LANGHAM NEIGHBOURHOOD PLAN 2022-2041

Support Document
SDL 5
Building Design

April 2022

CONTENTS

Why are building design and character important?

1. People choose to live in Langham for many reasons. High on that list of reasons are:
    - it has a unique character;
    - It is in a unique rural setting;
    - its easy access to local amenities.

2. The distinctive character of Langham comes from centuries of design evolution, from the design and layout of its buildings and from the street scene.

3. This support document looks at how best to enable a sustainable increase in the number of homes, and the improvement to existing homes, whilst retaining the fundamental character of the village for future generations.

Documents available to help with building design and character.

1. The NPPF makes clear that the creation of high-quality buildings and places is an essential part of the planning and development process.

2. The National Design Guide, National Model Design Code and Guidance Notes for Design Codes illustrate how well-designed places that are beautiful, healthy, greener, enduring and successful can be achieved in practice.

3. South Kesteven and Rutland have worked together to produce a Design Guide to help all communities in Rutland to do just this, and we have leant heavily on this document to guide our thinking.

Responding to the Climate Change.

1. RCC has a target of becoming net carbon zero by 2050. This means that all new developments, whether of ten homes or just one, need to be carbon-neutral. This can be achieved by paying attention to:
    a. the use of materials that are as green as possible, such as wood and stone rather than PVC and hollow concrete blocks;
    b. the energy used in the production of materials such as concrete and metal rebars;
    c. the energy efficiency of the design of the house – insulation, heating, green energy sources;
    d. managing flood risk, ground water and foul water;
    e. finding opportunities to generate energy on site eg. solar panels on the roof to generate electricity and heat water.

Energy efficient materials.

1. It is estimated that buildings contribute as much as 1/3 of total global greenhouse gas emissions, primarily though the use of fossil fuels during their operational phase.

2. To compare energy efficiency of materials, scientists use the Life Cycle Assessment (LCA) in which the materials, construction, use, and demolition of a building are quantified into embodied energy and carbon dioxide equivalents, along with representation of resource consumption and released emissions. This gives a measure of Embodied Energy (EE) for a material.

3. The manufacture, transport, and installation of building materials such as steel and concrete require a large quantity of energy, despite them representing only a small proportion of the ultimate cost in the building as a whole.

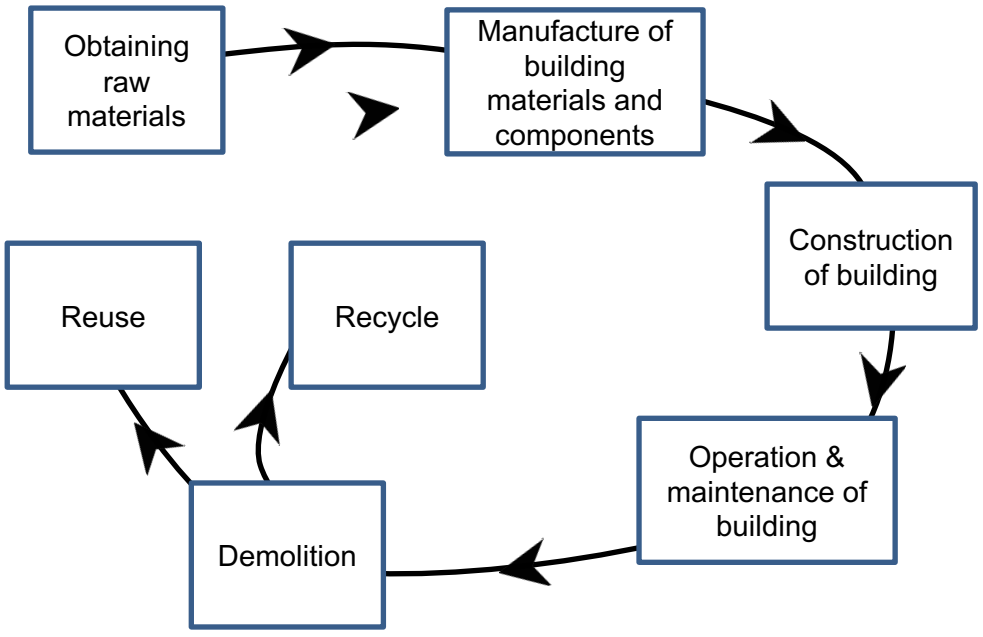
4. Though the EE of concrete is high at 12.5MJ/kg, compared with steel at 10.5MJ/kg and wood at 2MJ/kg, the problem is made worse by the sheer volume of concrete that is used in buildings today.

5. Wood on the other hand has a very low EE of some 2MJ/kg. It has the added advantage of being able to sequester carbon which no other material can.

