

Llandough Adult Mental Health Unit (LAMHU)



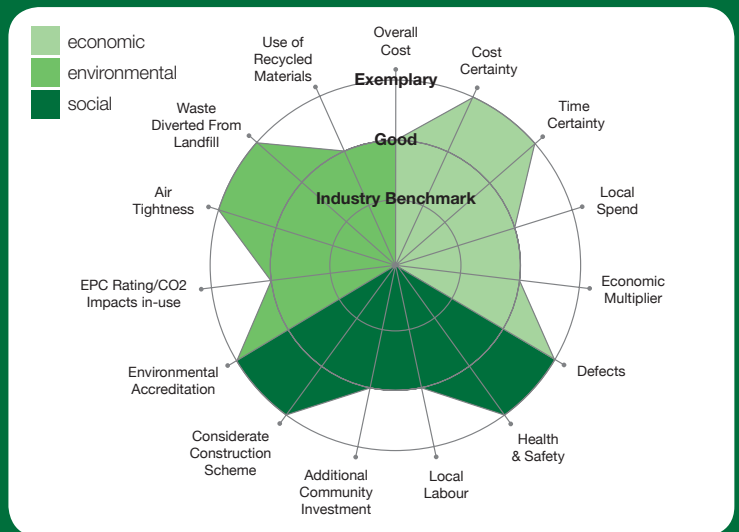
This project is aiming to deliver an exemplar modern mental health facility suited to the treatment needs of the 21st Century. This has to be delivered in the centre of a busy live hospital environment and specific attention has to be given to minimising disruption to patients, visitors and staff working within the Llandough Campus.

The project team was appointed by Cardiff and Vale University Health Board via the Designed for Life (DforL) Framework administered by NHS Shared Services. As with all projects let through the Framework the Principal Supply Chain Partner (PSCP) is appointed at concept stage to work up the design with the Health Board and the PSCP appointed design team.

A critical part of the delivery strategy is the adoption of modern methods of construction (Design for Manufacture and Assembly – DfMA) to drive efficiency of build. However, this case study also aims to demonstrate how a collaborative approach based on early integration of the whole team supports :

- Cost and time certainty
- Programme efficiency
- Reductions in construction waste
- High standards of health and safety
- High environmental performance

These are supported through the use of Building Information Modelling (BIM)



project details

client:	Cardiff and Vale University Health Board
architect:	Powell Dobson Architects
contractor:	Laing O'Rourke Construction Ltd
project value:	£70m
project size:	19,400m ²
contract:	NEC Option C
procurement strategy:	Early contractor involvement (ECI) via Designed for Life Framework (DfL1)



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what is an Exemplar project?

An Exemplar is defined as 'something worthy of being copied'. The Exemplar programme has been developed to help identify the reasons why certain projects are successful in a standardised, quantifiable way, and to share with the industry what enabled these successes. An Exemplar considers all aspects of sustainability, including economic, social and environmental. Projects must demonstrate that they have been innovative in one or more of these aspects in a way that exceeds normal industry practices, while achieving at least minimum standards in all other areas of the project. This is to demonstrate that the scheme is well rounded and has not sacrificed one aspect to be successful in another, while also incorporating best practice measures that can advance the state of the industry. An Exemplar project therefore reflects the ideal industry goal of achieving a scheme's primary function aims in a sustainable way, at acceptable costs. Case studies are prepared at 3 key stages : post-design, post-construction, post-occupation. This ensures that lessons learnt can be demonstrated throughout the development of the project.

what will make the project successful?

- The procurement approach allows early engagement with the supply chain to gain their expertise during the design development phase to better manage risks
- A BIM Level 2 was developed with all parties working in collaboration to support greater certainty in terms of cost, time and quality
- A focus on reducing energy consumption both during construction and throughout the operational phase will reduce whole life costs
- The delivery strategy of maximising the use of off-site manufactured components will allow a reduced construction programme as well as lower environmental impacts and construction waste.
- Early completion will facilitate the transfer of staff and patients from the outdated Victorian Asylum Facilities at Whitchurch to the new state of the art mental health facilities fit for the 21st Century.

