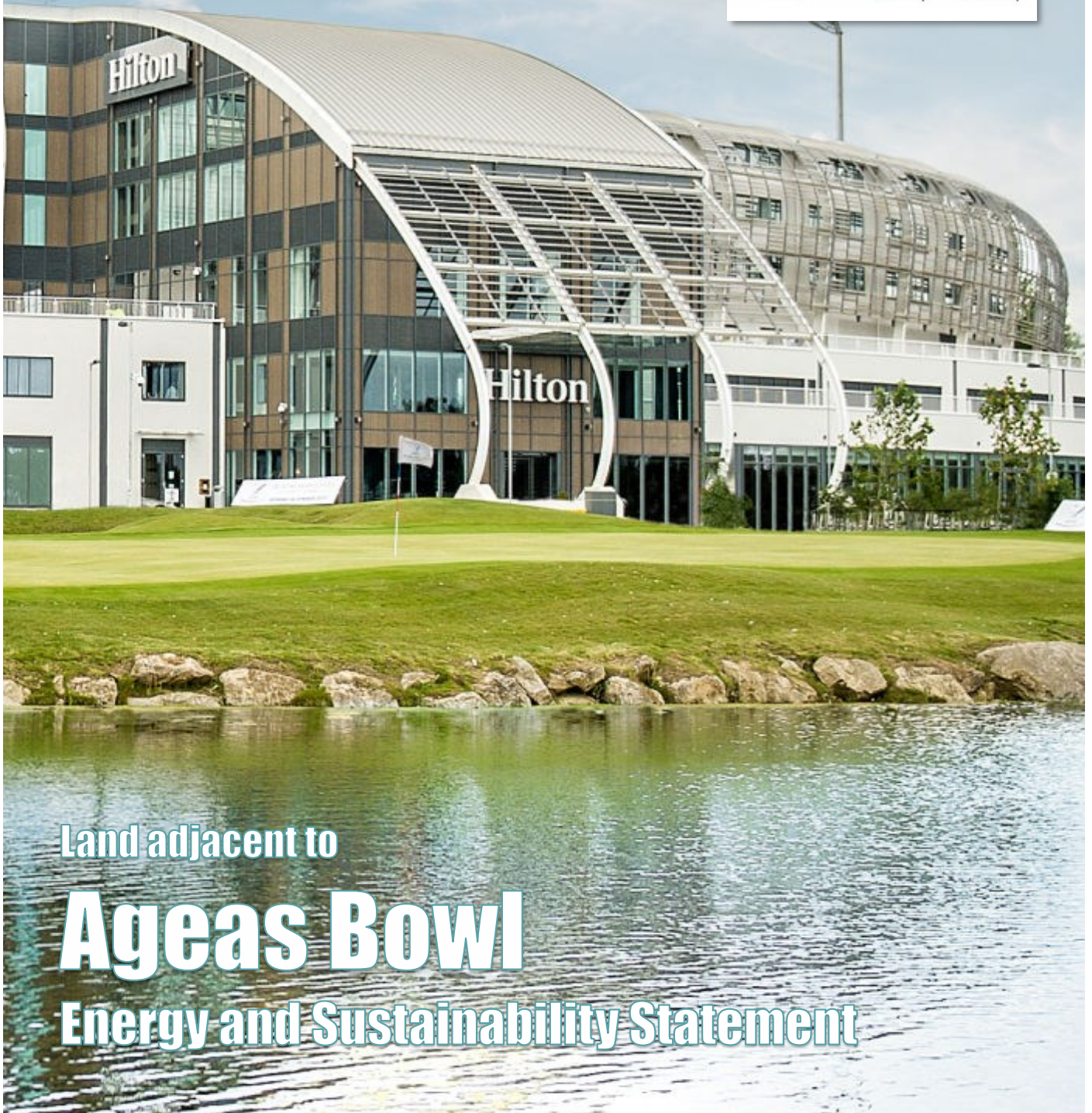




Land adjacent to

Ageas Bowl

Energy and Sustainability Statement

presented to

Eastleigh Borough Council

On behalf of

Land and Development Advisory

May 2022—Revision 3

Version History

Revision	Purpose	Date	Issued by
0	Draft For Comment	27/01/2021	E. Murphy
1	Updated with Comments	21/03/2022	E Murphy
2	Updated to latest Calder Peel Issue	05/05/2022	E Murphy
3	Updated with Boyer Comments	25/05/2022	E Murphy

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Executive Summary

Land and Development Advisory Limited (LDA) is pleased to provide this Energy and Sustainability Statement to Eastleigh Council in support of a formal Planning Application for the development of land adjacent to Ageas Bowl, West End, Eastleigh.

The new development encompasses five character areas covering 77 acres adjacent to the Ageas Rose Bowl, the home of Hampshire County Cricket Club, and the England International Test venue.

Architects, Calderpeel, conceived a masterplan that retains much of the verdant character and sense of place of the West End locality.

It's an approach in keeping with the latest updates of the National Planning Policy Framework and Eastleigh Borough Council's recently adopted Local Plan 2016 to 2036. Providing a context for this Energy and Sustainability Statement to frame a strategy that is protective of the West End's village character today, while establishing a basis to meet expected climate challenges tomorrow.

The critical elements of the Statement are:

- To put in place a fabric first policy with high standards of insulation and airtightness, minimising energy use and providing a basis for all buildings in the masterplan to become net-zero carbon or near net-zero energy once the addition of site or offsite renewable energy sources is introduced.

Much of this will be achieved through enhanced analysis using the latest “evolutionary algorithms” to locate zero-carbon, near-zero energy solutions at optimal cost.

- The whole of the site is fossil-fuel-free. Single dwellings will be heated using efficient heat pumps. Apartments will be heated using direct electric panel heaters. The Health and Wellbeing Centre will be efficiently heated and cooled using Variable Refrigerant Flow (VRF) heat pumps. All other buildings will be subjected to similar analytics processes to arrive at fossil-fuel-free BREEAM Excellent outcomes.
- Added to this, the site will include renewable energy sources. All dwellings will be fitted with a PV panels—sufficient to deliver zero energy for those homes with 20m² south facing arrays from the first occupation. All homes will have a minimum of 16m² arrays. Include 240m² of PV across the apartment blocks, enough to comply with the new Local Plan of 15% renewable energy.
- To take advantage of future renewable improvements in technology, and hopefully, at lower cost, the Sustainability Statement includes novel efforts to establish the creation of a Community Energy Forum. Discussions are

ongoing with a Hampshire County Council employed Community Energy Trust enabler to assist in meeting this outcome.

- To lock in the above measures, the Sustainability Statement includes the commitment to conduct an independent **BREEAM for Communities** assessment with at least a VERY GOOD outcome, and with an aspiration for Excellent.

The resultant draft BREEAM for Communities pre assessment includes the following credits (see Annex A for full details):

- Design to meet low embodied energy of materials benchmark of 500kg/CO m2 which is 20% better than the industry average.
- Design taking cognoscente of existing flood and rainwater management. Realigning the existing Character Area 5 culvert and creating a new open channels as an additional amenity.
- Reduce flood risk, improve water quality, provide opportunities for pollinators and increase climate change resilience.
- Mitigate match day noise from the adjacent Stadium to residences, and Independent Living

accommodation.

- Masterplanned design proposals with no reduction in current biodiversity. Provide the conditions for net gain in existing areas of low ecological value.
- Design with green infrastructure in mind to facilitate residents access to green space and Telegraph Woods as an amenity.
- Improve the take up of green transport modals by design that encourages walking and cycling, and reduced car-parking provision . Added to this EV rapid charging points will be provided to 25% of hotel and apartments car parking spaces and to all houses.
- Conduct an independent BREEAM post occupancy evaluation (POE) with all occupants and operators of the new development buildings.

In execution of the plan, there is an overriding duty of sustainability to protect and preserve the Urban Fringe character of the site. To respect the open and semi-rural character for a development to improve and not to harm the uniqueness of the West End



Fig 2. Ageas Bowl and the existing adjacent land for the masterplan

1.0 Introduction to Ageas Bowl

This section of the strategy document provides the background to the site and to the architectural Design Access Statement which integrates with it.

Ageas Bowl Adjacent Land

The Ageas Bowl site lies to the north-eastern urban fringe of the City of Southampton within West End Parish. Spread over a large 77 hectares area, the stadium complex includes the county cricket ground and stadium, golf course, Hilton Hotel, Hampshire Wellbeing Centre, and associated infrastructure.

Beyond the main Ageas Bowl complex, the site is characterised as a manicured golf course, open grass and loose gravel parking areas with extensive boundary vegetation comprising woodland belts, woodland pockets, and vegetation.

To the northeast of the site lies the M27 motorway. Hedge End Retail Park and residential suburb lie beyond. To the west of the site are the overspill carparks abutting the residential suburbs of West End, Harefield and Thornhill. Primary access to the site is from Marshall Drive from the north.

The site sits adjacent to the urban edge area defined by the Eastleigh Borough Council Policies Map (South) – 2018.

The challenge for the architect Calderpeel has been to address the issues of the very different but identifiable character areas whilst still uniting them in their relationship to the Ageas Bowl Stadium.

The design team has had many consultations with Eastleigh Borough Council and a nominated Design Review Panel. These discussions influence the outturn proposals presented here.

The strategy is to sensitively relocate the coach and car parking requirements to the eastern side of the



Fig 3. Character Area 5, Type A Residential Home

urban edge area to enable the potential for a high quality development of the western site. This facilitates the creation of five distinct but harmonious character areas (see Fig 3 below):

Character Area 1 Arrival and Ramp 2—sees the upgrade of the northeast carpark. To the north of the Rose Bowl ground, a new stadium ramp and promenade will create a sense of excitement and arrival to the stadium. The ramp circulates around a new fan shop and central square before rising above the new tree canopy “proscenium arch” - all as a precursor to arrival in the stadium amphitheatre (Fig. 4)

Character Area 2: Hotel and Conference venue - To the west of the carpark a new hotel and conference facility will be constructed as an extension to the existing Hilton Hotel, extending its capacity by a further 142 double bedrooms.

Character Areas 3 will see some improvements to the players pavilion to form new players changing rooms, hospitality support and match viewing spaces. There will also be some reconfiguration to aid storage and deployment of ground staff vehicles and pitch covers.

Character Area 4 - Independent Living enables the construction of a new independent living residence with 71 ensuite rooms. The curved building wraps gently around an existing monkey puzzle tree, and marks the arrival of fans from the new southern gateway promenade.

