

**CURTIN UNIVERSITY**  
**PROJECT DELIVERY GUIDELINES**

**FIRE SAFETY PROJECT  
GUIDELINE**

**000321**



**Curtin University**

<b>Details of revisions</b>			
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# **1 INTRODUCTION**

## **1.1 PURPOSE**

The purpose of this document, the Fire Safety Project Guideline, is to outline Curtin University's expectations for its built forms with respect to fire safety, in order to achieve consistency in the quality of design and construction. This will subsequently enable appropriate maintenance to be undertaken and a building's fire strategy to be upheld over its life.

One of the Guideline's goals is to highlight to all that a fire safety strategy is only effective when its parts are considered in unison, rather than independently. This understanding needs to be applied throughout the life of a building, commencing with design and continuing through construction, during ongoing maintenance and until retirement. Design and construction teams need to consider the coordination of, and communication between, systems, as well as the ability of fire safety strategies to be maintained without being too onerous.

It is important that a building's fire safety strategy is clearly documented to enable any future projects to easily identify if they impact upon these strategies and what, if any, actions are therefore required to be undertaken to address this impact. To achieve this, individuals need to be aware of Curtin University's expectations, who the key contacts and stakeholders are, and the level of documentation that is to be provided at the completion of works, whether or not such works are associated with the provision of a new building or with the refurbishment of an existing facility. This Guideline is therefore intended for use by any party who may be involved in the planning, design, construction, refurbishment and ongoing maintenance of Curtin facilities. This includes external consultants and contractors, Curtin planners, designers and project managers, as well as faculty and office staff.

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## **1.2 CURTIN REQUIREMENTS**

### **1.2.1 DISABILITY AND ACCESS INCLUSION PLAN**

Curtin University believes in creating equitable and inclusive access for people with a disability to its facilities, services, events and academic programs on all its Western Australian campuses.

The *Universal Design Guideline* has been developed to reflect a commitment to equity and inclusion for all by embedding Universal Design principles into project planning, design and delivery guidelines. Consultant architects, designers and engineers should make themselves familiar with the particular requirements of the *Universal Design Guideline* before responding to a project brief.

### **1.2.2 HEALTH AND SAFETY**

Curtin University is committed to providing and maintaining high standards of health and safety in the workplace and will:

- ensure compliance with relevant legislation and the University's Health and Safety Management System
- promote an organisational culture that adopts health and safety as an integral component of its management philosophy
- ensure that health and safety is part of the business planning processes and that it is adequately resourced by all areas
- maintain an effective mechanism for consultation and communication of health and safety matters
- maintain an effective process for resolving health and safety issues and managing health and safety risks
- provide appropriate health and safety training
- regularly review health and safety performance to monitor the effectiveness of health and safety actions and ensure health and safety targets and objectives are met.

A copy of our Health and Safety Management Standards can be found at:

<https://healthandsafety.curtin.edu.au/local/docs/HManagementStandards.pdf>

### **1.2.3 SUSTAINABILITY AT CURTIN**

It is Curtin University policy that all new or refurbishment projects on site should support its status as Australia's first university to achieve a 5-star Green Star – Communities rating from the Green Building Council of Australia (GBCA). Designers should understand and incorporate the Green Star criteria into designs and specifications in order to maintain and enhance Curtin's Green Star status. Information on the criteria can be found in the *PDG Green Star – Communities Design Guidelines*.

## **1.3 CURTIN UNIVERSITY FIRE PROGRAM**

The University has developed a Fire Program for the review of fire safety-related issues identified across the Campus and to assist in ensuring that appropriate communication between stakeholders occurs on fire-related matters. Items raised in the Program are logged in a register and assessed on a risk basis against the University's risk appetite. A subsequent priority ranking is then assigned to each matter and a Treatment Action Plan developed. The Fire Program Project Control Group meets on a regular basis to review the register, focusing on the medium and high risk ranking items.

To ensure that the information contained within this Guideline remains current with the University's requirements, an annual review is to be undertaken by the Fire Program Sponsor.

## **1.4 GUIDELINE STRUCTURE**

Section 2 of this Guideline outlines the University's expectations regarding the work required to be undertaken with respect to fire safety over the life of a building.

Section 3 details the University's expectations with respect to the level of fire safety that is to be provided.

Section 4 provides further information on a number of key project deliverables.

Aspects that relate to fire safety that are covered in this document include:

- fire and smoke compartmentalisation (including compartment penetrations)
- fire detection and warning systems
- smoke exhaust systems
- sprinkler/drencher systems
- fire hydrant systems
- specialised extinguishing systems
- fire hose reels
- portable fire extinguishers
- fire blankets
- emergency lighting and exit signage.

## **1.5 DISCREPANCIES**

The Guideline outlines the University's generic requirements above and beyond legislation requirements. Where the Guideline outlines a higher standard than within the relevant legislation, the Guideline will take precedence.

If any discrepancies are found between relevant legislation, the Guideline and project-specific documentation, these discrepancies should be highlighted in writing to the Fire Program Sponsor.

## **1.6 DEPARTURES**

The intent of the Guideline is to achieve consistency in the quality of the design and construction of buildings within the University Campus, as well as in the documentation received post works. Consultants and contractors are however, expected to propose best practice/state-of-the-art construction techniques and introduce technological changes that support innovative design.

In recognition of this, any departures from relevant legislation, or the Guideline, must be discussed with the Fire Program Sponsor. The Fire Program Sponsor will seek to obtain the appropriate approval for such departures where deemed appropriate.

Any departures made without such written confirmation shall be rectified at no cost to the University.

