

4.0 sustainability statement...

INTRODUCTION

In order to demonstrate that this sustainability statement has been made in a structured and comprehensive manner, the following section follows the main subject areas indicated in the Sustainability Construction Checklist and expands on the key features for each subject areas.

- Environmental Rating
- Site Contamination
- Site Ecology
- Energy Saving
- Renewable Energy
- Construction Materials
- Water Saving/ Recycling
- Recycling
- Surface Water Run Off
- Microclimate
- Public Transport
- Cycling and Walking
- Green and Open Spaces
- Secure Design
- Light Pollution
- Flood Resistant Design
- Access
- Construction Process

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ENVIRONMENTAL RATING

Checklist Requirements and Policy Text

Checklist Item

Achieve EcoHomes/ BREEAM 'Excellent' rating for design

Illustrating Compliance

An EcoHomes/ BREEAM assessor should be appointed to the project at the earliest stages. The assessor should prepare a Preliminary Assessment, which illustrates that the 'Excellent' rating will be achieved. This assessment should then be provided to the relevant case officer.

On completion of the construction works, the developer will be required to commission a Post Construction Review and provide this to Richmond Planning Authority. This review will confirm that the criteria specified at the design stage have been implemented during construction and that the 'Excellent' rating is still valid.

INTRODUCTION



A preliminary EcoHomes assessment for the residential accommodation is set out below.

From our present knowledge of the development, coupled with experience on similar schemes, we have used the BREEAM/EcoHomes assessment scoring checklists to evaluate the likely performance of the residential elements to arrive at a single anticipated rating for building use.

BREEAM is an independent, transparent environmental labelling scheme covering individual buildings either at the design stage or as part of a major refurbishment. It assesses the environmental equality of a project by considering the broad concerns of climate change, use of resources, pollution and impacts on bio-diversity. These concerns are balanced against the need for a high quality internal environment.

BACKGROUND TO ECOHOMES ASSESSMENT

Introduction

BREEAM (The Building Research Establishment Environmental Assessment Method) was developed to provide a credible and transparent environmental performance assessment method and certification scheme for new and existing buildings.

The scheme has been developed since the early 1990s and now exists in several forms to assess different types of buildings including offices, homes, retail buildings, industrial units and healthcare premises. Different forms of BREEAM Assessment exist for different types of building. This enables a consistent approach to be adopted when assessing these buildings.

EcoHomes was developed and launched in April 2000 by the Centre for Sustainable Construction at BRE with support from the National House Builders Council (NHBC). Its development was steered by a committee of industry representatives and environmental experts.

EcoHomes is an independent, transparent, environmental labelling scheme for housing, based on best practice. The scheme covers houses and apartments, either at the design stage or as part of major refurbishment.

The methodology assesses the environmental quality of a development by considering the broad concerns of issues such as climate change, the use of resources, pollution and impacts on biodiversity. These concerns are balanced against the need for a high quality internal environment.

Issues Assessed

The issues assessed by EcoHomes are grouped into the seven categories listed below:

- Energy - Operational Energy and CO₂
- Transport - Local issues related to transport
- Pollution - Air and Water Pollution (excluding CO₂)
- Materials - Environmental implications of materials selection, recyclable materials
- Water - Consumption issues
- Ecology and Land Use - Ecological value of the site, planting and landscaping
- Health and Well-Being - Internal and external issues relating to health and comfort

Credits and Ratings

Credits are awarded for achieving specified levels of performance set by BRE under each issue category. The number of credits available in each category does not necessarily reflect the relative importance of the issues being assessed, as a weighting factor is applied before the final score is calculated. For example, Energy and Transport related credits are weighted more heavily than those associated with Pollution and Water.

This is due to the fact that carbon dioxide (CO₂) emissions produced as a result of energy consumption, have a global impact and are therefore considered to be more significant. There is no requirement to achieve any particular credit, but a minimum number are necessary in order to achieve the following EcoHomes ratings: The table on the following page details the ratings and the effort required to achieve the rating.



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| RATING | % REQUIRED TO ACHIEVE RATING | EFFORT REQUIRED |
|-----------|------------------------------|--|
| PASS | 36% | Most developments should achieve this rating with minor design/specification changes at a minimal cost |
| GOOD | 48% | Developments demonstrating good practice in most areas will achieve this rating |
| VERY GOOD | 58% | Developments pushing forward the boundaries of environmental performance will achieve this rating |
| EXCELLENT | 70% | Developments demonstrating exemplary environmental performance across the full range of issues will achieve this rating. |

EcoHomes assessments are carried out by specialist assessors who are trained and licensed by BRE. BRE is also responsible for the quality assurance process and the development is certified by them following receipt of the final report from the assessor.

METHODOLOGY

The EcoHomes Pre Assessment Estimator (appendix a) was completed by the team with guidance from the assessor on specific credit requirements. Completion of the Estimator provides a quick evaluation of the likely rating to be achieved under a formal assessment and is a means of monitoring the sustainability performance of the development against this nationally recognised, independent benchmark. In addition, the results of the exercise can be fed back into the design process in order to maximise the final rating obtained and the sustainability credentials of the scheme.