Character Area 5- Wellbeing Centre and Residential includes a residential development with 103 houses and 82 apartments to the west of the stadium. The urban design including 6 house typologies reflects the need for a sympathetic transition from the elegant stadium bowl to the green edges of the historic Telegraph Woods.

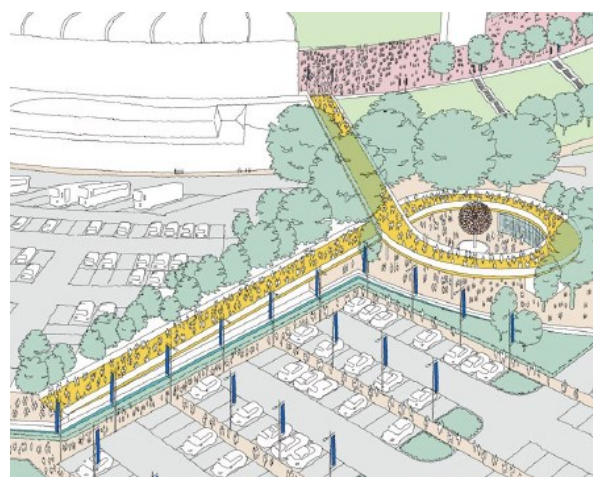


Fig 4. Character Area 1: New fan zone square and ramp

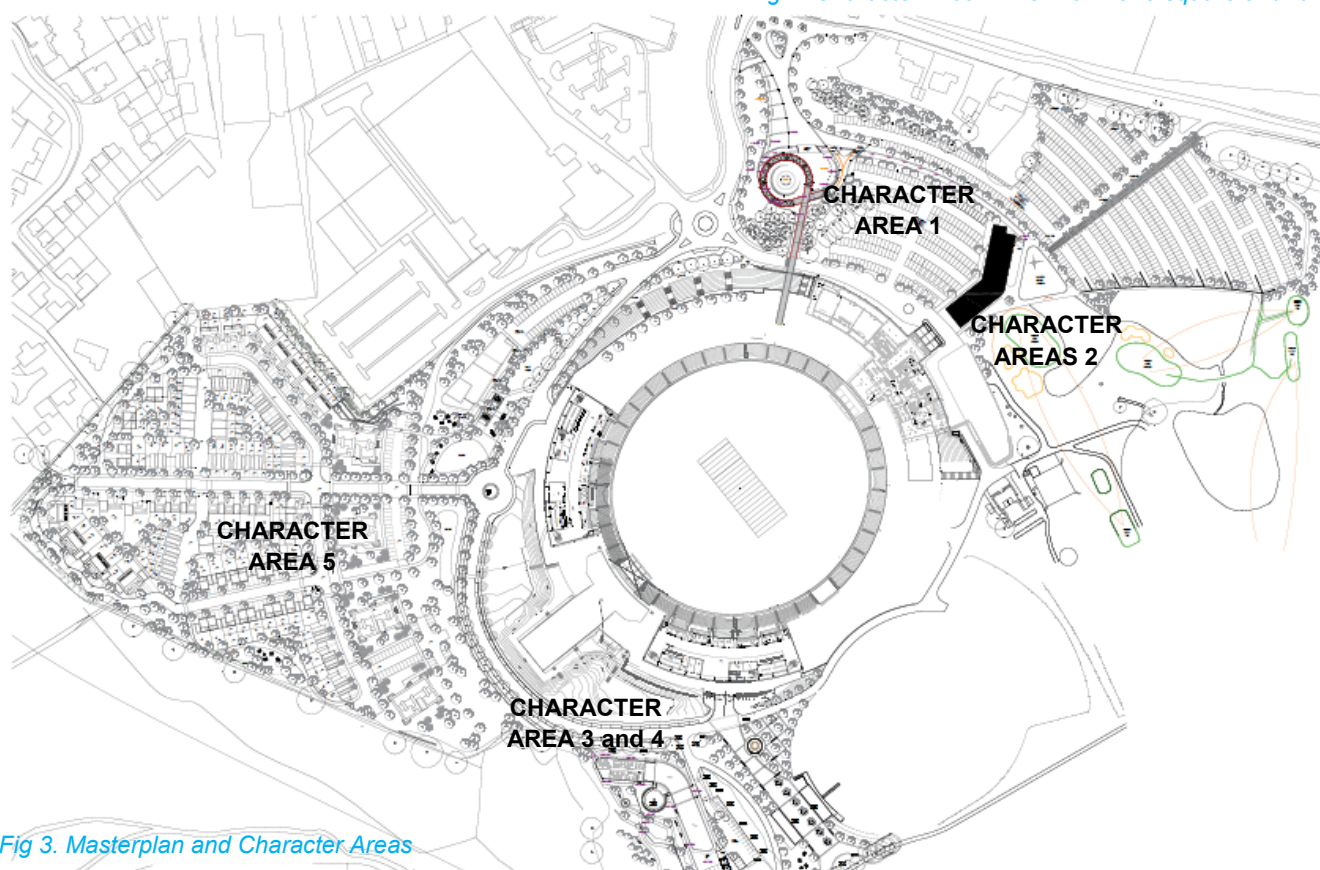


Fig 3. Masterplan and Character Areas

2.0 Context

This section looks at the legislative context of the Energy and Sustainability statement for this new planning application.

Introduction

The architect's Design and Access Statement outlines an aspiration to meet the National Planning Policy Framework (NPPF) requirements by bringing forward a development that *"is both sensitively conceived and contextually appropriate."*

Compliance with the NPPF requires the new land adjacent to Ageas Bowl masterplan will "act in favour of sustainability" by:

- *addressing the challenges of a changing climate, increasing social demands and diminishing natural resources*
- *including simple but effective solutions that have proven longevity*
- *including life cycle analysis*
- *creating spaces that promote well-being*
- *including designs that are flexible and adaptable to changing criteria*
- *build a sense of pride and community*
- *protects and support local ecology*
- *considers flood and flood mitigation*
- *deliver a strong BREEAM for Communities accredited development ."*

The NPPF implements legislation passed by the UK Government in cognoscente of its international commitments to deliver a zero-

carbon economy by 2050. The recent 2021 update of the framework follows a process of legislation adoption that has its origins in the publication of the UK Sustainable Development Strategy.

UK Sustainable Development Strategy

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

The UKSDS acts as an overarching document from which a range of specific policies and legislation has been derived. Although published in 2005, the strategy retains its importance through the current focus on the Government's legally enshrined mandate to UN COP21 updated at COP26 in Glasgow for the UK economy to achieve zero carbon status by 2050.

One of the key aims of the UK SDS is to recognise the threats of climate change and ensure that the UK maintains a strategy to mitigate and adapt to the impending threat to the national interest.

The document puts forward five key principles that should underpin a 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.

The strategy is implemented at a national level through the development of more specific strategies at a Government department or sector level.

With regards to planning and the built environment, this document sets the basis for the development of plans and policies that promote development that can mitigate and adapt to climate change.

Climate Change Act

The Climate Change Act (2008) sets a legally binding target for eliminating UK carbon emissions by 2050.

It established the Committee on Climate Change (CCC), an independent, expert body to advise the government on the level of carbon budgets and on progress in meeting these budgets - submits annual reports to Parliament on progress towards targets and budgets. The CCC is responsible for setting five year binding interim carbon budgets for the Government. The 5-yearly 'carbon budgets' act as a pathway to meet the long-term target. Ministers must report on the policies implemented to meet carbon budgets and produce an annual report to Parliament on the status of UK emissions.

The latest 5-year report shows that the UK was maintaining adequate progress, mainly through decarbonisation of the power grid, but says if current policies are maintained the UK will miss its next target due in 2022 by a significant margin and so there is a significant policy gap. An interim

update published for COP26 says that existing recently published policies continue to be inadequate and significant recasting of the governments strategy is needed to get things back on track.

UK Carbon Plan

In 2011, the Government published a 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.

In December 2020, with the UK's impending governorship of the vitally important COP 26, the UK government outlined its 10-point plan which includes plans to abandon natural gas as a means of heating for industry, move homes to electricity, move transport away from fossil fuels to electricity which will be completely decarbonised by 2030.

National Planning Policy Framework (NPPF)

Following its first publication on 27 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.

In 2019 and again in 2021 the NPPF received a significant upgrade however the core sustainability objectives remained much the same.

NPPF states that 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 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.

In 2021 the comprehensively updated NPPF policies were divided into 16 principles.

1. Achieving Sustainable Development
2. Plan Making
3. Decision Making
4. Delivering a sufficient supply of homes
5. Building a strong economy
6. Ensuring the vitality of town centres
7. Promoting healthy and safe communities
8. Promoting sustainable transport
9. Supporting high-quality communications
10. Making effective use of land
11. Achieving well-designed places
12. Protecting Green Belt Land
13. Meeting the challenge of climate change

14. Conserving and Enhancing the Natural Environment

15. Conserving and enhancing the historic environment

16. Facilitating the use of sustainable materials.

Where development demonstrates that it is supporting the relevant policies of the NPPF then it is deemed to be a 'Sustainable Development'. The issue for designers and planners then becomes one of definition of what "Sustainable Development" looks like.

Building Regulations –Part L

Whilst not planning policy the Building Regulations, and specifically Approved Document Part L, Conservation of Fuel and Power is relevant as it determines the energy efficiency and carbon emissions of new buildings.

The Building Regulations were updated in April 2013 with an upgrade to the SAP procedure which required all new residential buildings to achieve an aggregated carbon emissions reduction of 6% over Part L 2010. It was around this time that the UK government announced plans to suspend the drive to zero carbon homes expected to be achieved by 2016.

However, the UK government now realises that this suspension of zero-carbon homes places the UK behind the progress needed to meet its Climate Act 2050 objectives.

To address this concern, in 2019 the government published its draft **Future Homes Standard** for consultation. These changing national regulations will drive forward more challenging energy efficiency and carbon reduction improvements in tandem with the latest 2021/22 upgrade to Part L published in December 2021 and due for implementation in June 2022.

Future Homes Standard

The published Future Homes Standard consultation document sets a roadmap for a reduction in carbon emissions for all new homes starting in 2022 by:

- *Reducing carbon emissions on current standards by 25%*
- *Move to no gas heating by 2025*
- *Carbon emissions reduced by 75% to 80% on current levels by 2030*
- *More controls and more accuracy over energy calculations and predicted energy use.*
- *More controls and a digital (photographic) record of construction quality.*
- *Improved airtightness of 3achr/m2 from current 10achr/m2*
- *Testing airtightness of all properties, not just a sample.*

However, it is a strategy that the collective voice of the property consultancy industry, especially the younger elements are still prompted to find fault with, as demonstrated during the consultation stages which closed in January 2020.

