

Advanced Project Management

REPORT AND GANTT CHART

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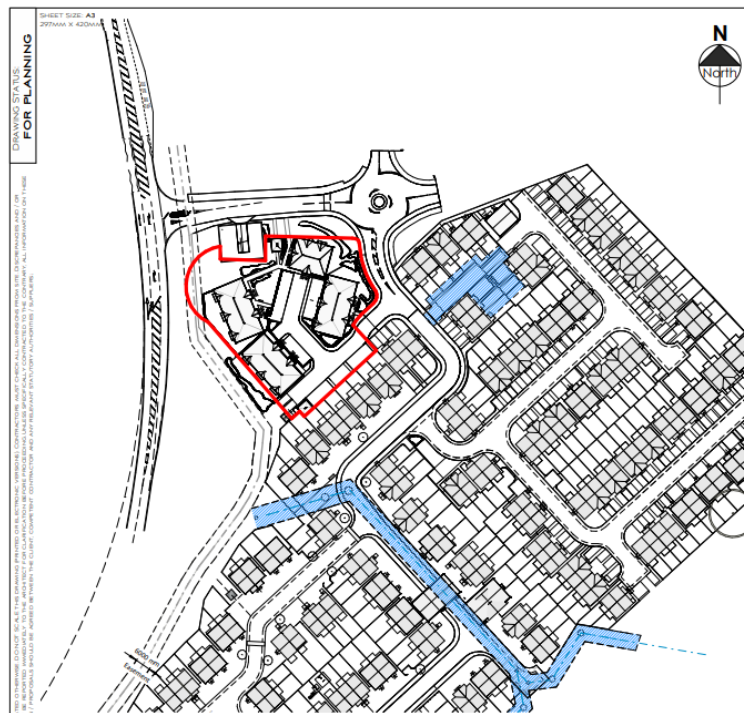
Task 1

Introduction

The successful delivery of a construction project depends on the effective identification, allocation, and management of the resources that underpin its progress. This report focuses on the development of 30 residential apartments and associated works at Upper Bank, Nantong Way, Pentrechwyth, Swansea, as outlined in planning application 2021/0944/FUL. As a multi-disciplinary construction scheme involving structural works, utilities, access improvements, and environmental considerations, the project requires a coordinated approach to managing critical resources such as labour, materials, equipment, finance, and site logistics. The complexity of the development, combined with its urban riverside location and regulatory constraints, makes resource planning and control essential to maintaining programme, cost, and quality targets.

This report evaluates the key resources required for the project and examines how they are monitored and controlled throughout the construction lifecycle. It also explores the potential causes and impacts of project delays, assessing a range of recognised project-management methods for resolving such issues. By analysing these approaches and justifying the most suitable strategies for this specific development, the report provides a structured foundation for ensuring that the project can be delivered efficiently, safely, and in accordance with planning and regulatory requirements.

The proposed construction site consists of four residential apartment buildings, each positioned on one of the four designated plots. Which is identified within the site location plan. The layout of the development has been arranged to make efficient use of the available land. Which ensures clear boundaries between plots



WHAT POTENTIAL DELAY ISSUES COULD ARISE DURING THE PROJECT?

Project Resources

Human resources:

Human resources are the backbone of any construction project. Their effective management is essential for ensuring that work progresses safely, efficiently, and to the required quality standards. Which a development such as the 30 residential apartments at Upper Bank, Nantong Way, the project relies on a string work force that includes project managers, site supervisors, subcontractors, skilled tradespeople, engineers, and general laborers. Each group contributes specialist knowledge and practical expertise, and the coordination between them determines the overall productivity of the site. Research consistently highlights that labor-related issues such as shortages of skilled workers, inadequate supervision, poor communication, and low morale are among the most significant causes of delays and cost overruns in construction. Effective human resource management therefore requires clear role allocation, strong leadership, continuous training, and proactive workforce planning to ensure that the right people are available at the right time. Which emphasizes that construction projects are highly dependent on teamwork and interpersonal relationships, meaning that communication and motivation strategies are just as important as technical skills. In addition, industry guidance from the Chartered Institute of Building stresses the importance of monitoring labor performance, ensuring compliance with health and safety regulations, and maintaining a positive site culture. For the Upper Bank project, where multiple subcontractors will be working simultaneously in a constrained urban environment, the ability to manage human resources effectively is critical to maintaining progress and achieving the projects deadlines