## 1.7 DEFINITIONS

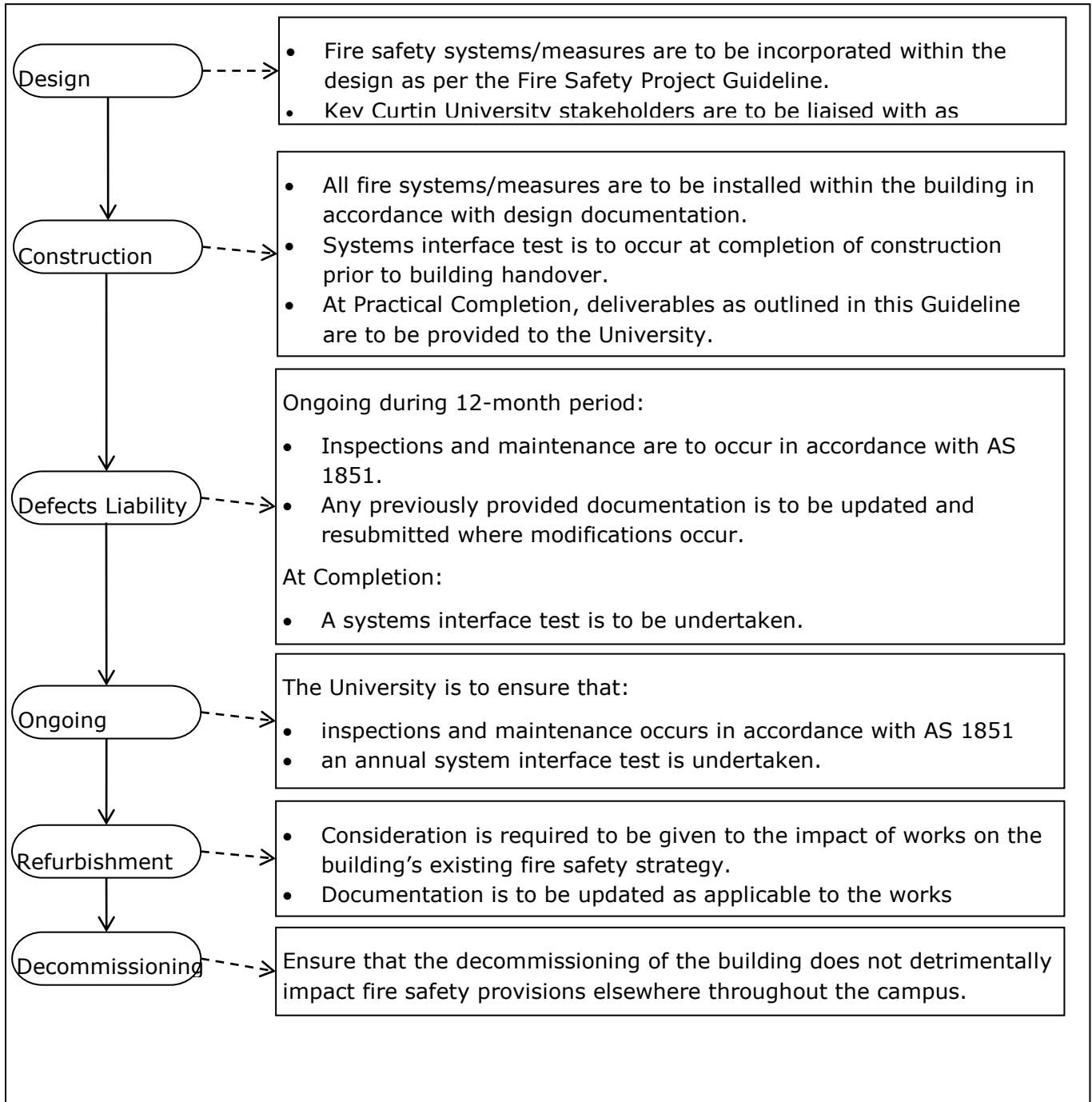
<b>Alternative/Performance Solution</b>	A building solution that complies with the performance requirements of the NCC other than by a reason of satisfying the Deemed to Satisfy provisions
<b>Authorities</b>	Shall mean statutory bodies or inspectors of such bodies having jurisdiction over the works under relevant current regulations and statutes
<b>Baseline data</b>	Data derived from the approved design and commissioning of a system, which serves as a basis for subsequent comparison with the data derived from inspection, test and survey
<b>Block Plan</b>	A plan providing information on the fire hydrant and/or sprinkler systems associated with a building
<b>Deemed to Satisfy (DTS) provisions</b>	Provisions that are deemed to satisfy the performance requirements of the NCC
<b>DFES</b>	Department of Fire & Emergency Services
<b>Evacuation Diagram</b>	A diagram providing emergency and evacuation information about the building, comprising a pictorial representation of a floor area and other relevant emergency response information
<b>EWIS</b>	Early warning interface system
<b>FIP</b>	Fire indication panel
<b>Fire Program Sponsor</b>	Individual that is responsible for providing the relevant approvals, resource allocation, direction and guidance associated with the Fire Program to ensure that the Program's objectives are realised.
<b>Fire Program Technical Sponsor</b>	Individual that is responsible for addressing technical queries relating to the management of Fire Safety aspects across Curtin University and the delivery of the objectives of the Fire Program.
<b>Fire Safety Engineering Report</b>	A report developed by a suitably qualified fire safety engineer that presents the fire and life safety Performance Solutions adopted within a building. It will include justification for the Performance Solutions and clearly outline any fire safety measures that are required to be implemented within the building's fire safety strategy as a result.



<b>NCC</b>	Shall refer to the National Construction Code series, as published by the Australian Building Codes Board
<b>Principal</b>	Shall mean Curtin University
<b>Responsible Officer</b>	Shall mean the nominated Curtin University representative for the project
<b>Tactical Fire Plans</b>	A set of plans located within the Fire Control Room that provide information on the building structure, layout, fire safety systems, fire fighter interface locations (gas shut-off, power supply controls, etc.) and potentially hazardous installations
<b>Zone Block Plan/Fire Zone Block Plan</b>	A diagram providing information on the fire alarm system

## 2 FIRE SAFETY PROCESS

Fire safety is required to be considered in all aspects of a building's lifecycle, from design through to decommissioning. Components of this are identified in the following figure. For all works, it is expected that suitably qualified and experienced professionals are engaged to interpret and apply this Guideline to Curtin projects. Works cannot be carried out by unqualified and unlicensed consultants or contractors.



## **2.1 CURTIN UNIVERSITY CONTACT REPRESENTATIVES**

Each of the various aspects of a design that relate to fire safety is managed by an Infrastructure Manager within the University's Public Realm and Infrastructure team. Where queries arise on a particular aspect, they should be addressed, via a project's Responsible Officer or their nominee, to the appropriate individual as identified within the Register of University Stakeholders (Knowledge Document ID: 000041).

## **2.2 NEW BUILDING WORKS**

Curtin University expects and requires that all new buildings be designed and constructed in compliance with the current National Construction Code (NCC), relevant Australian standards and as outlined within this Guideline. Compliance with the NCC can occur either on a Deemed to Satisfy (DTS) or a performance basis.

To ensure all aspects of work relating to the development of a building's fire safety strategy are considered within a project, a design checklist with applicable key Curtin stakeholders and the deliverables that are relevant to each design aspect is provided within Appendix A.

It is acknowledged that, in some instances, additional measures may require consideration within a project. Following the checklist will help to ensure that the necessary fire safety measures are accounted for, the necessary works undertaken and appropriate documentation provided to the University's Building Services Data Team at the completion of such works. Once the Building Services Data Team receive the relevant information it is able to update the Master Documentation for that building, ensuring that up-to-date records are always available.

### **2.2.1 EXISTING INFRASTRUCTURE AND BUILDING DOCUMENTATION**

The Building Services Data Team will store the majority of fire-related information on a building within a Fire Manual within the University's Drawing Management System. This manual is an electronic live document, updated as required when project information is received at the completion of works. The information stored within the Fire Manual is considered to represent the Master Documentation for a building. For this reason it is very important that all required project information be provided at the completion of work, as detailed in this Guideline.

The sections forming the Fire Manual for a building will typically include:

- a functional statement
- a fire safety engineering report
- a system interface matrix
- fire and smoke compartmentalisation baseline data (including a penetrations register)
- smoke detection and alarm system baseline data
- fire hydrant and hose reel system baseline data
- portable fire extinguishers and fire blankets baseline data
- fire sprinkler and drencher system baseline data

- smoke exhaust system baseline data
- specialised firefighting systems (e.g. gas suppression system) baseline data.

