcast and DAB radio.

b) The assessment has indicated that the development may have a major effect on the reception of satellite television in areas in the immediate vicinity of the development. Satellite dishes in the surrounding areas north-west of the development may have their 'line of sight' paths to the Astra satellites obscured.

Satellite dishes must be suitably relocated to ensure the 'line of sight' to the Astra satellite is not obscured by the buildings in the completed development. If relocating satellite dishes does not prove to be a viable solution, the affected properties may need to be connected to cable television services.

c) The buildings in the completed development would cast television reception shadows over existing properties. Overall, it is envisaged that the development may have a major effect on full digital terrestrial television signal reception to properties in the area north-west of the development site bounded by Wood Lane on the east, the Wormwood Scrubs Park to the north and the railway line to the west. The properties in this zone would therefore most likely need to be connected to satellite or cable television services e.g. Freesat or Virgin Media in order receive the entire range of DTT services.

d) The effects of reflections caused by the development would be negligible as only digital terrestrial television (DTT) signals will be broadcast at the time of the completed development and DTT signals are largely unaffected by interference effects.

18.5 (EVALUATION OF) SIGNIFICANCE OF RESIDUAL EFFECTS

18.5.1 The table below shows the effects and significance of interference effects due to the construction phase and the significant residual effects following mitigation.

Table 18.5: Construction Phase – Interference Assessment Summary

Resource/ Receptor	Impact	Effect	Mitigation	Significant residual effects (following mitigation)
Digital Terrestrial TV Viewers	Signal shadowing (north-west of the site) during construction of the buildings in the development	Sig	Connection of affected properties to satellite or cable television services	None
Broadcast Radio Listeners and Mobile Phone Users	None	NSig	None required	None
Satellite TV Viewers	Short-term signal shadowing during construction works by temporary structures like cranes.	NSig	Relocate satellite dishes to suitable locations to maintain 'line of sight' to the Astra satellites. Connection of affected properties to cable TV services if satellite dish relocation is not viable.	None
	Obstruction by the buildings of the 'line of sight' between existing satellite dishes and satellites in orbit, thereby creating shadow zones to the northwest of the site	Sig	Relocate satellite dishes to suitable locations to maintain 'line of sight' to the Astra satellites. Connection of affected properties to cable TV services if satellite dish relocation is not viable.	None
Satellite TV Viewers	Obstruction by buildings of the 'line of sight' between existing satellite dishes and satellites in orbit, thereby creating shadow zones to the northwest of the site	Sig	Relocate satellite dishes to suitable locations to maintain 'line of sight' to the Astra satellites. Connection of affected properties to cable TV services if satellite dish relocation is not viable.	None

Key: Nsig: not significant; Sig: significant; Psig: potentially significant

18.5.2 The table below shows the effects and significance of interference effects due to the operation of the completed development.

Table 18.6: Operational Phase – Interference Assessment Summary

Resource/ Receptor	Impact	Effect	Mitigation	Significant residual effects (following mitigation)
Digital Terrestrial TV Viewers	Signal shadowing (north-west of the site) by buildings in the completed development	Sig	Connection of affected properties to satellite or cable television services	None
Broadcast Radio Listeners and Mobile Phone Users	None	NSig	None required	None

18.6 SCOPE FOR MITIGATION

18.6.1 The assessment has indicated that the completed development would create terrestrial television signal 'shadows' towards Wembley/Brent. In addition, the development may also give rise to the 'shadowing' of satellite television signals to the north-west of the site. Consequently, the completed development may have a major effect on the reception of terrestrial television and a major effect on the reception of satellite television for properties in the immediate vicinity of the development.

18.6.2 In the event that the proposed development is deemed to be adversely affecting the reception of radio/television signals, the following mitigation measures or a combination of the measures which are generally considered to be acceptable to planning authorities, may be considered for the following services:

18.6.3 Digital Terrestrial Television

- § Re-direct aerials in the affected properties towards the Kensal Town relay transmitter.
- § Connect the affected properties to satellite television services e.g. Freesat.
- § Connect the affected properties to cable television services e.g. Virgin Media.

