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Engineering Project Management (ENG302)

Task 3 Project Plan B

Stafford Projects’ Innovative Leap Into Real-Time Metrics For Enhanced Health Hub Insights

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## Project Background

### Introduction to Risk Analysis

In project management, risk analysis applies tools and techniques to evaluate the likelihood and impact of identified risks, reducing uncertainties around schedule, quality, and cost (Bridges, 2023). Risks for this project were identified through a SWOT analysis and research into similar past projects. These risks were then quantitatively assessed and organised into category-specific risk registers, detailing triggers, risk owners, and mitigation strategies.

### Introduction to Supply Chain Management Plan

Another key section of this report is the supply chain management (SCM) plan, this is a systems-based approach to managing the flow of products, information, and funds from suppliers to resellers, aiming to maximise customer satisfaction (Blake, 2024). It includes procurement management and guidelines to minimise current and potential supply chain delays.

### Introduction to Implementation Plan

The final major section is the project implementation plan, a detailed blueprint that guides execution, aligns tasks with goals, and manages resources, risks, and timelines. It defines roles and responsibilities, working best through cross-team collaboration (Atlassian, 2024). This plan also supports project closure by guiding handover, validating client satisfaction, and capturing lessons learned.

### 1.4 Project Deliverable

By project completion, Stafford Projects will have a fully integrated, operational BIMS tailored to the health hub’s needs. This digital system will consolidate, monitor, and visualise key metrics in real time, supporting decisions, improving performance, and advancing strategic goals such as sustainability, asset retention, ROI, and a stronger presence in commercial property development.

The health hub BIMS will deliver:

* A centralised, web-based dashboard showing real-time building metrics
* Integration with existing and new sensors for continuous data collection and processing.
* Role-based user authentication and access control.
* On-demand and scheduled data reports, trend analysis, error detection, and sustainability tracking.
* Cross-device access via desktop, tablet, and mobile.
* Training and system support documentation.
* Compliance with required data security and regulatory standards.

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AI-generated content may be incorrect.A screenshot of a computer screen

AI-generated content may be incorrect.Figure 1: BIMS system architecture diagram

Figure 2: Health hub BIMS layout structure

Key attributes of the health hub BIMS, as illustrated in Figure 2, include:

* Accurate, real-time operational data to support timely decisions.
* Modular design enabling future upgrades (e.g. air quality monitoring).
* User-friendly, visually focused interface tailored to user needs.
* Supports sustainability by tracking resource usage and improvable areas.
* Adheres to cyber security standards and regulatory compliance.
* Streamlines and reduces manual overhead through automation.

## Risk Assessment

The following risk assessment procedures addressed potential internal and external risks.

### 2.1 SWOT Analysis

A SWOT analysis identified internal and external factors, categorising positives as strengths and opportunities while negatives as weaknesses and threats.

|  |  |  |
| --- | --- | --- |
|  | **Positive** | **Negative** |
| **Internal** | **Strengths**   * Experienced project team. * Flexible design and integration. * Showcase team capabilities. * Strong financial support. * Clear leadership. | **Weaknesses**   * Limited past experience with a BIMS. * Lack of in-house technical skill. * Possible skill gaps. * First commercial development. * Potential resistance to digital transformations. |
| **External** | **Opportunities**   * Rising demand of smart buildings. * Commercial market expansion. * Sustainability incentives. * Industry growth in healthcare. * Showcases digital innovations. | **Threats**   * Technology integration problems. * Data security and compliance risks. * Reliance on technology providers. * Economic uncertainties. * Lack of skilled contractors. |

Table 1: SWOT analysis for health hub BIMS project

### 2.2 Background Review

The SWOT analysis provided a strong foundation for identifying internal and external factors influencing project success, forming the basis for risk assessment. Additional risks were sourced from external research on similar BIMS projects and integrated into the health hub BIMS risk analysis. These include:

* Fund shortages.
* Economic downturns.
* Regulatory changes.
* Intellectual property litigations.
* Underperformance by third parties.
* Market volatility.
* Shifting client requirements.
* Ineffective leadership.
* Unsuitable application software.
* Poor user interface design.
* Unrealistic expectations.
* Incorrect software functionalities.
* Data breaches or leaks
* Inadequate development security.