Referenced:

- Assaf, S.A. and Al-Hejji, S. (2006). Causes of delay in large construction projects. *International Journal of Project Management*
- Loosemore, M. (2003). *Human Resource Management in Construction Projects*. Routledge.
- CIOB (2024). *CIOB*.
- HSE (2015). *Construction - Construction Design and Management Regulations 2015*.

To reduce human error a better way for to construct the project is by using a modular construction method. Which offers major advantages for human resource management because much of the work is shifted from a traditional site environment into a controlled

factory setting. This approach reduces the need for large on-site labor teams and allows tasks to be completed by a stable, skilled workforce operating in consistent conditions. With factories able to run year-round and free from weather disruptions, labor productivity becomes far more predictable, improving scheduling and reducing downtime. CITB data shows that modular construction can cut on-site labor requirements by up to 80%, easing pressure on recruitment and reducing the risk of labor-related delays. In addition, the factory environment supports stronger supervision, clearer workflows, and rigorous quality checks at every stage, helping ensure that human resources are used efficiently and that workmanship remains consistently high. By delivering modules that are already 70–80% complete. Which modular construction minimizes the number of trades required on site, improving coordination and reducing the likelihood of human-resource bottlenecks.

Boury, A. (2024). *Benefits of Modular Construction* | *The Access Group*.

Materials:

Material-related delays are a significant risk for the Upper Bank, Nantong Way apartment development because the project relies heavily on timely delivery of long-lead and high-demand construction materials. A scheme of this scale requires large quantities of concrete, steel reinforcement, blockwork, insulation, windows, roofing systems, and mechanical and electrical components. Any disruption in the supply chain such as manufacturing backlogs, transport delays, or shortages of specialist items can halt progress on critical path activities. Research shows that material delays are among the most common causes of construction overruns, often resulting from poor procurement planning, unreliable suppliers, or inadequate site storage capacity. Which this project, the constrained riverside site increases the risk because limited storage space means materials must be delivered just-in-time, making the program more vulnerable to external disruptions. Long-lead items such as windows, façade systems, and lift components are particularly sensitive; delays in these materials can prevent the building from becoming watertight, which in turn delays internal trades. Effective procurement scheduling, early supplier engagement, and continuous monitoring of delivery timelines are therefore essential to minimize material-related delays and maintain programming momentum.

“In recent years, UK builders have faced unprecedented supply chain disruptions. From Brexit-related import challenges to global manufacturing slowdowns, getting materials on time has become one of the biggest contributors to construction delays. Even a single missing component like a set of windows or a boiler can bring an entire project to a standstill.

Common reasons for shortages include:

- Increased demand during peak building seasons
- International shipping delays

- Factory production slowdowns or strikes
- Special-order materials with long lead times”

Builder Expert. (2025). *Common Causes of Construction Delays - And How to Avoid Them*

To stop delays in material delivery is by incorporating planning and using a strong supplier management. Accurate forecasting of material needs, clear communication of specifications, and early ordering help prevent errors and shortages. Choosing reliable suppliers and checking real-time stock availability ensures materials are genuinely obtainable before committing to an order. Tracking deliveries provides visibility and allows quick responses to issues. Building strong supplier relationships encourages prioritization during busy periods, while consolidating orders reduces logistical mistakes. Using local suppliers can shorten delivery times and minimize disruption from transport issues. Flexibility with alternative materials and maintaining contingency plans such as backup suppliers or emergency stock helps keep the project moving when unexpected problems arise. Overall, effective planning, communication, and monitoring are essential to keeping material-related delays to a minimum and maintaining project schedules. - MaterialsPro. (2024). *How to Minimize Building Material Delays: The Key to Timely and Smooth.*