A number of assumptions regarding the building performance were necessary in order to complete the Estimator, but it is considered that these were reasonable and the predicted score is therefore both realistic and achievable.

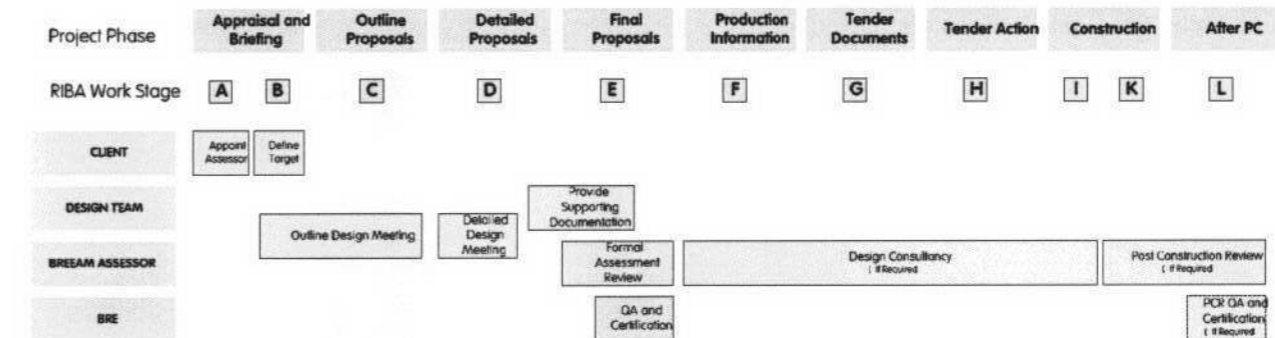
The results section which follows, evaluates the Credit score for aspects of the building to be assessed (as established in the pre-assessment exercise documented in appendix a) and presents the building rating. The graphs within this section show how the Credit score is translated into an EcoHomes Rating and the number of Credits actually achieved (i.e. for which full documentary evidence can be presented)

OPTIMISING ECOHOMES RATINGS

The most valuable and cost-effective way to ensure a high EcoHomes rating is to introduce the main issues at an early stage in the design process, to form a focus for the discussion of the environmental impacts of the building.

Input will be needed from across the design team. Although the architect and building services designers have the largest involvement, the project manager, structural engineer and contractors all may have a part to play. In addition, the Quantity Surveyor should have an input where there is potential for items on the Cost Plan to be added or amended.

The role of the EcoHomes Assessor is to coordinate the input of the team, and to track the development of ideas over time. The various activities undertaken as part of the EcoHomes assessment are shown below:



Caveat

The rating given is for guidance on the overall environmental performance of the scheme in general.

The predicted rating and individual Credit scores may differ from those obtained through a full formal assessment at the end of the detail design period. This assessment must be carried out by a licensed EcoHomes assessor. The predicted score is intended for guidance to the design team and can not be used to certify the building under EcoHomes 2006.

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RESULTS

Summary Statement

Presently, an EcoHomes rating of 'EXCELLENT' is anticipated for Waldegrave Arms development.

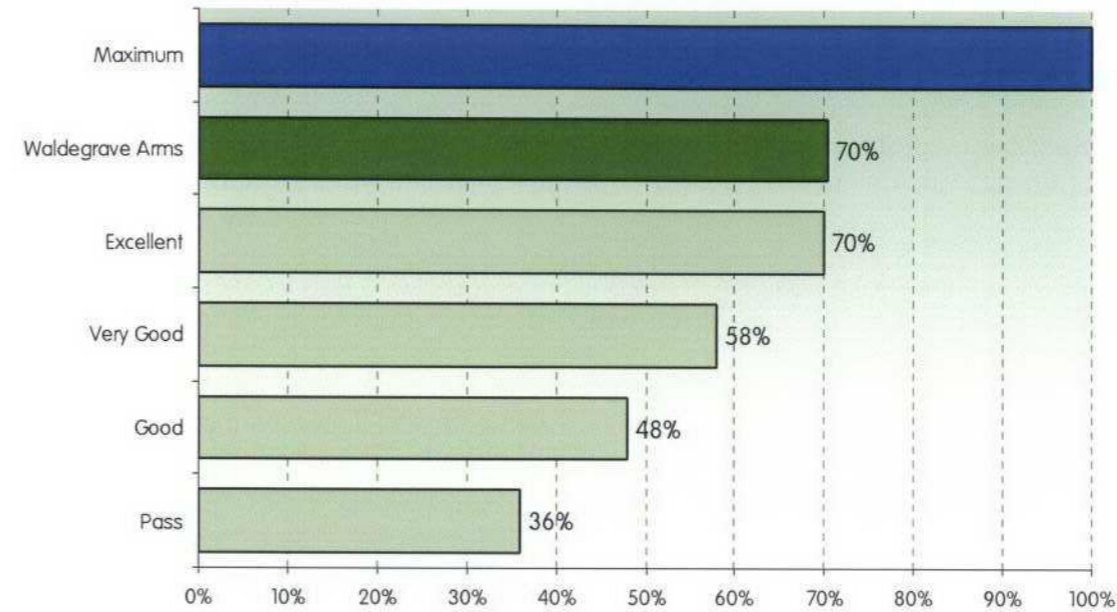
Whilst the design team should make every effort to ensure all Credits noted in the pre-assessment exercise table (Appendix a) are achieved, approximately 0.28% of the overall score remains 'in hand' for Credits which may have to be dropped in the detail development process.