18.6.4 Satellite Television

- § Re-direct satellite dishes in affected areas to establish a direct 'line of sight' to the Astra satellites.
- § Connect the affected properties to cable television services e.g. Virgin Media.

18.7 MONITORING

18.7.1 During construction, complaints from property owners in the terrestrial and satellite television shadow zones should be monitored and investigated to confirm that the initial baseline conditions have not substantially deteriorated. In the event that the proposed development is deemed to be adversely affecting the reception of radio/television signals, mitigation measures should be discussed and implemented which are acceptable to the local planning authorities.

18.7.2 A post-construction survey may be necessary to confirm that the initial baseline conditions have not substantially deteriorated below the levels recorded in the Baseline Television and Radio Interference Survey **Technical Appendix 18.2**.

References

Ref Appendix 18.1: Imperial West Radio and Television Signal Interference Assessment (Hoare Lea KH/2105216, October 2011)

Ref Appendix 18.2: Imperial West Baseline Radio/Television Reception Interference Survey. (Hoare Lea KH/CO/2105216, October 2011)

19 Residual Effects, Interrelationships, Cumulative and Non Significant Effects

19.1 INTRODUCTION

19.1.1 The process of Environmental Assessment - and the content of this Statement - are principally concerned with the likely significant effects to arise from the proposed development. Consideration of the potential interrelationships between effects and any cumulative effects in combination with the effects of other developments has however been given in the course of the preparation of the planning application and Environmental Statement.

19.1.2 This Section summarises the residual environmental effects of the proposed development – the effects taking into account mitigation measures - and then considers any interrelationships between those effects. The potential cumulative effects of the scheme in combination with other developments are then considered relative to the residual effects of the development in isolation.

19.2 RESIDUAL EFFECTS

19.2.1 The preceding technical assessments of the likely significant environmental effects of the proposed development have, where potentially adverse effects have been identified, proposed mitigation measures to reduce, as far as practicable, the significance of those effects. The resulting 'residual effects' of the development have been considered in the respective technical sections of the Statement above but for each of the 'environmental topic areas' are summarised as follows.

Townscape & Visual

19.2.2 The proposed development is assessed as having a range of **beneficia**l, **neutra**l, **negligible** or **no significant effects** upon twenty five of the verified views and an adverse effect, in winter, upon two verified views. The assessment concludes that in shorter range views, including from Wood Lane and Latimer Road, the proposed development would appear as a coherent development of high architectural quality.

Townscape character areas around the application site have also been identified in the assessment upon which it is concluded that the proposed development would have a **beneficial**, **neutral** or **negligible effects** overall. The townscape settings of Conservation Areas, listed buildings and buildings of merit within the identified townscape character areas with the potential to be affected by the proposed development have been considered and the effects are assessed as a range of **beneficia**l, **neutral** or **negligible** effects.

Built Heritage

19.2.3 The assessment of the likely residual effects upon the built heritage of the surroundings concludes that there will be a range of visual effects upon designated heritage assets from: **negligible to minor beneficial** effects upon listed buildings; **negligible to minor adverse** effects upon Conservation Areas; **negligible effects** upon Buildings of Merit; and a **moderate adverse** effect upon a Registered Park & Garden.

Archaeology

19.2.4 The assessment of the likely significant environmental effects upon archaeology concluded that the application site has low potential for the survival of remains. Given the effects of preceding developments and the absence of any identified remains following investigations pursuant to the Wood Lane Studios development the assessment concluded that there would be no significant effect upon archaeological remains either during construction or operation. No mitigation is therefore assessed to be necessary and there are therefore assessed to be **no significant residual effects** in respect of archaeology.

Transport

19.2.5 **No significant effects** are predicted in respect of the cumulative traffic generated by the combined development.

Noise and Vibration

19.2.6 The residual environmental effects of noise and vibration range from moderate adverse to negligible during construction with minor adverse to negligible effects during operation. Specifically, demolition and construction noise is assessed to give rise to **moderate – minor adverse effects**; road traffic noise during construction is assessed to give rise to **minor adverse effects**; construction vibration is assessed to give rise to **neutral effects**; operational road traffic noise is assessed to give rise to **minor-neutral adverse effects**; with the likely effects of vibration during operation assessed to be **neutral**.

