

Analysis Of Built Assets – A Case Study Approach

Building Conservation, Asset & Facilities Management

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Task Three – Asset Tags & Presentation in word format For Given Zone.
(See accompanied documents of:

- **Revit drawing showing asset tags and marks as well as descriptions**
- **Revisito drawing showing Asset stamps for maintenance**
- **Excel Document for asset management log**
- **Word Document for supportive writing**

References.....21

Task One –**Heritage Impact Assessment*****Section 1 – Introduction***

Site Name	UWTSD – St Davids Chapel and Founders Library
Address Of Site (Including Postcode)	College St, Lampeter SA48 7ED
Grid Reference	<i>SN 57950 48207</i>

1.0 - Aims and Objectives of proposed works

- 1.1 The client's intention is to find the most beneficial way to accommodate change into the historic building known as St Davids Old Hall. The client also wishes to consider the impact of updating the building fabric and its services in response to sustainable management.
- 1.2 The site is allocated for a refurbishment to ensure its longevity using specialist techniques to preserve and protect its original structure.
- 1.3 The building has a listed status assigned to it meaning that there are strict rules set in place for its restoration.
- 1.4 The present state of the site is satisfactory condition. It does require major repairs and remediation work to secure its future. The building is very large and requires a lot of attention especially to keep in with its listed status. The building is not adequately equipped for this modern day to have a sustainable future.
- 1.5 It is intended that the building will not only continue to be a place of education as it has done for the past two hundred years however will be a more comfortable and socially habitable building for its visitors as well as being economically and energy efficient.
- 1.6 Make alterations to current student accommodation, The student accommodation should provide a healthy comfortable environment which is energy efficient

Section 2 –Methodology***2.0 The significance of historic assets***

2.1 “Embracing all the cultural heritage values that people associate with it, or which prompt them to respond to it. These values tend to grow in strength and complexity over time, as understanding deepens, and people’s perceptions evolve” As described by (CADW, 2011)

2.2 Conservation Principles:

- **Evidential Value** - A location's ability to provide information about historical human activities.
- **Historical Value** - The ways in which a place can link historical figures, occasions, and features of life to the present.
- **Aesthetic Value** - The way in which a given area stimulates people's senses and minds.
- **Communal Value** – The significance of a location to the people who are associated with it or for whom it is a part of their shared history or experience

(CADW, 2011)

2.3 Cadw’s Guidance on its four-stage approach to the identification and assessment of setting effects is as follows:

- Stage 1- Determine which historical assets are at risk.
- Stage 2- Describe and evaluate the environment to see how it adds to the historical relevance of the asset.
- Stage 3- Assess the possible effects of development; and
- Stage 4-Think about ways to lessen or enhance that possible effect.

(CADW, 2017)

Section 3 - Statement Of Significance

3.0 Results

3.1 The site has both designated and non-designated historic assets, according to the Statement of Significance, with differing levels of importance. It concludes that some features of the site are a part of the historical setting of significant assets, which indirectly adds to their significance. The assessment's findings are summarized in the table below:

Historic Asset	Level Of Significance	Contribution To The Assets Setting
Grade II* Listed Building – St Davids Old Hall	High	• Association with interior • Association with exterior •
Chapel	High	• Association Interior décor • Association to Special historic

		features (structure, designs, historic ventilation system, ceiling fan)
Castle Mound - Conservation Area	High	• Association with historic castle
Gates & Boundary Wall	High	• Association with historic background and history
Lodge	Moderate	• Association to surrounding area and historic background

Section 4 – Preferred Approach

4.1 Opportunities and strengths

- Opportunities to restore a listed building with its original features (original rendering).
- Opportunities to ensure a sustainable feature for this building.
- Opportunities to protect the historic asset for future generations.
- Meet energy upgrades for 2050 Net Zero.
- Utilize surrounding building to provide safe and comfortable student accommodation.
- Create an accessible educational ground to provide additional income and social spaces for local students and local community.
- Construct and build better student accommodation on site.

