

Sitemap Key

- For Source Heat Pump
- Local Aspect Units
- Additional Side windows added
- Wheelchair level - Social Barred
- No Collection Point
- Proposed Rain Garden
- Street Lights

For further details talk to our sales advisor

Over 55 years experience

Llanmoor Development Co. Limited - 65-65 Talbot Road, Talbot Green, Walsby, Rhondda Cynon Taf, CF72 4AG. Company Registered in England & Wales, 837052

Saint Sannans Field Aberbargoed

A select development of 2, 3 and 4 bedroom homes situated in a premier location.

EXISTING PLAY AREA

EXISTING FARMLAND

B4511

Ty Gwyn

Bedwellly Road

- The Chelsea**
2 Bedroom Semi Detached Link
- The Ogmere**
3 Bedroom Semi Detached
- The Nash**
3 Bedroom Semi Detached En Suite
- The Litchard**
3 Bedroom Semi & Detached En Suite
- The Moulton**
3 Bedroom Detached En Suite
- The Cedars**
3 Bedroom Detached En Suite
- The Ewenny**
3 Bedroom Detached En Suite
- The Ferndale**
3 Bedroom Detached En Suite
- The Llandow**
4 Bedroom Detached En Suite
- The Mulberry**
4 Bedroom Detached En Suite
- The Llanmaes**
4 Bedroom Detached En Suite
- The Oakfield**
4 Bedroom Detached En Suite

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Sustainable Development

HND / BSC CONSTRUCTION MANAGEMENT ASSIGNMENT 1

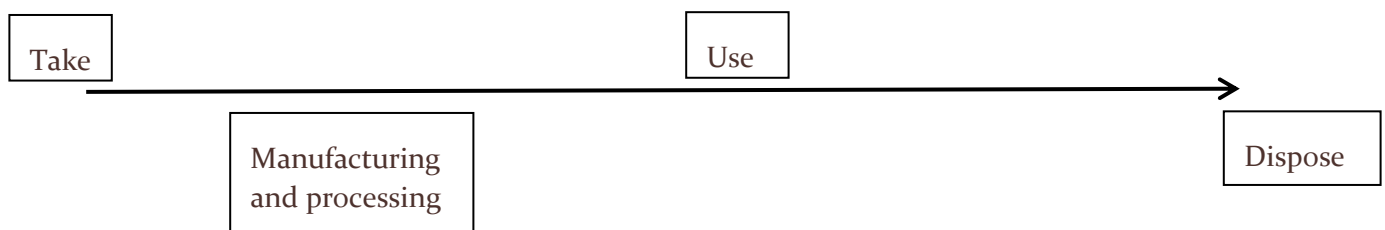
By Aaron Griffiths - 2223674 | Module Code - ACBA5028 | 07/01/25

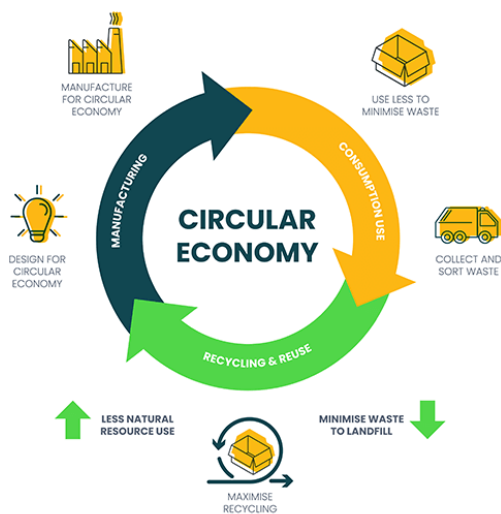
Introduction

I have been tasked with assessing a typical new building scheme being developed in the UK. The development which I will be assessing is the Saint Sannans field development which features 67 new homes built by Llanmoor Homes, these homes will range from two bedrooms to bedroom houses. As a typical new housing estate there will be the development of one-bedroom appartements, these will be managed by Caerphilly County Council.

For me to criticize these developments I am going to utilize existing frameworks such as BREEAM, Passivhaus standards and One Plant Development. Furthermore, these frameworks are leading the way when it comes to sustainable development in the construction industry.

