M EC

Land West of Fringford Road, Caversfield

Energy Statement

December 2023

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Appendices

1.0 Introduction

1.1 Purpose of the Report

Instructions were received from M EC to produce an Energy Statement for a proposed residential development on land west of Fringford Road, Caversfield. This report has been produced to support a planning application to be submitted for the proposed development, which is situated within the boundaries of Cherwell District Council.

This statement provides a response to the relevant Cherwell District Council documents and policies:

- The Cherwell Local Plan 2011-2031
- Policy ESD 1: Mitigating and Adapting to Climate Change
- Policy ESD 3: Sustainable Construction
- Policy ESD 4: Decentralised Energy Systems
- Cherwell Design Guide Supplementary Planning Document.

1.2 Site and Building Description

The development will be located at Fringford Road, Caversfield, Oxfordshire, OX27 8TH. The application seeks approval for the demolition of existing structures and erection of up to 99 dwellings, access, open space and associated works (outline, all matters reserved save for access). A proposed location layout has been included in Appendix 1.

1.3 Methodology

The proposed specifications we reviewed and as a result, sample SAP calculations for the proposed house types have been completed to determine the 'As Designed' performance of the development. The application will be considered under the new Part L1A 2022 regulations, therefore the new Elmhurst SAP 10 software has been used to conduct the above calculations.

An assessment has been completed to review the potential connection of the proposed development to an existing district heat network. Up to date map data has been provided by the Association of Decentralised Energy, to enable the suitability to the location of the proposed development from a district heating network.

In relation to the Part G water requirements, a proposed sanitaryware specification has been assessed against the 110 litre/person/day limit outlined in the building regulations requirements.

2.0 Planning Policy

2.1 The Cherwell Local Plan 2011-2031

The Cherwell Local Plan 2011-2031 outlines the requirements for new developments regarding sustainability, with Policies ESD 1, ESD 3 & ESD 4 having been identified as relevant.

2.2 Policy ESD 1: Mitigating and Adapting to Climate Change

Measures will be taken to mitigate the impact of development within the District on climate change. At a strategic level, this will include:

- *Distributing growth to the most sustainable locations as defined in this Local Plan*
- *Delivering development that seeks to reduce the need to travel and which encourages sustainable travel options including walking, cycling and public transport to reduce dependence on private cars.*
- ***Designing developments to reduce carbon emissions and use resources more efficiently, including water (see Policy ESD 3 Sustainable Construction)***
- ***Promoting the use of decentralised and renewable or low carbon energy where appropriate (see Policies ESD 4 Decentralised Energy Systems and ESD 5 Renewable Energy).***

The incorporation of suitable adaptation measures in new development to ensure that development is more resilient to climate change impacts will include consideration of the following:

- ***Taking into account the known physical and environmental constraints when identifying locations for development***
- ***Demonstration of design approaches that are resilient to climate change impacts including the use of passive solar design for heating and cooling.***
- *Minimising the risk of flooding and making use of sustainable drainage methods, and*
- ***Reducing the effects of development on the microclimate (through the provision of green infrastructure including open space and water, planting, and green roofs).***

Adaptation through design approaches will be considered in more locally specific detail in the Sustainable Buildings in Cherwell Supplementary Planning Document (SPD).

2.3 Policy ESD 2: Energy Hierarchy and Allowable Solutions

In seeking to achieve carbon emissions reductions, we will promote an 'energy hierarchy' 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.***

2.4 Policy ESD 3: Sustainable Construction

All new residential development will be expected 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 as such 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.

All new non-residential development will be expected to meet at least BREEAM 'Very Good' with immediate effect, subject to review over the plan period to ensure the target remains relevant. The demonstration of the achievement of this standard should be set out in the Energy Statement.

The strategic site allocations identified in this Local Plan are expected to provide contributions to carbon emissions reductions and to wider sustainability.

2.5 Policy ESD 4: Decentralised Energy Systems

The use of decentralised energy systems, providing either heating (District Heating (DH)) or heating and power (Combined Heat and Power (CHP)) will be encouraged in all new developments.