6. It has been calculated that a sustainably designed and constructed wooden home can be compared in energy saving to taking more than 2,000 cars off the road. For the volume of wood needed for such a home the ASTF (Alliance for Saving Forests) suggests forests grow this much wood in 13 minutes and the carbon sequestered in the wood is approximately 3,660 metric tons of CO_2 Even more significantly, such construction avoids the generation of greenhouse gas emissions in the order of 8,000 metric tons of CO_2 , which a home made of more conventional materials would generate. This confirms that wood is the best renewable, biodegradable, non-toxic, and energy efficient building material.

7. This suggests that, in Langham, when designing homes, developers should consider carefully the use of materials such as concrete and steel and look at more natural materials such as wood, stone and slate.

Figure SDL5.1: *The Environmental Life Cycle of buildings***.**



Energy efficient construction

1. There are energy savings to be made also in the transportation of materials to the building site, even though a relatively small proportion of the energy used in construction is in materials transport

Material	MJ/tonne/km	Material	MJ/tonne/km
RMC Concrete	0.1	Chipboard Flooring	0.29
RMC Mortars	0..05	Plasterboard	0.24
Dense Concrete Blocks	0.02	External Plaster	0.62
High Density Blocks	0.09	Internal Plaster	0.48
Thermal Blocks	0.05	Windows	0.33
Concrete Lintels	0.72	Roof Slates	2.55
Steel Shuttering	0.08	Insulation	7.92
Concrete Reinforcement	0.16	Angle Ties	40.24
Roofing Timber	0.36	Paint	1.34

Figure SDL5.2: *Energy Implications of the Transport of Materials*
(from a study at University of Brighton Department of Construction, Geography and Surveying)

Energy efficient design

1. A phrase used a lot today is 'Thermally Efficient Envelope ' which refers to the buildings external structure and the amount of heat energy that passes through it.

2. A thermally efficient building envelope reduces a building's carbon footprint significantly, as less energy is needed to heat (or cool) a building. A building designed with high R-value* insulation in the walls and roof, and with insulated glass units with a low solar heat gain for example, will prevent too much heat from escaping the building during cold weather.

3. While thermally efficient design can cost more up front, operational costs will decrease in the long term and productivity can rise. According to a 2014 International Energy Agency report, 'the value of the productivity and operational benefits derived from energy-efficiency measures can be up to 2.5 times (250%) the value of energy savings (depending on the value and context of the investment)'.

4. There are other factors, besides super-insulation of walls and roofs, that can improve the energy efficiency of a house, such as:
    a. insulating windows and doors;
    b. energy efficient heating system;
    c. the use of low carbon energy sources;
    d. installing energy–efficient LED lighting;
    e. using renewable energy such as solar power for electricity production and water heating;
    f. orienting the house so that sun can help warm the house through windows and solar panels can perform optimally.

** R value is a measure of how effectively a material resists the rate of heat flow. The higher the R value, the better the insulation.*

5. The dependence on personal cars is high in any village and it is unlikely that public transport will never be efficient enough to encourage people not to drive. This means that in locations where car-use is significant, the use of electric cars should be encouraged, to add to the local council's responsibility to introduce electric buses.

6. Whilst the government is talking of banning the sale of petrol and diesel as soon as 2030, locally it needs to be made easy and less expensive to install the proper electricity supply for a charging point in all homes.

7. Whilst forcing people to retro-fit charging points in their homes is not possible, ensuring that one or two charging points are an integral part of the design of all new homes, IS possible.

Water Management

This is covered in detail in Support Document SDL 3 Climate Change – Energy Efficiency and Water Management.

Materials and Building Design

1. Whilst energy efficiency is certainly an important consideration in any building, we must not lose sight of the appearance and character of buildings.

2. There is much, and varied, traditional architecture in Langham, as evidenced by the fact that the entire village has conservation status. The centre of the village, with Article 4 Direction contains those houses that are listed and of cultural and/or historical significance.

3. Development outside the Article 4 Direction has, over the years, given rise to a range of architectural design where the desire has not been to mimic the traditional style but to complement it whilst looking to the present and the future.

4. Consideration should be given to how materials will look over time, how they look against their neighbours, whether they reflect the character of the locale, and whether they reflect the quality of buildings throughout the village.

5. Variety of design is a feature of Langham, with varied roof lines, different styles of house next to each other, bungalows and 2 storey houses close to each other. Throughout this variety of style there is the consistency of simple lines, modest scale and small clusters or groupings of homes.