This diagram below shows how the construction industry and many other industries in the world are using materials to build/create products. This is also how our current generation is consuming technology, groceries, products etc. “Linear economic thinking has been around for centuries. It was the dominant economic model for most of the 20th century. It is based on the desire to make products and offers services for the lowest price. Raw materials are extracted from nature at the lowest cost, turned into products with the least amount of labor, and sold at the highest price” – information - [What is the linear economy?](#)





The diagram shows how our industry should be progressing by having a circular economy. This would allow our industry to reuse materials which regularly go to waste by recycling. “The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite

resources”. – (information found from - Ellen MacArthur Foundation (2024). *Circular Economy Introduction*. [online] Ellen MacArthur Foundation. Available at: <https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>.

Moreover, we should be adapting the ways we are producing and building current construction projects because as the company one planet living is suggesting we currently using 3 planets worth of resources. So, in the future we will not sustain ourselves and will be out of resources. Therefore, we need to adapt to the way in which we are living and be sustainable on one planet, as it’s the only planet we have got. The company one planet living has a framework which needs to be implemented on all new construction projects and adapt the way we live as a community. The principles which One Planet are suggesting are as follows:

- **Health and happiness**
Encouraging active, social, meaningful lives to promote good health and wellbeing.
- **Equity and local economy**
Creating safe, equitable places to live and work which support local prosperity and international fair trade
- **Culture and community**
Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living.
- **Land and nature**
Protecting and restoring land for the benefit of people and wildlife.
- **Sustainable water**
Using water efficiently, protecting local water resources and reducing flooding and drought.

- **Local and sustainable food**
Promoting sustainable, humane farming and healthy diets high in local, seasonal organic food and vegetable protein.
- **Travel and transport**
Reducing the need to travel, encouraging walking, cycling and low carbon transport.
- **Materials and products**
Using materials from sustainable sources and promoting products that help people reduce consumption.
- **Zero waste**
Reducing consumption, reusing and recycling to achieve zero waste and zero pollution.
- **Zero carbon energy**
Making buildings and manufacturing energy-efficient and supplying all energy with renewables.

If we could take these ideas from One Planet and implement them into the new estates which are being created in the UK, we would be more sustainable and reduce our carbon footprint.

The current construction of the Llanmoor Housing development is traditional build, which is not economical, not sustainable for the environment and has a large amount embodied energy for the materials produced to build the site. As a construction industry we need to change how we produce and use materials e.g. wastage, high embodied energy materials, usage and transportation of materials.

The subtitles below are from the BREEM legislation documentation for new development buildings. This framework was introduced in the 1990's which allows us to evaluate and enhance the performance and sustainability of a building. Which BREEAM has a complex assessment to decide on the performance of the construction and how to improve. "Navigating BREEAM policy and legislation is essential for UK businesses seeking to achieve sustainability objectives and maintain compliance with regulatory requirements" – (Information taken from - [BREEAM Policy and Legislation - Comprehensive Guide](#))

RESOURCES/MATERIALS

As a typical new housing building, most of the materials/resources for these sites across the UK would be either shipped or transported e.g., bricks, blocks, insulation and concrete. These materials listed have high embodied energy with creating the material or transportation from manufacturer to retailer to site. From the table below we can see how much carbon and energy embodied in which the materials we use on a day-to-day basis in construction.

Material Name	Embodied Energy (MJ/Kg)	Embodied Carbon (KgC/Kg)	Landfill Decomposition (Yrs)	Recyclability (%)	Toxicity (Low/Med/High)	Durability (Yrs)
Aggregates	0.083	0.0048	N/A	100%	Low	15
Aluminium (Recycled)	7.85	16.1	300	80%	Low	60
Plastic (PVC)	86	6	1000	90%	Med	500
Aluminium (New)	66	12.46	200	90%	Low	75
Stainless Steel	56.7	6.15	1000	100%	Low	50
Concrete (Reinforced)	1.11	0.159	50	70%	Med	135
Insulation (Fibre Glass)	28	1.25	20	30%	High	100
Timber (Hard Wood)	10.4	0.86	10	60%	Low	70
Silicone	5	6	500	90%	Low	20
Kingspan/Celotex	39.5	1.7	60	50%	Med	60
Slate (Imported)	0.1	0.006	N/A	60%	Low	150
Clay Tiles	6.5	0.45	2000	100%	Low	60
Bitumen	51	0.38	100	0%	High	20