Plant and Equipment:

Plant and equipment can play a crucial role in keeping construction projects on schedule, and delays in their availability or performance can have a major impact on productivity. For the Upper Bank apartment development, essential plant such as excavators, cranes, concrete pumps, scaffolding systems, and MEWPs must be available at the right time to support excavation, structural works, lifting operations, and access. Any breakdowns, late deliveries, or shortages can alter the critical path activities, causing knock-on delays for multiple trades. Research shows that poorly managed plant resources are a common cause of construction delays, often linked to inadequate maintenance, unreliable hire arrangements, or poor coordination between subcontractors (Gould & Joyce, 2014). Effective plant management therefore requires advance scheduling, regular servicing, competent operators, and clear communication with hire companies. Using modern tracking and maintenance systems also helps ensure equipment remains safe, reliable, and ready when needed. On a constrained site like Upper Bank, where space is limited and multiple trades will be working simultaneously, efficient plant planning is essential to avoid congestion, improve workflow, and maintain programme momentum.

Construction projects depend on precise coordination, and even a single piece of delayed or faulty equipment can disrupt the entire workflow. Which delays often arise from mechanical breakdowns, operator mistakes, late deliveries, or inadequate maintenance. Because equipment issues can stop major operations such as concrete pours or steel erection, they frequently become central evidence in high-value legal disputes. To understand the true impact, project teams must determine whether the equipment

problem caused a critical path delay, meaning it directly affected the project's completion date. This requires a detailed review of schedules, maintenance logs, site diaries, and communication records to reconstruct events accurately and assign responsibility for any resulting damages. - Discovery Experts. (2025). *Discovery Experts LLC*.

Site constraints:

The Upper Bank, Nantong Way site, has several constraints that directly influence planning, logistics, and construction sequence. Its riverside location near the River Tawe introduces environmental sensitivities, including strict controls on surface-water management, flood-risk mitigation, and protection of local ecology. The site is also relatively constrained in size, limiting space for material storage, plant movement, and welfare facilities, which increases reliance on just-in-time deliveries and careful traffic management. Which, access to the site is restricted to a small number of local roads, meaning construction vehicles must be carefully coordinated to avoid congestion and ensure safety for nearby residents and businesses. In addition, the proximity of existing residential and commercial properties requires strict noise, dust, and vibration controls, particularly during groundworks and structural phases. Utility connections such as drainage, electricity, and telecommunications must be coordinated with statutory providers, which can introduce delays if not planned early. These constraints mean that efficient site layout planning, phased logistics, and strong communication with stakeholders are essential to maintaining productivity and avoiding disruption throughout the project.

“The phrase site constraint normally refers to the physical constraints of a development site, such as the site boundary or surrounding features that may constrain the type of development that is possible. These constraints may also be dictated within planning policy, stating the type of development that is acceptable, known as 'planning constraints'. The development project itself may also be impacted by a number of other types of constraints, which might include legal, regulatory or environmental constraints; utility and infrastructure constraints; as well as budget constraints.

Understanding the site constraints is an important early step when planning a construction or development project, followed by or in tandem with consideration of the wider project constraints. Identifying and analysing such constraints on can help ensure that a project is primarily feasible and compliant with relevant laws and regulations as well as cost-effective. The RIBA Plan of Work section o Strategic Definition includes what is referred to as a site appraisal, which includes different actions to be taken at the early stage of a project. These include 'site appraisal of sustainability opportunities and constraints of potential sites and building assets". - Designing Buildings (2018). *Designing Buildings Wiki*. [online] Designingbuildings.co.uk. Available at: <https://www.designingbuildings.co.uk/wiki/Home>. [Site constraints - Designing Buildings](#)