A feasibility assessment for DH/CHP, including consideration of biomass fuelled CHP, will be required for:

- ***All residential developments for 100 dwellings or more***
- *All residential developments in off-gas areas for 50 dwellings or more*
- *All applications for non-domestic developments above 1000m2 floorspace.*

The feasibility assessment should be informed by the renewable energy map at Appendix 5 'Maps' and the national mapping of heat demand densities undertaken by the Department for Energy and Climate Change (DECC) (see Appendix 3: Evidence Base).

Where feasibility assessments demonstrate that decentralised energy systems are deliverable and viable, such systems will be required as part of the development unless an alternative solution would deliver the same or increased benefit.

2.6 Cherwell Design Guide Supplementary Planning Document

The Cherwell Design Guide Supplementary Planning Document has also been identified as relevant and adaptation through design approaches will be considered in more locally specific detail within this energy statement.

2.7 Policy Response Summary

The nature of response to the above policies identified are in **bold** as these are deemed relevant to this energy statement. We understand that other aspects of these policies will be addressed through other supporting documents within the planning application.

3.0 Policy Response

The Cherwell Local Plan 2011-2031

3.1 Energy Efficiency and Carbon Emissions

3.1.1 Energy Efficiency

In efforts to reduce the overall carbon emissions associated with the development and to maximise the energy efficiency, the developer has a robust 'fabric first' approach to the build specification, which allows it to achieve compliance with all metrics under the recently adopted and revised Approved Document Part L 2022.

This will be achieved in this project through building fabric improvements with an uplift on the minimum requirements of Approved Document Part L1A 2022, and also specification of efficient mechanical and electrical services, including a number of 'add-on' measures to improve efficiency and performance.

Fabric Energy Efficiency is a measure of the efficiency of the building fabric, the key areas being building fabric U-values, thermal bridging, air permeability, thermal mass and features which affect lighting and solar gains. A higher fabric energy efficiency means that the dwellings will require less energy to heat and cool thus reducing the energy demand of the property and the CO_2 released.

Table 1 demonstrates how the specification of the development at Fringford Road, Caversfield, compares to the limiting values and minimum efficiencies allowed within Part L 2022:

Table 1: Proposed Specification

Building Element	Limiting Part L 2022 Specification	Proposed Specification Part L
External Walls U-Value	0.26	0.18
Roof U-Value	0.16	0.11
Ground Floor U-Value	0.18	0.13
Window U-Value	1.60	1.30
Party Wall U-Value	0.20	0.00
Heating Efficiency	100%	336%
Pressure Test	8.00	5.00
Lighting Lumens	75 lm/w	80 lm/w

The development is proposed to adopt a 'fabric first' approach to the specification and as detailed above, the proposed U-Values are an improvement on the minimum requirements under Part L 2022. All the main building elements have been designed to provide a thermally efficient building envelope that achieves an improvement on the minimum requirements set out within Part L.

The external wall U-Value is noted to be a large improvement against the limiting Part L value. Being the largest heat loss element of a dwelling, the improvement noted will ensure a lower amount of heat loss, comparative to a specification of worse nature.

Robust, well insulated cavity walls, roof, floors and openings provide a comfortable environment within the development and reduce the buildings' reliance on the main heating system. The more onerous air permeability targets will ensure that thermal performance is enhanced by minimising heat and energy losses through thermal bridges and air gaps. The air permeability target in the apartments is 5.00 $m^3/(h.m^2)$, providing a considerable improvement over the Notional Building target.

The developments final heating system is yet to be decided, however I will comply with policy ESD:3, effectively achieving operational zero carbon under regulated energy. An option under consideration is the use air source heat pumps (ASHP). Air source heat pumps (ASHP) are able to extract heat from the outdoor air, even when the outside temperatures are very low, for use in space heating and hot water systems which can have very high efficiencies.

