



Trinity Group Ltd

Material Comparison

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**New Centre of Excellence for
Construction**

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Introduction

This section forms part of my individual contribution to the Integrated Project for the proposed Centre of Excellence for Construction Training at SA1 Swansea Waterfront. My work focuses on comparing material costs and reviewing different construction systems that could be used for the proposed building.

The project is for a two-storey education and training building, with teaching spaces, workshop areas, support accommodation and new parking provision. The current design taken forward by the group uses a steel frame, composite upper floor, green roof, insulated wall panels with a brickwork plinth, and aluminium triple-glazed windows. My section aims to test whether this selected specification provides reasonable value when compared against other possible construction options.

The comparison has been based on the current drawings, material take-offs and feasibility information prepared by the group. As the design is still developing, the figures should not be treated as a final tender estimate. They are intended to give an early-stage comparison of the main superstructure elements and support the decision to take Option A forward.

Rates have mainly been taken from Spon's Architects' and Builders' Price Book 2023, using a mixture of approximate and measured rates depending on the level of information available (AECOM, 2023). The comparison has been structured by building element, which follows the general approach used in RICS NRM 1 for early-stage cost planning and option comparison (RICS, 2021). RICS confirms that NRM provides standard measurement rules and guidance for cost management, and NRM 1 specifically relates to order of cost estimating and cost planning for capital building works.

Material Cost Comparison

Introduction

A material cost comparison was carried out for the proposed Centre of Excellence at SA1. The comparison focuses on the main superstructure elements that I was responsible for. These are the structural frame, upper floors, roof construction, external walls and windows/glazing.

The comparison looks at three options:

Option A is the proposed design shown in the drawings. This includes a steel frame, composite metal deck flooring, a green roof, QuadCore insulated wall panels with a brickwork plinth, and triple-glazed aluminium windows.

Option B is a more traditional alternative using a reinforced concrete frame, hollowcore precast floors, a metal roof, brick cavity walls and double-glazed aluminium windows.

Option C is a more specialist alternative using a glulam timber frame, in-situ reinforced concrete floors, a built-up felt roof, precast concrete cladding and uPVC double-glazed windows.

The purpose of this exercise was not just to find the cheapest option. For this project, the selected option also needs to suit the building use, the SA1 site, the construction programme and the client's sustainability aims.

The rates were mainly taken from Spon's Architects' and Builders' Price Book 2023 (AECOM, 2023). The full cost build-up and rate comparison are included in Appendix A.

Option A: Proposed Steel Frame Option

Option A is the option that has been developed in the current drawings. It includes a steel frame, Tata Steel ComFlor composite metal decking with concrete topping, a green roof system, a brickwork plinth with QuadCore KS1000RW insulated wall panels above, and triple-glazed aluminium windows.

The base material cost for Option A is approximately £609,230, increasing to around £670,153 after applying the 10% uplift for 2026 pricing and the Swansea location.

For this project, the steel frame is a sensible choice because the building needs open and adaptable internal spaces. The Centre of Excellence includes teaching and workshop areas, so the layout needs to be more flexible than a standard classroom building. A steel frame helps with this because it can provide wider, more open spaces with fewer internal restrictions.

The steel frame also suits the programme. Steelwork can be fabricated off site and erected quickly once the substructure is ready. This helps reduce time on site and supports the overall build programme. Buildability and programme control are important factors when selecting construction methods, particularly where the client has a fixed completion date (Harris et al., 2021).

The composite floor system also works well with the steel frame. The metal decking acts as permanent formwork, which reduces the need for temporary formwork on site. This should help the upper floor works progress more quickly than a fully in-situ concrete slab. This is useful because it allows the frame and floor structure to be formed efficiently before the envelope and internal works move forward.

The external wall build-up also fits the scheme. The brickwork plinth gives the lower part of the building a more robust finish, which is useful because the building will be used by students, staff, visitors and training users. At ground level, the façade is more likely to be exposed to impact, staining and general wear. The QuadCore insulated panels above the plinth help the building become weather tight earlier and give a more modern finish.