4.2 Constraints and weaknesses

- Major upgrades to building fabric without damaging external features and structures.
- Adding of internal insulation to enhance energy performance without damaging structure.
- Poor heating facilities – Major alterations needed.
- Poor lighting strategies – Major alterations needed to try and incorporate natural lighting much as possible.

Section 5- Impact Assessment

5.1 introduction

Planning Policy Wales Tenth Edition is followed in this section's assessment of the effects on heritage assets and either direct, physical effects on historic assets on the site or indirect effects on historic assets due to changes in their surroundings are used to evaluate the consequences.

5.2 Effects on designated historic assets

The statement of significance outlines that the building itself is listed, it also contains a high valuable chapel to which is used daily by both a local community and students, as well as the castle mound and boundary walls. All of the potential impacts on these are outlined below in section 5.3.1.

5.3 Listed Status

This site is currently assigned as a grade II* listed building. This listed status has been graded by being of “special architectural interest as an exceptional group of educational buildings of considerable national historic importance and significant architectural quality. Important also for the association with two major architects” as defined by (CADW, 2012).

5.3.1 Direct Impacts in line with listed status and other areas of interest.

St Davids Building including Chapel Of St Davids

Adding of materials to this listed building may alter its appearance therefore high attention to detail and advice should be sought before making any alterations. Recommendations include:

- Using the correct material for the date in which the building had been constructed.
- Use experienced tradesman to ensure that any person/s is experienced to care and maintain this building to its highest quality.

Castle Mound

Protection of this mound should be planned and organised throughout any maintenance of nearby buildings to ensure the mound is not damaged or altered. Recommendations include:

- Covering the mound with heavy duty materials to avoid damage.
- Ensure adequate watering to ensure the mound is kept in a good condition.

Gates & Boundary Walls

Even though these may seem insignificant compared to the rest of the listed areas, this section of the building should still be maintained and cared for just as the other areas are. Recommendations include:

- Colour and material paint matches.
- Continuous maintenance and upkeep including cleaning.

5.4 Proposed Changes

St Davids Building

Internal

- Insert underfloor heating to suspended timber floors on first floor using a retrofit system, this would ensure that the original timber floors remain.

- Existing internal features such as walls, floors and stairs and woodwork to be repaired and restored as well as finished with correct paint where needed.
- Ceiling plasterwork, architraves, and arched openings to be retained and repaired throughout including damp treatment and re-plastering of walls where required.
- Installing air source heat pump.

External:

- Replace current stucco cement render to a lime-based render to keep within its traditional construction.
- Slate roof and all iron work to be repairs including chimneys and all external roof additions.
- All existing windows to be retained and restored and finished with correct paint, installation of a secondary glazing should be placed where necessary to meet energy efficient standards.
- Redundant wiring, pipe work removed along external ground level see figures 4&5 within the appendix.
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Chapel Of St Davids

Internal

- Investigate current suspended floor to ensure no damage or leaks are present which could damage the building itself, repair any damage and restore if required and also install a retrofit system on top of original timber works to ensure that it remains untouched.
- Repair and restore historic artefacts within the chapel (e.g. pews, shrines, ceilings, walls).
- Wooden entrance door of chapel to be repaired and restored.

Student Accommodation

Internal –

- Removal of existing building, rebuild in keeping with current materials used on the main building e.g. stone, slate roof.
- Insert wall insulation and floor insulation.
- Insert underfloor heating or electric boiler to power heating sources.

External

- Install solar panels on south facing roof.

Castle Mound

- No obvious repair work needed, although would propose a sprinkler system installation and also bad weather covers to be present and housed nearby in case of possible weather damage in future.

Gates & Boundary Walls

- Continuous maintenance required, although if damages or minor issues arise, immediate repair and restoration should be carried out before it worsens over time, leading to permanent damage.
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Section 6 – Conclusions

6.1 The preferred development option has been assessed for its potential impacts on its historic asset in accordance with (CADW, 2017).

6.2 This report has highlighted a 'do nothing' option to the historic asset and its surrounding assets although given its condition and with immediate climate emergency, it is recommended that the above heritage assessment is carried out as soon as possible. By making these changes and repairs, it will make the asset longer standing with as near to its original features in years to come.