Scoring Table

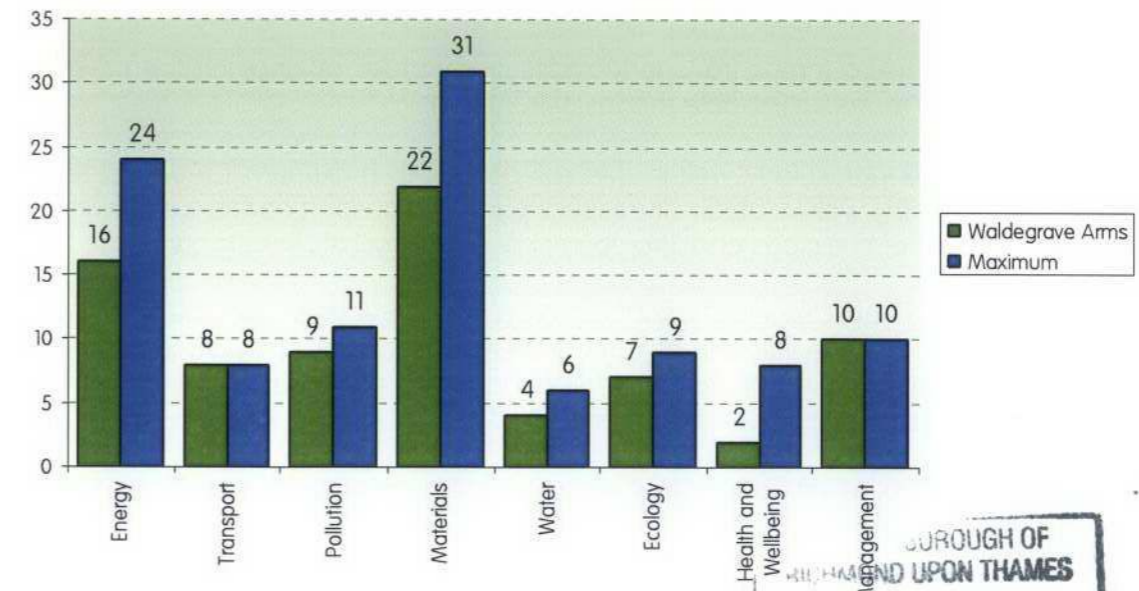
| Overall Credit Allocation | Env Weighting | Available | Required | % section credits | Overall Weighted % |
|---------------------------|---------------|-----------|----------|-------------------|--------------------|
| Energy | 22% | 14 | 16 | 67% | 14.67% |
| Transport | 8% | 8 | 8 | 100% | 8.00% |
| Pollution | 10% | 6 | 9 | 82% | 8.18% |
| Materials | 14% | 23 | 22 | 71% | 9.94% |
| Water | 10% | 3 | 4 | 67% | 6.67% |
| Ecology | 12% | 6 | 7 | 78% | 9.33% |
| Health and Wellbeing | 14% | 0 | 2 | 25% | 3.50% |
| Management | 10% | 10 | 10 | 100% | 10.00% |
| Total | | | | | 70.28% |

| BREEAM Rating | % Benchmark |
|---------------|-------------|
| Pass | ≥36 - <48 |
| Good | ≥48 - <58 |
| Very Good | ≥58 - <70 |
| Excellent | ≥70 |

Summary Scoring Chart



Detailed Scoring Chart



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COMMENTARY

Energy

The EcoHomes Credits in this category relate to the energy anticipated to be used by the occupier and the thermal efficiency of the apartments compared to the current Building Regulations. A large number of Credits are determined by the Dwelling Emissions Rate (building related CO₂ emissions).

A SAP calculation will be undertaken as part of the Building Regulations Part L assessment for the flats and it is anticipated that an average score would be achievable for building related CO₂ emissions, for the new development.

The use of energy efficient internal lights (such as those with compact fluorescent and discharge fittings) will also result in reduced energy use and a reduction in the overall SAP rating and CO₂ emissions for the apartments. Credits are also awarded for energy efficient internal and external lighting in their own right.

Since EcoHomes is intended to rate exemplar and super-insulated new homes, only one Credit for Building Fabric is anticipated to be achieved even with it being part new build.

Provision of internal drying space within all the apartments will also help gain credits along with the developer providing eco labelled white goods.

Transport

The overall aim of the EcoHomes transport Credits is to reduce reliance on the private car and encourage the use of more sustainable modes of transport.

The scheme performs particularly well in this category, with maximum Credits expected to be awarded. The site is very well located with respect to public transport nodes, being within walking distance of a number of bus stops and Strawberry Hill station with its links to London.

The close proximity of local amenities such as cash machines, a public house, children's play area and public green space will also encourage residents to walk rather than use private cars. Adequate cycle storage will be provided for all apartments in the development, with space for one cycle per one and two bedroom apartments needed to award the Credit.