Where information is required on an existing building or service within the Curtin University Campus, this should be requested from the relevant Curtin University personnel or directly from the Building and Services Data Team. It should be confirmed on a project-by-project basis if it is acceptable for an external consultant/contractor to request documentation directly or, alternatively, if such requests are to be fed through the project's Responsible Officer or lead consultant for the project.

## **2.3 CONSTRUCTION PHASE**

All fire systems are to be installed in accordance with the design documentation. All installation must be carried out in accordance with manufacturer specifications and data sheets to ensure product performance over its intended life and so as to not invalidate any warranties.

### **2.3.1 EQUIPMENT LABELLING**

Installed equipment and penetrations through fire and smoke floors/walls are required to be assigned an Archibus reference number and labelled in accordance with Knowledge Base document 000043 – Building Services Labelling Examples.

### **2.3.2 PRACTICAL COMPLETION PROJECT DELIVERABLES**

To assist with the ongoing maintenance of buildings, Curtin University requires that the following deliverables be provided at the completion of a project with respect to Practical Completion as applicable:

- as-constructed drawings
- functional statement
- system interface matrix (cause and effect matrix)
- baseline data with respect to:
  - fire and smoke compartmentalisation (including a fire and smoke floor/wall penetration register and compartmentalisation plans in both elevation and plan)
  - fire detection and alarm system
  - fire hydrant and fire hose reel systems
  - portable fire extinguishers and fire blankets
  - fire sprinkler and drencher system
  - smoke exhaust system
  - specialised firefighting systems (e.g. gas suppression system)
- graphics system map
- block plans

- zone plans
- tactical fire plans
- evacuation diagrams
- fire safety engineering report
- operations and maintenance manuals
- systems interface test report
- design and installation certificates of compliance for fire safety systems
- log books.

It is necessary that this list of deliverables is included within any scope of works detailed in tender documentation.

The format in which this documentation is to be provided is as dictated within Curtin University's Design Guidelines. The data is to be provided to the project's Responsible Officer, who will lodge it with the University's Business Support Team for inclusion within the Drawing Management System by the Building Services and Data Team. Note: this system is not limited to the storage of drawings, but also includes manuals, reports etc.

Further information is provided on a number of these deliverables in Section 4. It is noted that deliverable materials may be required additional to those listed above, specific to a particular fire safety system, as specified within this Guideline and/or project documentation.

### **2.3.3 TESTING AND COMMISSIONING**

The fire services contractor shall appoint a suitably qualified independent inspector to check, review, inspect and certify the design and operation of fire safety systems installed.

A certificate of compliance shall be provided to verify design and installation.

The contractor shall commission the system(s) in accordance with the requirements of the applicable Australian standards.

The contractor shall advise the Principal when commissioning testing is planned so that final testing may be witnessed by Curtin University or other nominated personnel.

All systems and equipment, and their interface with other systems, shall be fully tested to ensure correct operation. Further testing shall be carried out where required by DFES or any other bodies having jurisdiction.

Systems with smoke control shall be fully tested to demonstrate each smoke control zone operates as required. This shall involve single point testing of all smoke control compartments to ensure all fire modes and fire dampers operate as designed. Where required, the nominated Curtin mechanical services supervisor or contractor shall be consulted and/or involved in the commissioning process.

Mechanical and smoke control cause and effect matrices shall be completed and signed off for each operation by the contractor and witnessed by the nominated independent inspector.

Documentation shall be provided to the project manager to verify the system has been fully tested and commissioned in accordance with relevant Australian standards. This shall be supplied as part of the system documentation.

#### **2.3.4 OPERATOR TRAINING**

The contractor is to provide sufficient operator training and instruction for all new control and monitoring systems. Suitably qualified staff are to carry out the training to a minimum of three Curtin University-specified representatives. Training courses are to be a minimum of one hour's duration and be conducted within one week of the system being commissioned when it is in full operation. One week's notice is to be given to the Superintendent of the proposed training to enable the appropriate staff to attend.

Operator's Handbooks are to be provided to all trainees detailing all essential information.

#### **2.4 DEFECTS LIABILITY PERIOD**

The fire services sub-contractor is responsible for all maintenance works during the twelve-month defects liability period. Such work is to be undertaken in accordance with appropriate standards and AS1851.

To assist with the ongoing maintenance of buildings, Curtin University requires that, at a minimum, the following deliverables be provided at the completion of the Defects Liability Period:

- any documentation provided at Practical Completion that has been subject to amendment due to changes that have occurred to/within the building during the Defects Liability Period
- an updated Systems Interface Test Report
- warranties for defect liability for 12 months from the date of practical completion
- twelve-month maintenance records.

#### **2.5 HANDOVER**

Complete the testing and commissioning of all systems. Provide all commissioning and performance data for the installation including post-contract drawings prior to handing over the installation. Provide documented completion certificates for each fire system.

#### **2.6 REFURBISHMENTS AND REDEVELOPMENTS**

When refurbishments and redevelopments occur within a building, it is necessary to ensure that the works do not detrimentally impact on the building's fire safety strategy and that relevant documentation is updated as appropriate. To assist with this, a design process flow chart is provided within Appendix B.

It is acknowledged that, in some instances, additional measures may require consideration within a project.

Following receipt of any updated documentation following completion of the works, the Building Services Data Team will update the Master Documentation for that building.

### **2.6.1 DOCUMENTATION SHORTFALL**

Should any required fire-related documentation not be available for a given building, the extent to which a project is required to develop this as a component of its scope of works is determined in consideration of the size of the project and extent of work being undertaken. This is to be determined in accordance with the following:

1. Is the building planned for redevelopment within the next three years?
  - Yes: project team to determine the need to develop documentation on a risk basis.
  - No: continue to 2.
2. What extent of the building does the works impact?
  - All of the building: provide documentation as per the Fire Safety Project Guideline.
  - Single floor/fire compartment: provide documentation as per the Fire Safety Project Guideline with respect to that floor/fire compartment.
  - Part of a floor: continue to 3.
3. What is the extent of the work on services/fire systems/fire equipment?
  - Major impact: provide documentation as per the Fire Safety Project Guideline with respect to that system.
  - Minor impact (e.g. relocation of a few smoke detectors): continue to 4.
  - None: continue to 4.
4. Are Performance Solutions involved in the work?
  - Yes: liaise with appropriate technical stakeholders and Fire Program Sponsor to assess on a case-by case-basis.
  - No: project team to determine the need to develop documentation on a risk basis.

### **2.7 ONGOING MAINTENANCE**

Buildings are to be inspected and maintained in accordance with AS1851. This process is to be managed by Curtin University following the Defects Liability Period.

### **2.8 DECOMMISSIONING**

When a building reaches its end of life and is to be demolished, it is necessary to ensure that any such works do not detrimentally impact the level of safety provided to other buildings. For example, external hydrants may provide coverage to more than one building's muster points and their access paths are not removed and services to other buildings are not impacted by the removal of infrastructure.