Air Quality

19.2.7 The assessment of the effects of the proposed development concludes that with proposed mitigation and construction management measures implemented during demolition and construction the likely effects of dust soiling and generation of particulate matter would be reduced to occasional, temporary and short lived incidents of **minor adverse** significance.

19.2.8 The modelling predictions for the effects of road traffic identify no exceedences of any of the air quality objectives in areas where they are not currently exceeded and in that context there will be **no significant** air quality effects as a result of the development. With the implementation of recommended mitigation in respect of the air supplied to the lower residential units of Building F, the effects in respect of annual mean concentrations of nitrogen dioxide are similarly assumed to be **insignificant** in this respect.

Ground Conditions

19.2.9 The assessment of likely significant residual environmental effects in respect of ground conditions – assuming mitigation – concluded that the effects of contamination to be **slight** adverse to end users and workers; the effects of gas to end users to be **neutral**; the risk to controlled waters to be **negligible**; and the risk to buildings **neutral**.

Flood Risk

19.2.10 The assessment of the likely significant residual effects in respect of flood risk concludes the following. Standard best practice construction methods will be implemented to ensure pollution of groundwater does not occur. Consequently, there will be a **negligible effect** on the quality of the groundwater during construction.

19.2.11 During operation the site will have a **moderate beneficial effect** in respect of surface water flooding on the downstream flood regimes as a reduced discharge to the combined sewer will be achieved. This will reduce the probability of combined sewer overflow spills in the downstream sewer network. Consequently, there will be a **moderate beneficial effect** on the downstream watercourses as pollution events will be reduced in number and quantity. The use of Sustainable (urban) Drainage Systems will lead to a reduction of untreated surface water leaving the site. The proposals will result in a **minor beneficial effect** on the environment as the mitigation incorporated into the design of the development will result in water quality improvements as surface water is treated by green roof areas and attenuated prior to discharge from the site. The use of SuDS where practicable will be used to seek to mimic the pre-development drainage situation and an allowance for climate change will be included. Consequently, there will be a **moderate beneficial effect** on the downstream watercourses in relation to increased rainfall intensity associated with climate change.

Daylight / Sunlight

12.9.1 **No significant effects** on daylight, sunlight and overshadowing have been identified as a result of the proposed development. As such, no mitigation measures are considered necessary, and no residual impacts are likely to result for the proposals.

Wind

19.2.12 The assessment of likely significant environmental effects in respect of wind indicates that with necessary mitigation in some locations through screening, planting, landscaping and design detailing to recess entrances the microclimate will be compatible with the intended ground level and terrace uses. There are therefore assessed to be **no significant residual** effects of the development in respect of wind.

Socio Economic Effects

19.2.13 The assessment of the likely significant socio economic effects of the proposed development concludes that approximately 124 Full Time Equivalent jobs will be created by the construction of the development both directly on site and in the wider construction 'supply chain' – a **minor beneficial effect**. The completed development is assessed to result in a net increase of approximately 1,250 new jobs in Hammersmith & Fulham and 2,400 in London. As a result the employment effects of the

development are assessed to have a **minor beneficial effect** on the local economy.

19.2.14 The proposed development of 192 units will deliver approximately 31% of the London Borough of Hammersmith & Fulham annual housing target. Of the 192 units provided, 59 units will be available to key workers resulting in a long term **minor beneficial effect** on the mix and amount of housing stock and key worker provision.

19.2.15 The residential population generated by the completed development is estimated to be approximately 1,345 people for whom the 'child yield' would be 49 children of primary or secondary school age. Current capacity at both levels of schools in the catchment area has been identified.

Ecology / Biodiversity

19.2.16 The assessment of likely significant environmental effects in respect of ecology concludes that with appropriate mitigation there will be **no significant effect** upon bird nesting or habitats, **no significant effect** upon bats or other protected species and with the proposed landscaping - including biodiverse roofs - and the provision of bat roost opportunities a **minor beneficial effect** upon biodiversity.

Construction Management

19.2.17 The identification of potential environmental effects of demolition and construction has informed assessments of transport, noise and vibration and air quality variously considered in chapters 7, 8 and 9 respectively. It is anticipated that if the guidance presented in respect of construction management is applied then the likely significant environmental effects should be mitigated to those residual effects recorded in those chapters as referenced above.

