Langley Mill

Design & Access Statement

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Hoot Architecture

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0349 Langley Mill
Co. Durham

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Design & Access Statement

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Introduction

The following report summarises the design for a new build house at Langley Mill, Durham Road, Lanchester, DH7 0TW.

The site already has planning approval for a new build house, application ref: DM/15/02426/FPA. The construction for this house has been started with the demolition of the existing bungalow. The change of the design proposed is being submitted as a revision of planning condition 2, which states the approved plans.

While a Design & Access Statement is not strictly necessary for this type of application, it has been chosen to supply one to explain the design rational behind the submitted proposals

This report addresses matters in relation to:

- Use
- Layout
- Access
- Amount
- Scale
- Appearance

Site Analysis

The site is located directly south of the A691, 2 miles east of the centre of Lanchester. The site has historical use as a coal mine ans evidence of past ground works and buildings are visible on the site.

Access is by a dedicated turning point roughly in the middle of the north boundary. The existing driveway leads thought the site to the bungalow, an existing outbuilding and to an open area at the south of the site.

The land slopes down the road. There is an approx. 7m drop from the road to the level where the bungalow was built. There is a large level plateau in this area before the land drops a further 14m to the very south boundary of the site.

The majority of the site is covered with matures trees with cleared areas for the road and buildings, and former working areas.

The key constraints & opportunities are listed below:

- Level area to build on
- Some traffic noise from the A691
- Views to the south, but limited by mature trees.
- Views of the site from the A691 are well screed by matures planting

Photos of Current Site

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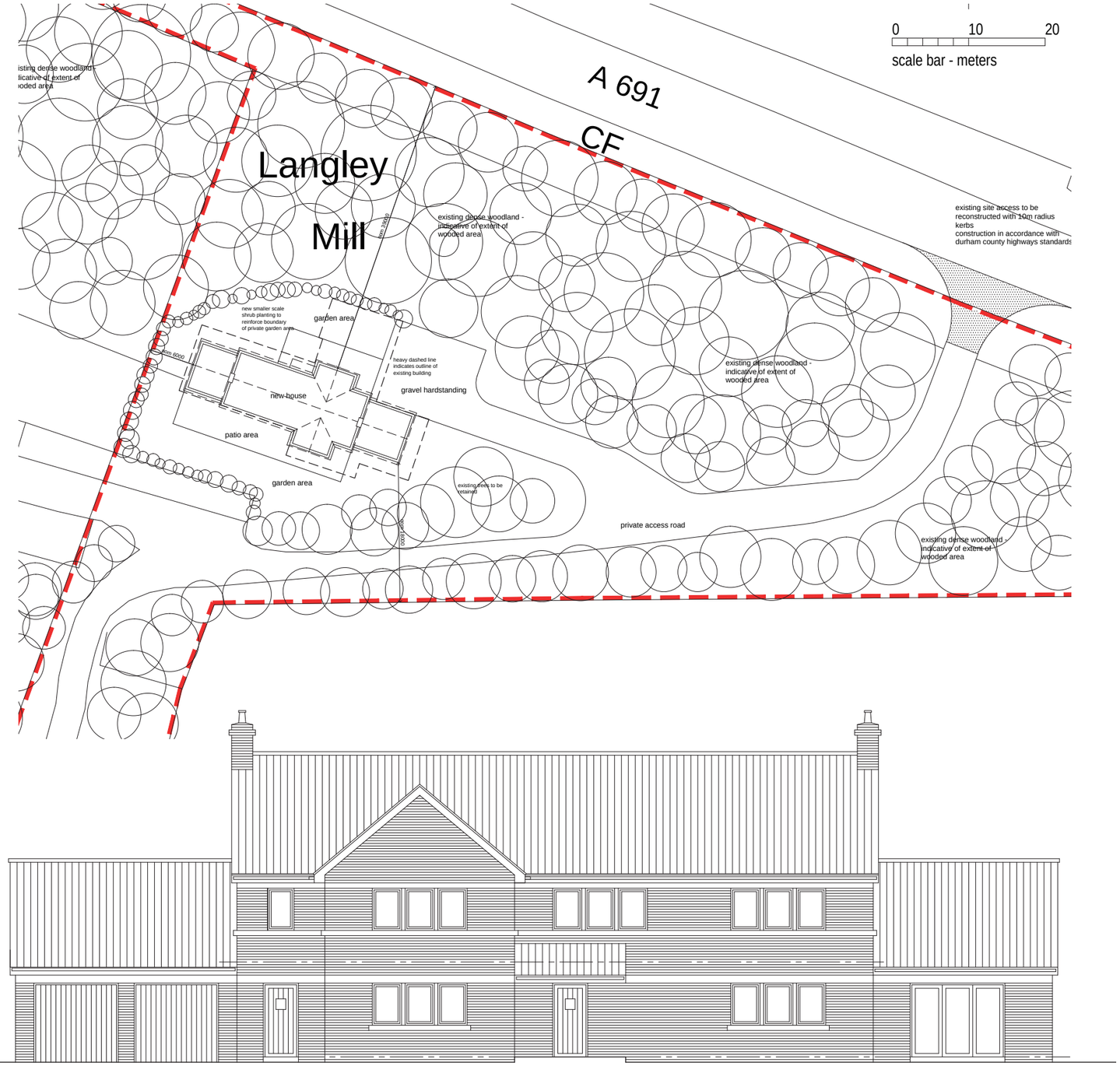
Approved Planning