### **3 FIRE SAFETY EXPECTATIONS**

Curtin University expects and requires that all works be undertaken in compliance with the National Construction Code (NCC), relevant Australian standards and as outlined within this Guideline. Compliance with the NCC can occur either on a Deemed to Satisfy (DTS) or performance basis. Typically, the current edition of the NCC should be referenced within a design however, in the case of existing buildings, this should be discussed with the project's Responsible Officer at the onset of any works, as it may be appropriate to give consideration to the regulations in place at the time of the building's construction.

Where it is desired that works deviate from the requirements outlined in this Guideline, approval is required to be sought from the Fire Program Technical Sponsor.

#### **3.1 STANDARDS AND CODES**

All fire safety works shall comply with current statutory regulations, Australian standards, supply authority regulations, Curtin University requirements and any other authority having jurisdiction over the works. Examples of these are

- National Construction Code
- AS/NZS3000
- Department of Fire & Emergency Services requirements
- Water Corporation requirements
- any other regulations that apply directly or indirectly to such installation in the locations
- Curtin University guidelines.

Where Australian standards and codes do not exist, the relevant international standard or code shall apply.

Where conflict arises between this document and any of the applicable Acts, codes or standards, the highest standard of materials and workmanship shall prevail. The most recent standards should be adopted within design work, unless otherwise permitted by the version of the NCC relevant to that project.

Appendix C provides a reference list to a number of key Australian standards, while Appendix D provides a reference list of relevant Curtin documentation. It is noted that these lists may not be exhaustive but provide reference to key documentation.

Specific Curtin University requirements relating to the provision and design of fire safety systems are detailed in this Section of the Guideline, with technical requirements included within the relevant services guidelines.

#### **3.2 FIRE DETECTION AND ALARM SYSTEM**

In addition to meeting NCC requirements with respect the provision of a detection and alarm system, Curtin University requires that the following be adhered to:

- All Curtin University buildings are to be fitted with some form of detection and alarm system. Where such a system is not required under DTS provisions, the



calibre of the system is to be discussed with the Electrical Infrastructure Manager and will be assessed on a risk management basis.

- All detection and alarm systems that include a fire indicator panel are to be monitored by Security and the Curtin campus site monitoring graphics system (refer to Section 3.2.2 for further information regarding the site monitoring graphics system). Monitoring of other buildings is to be assessed on a risk management basis in collaboration with the Electrical Infrastructure Manager and the Security Team Leader.
- Buildings and protected areas attended by DFES shall be connected to the DFES monitoring system.
- Unless otherwise required by a building's fire safety strategy, an EWIS shall operate immediately upon receiving a fire alarm signal, operating in 'alert' mode for 120 s before switching to 'evacuate' mode.

For additional technical requirements applicable to Curtin University facilities and buildings with respect to the smoke detection and alarm system, refer to the reference document, *000330 PDG Fire Services Technical Requirements*.

### **3.2.1 EWIS/OWS SYSTEM**

Emergency warning speakers shall be installed throughout the building in accordance with Australian standards and as described below:

- Each office, corridor and public area shall be provided with an emergency warning speaker mounted at high level.
- Where the speaker cannot be installed flush, the use of surface-mounted units is allowed. The speakers shall be set so that an audible alarm level of no less than 65 dBa is obtained throughout.
- For areas with high levels of ambient noise the minimum sound pressure level obtained shall be no less than 10 dBa above ambient levels.
- Where ambient noise level exceeds 90 dBa or where occupants may make use of ear defenders or similar hearing protection, visual flashing strobes shall also be provided. The strobes shall be a combined red and amber unit to indicate 'alert' and 'evacuate' conditions.

The EWIS shall operate immediately upon receiving a fire alarm signal.

Unless otherwise stated, the system shall be configured to operate all zones upon receipt of a fire alarm signal.

### **3.2.2 SITE MONITORING – GRAPHICS SYSTEM**

All new fire detection systems, or major fire upgrades involving replacement fire indicator panels, shall be connected to the Curtin campus site monitoring graphics system.

Each system shall be interfaced via the campus Ethernet LAN/WAN to provide all fire, fault and isolate signals directly to the computer monitoring systems at Bentley Security and Facilities management locations. This shall require the configuration of the fire indicator panel, MODBUS Ethernet modem and the monitoring computer

systems so that all detectors, devices and fire signals are independently identified at the monitoring system computers.

Each new system shall repeat all signals to the monitoring systems, which shall be provided with a graphics map for each building plan layout so that staff can identify its exact location.

The level of graphics maps required shall be nominated at the time of tender and shall be, as a minimum, the following:

- site plan showing building location in alarm or fault
- individual floor plans for each level showing fire zones
- detailed smaller floor plans where the building size is too large to be easily read on screen by staff
- each fire zone shall be highlighted on screen in normal and in alarm states
- other details as required by the Principal or superintendent.

Updated graphic maps are required to be provided where a change occurs to a zone within the detection system.

A dedicated rotary switch and indication LED (not key switch) shall be provided on the fire indicator panel so that the signals to each monitoring computer do not bring up an alert and display of devices being tested, however, each fire fault or isolated signal shall still be logged on the site monitoring system. This is to provide records of devices tested on site without causing nuisance alarms to Curtin staff at Security and Facilities management offices. The isolate switch however shall still report isolate to DFES.

The site computer system shall be modified by Ampac-trained personnel only. No works shall be performed on the site computer systems by the fire contractor. Contact Ampac for further details or requirements.

The systems shall be fully tested to prove all devices are repeated to the site monitoring system. This shall be logged on the site monitoring computers and provided in printed form with commissioning documents. Practical Completion shall not be achieved until commissioning documents are provided as required.

### **3.3 FIRE HYDRANT AND FIRE HOSE SYSTEM**

Fire hydrant and hose reel systems are to comply with the requirements of the NCC, AS2419 and AS2444 as appropriate, Water Corporation and DFES requirements.

New systems shall make use of existing water supplies. Information on existing system provisions at the Bentley Campus is provided in the *000326 PDG Hydraulic Services Design Guidelines*.

Hose reels shall not be located adjacent to any electrical switchboard.

The *000326 PDG Hydraulic Services Design Guidelines* provide additional technical requirements applicable to Curtin University facilities and buildings with respect to fire hydrant and fire hose reel systems.

### **3.4 FIRE SPRINKLER AND DRENCHER SYSTEM**

Fire sprinklers shall be designed, supplied and installed in accordance with the NCC and AS2118. Where an Australian standard is not available for the type of system required, the relevant NFPA standard shall be applied.

The *000326 PDG Hydraulic Services Design Guidelines* provide additional technical requirements applicable to Curtin University facilities and buildings with respect to fire sprinkler systems and water supplies

### **3.5 SPECIALISED EXTINGUISHING SYSTEM**

Some communications, data and electrical rooms may require specialised extinguishing systems that are not addressed in the NCC. Where this is required by Curtin University, the design shall comply with relevant manufacturer requirements. Prior to nominating the specific extinguishing system, consideration shall be given to budget, type of equipment, space constraints and maintenance costs.

#### **3.5.1 GASEOUS EXTINGUISHING SYSTEMS**

The system shall be designed to detect a fire automatically and activate the gaseous extinguishing system. Audible and visual alarms shall be provided to alert occupants.