Information taken a class task to research materials sustainability/environmentally friendly. Also helped from Top Trumps cards in a class exercise

A typical new housing development in the UK is made from bricks or concrete to build the walls of the house. Which is because these materials are great because they are very durable, low maintenance, energy efficient, easy demolition and have good strength. The way in which I propose for the re-design is to re-use the materials from a demolished school nearby which is Pontillanfraith Comprehensive School. This former school is only 12mins from site, it will be easy to transport and re-use the materials e.g. bricks, blocks, carpet tiles, concrete for aggregate and roofing materials. Therefore, from these materials you can use most of them to construct the estate. Another idea is to use the carpet tiles to create a cladding to the exterior of the house as a feature to make the house more interesting to look at and to protect the building from the weather elements.

To re-design the foundation I am going to use a screw foundation for the housing developments. The advantage of using this type of foundation over the other types is that it's more sustainable to ground below, no excavation needed to build the foundation, its cost effective, no soil seal needed, and they have a high load bearing capacity which is instant. All these advantages show that this type of foundation is more sustainable than other foundation options.

To insulate the new developments my choice of insulation is sheep's wool. This is because in Wales this is produced locally. Some advantages of using sheep's wool are:

- It is safe. Unlike many other insulation products, Sheep Wool Insulation is safe and allergy-free.
- It is eco-friendly. Sheep Wool Insulation is made from 100% pure wool and is the environmentally friendly, green way to insulate.
- It is efficient.
- It is easy to install.
- It saves you money.

(SheepWool Insulation. (n.d.). *Who is Sheep Wool for?* [online] Available at: [https://www.sheepwoolinsulation.com/where-to-use/who-is-sheepwool-for/.](https://www.sheepwoolinsulation.com/where-to-use/who-is-sheepwool-for/))

The windows of my building are going to be sourced from a local company in Wales Celtic Windows based in Llanelli. Which I am going to install triple glazing to the properties. The reason why I have chosen triple-glazing windows are because it will make its money back in years to come, with the saving costs of heating a home, also using less energy to heat the home. The materials in which the windows are going to be produced from is PVC. This material is not sustainable, however, will last for years to come over other material options.

More information is found at: Celtic UPVC Windows, Doors & Conservatories. (2023). *Home - Celtic UPVC Windows, Doors & Conservatories*. [online] Available at: <https://www.celticupvc.co.uk/> [Accessed 7 Jan. 2025].

By doing these upgrades it will increase the EPC rating of the building which explained briefly is the scale goes from G (inefficient) to A (extremely efficient). A potential rating (what could be accomplished with energy efficiency upgrades) and a present rating (based on the property's actual energy efficiency) are both included in the EPC. So, by upgrading the building, the development will have a higher EPC rating, which will mean it's cheaper to run and more energy efficient

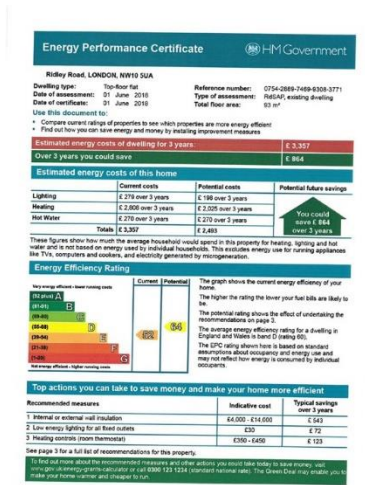


Image From <https://www.loveourpostcode.com> and Price, D. (2018). *Love Your Postcode™*. [online] *Love Your Postcode™*. Available at: <https://www.loveyourpostcode.com/energy-performance-certificates/> [Accessed 7 Jan. 2025].

WATER

The re design of the water system is within the new housing estate. My aim is to reduce the consumption of water being used and how to recycle the water within the housing development. This can be achieved by management and monitoring the water usage within. The values which we would gain by implementing this would be an increase of water usage in development, reducing the cost which homeowners would have to pay in the development and managing the water demand on the estate. If all new development could apply something similar, imagine the saving in which homeowners would save and the decrease the amount of water usage in the UK. Why do we need to implement water in BREEAMS framework? This is because, due to the increasing population over the years in the UK, the increase in demand for water has increased. Also, the risk of water shortages, e.g., rainfall patterns, are changing due to climate change, so how do we need to adapt from this information?