elevation B - northern elevation

In 2015 a planning application ref: DM/15/02426/FPA was submitted for the 'Demolition of vacant dwelling and erection of 2 storey 4 bedroom dwelling'.

Following comments by Nicola Duckworth an amended design was submitted that was approved on 7th January 2016

The proposed design is for a generic large house with a layout that does not respond creatively to the site characteristics. The appearance does not reflect either the local vernacular or a contemporary design approach.

Construction began within the 3 years of the approval date with the demolition of the existing bungalow.

Introduction

A low or zero carbon technology feasibility report was undertaken for the project to appraise the renewable and low carbon technology energy options available.

Wherever practical It is preferable that 'passive' measures be utilised in the design of the building, for example passivhaus techniques, enhanced U-Values, natural daylighting, exposed thermal mass (for temperature stabilisation), natural ventilation (where appropriate), etc. These 'fabric first' measures will help to create a better internal environment whilst at the same time, reduce the envelope between energy demand and energy consumption to its lowest practical level.

Natural Ventilation and Passive Energy Efficiency

Passive energy efficiency design measures are always the starting point for sustainable design. Air-tight, well insulated buildings with good control measures are among the most important considerations. Others include, optimising the availability of natural ventilation, natural daylight and the use of passive solar heating.

In order to reduce energy demand associated with ventilation, natural and assisted ventilation strategy will, as a mater of course, be considered in preference to mechanical ventilation where appropriate. This will be considered alongside the application of MVHR. There are also instances where mechanical ventilation cannot be avoided however, in these cases heat recovery will be utilised wherever it is practical and economical to do so.

The following provides a summary of the energy efficiency measures that are proposed to improve the feasible carbon emission rating of all the sites:

- The use of roof lights and glazing to maximise daylight in all areas.
- Passive solar control to help avoid any requirement for mechanical cooling systems.
- Partial or full solar control glazing to the south facing glazing as a minimum.
- Façade engineering to minimise peak summer sun but permit low season sun to the south facing areas as a minimum.
- The use of overhangs to limit peak summer sun.
- Enhanced U-Values for Walls, Roofs, Floors and Glazing to minimise heat loss.
- Maximise efficiency of plant and systems.
- Optimise control and flexibility of the installations.
- High thermal performance within the building envelope.
- Air-tight construction- air permeability
- HVAC and lighting systems to operate 'on-demand' wherever practical.

Renewable and Low Carbon Technology Energy

The following technologies were explored. From a high level appraisal of the low or zero carbon options available we have found the following;

Biomass

This option would necessitate an additional fuel service including onsite storage and distribution facilities. There would also be logistics involved in delivering the fuel to the Energy Centre which would need to be adjacent to the house (or system it was supplying). These logistical issues coupled with the nature of the site preclude this technology from further consideration.
Option rejected from further analysis.

CHP (micro-CHP)

This technology requires a gas service which is currently not onsite and also needs consistent base loads in order to perform and provide meaningful savings.
Option rejected from further analysis.

