September 15

Energy Statement

Gavray Drive,
Bicester

Turley
Sustainability

Contents

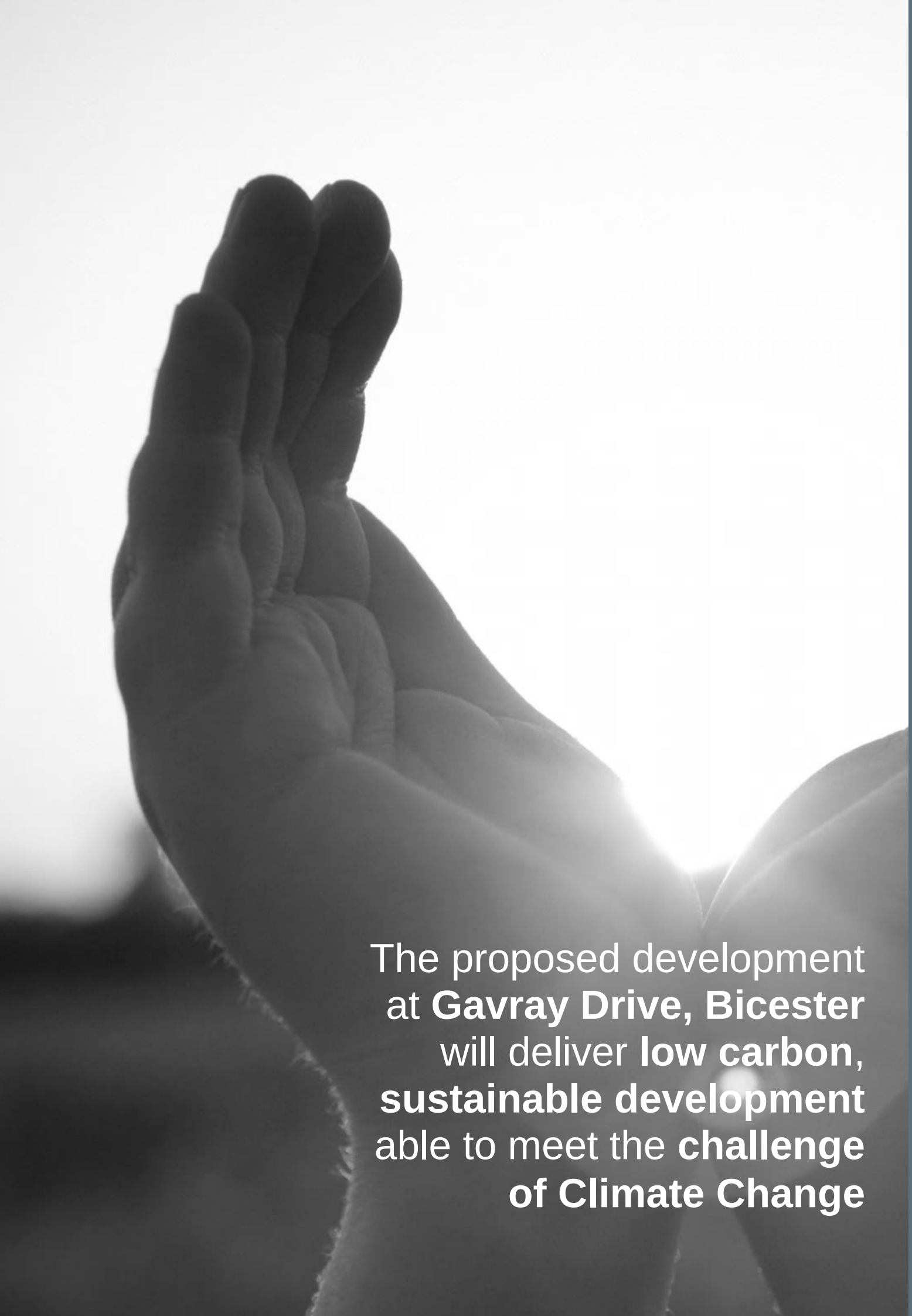
This **Energy Statement** has been prepared by **Turley Sustainability** on behalf of **Gallagher Estates** for the proposed development of up to 180 new homes at **Gavray Drive**, **Bicester**

Client
Gallagher UK

Turley reference
GALZ3001

Document status
FINAL

10 September 2015



The proposed development at **Gavray Drive, Bicester** will deliver **low carbon**, **sustainable development** able to meet the **challenge of Climate Change**

1. Introduction

This Energy Statement has been prepared in support of the Outline Planning Application for Land at Gavray Drive, south east of Bicester.

Gallagher Estates are proposing a new residential development of up to 180 new homes at Gavray Drive and have been requested to provide an Energy Statement by Cherwell District Council in response to the Local Plan sustainability policies.

Site and Surroundings

The proposed development is on the south eastern perimeter of Bicester, Oxfordshire. Development will support the growth objectives for Bicester and the wider Cherwell District. The proposal is in general conformity with Policy Bicester 13 of the recently adopted Cherwell Local Plan.

The site is located close to the town centre and north of Langford Village. The wider context for the site is of employment development to the north and west beyond the rail lines. Langford Village is located to the south with the remaining section of the Gavray Drive allocation to the east. Gavray Drive connects to the A4421 via a roundabout junction.

Proposed Development

The Gavray Drive Site is approximately 6.9 ha and currently in agricultural use with limited landscape features. The site is relatively flat, but it slopes gently from west to east with the low point of the Langford Brook.