Resultant consultation feedback on industry social media channels expressed practitioners desire to move more quickly to achieve absolute zero energy homes—, citing 2025 as a more appropriate datum to begin the path to zero-energy - suggesting the technology and economics are aligned to allow this to happen sooner rather than later.

In practice, government has decided to take a balanced approach between the more strident views of the architectural and building design community and that of the home building contractors. It will see much of the Future Homes Standard stay in place but with some relaxation of the standards to commence in 2022 with the publication of new Parts L, F, and O of the building regulations.

The Eastleigh Borough Council Local Plan

All local authorities are required by NPPF to develop a Local Plan. Eastleigh Borough Council has just completed the process of updating its Local Plan to reflect Councillors decision in 2017 to declare a Climate Emergency.

A new updated Local Plan 2016 to 2035 was put before Council in October 2018. The Plan was approved by Council for recommendation for Adoption by the Secretary of State. However, due to a number of challenges around housing and settlement gaps, the new Local Plan was delayed. A Secretary of State Inspector was appointed, and progression was made towards adoption of the plan in April 2022.

Hot off the press, the main principles of the new Local Plan is development that acts in favour of sustainability. These key sustainability requirements are contained in the Development Management section of the Plan, more specifically policies DM1 to DM14.

- Policy DM1, General criteria for new development
- Policy DM2, Environmentally sustainable development
- Policy DM3, Adaptation to climate change
- Policy DM4, Zero or low carbon energy
- Policy DM5, Managing flood risk
- Policy DM6, Sustainable surface water management and watercourse management
- Policy DM7, Flood defences, land reclamation and coast protection
- Policy DM8, Pollution
- Policy DM9, Public utilities and communications
- Policy DM10, Water and Waste Water

- Policy DM11, Nature conservation
- Policy DM12, Heritage assets
- Policy DM13, General development criteria - transport
- Policy DM14, Parking

Of particular note to this Energy and Sustainability Statement is

DM 2 Environmentally sustainable development

Policy DM2 states all new build residential development must :

- achieve a 19% improvement in predicted carbon emissions, compared with the building regulations standard current at the time.
- a predicted mains internal water consumption of no more than 110 litres/day.

All commercial new build above 500m2 must:

- achieve; BREEAM 'excellent' (or equivalent) or BREEAM 'very good' plus 'Passivhaus' certification.
- Include low or zero carbon energy generation on site or in a Borough location agreed by the Council sufficient to offset 15% of predicted carbon emissions of a building regulations compliant building current at the time.

All larger developments (above 150 dwellings or 10,000sq.m of floor space) must:

- address sustainable development issues at the masterplan stage through BREEAM Communities 'excellent' certification; and
- fund independent post occupancy evaluation studies.

In addition new residential development, and non-residential and multi-residential development should where practical and viable:

- incorporate energy-efficient passive design principles, the best use of natural daylight and natural ventilation systems wherever possible;
- use recycled, low embodied carbon, low environmental impact and locally sourced materials in construction where possible;
- be designed with sufficient flexibility to enable the life of the building to be extended by re-use for other purposes where feasible
- aim to achieve a predicted mains internal water consumption of no more than 90 litres/day
- aim to deliver at least 1% of all residential units which achieve full 'passivhaus' certification.

Policy DM3, Adaptation to climate change

All development should be designed to adapt to the predicted climate change impacts for the Borough.

- To reduce the potential impacts of surface water flooding, sustainable drainage systems need to be implemented as part of an integrated SuDS strategy for the site in accordance with policy DM6 (Sustainable surface water management and watercourse management) and as part of the landscape framework for the site including green open space and green roofs where appropriate.
- New development should have a cooling strategy which can include cooling through generous green infrastructure
 - areas of shade
 - water cooling
 - building design and orientation to reduce overheating

- ‘cool roofs’ or green roofs and green walls
- porous cool pavements and hard standings

The plan is supported by a suite of evidence and investigative reports to prove its safety. The key document with regard to sustainability compliance with the three principles of the NFFP is the Sustainability Appraisal Report.

BREEAM for Communities (International) (BfCI)

Despite the relative side-lining of the BREEAM in recent years, it remains a pertinent acid test for Local Authority planning departments of demonstration with the NPPF’s requirement that all new master-planned development should “*act in favour of sustainability*”. This is evidenced by the advised inclusion of the methodology in the 2016-2036 Local Plan.

The independent assessment method provides a robust framework for the comprehensive evaluation of a development’s conformance with exemplar environmental best practice.

BREEAM for Communities International focusses on the master planning of multi-development yet connected urban sites such as the Ageas Bowl. It is aimed at guiding construction industry professionals to design places that people want to live and work in, are good for the environment and economically successful.

In addition to an assessment of investment in sustainable infrastructure, BREEAM for Communities emphasises the softer benefits of sustainability with the inclusion of credits for development that mobilises local communities towards purposeful interventions in favour of a more sustainable and successful outcomes.

Fig 6. Telegraph Woods adjacent to Character 5 Residential Area.



The methodology provides step by step guidance to:

- Recognise the needs, ideas and knowledge of the community as a means to improve the quality of the design, planning and construction process.
- Arrange to have the masterplan's design reviewed by the community and other key stakeholders, creating the opportunities and local feedback to support a vibrant, healthy, functional and inclusive exchange with designers.
- Manage transport and movement strategies, reduce the impact of the development upon the existing transport infrastructure.

All of which helps to prove compliance with the requirements of the NPPF.

What it all means

The above review of the UK and Eastleigh legislative framework provides the context for this Energy and Sustainability strategy.

Most importantly the narratives speaks to policy makers response to the climate science and increasing urgency for all new development to take immediate steps to respond to the imperatives. This means balancing public investors responsibility with that of protecting the ability of future generations to thrive.

The timeline from here requires all new property developments from 2022 be designed to be at least zero carbon ready by 2035 if not before.

This resulting imperative must be to:

- Put in place plans that enable observable zero carbon outcomes within a ten-year horizon.
- Address future operational carbon as well as designed in embodied carbon, by building in in-use scenario planning for how buildings will be used and managed, and putting in place the interventions on the ground that can manage this.

- For the West End locale, to respond to the latest 2016-2036 Local Plan, and the Urban Edge Policy, and to preserve and if possible reinforce the semi-rural distinctiveness of the place.

In Section 3 below we outline how the above aspirations will be achieved as part of the masterplan of the land adjacent to the Ageas Bowl.

3.0 Sustainability Strategy

This section outlines the specific Energy and Sustainability measures to be put in place at the land adjacent to the Ageas Bowl for a development that delivers a healthy, zero carbon, climate responsive, future for the residents and visitors.

Introduction

The strategy to achieve a compliant master plan structured around the latest NPPF and Eastleigh Borough Council 's Local Plan 2016-2036 includes:

- Advanced thermal simulation modelling with Evolutionary Algorithm (EA) optimisation analysis as the basis of a passive fabric first strategy for all homes. Using EA the process optimises insulation thickness, airtightness, and operational efficiency for best practice fabric first solutions and zero-carbon outcomes.
- Next, exclude fossil fuel sources of heating and hot water production in homes and new non-domestic buildings, enabling all to be zero carbon when connected to a green electricity tariff.
- Include renewable energy photovoltaic panels to generate an aggregate of 15% of the new development's energy requirement. All modelled houses include photovoltaic (PV) panels and heat pump renewables for zero near zero energy performance.
- Include low water-consuming outlets and rainwater storage butts in houses to limit water use to 105 litres/person per day.
- Residential Character Area 5 will be assessed to achieve BREEAM for Communities certification VERY GOOD with an aspiration to Excellent.
- In compliance with Eastleigh Local Plan DM02, the Hotel, Assisted Living and Health and Well-being commercial buildings will achieve BREEAM Excellent.
- Include assistance to a local community energy enabler organisation to aid establishment of a Community Energy Forum for residents. The aim of the Forum will be to help residents accelerate the masterplan home's and apartment's transition to zero-energy by 2035.

If created, the Community Energy Forum will:

- Manage distribution of funds from apartments PV panel's generation to encourage the membership of all residents to the Forum.
- Enter a commercial PPA with a national power provider to buy and sell 100% renewable community-generated energy

at wholesale prices (and with an entire chain of custody to the source) so Ageas Bowl is genuinely zero carbon.

- Manage other longitudinal sustainability issues at site level such as:
 - Activating transportation impacts and sustainable modes of transport including homes and residential EV charging rollout as demand increases into the future.
 - Activate green infrastructure and protection of biodiversity initiatives.

The formation of a Community Energy Forum will attract credits in the BREEAM for Communities Project Consultation Plan. As noted in the architect's Design and Access Statement community engagement has been an important component of the design process to date. The new Community Energy Forum will be an important extension of the communication process with residents post handover and into the future.

Energy Efficiency and Renewables

As outlined above, this Energy and Sustainability Statement seeks to deliver a development that is zero carbon and, near zero-energy as a fundamental principle for success.

Zero carbon development is development associated with energy sources that have a complete chain of custody from a 100% renewable and known chain of custody source.

Zero energy development is a development that uses less energy than it generates as measured at the energy meter in use.

Near zero-energy development: is zero energy of the building and its installed heating, hot water, lighting and other fixed energy consuming systems. If PV is fitted in the single dwellings to the level indicated, calculations show there is some residual

renewable energy offset for user plug loads but much will depend on how energy conscious the users are in their purchase of white goods and electrical devices, as well as their patterns of use.

The designs for houses, apartments and commercial buildings are similar but also have some crucial differences in how they generate heating and domestic hot water:

For house typologies:

- All homes will be compliant with the latest 2021 Part L, Part F and Part O requirements.
- All homes and apartments design will benefit from evolutionary algorithms (EA) optimised thermal modelling software to optimise walls and roof fabric efficiency as a platform for introducing renewables and low energy comfort control systems. This EA optimisation analysis objective is (subject to detailed costing) to create the opportunity for the project to go beyond Part L 2021 towards Future Homes Standard compliance within optimal cost investment envelopes for fabric and services.
- Efficient heat pumps located in the property back gardens powers space heating systems. For optimal efficiency, hot water to homes will use instantaneous electric heating.
- All houses will include state of the art, intelligently controlled and 95% efficient heat recovery ventilation systems.
- Each house will include a minimum of 16m² photovoltaic panels (where roof area exists for 20m² on south facing roof panels will be fitted for full home zero energy outcomes) for Part L 2021 compliance sufficient to offset almost all home energy requirements together with the majority of average user plug loads.