(Ganbat et al., 2020) and (Baccarini et al., 2004).

Further analysis identified six dominant risk categories in similar tech-based projects; scope, people, commercial/legal, economic, technological, and project management, helping to guide the prioritisation of key risks for the health hub BIMS. These categories are illustrated in Figure 3 below.

### A red arrow pointing down AI-generated content may be incorrect.2.3 Root Cause Diagram

Figure 3: Health hub BIMS root cause diagram

### 2.4 Risk Analysis

The risk analysis applies a scoring system based on each risk’s probability and impact (rated 1 to 3), weighted by root cause priority from the root cause diagram. Each risk is prioritised by total score, assigned a traffic light rating, and entered into its corresponding risk register table, including its defined trigger, risk owner, and tailored mitigation strategy.

A screenshot of a computer

AI-generated content may be incorrect.Table 2: Numerical evaluations of root cause risks

Table 3: Health hub BIMS risk register for people

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk** | **Score** | **Details** | **Trigger** | **Risk Owner** | **Mitigation Strategy** |
| Unrealistic expectations | 4.8 | Demands exceed scope, timeline, or budget | Scope change requests | Project Manager | Set clear scope and goals early |
| Late feedback | 10.8 | Delayed decisions | Delayed approvals | Contract Administrator | Establish deadlines for reviews |
| Low engagement | 10.8 | Minimal stakeholder input | Missed meetings | Stakeholder Manager | Regular updates and meetings |
| Conflicting priorities | 7.2 | Focus split across projects | Staff diverted elsewhere | Team Leaders | Align team priorities with project goals |
| Project confusion | 3.6 | Unclear goals or roles | Repeated clarifications | Project Manager | Clear documentation and roles |
| Poor communication | 3.6 | Misunderstandings arise | Mixed messages | Communications Officer | Use central communication tools |
| Lack of staff | 7.2 | Insufficient workforce | Vacant roles | HR Manager | Hire or reassign resources promptly |
| Technical expertise | 10.8 | Skill gaps impact work | Errors and delays | Technical Leaders | Provide training or hire experts |
| Price competition | 2.4 | Rival offerings pressure pricing | Lower competitor bids | Business Development Manager | Highlight project value and quality |
| Reputation | 3.6 | Past issues affect trust | Stakeholder distrust | CEO | Maintain transparency and quality standards |
| Competing developments | 2.4 | Other projects reduce demand | New projects nearby | Strategic Planning Manager | Monitor market and adjust plans |

Table 4: Health hub BIMS risk register for scope

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk** | **Score** | **Details** | **Trigger** | **Risk Owner** | **Mitigation Strategy** |
| Unforeseen limitations | 12.6 | Unexpected technical/legal issues | Unexpected system issues | Technical leader | Conduct early feasibility assessments |
| Process delays | 8.4 | Slow approvals or procurement | Missed deadlines | Project Manager | Set clear timelines and monitor progress |
| Unclear/incomplete requirements | 8.4 | Vague or missing specifications | Lack of instructions | Business Analyst | Use detailed requirement-gathering sessions |
| Integration complexity | 8.4 | Difficult system/data merging | Complex system links | Systems Architect | Plan phased integration with testing |
| Scope creep | 2.8 | Uncontrolled scope expansion | Unapproved changes | Project Manager | Enforce strict change control processes |
| Misalignment with strategic goals | 4.2 | Goals not aligned with strategy | Off-target features | Sponsor | Align project milestones with strategic reviews |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk** | **Score** | **Details** | **Trigger** | **Risk Owner** | **Mitigation Strategy** |
| Cost overruns | 3.2 | Expenses exceed budget | Inaccurate estimates or scope changes | Project Manager | Strict budget control and regular reviews |
| Poor ROI | 4.8 | Returns lower than expected | Delayed benefits and reduced efficiency | Finance Manager | Monitor performance and adjust plans early |
| Market fluctuations | 9.6 | Economic changes impact costs/demand | Supply/demand shifts (inflation) | Business Development Manager | Use fixed-price contracts and diversify suppliers |
| Long-term maintenance costs | 6.4 | High ongoing upkeep | Ageing systems and poor quality installs | Operations Manager | Invest in quality materials and plan preventative maintenance |
| Interest rate change | 3.2 | Increased loan costs | Central bank policy updates | Finance Director | Secure fixed interest rates and adapt |