The outline planning application at Gavray Drive comprises of up to 180 dwellings to include affordable housing, public open space, localised land remodelling, Sustainable Urban Drainage Systems and structural planting (OUT15/00837).

The development description:

Residential development including affordable housing, public open space, localised land remodelling, compensatory flood storage and structure planting.

Figure 1: Site Boundary

Full details are provided within the Design and Access Statement and Planning Statement that accompany the Outline Planning Application.

2. Policy Context

This section of the report provides an overview of the relevant planning policy and guidance regarding sustainability and development at Gavray Drive, Bicester from a national and local perspective.

UK Sustainable Development Strategy

In 2005, the Government published an updated strategy for implementing sustainable development across the UK.

This strategy acts as an overarching document from which a range of specific policies and legislation was derived. Although published in 2005, the strategy has taken a recently renewed focus in light of the Government's definition of Sustainable Development in the NPPF.

One of the key aims of this strategy is to recognise the threats of climate change and ensure that the UK develops a strategy to mitigate and adapt to this phenomenon.

The document established five key principles that will underpin the national sustainable development strategy:

1. **Living within Environmental Limits;**
2. **Ensuring a Strong, Healthy and Just Society;**
3. **Achieving a Sustainable Economy;**
4. **Promoting Good Governance; and**
5. **Using sound science responsibly.**

With regards to planning and the built environment, this document set the basis for the development of plans and policies that promote development that mitigates and adapts to climate change.

Climate Change Act

The Climate Change Act (2008) sets a legally binding target for reducing UK CO_2 emissions by least 80% on 1990 levels by 2050.

It established the Committee on Climate Change, which is responsible for setting binding interim carbon budgets for the Government over successive five year periods. The first three carbon budgets were announced in the Budget 2009, resulting in an interim target of a 34% reduction in CO_2 equivalent emissions on 1990 levels by 2020.

UK Carbon Plan

In 2011, the Government published an updated Carbon Plan setting out how the UK will achieve decarbonisation and make the transition to a low carbon economy. It sets this objective within a framework of mitigating and adapting to climate change and maintaining energy security in a way that minimises costs and maximises benefits to the economy.

With regards to development, the Carbon Plan presents the Government's approach to promoting the delivery of low carbon, resilient and adaptive buildings and enabling sustainable transportation as positively contributing to these national carbon reduction targets.

Building Regulations

Whilst not planning policy, the Building Regulations, and specifically Approved Documents Part L; Conservation of Fuel and Power, are relevant as they determine the energy efficiency and carbon emission standards required by new buildings.

The primary mechanism for reducing carbon emissions in new development is progressive changes to Part L supporting increased levels of energy efficiency in buildings and homes.

In April 2014 the Part L regulations changed and it is now a requirement for new homes to deliver a 6% reduction in carbon emissions compared to equivalent 2010 Part L standards. This change aims to strike a balance between the commitments to reducing carbon emissions and improving energy efficiency and ensuring that the overall effect of regulation upon consumers and businesses does not stifle growth.

The Government has stated that house builders will continue to have flexibility in how they meet carbon reduction targets, however, the emphasis of these changes is on using a fabric first approach and this was reinforced through the introduction of a new target for fabric energy efficiency within Building Regulations Part L 2013.

The zero carbon policy set out a plan for progressive changes to Part L of the Building Regulations to eventually achieve zero carbon homes. As detailed in The Housing Standards Review and Fixing the Foundations chapters below, the Government have postponed any increase in on-site energy efficiency and carbon reduction standards that were due to come into force in 2016.

The Housing Standards Review

Following the Housing Standards Review and subsequent consultation on the review completed in 2013, the Government announced the conclusion to the Housing Standards Review in March 2015. The review aimed to simplify government regulations and standards into one key set, driven by Building Regulations.

To achieve simplification of regulation the government created a new approach for the setting of technical standards for new housing. The new standards aim to rationalise the many differing existing standards into a simpler, streamlined system and help bring forward much needed new homes.

A Ministerial Statement published in March 2015 withdrew the Code for Sustainable Homes confirming ‘the government has now withdrawn the code, aside from the management of legacy cases’ and therefore Local Authorities should no longer require it as a planning condition for new approvals.

Fixing the Foundations

Following the election in May 2015 the government has produced a number of policy documents including “Fixing the Foundations” published in July 2015.

The document includes a statement outlining the government’s intention to no longer continue with the Allowable Solutions scheme or impose any increases in on-site energy efficiency standards in 2016 as part of the national zero carbon buildings policy.

It is understood the government aim to keep energy efficiency standards under review, recognising that existing measures to increase energy efficiency of new buildings should be allowed time to become established.

National Planning Policy Framework

Following its publication in March 2012, national planning policy is now provided by the NPPF which sets out the government's planning policies for England and how these are expected to be applied. It also sets out the requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.

The Government has made clear its expectation that the planning system should positively embrace well-conceived development to deliver the economic growth necessary and the housing we need to create inclusive and mixed communities.

The NPPF states that: 'The purpose of the planning system is to contribute to the achievement of sustainable development'.