Due to the continuing decarbonisation of the UK energy supply, electricity is increasingly becoming the low carbon choice for heating strategy, and it is expected this will continue as more renewable electricity sources become operational and fossil fuel sources are phased out. Therefore, the use of ASHP in this scheme can be seen to meet this requirement, future proofing the scheme when compared against future Part L regulation changes and meeting the requirements of Policy ESD:3

The development at Aunt Ems Lane, Caversfield will comply with the new Part S Building Regulations. This requires new homes and existing homes undergoing large renovations (of 10 more or dwellings) to have facilities for charging electric vehicles at each dwelling. Therefore, in order to comply with these new regulations each dwelling will have at least one installed vehicle fast charging (7-22kW) EV charging point.

To summarise, all of the main building elements outlined in Table 1 have been designed to provide a thermally efficient building envelope that achieves an improvement on the minimum requirements set out within Part L. These elements when combined with efficient mechanical and electrical services, achieve an improvement on the minimum requirements set out within Part L1A 2022 and ensure enhanced energy efficiency and reduce CO_2 emissions, thus mitigating the impacts of climate change.

3.1.2 Fabric Energy Efficiency

To understand the overall approximate performance of the development, SAP calculations have been undertaken. The initial calculations have been undertaken on a representative sample of the proposed dwellings at the development. Software outputs of the calculations completed can be made available on request.

Table 2 demonstrates the development's approximate average building fabric energy efficiency based on the domestic building types modelled.

Table 2: Fabric Energy Efficiency Breakdown	
Domestic	**Average (kWh /m²/yr)**
Target Fabric Energy Efficiency (TFEE)	50.68
Dwelling Fabric Energy Efficiency (DFEE)	50.28
Percentage Reduction (%)	**0.40%**

As a result of the representative sample SAP outputs for the development, Table 2 shows the average Target Fabric Energy Efficiency (TFEE) of the development to be 50.68 kWh/m²/yr. The average Predicted Dwelling Fabric Energy Efficiency (DFEE) is demonstrated to be an improvement against this amount, currently modelled to achieve 50.28 kWh/m²/yr.

Overall, this is an improvement in fabric energy efficiency, equating approximately 0.40% reduction against the notional amount. This highlights the design specification performance of the development being an uplift to Building Regulations requirements.

3.1.3 Carbon Emissions Breakdown

To understand the overall approximate performance of the development, calculations have also been undertaken against the same representative SAPs. Software outputs of the calculations completed can be made available on request.

Table 3 below demonstrates the development's total approximate breakdown of carbon emissions, based on the sample domestic building types modelled.

Table 3: Carbon Emission Breakdown	
Domestic	**Total Emission Rate (kg/CO_2/yr)**
Target Emission Rate (TER)	104,385.20
Dwelling Emission Rate (DER)	40,607.12
Total Carbon Reduction	63,778.04
Percentage Reduction (%)	**61.10%**

As a result of the sample SAP outputs for the development, Table 3 shows the Target CO_2 emissions (TER) of the development to be 104,385.20 kg/CO_2/yr. The Predicted Carbon Emissions (DER) are demonstrated to be a substantial improvement against this amount, currently modelled to achieve 40,607.12 kg/CO_2/yr.

Overall, this is a 63,778.04 kg/CO_2/yr reduction in carbon emissions, equivalent to a circa 61% reduction against the building regulation requirements.

3.2 Water Use Efficiency

3.2.1 Water Efficiency

It is a requirement that planned water usage does not exceed the Building Regulations Target of 110 Litres/per person/per day. The development will incorporate efficient, water saving sanitaryware to meet this goal. Where this is not possible, flow restrictors will be installed to limit water use of sanitaryware items.

A representative specification is demonstrated in Table 4 below, whilst the final flow rates of individual sanitaryware items may change as detailed design progresses, the 110 Litre limit will be maintained. A full breakdown of flow rates is available in Appendix 3.