The basic principle of operation is:

- a fire detected by the smoke detectors shall initiate the following:
  - indicate an alarm on the detector
  - indicate a zone alarm at the FIP
  - operate the Stage 1 audible alarms (alert)
  - shut down A/C plant
  - transmit a signal to the main fire detection system
- upon receipt of an alarm from a second smoke detector the following shall operate:
  - visual alarms 'Evacuate Area' and 'Do Not Enter' signs
  - operate the Stage 2 audible alarms (evacuate)
  - initiate the gas discharge sequence.

Following discharge of the extinguishing gas, the system pressure switch shall provide signals to the FIP and DFES confirming gas released.

The audible alarm shall be configured so that the 'bell isolate' or 'sounder isolate' function of the FIP shall silence all of the audible alarms when operated. Use of the reset function to silence audible alarms shall not be deemed as compliance with this requirement. The visual alarms shall remain operative until the pressure switch has been reset.

The A/C plant shutdown facility shall be configured so that the shutdown of the A/C plant can be isolated by a 'plant isolate' facility on the FIP.

The 000311 PDG Mechanical Services Guidelines provide additional technical requirements applicable to Curtin University facilities and buildings with respect to specialised extinguishing systems.

### **3.6 PORTABLE FIRE EXTINGUISHERS**

Fire extinguishers shall be selected, located, distributed and signed in accordance with NCC and AS2444. Dry powder extinguishers shall be provided unless specific risks warrant a different type of extinguisher at the location of the hazard.

Where located externally, stainless steel extinguishers shall be provided. In dusty or dirty locations, protective dust covers shall be fitted.

A schedule of all extinguishers, complete with all details (location, size, class and supply date) is to be provided to the University.

### **3.7 MECHANICAL SYSTEMS**

Smoke exhaust systems shall be provided to comply with NCC and AS1668 requirements.

All non-essential mechanical systems shall shut down in the event of a fire.

### **3.8 PASSIVE FIRE BARRIERS**

#### **FIRE AND SMOKE BARRIERS**

All fire and smoke walls shall comply with NCC requirements and the relevant AS1530 standards.

All service penetrations through a fire wall or floor shall be sealed in accordance with NCC Clause C3.15. In each instance, the barrier shall be clearly labelled and marked with the following information:

- standard(s) the system is compliant with (e.g. AS1530.4 and AS4072.1)
- fire resistance level of the system
- name and contact details of the installer
- installation date
- name and contact details of the manufacturer.

Further information relating to Building Service Labelling is provided with Knowledge Base Document ID 000043 Building Services Labelling Examples.

#### **FIRE DAMPERS**

Fire dampers shall be constructed and installed in accordance with AS1682 and AS1668.

#### **SMOKE DAMPERS**

Air volume control dampers used for smoke control shall comply with the requirements of AS1668.1.

## **FIRE DOORS**

Fire doors shall be manufactured and installed in accordance with AS1905.1. Doors shall be tagged on the door frame and door leaf as required under AS1905.1.

## **SMOKE DOORS**

Smoke doors shall be compliant with NCC requirements to be at least 35 mm solid core. Smoke seals shall be at least medium temperature seals able to withstand temperatures of up to 200 °C.

All smoke doors shall be labelled either via a door tag or signage on the door.

## **FIRE AND SMOKE CURTAINS**

Fire and smoke curtains are to be confirmed for use by a fire safety engineer with justification for its use to be outlined in a fire safety engineering report.

Location of fire and smoke curtains shall be clearly indicated via signage to ensure they are not obstructed from closing.

## **4 DELIVERABLES**

This section provides further detail of some of the deliverables that the University requires be provided at the completion of each project, as identified within this Guideline. By having this information available, the University will be better equipped to maintain a building as it was intended to operate.

### **4.1 AS-CONSTRUCTED DRAWINGS**

As-constructed drawings for the building are to be provided within two working weeks prior to completion of the project. All drawings shall be completed in accordance with Curtin University Documentation Protocols.

Included in this documentation is to be a set of drawings identifying fire and smoke wall/floor locations, both in plan and elevation, as well as all fire services drawings.

Services drawings are to include a legend noting all fire and smoke dampers and their Archibus reference numbers.

### **4.2 FUNCTIONAL STATEMENT**

A building's Functional Statement is to provide an overview of the fire safety strategy adopted for a building, including reference to any fire safety engineering report (FSER) and Performance Solutions, the fire safety systems present and to what standard such systems have been designed and constructed. It is to clearly explain how the fire safety systems within the building function together to form a holistic solution in fire situations, i.e. to outline the philosophy of the fire safety strategy. This explanation is to then be supported by a system interface matrix (refer to Section 4.3).

Appendix E provides an example of a typical building Functional Statement. For new buildings, the template to be used for development of this document is available from the Responsible Officer for the project (*000260 Tool – Functional Statement*).

### **4.3 SYSTEM INTERFACE MATRIX**

A fire interface matrix shall be provided for all projects to ensure that connections between services are clearly outlined. Examples of these include:

- mechanical system fire mode operation
- electronic door lock release
- emergency warning and intercommunication system
- fire or smoke curtains
- isolation sequences for research facilities such as fume cupboards (as applicable).

In cases where there are Performance Solutions, requirements from the FSER shall be accounted for in the matrix with a clear reference to the specific FSER.

The matrix is to be in the form of a document that presents in a grid-type cross-reference, clearly showing smoke detection and smoke control zone inputs, (including any suppression system inputs to the fire detection control indicating equipment) on

one axis with the corresponding functionality for each smoke control zone input on the other. The document will state the date of development and date of any subsequent modifications.

An example of a system interface matrix is provided in Appendix F.

#### **4.4 BASELINE DATA**

In accordance with AS1851, baseline data for all fire safety systems shall be clearly documented in the as-constructed documentation for use as a basis for maintenance works.

The baseline data for a system shall include, but not be limited to, the following (some aspects of the baseline data are detailed further in this section of the Guideline):

- site identifier/address
- building number and/or name
- system scope; an alteration to an existing system or a new system
- type of system e.g. for smoke detection, conventional, addressable, addressable/analogue or combination
- design reference e.g. standard reference (including year), Deemed to Satisfy or Performance Solution
- The fire safety engineering report reference if a Performance Solution is applicable
- a statement that the equipment used within the system meets the product standards
- design drawings showing the system layout (building plans), equipment type, location and designation (to be provided as part of the as-constructed drawing set)
- systems interface matrix
- a cause and effect matrix
- a list of all system components, their location, type, unique system designation and descriptor
- a list of each system component having a fixed service life, nominating the service date
- a list of any ancillary equipment
- an equipment building services label register
- manuals for all control indicating equipment and system components (as applicable).

#### **4.5 PENETRATIONS REGISTER**

All penetrations through fire and smoke floors/walls are to be assigned an Archibus reference number. This is to be identified on a label installed on, or adjacent to, the

penetration. The format and location of the label is to comply with the University's Building Services Labelling Examples document (Knowledge Tree ID: 000043).