It states clearly that in order to deliver sustainable development, the planning system must perform three distinct roles, aligned to the three pillars of sustainability, which must not be taken in isolation and should be pursued jointly:

An economic role contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

A social role supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and

An environmental role contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

Demonstrating Sustainable Development

Paragraph 6 of the NPPF states that: *"The purpose of the planning system is to contribute to the achievement of sustainable development. The policies in paragraphs 18 to 219, taken as a whole, constitute the Government's view of what sustainable development in England means in practice for the planning system".*

The policies referred to in Paragraph 6 of the NPPF have been divided into 13 themes;

1. **Building a Strong Competitive Economy**
2. **Ensuring the Vitality of Town Centres**
3. **Supporting a prosperous rural economy**
4. **Promoting sustainable transport**
5. **Supporting high quality communications infrastructure**
6. **Delivering a wide choice of high quality homes**
7. **Requiring good design**
8. **Promoting healthy communities**
9. **Protecting Green Belt Land**

10. **Meeting the challenge of climate change, flooding and coastal change**

11. **Conserving and enhancing the natural environment**

12. **Facilitating the sustainable use of minerals**

Should a proposed development demonstrate that it is supporting the relevant policies of the NPPF then it is deemed to be 'Sustainable Development'.

Chapter 10 of the NPPF; Meeting the challenge of climate change, flooding and coastal change gives essential guidance on meeting the challenge of climate change through the planning process. Guidance encourages new development to;

- Shape places to secure reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change

National Planning Policy Guidance

In March 2015 the Government released the updated National Planning Policy Guidance (the Guidance). The Guidance provides information to local authorities on how to implement the policies of the NPPF and approach specific policy aims.

The guidance sets out how local authorities should include polices that protect the local environment and strategies to mitigate and adapt to climate change. It reiterates that local authorities should set sustainability policies for new housing in line with Government Policy and the findings of the Housing Standards Review.

Following the release of the Productivity Plan in July 2015, the government confirmed its intention to no longer proceed with the zero carbon Allowable Solutions carbon offsetting scheme, or the proposed 2016 increase in on-site energy efficiency standards. The plan did confirm however that energy efficiency standards will be' kept under review, recognising that existing measures to increase energy efficiency of new buildings should be allowed time to become established'.

Due to the Productivity Plan's very recent release there has not yet been clarification on the effects of this change on local and national policy. The importance of 'well designed, functional developments' that are adaptable for the future will continue to be integral to sustainability and planning policy and therefore will be supported by any changes following the plans release.

The National Planning Policy Framework (NPPF) was published on 27 March 2012 and replaced all the previous Planning Policy Statements, however, PPS1 Supplement is still considered relevant and applicable.

The Development Plan

The NPPF reiterates the status of the Development Plan as the starting point for decision making unless material considerations indicate otherwise.

The adopted local development plan for Cherwell comprises:

- **Cherwell Local Plan (2011-2031) Part 1**

Cherwell Local Plan

The Local Plan Part 1 and all supporting documents were submitted to the Secretary of State on 31st January 2014 for formal examination. The plan was formally adopted on the 20th July 2015 and replaces the Non-Statutory Cherwell District Local Plan 2011 previously used as interim policy guidance.

The site at Gavray Drive is allocated within the Local Plan as Bicester 13 and the site specific requirements include the demonstration of Climate Change mitigation and adaptation measures including compliance with policies ESD 1 – 5. Policies ESD 1-5 of the Local Plan set out the council's sustainability objectives and policies.

The relevant policies to the development are detailed as follows;

Policy ESD 1 - Mitigating and Adapting to Climate Change states that measures are encouraged to be taken to mitigate the impact of development within the district on climate change and improve the development microclimate.

Policy ESD 2 - Energy Hierarchy and Allowable Solutions recognises it would be counter-productive to encourage generation of renewable energy if energy is being wasted by inefficiency. As such the policy supports the use of the 'energy hierarchy' to guide reductions in energy and associated carbon emissions as follows:

- *Reducing energy use, in particular by the use of sustainable design and construction measures;*
- *Supplying energy efficiently and giving priority to decentralised energy supply;*
- *Making use of renewable energy;*
- *Making use of allowable solutions*

The policy states an Energy Statement will be required for proposals for major residential developments (over 10 dwellings, or 1,000 sqm of non-residential floorspace) and all non-residential development.

Policy ESD 3 - Sustainable Construction States that new residential development is advocated to incorporate sustainable design and construction technology to achieve zero carbon development through a combination of fabric energy efficiency, carbon compliance and allowable solutions in line with Government policy.

Cherwell District is in an area of water stress and the Council will seek a higher level of water efficiency than required in the Building Regulations, with developments achieving a limit of 110 litres/person/day. Key principles of policy ESD 3 include;

- *Minimising both energy demands and energy loss*
- *Maximising passive solar lighting and natural ventilation*
- *Maximising resource efficiency*
- *Incorporating the use of recycled and energy efficient materials*
- *Incorporating the use of locally sourced building materials*
- *Reducing waste and pollution and making adequate provision for the recycling of waste*
- *Making use of sustainable drainage methods*
- *Reducing the impact on the external environment and maximising opportunities for cooling and shading (by the provision of open space and water, planting, and green roofs, for example); and*
- *Making use of the embodied energy within buildings wherever possible and re-using materials where proposals involve demolition or redevelopment.*

Policy ESD 4 - Decentralised Energy Systems states the use of decentralised energy systems, providing either heating (District Heating (DH)) or heating and power (Combined Heat and Power (CHP)) are encouraged in new developments of above 100 units, where viable.