For me to design the housing development for water within, I am going to keep the existing Suds system (Sustainable Drainage System) in the estate and make it larger to

allow for more water to be collected to reduce flooding within the development. By having a larger SUDS System, it will allow for the development to recharge more ground water supplies, capture water for re-use and help more plants and wildlife to be attracted to the area. Installing SUDS systems was made mandatory by the government in 2023, however to certain size requirements. We should be installing larger SUDS into developments, we could re-use the water more water, instead of relying on the mains water supply, and be more efficient.

For my scheme I am going to implement a communal garden space for the homeowners at the estate. By having a SUDS system, this will allow me to reuse the water to pump up to a tank at the communal garden for homeowners to use the water to water the plants/vegetables being produced on the developments. The filter water from the SUDS system will be stored in a large tank on site and distributed to the houses on the development. Also, all homes on site will have a rainwater collection system which will be implemented with the SUDS system to allow them to recycle the rainwater. Along with ACO drains installed on the roads and paths to run into the SUDS system.

Water under BREAM is one credit, which there is an assessment which you must follow to gain this one credit. Which is:

1. Identify water demands. Then do the calculation of water efficiency. That could be realistically mitigated or reduced with the project's usage.
2. Identify water demands and systems or processes to reduce relevant water demand.

TRANSPORT

Transport for the redeveloped estate would for the people in the community to use the local bus stop at the entrance of the estate. This would reduce the number of cars used and decrease the emissions from the estate, by achieving this would create a smaller carbon footprint. Also, as a community could lift share to destinations e.g. a shop's, school runs (dropping off and picking up) and sports training/games. Another idea would be to cycle to closer destinations more. Which would eliminate using separate cars as a mode of transportation. A scheme which is trying to implement this more is the cycle to work scheme. "The cycle to work scheme allows employees to obtain commuter bikes and cycling accessories through their employer, whilst spreading the cost over 12 months" - Cyclescheme. (n.d.). *The UK's Most Popular Cycle to Work Benefit*. [online] Available at: <https://www.cyclescheme.co.uk/employers>.

[Cycle to Work Scheme guidance for employers](#) – Government cycle to work scheme.

Moreover, for the people who would need to have cars on the development there would be a policy where you would only be allowed to have electric cars. Which, each home will be installed with charging points on the drives to charge the vehicles. The Cars will be charged using sustainable electricity explained in the energy part of the document. For the

flats on the estate, there will be a communal parking area in which, charging points will be installed to use. Therefore, there will be one charging point and space for each flat. I would use a local company in the area to install the charging points. The company which I have found is - Briffa, J. (2024). *Home Charging in Pontypridd*. [online] MJP Electrical South Wales. Available at: <https://www.mjpelectricalsouthwales.com/home-charging/home-charging-in-pontypridd/> [Accessed 6 Jan. 2025]. By choosing a local company to complete the work, it keeps travelling from the site down, which keep emissions low and giving local companies support for work. This will ensure when fitting these chargers, we are being sustainable for the development in the building process.

Another idea to implement within the development could possibly be having no cars for the homeowner and having a handful of communal cars which everyone would have to share. Which would be a cost-effective and more efficient way for the homeowners to travel. This would be on a router basis or sharing lifts with each other to be more environmentally friendly with using less cars.

ENERGY

To re design the energy source on site, am I going to be installing solar panels to roofs of the properties. A software which will help me to render/calculate the number of solar panels for each property would be the company One Solar. (Open Solar. (2024). *Accurate 3D design*. [online] Available at: <https://www.opensolar.com/3ddesign/> [Accessed 6 Jan. 2025]. By using this software will be able to calculate the efficiency of the solar panels which we could install, which type of solar panel, the size of the solar panel and the rough price. The advantages of installing solar panels in the development are energy bills for homeowners will decrease, can use power when the grid goes out, have a lower carbon footprint and has a minimal maintenance cost to keep them working. These solar panels will be installed to a 10kw battery because this will allow the property to have 10-12 hours of electricity use on a full charge. This however in the summer will be efficient, but in the winter, months will not work as great, due to the lighting and keeping the grime/dirt off the solar panels. A local firm would install the solar panels Greenenergysolar.co.uk. (2023). *Solar Panels Cardiff, South Wales - Green Energy Solar*. [online] Available at: <https://www.greenenergysolar.co.uk/> [Accessed 6 Jan. 2025]. which would I propose the establishment would set up a maintenance plan which would keep the PV panels in working order and work efficiently.