notable achievements

- Early contractor engagement via the DfL Framework will ensure a high level of cost certainty
- The Design for Manufacture and Assembly (DfMA) process supports a much speedier construction programme and higher quality assurance in a sensitive and logistically difficult site
- Early contractor engagement will allow local spend opportunities to be maximised
- The application of BIM Level 2 and a collaborative approach through the design stages will help to reduce construction waste both on- and off-site
- A reduction in energy consumption is targeted both during construction and throughout the life cycle of the facility
- The scheme is designed to achieve a BREEAM Excellent rating and will utilise a minimum of 15% recycled content
- A number of features on the project will aid the rehabilitation and recovery of the patients
- The scheme is in a prominent position within the heart of the hospital campus. The DfMA process will reduce impacts on the local community - less noise, reduced waste on site, shorter construction period, fewer lorry movements and lower CO2 emissions
- Additional community benefits will be realised through the early engagement of an integrated team

economic considerations

Early contractor engagement via the DfL Framework will ensure a high level of cost certainty.

Early contractor engagement was essential for a DfMA approach to be applied. The DfL process facilitated this by bringing the whole team together at a relatively early stage. This allowed the team to pursue aspects of the Welsh Government's Construction Procurement Strategy in relation to increasing value through greater standardisation, prefabrication and offsite manufacturing across the construction industry. A collaborative approach based on early team integration and joint working between all parties ensured the scheme was developed with this type of manufacturing led solution as the guiding vision.

The team were appointed at concept stage with option appraisal still being undertaken. This integrated and collaborative approach enabled all parties including mental healthcare professionals, designers, contractors and specialist sub-contractors to come together in a single delivery team to ensure the optimum scheme was delivered for the Health Board and more importantly the patients that will be treated within the new facility. Throughout the design development phase the team were able to engage early with the supply chain to gain their expertise. This was key in fixing the design at a relatively early stage to facilitate the required lead in periods and the subsequent manufacturing of components.

This component led solution lends itself to projects when both the design and construction team work in partnership with the client and key stakeholders early in the design process. It maintains alignment between the design and manufacturing processes and involves suppliers early in the design cycle. Through this approach almost 58% of the components being utilised on this project will be manufactured and preassembled in a controlled environment, prior to delivery to the construction site for installation. This will help to drive greater cost certainty.

An additional benefit was derived from the continuity of the delivery team having worked together on a number of projects.

This has greatly facilitated the delivery process through knowledge transfer and lessons learnt from other healthcare schemes across the UK. It has enabled a streamlining of the process and introduced efficiencies in the construction methodology e.g. structural facade panels being utilised.

The Design for Manufacture and Assembly (DfMA) process supports a much speedier construction programme and higher quality assurance at a sensitive and logistically difficult site.

The strategy of off-site manufacture allows for the construction phase to be significantly accelerated thus enabling the local community to access the new facilities at an earlier date than would have been achievable through conventional construction methods. It is also aimed at reducing disruption to an already busy and congested hospital site through a reduction in deliveries and labour movements on site and a major reduction in the delivery period.

However, this component led approach to the on-site delivery process places greater emphasis on the design development phase. In order for this process to be truly effective the design needs to be finalised relatively early in the process. A key enabler to this delivery strategy is the development of a BIM Level 2 with all parties working in collaboration including the main contractor, the designers, client, key stakeholders and the supply chain. Manufacturers of the majority of the components on this project utilised BIM during the manufacturing process to accelerate and streamline the production of components. The model was time linked and will be used during the delivery process to aid in the overall construction and logistics management and programming of the project.

The off-site manufacturing process in factory conditions will also allow for greater quality assurance of the final product on site. The components used will require minimal maintenance and give a robust and durable finish to the building and the use of modular services will provide a standard and uniform access zone for ease of maintenance in future.

Early contractor engagement will allow local spend opportunities to be maximised.

In order to guarantee that the project provides maximum benefit to the local economy and the community that it will serve the team has targeted over 80% of the sub-contract spend to be within a 50 mile radius of the site. In line with the Designed for Life Framework KPI's the team are monitoring the home addresses of all the labour working on the project and are targeting over 90% of the labour employed on the project being resident within Wales.

The project team are utilising the Welsh Government Community Benefits Measurement tool to ensure they monitor their on-going performance in relation to the tangible benefits the project is providing to the Welsh economy.

environmental considerations

The application of BIM Level 2 and a collaborative approach through the design stages will help to reduce construction waste both on- and off-site.