Penetrations are to be detailed within a register that is to be stored in the fire manual for the building. The register is to include a picture of the penetration, the rating of the wall/floor that it passes through, the details of the penetration and the specific protection method adopted.

Appendix G provides an example of a typical building Penetration Register. For new buildings or developments, the template to be used for development of this document is available from the Responsible Officer for the project (*000513 Tool - Penetration Register*).

## **4.6 OPERATIONS AND MAINTENANCE MANUALS**

Operations and maintenance manuals are to be provided for all fire safety systems present within the building.

The operator's manuals shall be prepared and submitted in PDF electronic format within two weeks of Practical Completion. Practical Completion will not be achieved until all drawings, documents and electronic files have been delivered to the satisfaction of the Principal.

The general content and format to be adopted for a manual (as applicable) is as follows, with reference also given to any specific requirements within each system's Design Guideline.

Include the following:

### **SECTION 1 – INDEX**

- sections and subsections
- a list of drawings

### **SECTION 2 – SYSTEM DESCRIPTION**

- a general description of the system and its components including FIP details/connections
- design criteria.
- a schedule of capacities for all equipment
- calculations
- certificates of compliance

### **SECTION 3 – INSTALLATION MAINTENANCE AND OPERATING INSTRUCTIONS**

- detailed maintenance log sheets for each item of equipment
- manufacturer's installation, maintenance and operating instructions for each item of equipment



## **SECTION 4 – OPERATING INSTRUCTIONS**

- a complete description and correct sequence of all actions necessary for the starting up, operation and shutting down of the fire system
- emergency shutdown procedure
- details of all isolation procedures of gas systems and or plant shutdowns and the like

## **SECTION 5 – PERFORMANCE TEST RESULTS**

- commissioning data, performance test results and authorities test certificates
- independent authorised inspector's certificates/documents
- hydrostatic/annubar test results

## **SECTION 6 – DATA SHEETS**

- data sheet index
- manufacturer's literature for all equipment

## **SECTION 7 – INSTALLATION DRAWINGS**

- drawing index
- a full size and A3 copy of all construction drawings
- coloured copies of each graphic map for site monitoring system
- relevant system calculations and associated node drawing
- a CD, containing the as-constructed drawings in AutoCAD format, and all data sheets and commissioning sheets in electronic format.

### **4.7 BLOCK PLANS**

Block plans are required where a building incorporates a fire hydrant system or sprinkler system. Their intent is to ensure that firefighters using the booster assembly are aware of the system (i.e. hydrant and/or sprinkler) in terms of its designed capacity, extent and configuration. They are to be developed by the design and construction team in accordance with AS2419, AS2118 and Curtin Documentation Protocols. A template for development of a block plan is available from the Building Services Data Team.

The hydrant system block plan is to be fixed within the booster cabinet/enclosure/recess, fire control room and pump room where it can be readily seen. It shall be of a minimum A3 size, water- and fade-resistant, and have text no smaller than 2.5 mm.

The hydrant system block plan shall include, but not be limited to, the following information:

- a diagrammatic layout of the protected building
- a diagram showing:

- size and location of water supply mains
- location and capacities of water storage tanks
- location of pumps
- location and total number of fire hydrants
- location of all fire brigade booster assemblies
- any connections to other installed fire protection systems
- location of main electrical switch room
- location of isolating and non-return valves
- the year of installation, any major extensions or any unusual features
- name of the contractor who installed/modified the system
- system design and commissioning pressure and flow rate
- height of the highest fire hydrant above the lowest booster inlet connection
- reference to the applicable fire safety engineering report where an Alternative Solution is adopted within the system design.

Where a sprinkler system is present within the building, a sprinkler system block plan with the position of the main stop valves clearly indicated shall be placed adjacent to each set of installation control assemblies or group of valves, where it can be readily seen by firefighters and others responding to the alarm. The sprinkler system block plan shall include, but not be limited to, the following information:

- a diagrammatic layout of the protected building or areas
- a diagram of water supplies including sizes and locations of supply mains and valves, storage tanks (capacity and locations) and pump duties
- the location and telephone number of the responding fire station
- the location of the main switchboard, distribution boards and starters
- the outline of the area of each individual hazard and the design density for that area.

#### **4.8 ZONE BLOCK PLAN**

Zone block plans are required where a building incorporates a fire alarm system. They are to be developed by the design and construction team in accordance with AS1670.1 and Curtin Documentation Protocols. A template for development of a zone block plan is available from the Building Services Data Team.

A hard copy of minimum A3 size of the zone block plan shall be securely mounted in a picture frame adjacent to the FIP, mimic panel, repeater panel and fire brigade panel, so that tools are required to remove it.

The orientation is to be accurate from the standpoint of a person viewing the block plan.

It shall be a permanent diagram that is water- and fade-resistant; the material of the plan is to be laminated and UV-stabilised.

The information contained on the zone block plan should be limited to prevent any confusion. It is to provide a quick and easy reference for the attending fire brigade personnel to locate the active zone. The zone block plan is to show:

- a diagrammatic layout of all levels of the building in which the fire alarm system is installed
- the area covered by each zone with a different and contrasting colour for each zone
- the zones, delineated by infill colouring of each zone without the use of solid, dashed or dotted lines
- room numbers
- location of the FIP and all sub-indicator panel (SIP), mimics and repeater panels
- location of any other control and warning systems and indicating equipment including sound systems and intercom systems for emergency purposes
- location of any fire suppression system controls
- location of the fire fan control panel
- location of the building's main electrical switchboard to enable power to be shut off if necessary, such location to be worded 'MAIN ELECTRICAL SWITCH BOARD'
- where CO detectors are used, the plan clearly indicating 'Note: CO Detectors Installed' with at least 5 mm high letters in a contrasting colour.

#### **4.9 TACTICAL FIRE PLANS**

Tactical fire plans are required to be produced where a building includes a fire control room. They are to be developed by the design and construction team and submitted to the Electrical Infrastructure Manager for approval. The important features required in tactical fire plans are:

- general information on the building
- details of the fire protection facilities available
- fire safety features.

Tactical fire plans must clearly illustrate the significant elements of a building's active and passive fire protection systems and provide essential instructions for their operation and control in the case of fire and other emergency. Special hazards must also be identified. The plans must be clear and concise, not smaller than 1:200 scale, colour-coded and fade-resistant.

Building plans should include:

- a plan view of each level showing relevant items colour-coded
- sectional elevations of the building including fire barriers, service rises and other relevant items
- schematic diagrams including:

- fire mains systems (including isolation valves)
- smoke control/stair pressurisation systems
- fire detection and control systems
- essential service power distribution systems
- essential instructions for the operation and control of emergency systems.

The plans should be developed in line with the Curtin Documentation Protocols, with consideration given to DFES Built Environment Branch (BEB) Guideline GL04 Fire Indicator Panel, Fire Control Centres/Rooms and Tactical Fire Plans.

#### **4.10 EVACUATION DIAGRAMS**

Evacuation diagrams are to be displayed in all facilities. They are to be developed by the design and construction team with the Emergency Planning Manager advised at the time of their installation.