Figure 1 [Air Source Heat Pumps | Nu-Heat](#)

Moreover, air source heat pumps will be installed to each property. The advantages to using air source heat pumps over your traditional gas or oil boilers are, “they are more environmentally friendly, no carbon emissions, safer than your traditional gas boiler, has a longer lifespan, work all year round in the different elements, less destructive than a ground source heat pump, highly effective in turning electricity into

heat, cost effective and low maintenance”. - (www.ovoenergy.com. (n.d.). *Advantages and Disadvantages of Heat Pumps – OVO Energy*. [online] Available at:

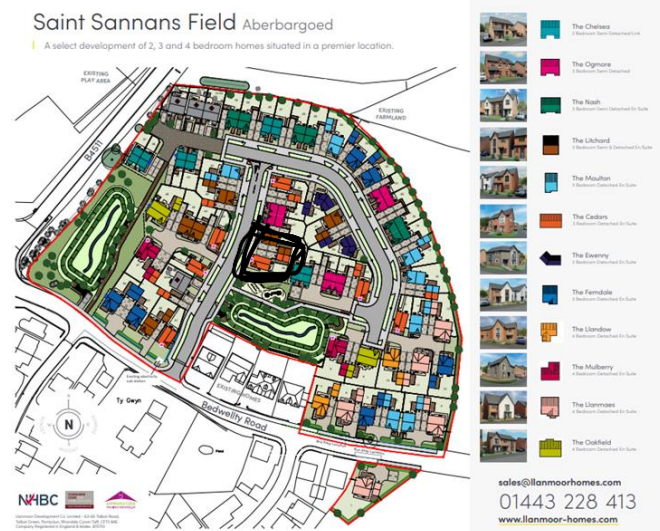
<https://www.ovoenergy.com/guides/air-source-heat-pumps-advantages-and-disadvantages>)

On the Llanmoor Homes website its state that these will be installed to heat water and heating. After calling the company they stated these will not be installed on this site development.

HEALTH & WELLBEING

The current development has a small park located in the middle of the estate. My

proposed is to have a communal gardening space for the homeowner to use. By having a communal it allows for the community to have social interaction, so the community would be closer. Also provide a space in which the social flats could be able to grow fruit, veg and plants/flowers. Additionally, to this I am going to propose for a vegetable box scheme so, each homeowner could sell/share the additional vegetables inside the development and for other members of the public in the community. Advantages of having a vegetable box scheme it that its supply's fresh veg for the community, seasonal produce and will strengthen the bond between growers and buyers. To allow for the space for this to happen, I am going to sacrifice the 3 houses circled in the photo. I believe by sacrificing these properties, it will mean that the development will have a more communal space to make the development feel more like a community, while people look out for each other.



WASTE

An idea for the food waste of the development is to have a compost bin by the communal garden. So, homeowners can remove their food waste from their home to this compost bin, so they will have fertilised soil for them to grow plants. Also, the compost bins will allow for wildlife and animals to habitat and eat from the food source. If the compost bins are full there will be a collection for the food waste to be used as a biofuel which will be shipped to companies which use this fuel source like Bluestone in Pembrokeshire. Which bluestone use Bio Energy to heat and produce energy on there holiday resort and are leading the way when it comes to sustainability with holiday homes/resorts.

For other waste there will be a communal drop off place for the bins and recycling, so that the waste is secure, safe and make it easy for the council to collect. To reduce mess made on the development.



*Archwood Greenhouses.
(2024). Wooden Compost Bin (Large
Sizes) | Archwood Greenhouses.
[online] Available at:
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- [Air Source Heat Pumps | Nu-Heat](#)