JS LEWIS LTD

Energy and Sustainability Strategy

Revision A

Land off Chester Road, Lavister, Wrexham

Galliers Homes Ltd

November 2018

Client:	Galliers Homes Ltd
Date:	November 2018
Report:	Land off Chester Road, Lavister, Wrexham
Version:	Revision A
Previous versions:	Draft for Review

Author:	Johnny Lewis, Director
Signature:	(Hard copy only)

Contact: JS Lewis Ltd
29 Church Road
Bath
BA1 4BT

Registered Company No. 0706 6238
VAT Registration No. 121 2714 62

CONTENTS

Contents 3
Figures 4
Executive Summary 5
1 Introduction 6
1.1 Scope and Purpose of Report 6
1.2 Galliers Homes Ltd 6
1.3 Description of Development 6
1.4 Approach to Design and Sustainability 7
2 Planning Policy 8
2.1 National Planning Policy 8
The Deregulation Act 8
2.2 Local Policy 8
2.3 Policy Analysis 9
3 Approach and Methodology 10
3.1 Approach 10
3.2 Environmental Assessment 10
3.3 Viability 10
4 Energy, Greenhouse Gases and CO2 11
4.1 The Energy Hierarchy 11
4.2 Preferred Approach to Low Energy Design 11
4.3 Demand Assessment 11
4.4 Energy Efficiency 11
4.5 District Heating Solutions and CHP 13
4.6 Renewable Energy 14
4.7 Conclusion 14
5 Sustainable Development 16
5.1 Materials and Resource Efficiency 16
5.2 Water Use and Management 16
5.3 Waste and Recycling 16
5.4 Pollution 16
5.5 Ecology and Biodiversity 16
5.6 Travel and Transport 17
5.7 Socio-Economic Sustainability 17
6 Conclusion 18
6.1 Sustainable Development 18
6.2 Policy Compliance 18

FIGURES

Figure 1 Emissions Assessment (BAU) 11
Figure 2 Energy Demand Assessment (EE) 13
Figure 3 Emissions Assessment (EE) 13
Figure 4 Renewable Energy Options Appraisal Findings 14
Figure 5 The Energy Hierarchy and Scheme Performance 15

EXECUTIVE SUMMARY

This statement has been prepared in support of the outline planning application for the land off Chester Road, Lavister, Wrexham. JS Lewis Ltd was engaged by Galliers Homes Ltd to help develop a sustainability strategy appropriate to the nature of the outline planning application, and to local and national planning policy. This document sets out that strategy.

The outline planning application is for the erection of up to 77 dwellings, with access from the North West of the site, associated internal access roads, footpaths, garaging, parking, open space and landscaping. The submission proposes a sustainable development which will provide high quality new open market and affordable housing. An indicative site layout has been prepared for the scheme.

The design team approach has been to consider the adopted policy framework and to integrate measures across the disciplines that contribute to sustainability. A design team has been appointed and has worked together to develop a strategy that addresses all of the key sustainability issues, and to develop a scheme that is deliverable.

Energy options have been considered. District heating, CHP and renewable technologies are considered unlikely to be viable or necessary, and not aligned with the energy hierarchy and the increasing shift towards fabric efficiency. It is proposed that the scheme achieve the national proposed standards through energy efficiency thereby complying with the energy hierarchy.

Other sustainability issues are dealt with within the proposals including water consumption, materials and resource efficiency, waste and recycling, pollution prevention, and socio-economic benefits.

Economic benefits include:

1. Delivery of important housing numbers for the local need;
2. Job creation during the construction process.

Social benefits include:

1. Delivery of affordable housing;
2. Provision of contributions towards local services via planning contributions.

Environmental benefits include:

1. Energy efficient design approach to energy and CO2 in line with the energy hierarchy;
2. Efficient use of low impact materials;
3. Waste and recycling designed in;
4. Pollution during construction and operation will be controlled.

The proposed development has been designed to achieve a wide range of sustainable benefits – economic, social and environmental. Accordingly, the proposals can be considered sustainable. They meet the local adopted policy on sustainable development and the national standards too.

1 INTRODUCTION

1.1 Scope and Purpose of Report

This statement has been prepared in support of the outline application for the land off Chester Road, Lavister, Wrexham. JS Lewis Ltd was engaged by Galliers Homes Ltd ("Galliers") to help develop a sustainability strategy appropriate to the nature of the development, and to local and national planning policy. This document sets out that strategy.