Table 5: Health hub BIMS risk register for economic

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk** | **Score** | **Details** | **Trigger** | **Risk Owner** | **Mitigation Strategy** |
| Lease agreement limitations | 6.4 | Lease restricts BIMS setup | Conflicting lease clauses | Legal Leader | Review/adjust lease early |
| Legal/regulatory changes | 9.6 | New laws affect system | Legislative updates | Compliance Officer | Monitor and adapt plans |
| Workplace standards | 6.4 | Safety/access rules change | Code updates or audits | Safety Officer | Stay relevant to changes |
| Ownership and liability | 14.4 | Role or asset disputes | Unclear agreements | Contract Administrator | Define in contracts |
| Contract disputes | 4.8 | Scope/timeline issues | Ambiguity or delays | Contract Administrator | Use clear terms |
| Non-compliance | 9.6 | Breach of rules | Audit failure | Compliance Officer | Regular checks |

Table 6: Health hub BIMS risk register for commercial/legal

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk** | **Score** | **Details** | **Trigger** | **Risk Owner** | **Mitigation Strategy** |
| Resource constraints | 16.2 | Not enough staff/budget | Overallocation or shortages | Project Manager | Prioritise and reallocate early |
| Ineffective communication | 10.8 | Misunderstandings and delays | Missed updates | Communication Leader | Set clear channels |
| Project drawbacks | 3.6 | Delays, misalignment, or errors | Missed KPIs | Sponsor | Regular reviews |
| Change management failures | 10.8 | Poor handing of changes | Staff resistance | Project Manager | Train and engage early |
| Inadequate | 3.6 | Vague or missing requirements | Stakeholder gaps | Business Analyst | Confirm early needs |
| Unrealistic timelines/milestones | 10.8 | Too ambitious | Delayed tasks | Project Manager | Set achievable plans |
| Scope creep | 3.6 | Uncontrolled scope growth | Untracked change requests | Project Manager | Enforce change control |

Table 7: Health hub BIMS risk register for management

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk** | **Score** | **Details** | **Trigger** | **Risk Owner** | **Mitigation Strategy** |
| Quality and reliability | 12 | Inconsistent system performance | Frequent system faults | Project Team | Regular testing and conduct QA processes |
| Expertise knowledge | 12 | Lack of technical skill | Delays and error in setup | Technical Leader | Hire/train skilled staff |
| Lack of scalability or flexibility | 6 | System can’t adapt or grow | Expansion plans fail | System Architect | Design modular systems |
| Software bugs or instability | 18 | Frequent system crashes/errors | Post-deployment failures | Project Team | Version testing and patching |
| Hardware incompatibility | 18 | Hardware doesn’t integrate | Setup/configuration errors | Technical Leader | Pre-check specifications and test hardware |
| Integration failures | 12 | Systems don’t connect | API/data mismatches | Project Team | Early integration tests |
| Data breach | 12 | Unauthorised data access | Weak security protocols | Security Officer | Encrypt and secure access |
| Malware threats | 6 | Viruses or attacks | Infected devices/software | Cybersecurity Officer | Use antivirus and firewalls |
| Internal/external access | 18 | Access given to wrong users | Poor role management | Technical Leader/Security Officer | Role-based access controls |

Table 8: Health hub BIMS risk register for technological

### 2.5 Stakeholder Participation

Each risk register categorises key risks with associated scores and colour coding to indicate its severity. These tables are dynamic and can be updated when needed throughout the BIMS project. Internal/external stakeholder must actively engage by:

* Acknowledging and applying mitigation strategies.
* Monitoring and reporting triggers.
* Accepting assigned risk ownership
* Adding new risks if relevant.
* Sharing responsibility and contribution for risk management.

All new risks must be acknowledged and signed off via the Risk Register Sign-Off (Appendix A).