For apartment blocks

- Apartment fabric design will be evolutionary algorithms optimised with good insulation and 2 m³/hr@50Pa airtightness as a platform for zero carbon outcomes.



Fig 7. Views of Pavilion Independent Living

- All modelled apartments are low energy, with fully electric underfloor resistance heating in living spaces and panel heaters in bedrooms. This paves the way for the apartments to become zero-carbon when connected to a 100% renewable energy tariff.
- All apartments include intelligently controlled and 95% efficient heat recovery ventilation systems.
- Where the available green and outdoor seating roof design permits, include 240m2

of photovoltaic panels across all four apartment blocks to deliver 15% on-site renewable energy. This exceeds the mandatory array size of PV (148m2 fitted as a minimum) to meet the new Part L 2021.

For Health and Wellbeing Centre

As with the residences the fabric design for the Health and Wellbeing Centre also benefits from evolutionary algorithms optimisation analysis as a basis for a BREEAM Excellent outcome.

- The building will be heated and cooled using



Fig 8. Views of Health and Wellbeing Centre

efficient VRF heat pump systems.

- All areas in the building will be ventilated using intelligently controlled and 95% efficient heat recovery ventilation systems with high levels of pathogen filtration.
- Where roof area design permits, include 90m² of photovoltaic panels to deliver 15% on-site renewable energy.

For remainder Character Area 1 to 4 new Buildings

As with residences and Health and Wellbeing Centre the fabric design for the new players Pavilion, Independent Living, and Hotel franchised building will be equally specified to comply with Part L 2021 enroute to a BREEAM Excellent outcome.

Full details of the Character Area 1 and 4 buildings will form a separate energy and sustainability building regulations submission prior to commencement on site.

Energy Modelling, Evolutionary Algorithms and Fabric Specification

As indicated above, a core element of this Energy and Sustainability Statement is the provision of exemplar well insulated and airtight residences using the very latest Evolutionary Algorithm (EA) optimisation techniques as a basis for their fabric design.

To facilitate this each home with its expected fabric

envelop geometry was constructed as a digital model. The model was then subjected to a simulated weather year to dynamic predict the expected annual energy of the homes. (see Fig 9 below)

The software allows Ollio designers to answer the questions that then arise as to how much wall or roof insulation is sufficient on each typology of home, how airtight, and to what standard should the windows be provided as a basis for the optimised cost versus near zero-energy outcomes for each home typology? The higher the insulation specification the higher the capital cost. Too low and near zero carbon will not be optimally achieved.

Until recently answers to these questions were provided using SAP calculations and the experience of designers which invariably resulted in performance gaps.

Now more systematic and sophisticated evolutionary algorithms calculation engines are available to aid designer's decision making.

Ageas Bowl will become one of the first residential developments in the UK to use EA optimised pathways to zero energy, zero carbon outcomes.

Evolutionary algorithms- how it works

The first step in conducting an EA optimisation analysis is to build a virtual model of all dwellings on the development, to facilitate the prediction of the likely energy performance.

The virtual thermal model facilitates the dynamic simulation of energy-use subjecting each home to a calculation of the predicted hourly energy over an entire average weather year for Southampton.

Summing the hourly predictions of energy use gives an expected annual energy use total. The



Fig 9. Thermal Model view of Type F home

totals from each residence type provides the expected diversified electrical energy demands required for the development as a whole.

Having this model allows our designers to test different specification improvement scenarios, heating systems and renewables for each dwelling type across the development.

Conventional dynamic thermal modelling energy design starts with the construction of a base Part L 2013 compliant virtual model. Then in a process of trial and error, the designer iterates insulation thickness, improved airtightness and glazing specifications of the given architectural

geometry. Iterating manually to refine the development's fabric specifications until the basis for a zero-energy solution is found.

As an alternative to this manual procedure, Ollio has been working with evolutionary algorithms (EA) developers at University College London and Loughborough University to commercialise EA in the field of the built environment.

The EA algorithms work by automating the solution iteration process. Generating mutations of the given building's thickness of insulation, type of fenestration, types of heating systems, even the amount of renewables. Up to 85 million possible mutated variants of Character Area 5 house specifications are searched until it finds

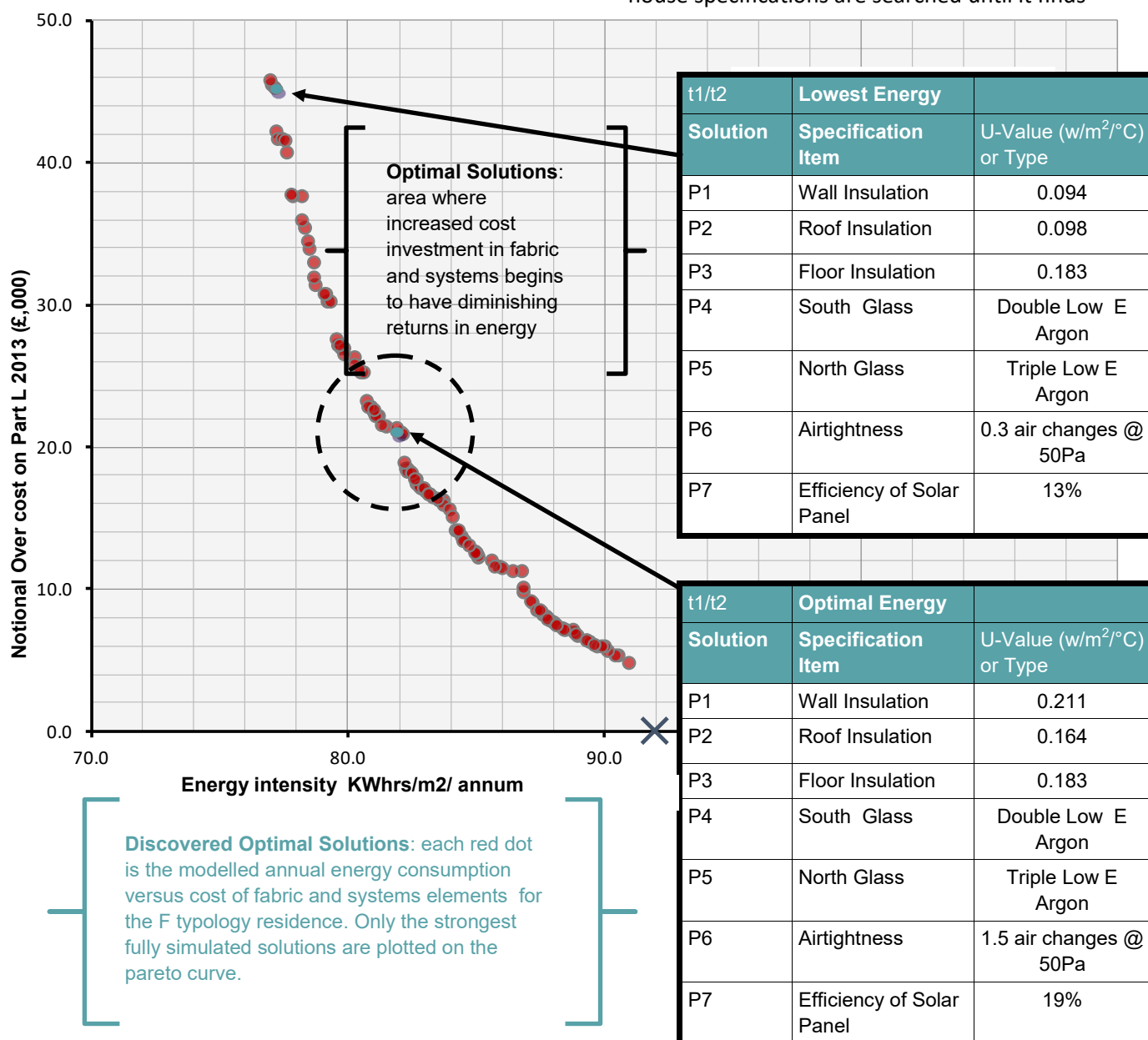


Fig 10. EA Algorithm outputs

the optimal ones which it then plots on a simple X/Y graph (see Fig 10 below). Each dot represents the cost and energy use per m² solution to a full weather year modelled specification mutation.

Fig. 10 shows only the strongest solutions. Calculated weak solutions are not plotted. The shown strongest red dots solutions sit on what is called the Pareto line.

For comparison, the lowest energy EA routine calculated solution is shown in the upper specification table (Fig 10 above) indicated.

The lower table in Fig 10 arrows to the chosen “blue dot” optimal solution for the House Type F Ageas Bowl type F homes.

The solutions inside the black circle represent a cluster of the most “cost-optimal” solutions.

For brevity and demonstration purposes, this report outlines the EA process undertaken for the Type F home only. However, the process will be repeated for all typologies prior to finalisation of the Building Regulation submission of fabric specifications.

Outline House Speciation

The key optimised features of the Type F house (as a typical specification for all types) arrived by the EA algorithm are summarised below:

- North and east facing windows are triple glazed.
- South and west windows are double glazed to optimise daylighting and solar heating.
- External Walls insulated to achieve 0.211W/m²/°K.
- Roof insulation is 0.164 W/m²/°K .
- Airtightness is 1.5 m³/m²@50Pa.
- Efficient MVHR with smart controls whole house ventilation with electric post heater.
- Minimum 16.64m² (9 panels) roof-integrated solar PV panel to achieve near net-zero outcomes (see fig 11 below). 20m² of PV on houses with larger south facing roof.
- Heat pumps with SSER of 3.5 and instantaneous HWS to meet space heating and hot water requirements.
- Ground floor underfloor heating to kitchen dining.
- Radiators in upper floors sized to lower 55°C flow

Type F Home Options Appraisal (kwhrs/annum)