Ground Source Heat Pumps

This option requires numerous boreholes or an area of ground where a 'slinky' or 'series of slinkies' could be installed. This technology is applicable to site and could be used in conjunction with LTHW serving under floor heating systems; however, the array could seriously affect the future flexibility of site. It is attracts relatively high capital costs compared with other options.
Option rejected from further analysis.

Air Source Heat Pumps

This technology like GSHP is a viable option for site but without the excessive capital outlay for the installation and could be used in conjunction with LTHW serving underfloor heating.
Option Included in further analysis

Photovoltaic (PV's)

This technology is appropriate for site given the amount of roof space available and likely loads.
Option Included in further analysis

Solar Hot Water

Works in conjunction with domestic hot water generation system and provide free water heating when conditions are appropriate.
Option Included in further analysis

Wind Turbine

This choice is precluded from further consideration on the grounds of capital cost and likely planning and noise issues.
Option rejected from further analysis.

Plant and Control Efficiency

The following provides an overview of the plant efficiency and control measures that are proposed to minimise the carbon emissions:

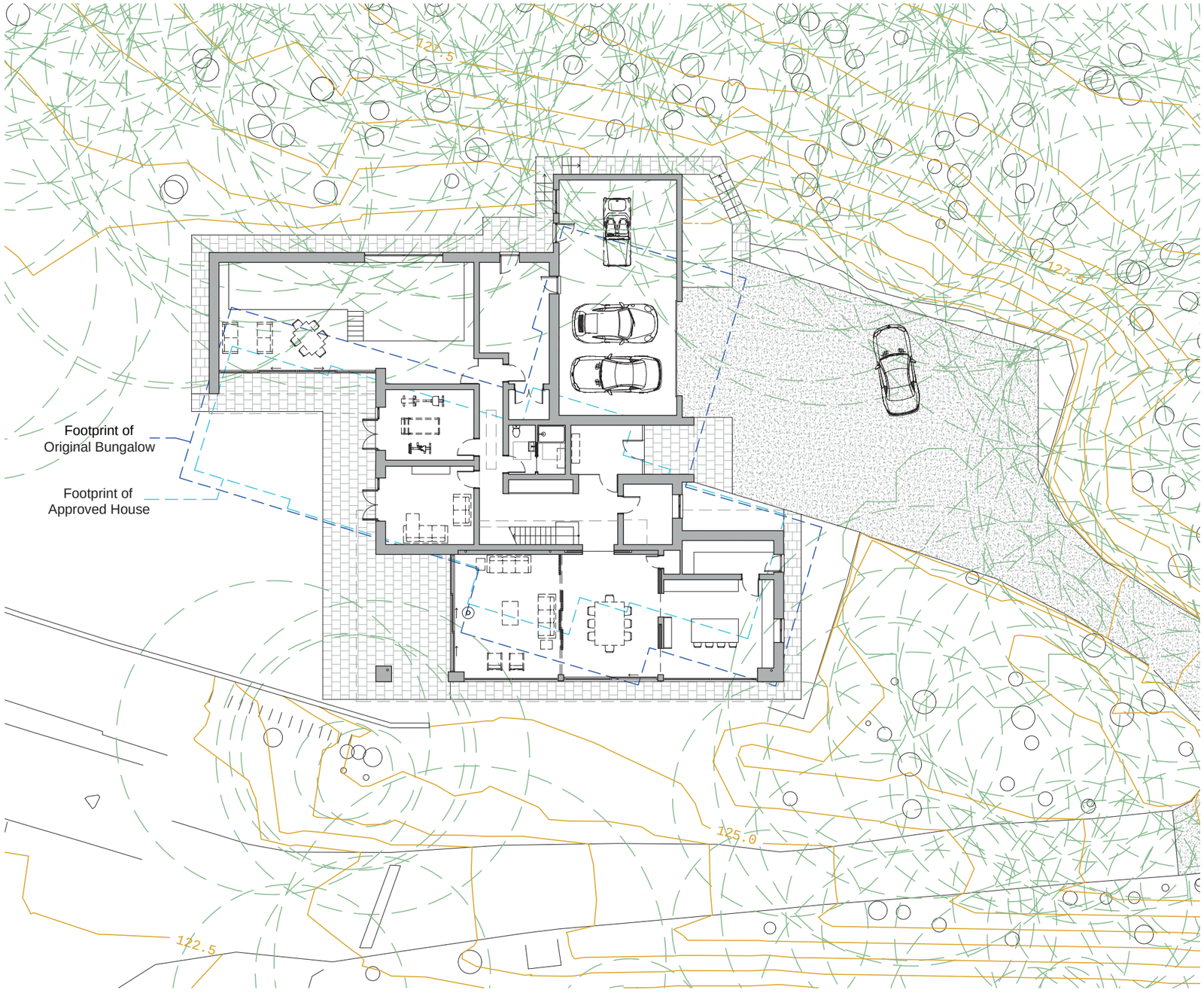
- High efficiency heat pumps to have a high coefficient of performance (COP).
- Low pressure hot water heating flow and return temperatures – low grade heat, lower than traditional installations to maximise heat generating efficiency.
- Zoning of HVAC systems including zoning of mechanical ventilation systems where appropriate
- Occupancy detection control strategies to be linked to various systems such as mechanical ventilation systems wherever practical, resulting in 'on-demand' zoned control, lower delivered fan power and increased flexibility in building usage.
- Occupancy detection control strategies to be linked to heating systems with un-occupied set-back temperature, heating is provided 'on-demand'.
- Heat recovery devices to be used wherever practical on all supply air mechanical ventilation systems.
- Mechanical ventilation systems to include automatic control strategies that provide for secure night time purging and free cooling, maximising the benefit of exposed building mass to limit the requirement for air-conditioning.
- Automatic control routines to ensure systems are enabled/disabled at optimum times (i.e. latest possible start-up time and earliest shut-down time) using intelligent 'self learning' controls.
- Lighting solutions to employ low energy lamps and high frequency control gear.
- Lighting installation to include occupancy detection and daylight linking.
- High efficiency motors to be used to drive mechanical ventilation systems.
- Variable speed pumps and fans to be used to promote lower operating costs and help match energy usage with the operating profile of the building.
- Sub-metering to be considered from main incoming supplies
- In addition to the above, consider controls that shall also raise an identifiable alarm in the event that out of normal range values or end use energy consumption is detected as a result of out of ordinary building use, failure of automatic control systems or inefficient plant operation.