6. Architectural quality can be down to factors such as pitch of roof, the depth of the building, the eaves, the roof material, gables and the wall finish. In Langham there is a mixture of architectural design, but throughout there is a consistency in the quality, style and nature of the materials used to build the homes, where extensions and alterations need to fit with the original and where new developments reflect the materials that are favoured throughout the village. These favoured materials are ironstone and red or buff brick (not render or wood cladding) for walls, and grey textured slate, Westmoreland Slate or Collyweston Slate for roofs.

Figure SDL5.3: *Wall Materials Typical of Rutland*
(taken from SK&R Design Guide)

Housing Density and Layout

1. Both high and low density of housing have their pros and cons:
    a. high density housing, usually found in cities, means less reliance on cars, has amenities very close by, often has a buzz about it, public transport is better and easier to access. On the other hand, it can be noisy and lack privacy, there is usually a lot more traffic and associated pollution, there can be a big strain on services such as schools and medical facilities, and there may be little private open space.
    b. low density housing, usually found in villages, has more open space, more privacy, less noise, often has easy access to the countryside, has less traffic. But public transport services are often poor, facilities such as schools, doctors and shops can be some distance away and there will be an over-reliance on cars to get around.

Figure SDL5.5: **High and low density housing.**

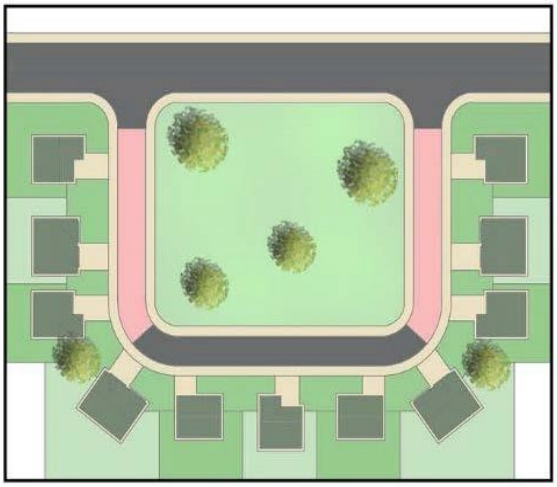
2. This does not mean that either is right, but each offers a different style of living and people need that choice.

1. **Angular**, some street-facing

Example: *Burley Rd.*

2. **Cul-de-sac**

Example: *Fairfield Close.*



3. **Clusters** (through road with communal open space)

Example: *Bridge St.*

Figure SDL5.6: *Preferred layouts for development and examples within the village.*

3. The Housing density in Langham is low – with 30 houses per hectare a maximum density. This openness is a feature of the village and needs to be reflected in any new developments. It is also a challenge to ensure that this density is preserved within the village where people may wish to build homes in their gardens or extend their homes significantly.

4. The layout of any development also contributes to the character of the village. The street scene , trees, gardens etc. are discussed in Support Document SD8 Village Character.

5. The community is clear that there are three types of layout that are seen in Langham and that would be preferred in any new development (see ***Figure SDL5.6***):
    a. cul-de-sac;
    b. crescent;
    c. angular.

Future-proofing homes with technology

1. The government has announced plans to introduce legislation requiring developers to ensure that new-build properties can support gigabit-speed internet. The impact of Covid-19 has significantly changed the office working landscape, with many workers setting up an office at home. This has highlighted the importance of broadband internet access. Gigabit-speed internet will allow for easier working from home and provide faster, more reliable connections for streaming TV and films.

2. It is suggested that new homeowners are demanding higher specifications in houses to include "smart" technology covering heating, lighting, and entertainment systems. In addition, the Centre for Economics & Business Research (CEBR) predicts that approximately 25% of the UK workforce, approximately 6 million people, will be working from home on any given day by 2025. No longer is reliable broadband and internet connection a luxury; it is an absolute necessity.

3. The best connectivity will be achieved in new builds by ensuring that all homes will have fibre connections directly to the property. The construction industry has many options for the choice of connectivity to provide, but a 'Fibre To The Premises' (FTTP) connection seems the most attractive. This enables fibre-optic cabling to be deployed to every property within a development, providing gigabit-symmetric connectivity and bandwidth.

4. FTTP connectivity has previously been more commonly used for higher specification homes. However, it is argued that FTTP should no longer be considered as just a gold standard but that it should be an essential part of all new builds.

5. The government has announced that it will amend building regulations (applicable to England only) to guarantee that all new homes have the right infrastructure to support gigabit broadband and that housing developers must work with network operators to install internet speeds of over 1,000 megabits per second (Mbps) in new-build homes, up to a cost cap of £2,000 per dwelling.

6. A new report from the Fiber Broadband Association predicts that a four-person household will require 2,141 Mbps speeds in the next decade.