Policy ESD 5 - Renewable Energy suggests a consideration be given to the potential for onsite renewable energy provision above any provision required meeting national building standards.

Policy ESD6 - Sustainable Flood Risk Management the Council will manage and reduce flood risk in the District through using a sequential approach to development. Flood risk assessments should assess all sources of flood risk and demonstrate that:

- *No increase in surface water discharge rates or volumes during storm events up to and including the 1 in 100 year storm event with an allowance for climate change*

- *Developments will not flood from surface water up to and including the design storm event or any surface water flooding beyond the 1 in 30 year storm event*

Policy ESD7 - Sustainable drainage systems Developments are encouraged to incorporate sustainable drainage systems (SuDS) to manage surface water run-off.

Emerging Policy

Cherwell Local Plan 2011 – 2031 (Part 2): Development Management Policies and Sites

Part 2 of the Local Plan will contain detailed planning policies for considering planning applications and non-strategic site allocations.

Upon adoption by the Council as a Development Plan Document it will become part of the statutory Development Plan. It is expected that the Plan will be adopted in 2017.

Policy Summary

Central to the government's and Cherwell District's vision for 'Sustainable Development' is the approval of development that jointly promotes economic, social and environmental benefits.

The NPPF states that these principles should be promoted simultaneously through the planning system to achieve sustainable development. Cherwell's Local Plan encourages development to meet the challenge of climate change through application of the energy hierarchy in accordance with Government policy.

The recommendations of the Housing Standards Review have signalled a shift to rationalise various conflicting sustainability metrics applied through the planning and building control system. This includes the winding down of the Code for Sustainable Homes with the exception of legacy cases.

Further changes in national policy for new homes have occurred in recent months following the change of government, including confirmation that the zero carbon homes policy and allowable solutions will not now be implemented nationally from 2016.

The Local Plan advocates new development to incorporate sustainable design and construction technology to achieve zero carbon development in line with government policy, which has now confirmed the postponement of zero carbon standards and allowable solutions for new homes.

The proposed Energy Strategy for new homes at Gavray Drive is summarised in Section 3 of this report, reflecting the sustainability priorities of Cherwell's Local Plan in the context of the Housing Standards Review and changes to national zero carbon building policy.

3. Gavray Drive Energy Strategy

This Energy Statement has been prepared to summarise the proposed approach at the outline planning stage to deliver sustainable new homes at Gavray Drive, Bicester.

The proposed energy strategy reflects the varying requirements of both national and local planning policy including recent changes following the Housing Standards Review.

Gallagher Estates aim to support the Government's ambition for energy efficient new homes whilst also responding positively to local sustainability policy and priorities.

At the Outline Planning Application stage this energy strategy provides the framework within which energy efficient and sustainable new homes can be delivered.

Energy Hierarchy

The Energy Strategy for homes at Gavray Drive reflects Cherwell's sustainable design and construction policies and the commitment to building homes in accordance with the energy hierarchy.

This prioritises investment in good quality and energy efficient homes as the foundation prior to the installation of any decentralised, low carbon or renewable energy technologies.

The strategy is summarised under the following headings;

3.1 Fabric First (ESD 2)

3.2 CHP and District Heating (ESD 4)

3.3 Renewable Energy (ESD 5)

3.4 Sustainable Construction (ESD 3)

These themes respond to the energy and sustainability priorities established in local planning policy and support the delivery of resource efficient and low carbon new homes and buildings.

3.1 Fabric First

Local Plan Policy ESD 2 'Energy Hierarchy and Allowable Solutions' encourages the use of the energy hierarchy in guiding the reduction in carbon emissions of new development in Cherwell, which is supported by local and national planning policy.

The energy hierarchy is summarised below;

1. **Lean:**
   Use less energy. Minimise energy demand through efficient design and the incorporation of passive measures.

2. **Clean:**
   Supply energy efficiently. Reduce energy consumption through use of low carbon technology.

3. **Green:**
   Use renewable energy systems.

At Gavray Drive a fabric first commitment to the design and construction of new homes is proposed in accordance with the energy hierarchy in order to reduce energy demand and 'lock-in' long term cost effective carbon reductions for the lifetime of the development.

All new homes will target reductions in energy consumption through high standards of fabric energy efficiency. At the outline application stage it is envisaged that the following measures will optimise energy efficiency of all homes:

- *Design and layout to promote passive solar gains, maximise natural daylight, sunlight and ventilation;*
- *Design of new homes will optimise natural daylight in all the habitable spaces and all homes will incorporate suitable window sizes relative to living spaces and bedrooms;*
- *Development will aim to balance minimising the direct adverse impact of shading from other buildings and landscape features and optimise access to passive solar gains;*
- *Material selection will aim to balance the aesthetics, robustness and durability with optimal thermal benefits for every home;*
- *All homes will incorporate high efficiency lighting targeting 100% of all light fittings as low energy lighting.*
- *All new homes will target building element U-values and air tightness above the minimum Part L 2013 backstop standards.*
- *High performance glazing with appropriate window u-values and g-values will reduce heat loss and optimise positive solar gain and also minimise the solar intensity to reduce potential overheating impact.*

Table 1 details the target thermal efficiency levels for new homes at Gavray Drive.