A home office shall also be set up to reduce occupants requirements for travel to and from work.

Pollution

EcoHomes Credits in this category aim to cut the use of pollutants that damage the earth's protective stratospheric ozone layer, contribute to global warming and cause acid rain. The use of zero emission energy sources is also encouraged to stimulate the demand for locally generated renewable energy sources. A reduction in surface water run-off is sought to decrease the risk of localised flooding and pollution to natural watercourses, rivers and municipal systems.

The Credits for limiting rainwater run-off from the hard surfaces of the development by the use of underground storage tanks and further inline storage and/or hydrobrakes have been proposed. This will be specified to restrict surface water discharge to 50% during peak times.

The potential for incorporating renewable or low emission energy sources has been investigated, and it is proposed to provide 10% of the sites energy from renewable sources.

The location of the development in a zone having a low annual probability of flooding is reflected by the award of 2 Credits.

Materials

The Credits in this category aim to reduce the environmental impact of the materials specified for the housing and to encourage residents to recycle waste.

Credits shall be achieved by the specification of timber used for basic building and finishing elements that from sustainably managed sources. The materials specified for the roof and external walls of the building shall be specified as far as possible with low environmental impact, achieving an 'A' rating as defined by the BRE 'Green Guide to Housing Specification' which gives an environmental rating for the types of materials used in house construction.

Waste recycling at Waldegrave Road will be encouraged by the provision of internal recycling bins for all of the apartments with a minimum total capacity of 60 litres, and facilitating the use of the Local Authority collection scheme.

Water

The objective of this category is to reduce water consumption in the home by specifying water saving devices such as aerated taps, low water use toilets, low flow rate showers, efficient washing machines/dishwashers and water butts.

It is estimated that the proposed development would use less than 42m³ of water per bed space per year, through the provision of water efficiency measures such as spray taps and low volume dual flush toilets with individual apartments metered. Water Butts will also be incorporated for irrigation of the common garden. Rainwater Harvesting helps gain the External Potable Water Use credit.

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Land Use and Ecology

This category aims to minimise the impact of new development on ecological resources by awarding buildings with a high floor area to footprint ratio and encouraging development on land with a low ecological value. It also seeks to protect and enhance existing ecological features on site. In addition, Credits are awarded for the provision of ecological features that enhance the site's ecology in accordance with advice obtained from a registered ecological consultant.

In order to make efficient use of the land available, it is important to ensure effective use of the building footprint by maximising the useable space. As the development comprises of a 2-3 storey residential buildings with a pub/restaurant, the floor area to footprint ratio will be greater than 3.5:1 in at least 80% of dwellings and therefore the criteria set by BRE in this respect will be met.

Given that the proposals comprised the reuse of an existing brownfield site and there are very few significant ecological features on the site that need protecting, the Credit for building on land that has limited wildlife value is achievable. It is thought likely that the ecological value of the site will increase as a result of the proposals therefore three Credits are given for creating a positive impact and the garden planting and planting proposed as part of the landscape design within the development will serve to 'green' an urban, city centre location, to the benefit of future residents.

Health and Wellbeing

Issues considered in the health and well being category relate to the daylighting criteria set out in British Standard BS 8206: Part 2, adequate sound insulation with pre-completion testing and the provision of outside space that is at least semi-private.

The development is not likely to provide daylighting provision to all the residential flats, kitchens, however it is thought living rooms, dining rooms and studies will meet the daylighting criteria set out in British Standard BS 8206 Part 2. It is also considered that not all of these rooms would achieve a view of the sky in accordance with the same British Standard. The provision of external space around and close to the home, such as a private or shared garden, balcony or roof terrace, is recognized by EcoHomes as a major factor affecting the quality of life of the occupants, and therefore the shared garden available for the future occupants of the Waldegrave Road Development achieves the credit.

Management

The Waldegrave Road development scores very well across most items in the Management category. There is provision in place to work towards a Secure by Design award for the site, therefore achieving the Security Credit. The Building User's Guide has been allowed for since it is a relatively inexpensive item which will make up for the Credits lost under the Health and Wellbeing category.

The contractor has confirmed their commitment to complying with best practice site management principles and will confirm their commitment to achieving a number of monitoring activities around the site in line with the EcoHomes Guidance 2006.

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NOTE:

A post Construction review is also to be carried out to ensure an 'Excellent' EcoHomes rating is carried forward after the design stage.



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SITE CONTAMINATION

Checklist Requirements and Policy Text

Checklist Item

Investigate potential contamination of site.

Illustrating Compliance

Proposers of development on potentially contaminated sites should arrange pre-application discussions with the local planning authority (LPA) and other regulators, including the Environmental Health and Building Control departments of the local authority, the LPA's archaeological and nature conservation advisers and the Environment Agency (where pollution of controlled water and the waste management implications of land contamination are likely to be issues).

ENV 7 Contaminated Land

The Council will seek to identify contaminated land, whether in public or private ownership, and will take necessary measures to ensure that the contamination is treated appropriately in order to protect public health and the natural environment and bring sites into beneficial use. Before considering applications for the development of sites which are possibly contaminated, the council will require developers to undertake an assessment of the types and concentration of contaminants present and provide a statement of the method and scope of the assessment and remedial measures proposed.