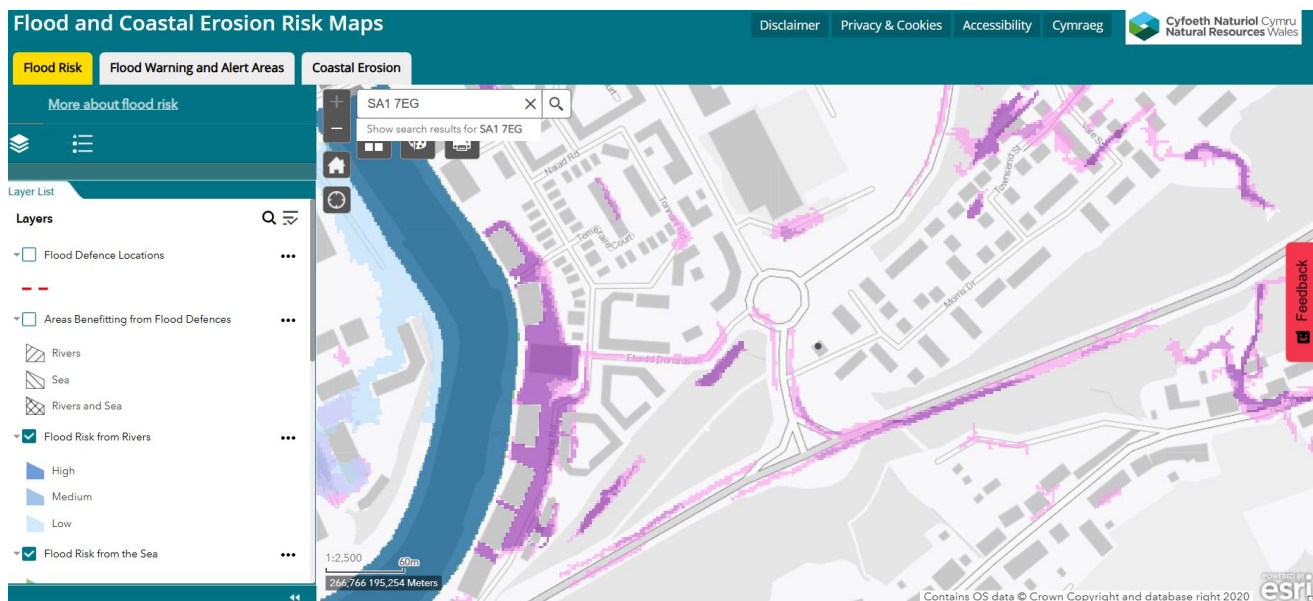


Figure 4 – Flood risk map of location plan - Natural Resources Wales (2020). Story Map Series.

Natural Resources Wales has a legal obligation under Section 18 of the Flood and Water Management Act 2010 to provide Welsh Ministers with reports on how flood risk and coastal erosion are being managed across Wales - The National Strategy for Flood and Coastal Erosion Risk Management in Wales THE NATIONAL STRATEGY FOR FLOOD AND COASTAL EROSION RISK MANAGEMENT IN WALES 2. (2020)

In which the proposed site near the water table of the river could cause delays if heavy rainfall occurs. This the timeline of the project would hurt

Contract Law

Within the construction industry in the UK two common contracts which are used are JCT and NEC. Which described:

- **JCT:** Established in 1931, JCT contracts are traditional, with clearly defined roles and responsibilities, and most risk is allocated to the contractor. They are suited for projects with well-defined scopes and are best for clients who prefer cost and risk predictability.
- **NEC:** Introduced in 1993, NEC contracts are modern, promoting collaboration and proactive management. They are designed for flexibility and international use, encouraging trust and risk sharing. NEC contracts are best for projects where flexibility and close working are key.”

Gerrard, R. (2014). *A COMPARISON OF NEC AND JCT*.