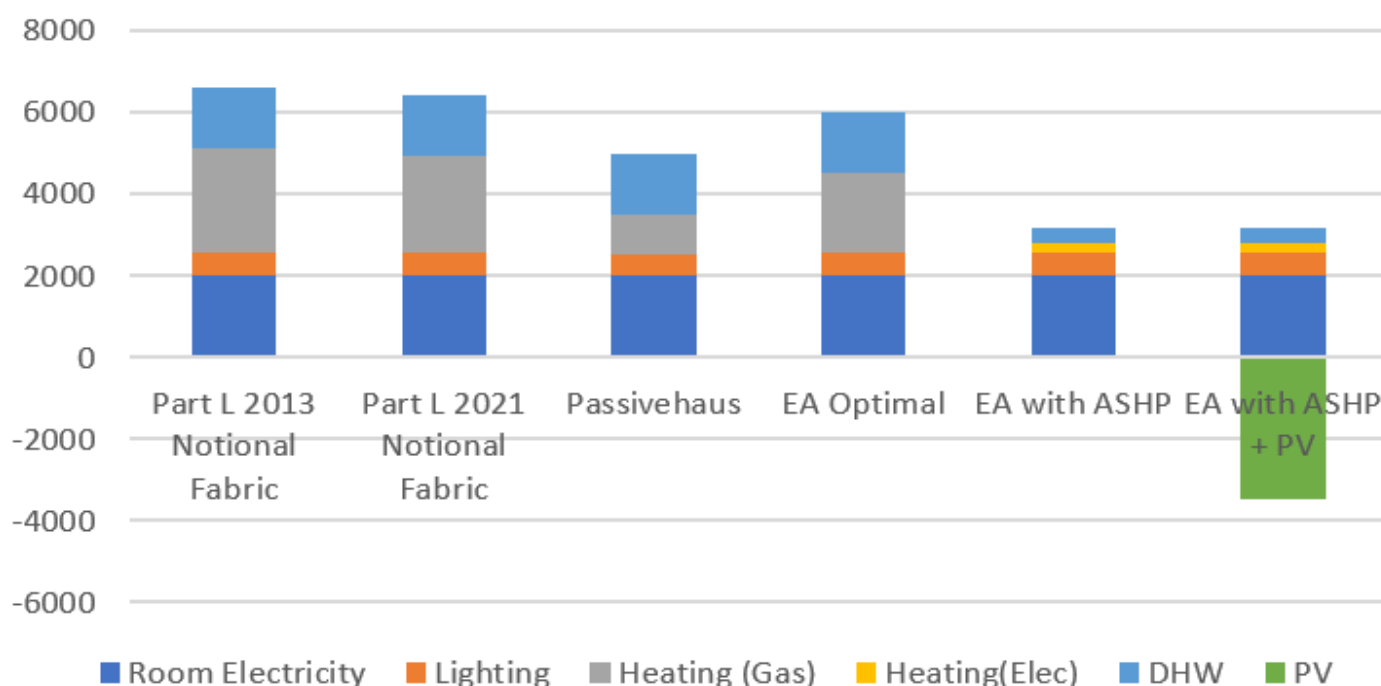


Fig 11 Modelled energy performance of homes with AI optimised specifications compared to current and latest Part L (2013)

45°C return, thus suitable for connection of a heat pump.

- Also, all double and triple glazing sound attenuated to meet with the required acoustic values of 30dB R_{tf} proposed by the Acoustic Consultants report submitted with this application.

Fig. 11 (above on page 20) shows the impact of above specified interventions for the sample Type F typology when compared to a regular Part L and Passivhaus dynamically modelled home of identical geometry.

The charts show that the new EA optimised default home with heat pump results in an **average 75% improvement** in energy compared to current notional Part L (2013) standards.

Home SAP Compliance Test

To check that the new homes are typically compliant with Building Regulations Part L - the Type F typology was subjected to an SBEM test calculation using the standard home specification and SAP/SBEM calculation methodology to produce a sample EPC rating.

The calculation is simplified so does not model real world energy in use but merely performs a mandatory building regulations fabric compliance test.

The results showed EA optimised houses require a slight increase in wall insulation thickness to comply with limiting Part L 2021 fabric specifications. This is despite the fact that the EA homes have better performance than a notional Part L home.

Some further discussion with building control officers will be required to resolve the perceived EA/SAP discrepancies at Building Regulation submission.

Nonetheless, the exercise confirmed the modelled home geometry options can meet the regulatory requirement and achieve an EPC Band

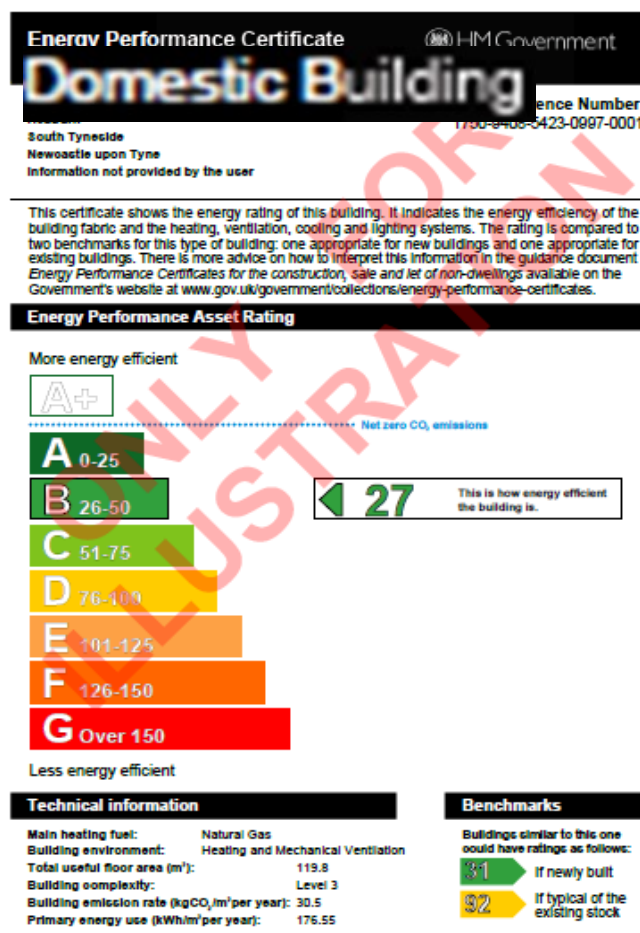


Fig 12 Sample EPC House Type F

-B rating as shown in Fig 12 above.

Calculations show the optimised template specifications for the typical Character 5 area home is summarised in Fig 13 overleaf.

Building Regulations Part O—Overheating

Approved Document Part O 2021 of the building regulations due for implementation in June 2022 serves to ensure that future homes can adapt to inevitable temperature rise. By 2080, the climate in Southampton is predicted to be close to that of the South of France in 2022.

Homes built today must meet two future climate stress tests. First all living areas should not have temperatures that go above 26°C for more than 3% of occupied hours.

Second, all bedrooms should not go above 26°C

Element	House Specification	Comment
Fabric Specification	Heavy Walls U Value = 0.211, Pitched roof U Value =0.164, Concrete Floor U Value= 0.183, Air tightness 2 air changes @50Pa	
Windows	North facing: Low E triple glazed and argon fill with 6mm outer pane for 30dB noise reduction—U Value 1.9 W/m2 °K South facing : Low E double glazed argon fill with 6mm outer pane for 30dB noise reduction—U Value 1.3 W/m2 °K	
Heating	Heat Pump Option: External heat pump rated at SEED 3.6 with sized thermal buffer vessel in lieu of gas boiler. UFH and radiator systems as gas above.	All rooms fitted with TRV room control. Heating systems controlled from timed week/weekend and weather compensated controller with kitchen mounted controller and mobile phone app. Pipe work will be arrange to facilitate future upgrade by occupiers from standard to heat pump systems.
Ventilation	Whole house intelligent ventilation system located in a store for easy access and servicing. Heat recovery exchangers 95% efficient and fully extractable for cleaning.	Micro-controls included to minimise thermal overheating and provide optimal fresh air ventilation year round.
Hot Water	Heat Pump Include 120 litre closed system HWS storage vessel with suitable expansion in available store locations	Pipe work will be arrange to facilitate future upgrade by occupiers from standard to heat pump systems.
Lighting	All lighting will be LED	
Renewables	Photovoltaic panels to south or west facing aspects. Minimum panel efficiency 19%. 25 year manufacturer's guarantee.	
Predicted Energy Use Intensity (kWhrs/m2/a)	Type F 23.45	
EPC Rating	Type F: Base fabric Band B or CSH 4 equivalent - with heat pump and PV Band A+ zero energy . All homes typologies A to F expected to be similar in performance to Type F.	

Fig 13 Homes confirmed specifications

during night-time occupied hours for more than 1% of the occupied time. Approved Document Part O allows homes with glazed areas of less than 18% glass to floor area on a room by room to comply without calculations.

The average glazed area of a Type F home is average 12% window to floor area. On this basis, it is expected that all other homes will comply with Approved Document Part O being of similar townhouse design format.

Apartment Blocks Specification

Turning to the apartment blocks, all are identical in layout and elevational detail.

In similar fashion to the houses, EA fabric optimisation analysis was undertaken for the typical geometry of the four storey block. Fig 15 below shows an image of the model taken from the thermal modelling software.

The results of EA modelling of the cost versus carbon optimisation identified:

- Airtightness $2\text{m}^3/\text{hr}/\text{m}^2@50\text{Pa}$ in keeping with practical construction quality constraints for the much larger build volume of the apartments.
- Similar 95% efficient MVHR recovery as houses with smart controls whole apartment ventilation with electric post heater.
- Heating will be underfloor laid-on screed electric resistance mat heating to kitchen dining powered mostly by zero-carbon night time tariff off-peak electricity.
- Electric panel heating with a smartphone app to control heating in bedrooms, bathrooms and common spaces.
- Roof integrated solar PV panels of a minimum area of 80m^2 per block to exceed Part L 2021 requirements (which is just 37m^2), and to generate 15% as required by Eastleigh 2016-2036 Local Plan.
- Unlike the homes which will be near zero energy, apartments would need considerably more

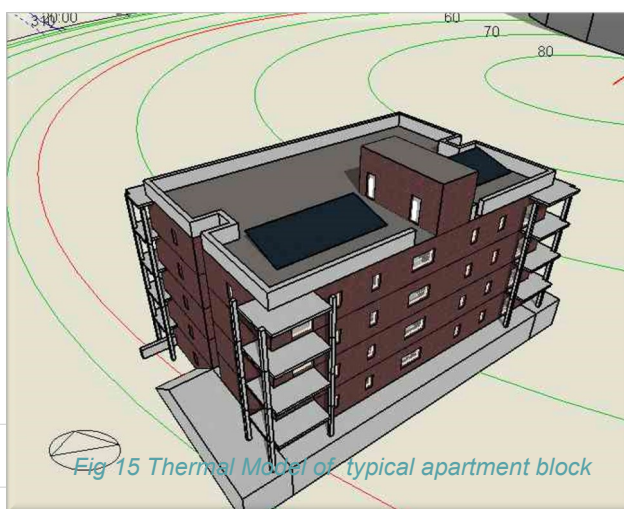


Fig 15 Thermal Model of typical apartment block



Fig 14 Modelled energy performance of apartment typical floor (inset) with house AI optimised specifications compared to current Part L (2013)

renewable energy generation to reach this status. The best they can achieve is to be zero carbon where all electrical energy provided on a green electricity tariff.