Commentary

Ground and water pollution may result from activities such as gas manufacture, industrial processes, land-fill and sewage disposal.

It is important to identify the extent of the contamination to ensure that remedial action can be under taken to protect public health and the environment, including wildlife and groundwater.

At present the site is thought to be uncontaminated, but a survey will be completed to assess levels of contamination. Any contamination will have remedial action undertaken prior to development, to ensure safety both during and after development. The level of remediation required will be that sufficient to render sites harmless, taking account of the views of the Environment Agency and in accordance with government and other appropriate guidelines, but will also be at a level appropriate to the use proposed.

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SITE ECOLOGY

Checklist Requirements and Policy Text

Checklist Item

Undertake ecological assessment

Illustrating Compliance

1. Secure ecological data through a scoping study, ecological survey and impact assessment (Refer London Development Agency (LDA) Design for Biodiversity guide)
2. Ensure no net loss of biodiversity on the site but aim to achieve a net gain of biodiversity through:
 - Creating, restoring or balancing wildlife habitat on site
 - Incorporating vegetation into built structures, such as green roofs, green walls, balconies terraces
 - Incorporating appropriate nesting boxes and roosting structures
3. Describe how ongoing ecological management of the wildlife habitat will be achieved
4. Where net loss of biodiversity cannot be avoided, describe how loss will be fully mitigated

(Advice on ecology (where required) is to be sought from individuals of recognised organisations e.g. Association of Wildlife Trust Consultancies (AWTC), a member of the Institute of Environmental Management and Assessment (IEMA), a member of the Institute of Ecology and Environmental Management (IIEEM) or a member of the Landscape Institute (LI) with appropriate qualifications

ENV 9 - TREES IN TOWN AND LANDSCAPE

The Council will:

- a) continue to protect trees and make tree preservation orders (TPOs) where appropriate;
- b) encourage tree planting where appropriate, and give priority to native trees where these are suitable. The Council will continue its own programme of planting, especially in the areas shown on the proposals map;
- c) continue its programme of maintaining trees in streets and public open spaces and of selectively clearing and replanting trees;
- d) seek to retain the existing character of areas of forest tree planting, and generally favour forest trees over others where opportunities arise;
- e) promote planting of clumps and thickets in appropriate locations.

ENV 24 - SPECIES PROTECTION

Planning permission will not be granted for development or land use changes which would have an adverse impact on badgers or species protected by schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981. In addition, the Council will take into account the presence of local or national biodiversity priority species when assessing applications. Where development is permitted that may affect those species, the council will impose conditions where appropriate, and seek to use its powers to enter into planning agreements to facilitate the survival of individual members of the species; reduce disturbance to a minimum; and provide adequate alternative habitats to sustain at least the current levels of population.

BLT 14 - LANDSCAPE AND DEVELOPMENT

6.72 The inclusion of landscape proposals will normally be required in submissions for new development, and the Council will insist on the retention of existing trees and other important landscape features on development sites where practicable. Where trees are removed replacement planting will normally be required. There will be a presumption against schemes that result in an unacceptable loss of trees.

Commentary

To achieve compliance with this checklist item requires careful consideration of the existing and neighbouring features as well as careful selection of plant species and habitats. This is an area of specialist expertise and requires input from experts at site master planning and detailed design stages.

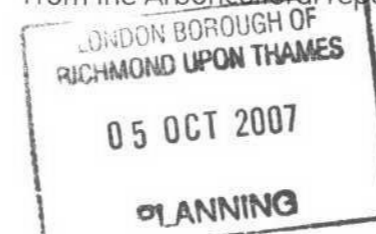
An Ecologist shall be appointed in order to ensure that wildlife habitats on site are creating, restored and balanced by incorporating appropriate nesting boxes and roosting structures along with landscaped gardening.

The new ecologically valuable habitat will be appropriate to the local area. This will include habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself.

On the Waldegrave Arms site an Arboricultural Impact Assessment has been carried out to investigate the following issues:

- The species, size and position of the trees and other vegetation within the area of the proposed development and within neighbouring and adjoining areas where trees may have some significance to the proposed development.
- The maturity and condition of the trees surveyed with appropriate recommendations for action.
- The impact of the proposed development upon the tree population in and around the site.
- Measures required to protect trees during proposed development works.