7. Whilst new homes may have Fibre to the Premises fitted, and some people may afford to retrofit that capability, most homes will rely on broadband speed improvement via Fibre to the Cabinet (FTTC). The three types of broadband ‘delivery’ methods are summarised on the next page.

8. The speed required by a household is dependent on how many users there are in the home and what they use broadband for. It is suggested that a typical 4-member family usage requires a speed of 10Mbps for a good service today. That is likely to reach as high as 500Mbps by 2041.

9. Whilst work can be done to improve the speed of service to the ‘cabinet’, it is the broadband provider who can add the extra speed and that consideration must be down to the individual householder.

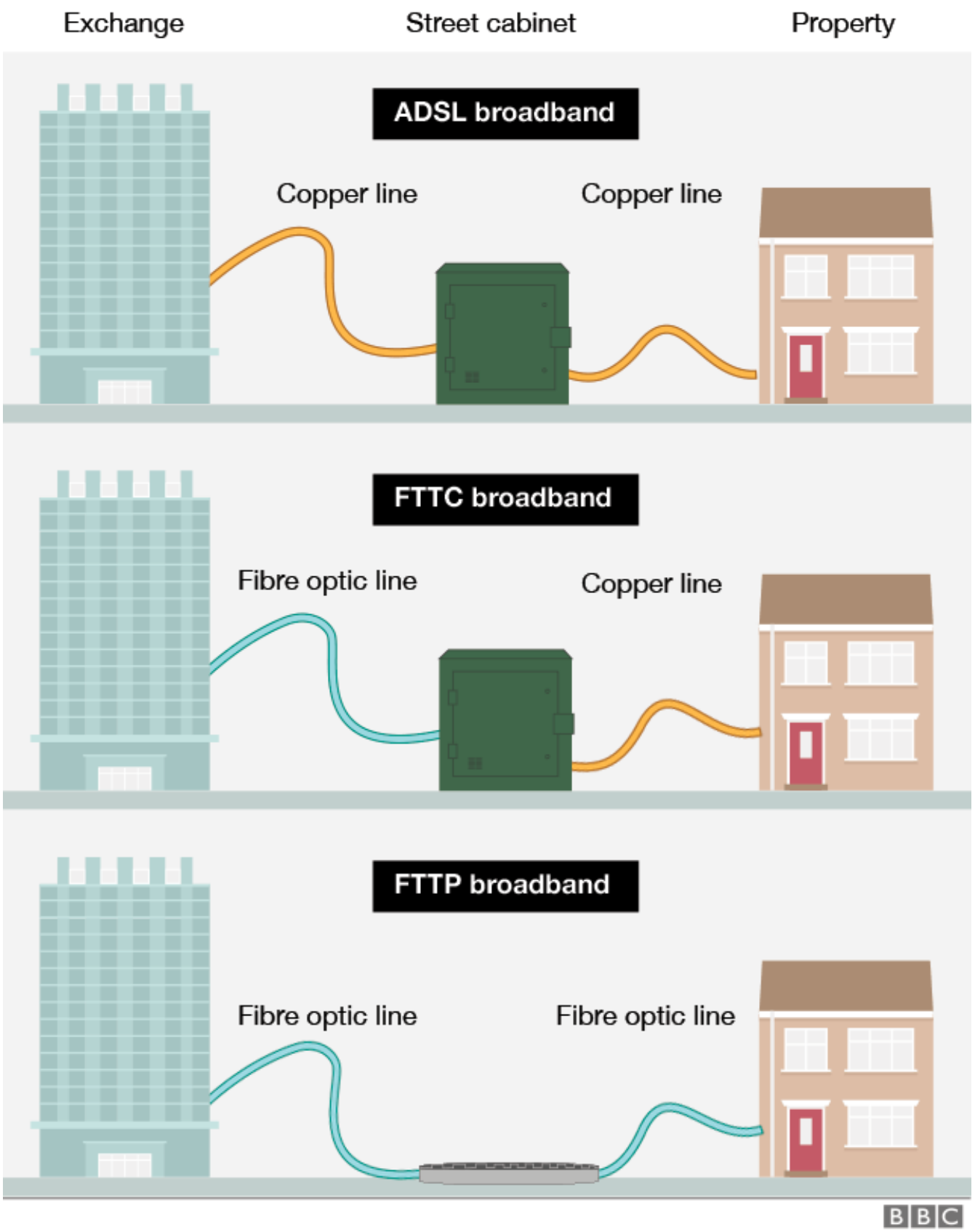


Figure SDL5.8: Asymmetric Digital Subscriber, Fibre to the Cabinet and Fibre to the Home broadband options.