- All apartments include smart controls linked to the mobile phone app to provide owners with real-time feedback on energy, carbon and cost.
- Also, all double and triple glazing will meet with the required noise reduction acoustic values of 30dB on south and east facing apartments to mitigate match day stadium noise.

Apartment Comparison to Part L and SAP Test Ratings

Typically, residential apartment blocks fall into a mix of needing a SAP requirement for each fully contained apartment, and non-domestic SBEM compliance checks for all landlord and common circulation spaces. To assess Part L compliance each apartment will be subjected to the new V10 SAP test calculation using the standard fabric specification.

As with the houses, the apartments will include MVHR to facilitate mitigation of overheating in summer particularly where window opening needs to stay closed to mitigate stadium noise intrusion. Windows will still be openable to meet Building Regulation Part F requirements.

Fig 14 (above on page 23) shows the impact on annual energy use of above-specified interventions when compared to a regular Part L or Passivhaus apartment block.

The models show that for the electrically heated EA derived apartments specification there is an **average 8% improvement** in energy compared to current notional Part L (2013), and 2% improvement compared to Part L 2021. Suggesting the arrangement of the apartment geometry is producing energy figures well below the Target Emission Rate (TER) notional values.

This fabric first non-fossil fuel based heating design enables a zero carbon in use outcome once consumers sign up to a 100% renewable energy tariff. The approach enables them to transition to zero energy in the future, especially where a Community

Energy Forum connects to a local community energy Power Purchase Agreement (PPA) or private wire renewables installation with a known chain of custody.

Apartment Part O overheating checks.

The model shows that the ratio of window to wall area is just 7.6 %, well below the simplified method of 18% window to floor area ratio required by the new standard.

Health and Wellbeing Centre Specification

By way of example, the Health and Wellbeing Centre is the first of the commercial buildings to be fabric optimised using EA techniques. The approach is typical of that to be employed at the Independent Living and Hotel in due course.

The results confirmed:

- North and east facing windows will be triple glazed low e argon filled.
- South and west windows are triple glazed low e argon filled. Doors can be double glazed with argon fill.
- Walls are at least 0.177W/m²/°K.
- Roof insulation is at least 0.109 W/m²/°K as EA proposed.
- Airtightness 2m³/hr/m²@50Pa is in keeping with practical construction quality constraints for the much larger build volume of the apartments.
- Similar 95% efficient MVHR recovery with smart controls will support a full variable refrigerant flow fan coil comfort cooling system.
- Electric ceiling mounted radiant panels condition the reception and corridor circulation areas.
- Roof integrated solar PV panels with a minimum area of 70 m² exceeds Part L 2021 requirements and the 15% requirement of the Eastleigh 2016-2036 Local Plan.

The net Energy Use intensity is 127kWhrs/m² (144 kWhrs/m²/a with plug loads) of this carbon zero fossil fuel free results in an estimated EPC B.

Most of the energy use is modelled to be from the

Element	Apartment Specification	Comment
Fabric Specification	Light Walls U Value = 0.211, Roof U Value = 0.164, Ground Floor U Value = 0.183, Air tightness 2 air changes @50Pa Intra-floor airtightness to 2 air-changes@50Pa	
Windows	North and East facing: Low E triple glazed and argon fill with 6mm outer pane for 30dB noise reduction—U Value 1.3 W/m² °K South and West facing :Low E double glazed argon fill with 6mm outer pane for 30dB noise reduction—U Value 1.9 W/m² °K	
Heating	Post heater to MVHR unit, plus wall mounted electric panel heaters	All rooms fitted with control thermostats. Heating systems controlled from timed week/weekend and weather compensated controller within MVHR with kitchen display and mobile phone app access.
Ventilation	Whole apartment intelligent ventilation system located in a store for easy access and servicing. Heat recovery exchangers 95% efficient and fully extractable for cleaning.	Micro-controls included to minimise thermal overheating and provide optimal fresh air ventilation year round.
Hot Water	Standard Option: Instantaneous hot water to via under sink heaters. Showers will be instantaneous electric.	
Lighting	All lighting will be LED.. External lighting also LED	External lighting designed to be mindful of ecology .
Renewables	Photovoltaic panels to deliver sitewide renewable energy of at least 10%.	
Predicted Energy Use Intensity (kWhrs/m ² /a)	25 kWhrs/m ² /a (gross)	
EPC Rating	EPC Band B Code for Sustainable Homes 4 minimum. With renewables Band B.	

Fig 16 Apartments confirmed specifications

generation of hot water for showers and the kitchen.

Health and Wellbeing Building Optimisation Sensitivity Analysis

Using the EA optimisation algorithms it becomes possible to conduct a sensitivity analysis of the impacts of every pound spent on improving the building's energy performance. This allows designers to be more specific in targeting those interventions that will be more impactful to the overall goal of delivering a lower carbon outcome.

In Fig 19 opposite we see a sensitivity analysis chart taken from the EA optimisation software for the Health and Wellbeing Centre. It shows P07: airtightness has the largest impact on energy per cost unit spent on improving it. The blue bar (mu) is impact of improving airtightness acting alone, and the red bar (sigma) is impact on other things (e.g. improved airtightness making for a smaller boiler or chiller). P08, P09, P10, and P11 (which all relate to windows) show East and South facing windows specifications have the next largest impacts. Improving wall insulation has a minor effect. Improving the roof insulation (P04) has a more positive effect than improving wall insulation. The

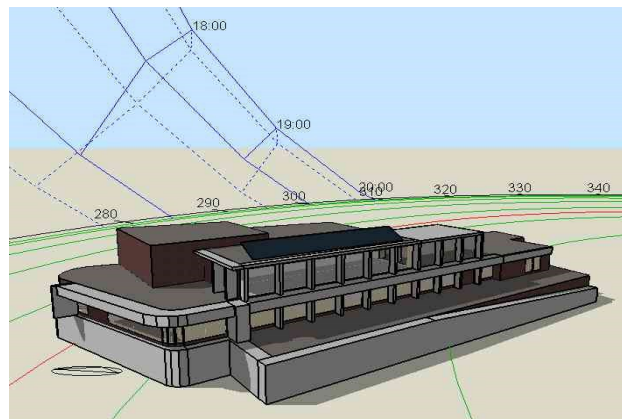


Fig 18 Health and Wellbeing Building
Ground Floor Overheating Check

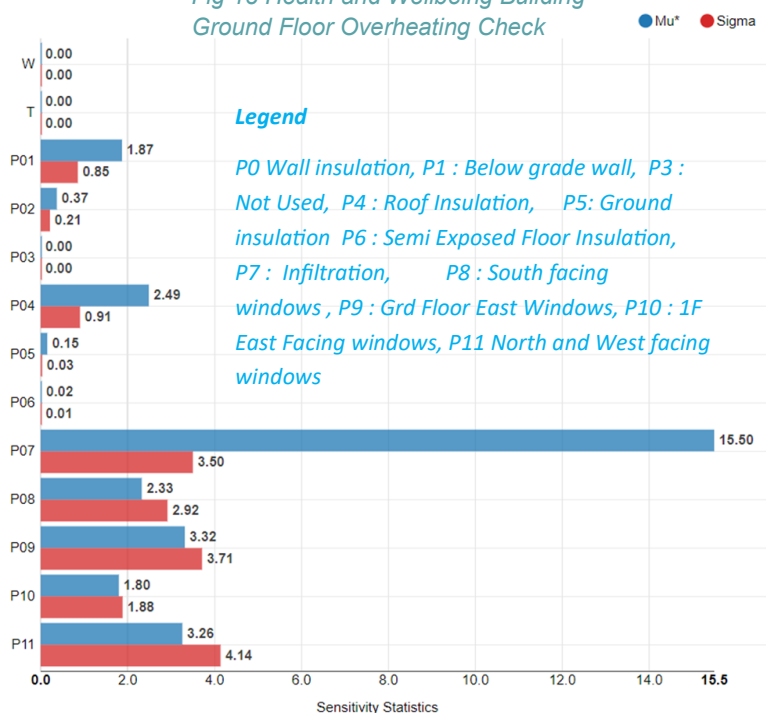


Fig 19 Health and Wellbeing Building Sensitivity Analysis

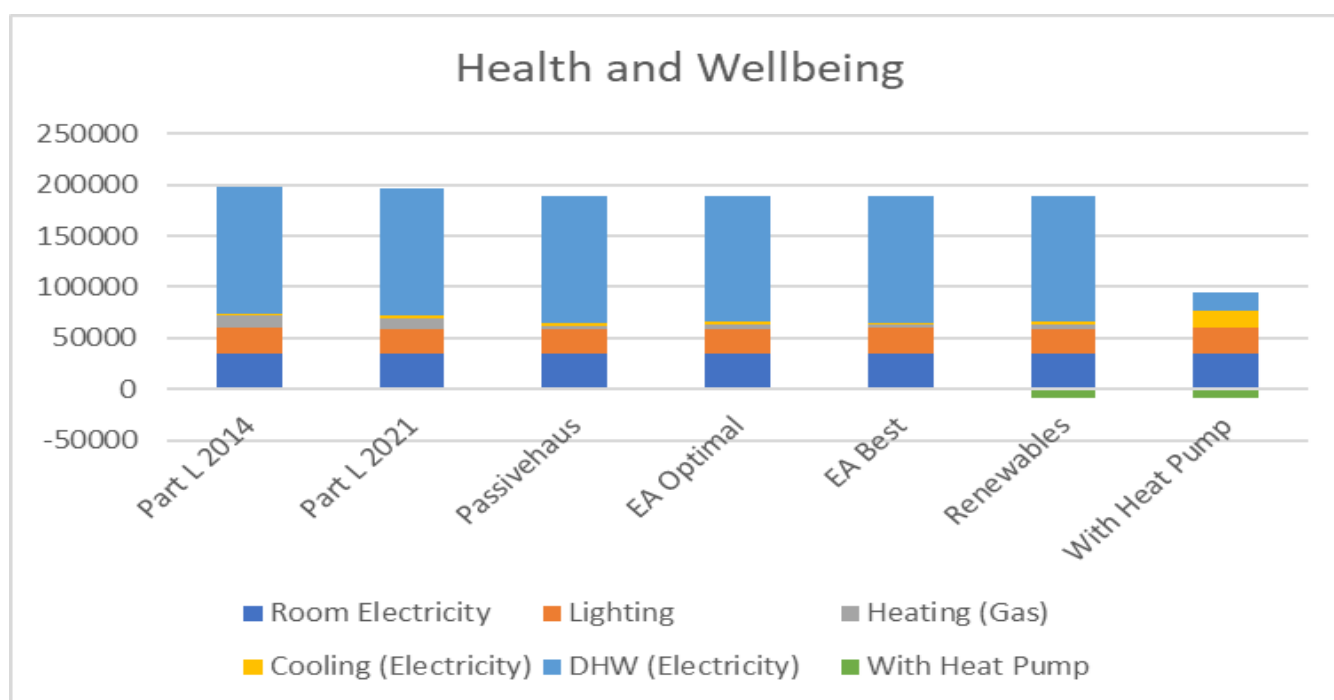


Fig 17 Modelled energy performance of Health and wellbeing Building EA optimised specifications compared to current Part L 2013/4 and 2021/2