Site Waste Management

19.2.18 The identification of site waste generation during construction and operation and opportunities for optimising recourses and minimising waste – and the likely quantities and types of waste generated during the demolition, construction and operational phases of the scheme – has similarly variously informed technical assessments within this Statement.

TV / Radio Reception

19.2.19 Assuming the implementation of various recommended mitigation measures, **no significant effect** is predicted to arise from the proposed development during construction or operation for: digital terrestrial TV viewers from signal shadowing; broadcast radio listeners and mobile phone users; or satellite TV viewers from short term signal shadowing during construction by temporary structures or during operation through obstruction by buildings.

19.3 INTERRELATIONSHIPS

19.3.1 The Regulations require a description of the aspects of the environment likely to be significantly affected by the development and the "interrelationships" between those aspects. Whilst the Environmental Assessment process can identify some common areas for interrelationship at the outset, the potential for others to arise during project development has been monitored.

19.3.2 The relationships between the effects upon humans from noise and vibration and air quality resulting from transport and railway movements are the most readily identifiable and these are variously considered in chapters 7, 8 and 9 in respect of Transport, Noise & Vibration and Air Quality respectively. Given the limited predicted traffic generation of the proposals, no significant effects are predicted to arise.

19.3.3 The approach to the energy strategy for the site and consideration of different technologies has been considered particularly in respect of the relationships with air quality effects.

19.4 CUMULATIVE EFFECTS

19.4.1 The Regulations require consideration of the cumulative effects of a development insofar as Schedule 4 Part 1(4) – referring to information to be included in an Environmental Statement - includes 'cumulative' effects within a description of the likely significant effects of a development on the environment. The Environmental Assessment process has given consideration to the potential for cumulative effects to arise from both a combination of different effects of the development and the effects of the development in combination with other developments in the area.

Combined Effects

19.4.2 Consideration has been given to the potential for a combination of different effects which individually may or may not have an effect upon a receptor but collectively may have an effect or an effect of greater significance than any individual effect.

19.4.3 There is a recognised potential, without mitigation, for a combination of adverse effects to potentially arise during demolition and construction principally relating to noise and vibration and air quality. Such a combination of effects is not readily quantified but could affect a range of receptors including pedestrians, workers, visitors to the site, adjoining habitats and occupiers of neighbouring residential properties. Construction site management controls required and enforced by planning conditions, together with best practice construction techniques and construction management plans to control the individual effects of construction should however reasonably be expected to mitigate the potential incidence, interaction and magnitude of any such combination of effects.

Cumulative Developments

19.4.4 In respect of the potential for cumulative effects to arise from the effects of the proposed development in combination with other developments, a structured approach to identifying developments of a scale and proximity to the application site which could give rise to cumulative effects has been undertaken.

19.4.5 In order to understand what other developments could come forward in the timeframe of the proposed development - and therefore have potential cumulative effects - a comprehensive review of potential developments in the locality was undertaken with reference to:

- extant planning permission(s) – unimplemented and under construction;
- current, undetermined, planning application(s);
- Development Plan, emerging Local Development Framework and emerging London Plan / Opportunity Area policies and designations; &
- proposals under discussion/publicity/consultation but not yet the subject of planning applications.

proposals of the order of 10000 sq m gross additional floorspace.

19.4.6 The identification of schemes for possible inclusion in the assessment of cumulative effects necessarily involves judgement and neither the area of search or size criteria are intended to be prescriptive or exclusive.

19.4.7 With regard to the area of search, consideration has been given to proposals within streets and areas immediately adjoining the application site and beyond broadly equating to a 500m radius from the boundary of the site – whilst also being mindful of the potential for particularly large or tall proposals which, although more distanced from the application site may, by reason of scale have potential for cumulative effects.

19.4.8 With regard to the size of proposals to identify as having potential for cumulative effects the criteria broadly applied was developments of the order of 10,000 sq m of additional floorspace. However, relatively small developments in immediate or close proximity to the proposed development have been recognised to have potential to give rise to cumulative effects.