### 2.6 Insurance

To mitigate key risks, the following insurances must be secured before project execution:

* **Professional indemnity –** Covers BIMS design and implementation errors.
* **Public liability –** Covers third-party injury or property damage.
* **Cyber liability –** Protects against data breaches, hacking, and privacy violations.
* **Construction/contract works –** Covers accidental damage or loss of materials, equipment, and on-site works.
* **Product liability –** Covers harm caused by faulty equipment or software.
* **Workers’ compensation –** Covers staff injuries during the project.
* **Directors & officers (D&O) –** Protects leadership from personal liability tied to management decisions.

## Supply Chain Management

Supply Chain Management (SCM) is a procurement-led function overseen by the PM, managing the full BIMS lifecycle from sourcing to implementation at the health hub. Key stages include demand forecasting, sourcing, procurement, production planning, inventory control, distribution, and returns (Anderson, 2023).

### 3.1 Vendor Analysis

The first phase involves vendor analysis based on work quality, financial stability, resource availability, and legal history. With support from Academic Consultants, Stafford Projects must ensure shortlisted suppliers and contractors are free from conflicts of interest.

### 3.2 Information Requirements

To manage supplier disruptions and logistical delays, the procurement team must verify and complete the following vendor information:

* Company profiles including legal name, ABN, years of operation, key personnel, and business address.
* Proof of licences, insurance, and industry certifications.
* Financial records and credit ratings (if required) confirming viability.
* Full scope of goods/services with specifications, compatibility, warranties, and support.
* Itemised pricing with documented payment terms, deposits, and discounts.
* Formal delivery schedules, lead times, logistics, and installation details.
* Disclosure of all subcontractors to ensure compliance with Stafford Projects’ standards.
* Record of legal disputes, contract breaches, or terminations within relevant time frames (e.g. 5 years).
* Verification of all documents prior to shortlisting, with gaps reported to the PM.

### 3.3 Site Storage Requirements

Given the nature of the health hub BIMS project, site storage must prioritise security, efficiency, and compliance:

* Lockable, access-controlled storage with CCTV and/or patrols to protect valuable equipment and materials.
* Climate-controlled, weatherproof spaces for sensitive electronics, clearly labelled and organised by trade.
* Accessible locations with designated loading zones.
* Digital inventory tracking and regular audits to minimise loss or damage.
* All storage practices must align with WH&S regulations and support ongoing project progress.
* Large components should be placed in temporary laydown areas near installation zones, with tools securely stored overnight.

### 3.4 Procurement Management Plan

The following procurement management plan outlines the essential software, hardware, and technical materials required to successfully deliver the health hub BIMS project. It specifies the responsible contractors, expected delivery dates, and whether substitutes are permitted. Flexibility in product selection is guided by project specifications and may be negotiated in cases of supply delays or product unavailability.

Table 9: Health hub BIMS project procurement management plan

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Qty** | **Date Required** | **Responsibility** | **Flexible Options** |
| BIMS software licenses | 10 | 11/07/2025 | Academic Consultants | N – Specified in contract |
| IoT sensors (environmental) | 20 | 20/07/2025 | Technological Contractors | Y |
| Network switches | 5 | 28/07/2025 | Electrical Contractors | N – Specified in contract |
| Structured cabling materials | 500m | 02/08/2025 | Electrical Contractors | Y |
| Smart meters & interfaces | 12 | 10/08/2025 | Academic Consultants | N – Specified in contract |
| Server hardware | - | 18/08/2025 | Technological Contractors | Y |
| Storage racks (data centre) | - | 25/08/2025 | Technological Contractors | Y |
| Cameras (security & thermal) | 15 | 03/09/2025 | Security Contractors | N – Specified in contract |
| Cloud service subscription | 1 | 10/09/2025 | Academic Consultants | Y |
| Backup power systems | 3 | 17/09/2025 | Electrical Consultants | N – Specified in contract |
| Touchscreen panels | 5 | 25/09/2025 | Academic Consultants | Y |
| BIMS integration software | - | 02/10/2025 | Academic Consultants | N – Specified in contract |
| Cybersecurity package | 1 | 10/10/2025 | Technological Contractors | N – Specified in contract |
| Installation tools & kits | - | 17/10/2025 | Electrical Contractors | Y |
| Testing & validation software | - | 24/10/2025 | Academic Consultants | Y |
| Training manuals & materials | 50 | 31/10/2025 | Academic Consultants | N – Specified in contract |
| Final integration support | - | 10/11/2025 | Academic Consultants | N – Specified in contract |
| Post-project maintenance kit | - | 18/11/2025 | Academic Consultants | Y |

## Implementation Plan

The implementation plan outlines the final phase of the health hub BIMS project, covering project completion and contractor demobilisation.