Table 1: Target thermal efficiency of new homes

Element	Part L 2013 Backstop	Target thermal performance
Walls	**≤ 0.35 W/m^{2}K**	**≤ 0.2 W/m^{2}K**
Floor	**≤ 0.25 W/m^{2}K**	**≤ 0.16 W/m^{2}K**
Roof	**≤ 0.20 W/m^{2}K**	**≤ 0.16 W/m^{2}K**
Windows and Doors	**≤ 2.0k/m^{2}K**	**≤ 1.5 W/m^{2}K**
Air tightness	**≤ 10m^3/m^2/hr**	**<5m^3/m^2/hr**

The design thermal performance of individual homes will be further developed as part of future reserved matters and confirmed as part of the detailed design process.

The estimated regulated energy demand and carbon emissions of all new homes at Gavray Drive following energy efficiency measures is summarised in Table 2 below.

At the outline application stage this is based on benchmark performance data for typical house types and average housing type proportions from the English Housing Survey (2012-13) in the absence of a detailed accommodation schedule at this stage.

Table 2: Estimated Energy and carbon

Energy	Regulated Energy (kWh/yr)	Regulated Carbon (kgCO2/yr)
Electricity	132,647	68,844
Heat	928,532	200,563
Total	**1,061,176**	**269,407**

Even following lean energy efficiency measures space heating and hot water is anticipated to account for the greatest proportion of energy consumption at Gavray Drive, albeit a much lesser proportion of regulated carbon emissions.

Provision of home user information and the roll out of smart energy metering as part of the national smart meter roll our programme and where specified installation of high energy efficient rated appliances are all anticipated to contribute positively to reducing and managing unregulated energy consumption such as cooking and appliances that fall outside the control of building regulation.