Element	Health and Wellbeing Centre Specification	Comment
Fabric Specification	Light Walls U Value = 0.177 Roof U Value = 0.109 Ground Floor U Value = 0.183, Air tightness 2 air changes @50Pa Intra-floor airtightness to 2 air-changes@50Pa	
Windows	North facing: Low E triple glazed and argon fill with 6mm outer pane for 30dB noise reduction—U Value 1.3 W/m ² °K South facing: Low E double glazed argon fill with 6mm outer pane for 30dB noise reduction—U Value 1.9 W/m ² °K	
Heating	Variable Refrigerant Volume Heat Pumps in all rooms. Electric radiant panels in circulation spaces and stairs. Inverter controlled electric heating in MVHR units	All rooms fitted with control thermostats. Heating systems controlled from timed week/weekend and weather compensated controller within MVHR with kitchen display and mobile phone app access.
Ventilation	Whole building intelligent ventilation system. Heat recovery exchangers 95% efficient and fully extractable for cleaning. HEPA filtration to dilute pathogens including Corona virus.	Micro-controls included to minimise thermal overheating and provide optimal fresh air ventilation year round.
Hot Water	Standard Option: immersion heater and Heat Pump	
Lighting	All lighting will be LED. External lighting also LED	External lighting designed to be mindful of ecology.
Renewables	70 m ² of photovoltaic panels to deliver sitewide renewable energy of at least 15%. EV charging to 20% of basement carparking spaces.	
Predicted Energy Use Intensity (kWhrs/m ² /a)	127 kWhrs/m ² /annum Net 144kWhrs/m ² /annum gross (plug loads)	
EPC Rating	Type B: : Band B	

Fig 19 Health and Wellbeing Centre building confirmed specifications

chart is generated from the results of 4,000 mutated specification simulations of over 400 specification families.

Overheating—Health and Wellbeing Centre

The Health and Wellbeing building is comfort cooled and so not subject to TM52, Part O check. The glazed area is high at 21%, and there would be merit in providing additional shading to the south facing glass elevations. Fig 20 below shows the Ground Floor relative daytime surface temperatures in summer. The Consultation rooms are warm and require further mitigation of solar gain for internal comfort.

Community Energy Forum

This Ageas Bowl Energy and Sustainability Statement is founded on the principle of best-in-class performance, so Ageas Bowl development will be zero-carbon and fossil fuel free at first handover.

With this, it could be said that nothing more needs to be done. However, if all of the new energy demand could be met using off or onsite based renewables of known chain of custody, then the Ageas Bowl Masterplan could be zero energy status.

To lock in future upgrades and technology exploitation HCCC with LDA are exploring a partnership with a prominent local Community Energy enabler. The partnership will create a Community Energy Forum at Ageas Bowl to:

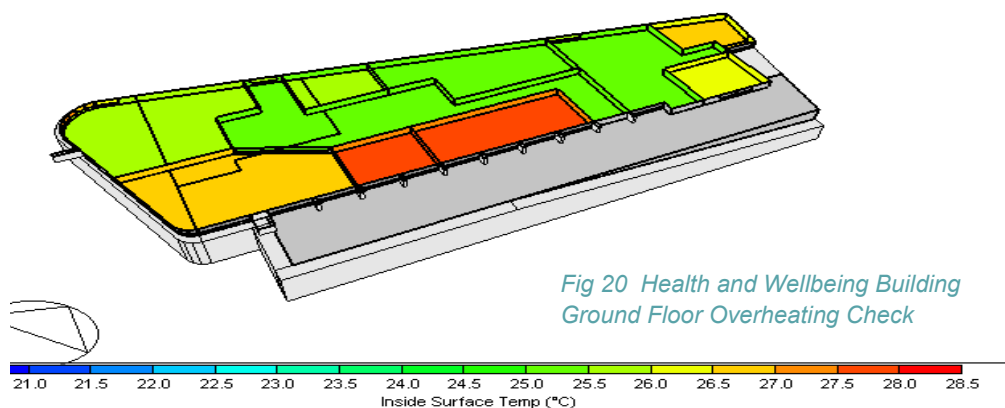
- Create the founding legal framework for the new Community Energy Forum in the first instance.
- Engage with residents, to promote and register membership with the Energy Forum.
- Write the website, marketing and promoting itself and its benefits
- Distribute benefits/profits of the apartment blocks PV panel export revenue to members (largely through lower electricity bills).

- Integrate future EV charging and battery storage with renewables as EV becomes the dominant transport modal.
- Provide guidance and husbandry over green spaces and green infrastructure, promote biodiversity and protect existing protected species populations.
- Link design with operation in use so that zero means zero.
- Become a vehicle to link future sources of government green deal funding with new and renewable zero-energy projects.
- Finally and most importantly, work with local communities and residents to deliver a zero energy Ageas Bowl Master Plan by 2035

In keeping with the above and with a willingness from local stakeholders and residents, HCCC and LDA would be prepared to:

- assist with putting in place the legal framework for the creation of a residents Community Energy Trust. In large part, this is already captured through the requirements of the Governance sections of the BREEAM for Communities credits.
- draft an MoU of the Community Energy Forum to transfer ownership and associated revenues of the 240m² of PV panels on apartment roofs to the CEF.
- Provide some seed funding and facilitate to aid and set-up of the group.

The initiative fits well with the development's commitment to achieving a minimum of Very Good Rating under BREEAM for Communities and the Local Council's and County Council's commitment to zero-



BREEAM for Communities:

To lock in the features of this Energy and Sustainability Strategy and thus prove compliance with the requirements of the National Planning Policy Framework, as requested in the Eastleigh's Local Plan DM2, LDA provide the commitment to undertake a BREEAM for Communities International and to achieve a minimum Very Good and aspire to Excellent over the whole of the masterplan character areas.

The BREEAM for Communities assessment consists of forty-four individual areas of enquiry spanning six core technical categories,

- Governance;
- Land use and ecology;
- Resources and energy;
- Social and economic wellbeing;
- Transport and movement; and
- Innovation'

Each of the assessment areas has credits assigned to it which are awarded where the developments designs and plans meet the performance levels defined for that issue.

Fig 21 below shows the breakdown of where the credits are expected to come from.

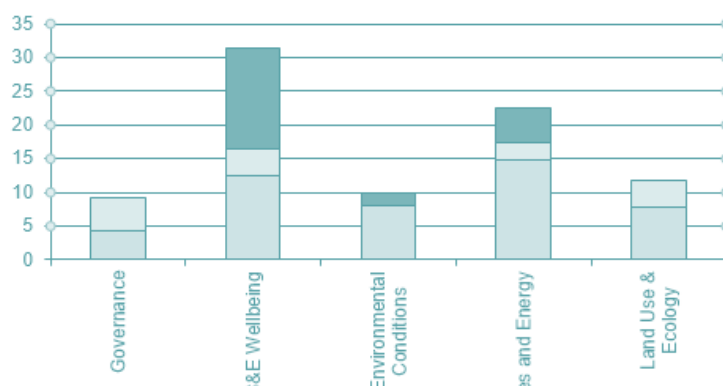
Some of the best practice sustainability issues over and above those already included above are:

Community Engagement and Local Economy

Review: Within the governance section LDA will produce a high-level **Consultation Plan** to determine how the development will be used and what steps will be required to support the development of a vibrant residential community into the future. Much of this has already been achieved and included within the submitted Design and Access Statement.

The **Consultation Plan** formalises the already undertaken review of current housing tenures, demographics and local economy to determine housing mix, community facilities and employment opportunities and how this knowledge might be used to best address and then implement the findings.

By extension, the Consultation Plan serves to identify the key stakeholders to action the creation of the important **Community Energy Forum**, as a



	Points Available	Likely	Possible	Unlikely
Governance	9.20	4	5	0
S&E Wellbeing	31.91	12	4	15
Environmental Conditions	10.80	8	0	2
Res and Energy	21.9	15	3	5
Land Use & Ecology	12.6	8	4	0
Transport	13.80	8	4	2
TOTAL SCORE:	100	55	20	23

Fig 21 BREEAM Communities International Pre Assessment

management vehicle to adopt and embrace sustainable principles into the future.

Design Review: Credits are included in BREEAM Communities for an independent design review of the full scheme and a commitment to implement the findings of the Review Panel. The design review process which is already ongoing follows a design workshop with the community and the local authority to take initial sounding as to how the LA and the local community feel about the scheme and what if any opportunities exist to enhance the current masterplan proposals.

Public Realm: Using our Urban specialist partners in the Calderpeel team, open consultation with the local authority and potential users of the development to understand the activities, uses and local identities that the public realm can promote.

The consultation considers how existing West End residents see the development of local heritage sites in and around the Telegraph Woods as amenities and where improvements can be made. Also how the hotel expansion should sit within existing developed landscape, and protecting green spaces.

As far as possible the design of the Health and Wellbeing Centre and Independent Living allows multiple uses for different local users, including children, the elderly and disabled people with consideration given to safety, comfort, disturbance and security.

The assessment identified appropriate shared spaces, local foot paths and design plans to guide how space for social interaction has been considered how separation access for local residents and visiting fans can be controlled on match days.

Green Infrastructure: Further consultation will take place with the local authority, existing residents and potential users of the development to understand the desired uses,

design, quantity and location of the accessible and natural greenspace.

A **green infrastructure plan** will be developed as a part of the consultation engagement. A summary of the responses and any constraints restricting the provision of natural accessible greenspace will be included in the plan. The strategy being to also put in place a long-term maintenance plan for greenspaces ahead of practical completion. Full details of the credits and where they have been derived from is shown in Annex A on page 35.

Sustainable Low Carbon Construction Planning

LDA and HCCC are committed to supporting sustainable construction and minimising environmental impacts associated with the regeneration proposals at Ageas Bowl.