6.3 In reference to (Welsh Government, 2018) , “the aim should be to find the best way to protect and enhance their special qualities, retaining them in sustainable use. The continuation or reinstatement of the original use should generally be the first option, but not all original uses will now be viable or appropriate.” For this listed building the building would be brought back into sustainable use.

6.4 Given the current climate with regards to its economic needs, it may be deemed that the work above cannot be carried out immediately however if the work and repairs have not been completed within a reasonable amount of time, recommendation of a new HIS should be instructed and sought.

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Section 8 – Appendix/Photos/Graphics



Figure 1 Showing building span.



Figure 2 - Showing exterior traditional windows with metal transom topped by gothic style arched heads. This figure also shows detailed stone surround and the potential modern cement base.



Figure 3- displaying a Tudor arch with an ornate figure positioned in the middle above the opening. Also showing the decorative turret.



Figure 4 Showing loose wiring on the external grounds around building also featuring the buildings cut stone footings



Figure 5- Showing external wiring around building



Figure 6 Showing traditional slate roofing materials along with the traditional round turret made from lead and topped with a decorative spindle and its original brick chimney stack



Figure 7 Showing current heating strategies which is gas mains fed, conventional stand-alone system.



Figure 8 Showing External 'Stucco' technique with added modern materials which will be required to be removed, traditional lime-based material reapplied.



Figure 9 Showing modern repair work that will require attention furthermore applying traditional lime-based render instead.

Task Two – Asset Management

As we move forward into the future of modern building, it is important not to forget about the historic buildings that we already have, and we should manage and care for these to ensure they have a chance of being around for use by future generations. These historic buildings hold a lot of significant value and in some cases, a significant point in history which can help educate those about the past.

Reviewing the philosophy and processes involved in managing the care of historic buildings first starts by understanding the heritage values and the significance, these can be done by a statement of significance written by an authoritative body and by obtaining this statement it that allows the proposed changes and provides the client with clear evaluation of these. As stated by (CADW, 2011) there should be clear understanding of the heritage values, these include:

- Evidential Value
- Historic Value
- Aesthetic Value
- Communal Value

These values should be considered fully when assessing a buildings significance, it would be necessary to compare the values under respect of others in the local region.

The conservation principles are separated into six sections, each have their own significance on how to understand, manage and assess the historic significance. Conservation principles can be seen to help and educate those in the protection of all aspects of the historic environment as detailed by (CADW, 2011).

The conservation principles laid out by (CADW, 2011) are:

1. Historic assets will be managed to sustain their values

This is demonstrated by obtaining and communicating knowledge of its importance and it highlights the method of consistency in decision-making. This ultimately ensures that the goal is to maintain the authenticity and future of the historic asset, As well as establishing a balance between the impact of the various differences on the heritage value and the significance of those affected assets.

To relate this to Lampeter as an historic asset, it is important to assess any change and ensure that these changes are only to benefit Lampeter and prevent any loss or damage.

2. Understanding the significance of historic assets is vital

This is the section which considers the points raised above in the section on values. It stresses the importance of understanding these values to educate those on decision making in relation to the asset's future.

Lampeter has been around for a number of years, with only recently having an official heritage impact assessment completed. To ensure that those who care for this asset understand the significance of all aspects of the building, whether this be its traditional lime-based render or well-kept historic photographs and documentary, full detailed

timelines of its existence enabling us to capture all aspects of the past, in keeping any changes to its traditional past and ensure that any values of the assets are kept for those to relate to them. For example, the old building within Lampeter contains a significant chapel, still in use today by the local community and therefore needs to be maintained and valued as a historic significance.

3. The historic environment is a shared resource

This section devotes its significance to ensure that communities, young and old understand that the historic environment as a 'Shared Resource' and everyone is responsible for its upkeep and registering its significance with the ability to ensure it can of benefit to the future generations.

To relate this to Lampeter itself, the building and its surroundings have had many previous purposes e.g. an initial college building and now a university facility with a growing campus community, both of these uses provide a 'shared resource' not only for its users as students but the local community in a social and economic way.