1.2 Galliers Homes Ltd

Galliers is a family-owned property developer with a track record in high quality residential developments across Shropshire and Wales. They recognise the importance of addressing climate change and energy and CO2 emissions in new developments, and have a suite of policies that are applied across new developments. For example, all new developments seek to minimise waste, and employ a timber procurement policy that means they only deal with suppliers that have a Sustainable Timber Procurement Policy.

1.3 Description of Development

The proposed development is the land off Chester Road, Lavister, Wrexham. The 5.5Ha site is located to the Northern boundary of Lavister, accessed off the B5445. It is a largely flat site bounded to the West, South West and South East by residential properties. To the East and North East it is bounded by green open space. Lavister itself is located equidistant between the two major employment centres of Chester (to the North) and Wrexham (to the South).

The proposals are for the erection of up to 77 dwellings, associated internal access roads, footpaths garaging, parking, open space and landscaping. The submission proposes a sustainable development which will provide high quality new open market and affordable housing. An indicative site layout has been prepared for the scheme. The indicative accommodation schedule is as follows:

Accommodation Schedule

Private	**Type**	**Area** sqft	**Area** sqm	**Units**
H-3-950	Hs	950	88	12
H-3-1004	Hs	1,004	93	5
H-4-1167	Hs	1,167	108	4
H-4-1238	Hs	1,238	115	6
H-4-1346	Hs	1,346	125	4
H-4-1498	Hs	1,498	139	7
H-4-1395	Hs	1,395	130	4
H-4-1622	Hs	1,622	151	5
H-4-1650	Hs	1,650	153	2
H-4-1744	Hs	1,744	162	2
H-5-1810	Hs	1,810	168	4
H-5-2048	Hs	2,048	190	3
				58
Affordable				
SH-2-725	Hs	725	67	11
SH-3-868	Hs	868	81	8
				19
Total		1,210	112	77

1.4 Approach to Design and Sustainability

The approach to low carbon buildings has evolved from early 'Merton Rule' policies that specifically drove onsite renewable energy to an increasing focus on carbon savings, and more recently, closing the gap between design performance and performance in occupation.

The preferred approach is therefore to try to achieve demanding energy efficiency and carbon standards in line with Building Regulations with measures that will work in the long-term without affecting the external aesthetic of the buildings. The approach will be on fabric-first measures to maximise the longevity of the CO2 savings and benefits.

The policy context for energy and CO2 in new developments is considered in the next section.

2 PLANNING POLICY

2.1 National Planning Policy

Planning Policy Wales (Nov 2016)

Some of the key extracts from the main planning policy document that relate to sustainable development are as follows:

> *4.2.2 The planning system provides for a presumption in favour of sustainable development*
>
> *4.7.7 For most rural areas the opportunities for reducing car use and increasing the use of walking, cycling and public transport are more limited than in urban areas.* ***In rural areas the majority of new development should be located in those settlements which have relatively good accessibility by non-car modes***
>
> *4.12.1 Climate responsive developments are those that tackle the causes of climate change and adapt to the current and future effects of climate change through the incorporation of effective mitigation and adaptation measures*

Planning for Sustainable Buildings (2014)

This document provides extensive and broad-ranging guidance for designing for sustainability. Many of the aspects discussed relate to detailed design considerations. The proposed application is an outline application, and as a result, some of the guidance is premature. Nevertheless, it provides useful input on aspects such as site analysis, building form, efficiency, materials, building services, water and waste management, and building management.

The Deregulation Act

The Deregulation Act (2015) changed the ability of local planning authorities in England to set standards for sustainability for new developments. However, it also discontinued the Code for Sustainable Homes, remaining in place only for legacy projects. The Code is therefore no longer relevant to new developments and should not be conditioned or required.

2.2 Local Policy

Wrexham Council Unitary Development Policy (2005)

Chapter 5 of the local UDP has a variety of policies that relate to sustainable development issues including biodiversity, flood risk, and water body protection. However, there are no specific strategic policies on energy or climate change, or indeed environmental standards. Key policies include:

> ***Policy PS2*** *Development must not materially detrimentally affect countryside, landscape/townscape character, open space, or the quality of the natural environment.*
>
> ***Policy GDP1*** *All new development should:-*
>
> - ***a)*** *Ensure that built development in its scale, design and layout, and in its use of materials and landscaping, accords with the character of the site and makes a positive contribution to the appearance of the nearby locality.*