The green roof and triple-glazed aluminium windows are the main reasons Option A is more expensive than Option B. However, these are not just upgrades for appearance. The client brief places importance on sustainability, innovation and environmental impact. The green roof supports this by improving the environmental performance of the roof and helping with rainwater management. The triple glazing also supports thermal performance and gives the building a higher quality finish.

In my view, Option A is not the cheapest option, but it is the most suitable option for the scheme shown in the drawings. It fits the building use, supports the programme and reflects the client's aim for a modern and sustainable Centre of Excellence.

Option B: Concrete Frame Alternative

Option B uses a reinforced concrete frame, hollowcore precast floor slabs, a metal roof, brick cavity walls and double-glazed aluminium windows. This option was the lowest-cost option in the comparison, with a base cost of approximately £594,636, increasing to around £654,100 after the 10% uplift.

The lower cost is mainly due to the simpler specification. The metal roof is considerably cheaper than the green roof, the brick cavity wall is a familiar and cost-effective wall type, and double-glazed aluminium windows are cheaper than the triple-glazed windows used in Option A. The hollowcore precast planks also help keep the floor construction efficient when compared with a fully in-situ slab.

This option is a useful benchmark because it shows what a more traditional construction approach could cost. It would likely be familiar to contractors and could

be straightforward to price and build. The concrete frame would also provide good durability and fire resistance.

However, Option B is not automatically the best choice just because it is the cheapest. A reinforced concrete frame is generally heavier and usually involves more trades, formwork, reinforcement and curing time. This could create more pressure on the programme.

There is also a flexibility issue. The proposed building is intended for construction training, so the internal spaces may need to adapt to different teaching methods, equipment or workshop layouts over time. A steel frame is better suited to that requirement than a heavier concrete frame with less flexibility.

The ground conditions also need to be considered. The site is within a former dockland area, and the group's feasibility work identified ground-related constraints that may affect foundation design. Because of this, a heavier superstructure could place greater demand on the substructure. Although substructure costs are excluded from my comparison, this is still a factor that should be considered when selecting the frame option.

Overall, Option B is strong from a basic material cost point of view. However, when programme, flexibility and the project's training use are considered, it does not fit the scheme as well as Option A.

Option C: Glulam Timber Frame Alternative

Option C uses a glulam timber frame, in-situ reinforced concrete floors, a built-up felt roof, precast concrete cladding and uPVC double-glazed windows. This was the most expensive option in the comparison, with a base cost of approximately £724,248, increasing to around £796,673 after the 10% uplift.

The main cost issue with Option C is the precast concrete cladding. This makes the external wall package much more expensive than the insulated panel system used in Option A and the brick cavity wall used in Option B. The glulam frame also adds cost because it is a more specialist system and would need more design coordination.

There are positives to this option. A glulam frame would support the client's sustainability and innovation aims. It could also be useful for a Centre of Excellence because the building itself could demonstrate modern methods of construction and alternative structural materials. This would fit well with the purpose of a construction training facility.

However, Option C also brings more risk at this stage. Glulam needs careful detailing, especially around fire protection, moisture control, connections and long-term

durability. The building includes practical training and workshop areas, so the durability of finishes and structural protection would need to be carefully considered. The in-situ concrete floor also slows down the construction compared with the composite floor system in Option A.

Although Option C has sustainability benefits, the way this option has been built up does not provide the best value for this project. The savings from the felt roof and uPVC windows are not enough to offset the higher cost of the glulam frame and precast concrete cladding.

For that reason, Option C is not recommended as the preferred option at this stage. It could be developed further if the client wanted to prioritise embodied carbon and innovation above cost, but based on the current comparison, it is too expensive and too specialist compared to the preferred option.

Overall Comparison

The comparison shows that Option B is the cheapest in initial material cost terms, followed by Option A, with Option C being the most expensive. However, the cheapest option is not always the best option. A QS appraisal should consider cost alongside programme, buildability, flexibility, risk, specification and suitability for the client's brief (Ashworth, Hogg and Higgs, 2013).