4. Everyone will be able to participate in sustaining the historic environment

Again, this section emphasizes the need for all generations to care for their historic environment, this can be done in many ways however one key pathway is to ensure generations 'maintain and pass on the specialist craft, professional skills and knowledge'.

Using the points raised for number 3 above and Lampeter being a shared resource, the use of incorporating the local community and encouraging education within such a historic building can be a significant part in sustaining the historic environment and making all uses aware of its heritage value and significance.

5. Decisions about change must be reasonable, transparent, and consistent

This section discusses 'Good Practice' in relation to how owners and managers of these historic assets can prepare for change and who they are able to seek advice from in order to do these changes.

In relation to Lampeter, it provides advice that those caring for the building should seek expert knowledge and advice prior to carrying out any work. Relating back to the traditional lime based render, previously this was not used and a cheaper modern alternative has been used, therefore if advice would have been appointed, the exterior walls may be of better quality now than they are and in keeping with the rest of the building, instead this modern render has somewhat damaged the traditional historic values. This is also another reason for a heritage impact assessment to be carried out by experts advising on these changes.

6. Documenting and learning from decisions are essential

Principle 6, details that owners and managers need to ensure correct and detailed records are kept in safe places such a public archive, these will contain justification on all decision made and considered on the historic asset. This will be crucial for future generations to identify any change or alteration made by using these documents.

Although, we are educated in relative to the main principles of conservation, which enables us to protect, understand, assess, and manage, it is of benefit to understand those six principles in action with respect to the following:

- Preamble
- Routine management, maintenance, repair, and restoration
- New work and alterations
- Periodic renewal and archaeological intervention
- Merging conservation and enabling development

Even though all of the points stated above are in relation to care, management and protection, the main point which should be at the forefront of conservation management is in fact the routine management, maintenance, repair, and restoration sections within the report.

As indicated by (CADW, 2011) it states that there should be 'Continual improvement' which helps the need for identifying repairs and renewals at an early stage, this also coincides with repairs and restoration where it identifies the need for low-risk maintenance that happens regularly to avoid mass disrepair. It should be highlighted that if a historic asset is left to deteriorate, it can prove more harm than good leaving the asset in possible condition of mass decay and neglect. This could result in a costly investment to ensure the property is able to get back up to its original or near original state.

Finally, relating this point back to Lampeter, educates the assets managers and owners to learn from mistakes, again using the modern techniques can actually damage the historic assets and its history. It is also required to provide documentary evidence on any changes whether these be good or bad just so the future generations are able to fully understand the materials and techniques used.

Retrofitting and PAS 2035

As we progress further into the future, it is important to remember that historic buildings will not just disappear, they will continue to hold a significant value. If we look at modern day construction of buildings, the life expectancy can be around fifty years according to (Bathurst, 2023) whereas historic assets are still standing decades later, some with severe deterioration and therefore lessons should be learnt to respect the quality and workmanship of these buildings, and this is where we begin highlight the significance of retrofitting.

PAS 2035 and retrofitting go hand in hand, providing information on improving the use of old building stock using modern day education and techniques. In light of the document by (BSI, 2023) it promotes "technically robust" domestic retrofit with relation to:

- Enhanced building functionality, usability, and durability.
- Enhanced comfort, health, and well-being of building occupants and visitors.
- Enhanced energy efficiency, resulting in decreased fuel use, fuel costs, and pollution (particularly greenhouse gas emissions associated with energy use)
- Reduced environmental impacts of buildings.

- Safeguarding and enhancing the building stock's architectural and cultural heritage.
- Preventing any unintended consequences from any of the aforementioned.
- minimizing the "performance gap," which arises when fuel use, fuel cost, and carbon dioxide emissions are not reduced to the intended or anticipated levels.
- Safeguarding the client and the general public in relation to retrofit work.

As discussed in the conservation principals section of this report, we need to utilize old building stock and ensure they are kept in the best condition as they age and to do this, we should emphasize all different asset management approaches and the challenges buildings can face.