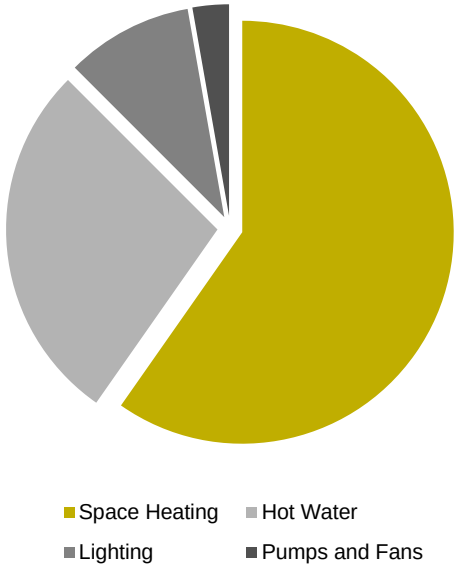


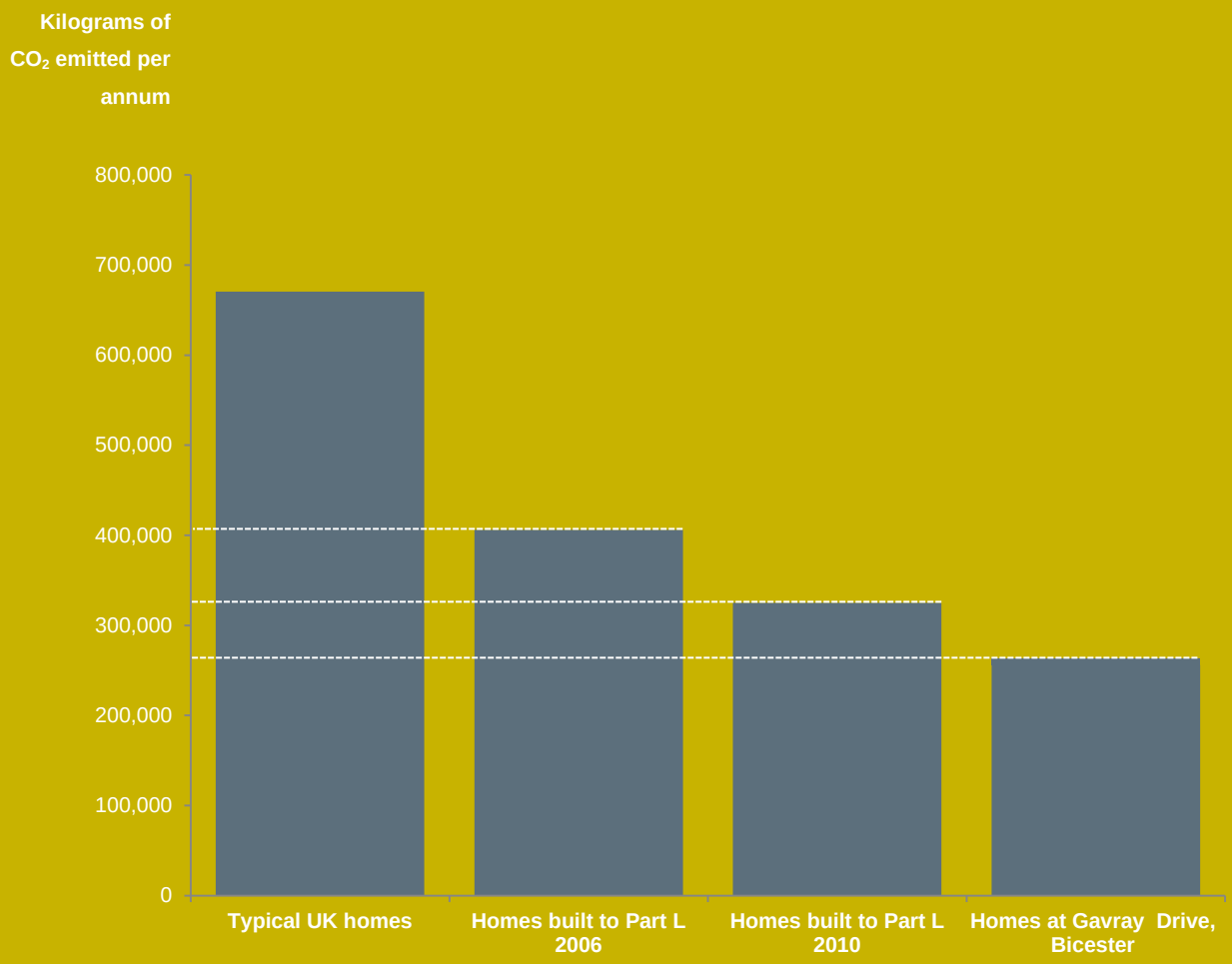
Figure 2: Energy Breakdown

The high standards of fabric efficiency will have a positive impact in reducing the risk of fuel poverty. Whilst this is lower in Cherwell than the national average it is important that new properties have high levels of energy efficiency, lessening the amount of fuel needed to heat homes and making them cheaper to run.

The graph on the following page illustrates the estimated carbon emissions of new homes at Gavray Drive and that these are anticipated to be considerably more energy efficient and less carbon intensive than typical homes and shows the progressive improvements and reduction in emissions achieved through tightening of the Part L Building Regulations.

Carbon Footprint of Gavray Drive

The graph below illustrates the estimated regulated carbon emissions of the proposed development of up to180 new homes compared with the performance of existing homes and previous standards in accordance with the energy hierarchy and national zero carbon building policy.



3.2 CHP and district heating

Policy ESD 4 - Decentralised Energy Systems states the use of decentralised energy systems through District Heating (DH) or Combined Heat and Power (CHP) are encouraged in new developments of above 100 units, where viable.

Gallagher Estates is fully supportive of the concept of decentralised energy provided that it represents the most technically and commercially viable solution to reducing carbon emissions and will provide real benefits to the occupants of new homes.

The national heat map (Figure 3) establishes that the site's existing heat density is very low and the surrounding area does not represent any substantial existing heat demand.

The closest proposed heat network in development is associated with the Ardley Energy from waste plant which is over 8km away. There are currently no existing networks in the Bicester area that the development might be able to connect to. Gavray Drive is on the mains gas network and therefore it is not considered a priority site for CHP at this point in time.

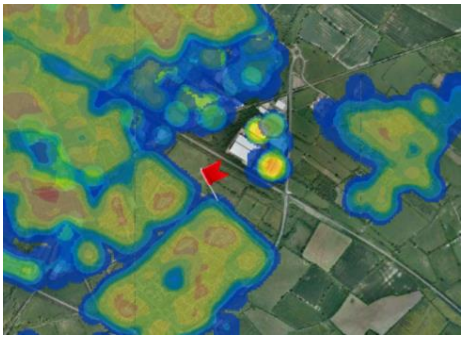


Figure 3: Site heat density

The potential for CHP/DH at Gavray Drive has also been considered under the following headings;

- **Technical Factors**
- **Commercial Factors**
- **Physical Factors**

3.2.1 Technical Factors

Thermal Demand

One of the principal restrictions to the use of District Heating and Combined Heat and Power (CHP) by residential led development is the low heating and hot water demand of new homes that are designed in accordance with the energy hierarchy.

Thermal demand is a critical factor in the suitability of decentralised energy systems. Systems such as CHP led district heating can only operate efficiently where year round heating demand can utilise the available waste heat from co-generation to improve efficiency and reduce carbon emissions. If this waste heat is not utilised then the efficiency and carbon benefits of systems could be worse than conventional supplies.

The Renewable Energy and Sustainable Construction Study for Cherwell highlights the requirement for high density and preferably mixed use development as key constraints for installations.

The 'Fabric First' principal advocated by Gallagher Estates and set out in Section 3.1 is anticipated to result in new homes requiring low levels of annual space heating compared to existing homes and decentralised energy systems are most suitable in mixed use, high density environments where there is a constant heat and power demand from a wide variety of usages.

3.2.2 Commercial Factors

Gallagher Estates does not currently, or intend in the future, act as an energy supplier which will require the contracting of any decentralised energy scheme to a third party energy services provider.

The development of CHP led small scale DH in new build housing has been supported by enabling funding mechanisms to meet the capital shortfall and viability.

As the capital costs can be high and payback periods can be long for CHP led district heating installations, the UK's schemes have been supported by financial mechanisms to improve the economics of decentralised energy. The majority of successful DH schemes in the UK have been local authority or HCA led to ensure that multi-stakeholder interests are suitably safeguarded and the significant early planning and development costs are met.

There are considerable challenges to viably operating a small scale CHP DH network in isolation where only a low level of solely residential heat demand exists. The administrative burden of managing small scale energy service companies (ESCOs), and the low unit price available for small volumes of exported CHP electricity, means it is generally uneconomic or can result in significant increases in annual heat charges for home occupants.

3.2.3 Physical Factors

The most promising sites for decentralised energy systems in Cherwell have been identified through The Renewable Energy and Sustainable Construction Strategy and Gavray Drive is not among those listed. As Gavray Drive is on the mains gas network it is not considered a priority site.