- ***b)*** *Take account of personal and community safety and security in the design and layout of development and public / private spaces.*
- ***c)*** *Make the best use of design techniques, siting and orientation in order to conserve energy and water resources.*
- ***d)*** *Ensure safe and convenient pedestrian and vehicular access to and from development sites, both on site and in the nearby locality.*
- ***e)*** *Ensure that built development is located where it has convenient access to public transport facilities, and is well related to pedestrian and cycle routes wherever possible.*
- ***f)*** *Ensure the safety and amenity of the public and safeguard the environment from the adverse effects of pollution of water, land or air, hazards from industry and quarrying, and associated noise, odour or vibration arising from development.*
- ***g)*** *Secure public services (e.g. gas, water, electricity) to development at minimum public cost.*
- ***h)*** *Safeguard sites and areas of nature conservation and wildlife interest, and to provide new habitats where there is an unavoidable loss of existing habitats and areas of wildlife interest.*
- ***i)*** *Ensure that development does not result in, or is subject to, flooding, soil erosion, landslides or contamination, either on or off the site.*
- ***j)*** *Have regard to the need to safeguard those areas that possess a strong Welsh cultural and/or linguistic identity from development that could harm this identity.*
- ***k)*** *Secure the development of sustainable communities, through the promotion of the economic, social and environmental well-being of the area.*

Local Guidance Note 30 - Design

This guide is to amplify development policies on good design including PS2 and GDP1 of the adopted UDP. The key extract is as follow:

> *The Council will ensure sustainability features are incorporated into the Design Solution by the use of nationally recognised and quality assured standards. All new residential development must meet a minimum of Level 3 of the Code for Sustainable Homes or recognised equivalent scheme and provide 10% of the future energy requirements of the building through renewable energy sources.*

2.3 Policy Analysis

The Code for Sustainable Homes can no longer apply as it has effectively been discontinued by the Deregulation Act. As a result, that element of the local policy wording does not apply. The wording also considers a target of 10% renewable energy onsite. Policy has also moved on significantly since these 'Merton-Rule' policies were adopted, and a fabric-first approach to meeting CO2 emissions in line with national regulations is preferred. This is in line with the energy hierarchy.

3 APPROACH AND METHODOLOGY

3.1 Approach

The design team approach has been to consider the adopted policy framework and the aims of the emerging policy framework, and to integrate measures across the disciplines that contribute to sustainability. A design team has been appointed and has worked together to develop a strategy that addresses all of the key sustainability issues, and to develop a scheme that is deliverable.

3.2 Environmental Assessment

The scheme has to address the local environmental infrastructure including flood control, ecology and biodiversity, waste and transportation as part of the wider requirements of the development. Energy and CO2 reduction measures are considered according to the energy hierarchy – energy efficiency, clean technology, and then renewable energy. At the national scale, the focus on efficiency has become increasingly important with a shift away from technological solutions. Fabric first solutions are increasingly being seen as the most sustainable approach to development.

The methodology for assessing energy and CO2 performance is to for an accredited SAP assessor to calculate the likely energy performance and emissions based on planning-stage information. However, this is premature at the outline planning stage, so an estimate has been made based on developments of a similar nature.

3.3 Viability

It is essential that the proposals remain viable and deliverable, whilst achieving a sustainable development. Viability has two aspects to it – technical viability, and economic viability. Where something is not technically robust, it can be considered not viable. Economic viability itself has two aspects – whether the cost of the proposed measures can be supported by the development, and secondly, whether the measures proposed have an economic operating model that will ensure their ongoing success. The latter is less important with passive measures, but where technologies have significant operating requirements and costs, it is a crucial consideration. If the operating model makes a loss, then the proposal cannot be considered viable as it would be mothballed and not used.

4 ENERGY, GREENHOUSE GASES AND CO2

4.1 The Energy Hierarchy

The well-established principle of the energy hierarchy should inform how new developments approach their strategies for reducing CO2. The hierarchy is as follows:

- Energy efficiency (be mean);
- Clean energy (be clean);
- Renewable energy (be green).

The hierarchy should be applied so that energy efficiency is the highest principle and should be prioritised above all others.

4.2 Preferred Approach to Low Energy Design

In accordance with the above, the primary principle that the proposed development will follow is to prioritise energy efficiency over technological fixes. This is in line with the change in priorities for the new Part L and wider concerns that technology is being used in lieu of efficiency measures, working against the energy hierarchy. The proposed development will integrate high levels of energy efficiency throughout.