Within this project contract law could be a possibly of delay due to contract procedures, approvals, or dispute-resolution processes slow down progress. Ambiguous terms, strict notice requirements, disagreements over variations, and slow decision-making can all stall work on site. Payment disputes or claims raised under the contract can also interrupt the programme, while unclear risk allocation may trigger legal arguments that take time to resolve. Which, these contractual and legal procedures can significantly impact the project timeline.

The time, cost and quality triangle:

The Time-Cost-Quality Triangle is a project management model showing how Time, Cost, and Quality (often linked with Scope) are interconnected; changing one inevitably affects the others, forcing trade-offs to maintain project success, with the core idea being you can't have it fast, cheap, and perfect simultaneously without adjusting resources. It helps set realistic expectations by illustrating that increasing speed often raises costs or lowers quality, while cutting budget might extend timelines or reduce features. - Jenkins, N. (2021). *A Project Management Primer: Basic Principles - Scope Triangle*



Figure 5 - Project Smart. (2023). *A Project Management Primer: Basic Principles - Scope Triangle*.

Health and Safety

Under the CDM 2015 regulation the project could encounter delays. Delays on the Upper Bank, Nantong Way project may occur from legal duties on clients, designers, and contractors to plan and manage health and safety throughout the project. CDM 2015 requires the project to be properly notified to the HSE using an F10 form, which is mandatory for projects lasting more than 30 working days or exceeding 500 person-days. Any failure to appoint competent duty holders such as the Principal Designer or Principal Contractor in delays preparing the essential documents like the Construction Phase Plan can halt work until compliance is achieved. The HSE also emphasises that CDM requires projects to be “sensibly planned” with the right people and information in place from the start, meaning incomplete designs, missing risk information, or poor coordination can all slow progress. Non-compliance may trigger enforcement action, further delaying the programme.

HSE (2015). *Construction - Construction Design and Management Regulations 2015*.

Financial Resources

Within this project due to the scale of the construction and the many parties and workers involved Cash-flow problem could occur. In which could reduce workforce numbers, postponed orders, or delays in appointing subcontractors. Rising material prices or unexpected cost increases can also force the project team to pause work while budgets are reviewed or additional funding is sought. Such as the covid 19 pandemic where prices increase within the construction industry. Therefore, financial constraints create uncertainty, disrupt scheduling, and can significantly extend the overall project timeline.

“Key Financial Causes of Delays:

- Cash Flow & Payments: Client payment delays, poor contractor cash flow, and issues with invoices/approvals stall work.
- Budget & Funding: Inaccurate cost estimates, insufficient initial funding, scope creep, and rising material/labor costs.
- Market Instability: Inflation and volatile material prices increase expenses and budget uncertainty.
- Financial Distress: Supplier/subcontractor insolvency can halt specialized work.
- System Inefficiencies: Fragmented financial systems lead to data silos, errors, and slow processes.

Financial Impacts of Delays

- **Increased Costs:** More overtime, extended equipment rentals, administrative overhead, and penalty clauses.
- **Lost Revenue:** Delayed project completion postpones income generation.
- **Higher Financing Costs:** Increased interest on loans or need for more capital.
- **Reputation & Legal Issues:** Damaged reputation, loss of future contracts, lawsuits, and arbitration.

Mitigation Strategies

- **Financial Management:** Conduct thorough risk assessments, maintain accurate budgets, and ensure adequate financing.
- **Contractual Clauses:** Include delay clauses, escalation terms, and clear payment schedules.
- **Technology:** Use integrated financial software for better efficiency and automation.
- **Planning:** Incorporate buffers into schedules and pre-order long-lead items.
- **Communication:** Improve communication between all parties to resolve issues quickly.
- **Monitor:** Track changes, approvals, and subcontractor performance closely. “

Dost.io. (2025). *Financial processes and how they impact project delays* | Dost.