They are to be displayed in locations where occupants and visitors are able to view the diagrams, within a zone at a height not less than 1,200 mm and not more than 1,600 mm above the plane of the finished floor. Each diagram is required to have the correct orientation with regards to direction of egress and its location of the 'YOU ARE HERE' point.

At a minimum, the following elements are to be included in each evacuation diagram:

- a pictorial representation of the floor or area, at least 200 x 150 mm
- the title 'EVACUATION DIAGRAM'
- the 'YOU ARE HERE' location
- the designated exits in the facility
- the following communications equipment, where installed:
  - warden intercommunication points
  - manual call points (red) and emergency call points
  - main controls/panels for the occupant warning system
- hose reels
- hydrants
- extinguishers
- fire blankets
- fire indicator panel (if provided)
- location of assembly area
- fire and smoke compartments.

These diagrams are to be developed in accordance with AS3745 Planning for Emergencies in Facilities, and Curtin Documentation Protocols. A template for

development of an evacuation diagram is available from the Building Services Data Team.

#### **4.11 FIRE SAFETY ENGINEERING REPORT**

The fire safety engineering report is to detail the non-compliances with the DTS provisions of the NCC that are adopted within the design and construction of a building. Justification for each non-compliance is to be presented and the fire safety strategy for the building clearly outlined. It should be comprehensible to all stakeholders and in a form suitable for retention as a source of information on the building in question. The information contained within the report may find use during construction, commissioning, management, use, maintenance, audits, alteration/extension or change of use of the building.

To achieve the above, it is recommended that the five-stage process outlined in the International Fire Engineering Guidelines is adopted for development of the fire safety engineering report. The five stages are:

1. Prepare a fire engineering brief.
2. Undertake the analysis.
3. Collate and evaluate the results.
4. Draw conclusions.
5. Prepare the fire safety engineering report.

Throughout this process it is important that the fire safety engineer is in continuous discussion with the other members of the design team as well as the appropriate Curtin University representatives, ensuring that the strategy being developed is viable in its application. This is particularly important during the first and last of the five stages noted above.

#### **4.12 SYSTEMS INTERFACE TEST REPORT**

At the completion of construction and at the end of the Defect Liability Period, a systems interface test is to be undertaken by a third party. This test is to be attended by Curtin University's maintenance team and any other staff members and consultants/contractors as deemed appropriate. Appropriate tests are to be undertaken to demonstrate that the cause and effect matrix includes the necessary and correct information and is in line with the expectations detailed within the functional statement. This test shall then be repeated, as managed by the University, on an annual basis.



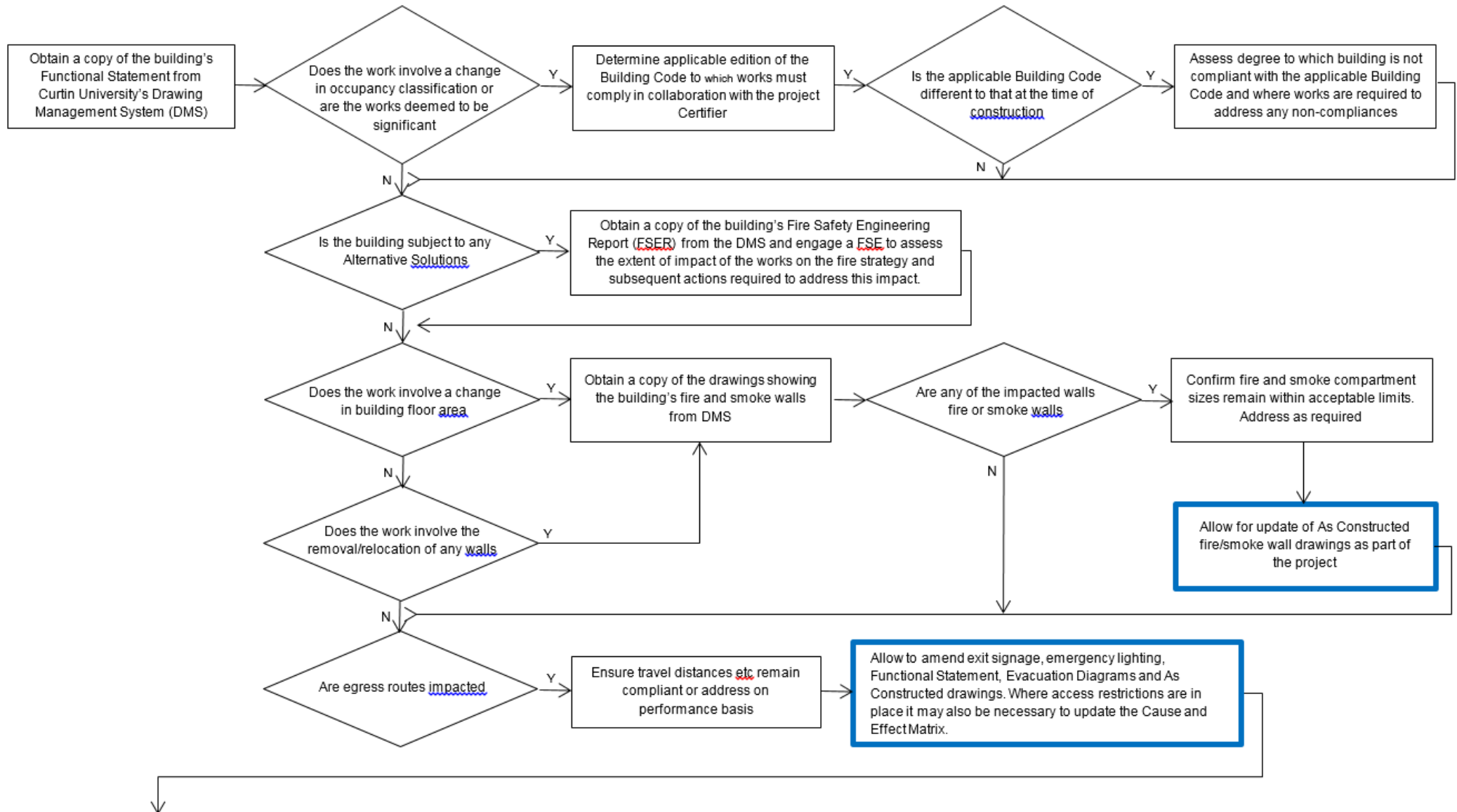
Design Aspect	Include within Design Scope	Key Stakeholders	DELIVERABLES ASSOCIATED WITH										
			As-constructed DWgs	Functional Statement	Systems Interface Matrix	Baseline Data	Penetrations Register	Graphics System Map	Block Plans	Zone Plans	Tactical Fire Plans	Evacuation Diagrams	Fire Safety Engineering Report
Is the design Deemed to Satisfy (DTS) compliant or performance-based?	Develop a fire safety strategy to address non-compliances with DTS provisions	Emergency Management Planning, Infrastructure Managers as appropriate	✓	✓									✓
Compartmentalisation	Determine fire and smoke compartmentalisation.		✓	✓		✓	✓						
Emergency egress	Establish emergency egress strategy	Emergency Management Planning, Security	✓	✓								✓	
Fire safety systems and measures	Establish applicable fire safety systems												
Detection and Alarm System	Undertake system design work	Infrastructure Manager Electrical, Security	✓	✓	✓	✓	✓	✓		✓	✓		