In addition the site is bounded by railway lines to the north and east, acting as a physical barrier to the development any large district heating scheme.

In conclusion, it is considered that an on-site CHP led district heating network is not suitable for the proposed development at Gavray Drive with no options for connection to any existing or planned heat networks in the local area.

3.3 Renewable Energy

Cherwell policy ESD5: Renewable Energy encourages all residential developments over 100 dwellings to assess the potential for the provision of on-site renewable energy.

The next step in the energy hierarchy is the consideration of on-site renewable energy technologies. As a commitment to building sustainable homes, a high level assessment of potentially suitable low and zero carbon micro-generation technologies has been undertaken to determine which technologies are likely to be most suitable for consideration at the site.

Generating low carbon energy on-site can, in the right circumstance, reduce reliance on fossil fuels and minimise energy lost through transmission, contributing to security of supply and better connections between energy demand and generation.

The suitability of renewable energy technologies for new homes needs to be considered as part of the detailed layout and design of individual homes in response to constraints, such as over-shading, technology advances and changes in costs and subsidies. This is reflected in Cherwell's background paper on policies ESD 1-5 which establishes it is not considered suitable to set specific targets for on-site renewable energy for individual sites.

The amount of energy demand that can be met through renewable energy depends greatly on the technology and energy demands of development. For example, in regards to solar PV the aspect and roof pitch can all affect its potential. In contrast, waste water heat recovery (WWHR) can be potentially installed in the majority of new homes, although the heat it provides depends greatly on individual household's hot water usage.

Cherwell's Local Plan confirms that sustainable design standards detailed should not be used as blanket principles for all developments and the policy is intended to be flexible to ensure the most appropriate design standards are selected depending on the new homes location, type and use, amongst other factors.

In this context the potential for renewable energy at Gavray Drive has been assessed in order to inform a holistic whole house approach to energy and sustainability.

The table on the following page provides a high level summary of potential opportunities and constraints to low carbon and renewable energy technologies for new homes at Gavray Drive as is appropriate to the Outline Planning Application stage.

Table 5: Assessment of LZC Technologies

LZC Technology	Overview	Opportunities	Constraints	Potential
Solar PV	• Solar PV systems generate electricity from sunlight and can be installed on pitched or flat roofs with 30 degrees off south.	• A proportion of new homes may have south facing roof spaces suitable for the consideration of solar PV systems.	• At the outline stage there is not currently enough information to confirm the homes are able to accommodate these systems. • The over shading and orientation of the new homes will influence the feasibility of solar PV • Financial incentives available may be reduced, for example the Feed in Tariff (FiT) scheme. • Potential for a negative impact on the grid due to export of energy from solar PV.	
Solar Thermal Hot Water	• Solar Thermal systems generate hot water from sunlight and can be installed on pitched or flat roofs with 30 degrees off south.	• As above, a proportion of new homes may have suitable roof space and orientation to consider solar thermal hot water.	• It cannot be confirmed that houses will have space or appropriate orientation for solar thermal at this stage. • The homes must have space for a hot water storage tank • Solar Thermal systems compete with Solar PV for sunlight and must be installed in the absence of the other. • Similarly to Solar PV there is a risk to financial incentives and export s could cause negative grid impacts.	
Biomass Heating	• Biomass boilers can provide hot water and space heating to homes and buildings.	• Biomass is a renewable and low carbon fuel source.	• These are not considered likely to be suitable for new homes given the site location, spatial and maintenance demands, alongside potential storage and air quality impacts.	
Heat Pump Systems	• Heat pumps provide low grade heat from the ground. Ground Source Heat Pumps (GSHP) or Air Source Heat Pumps (ASHP).	• Heat pump systems can be well suited to new energy efficient new buildings.	• GSHP require sufficient external space for horizontal loops or vertical boreholes. • ASHP need less space but there is anecdotal evidence of poor performance of domestic ASHP systems and noise can be a consideration. • Both systems rely on carbon intensive grid supplied electricity • Possible visual impacts and external space for plant	
Waste Water Heat Recovery (WWHR)	• WWHR systems extract heat from waste water used in the home, usually from the shower or bath in residential properties.	• Can be installed to new properties with relative ease and at low cost • No visual or physical impacts	• Savings dependant on water used by individual homes. • Relatively new technology in UK.	
Wind power	• Wind power has the potential to power a large number of buildings through generation of energy from wind.	• Wind speed, location, height and grid access influence the installation of a wind turbine and if these key factors are present wind power can be feasible	• There is anecdotal evidence that small scale wind systems are ineffective. • Potential constraints including noise, planning, visual and ecological impacts.	
Micro-Hydro power	• Micro-hydro schemes generate water from running water.	• The Langford Brook is a watercourse close to the site.	• Langford Brook is not anticipated to be suitable for installation of a viable and feasible micro-hydro system.	

At this stage the most suitable low carbon and renewable energy technologies are anticipated to include

- **Solar Photovoltaic**
- **Solar Thermal Hot Water**
- **Waste Water Heat Recovery**

However there could be significant constraints to these technologies for individual homes depending on layout and design and it is Gallagher Estates intention to prioritise fabric energy efficiency in accordance with the energy hierarchy.