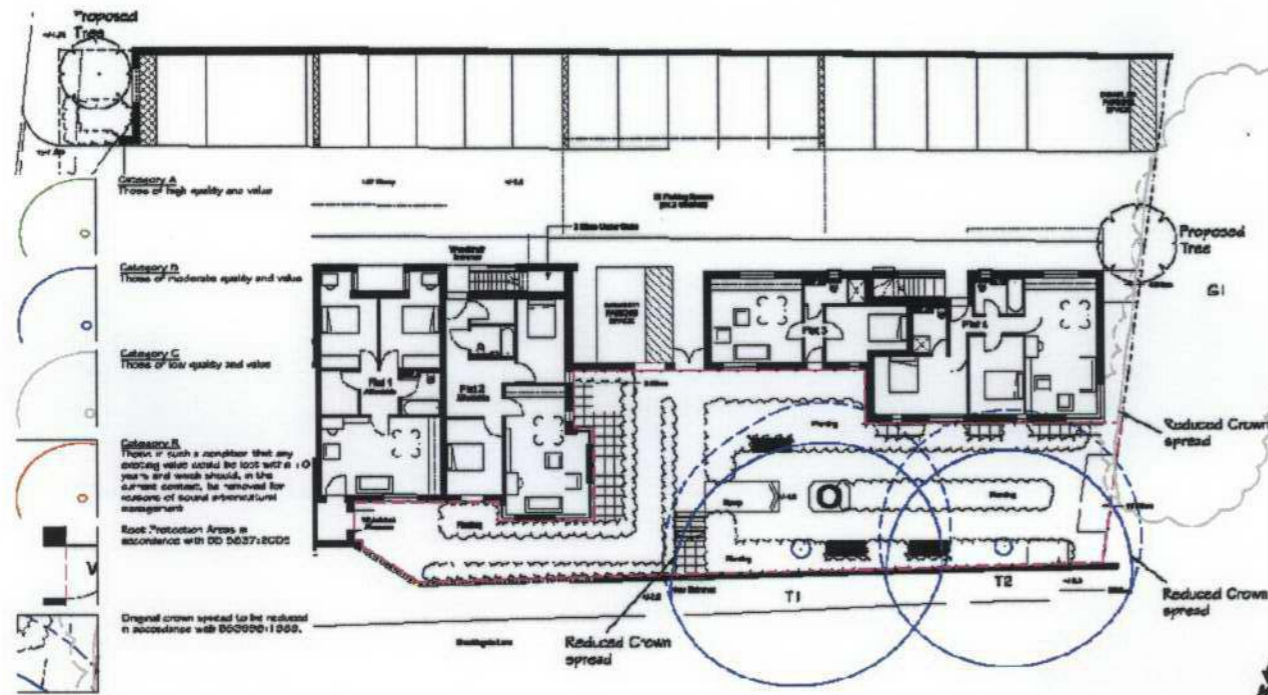
From the Arboricultural report the following actions are to be undertaken:



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- Protection of two trees on the north side of the development on Shacklegate /Lane.
- Root protection areas are to be set up to cover the whole of the proposed garden for the protected trees.
- It is proposed that some crown reduction works are undertaken to the protected trees to maintain sufficient clearance from the proposed development and to allow the construction of the development. The extent of the works to the crown reduction and root protection area is illustrated in the drawing below.



During the construction it is expected the retained trees will be at risk from the follow operations:

- Bringing heavy plant onto the site – Potentially damaging to the crowns, stems and roots of trees. Trees with low branches over the area of works may require pruning and protective fencing will be required to prevent compaction of soil beneath the crowns of trees and to prevent damage to stems and crowns.
- Handling and storage of materials on site – The construction of the proposed buildings will require the transporting, storage and handling of large quantities of materials. Space for these activities must be provided without damage to trees that are to be retained.
- Construction works – It must be assumed that some space will be required around the proposed buildings to allow for normal construction activities. Any tree crowns within 1.5m of proposed structures will need to be pruned to allow for the erection of scaffolding etc.
- New service runs – If new service runs are required to or from the proposed buildings, car parking areas or driveways these may impact upon existing trees by severing roots or altering drainage characteristics of the soil. The impact on trees will need to be assessed when plans are available. The above risks to trees can be adequately managed by an approved method statement in response to suitably drafted planning conditions.

Ecological Management

Ongoing ecological management of the wildlife habitat will be achieved with an appropriate management plan covering at least the first 5 years after project completion. This will be handed over to the building occupants and includes:

- a. Management of any protected features on site,
- b. Management of any new, existing or enhanced habitats,
- c. A reference to the current or future site level Biodiversity Action Plan.



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ENERGY SAVING

Checklist Requirements and Policy Text

Checklist Item

Design building and its services for minimum energy use

Illustrating Compliance

An energy assessment should be submitted to the planning authority, which shows the predicted energy demand and carbon dioxide emissions for the site and subsequently how these have been reduced by:

- 1 Using less energy (being lean)
 - 1.1.1 Illustrate how energy demand for the development has been reduced by:
 - Applying passive solar design principles
 - Installing energy efficient measures and technologies
- 2 Using renewable energy (being green)
- 3 Supplying energy efficiently (being clean)
 - 3.1 Illustrate in the proposal how the use of Combined Heat and Power (CHP) technology or a community/ district heating scheme has been explored (where applicable)

BLT 15 - DAYLIGHTING AND SUNLIGHTING

The Council will generally seek to ensure that the design and layout of buildings enables sufficient sunlight and daylight to penetrate into and between buildings, and that adjoining land or properties are protected.

BLT 31 - ENERGY AND RESOURCE CONSERVATION

The Council will seek to ensure that the design, orientation, and use of materials in new buildings, extensions and external works maximise potential for energy generation from renewable sources and resource conservation, take into account the principles of energy and water conservation and collection, and that materials are obtained from renewable sources and whenever possible are obtained by re-use or recycling. Proposals for development to enable the exploitation of renewable energy resources will be encouraged subject to impact on amenity.