19.4.9 Consideration has been given to the planning status of other proposals for development, the certainty of their implementation and the decision as to whether to include them within a cumulative assessment.

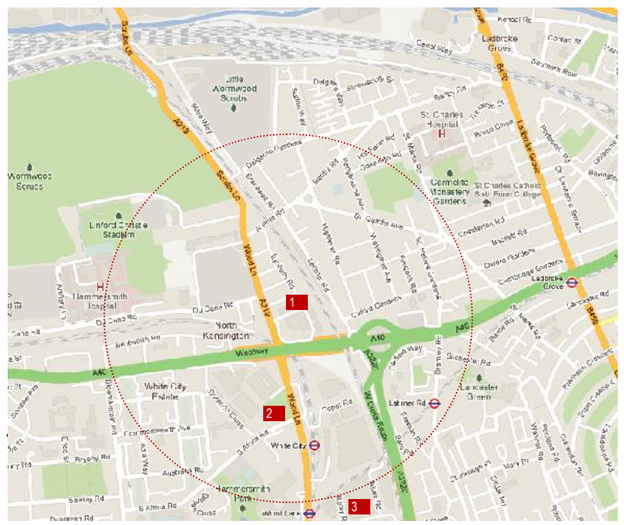

Figure 19.1: Cumulative Development Considerations

19.4.10 Developments identified involving additional floorspace over the selected threshold of additional floorspace of the order of 10,000 sq m and subject to the determination of a planning application were as follows:

Table 19.1: Proposed Developments subject to Planning

Location Application Ref Date received	Description of development
Westfield 2011/02940/OUT 31/08/2011	Outline Planning Application (All Matters Reserved) for comprehensive redevelopment of site to comprise a mixed use scheme consisting of new additions and alterations to the existing shopping centre, erection of three new blocks (Blocks A, B & C) ranging from 8-20 storeys (plus basement level) connected to a podium (above existing ground level) to the north of the shopping centre, erection of an 8-12 storey free standing block (Block D) to the south of Wood Lane Station, erection of a building up to 8 storeys to the east of DIMCO Building (Block E), erection of a 4-5 storey addition to western wall of the existing shopping centre (Block F) adjacent to Wood Lane, to facilitate the provision of up to 50,855 sq m Class A1 (Retail), up to 5,070sqm Classes A3, A4 and A5 (Restaurants, Cafes, Bars, Hot-food Take-away use), up to 540sqm Class B1 (Offices), up to 1,520sqm Class D1 (Community use) and up to 1,758sqm Class D2 (Leisure use) floorspace (All Gross Internal Areas) and up to 1,646 (Class C3) residential units with associated private and communal garden areas and amenity spaces (including balconies/terraces), provision of an energy centre together with associated development including new and enhanced public realm across the site with new open spaces, pedestrian and cycle routes, vehicular access and servicing facilities, retention of existing bus station , stabling area and DIMCO buildings and the demolition of existing industrial buildings and associated structures, the closure and alteration of highways.

19.4.11 The extension to Westfield is distanced from the application site – some 500m boundary to boundary - but has not been approved and on that basis is not considered further in the cumulative assessment.

Opportunity Area Developments

19.4.12 The wider White City Opportunity Area within which the application site is located is subject to a number of emerging proposals from landowners and developers of considerable scale, underpinned by the similarly emerging policy aspirations for the area. Whilst it has been appropriate in scheme development to be aware of such potential schemes which are in the public domain and which may well come forward in the future any recognition for the purposes of considering cumulative effects has been tempered by the absence of current detail or certainty about the proposals. Inclusion at this stage could otherwise introduce uncertainties and unnecessary speculation in the assessments.

19.4.13 Reference has therefore been made to the GLA and to local planning registers for developments which are currently under construction or are otherwise subject to a planning permission and therefore have some degree of certainty of implementation.

Figure 19.2: Land Ownership in the White City Opportunity Area

19.5 Consented Development

19.5.1 The developments identified as having an extant planning permission are identified in the table below.

19.5.2 However, although permission has only very recently been granted for the Reserved Matters for parts of the BBC Media Village (01/12/11) it is understood that this permission is not likely to be implemented. That development has consequently been excluded from the cumulative assessment. Therefore, the only substantial development in proximity to the application site identified as having an extant planning permission and some certainty of coming forward is the Wood Lane Studios at Imperial West development adjoining the application site which is summarised below and is widely described and considered in preceding sections of this Statement.