There are 3 asset management approaches which are most commonly used in industry, these approaches can be considered as conflicting due to the methods each use, however, neither can be considered as a 'bad approach' as one may work better than the other for different types of buildings. The three approaches are:

Reactive plan or Run to Fail

This approach is seen as a plan in which is put into place to allow all assets to completely run to the end of their lifespan and at that point, it is then replaced and only that asset nothing else. There are positive and negative aspects of using 'Reactive Plans Or Run To Fail' for asset management and this is because a reactive approach can be used in a more strategic manner, deploying this strategy to items which are of low cost and do not affect the functionality of a building. The positive aspects are:

- Minimal upfront maintenance costs due to the lack of software needed to monitor assets.
- Less staffing costs due to not having to employ specialists to continuously test and monitor significant assets.
- Less time consumed on planning for maintenance, as this approach doesn't require planning, only a reaction once the asset has stopped working.

The downfalls to this approach are significantly higher than the advantages, The drawbacks include:

- Increase in unplanned maintenance and this is down to the fact that nothing has been drafted for a replacement or alternative forms of rectification are now on hold until a new part arrives, this could provide difficulty if that department is out of use because of a broken asset and users are not able to access this department as it could be unsafe to do so.
- Higher expenses on emergency call out fees due to breakdowns happening out of hours or in the case of an emergency.
- Risk to staff safety as un-serviced equipment could cause harm to staff members or users of the building.
- High consumption of energy usage due to performance levels of that asset dropping and costing more expense to run.

PPM (Plan and Preventative Maintenance)

An alternative approach to asset management would be the PPM method, this provides regular routine checks and servicing to ensure the asset is running to the best of its ability and that way the software system is also updated on asset shelf life. By continuously servicing an asset it allows the user to pre-empt any forthcoming maintenance in order for them to source a contractor or a replacement by the time that asset does eventually break down. The positive aspects of this approach are:

- Reduces long terms costs as plans have been put into place for future repairs therefore costs can be put aside ready for this new part or larger repairs.
- Better energy consumption due to the asset running as smoothly as possible from continuous maintenance and repairs.
- Long life span of assets due to continuous monitoring and services parts.
- Improving the time and resource consumption for staff as everything should be logged on a system meaning staff do not need to spend excess time on finding a replacement or sourcing a repair.

Drawbacks to using the PPM approach is as follows:

- Can be relied on too much and therefore 'Over Maintaining' meaning that it can be seen as a waste of time and money in some cases and sometimes parts can break because of frequent disruption of inspections.
- There is question as to whether it is one hundred percent correct and accurate.

Statutory Only

This final asset management approach is carrying out duties of responsibility, repair and maintenance on assets that are only required by statutory regulations and legislation, this approach can be seen in instances where buildings are being made redundant and that require minimal care in order to keep them standing, statutory only asset management factors in assets such as fire alarm systems, security systems and any asset that could cause harm to the user/s.

Asset management systems are crucial to keeping track of all assets involved within a building. Asset management systems consist of the following aspects:

- People

This ensure that all those involved in asset management are aware of the roles and responsibilities required.

- Process

These can include understanding the processes involved in asset management, the processes can be identified in the form of Decision trees, flow charts, RACI Charts, and financial analysis.

- Software

The software can include CMMS, SCADA, DSS and GIS all which provides a substantial software to include all the data needed.

- Data

Will be required to involve quality, accuracy, validity, completeness and uniqueness, these crucial elements of information can provide the user with a greater understanding of their assets.

- Assets

Can be classed as, mechanical, electrical, BMS, structural, plumbing, equipment, and IT systems. All of these are assets within a building and are required to be monitored and detailed for future reference. Providing more information of these assets will pose the user with better understanding of the building and enable a more efficient asset management procedure.

To conclude these approaches, you can clearly see the difference in the drawbacks and the positive aspects of each approach, although it must be said that these approaches may be beneficial to some projects and not to others. It is key to consider the size of the building when planning which approach is best suited. The key to having an efficient and successful asset management approach, is relying on significant, detailed, and specific data.