Table 4: Proposed Sanitaryware Specification Flow Rates

Component	Water Usage
WCs	4.5 Litres (Full Flush Volume), 3 Litres (Part Flush Volume)
Bath	155 Litres
Showers	9 Litres/Minute
Wash-hand basin taps	4 Litres/Minute
Kitchen taps	5 Litres/Minute
Washing Machine	8.17 Litres/kg
Dishwasher	1.25 Litres/place setting
Calculated Use	**108.7 Litres/Person/Day**

This proposed specification has a calculated water use of 108.7 Litres/per person/per day. This is an improvement on the Building Regulations target of 110 Litres/per person/per day, thereby meeting policy requirements.

3.3 Building Orientation, Solar Radiation & Passive Cooling

Passive solar design and providing a benign site microclimate both enhances the energy and environmental performance of a building. The development will have good access to solar radiation and daylight.

Whilst final designs have not been made on the location and orientation of the proposed dwellings, it will be sort that the dwellings will not be significantly shaded by surrounding buildings and there will be sufficient space between the each so that overshadowing will not be an issue. This will promote a higher potential for solar gain.

It is proposed the construction of the dwellings will be of a traditional nature. The use of high thermal mass and good insulation levels in this proposed scheme will provide an effective medium for managing solar gains, both having the ability to both hold heat and cool.

Due to the material having a high level of thermal mass, dwellings will be able to absorb excess heat throughout the day, keeping the surrounding area cooler, and then slowly release and re-radiate the stored heat as the temperature drops. This prevents rooms from becoming uncomfortably hot in summer and stores warmth in winter.

Given the timescales of the proposed scheme, it will be assessed against the new Part O Overheating Building Regulations. It is currently expected that compliance will be achieved through a combination of passive measures and ventilation, and the client is currently in the process of developing a rigorous strategy to ensure Part O Compliance. Where further measures are required to ensure Part O Compliance, these will be installed in full by the client.

3.4 Sustainable Construction

3.4.1 Waste and Recycling

In efforts to reduce waste throughout the construction process, as part of the design development, the design team have implemented a number of measures to eliminate potential waste. The contractor will be required to have an effective site waste management system adopting waste hierarchy principles of reduce, reuse, or recycle.

All waste will be handled by a licensed waste contractor who will segregate and process waste produced. Such waste will be separated into key waste groups and recycled at a waste processing plant to be refined into new products or reused in other projects where they cannot be reformed. A target will be set for the contractor in terms of reduction of waste that is taken to landfill that will be a significant improvement on standard market practices, and they will be expected to demonstrate compliance with this. Site hoarding or materials where safe and appropriate will be transported from other sites for reuse.

The design of the dwellings looks to incorporate recycling facilities for residents further encouraging the principles of recycling. Cherwell District Council operate an alternative collection for refuse waste & recycling waste, allowing for residents to segregate waste types in a more sustainable manner. To enable efficient segregation of operational waste for their residents, sufficient spacings and access will be provided to dwellings to enable waste bins to be collected in line with Cherwell District Council waste collection regime. The potential for on-site composting facilities for use on the communal garden areas will also be explored, subject to other requirements and considerations.

3.4.2 Material Selection

The new development at will strive to incorporate sustainable design into the building. Material selection will endeavour to show preference to suppliers who operate responsible sourcing practices and have current environmental management certificates. Examples including FSC/PEFC certified timber products will be utilised, this ensures all products have been obtained from sustainable and legal sources.

Where possible, the development will look to source building materials from local suppliers. Through this approach, delivery materials will be transported lesser distance, reducing the associated CO_2 emissions and fuel use of delivery loads. Similarly, where feasible contractors and site personnel required will be selected who are local to the site to aid the construction efforts. This again will reduce the associated CO_2 emissions of travel, in addition to supporting the local economy.

In efforts to reduce waste throughout the construction process, as part of the design development, the design team have implemented a number of efficiency measures to eliminate potential waste. The development design is to standard material dimensions to avoid waste generation. This reduces waste not only at the manufacturing stage, but also during construction as it reduces the need to re-size materials on site. In addition, the use of standardised materials increases the ease of deconstruction and improves the likelihood that the materials will be reused, in the eventuality that the site is redeveloped in the future.