Table 19.1: Consented Developments

Location Application Ref Date received	Description of development
Imperial West Phase 1 – Woodlands (now known as Wood Lane Studios at Imperial West) 2010/02218/FUL 13/07/2010	Redevelopment of part of Imperial College Campus Woodlands, which comprises the erection of postgraduate student accommodation buildings comprising 606 units, 9 x residential units (Class C3) and 120sqm GEA of Class D1 floorspace plus ancillary facilities, access, parking, cycle storage, ancillary plant, landscaping and public realm
BBC 2009/01940/RES	Submission of reserved matters application relating to design, external appearance and landscaping for the Music Centre (12,300m2 gross floor space), Gateway Office building (18,015m2 gross floor space) and Leisure Centre (3,768m2 gross floor space) at BBC Media Village, pursuant to outline planning application reference 2000/3126/COMB approved 7 September 2001.

19.6 Analysis

Effects during Construction

19.6.1 Given the programme for the completion of the Wood Lane Studios at Imperial West – Summer 2012 - no coincidence of construction activities with the proposed development is anticipated. However, demolition of the remaining buildings on the application site could proceed earlier than currently programmed and there could therefore be some associated activities that coincide with the completion of the construction of the Wood Lane Studios. Given the likely extent of completion and preceding scale of construction activities associated with the Wood Lane Studios development, should any early demolition activities proceed no significant cumulative effects are predicted. Some consideration is given in respect of air quality, noise and vibration and construction management below.

19.6.2 The Wood Lane Studios development is substantially structurally complete and this regard the mass of those buildings has formed part of the baseline environment for a number of technical assessments. The occupancy of the buildings when completed has been considered in respect of the cumulative effect of the combined population and expenditure and transport.

Effects during Operation

Townscape & Visual

19.6.3 The substantially complete Wood Lane Studios development contributes to the visual baseline environment of the surroundings and the assessment of townscape and visual effects in Volume II of this Statement assumes its completion and in this regard the cumulative consideration is integrated with the assessment of the effected reported.

Built Heritage

19.6.4 The assessment of the residual effects of the Wood Lane Studios development concluded that the development in isolation would have no significant effect upon the Built Heritage of its surroundings. There will therefore be **no significant effect** arising from that development in combination with the proposed development which would alter the assessment of residual effects for the proposed development.

Archaeology

19.6.5 Investigations preceding construction of the Wood Lane Studios development confirmed the absence of surviving archaeological remains of any significance. No significant residual effects in respect of archaeology have been identified in respect of the proposed development. There are therefore assessed to be **no significant cumulative effects** arising from the developments in combination.

Transport

19.6.6 The assessment of transport effects and the generation of traffic in particular has considered the entirety of the masterplanned development and therefore integrated a cumulative assessment.

19.6.7 **No significant effects** are predicted in respect of the cumulative traffic generated by the combined development.

Noise and Vibration

19.6.8 The assessment of the residual effects of the Wood Lane Studios development for noise and vibration concluded the same range of significant effects as for the proposed development. Given that the Wood Lane Studios development is substantially complete the principal consideration of cumulative effects is the operational effects for which **no significant effects** are predicted to arise from the combination of developments

Air Quality

19.6.9 The demolition and principal construction activities associated with the Wood Lane Studios at Imperial West development with potential for air quality effects have been complete. No cumulative effects in this regard are therefore predicted.

19.6.10 The assessment of transport effects and the generation of traffic in particular has considered the entirety of the masterplanned development and therefore integrated a cumulative assessment which has similarly informed an integrated, cumulative, assessment of the air quality effects in this regard.

19.6.11 **No significant** effects are therefore predicted in respect of the cumulative traffic generated by the combined development.

Ground Conditions

19.6.12 Given the advanced stage of construction of the Wood Lane Studios development, site specific mitigation already undertaken in respect of that site - and the understanding of ground conditions across both sites - **no significant cumulative effects** are predicted to arise from the combination of developments.