Conclusion

A method to resolve the risks and delays which could occur in this project is PERT. PERT (Program Evaluation Review Technique) “is method is a project management tool for scheduling complex projects with uncertain activity durations, using optimistic, most likely, and pessimistic time estimates to calculate a realistic project timeline, identify the critical path, and analyze task dependencies via network diagrams (PERT charts). Developed for the U.S. Navy, it helps visualize tasks, manage risks, and determine the probability of meeting deadlines.” - Artem Gurnov (2019). *What is PERT in Project Management?*

A software which helps reduce this risk factor is Microsoft project. This is because “Microsoft Project helps teams stay organized and focused by structuring tasks, timelines, and dependencies. Its user-friendly interface simplifies planning, while budget management features track costs effectively. With resource forecasting, teams can optimize workloads, and its flexibility supports projects of all sizes. These benefits make it

a must-have tool for efficient project planning.” - PL Projects. (2025). *Top 5 Benefits of Using Microsoft Project for Project Planning.* | PL Projects.

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- Jenkins, N. (2021). *A Project Management Primer: Basic Principles - Scope Triangle*. [online] Project Smart. Available at: <https://www.projectsmart.co.uk/best-practice/project-management-scope-triangle.php>.
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Appendix

Figure 1 - Swansea.gov.uk. (2026). *Planning Application details not available*. [online] Available at: https://property.swansea.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=QR8PO1EV0oHooBD756E5F4EC576391D2C6/pdf/2021_0944_FUL-LOCATION_PLAN_-_PHASE_9-1408042.pdf [Accessed 19 Jan. 2026].

Figure 2 - Swansea.gov.uk. (2026). *Planning Application details not available*. [online] Available at: https://property.swansea.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=QR8PO1EV0oHooBD756E5F4EC576391D2C6/pdf/2021_0944_FUL-LOCATION_PLAN_-_PHASE_9-1408042.pdf [Accessed 19 Jan. 2026].

Figure 3 - Swansea.gov.uk. (2026). *Planning Application details not available*. [online] Available at: https://property.swansea.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=QR8PO1EV0oHooBD756E5F4EC576391D2C6/pdf/2021_0944_FUL-LOCATION_PLAN_-_PHASE_9-1408042.pdf [Accessed 19 Jan. 2026].

Figure 4 - Natural Resources Wales (2020). *Story Map Series*. [online] flood-risk-maps.naturalresources.wales. Available at: <https://flood-risk-maps.naturalresources.wales/?locale=en>.

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Task 2

For the delay in which has occurred within the program is the roofing team and materials delay for the roof coverings have occurred. The usual supplier Marley tiles have an additional week lead on the project.