3.5 District Heating

Developments of less than 100 dwellings or 10,000sqm of non-residential floorspace should connect to any existing available district heat network(s) in the vicinity, providing this is practical and would not adversely affect the viability of the development.

The scheme currently falls below the threshold, nevertheless an exercise has been carried out for completeness to review the potential for the proposed development at Aunt Ems Lane, Caversfield to connect to an existing district heat network. Both the 'Theme Map – Renewable and Low Carbon Energy' *(Cherwell Local Plan Appendix 5)*, and The Association for Decentralised Energy's (ADE) District Heating connection map has been reviewed to confirm the closest possible connection point.

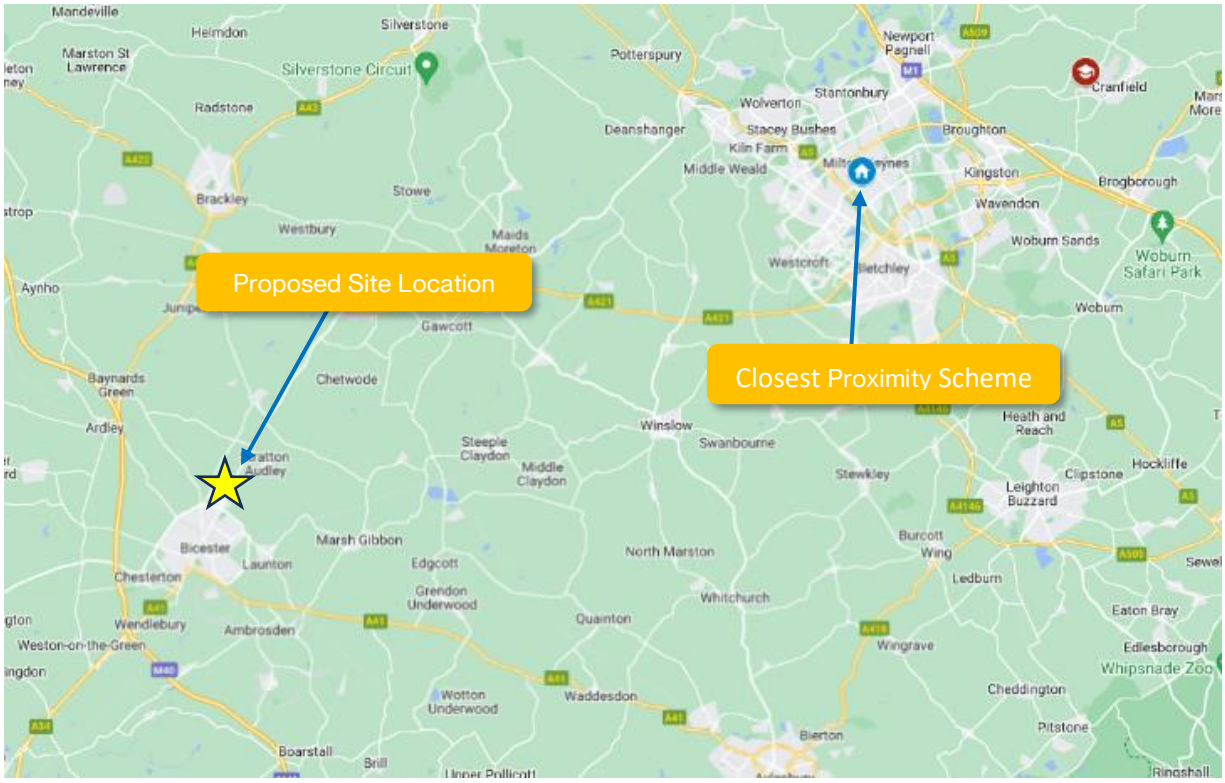

Figure 1 – Association of Decentralised Energy - www.theade.co.uk

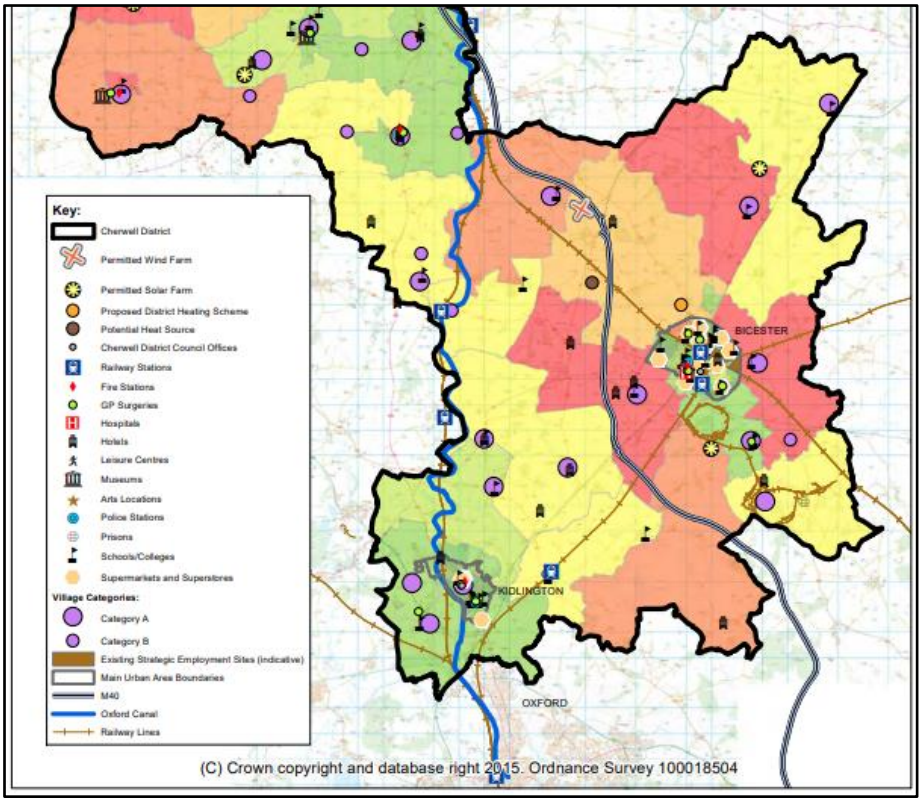

Figure 2 – Theme Map – Renewable and Low Carbon Energy' (Cherwell Local Plan Appendix 5)

As demonstrated in Figures 1 and 2, the scheme lies outside of any existing heat networks, with the closest connection point is the *Milton Keynes District Heating MK9 2GA* approximately 29.70 km from the proposed site location. Due to the extended distance between these two points, it is considered that this would not be a feasible application.

Owing however to the potential installation and use of ASHPs or a wet based distribution system for space heating and hot water within the design, the scheme could adapt to a future connection of district heating at a later date if deemed practical.

4.0 Conclusion

This statement has reviewed the proposed development on land west of Fringford Road, Caversfield, Oxfordshire, OX27 8TH, which consists of the construction of 99 residential dwellings, as well as associated parking and garden areas, and has provided an assessment of the proposed scheme against the relevant documents and policies.

- The Cherwell Local Plan 2011-2031
- Policy ESD 1: Mitigating and Adapting to Climate Change
- Policy ESD 3: Sustainable Construction
- Policy ESD 4: Decentralised Energy Systems
- Cherwell Design Guide Supplementary Planning Document.

The statement has highlighted that the scheme currently proposes to utilise a good thermal envelope to minimise heat loss, as well as efficient heating and lighting systems, which will drive energy efficiency in the building. This is in line with the Policy ESD1 objective of promoting development which minimises carbon emissions and increases energy efficiency.

The calculations completed on the building fabric and the potential use of the ASHP confirm that the specification meets the required performance in relation to the Fabric Energy Efficiency. The Dwelling Fabric Energy Efficiency of 50.28 kWh/m^2/yr, against the Target Fabric Energy Efficiency of 50.68 kWh/m^2/yr confirm an approximate 0.40% improvement, meets Building Regulations Part L 2022 requirements.