Flood Risk

19.6.13 As part of the 'masterplanned' approach to integrate the application site and the Wood Lane Studios development a comprehensive approach to flood risk and surface water strategies has been embodied in the site development including the approach to green space, the use of green roofs and storage tanks to address peak water discharge to rates agreed with the Environment Agency. The cumulative effect of the combined developments will therefore have **no significant effect** upon the residual effects reported for the proposed development in isolation in respect of surface water flooding, water quality and the effects upon downstream watercourses.

Daylight / Sunlight

19.6.14 **No significant effects** on daylight, sunlight and overshadowing have been identified as a result of the proposed development. In combination with the Wood Lane Studios development.

Wind

19.6.15 The wind tunnel testing modelled the Wood Lane Studios development as part of the completed development scenario i.e. the completed 'masterplanned' development. The cumulative effect of the proposed and Wood Lane Studios developments together has therefore been assessed as recorded in Section 13 – Wind and residual effects above. No further cumulative analysis in respect of wind effects is therefore required.

Socio Economic Effects

19.6.16 The principal cumulative socio economic effect in respect of the proposed development in combination with the Wood Lane Studios development relates to available income and expenditure. Students within the Wood Lane Studios and private residents in the proposed development will not have the same level of income and therefore different sources and spend figures have been used to establish their respective expenditure profiles.

19.6.17 There are 606 studio units for student accommodation in the Wood lane Studios development with an assumption of one occupier per unit. The 2007/08 Student Income and Expenditure Survey provides the latest available data and breakdown of student spend. The average living costs per full-time student in the UK (excluding accommodation) in 2007/08 was £5,289. Allowing for inflation this equates to £5,694 in 2010/11. Multiplying this figure by the number of students residing at Wood Lane Studios provides an estimate of total annual expenditure of some £3,450,685. Broadly assuming students in the accommodation to be mostly new residents to the Borough and most living expenses being likely to be satisfied within the Borough – given that grocery shopping tending to be local and given the proximity of Westfield for comparison and other forms of shopping - overall student spend is likely to support 34 jobs in the Borough. This represents a **minor beneficial effect.**

Ecology / Biodiversity

19.6.18 The approach to landscaping and biodiversity at the Wood Lane Studios development has been integrated within a 'masterplanned' approach including the application site for the proposed development.

19.6.19 Given the substantial construction of the Wood Lane Studios development the principal consideration of cumulative effects concerns biodiversity. With the retention of existing trees on Shinfield Street, enhanced planting and consequent provision of new foraging opportunities including biodiverse roofs as part of the Wood Lane Studios development the combined effects of the developments will enhance biodiversity by provided a greater aggregated and integrated area of habitat and foraging potential. The cumulative assessment of likely significant environmental effects in respect of ecology is that there will remain **no significant effect** upon bird nesting or habitats, and **no significant effect** upon bats or other protected species during construction but the proposed landscaping across both sites - including biodiverse roofs – in proximity to the rail side habitat and the provision of bat roost opportunities the effect upon biodiversity will maintain a **minor beneficial effect** upon biodiversity.

Construction Management

19.6.20 Given the absence of coinciding construction programmes with the exception, potentially, of some early demolition of the remaining buildings on the application site, management of the construction of the proposed development will be unaffected by works to complete the Wood Lane Studios development. In the event that some activities coincide, individual site construction management arrangements should reasonably be expected to address any transport, noise and vibration and/or air quality effects. **No significant effects** in this regard are predicted to arise for the development in combination with the Wood lane Studios development.

Site Waste Management

Given the advanced construction of the Wood Lane Studios development there is likely to be little generation of site waste in combination with the proposed development other than potentially from demolition. There is therefore likely to be **no significant effect** arising from the developments

in combination. During operation, individual waste management operations for each of the developments will be in place which should effectively manage the effects of waste from each.