For this project, Option A gives the best overall balance. The steel frame supports the open teaching and workshop spaces, the composite floor system works well with the frame, and the insulated panels help the building become weather-tight earlier. The green roof and triple glazing also support the client's sustainability and performance aims.

Option B is cheaper, but it is more traditional and does not support the project programme and future flexibility as well as Option A. Option C has some strong sustainability points, but the higher cost and specialist detailing make it harder to justify at this stage.

Based on the current drawings, cost comparison and feasibility information, Option A is the most appropriate option to take forward. It is not selected because it is the cheapest. It is selected because it gives a better overall fit for the Centre of Excellence.

Basis of Estimate

This material cost comparison has been prepared using the drawings, material take-offs and feasibility information available at this stage of the project. The comparison focuses on the main superstructure elements only. These include the frame, upper floors, roof, external walls and glazing.

The rates have mainly been taken from Spon's Architects' and Builders' Price Book 2023. Approximate rates have been used where a suitable system rate was available and measured works rates have been used where a direct system rate could not be found (AECOM, 2023).

The comparison has been set out by building element. This is appropriate for an early-stage cost exercise because it allows different systems to be compared clearly. This approach is also consistent with RICS NRM 1, which guides the order of cost estimating and cost planning for capital building works (RICS, 2021).

The rates used reflect the Spon's rate basis, including labour, plant and material allowances where these are included in the published rates. The comparison excludes preliminaries, overheads and profit, design fees, services, internal finishes, external works and substructure.

A 10% uplift has been applied to allow for 2026 pricing and the Swansea location. This uplift has been applied consistently to all three options so that the comparison remains fair.

This estimate is suitable for feasibility-stage comparison only and should not be treated as a final tender estimate. The costs should be reviewed and updated once the design develops further, specifications are confirmed and contractor quotations are available.

The full material cost comparison spreadsheet and rate build-up are included in Appendix A.

Assumptions

The comparison is based on the current project drawings, material take-offs and feasibility information prepared by the group.

The building has been treated as a two-storey education and construction training facility at SA1 Swansea Waterfront.

The comparison only includes selected superstructure elements. These are the frame, upper floors, roof, external walls and glazing.

Substructure works have been excluded because detailed foundation design and ground investigation information were not available. Substructure costs should be reviewed separately once the ground conditions and foundation details are confirmed.

Services, internal finishes, external works, preliminaries, overheads and profit have not been included in this comparison.

The 10% uplift has been applied to all options to allow for 2026 pricing and the location.

The parking shown on the site layout, including 35 spaces and 6 disabled bays, has been treated as part of the wider scheme but has not been included in this material cost comparison.

The window areas are based on the material take-off and elevations. A consistent area-based approach has been used for costing, although individual window sizes vary across the drawings.

Limitations

This comparison is suitable for the feasibility stage review only. It should not be treated as a final tender estimate.

The comparison only includes selected superstructure elements and does not represent the full building cost.

The rates are based on Spon's published information and may not reflect live contractor pricing, procurement routes, discounts, market conditions or site-specific risks.

The comparison does not include detailed lifecycle costing, embodied carbon assessment or long-term maintenance costs.

Substructure costs have been excluded due to the lack of detailed foundation design and ground investigation information.

5.6 Uses of Surrounding Development

The proposed site is located within the SA1 Swansea Waterfront area. This is already a mixed-use regeneration area, with university buildings, offices, commercial uses, residential properties and public routes through the waterfront. This makes the proposed Centre of Excellence suitable for the site because it fits with the existing education and employment character of the area.

The existing UWTSD buildings are important when considering the surrounding development. The IQ Building and Y Fforwm are already located at the SA1 Waterfront Campus, and UWTSD describes the IQ Building as a space linked to STEM subjects, innovation and specialist equipment (University of Wales Trinity Saint David, n.d.). This supports the proposed use because the Centre of Excellence would add to the existing education and training activity in the area rather than introducing an unrelated use.