The calculations completed on the building fabric and the potential use of ASHP confirm that the specification meets the required performance in relation to carbon emissions. The proposed carbon emissions of 40,607.12 kg/CO_2/yr, against the target carbon emissions of 104,385.20 kg/CO_2/yr confirm an approximate 61.10% improvement, meets Building Regulations part L 2022 requirements.

A proposed sanitaryware specification of 108.7 Litres/per person/per has been provided. This is an improvement over the Building Regulations requirement of 110 Litres/per person/per day.

Whilst the proposed water sanitaryware flow rates and the use of ASHP are the preferred specification at this present time, the strategy and required contribution may be subject to change as design develops further. Nonetheless, it will be ensured that where any changes are made, the policy requirements listed will be maintained.

Appendix 1

Proposed Site Plan

PLANNING

- Site boundary
- 1 Proposed vehicular/cycle/pedestrian access
- 2 Proposed emergency/pedestrian & cycle access
- 3 Primary tree lined street
- 4 Secondary street
- 5 Village mews
- 6 Private lane/drive
- 7 Shared surface
- 8 Informal courtyard with agricultural theme
- 9 Historic track alignment
- 10 Cycle way
- 11 Play space (LEAP)
- 12 Natural play/ trail space
- 13 Sustainable drainage
- 14 Entrance green (wildflower planting)
- 15 Planted swale corridor
- 16 Existing vegetation retained and enhanced as necessary
- 17 Mown path
- 18 Open grassland
- 19 Community orchard
- 20 Garden Common
- 21 Natural open space
- 22 Soft development edge
- 23 Area to be fenced off for ecology/ wildlife
- 24 Drop bollards

Rev.	Date	Description

Land West of Fringford Road
CAVERSFIELD

Illustrative Masterplan

Job ref:	Drawing number:	Revision:
501	P07	-

Scale:	Date:
1:1,500 @ A3	December 2023

edge URBAN DESIGN

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Appendix 2

Part G Water Calculations

breglobal

Job no:	R3737
Date:	October 2023
Assessor name:	Adam Revill
Registration no:	
Development name:	Aunt Ems Lane, Caversfield

PRINTING: before printing please make sure that in "Page Setup" you have selected the page to be as "Landscape" and that the Scale has been set up to 70% (maximum)

WATER EFFICIENCY CALCULATOR FOR NEW DWELLINGS - (BASIC CALCULATOR)

	House Type:	Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7		Type 8		Type 9		Type 10	
	Description:	Specification 1																			
Installation Type	**Unit of measure**	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day
Is a dual or single flush WC specified?		Dual		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Click to Select		Click to Select		Click to Select	
WC	Full flush volume	4.5	6.57		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
	Part flush volume	3	8.88		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Taps (excluding kitchen and external taps)	Flow rate (litres / minute)	4	7.90		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Are both a Bath & Shower Present?		Bath & Shower		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Bath	Capacity to overflow	155	17.05		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Shower	Flow rate (litres / minute)	9	39.33		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Kitchen sink taps	Flow rate (litres / minute)	5	12.56		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a washing machine been specified?		Yes		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Washing Machine	Litres / kg	8.17	17.16		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a dishwasher been specified?		Yes		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Dishwasher	Litres / place setting	1.25	4.50		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a waste disposal unit been specified?		No	0.00	Select option:	0.00	Select option:	0.00	Select option:	0.00	Select option:	0.00	Select option:	0.00	Select option:	0.00	Select option:	0.00	Select option:	0.00	Select option:	0.00
Water Softener	Litres / person / day		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
	Calculated Use		113.9		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
	Normalisation factor		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91
Code for Sustainable Homes	**Total Consumption**		**103.7**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**
	Mandatory level		**Level 3/4**		-		-		-		-		-		-		-		-		-
Building Regulations 17.K	External use		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0
	Total Consumption		**108.7**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**
	17.K Compliance?		**Yes**		-		-		-		-		-		-		-		-		-

Appendix 3

SAP Calculations (Available on request due to size)