### 4.1 Contractor Documentation

Upon completing each work package, contractors must submit a finalised Form 16 inspection certificate (Queensland Government, 2019) and attend milestone inspections to identify and resolve any defects. It is their responsibility to rectify issues before work approval. Final contract payments will only be released once the following checklist is completed and signed off by the PM:

1. Work package completed.
2. Initial inspection with contractor/s and milestone team (defects noted).
3. Follow-up inspection confirming defect resolutions.
4. Form 16 certificate submitted by contractor/s.
5. Relevant input added to lessons learned.
6. Site area cleaned, cleared, and approved.

### 4.2 Transition Plan

Successful project completion will enhance Stafford Projects’ three-story health hub with minimal handover requirements. Core systems including data integration, dashboard setup, sensor calibration, and cloud connectivity will function independently without end-user input post-installation. However, ongoing functionality will rely on regular sensor cleaning and software updates, with maintenance instructions provided at handover.

Before handover, each contractor must demonstrate the operation and maintenance of their installed systems (e.g. sensors, control panels, security systems). As the system owner, Stafford Projects will have full access to the BIMS interface for real-time monitoring, historical data, and analytics on energy use, occupancy, and alerts.

The final handover package will include as-built schematics, configuration records, compliance certificates, and required council approvals.

Table 10: Transition items for BIMS checklist

|  |  |
| --- | --- |
| **Transition Item** | **Date Delivered** |
| BIMS maintenance and cleaning instructions | 07/11/2025 |
| Access to real-time system monitoring dashboard | 08/11/2025 |
| Final system schematics and configuration plans | 11/11/2025 |
| Compliance certifications and council approvals | 13/11/2025 |
| Contractor demonstrations and handover documents | 15/11/2025 |

### 4.3 Follow-Up Plan

For the health hub BIMS to be considered successful, sponsor satisfaction with system performance and outcomes is essential. All outputs and benefits must be formally verified and documented. The PM will maintain informal contact with Stafford Projects’ sponsors post-handover to address any queries. During the first quarter, system data will be analysed to assess performance and identify any corrective actions. After four quarterly reviews (one year), the data will be evaluated to confirm if project objectives were met. Findings will be presented to Stafford Projects, who may provide feedback after each review and at the end of the first operational year.

### 4.4 Closeout Report

The closeout report serves as an internal reference for Academic Consultants in future projects. Led by the PM with team input, it includes:

* Project deliverables.
* Staff roles and responsibilities.
* Final plans and schematics.
* Contractor list and evaluations.
* Goods/services list and evaluations.
* Lessons learned.

## Recommendations

Lessons learned should be captured throughout all phases of the health hub BIMS project, incorporating contractor feedback. Post-completion data analysis is critical to confirming whether the BIMS achieves its intended outcomes, such as improved energy efficiency, accurate occupancy insights, and responsive system operations. A full year of quarterly reviews will assess:

* 15% reduction in energy use.
* 95% occupancy detection accuracy.
* 98% system uptime.
* 90% system alert response within 10 minutes.
* 95% environmental compliance.
* 80% user satisfaction.

Given the fast-paced tech sector and supply chain risks, Stafford Projects should pre-approve multiple brands for key hardware (e.g. sensors, control units, servers) to give the procurement team flexibility in sourcing and scheduling.

## References

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## Appendix

### 7.1 Risk Register Sign-Off (Appendix A)

|  |  |  |  |
| --- | --- | --- | --- |
| **Stakeholder (Name)** | **Version of Register (e.g. Version 3)** | **Stakeholder’s Signature** | **Date of Signature** |
| *Example 1* | *Version 1* | *Signature 1* | *17/05/2025* |
| *Example 2* | *Version 2* | *Signature 2* | *24/06/2025* |
| *Example 3* | *Version 3* | *Signature 3* | *09/07/2025* |