Access is also a positive factor. UWTSD states that the IQ Building at SA1 Swansea Waterfront is within walking distance of the city centre, the central bus station and Swansea train station. It is also accessible by cycle paths, buses and by car (University of Wales Trinity Saint David, n.d.). This is important because the proposed building will need to be accessible for students, staff, and visitors.

The site layout also shows new parking provision, with 35 spaces including 6 disabled bays (The Trinity Group, 2025a). This supports the day-to-day use of the building and helps reduce pressure on existing parking in the surrounding area. This is especially important because SA1 is already used by university staff, students, businesses and residents.

The main issue with the surrounding development is that the site is not isolated. It sits close to existing university buildings and public paths. During construction, there could be disruption from deliveries, plant movement, noise and temporary traffic changes. This does not make the site unsuitable, but it does mean that construction logistics need to be planned properly.

In my view, the surrounding development supports the proposed building. The site fits the existing use of SA1 and supports the wider regeneration of the waterfront. The main challenge will be managing the construction phase so that disruption to nearby users is kept as low as possible.

7.1 Existing Construction Composition and Level of Specification

The proposed building is based on Option A, which is the steel frame option shown in the current drawings. This includes a steel frame, composite upper floor, green roof, brickwork plinth, QuadCore insulated wall panels and triple-glazed aluminium windows.

For this project, the steel frame is a good fit because the building needs open and flexible spaces. The Centre of Excellence will include teaching and practical training areas, so the layout needs to work for different types of use. A steel frame gives more flexibility than a heavier concrete frame and is better suited to open workshop and teaching spaces.

The steel frame also supports the programme. Steelwork can be fabricated off site and then erected quickly on site. This is useful for the SA1 project because it reduces the time needed to form the main frame compared with slower wet construction methods. Harris et al. (2021) identify buildability and programme control as important factors in construction management.

The upper floor uses Tata Steel ComFlor composite metal decking with a concrete topping. This works well with the steel frame because the metal decking acts as permanent formwork. It reduces the amount of temporary formwork needed on site and helps the floor works progress more quickly. This is a practical choice for this building because it supports the programme and provides a strong upper floor for education and training use.

The roof is specified as a green roof system. This is a higher-cost choice compared with a basic metal or felt roof, but it suits the client's sustainability aims. A green roof can help with rainwater management and improve the environmental performance of the building. It also gives the building a more considered finish, which is suitable for a Centre of Excellence.

The external wall build-up uses a brickwork plinth at low level with QuadCore KS1000RW insulated wall panels above. This is a practical solution for the project. The brick plinth gives durability at ground level, where the building is more likely to be affected by impact, staining or general wear. The insulated panels above are quicker to install than traditional masonry and help the building become weather-tight earlier.

The windows are triple-glazed aluminium units. This is a higher specification than standard double glazing, but it supports better thermal performance and durability. Aluminium also suits the appearance expected for a modern education and training building.

Overall, the selected construction composition is a high specification for this type of building. It is not the cheapest route, but it suits the client's brief and the purpose of the Centre of Excellence. The main benefit of the selected specification is that it balances buildability, programme, durability, sustainability and long-term use.

7.2 Alternative System of Construction

Alternative systems of construction were considered to test whether the selected Option A steel frame solution was the most suitable choice. This was important because the material comparison showed that Option A was not the cheapest option. A proper appraisal needs to consider more than just initial material cost. It should also consider programme, buildability, flexibility, sustainability and suitability for the client's brief (Ashworth, Hogg and Higgs, 2013).

Option B was a reinforced concrete frame with hollowcore precast floors, a metal roof, brick cavity walls and double-glazed aluminium windows. This was the lowest-cost option in the comparison. It is a more traditional form of construction and would be familiar to many contractors. It also provides good durability and fire resistance.