4.3 Demand Assessment

The scheme baseline emissions were estimated using Part L 2013 and some indicative dwellings from a similar density of development. The results were as follows:

Emissions Summary		
BAU	148.38	tCO2
Energy efficiency	145.51	tCO2
CHP	145.51	tCO2
Renewables	145.51	tCO2
Efficiency savings	2%	
CHP savings	0%	
Renewables savings	0%	
Total savings	1.9%	

Figure 1 Emissions Assessment (BAU)

4.4 Energy Efficiency

Energy efficiency comes first in the energy hierarchy, and therefore needs to be addressed prior to low carbon energy and renewable energy measures. There are design measures than can achieve strategic efficiency objectives such as reduced heat loss areas, natural ventilation, and useful solar gain during the heating season; fabric measures that can reduce heating demand; and specification measures selecting the lowest energy technologies for the provision of services. The approach would address:

- Fabric insulation standards;
- Thermal bridging minimisation;

- Construction detailing to reduce unwanted ventilation losses;
- Efficient heating and hot water plant;
- Controls for managing behavioural aspects of demand;
- Recovery of waste heat;
- Efficient plant

Key measures that are likely to be used are as follows:

- Fabric efficiency;
    - Demanding wall, floor and roof U-values;
    - High performance double glazing with low e coatings;
    - Sealing of party walls;
    - Adoption of construction detailing to minimise linear thermal bridging normally caused by penetrations to the insulating layer;
    - Demanding air tightness levels.
- Heating efficiency;
    - Use of high efficiency condensing boilers;
    - Use of low temperature circulation systems;
    - Programmable thermostats.
- Hot water efficiency;
    - Tap flow rates with appropriate controls;
    - Managed shower flow rates;
    - Bath volumes selected to reduce unnecessary water use;
- Electrical efficiency;
    - Use of lighting with an efficacy of greater than 40lumens/circuit Watt;
    - Energy labelled white goods;
    - Controls on external lighting to switch automatically when not required;
    - Controlled ventilation fan power.

The actual specification would be determined and refined at the reserved matters stage and subsequent to that at the building control stage. As part of the building control submission, an overheating assessment will have to be undertaken to check the likelihood of over-heating and identify options for mitigating risks. Windows will be openable, and trickle vents will be provided.

The efficient scheme will aim to comply with Part L through efficiency measures alone. Compliance with Part L is possible through fabric and services efficiency measures alone, and this would be proposed as the most sustainable approach. This goes against the outdated local policy for 10% renewables, but complies with the broader energy hierarchy and is now considered to be a more sustainable approach to CO2 reductions. The full table with estimated energy demands and emissions based on similar schemes would be as follows:

Private	Area	Units	DER	TER	Main Heating Fuel Requirement (DER)	Water Fuel Requirement (DER)	Electricity Pumps Fans Requirement (DER)	Electricity Lighting Requirement (DER)
	sqm	sqm	kgCO2/sqm	kgCO2/sqm	kWh/sqm	kWh/sqm	kWh/sqm	kWh/sqm
H-3-950	88	12.00	18.48	18.66	3,971	2,464	76	388
H-3-1004	93	5.00	16.93	17.13	3,601	2,502	76	426
H-4-1167	108	4.00	18.15	18.36	5,083	2,765	83	443
H-4-1238	115	6.00	16.89	17.06	5,237	2,461	72	468
H-4-1346	125	4.00	16.89	17.06	5,694	2,676	78	509
H-4-1498	139	7.00	15.63	16.12	6,026	2,670	78	494
H-4-1395	130	4.00	15.63	16.12	5,612	2,486	72	460
H-4-1622	151	5.00	15.63	16.12	6,525	2,891	84	534
H-4-1650	153	2.00	15.63	16.12	6,637	2,940	85	544
H-4-1744	162	2.00	15.63	16.12	7,016	3,108	90	575
H-5-1810	168	4.00	15.63	16.12	7,281	3,226	94	596
H-5-2048	190	3.00	15.63	16.12	8,238	3,650	106	675
		58						
Affordable								
SH-2-725	67	11.00	19.57	19.76	2,925	2,246	78	310
SH-3-868	81	8.00	17.32	17.52	2,984	2,351	74	396
		19						

Figure 2 Energy Demand Assessment (EE)

The efficient emissions will be as follows:

Residential (EE)		
BAU emissions	148.38	tCO2
Efficiency savings	2.87	tCO2
Efficiency savings vs regulated emissions	1.93%	
Regulated emissions	145.51	tCO2

Figure 3 Emissions Assessment (EE)

As a result, the scheme is capable of achieving the energy and CO2 standards required of it through energy efficiency measures alone. This is the highest priority in the energy hierarchy.