The delivery team has worked together during the pre-construction process to optimise the design to reduce waste and achieve efficiencies such as a reduction in labour, programme (schedule), carbon footprint and accidents. These will all be measurable and a direct comparison will be made to other DfL projects delivered in a more traditional manner.

The application of BIM was initially driven by the delivery team with the full support of the Health Board. The early appointment of the team aided the design development stage and facilitated the utilisation of the model in the manufacturing process. The project team is already in the process of sharing best practice with the wider industry and the project provided a case study at a Welsh Government BIM Seminar focusing on benefits to the industry of utilising digital engineering on publicly funded projects.

Through the use of BIM the scheme will generate considerably less waste associated with activities such as plasterboard off-cuts from drylining activities, cable drums and packaging associated with fragile M&E components. The team anticipates that site construction waste arisings will be reduced by more than 50%. The project is targeting 3.2 tonnes/100m² GIFA or lower, compared to 10 tonnes/100m² GIFA for more traditional projects.

Given that the scheme is in a prominent position within an existing hospital site the benefit of the off-site manufacturing process in reducing waste will also minimise disruption to the local community by reducing traffic movements to and from the site and operations on the site.

A reduction in energy consumption is targeted both during construction and throughout the life cycle of the facility.

The team is targeting site CO₂ emissions of 1200kg CO₂/£100k and a water consumption rate of 8m³/£100k. This will be evidenced as the project progresses.

Improved air tightness levels achieved through the DfMA process will also ensure greater energy efficiency throughout the operational phase of the asset. Air tightness levels of less than 3cum/m/hr are targeted.

The scheme is designed to achieve a BREEAM Excellent rating and will utilise a minimum of 15% recycled content.

BREEAM Excellent will be achieved through the adoption of a number of sustainability measures incorporated during the design stage. This includes a natural ventilation strategy, high frequency lighting and LED lighting with daylight dimming, photovoltaic panels, green roofs and the utilisation of the thermal mass of the exposed concrete structure of the building to reduce energy consumption.

Social Considerations

A number of features on the project will aid the rehabilitation and recovery of the patients

A large number of the shops in Llandough have been lost over the years and the aim and intention is that the new concourse can act as a hub not only for the patient, staff and visitors but also for the local community, making the hospital integral to this part of Cardiff.

As physical exercise is proven to aid in the rehabilitation of patients external sports and exercise areas will be provided. The new concourse area will have bookable community space along with a retail provision. This has been provided to not only service visitors to the hospital but also for the local community.

The scheme is in a prominent position within the heart of the hospital campus. The DfMA process will reduce impacts on the local community - less noise, reduced waste on site, shorter construction period, fewer lorry movements and lower CO2 emissions.

As the scheme is in a prominent position within the heart of the hospital the off-site manufacturing process will minimise noise and disruption to the local community as traffic movements to and from the site will be reduced. Also, as the site delivery process will be accelerated this will reduce the period of impact on the users of the hospital. Furthermore, traffic disruption has been minimised through the creation of a temporary entrance into the hospital which keeps delivery traffic away from the main entrance and greatly reduces the impact of the works on the users of the hospital. This work has been enabled through the early engagement of the whole team.

Additional community benefits will be realised through the early engagement of an integrated team

The project team are aiming to have a lasting impact on the wider community. The project community plan will involve the team in renovating a Council owned property to provide new facilities to house an Alcohol Treatment Centre which is currently being run by volunteers from a temporary facility. The new centre will enable weekend revellers to be treated for the misuse of alcohol without them having to be taken to A&E at the University Hospital Cardiff.

This work will be facilitated by the contractor and their supply chain through volunteering and material donations and is being done to support the client and to benefit the wider community of Cardiff. Other community initiatives will also be undertaken including a number of school engagement projects in both Cardiff and the Vale.

The early completion of the main scheme will facilitate the transfer of staff and patients from the outdated Victorian Asylum Facilities at Whitchurch to new state of the art mental health facilities fit for the 21st Century. It will also allow the Health Board to dispose of elements of the redundant facilities at Whitchurch unlocking value sooner within the process and allowing this to be re-invested in healthcare provision across this part of Wales.

As part of the enabling works a drainage scheme will be constructed with major attenuation measures put in place to address flooding to adjacent allotments and gardens. This will offer a major benefit to the allotment users and homeowners.