Water Usage

Water usage will be reduced by the including of rainwater harvesting for use in landscape watering.

The existing water supply is by a private supply from a nearby by farm. The intention explore the opinion of an on-site bore hole for the domestic water supply.

Proposed Design



Use & Amount

The proposed design is for a house of the same description of a '2 story 4 bedroom dwelling'. The revised design has been undertaken to create a design that responds better to the constrains and opportunities of the site and the requirements of a highly sustainable low carbon build.

Layout & Scale

The proposed house occupies an area on the site similar to the demolished bungalow and the approved house. The living area and bedroom all face south to maximise natural daylight and heat gain with the massing of the house screening these areas from any noise from the road.

The orientation of the house is rotated to face due south. This to maximise the efficiency of the solar panels on the roof which operate best facing due south on a 30-40deg roof pitch.

Access

Site access is from the existing access point which, as previously agreed, will be improved by the provision of 10m entry radii and constructed in accordance with the requirements of Section 184(3) of the Highways Act 1980.

Proposed Design

Appearance

The house has been designed to be a contemporary sustainable home. The sustainably requirements have significantly informed the appearance. The living area and bedroom all face south to maximise natural daylight and heat gain. To prevent overheating in the summer the south facade features a number of overhangs and fixed brise soleil. There are minimal windows to the north elevations.

The main form of the house has been kept relatively simple to maximise the form factor which improves thermal efficiency. The massing of the main body of the house has been accentuated by separating the upper floor from the ground floor. This separation has been repeated on the ground floor swimming pool to tie the different elements of the house together.

The pitch and shape of the roof has 2 function, the first is to maximise the area for possible solar panels high on the roof so they are not overshadowed by the surrounding mature trees. The added benefit of this as barrier from any traffic noise on the A691.

The house uses a select palette of durable materials with a low carbon impact and high recycle-ability potential. The ground floor is predominately clad in stone, while the upper floor and swimming pool in metal standing steam cladding. The covered entrance and balcony are accented with timber cladding.

The windows will be thermally broken triple glazed aluminium framed units. The colour of the frames match the cladding colour.

Visual 1

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