4.5 District Heating Solutions and CHP

District heating has been assessed for the proposals. It has been dismissed on the basis of economic viability.

The proposed development is relatively low density, which creates a high capital cost for the infrastructure. However, more importantly, the operating model for district heating with gas CHP or biomass is one that makes an annual loss. This results in a redundant investment, and one that would be mothballed immediately. Any theoretical CO2 saving would not occur in reality.

These findings are reflective of the general market for CHP within the UK. As a result, technologies that rely on district heat such as gas CHP and biomass are not viable for the proposed project.

4.6 Renewable Energy

Renewable energy technologies were assessed for the proposals and the table below sets out the findings:

Technology	Viability	Explanation
Connection to existing CHP/heat network	Not viable	No existing CHP/DH infrastructure
Site wide renewable CHP/CCHP	Not viable	No commercially viable technology for biomass available; biofuel CHP carbon savings are nil over gas base-case; AD not viable at this scale; all systems require district heating (not viable in itself)
Site wide gas-fired CHP/CCHP	Not viable	Makes a loss year on year and is not financially viable
Site-wide renewable heating/cooling	Not viable	Requires district heating which is not financially viable
Site wide gas-fired heating and cooling	Not viable	Not financially viable
Solar thermal	Not viable	Limited by liekly heating provision, potential CO2 savings and combi boilers
Ground source heat pumps	Not viable	Could increase CO2 emissions compared with gas base-case
Air source heat pumps	Not viable	Could increase CO2 emissions compared with gas base case
Solar photo-voltaics	Not viable	Efficeincy measures preffered
Wind turbines	Not viable	Not technically viable in this location due to poor urban wind profile

Figure 4 Renewable Energy Options Appraisal Findings

Site-wide solutions that require district heating were not viable due to the expense of the network and the loss-making operation. This effectively discounted CHP, biomass, anaerobic digestion and any other solution requiring centrally generated heat.

Heat pumps could potentially increase CO2 compared with a gas base case due to the COPs achieved and the split between hot water load and space heating. The hot water load would typically be provided through electric immersion top-up which affects the CO2 emissions negatively. Wind turbines were considered not viable due to poor performance in the urban environment and an unwanted visual impact.

Solar thermal is very limited in its savings as modern houses are often serviced by combination boilers without cylinders. The provision of solar thermal would therefore save a very marginal quantum of CO2, whilst having an impact on both build cost and external aesthetics. Solar PV would have an impact on both build cost and on the external aesthetic. Further, there is no requirement for low carbon energy sources as the scheme can achieve the Building regulations requirements through energy efficiency alone.

4.7 Conclusion

Accordingly, the preferred approach for the proposed development is therefore to pursue a fabric first option that maximizes the passive efficiency measures rather than relying on technology.

Each unit will have to demonstrate compliance at the building control stage, and will utilize fabric first solutions to achieve compliance wherever possible to avoid add-on technology. The scheme will therefore be achieving the requirements through a fabric first approach which will be more sustainable in the long term.

This approach is consistent with the energy hierarchy and the Deregulation Act.

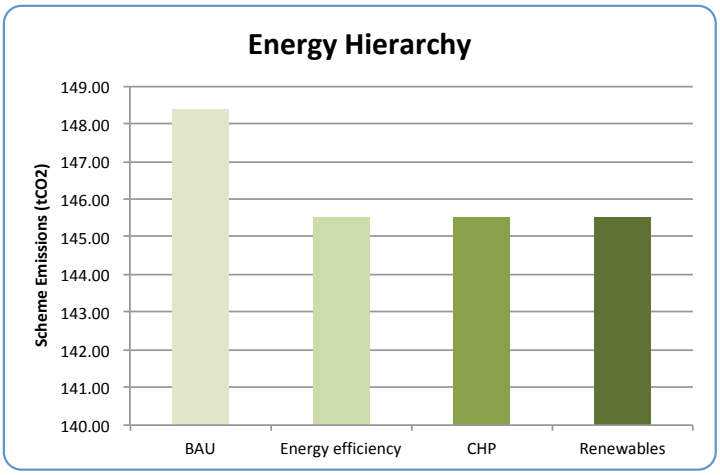

Figure 5 The Energy Hierarchy and Scheme Performance

5 SUSTAINABLE DEVELOPMENT

5.1 Materials and Resource Efficiency

Low-density residential housing constructions typically achieve A and A+ Green Guide ratings for materials impacts. As a specialist house-builder, Galliers has streamlined processes for building and therein for materials efficiencies and waste reduction. They have specific policies on sustainable timber procurement and on waste management. There are no significant opportunities for the reuse of material on site as it is a clear site and a major development. However, low impact materials will be specified where appropriate (sustainable timber, low GWP insulation).