The delivery of each phase of the development will prioritise a range of sustainable construction practices including:

- Avoiding the removal of soil to landfill.
- Specify all large area items for structural elements, walls, floors, roofs, doors, glazing, ceilings, and floor coverings to be made from lower embodied energy or recyclable sources, and be themselves recyclable at end of life.
- Set targets for embodied carbon per residential block will at 500kgCO₂/m² built area, compared to the industry average of 600kgCO₂/m². This will also require the specification of all materials, insulants and refrigerants to be Ozone Depletion Potential (ODP) free and Global Warming Potential < 5.
- Specify all internal materials, paints and glues to be low in VOCs and SVOCs. This will also serve to create a healthier internal environment to aid good air quality for health and wellbeing.
- Monitor all water and electricity consumption during each phase of construction and the use of measures to reduce usage where possible.
- Avoid the use of insulation materials containing substances known to contribute to

stratospheric ozone depletion or with the potential to contribute to global warming.

- Use only FSC timber or equivalent in construction.
- The selection of contractors who are registered with the Considerate Contractors Scheme (CCS). Each construction phase will aim to minimise any adverse impacts on the environment, community, people and existing buildings.

Site Waste Management Planning

The tender documentation for the construction of the development will require the contractors to develop and enforce a bespoke site waste management plan. The plan will require:

- the reuse and recycling of materials from any demolition of the existing site buildings.
- Implementation of a **Construction Resource Management Plan** or equivalent to minimise and manage the production of waste during demolition and construction.
- Diversion of at least 95% non-hazardous waste from landfill for recycling or reuse.
- Use of aggregates that have arisen from demolition or that are supplied from recycled sources.
- Constructors will consider a range of options to encourage sustainable waste management including provision of segregated recycling bins in public areas.
- Facilities to encourage recycling during the operational phase. The specific operational waste measures incorporated will be detailed as part of future applications for each phase of development within the outline masterplan area.

A Materials Procurement Strategy

Development specifications will require all contractors and sub-contractors to have environmental management policies and procedures, such as EMAS/ISO14001, in place to ensure the sustainable management and supply of materials used in the public realm.

The design of the residences will evaluate the use materials that achieve an A+ to B rating, as defined in the Green Guide to Specification., to achieve an embodied energy benchmark target of 500kgCo2/m2

Put in place procedures to prioritise the sourcing of concrete and steel frame produces from within a 50-mile radius of the site.

Sustainable Urban Drainage and Flood Risk

The development's civil engineering specialist has already assessed the risk of a site flooding and the impact from flood that future development will have on the site and future properties.

The development includes realigning the existing streams and culverts to improve water flow and to aid biodiversity while containing 100 -year return stormwater flow offsite to zero. Approaches to managing surface water that takes account of water quantity (flooding), water quality (pollution) biodiversity (wildlife and plants) and amenity are collectively referred to as Sustainable Drainage Systems (SuDS).

The SuDS system will be designed to collect and manage all surface water, slow runoff down run off from the site or to the exiting water courses. The site will minimise the creation of hard surfaces and substitute for percolation surfaces in so far as possible.

All dwellings will be constructed to eliminate future damage to properties from a 1 in 200-year return storm.

A Biodiversity Strategy –

The proposed Ageas Bowl development involves the redevelopment of a site in the Urban Fringe of Southampton.

An Ecological Assessment has been undertaken by Johns Associates to assess the ecological impacts and include appropriate measures to safeguard the natural environment and enhance biodiversity where possible.

This assessment has confirmed that although the the land for development is mainly car-parking and managed Golf Course of low ecological value, there are measures that can be taken to increase the gain of biodiversity and to create improved green infrastructure for migration of species..

More detail on the biodiversity plan can be found within the Ecology Report, **Environmental Impact Assessment and Design Access Statement** which accompanies the full application.

A Sustainable Transportation Plan

Include measure to eliminate unsightly parking on newly created urba areas , while also encouraging more sustainable choices particularly walking and cycling.

The proposed development is an existing urban fringe area which we understand is served by 30 minute interval local bus links to the city centre.

A Transport Assessment (TA) and Framework Travel Plan have been produced by transportation consultant WSP to accompany the planning application. The Travel Plan aims to create a more sustainable, community-driven environment for all residential users; and to discourage car ownership and visitors to adopt more sustainable travel choices. Improvements

through the creation of a new roundabout will help to ease matchday congestion.

Environmental Impact Assessment

Adding to this Energy and Sustainability narrative is the separately submitted Environmental Impact Assessment report which embraces the following key sustainability initiatives:

- Sustainable Construction Plan
- Water Efficiency and Conservation
- Sustainable Transport
- A Health and Wellbeing Plan
- A Daylighting assessment
- A Biodiversity Plan

Post Occupancy Evaluation

Conduct an independent BREEAM Man 05 Post Occupancy Evaluation across all dwellings and commercial buildings in the master planned character areas. The POE will learn lessons, and review energy and carbon use against benchmarked design targets.

All of the above, which when combined with the contents of this document serves to prove compliance with the objectives of the NPPF and EBC 2016-2036 Local Plan.

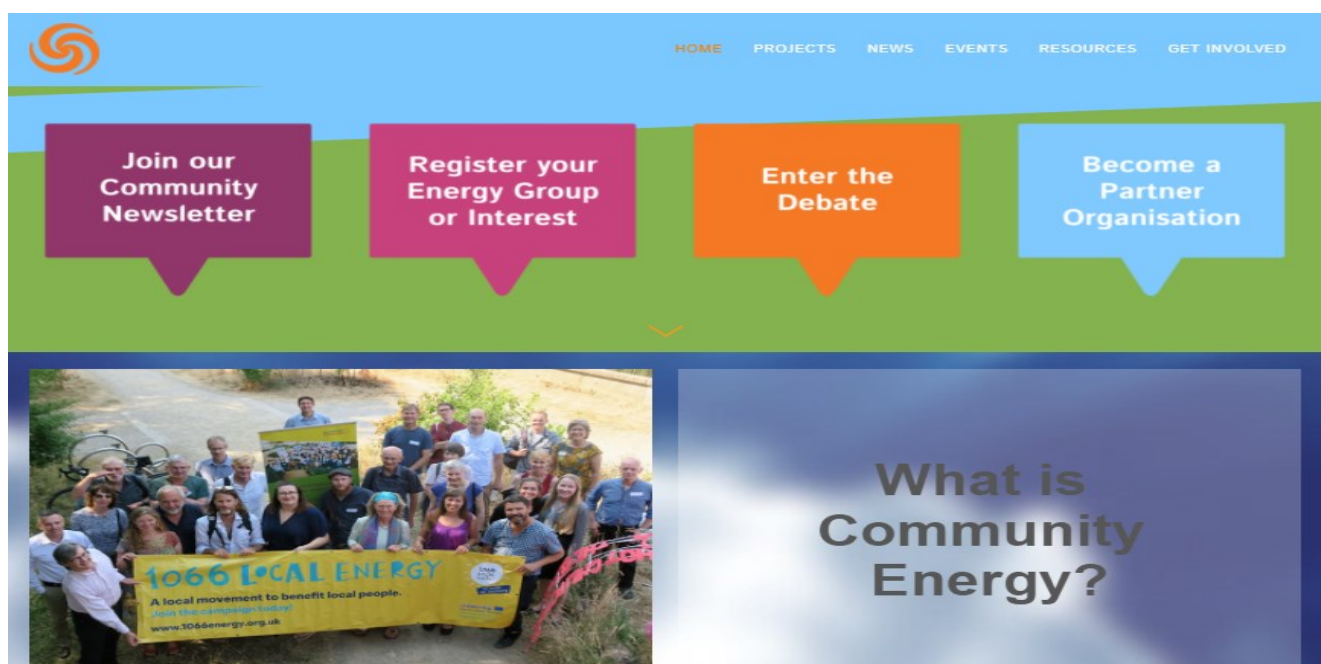


Fig 22. Community Energy DNO Website (click to access)

4.0 Summary

This Energy and Sustainability Statement demonstrates how the new masterplan development of land adjacent to Ageas Bowl will act in favour of sustainability. In doing so, it's a strategy future proofed to meet Eastleigh Borough Council's new 2016-2036 Local Plan, and the latest UK Government Building Regulations not due for site implementation until June 2023.

The process follows a systematic step by step approach to:

- Adopt a fabric first policy to optimise insulation and airtightness, minimising energy use through innovation and providing a basis for zero carbon and near-zero energy.
- Enable optimised near zero development, by deploying innovative evolutionary algorithm thermal modelling techniques.
- Include a fossil fuel-free strategy across the entire master plan. Homes are heated using efficient heat pumps. Apartments are direct electric, and the Wellbeing Centre is efficiently heated and cooled using Variable Refrigerant Flow (VRF) heat pumps.
- All new buildings will include on-site renewable energy from photovoltaic panels (PV). All single dwellings will be fitted with a minimum of 16m² of photovoltaic panels sufficient to deliver a near-zero energy home from the first occupation.
- Apartment blocks include 240 m2 to deliver 15% in compliance with the Local Plan 2016 to 2036, exceeding the 148m2 required by the new Part L.
- Put in place the novel measures to establish a Community Energy Forum. The Forum will act with

residents in the important years ahead to apply for new grant funding, exploit the latest technologies, and at lower costs continue the sustainable development of Character Area 5 up to 2035 and beyond.

- Assist the Community Energy Forum to gain traction by putting in place some developer seed funding to allow it the time to gain its financial traction.
- Lastly, lock in the framework for sustainability with a commitment to undertake a **BREEAM for Communities** assessment and achieve a VERY GOOD score with an aspiration for Excellent.
- Conduct a post occupancy evaluation across all buildings and dwellings in the master planned character areas.

“Ageas Bowl will become one of the first UK residential developments to use EA optimised pathways to zero carbon. outcomes.

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Annex A: BREEAM for Communities Pre Assessment

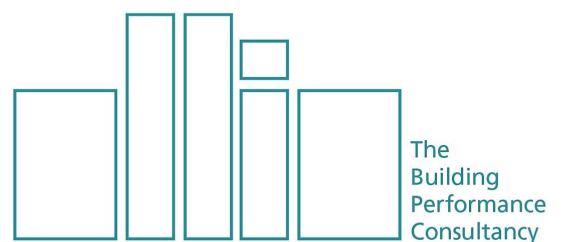
A full BREEAM for Communities International 2013 pre assessment has been carried out for the project to predict a VERY GOOD rating with sufficient capacity to realise an Excellent outcome through design. Click on the link below to download the calculation spreadsheet

[Click here to go to Excel spreadsheet with full details](#)

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