However, Option B does not fit the project as well as Option A. The concrete frame is likely to be slower to build because it involves more wet trades, formwork, reinforcement and curing time. It may also be less flexible if the internal layout needs to change in the future. For a construction training facility, flexibility is important because the building may need to adapt to different workshop layouts, equipment or teaching methods.

Option C was a glulam timber frame with in-situ concrete floors, a built-up felt roof, precast concrete cladding and uPVC double-glazed windows. This option has sustainability benefits because glulam can reduce carbon if it is properly sourced and designed. It could also suit the innovation side of the client's brief, as the building itself could demonstrate a modern construction method.

The issue with Option C is that it is more expensive and more specialist. The precast concrete cladding significantly increases the external wall cost, and the glulam frame would require careful detailing around fire protection, moisture, connections and durability. The in-situ concrete floor also does not support the programme as well as the composite floor in Option A. For this project, Option C introduces more cost and design risk than the selected steel option.

In my view, Option A is the strongest choice overall. Option B is cheaper, but it is less suited to the project programme and future flexibility. Option C has sustainability benefits, but the higher cost and specialist detailing make it less suitable at this stage.

Option A provides the best balance between cost, buildability, programme, sustainability and design quality.

The comparison has been structured by building element, which supports a clearer like-for-like review of the different options. This is consistent with RICS NRM 1, which provides a standard basis for early-stage cost planning and comparison of construction elements (RICS, 2021).

Reference List

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University of Wales Trinity Saint David (n.d.) How to get to our Swansea Campus. Available at: University of Wales Trinity Saint David website (Accessed: 05 May 2026).

Material Cost Comparison: Superstructure Options					
UWTSD Construction Centre					
Trinity Group Limited					
Option A: Proposed Steel Frame Solution Option B: Concrete Frame Alternative Option C: Glulam Timber Alternative					
 TRINITY GROUP					
Element	Option A - Description	Quantity	Unit	Option A - Rate (£)	Option A - Total (£)
Frame	Steel frame	54.50993	tonnes	£3,431.01	£187,024.11
Upper Floors	Tata Steel ComFlor composite ribdeck flooring with concrete	509	m2	£110.00	£55,990.00
Roof	Green roof system	553	m2	£212.50	£117,512.50
External Walls	Brickwork plinth	57	m2	£63.25	£3,605.25
	QuadCore KS1000RW insulated panels	742	m2	£260.00	£192,920.00
Windows & Glazing	Triple glazed aluminium windows	64	m2	£815.29	£52,178.37
					Adjustments for location & inflation @ 10%
					£609,230.23
					£670,153.26
Element	Option B - Description	Quantity	Unit	Option B - Rate (£)	Option B - Total (£)
Frame	Concrete Frame	1410	m2	£210.00	£296,100.00
Upper Floors	Hollowcore precast planks	509	m2	£100.00	£50,900.00
Roof	Metal roof	553	m2	£109.50	£60,553.50
External Walls	Brick Cavity wall	799	m2	£170.00	£135,830.00
Windows & Glazing	Double glazed aluminium windows	64	m2	£741.17	£47,434.88
					Adjustments for location & inflation @ 10%
					£590,818.38
					£649,900.22
Element	Option C - Description	Quantity	Unit	Option C - Rate (£)	Option C - Total (£)
Frame	Glulam timber frame	1410	m2	£220.00	£310,200.00
Upper Floors	In-situ reinforced concrete slab	509	m2	£110.00	£55,990.00
Roof	Built-up felt flat roof	553	m2	£132.50	£73,272.50
External Walls	Precast concrete cladding	799	m2	£335.00	£267,665.00
Windows & Glazing	uPVC double glazed windows	64	m2	£267.50	£17,120.00
					Adjustments for location & inflation @ 10%
					£724,247.50
					£796,672.25
Assumptions					
Rates based on Spon's 2023.					
Quantities taken from project drawings and take-offs.					
Costs are material/superstructure comparison only.					
Substructure, services, finishes, preliminaries, OH&P and external works excluded.					
10% uplift applied for 2026 pricing and Swansea location.					
Suitable for feasibility-stage comparison only.					