In relation to Lampeter's building, the current approach used is the reactive approach, where they allow assets to fully break before considering a replacement, and to reference the drawbacks of this approach in comparison to Lampeter, the building is owned by a public body and may not have the funds to integrate a software to help monitor all of its assets, the building is of a large size and covers multiple different buildings within the campus. If we were to consider an alternative approach for Lampeter to use as its asset management, it may be beneficial given the points mentioned above in relation to available funds, usage and size of the building, to utilise the PPM method, although there may be an enormous upfront cost, the overall future costs can be reduced massively just by using a software and equipping an adequate maintenance team. To combat areas that do not require as much maintenance due to not being used for a certain amount of time per day or months then this could also be noted on the software to allow for larger timescales of maintenance required when these rooms are out of action. It should also be noted that the building is of a listed status meaning that it can be detrimental to allow for assets to be broken or faulty for some time before replacement as this could affect the buildings over all structure and possibly cause more damage.

When we carry out asset management within a building, it is important to ensure that all aspects that are put in place, benefit the building in future. These approaches should include weatherproofing and sustainability for example. It is crucial to ensure that when using asset management, it is used to its greatest potential, this can be done by ensuring the building and its management is equipped with a good amount of pre-planning and organisation, and this will endeavour to prevent additional and unreasonable costs being spent in the near future. As we progress into the later stages of this building's life, it will be inevitable that it will require an in depth and advanced asset management plan which ultimately means spending money now rather than adding to the list of asset failures.

When considering an asset management plan for a large complex building such as Lampeter, key challenges need to be taken into account. These key challenges come in the form of financial restrictions such funding, the over status of the building including listed status and the current occupiers and their time of occupation. Other challenges include getting any maintenance or repairs completed without much disturbance as well as targets and goals set by external bodies such as energy performance, building performance, any compliance set by building control. Finally, the most significant challenge is the software of asset management systems, some of which cost a lot of money and others require training for staff and training on these asset management systems, both of these would ensure that these systems are used to the best of its ability.

Sustainable Strategies-

From this point forward sustainability should be high on the agenda for restoration or new projects. Sustainable strategies also known as the four pillars of sustainability relates to human, social, economic, and environmental aspects as stated by (RMITUniversity, 2017).

Net zero integrates well with sustainable strategies in terms of preventing deterioration of the condition as well as preparing it for the future. It is about preserving buildings with the correct techniques in order to provide the building a stable condition in years to come. It must be taken into consideration the effect of global warming on historic buildings and how we will equip the historic asset with the resources to withstand the needs and the effects of global warming and climate change.

Sustainable management and life cycle analysis can be seen as an integral part of sustainable strategies, as the management focuses on aspects such as the embodied carbon and energy within the building itself and the products used. Embodied carbon is defined as the amount of greenhouse gases released during the production, delivery, installation, upkeep, and disposal of construction materials as indicated by (Carbon Leadership Forum, 2023). It is also important to consider the operational carbon as well as the embodied energy that is present in the building once it is in working practice. Operation carbon cannot be reduced once the building has been constructed therefore considerations need to be at the forefront of all of its design and construction, Especially when choosing the correct materials and products as these can have a knock-on effect to how much operation carbon is used once the building is in use by its occupants. When retrofitting a project, choosing the materials in order to retrofit needs to be closely considered to prevent any additional operational carbon once the project has been completed.

The life cycle analysis considers the impact of the whole life cycle of a project, and it simply ensures that the quantities and quality of all the materials and processes are combined into a data block called an inventory.

Lampeter is a non-renewable resource which ultimately means we have to secure its long-term survival as a way of its sustainable development. Lampeter itself contains a large amount of embodied energy and carbon, meaning the more we can sustain this development the greater contribution of its embodied energy to sustainability.

This has been proven by its previous uses of a college and now as a university and in many years to come, hopefully this building will continue its current use or adapt into a new form of use, continuing to benefit its embodied energy and carbon.

Another significant part of sustainable strategies is to ensure correct maintenance and repair, which relates back to asset management approaches discussed above, where the better the management of the asset, the better outcome the building will have on being preserved and also, the better the asset is managed with relation to energy efficiency, the better occupants can preserve energy because of the environment being of more comfort.

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