5.2 Water Use and Management

Water conservation in dwellings will be driven through the specification of efficient fittings, and the installation of water meters, both currently required by building regulations now. Sustainable drainage measures have been engineered into the landscape to deal with run-off. There are three different balancing ponds proposed for the three different catchments on the site. The ponds to the South and East will drain into the adjacent watercourse, and the pond to the North will drain into the Lavister Brook.

5.3 Waste and Recycling

Waste and recycling in construction will be managed in accordance with Galliers waste management plan. During occupation, recycling will be provided internally and externally to meet the local authority standards. Household waste will be managed through waste disposal facilities in line with the local authority design standards. Each unit will have the opportunity for external provision of waste storage either within the garages where storage has been designed in, or on the external hard surfacing provided.

5.4 Pollution

Good practice pollution prevention and control procedures will be put in place during the construction process. Air quality will be controlled during the construction phase a variety of measures. During the operational phase, low NOx boilers (where gas is applicable) will minimise the local emissions to air. No biomass is proposed, avoiding the localised impacts on air quality that can arise from that. Water quality will be controlled through measures set out in the drainage strategy.

5.5 Ecology and Biodiversity

The baseline biodiversity for the site is limited. An ecological habitat survey accompanies the application done by specialists Aspect Ecology. In addition, the scheme integrates significant landscape planting that will provide some ecological habitats. The density of the scheme allows for the provision of green infrastructure in and around the dwellings and access roads.

Individual gardens can be very good for biodiversity, with an abundance of flowering plants for insects, and roosts and foraging for birds and bats. Tree planting will enhance the ecology of the adopted spaces and the public open space. Further, the balancing ponds will provide an aquatic habitat.

5.6 Travel and Transport

The location is a sustainable location, with excellent public transport links to both Chester and Wrexham, the two major local employment centres. The Sapphire 1 bus service run by Arriva provides frequent links directly to Chester and Wrexham (refer to Transport Statement for exact timetables).

The increased population should serve to enhance the viability of local bus routes. There are some pedestrian connections across the site to the surrounding landscape that will be maintained and enhanced.

The homes will also be suitable for home working, allowing for more sustainable travel options for occupants.

5.7 Socio-Economic Sustainability

The proposed development has the potential to provide a range of benefits that are beneficial on a socio-economic basis. These include:

1. Delivery of important housing numbers for the local need;
2. Job creation during the construction process;
3. Delivery of affordable housing;
4. Provision of contributions towards local services via S106.

The provision of new housing is fast being recognized as one of the most important aspects of creating a competitive economy within the UK. The current dearth of housing means that home ownership is costly and this can restrict the opportunities available to people for work and jobs. The development of new housing is key to having a vibrant and competitive economy.

6 CONCLUSION

6.1 Sustainable Development

The proposed development on the Site has been designed to achieve a wide range of sustainable benefits – economic, social and environmental. These are summarized below:

Economic benefits include:

1. Delivery of important housing numbers for the local need;
2. Job creation during the construction process.

Social benefits include:

1. Delivery of affordable housing;
2. Provision of contributions towards local services via S106.

Environmental benefits include:

1. Passive design approach to energy and CO2 in line with the energy hierarchy;
2. Efficient use of low impact materials;
3. Low flood risk site and greenfield drainage levels to be maintained;
4. Waste and recycling designed in;
5. Pollution during construction and operation will be controlled;
6. Ecology and biodiversity have been considered.

6.2 Policy Compliance

The scheme has address the following:

- The Welsh Planning Policy
- Wrexham Unitary Development Plan
- Local Planning Guidance Note 30 - Design
- The Deregulation Act

The proposed development has been designed to achieve a wide range of sustainable benefits – economic, social and environmental. The proposal scan be considered sustainable.

JS LEWIS LTD