Response to Council Comments

Himley Village – Zero Carbon

May 2015

It is understood that the energy strategy submitted with the Himley Village planning application has been reviewed by Bio Regional on behalf of the Council. The Council has requested additional information to confirm that the scheme will be able to achieve zero carbon.

1 Further details are needed to justify the energy baseline. The baseline electrical demand appears to be too low and the baseline heat demand appears to be very high.

As set out in the Sustainability and Energy Statement report accompanying the planning application the baseline energy demand is based on the baseline modelled SAP assessments for a variety of dwelling types and provided in the NW Bicester Masterplan Energy Strategy to ensure a degree of consistency with the wider masterplan and as a conservative worst case scenario at the outline planning application stage.

The non-domestic baseline is based on CIBSE Guide F as a conservative worst case benchmark of actual performance. The relatively high baseline heat demand is judged to be a result of the proportion of non-domestic development and use of benchmark data, which cannot be more accurately defined at the outline application stage.

As an outline planning application the detail available with regard individual phases and units is limited and dwelling specific detailed modelling is only considered of value when based on sufficiently developed orientation and specification of individual plots or detailed phase elements which are not determined at this stage.

A phased heat demand profile as part of the decentralised energy strategy will be developed as part of the commercial agreement with the Energy Services Company in response to the detailed design and layout of individual phases and homes.

2 The strategy then predicts a further 8% electricity reduction for 'lean' improvements – this seems very unachievable so we need to understand the intentions here

The strategy is a forecast based on savings from domestic and non-domestic development. It is envisaged that there will be substantial opportunities for reducing electricity consumption above the benchmark baseline in all non-domestic buildings at Himley Village.

The report sets out those reductions in solely domestic electricity consumption equate to 2% above a Part L 2013 baseline which is considered a realistic and deliverable target for new homes

3 What is the basis for the predicted electrical demands and what are the assumptions around low energy lighting and appliances?

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The basis of the electrical demands is summarised in point 2 above. It is assumed that low energy LED lighting and high efficiency appliances (where provided) will be installed as standard in all homes at Himley Village. The estimate of energy consumption for cooking and appliances from new homes at this stage is based on the guidance provided in the latest Code for Sustainable Homes Technical Guide addendum (2014) and Section 16 of SAP.

We think it is important to recognise that the planning application is in outline and the applicant has made the commitment to delivering zero carbon standards. We feel it is also appropriate that future developers retain a degree of flexibility in how this standard is achieved and that this is able to adapt to changes in best practice, technology and legislation.

4 Gas/heat reduction are given as around 5% against a very high baseline. Predicted heat demand is much higher than the exemplar standard and we are concerned that they might not meet the FEES level set by Code 5. Clarification is also sought over the actual FEES level and the basis of the predicted demands.

Himley Village aims to achieve the right balance in fabric efficiency, cost and occupant needs. The applicant has committed to achieving Code for Sustainable Homes Level 5 and meeting the associated FEES of 39kWh/m^2 for apartments/terraces and 46kWh/m^2 for houses, subject to the on-going registration of dwellings, now the code has been officially withdrawn.

It should be noted that the forecast heat demand is inclusive of both space heating (governed by FEES) and domestic hot water of the dwellings based on the mix and floor areas. The application assessment has an aggregated average domestic space heating demand 35.85kWh/m^2 and domestic hot water of 30.92kWh/m^2.The assumption at this stage is considered to be a suitable conservative case assessment for the purposes of the outline planning application.

Individual reserved matters will provide more detailed energy performance of each phase based on more detailed modelling once the design and specification of individual homes are more advanced.

5 We are unclear what energy solution is proposed for homes 401 – 999. To what extent will zero carbon be achieved during this phase? For the energy strategy that is being adopted, we would expect zero carbon to be achieved before the 400th home and on an on-going basis.

As detailed in the report at pg. 19 a hybrid gas and biomass energy centre will supply the homes in the interim phases prior to the planned larger CHP engine coming online once 1,000 homes are constructed and connected to the energy centre. Homes 1-999 are envisaged to be supplied by the heat network from the biomass and gas energy centre with roof mounted solar PV.