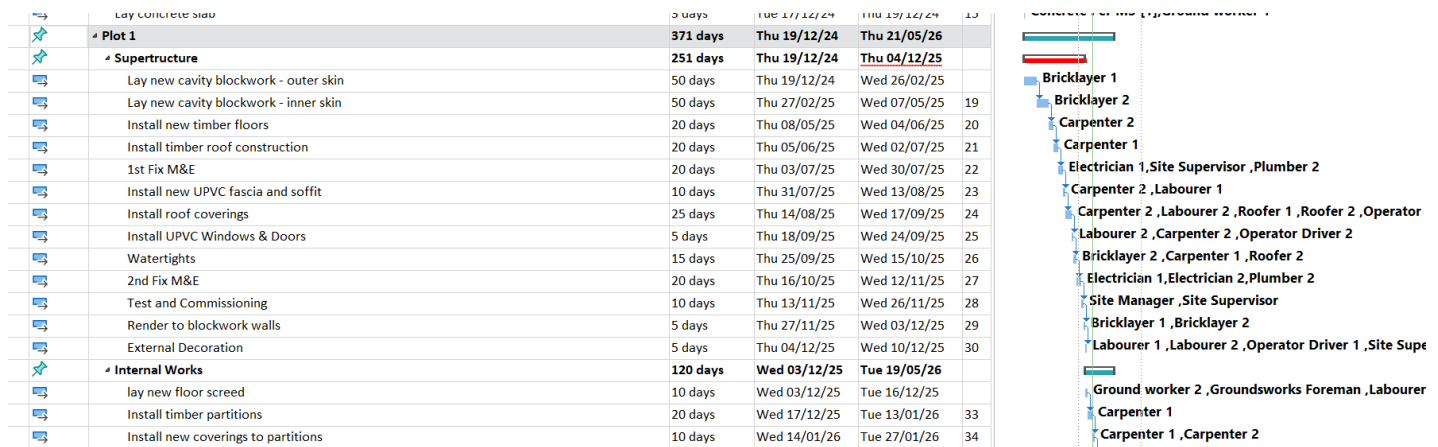


Figure 1 – Screen shot of MS delay for roof coverings to be installed

Because additional time is required to install the roof covering, the scaffolding will need to remain in place for longer, which will increase the overall scaffolding cost for the project.

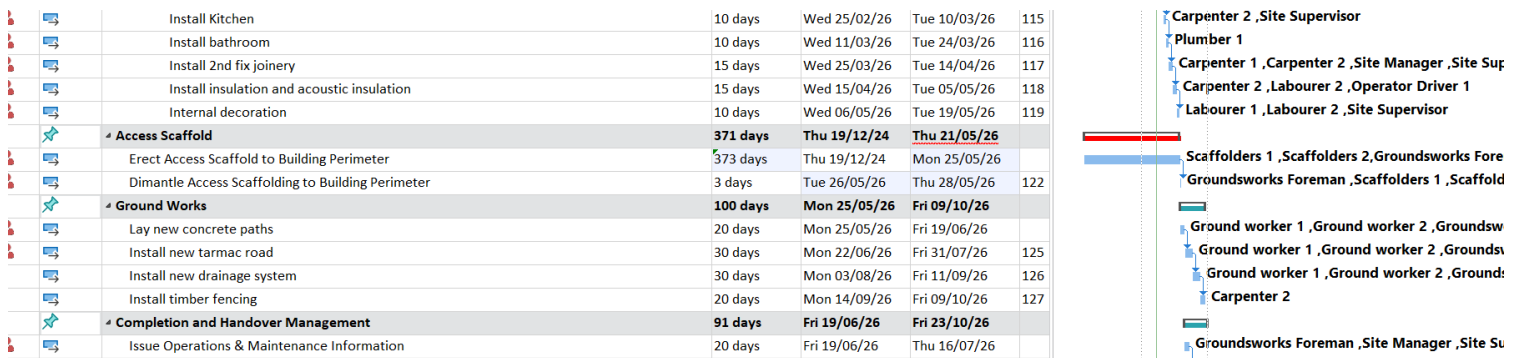


Figure 2 – Screenshot of the additional time needed for scaffold.

To recover the lost time, the roofing subcontractor will be paid to work over the weekend to complete the outstanding tasks. This will result in a price variation, but the additional cost is justified in keeping the project on schedule.