It is proposed that the suitability of technologies will be reviewed as part of future reserved matters and ultimately during detailed design of individual homes in accordance with the energy hierarchy and as part of a holistic whole house approach to energy efficiency and carbon reduction.

3.4 Sustainable Construction

Cherwell Policy ESD 3 Sustainable Construction encourages new residential development to incorporate sustainable design and construction technology into schemes.

Sustainable design can have beneficial effects on a number of areas, including water use and waste management and has been considered as part of the proposed development at Gavray Drive through a range of measures in support of the key sustainable construction principles set out in ESD 3. These measures have been set out under the following themes;

- **Water**
- **Sustainable Drainage Systems**
- **Waste**
- **Environment and Climate Change**

3.4.1 Water

Local Plan Policy ESD 3 confirms, Cherwell District is in an area of water stress and the policy seeks a higher level of water efficiency than required in the Building Regulations, a limit of 110 litres/person/day.

Average water use in Cherwell is higher than the national average at 159 litres person/day in a dry year. All homes at Gavray Drive aim to target a substantial reduction in domestic water use aiming to achieve 105 litres/per/person/day, lower than the target encouraged by policy ESD 3.

It is anticipated that this will be achieved through the use of water efficient appliances that may include; dual flush toilets, low flow showers and spray taps.

3.4.2 Sustainable Drainage Systems

ESD 6 Sustainable Flood Risk Management and ESD 7 Sustainable Drainage Systems confirm the importance of minimising flood risk and maintaining drainage capacity.

Gavray Drive is located in Flood Zone1 and considered to be at low risk of flooding. A drainage strategy has been developed and accompanies the planning application that incorporates the principles of Sustainable Urban Drainage in order to reduce the impact of surface run-off.

3.4.3 Waste

Policy ESD3 confirms the Council's support for waste management in accordance with the waste hierarchy to reduce and recycle construction and operational waste.

Gallager Estates is committed to the responsible management of waste during construction and occupation to promote recycling and minimise adverse environmental impacts

development of a suitable construction waste management strategy will be undertaken prior to construction and include:

- *Prioritising the use of recycled and low environmental impact construction materials where possible.*
- *Monitoring and targeting systems to reduce waste and pollution.*
- *Adequate provision for the recycling of waste.*
- *Guidance on procurement of locally sourced materials.*

In addition the design of all new homes will include appropriate provision for the management of waste supporting recycling in accordance with the Councils kerbside collection arrangements.

3.4.4 Environment and Climate Change

Local Plan policy ESD1 'mitigating and adapting to climate change' encourages proposed developments to mitigate the impact of development on climate change.

Policy ESD3 also encourages the maximisation of opportunities for cooling and shading.

Environment

Policy ESD 3 emphasises the importance in reducing development's impact on the environment. This is further supported by Local Plan Policy ESD 10: 'Protection and Enhancement of Biodiversity' which encourages development proposals to incorporate measures to support ecology and biodiversity.

The proposed layout has taken into account the habitats and features of local value at the site and seeks to retain and enhance these features.

Further measures will be considered to protect and enhance the sites ecology which include:

- ***New habitat creation within the site***
- ***Retention of trees and hedgerows within the site***
- ***Protection of species during construction***

The significant area of retained green space on the site will include a play area footpath route and flood attenuation measures.

Climate Change

Overheating is likely to be a key climate change risk in the future and the design of new homes at Gavray Drive will consider suitable adaptation measures and provision of information for occupants.

This could include *enabling secure opening of windows in the night to provide passive cooling and* shading of homes through planting and orientation.

Retention of existing green infrastructure combined with new native planting and green open spaces will also provide a carbon sequestration source and contribute to a healthy environment for people and wildlife.

5. Conclusion

The proposed development at Gavray Drive will deliver energy efficient and low carbon new homes in support of local and national sustainability policy.

The Outline Planning Application's Energy Strategy establishes a framework from which new homes can be delivered in support of local and national sustainability policies and priorities.

The Outline Strategy includes:

- A 'lean' **fabric first** approach to design and construction in accordance with the **energy hierarchy** and supporting policy ESD 2.
- Consideration of opportunities and constraints to 'clean' **CHP and decentralised energy** in response policy ESD 4 confirming this is unlikely to be feasible or viable.
- Assessment of the potential opportunities and constraints to **low carbon and renewable energy** as part of a whole-house approach to carbon reduction and commitment to further evaluate opportunities as part of future design development**.**
- Commitment to reducing domestic **water** consumption targeting water consumption of 105 litres/person/day for all new homes below the target of policy ESD 3.
- Development in an area of low flood risk and a **sustainable drainage strategy** that incorporates the principles of Sustainable Drainage principles and minimises surface water run-off in response to policies ESD 6 and 7.
- Commitment to responsible **waste management** in construction and operation through design of new homes and a suitable waste management strategy in support of policy ESD 3.
- A framework for consideration of future **climate change** risks and potential adaptation measures including passive cooling in support of policy ESD 1.
- Commitment to protect and where possible enhance on-site ecology and biodiversity including new **green infrastructure** providing an additional contribution to carbon sequestration**.**

Gavray Drive will deliver sustainable and low carbon new homes constructed in accordance with the energy hierarchy that support the sustainability priorities of Cherwell, whilst also reflecting latest national sustainability policy and guidance.

Turley Sustainability
9 Colmore Row,
Birmingham
B3 2BJ

T 0121 233 0902