Commentary

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ENERGY CONSERVATION

As the majority of the building is predominantly of residential use, there are large benefits from the orientation of the building. In order to increase the benefits of energy gain, sustainability and user amenity the building forms make use of controlled natural daylight, therefore reducing the daily usage of the artificial lighting systems. This has been achieved within the residential element by the use of relatively shallow depth floor spaces, by maximising façade to floorplate ratios.

This has the advantage of maximising the levels of natural daylight penetrating the building, and thereby reducing the space heating requirements in the Spring and Autumn. The limited extent of glazing in the building in general, means that the building is protected from prevailing winds and reduces the likelihood of overheating.

The accommodation provided within the site would benefit from adequate levels of daylight and sunlight to all habitable rooms due to their orientation fronting Waldegrave Road and Shacklegate Lane not to dissimilar to the arrangement found in much residential accommodation fronting roads.

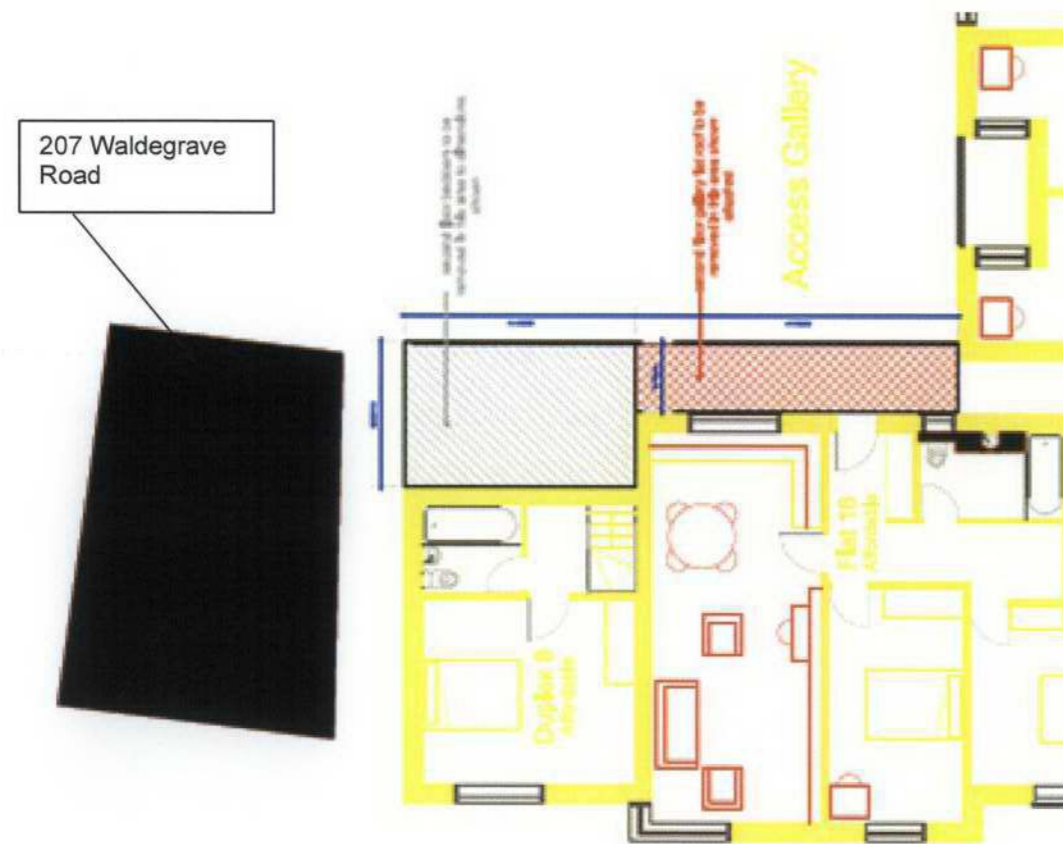


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The main issue for consideration in relation to the impact of the development on sunlight / daylight on neighbouring properties would be to the adjacent property at 207 Waldegrave Road which incorporates residential units within the rear part of the building.



Daylighting assessments carried out have resulted in additional cut backs to the rear of the new building fronting Waldegrave Road at second floor level. These cut backs facilitate adequate daylight to the ground floor and first floor flats within 207 Waldegrave Road in line with the BRE guidelines.

A daylight / sunlight study confirming this has been produced by Richard Wilson at Tryglyph and is contained within the planning documentation.

ENERGY EFFICIENCY

The building fabric and glazing required shall be designed in compliance with Part L of the Building Regulations; Conservation of Fuel and Power, the revisions to which came into force in April 2006. The development will employ building fabric and overall building designs that meet and exceed the requirements of Part L (2006), whilst being economic in construction terms.

Criterion 2 of Part L1A (2006) of the Building Regulations relates to the performance of the building fabric considered in isolation of operation or servicing issues and so may be used to verify that

the fabric U-Values (insulation standard) specified for the building is no worse than those required by the Regulations

The production of SAP calculations, will be produced for the residential portion and will show compliance to be above the minimum requirements for Building Regulations.