	RESOURCE NAME	Type	INITIALS	GROUP	PERCENT	JOB RATE	OFF RATE	COST USE	PRORATE	STANDARD	LOUSE	REAL
2	 Site Manager	Work	S		100%	£19.36/hr	£0.00/hr	£0.00	Prorated	Standard		uk.indeed.com. (n.d). Site Manager
3	 Site Supervisor	Work	S		100%	£14.49/hr	£0.00/hr	£0.00	Prorated	Standard		https://uk.indeed.com/career/const
4	 Groundworks Foreman	Work	G		100%	£23.08/hr	£0.00/hr	£0.00	Prorated	Standard		https://uk.talent.com/salary?job=Grc
5	Ground worker 1	Work	G		100%	£19.28/hr	£0.00/hr	£0.00	Prorated	Standard		https://www.checkatrade.com/blog/t
6	Ground worker 2	Work	G		100%	£19.28/hr	£0.00/hr	£0.00	Prorated	Standard		https://www.checkatrade.com/blog/t
7	Bricklayer 1	Work	B		100%	£19.28/hr	£0.00/hr	£0.00	Prorated	Standard		https://www.checkatrade.com/blog/t
8	Bricklayer 2	Work	B		100%	£19.28/hr	£0.00/hr	£0.00	Prorated	Standard		https://www.checkatrade.com/blog/t
9	 Carpenter 1	Work	C		100%	£19.00/hr	£0.00/hr	£0.00	Prorated	Standard		
10	 Carpenter 2	Work	C		100%	£19.00/hr	£0.00/hr	£0.00	Prorated	Standard		
11	Electrician 1	Work	E		100%	£35.00/hr	£0.00/hr	£0.00	Prorated	Standard		
12	Electrician 2	Work	E		100%	£35.00/hr	£0.00/hr	£0.00	Prorated	Standard		
13	 Plumber 1	Work	P		100%	£40.00/hr	£0.00/hr	£0.00	Prorated	Standard		
14	Plumber 2	Work	P		100%	£40.00/hr	£0.00/hr	£0.00	Prorated	Standard		
15	Site Security 1	Work	S		100%	£18.00/hr	£0.00/hr	£0.00	Prorated	Standard		
16	Site Security 2	Work	S		100%	£18.00/hr	£0.00/hr	£0.00	Prorated	Standard		
17	Scaffolders 1	Work	S		100%	£21.00/hr	£0.00/hr	£0.00	Prorated	Standard		
18	Scaffolders 2	Work	S		100%	£21.00/hr	£0.00/hr	£0.00	Prorated	Standard		
19	 Labourer 1	Work	L		100%	£14.00/hr	£0.00/hr	£0.00	Prorated	Standard		
20	 Labourer 2	Work	L		100%	£14.00/hr	£0.00/hr	£0.00	Prorated	Standard		
21	 Operator Driver 1	Work	O		100%	£30.00/hr	£0.00/hr	£0.00	Prorated	Standard		
22	 Operator Driver 2	Work	O		100%	£30.00/hr	£0.00/hr	£0.00	Prorated	Standard		
23	Roofer 1	Work	R		100%	£25.00/hr	£0.00/hr	£0.00	Prorated	Standard		
24	Roofer 2	Work	R		100%	£25.00/hr	£0.00/hr	£0.00	Prorated	Standard		

Figure 3 - Resource sheet – Work

25												
26	Crane Hire Per Day	Work		C		100%	£12.50/hr	£0.00/hr	£0.00	Prorated	Standard	
27	Tele Handler	Work		T		100%	£20.00/hr	£0.00/hr	£0.00	Prorated	Standard	
28												
29	Concrete Per M3	Material		C			£90.00		£0.00	Prorated		
30	Timber 70mm x 45mm	Material		T			£3.77		£0.00	Prorated		
31	Blocks	Material		B			£1.50		£0.00	Prorated		
32	Windows	Material		W			£100.00		£0.00	Prorated		
33	Doors timber FD30	Material		D			£73.45		£0.00	Prorated		
34	Soffits LM	Material		S			£100.00		£0.00	Prorated		
35	Roof Coverings M2	Work		R		100%	£120.00/hr	£0.00/hr	£0.00	Prorated	Standard	

Figure 4 - Resource Sheet - Equipment & Materials

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Carpenter: [How Much Does A Carpenter Make? | Checkatrade](#)

Electrician: [Electrician rates near you for 2026](#)

Plumber: [Emergency Plumber Cost Guide 2026: How Much is a Plumber?](#)

Security Guard: [How Much Does It Cost To Hire a Security Guard In The UK? - Double Check Security Group](#)

Scaffold: [How Much Do Scaffolders Make? | Checkatrade](#)

Laborer: <https://www.checkatrade.com/blog/cost-guides/labourer-day-rate/#:~:text=If%20the%20work%20will%20take,The%20type%20of%20job>

Operator:

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