6 For the interim energy solution, what proportion of demand will be met by the biomass boiler and the back-up gas boiler (KWh/yr for each)

Details of the estimated breakdown of the energy centre energy supply for the Himley Village development when completed is provided on pg. 19 of the report. The energy centre design for interim phases will aim to optimise proportion of biomass heat supplied through suitable buffer sizing. The target will be to maximise the proportion of biomass heat delivered and is anticipated to

target 80% biomass utilisation for interim phases although this is subject to further design development.

7 The ultimate energy solution seems oversized for heat demand. Is the intention that the proposed energy centre will meet heat demands from other parts of the masterplan?

The energy centre sizing is based on on-going commercial negotiations between the applicant, the energy services market and its preferred ESCo partner Metropolitan. It is the intention that the energy centre could form part of linked network of decentralised energy connecting with other phases of development. An ESCo has to operate a sufficient degree of resilience to ensure continuity and security of supply to domestic consumers and the plant sizing at the outline application stage reflects this and the ability to accommodate growth.

8 We ask that they provide an indicative performance specification and efficiency data for the CHP plant, biomass boiler and back up boilers.

The final specification of equipment will be the responsibility of the nominated Energy Services Company who will complete the detailed design, installation and be responsible for the on-going operation of the energy centre and related equipment.

The CHP engine proposed by the Metropolitan design as part of previous concept design was a GE Jenbacher JMS612GS-NL unit operating with a maximum electrical output of c2,000kW, and, thermal output of 1,912kW emitting less than 250mg/Nm3.

- *Electrical efficiency of the engine: 44.0% c2,000kW electrical output*
- *Thermal efficiency of the engine: 42.2% c1,900kW thermal output*
- *Combined engine efficiency: 86.2% c4544kW gas input*

Biomass woodchip boilers installed at the energy centre in the interim phase are anticipated to comprise c500kWth of packaged plant such as the HERZ BioFire 500-1000 BioControl range.

9 A detailed carbon balance for the overall solution and for interim phases needs to be provided

The Sustainability and Energy Statement report provided with the application sets out the strategy for delivering zero carbon standards as is considered appropriate to the outline nature of the planning application.

We would request clarification in relation to what exactly the council expects a detailed carbon balance to include at the outline application stage beyond that which has already been provided with the application.

10 Once the CHP plant is running, what combination of the biomass boiler and back up boiler will be used to meet the remaining demand

Details of the breakdown of supply are provided in Section 3.1.3 in table 5 of the report on page 19. This is duplicated here for ease of reference.

District heating network supply at Himley Village	% of energy source
% from gas CHP	64%
% from gas boilers	20%
% from biomass	16%

The energy centre will aim to optimise CHP and biomass contributions through suitable design and buffer sizing. The target will be to maximise the proportion of heat delivered by CHP and optimum configuration with the biomass and gas interim system.

11 **An initial look into the energy strategy suggests that heat outputs could be very high – this indicates that there could be very large distribution losses, very low efficiencies from the biomass and gas boiler or there is too much heat in the system that would then need to be dumped.**

The intention is to minimise losses and optimise efficiency of any heat network and it will be in the best interests of the appointed ESCo to achieve this. RHI for biomass cannot be claimed for distributions losses.

It is envisaged that a low temperature distribution network and optimum flow and return will allow this to be achieved. There will always be a degree of heat loss in any distribution network however the design of the energy centre and downstream distribution network will aim to minimise losses and optimise overall network efficiency.

12 **Estimated PV panel installation is 32m^2 per home. Have indicative roof areas been checked for this, allowing for sufficient areas around the edge of the roofs. Please provide details.**

This is an estimate appropriate to the nature of the outline planning application for 1,700 new homes. Some homes may need more and some less Solar PV to meet the zero carbon target.

It is envisaged that the developed design of individual homes as part of future reserved matters applications will consider the need for Solar PV and 'design-in' appropriate solutions.

Contact
Richard Halsey
Associate Director, Sustainability
Richard.halsey@turley.co.uk

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Turley