TV / Radio Reception

19.6.21 The assessment of TV / radio reception effects of the proposed development also considered the Wood Lane Studios development in respect of comparing shadow lengths. Building B of the Wood Lane Studios development is of a similar height to proposed Building C; and as such casts a similar shadow length. It is estimated that the shadows cast by Buildings C and D will overlay Building B, from the development site to near Stephenson Road. Annex H of the Television and Radio Interference Assessment **Technical Appendix 18.1** shows the estimated overlap of shadow zones from the Wood Lane Studios and the proposed development for signals from the Crystal Palace transmitter, superimposed on a map of the area. On the basis of the overlap there is therefore assessed to be **no significant cumulative effect** in respect of TV / Radio Reception.

19.7 NON SIGNIFICANT EFFECTS

19.6.22 The potential for the proposed development to have significant environmental effects in respect of aviation and the safeguarding of aerodromes was considered during design development and the scoping of likely significant effects. The applicants consulted with a Safeguarding officer at the Defence Infrastructure Organisation (DIO) in relation to RAF Northolt on the basis of the tallest building being of a height of approximately 100m. The DIO confirmed that a building of that height would be clear of all safeguarding surfaces at RAF Northolt – falling below its 170m threshold.

19.6.23 During LBHF's consultation on the applicant's request for a Scoping Opinion the NERL Safeguarding Team confirmed that as the proposal did not include any sort of wind turbine it had no comments on the development.

19.6.24 The Directorate of Airspace Policy for the Civil Aviation Authority has confirmed that the Scoping Report accurately records the related civil aviation issues whilst reiterating detailed advice given previously in respect of a similar proposal but on the basis that the maximum height of any structure associated with the proposed development would be approximately114m (374 ft).

19.6.25 The application site falls outside of the safeguarded zone for London City Airport and the maximum structural height of the tallest building – Building F – as proposed in the planning application does not exceed the threshold of 150m which would otherwise be of concern in respect of BAA aerodrome safeguarding.

19.6.26 It is acknowledged however that although Building F is below the height at which obstruction lighting is legally mandated consideration should be given to lighting by virtue of the location and nature of the development. It is further acknowledged that allowances should be made during for additional height during construction as a result of the use of high level cranes and in this regard lighting should be provided to treat such temporary structures as permanent obstacles.

19.6.27 Away from aerodromes there is a mandated requirement under the UK Air Navigation Order to promulgate and chart all known structures of a height (i.e. above ground level) of 91.4m (300ft) or more and a further requirement for structures of a height of 150 m (491 feet) or more to be equipped with aviation warning lighting.

19.6.28 Assuming such measures are considered and adopted in consultation with the relevant safeguarding authorities **no significant effect** in respect of aviation is predicted.

19.6.29 Light spillage has been considered in respect of overall scheme design and in respect of the development of the masterplan proposals and individual Design & Access Statements as a non significant issue.

19.8 CONCLUSION

19.6.30 The consideration of cumulative effects of developments has not identified any significant effects likely to arise during the construction period.

19.6.31 Integrated site management controls are anticipated to be effective in regulating any effects should there be any overlap between early demolition on the application site and final stages of construction of the Wood lane Studios.

19.6.32 Although not appropriate to be explicitly considered in this cumulative assessment due to uncertainties, conceivably some of the other potential developments in the wider area could come forward for construction within the phased programme for the proposed development. In such circumstances, individual construction site management controls should reasonably be expected to regulate and limit the potential, frequency and significance of any cumulative incidents.

19.6.33 Upon completion of the proposed development and the Wood Lane Studios, several beneficial long term effects are predicted to arise from the delivery of new housing, including student and key worker housing, the creation of new employment opportunities and increased economic activity which will collectively contribute to the wider regeneration of the area. Similarly, significant beneficial cumulative effects in terms of heritage, townscape and visual effects are considered to arise from the completion of the developments.

Access to Further Information

Planning Application documents and the Environmental Statement and Technical Appendices can be viewed at:

Planning Division Environmental Services Department
London Borough of Hammersmith and Fulham
Town Hall Extension
King Street London
W6 9JU

where comments should be addressed.

Requests for copies of materials submitted with the planning application and the Environmental Statement should, in the first instance, be addressed to:
Jones Lang LaSalle
Ref: Imperial West
Planning & Development
22 Hanover Square
London
W1S1JA

Copies of the Environmental Statement are available at a cost of £175. Individual copies of the Non-Technical Summary are available free of charge.

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