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Energy Efficient Lighting and Appliances

Introduction

White goods include washing machines, dryers, dishwashers and fridge/freezers.

Fridge/ Freezers

As these appliances operate continuously throughout the year, they provide significant scope for energy savings. A-rated appliances are available from all the major manufacturers and these models are fast becoming the industry standard. They should be placed in a well aerated place, as far as possible from potential heat sources such as cookers, windows, etc.

Cooking

The cooker is the largest energy device (up to 15kW) in a house, and thus has major implications for both overall annual electricity consumption and also peak demand. Solutions to this problem include:

- the installation of A-rated electric ovens and hobs,
- the use of A-rated gas appliances (for either hob-only or whole oven cooking), and
- provision of microwave ovens.

Dishwashers and Washing Machines

'A'-rated dishwashers and washing machines are increasingly available with hot water as well as cold water intakes. However, these machines still take in only a small amount of hot water blended with a larger amount of cold water and then electrically heated to the required temperature. Nevertheless hot-fill is preferable because the domestic hot water supply is likely to be heated more efficiently than can be achieved in the appliance.

Tumble dryers

Tumble dryers are generally the biggest consumers of electricity within the home and whilst A-rated tumble dryers are available their energy consumption remains high. Drying the clothes with natural methods, such as a washing line, is a far more efficient method which also serves to air the clothes.

The scheme shall reduce the need for tumble dryer use by providing purpose made drying facilities in the form of over-bath washing lines in the flats.

The provision of a drying space for apartments can be achieved by an over-bath line holding at least 4m for single and two bed units. Ventilation in the bathroom shall be controlled by either a humidistat or passive vents and the heating is not oversized to meet the drying requirements. The spaces used for drying will not prevent the intended use of the area.

White goods are now provided with a certified energy label. These are rated A+, A, B and C with C being the least efficient. Data supplied by the Energy Advice Centre suggests that using A rather than C rated white goods would reduce electrical energy consumption in each dwelling by 800

kWh year worth about £56. It has been agreed that all white goods supplied to the dwellings will be A or A+ rated.

Lighting and appliances can account for up to 30% of the total energy demand in a naturally ventilated building, and up to 40% of the total energy costs. The level of electricity demand continues to grow especially within the residential sector and this remains a point of focus in energy conservation.

The installation of energy efficient light fittings in each unit and associated communal areas, along with low energy external lighting using PIR and daylight cut-off sensors (as per EcoHomes methodology), will all help to reduce the electrical demand. In addition, A and A+ rated energy efficient appliances (fridge freezer, and washing machine) will also be specified within units to further reduce the base load electrical requirement.

Low Energy Lighting

Low energy lamps (compact fluorescent or linear fluorescent) use about 80% less energy than conventional tungsten lamps for the same light output.

In dwellings, the new Part L regulation requires that 1/3 of all fixed light fittings must be capable of accepting only low energy lamps.

Conventional lighting accounts for about 16% of electrical energy consumption in dwellings, (EcoHomes). If fixed lighting, rather than the minimum 1/3, used only low energy lamps, this would yield a further saving of 8.5% of total electrical energy in each dwelling. This equates to a saving of about £8 per year.

Over the whole development, this produces a carbon emission saving of 2.3%.

Even greater savings are claimed for the latest LED lamps which are becoming available for domestic luminaires. The use of such lamps will be investigated at the detail design stage.

Natural Ventilation

A naturally ventilated building is proposed for the residential and restaurant areas of the development, with large openable windows providing good ventilation. Natural ventilation has been possible as highly insulated building elements have been specified and good cross flow ventilation is possible within the individual flats.



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COMBINED HEAT AND POWER (CHP)

The suitability of CHP for a particular process or application requires a detailed appraisal of heat and electricity requirements, along with other design factors.

The site contains 22 residential units, therefore relatively small heat and electricity requirements are required. This would lead to considering direct gas-fired micro combined heat and power.

Micro CHP is a low carbon technology which could provide the sites energy usage by generating electricity locally. This uses a miniature CHP unit designed to provide heat and power to a small building in place of a conventional boiler. Most Micro-CHP sites use Stirling engines to operate. This will normally be cheaper than purchasing electricity from a conventional supplier.

For a site to benefit, it will usually need to meet certain criteria:

- CHP is only cost-effective with long operating hours (i.e. ideally for at least 12 hours/day, 7 days/week) but in general, the greater the annual period of demand, the higher the cost savings.
- There should be reasonable confidence in the future demand for heat and power over the lifetime of the CHP plant, typically 10-15 years. However, packaged Micro-CHP units can usually be relocated.
- There must be an adequate supply of a suitable fuel.

Direct gas-fired micro combined heat and power has been considered for this development, but due to the relatively small heat and electrical requirements and low hours of operating, it is not thought to be a viable option.

Micro CHP systems are also new technologies to the market place and therefore the systems are unproven. It is thought that the risks are too high to incorporate this technology for use within this proposed development, however future installation can be accommodated within the current design proposals for a centralised boiler room and 'community heating scheme'.