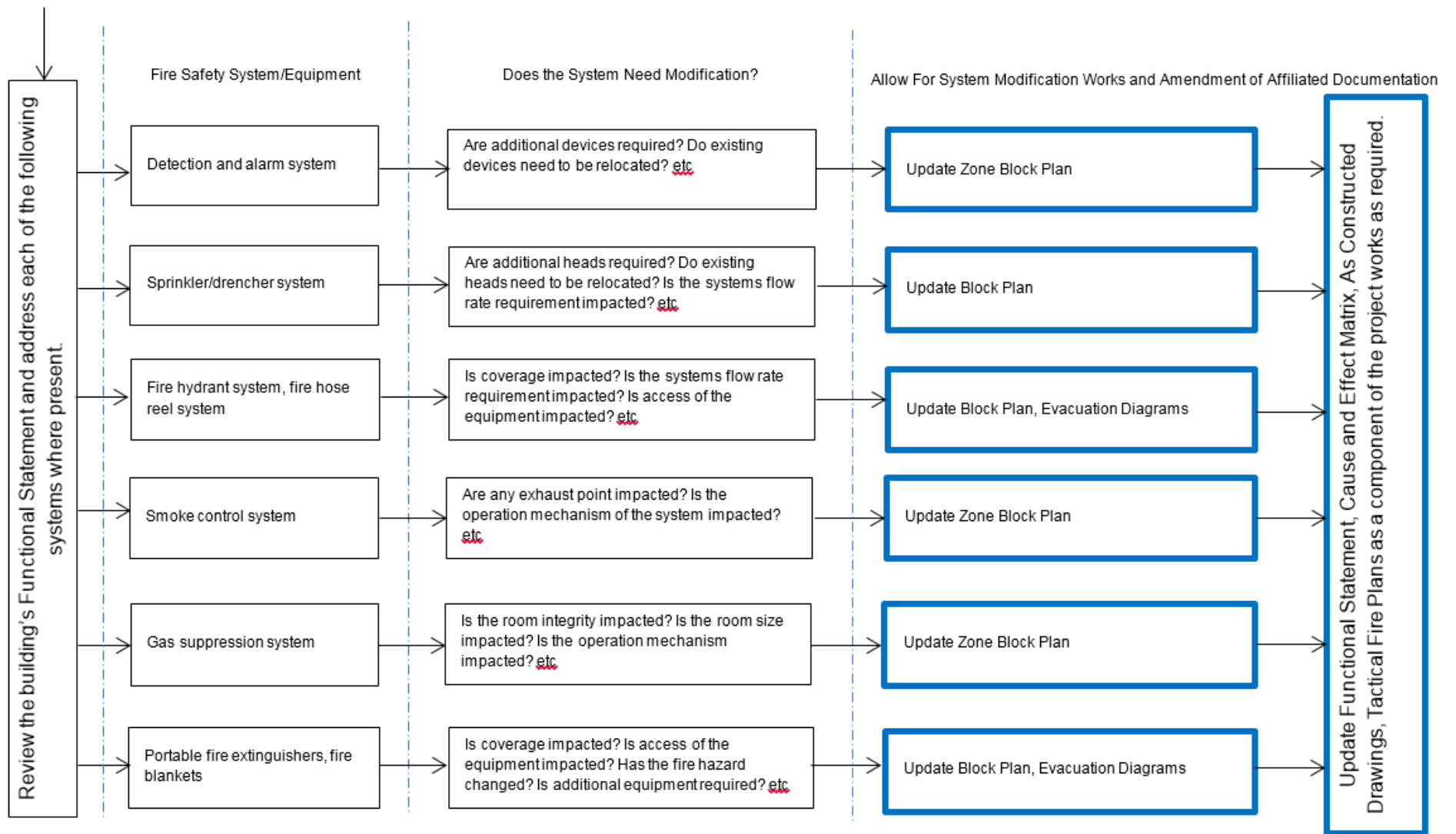
Design Aspect	Include within Design Scope	Key Stakeholders	DELIVERABLES ASSOCIATED WITH										
			As-constructed DWGs	Functional Statement	Systems Interface Matrix	Baseline Data	Penetrations Register	Graphics System Map	Block Plans	Zone Plans	Tactical Fire Plans	Evacuation Diagrams	Fire Safety Engineering Report
Sprinkler/Drencher System, Fire Hydrant System, Fire Hose Reel System	Undertake system design work ensuring that system does not detrimentally impact on existing infrastructure serving remainder of campus	Infrastructure Manager Civil	✓	✓	✓	✓	✓		✓		✓	✓	



Design Aspect	Include within Design Scope	Key Stakeholders	DELIVERABLES ASSOCIATED WITH											
			As-Constructed Dwgs	Functional Statement	Systems Interface Matrix	Base Line Data	Penetrations Register	Graphics System Map	Block Plans	Zone Plans	Tactical Fire Plans	Evacuation Diagrams	Fire Safety Engineering Report	
Smoke Control System	Undertake system design work	Infrastructure Manager Mechanical	✓	✓	✓	✓	✓					✓		
Gas Suppression System	Undertake system design work	Infrastructure Manager Civil	✓	✓	✓	✓	✓					✓		
Portable Fire Extinguishers, Fire Blankets	Undertake system design work	Infrastructure Manager Civil	✓	✓								✓	✓	
Emergency Lighting and Exit Signage	Undertake system design work	Infrastructure Manager Electrical, Emergency Management Planning	✓	✓	✓									

## APPENDIX B WORKS WITHIN EXISTING BUILDINGS





## APPENDIX C KEY REFERENCE STANDARDS

Reference	Title
AS1221	Fire hose reels
AS1670	Detection and occupant warning system
AS1688	The use of ventilation and air conditioning in buildings
AS1682	Fire, smoke and air dampers
AS1851	Routine service of fire protection systems and equipment
AS1530	Methods for fire tests on building materials, components and structures
AS1905	Fire doors
AS2118	Automatic fire sprinkler systems
AS2220.1	Emergency warning and intercommunication systems in buildings
AS2419	Fire hydrant system
AS2441	Installation of fire hose reels
AS2444	Fire extinguishers
AS2941	Firefighting pumpsets
AS3013	Emergency warning and communication systems within buildings
AS3000	Electrical installations
AS4072	Components for the protection of openings in fire-resistance separating elements

## APPENDIX D CURTIN UNIVERSITY REFERENCE DOCUMENTS

Reference	Title
000330	PDG Fire Services Standard Specification
000311	PDG Mechanical Design Guidelines
000326	PDG Hydraulic Design Guidelines
-	Agreement for the Provision of Fire Services Maintenance 2015 - 2018
000331	PDG Emergency Management Design Guideline
-	Curtin Documentation Protocols
-	Electrical Consultancy Summary Guide for Electrical Consultants
000312	PDG Electrical Services Guidelines
000328	PDG Security Infrastructure Specification
000327	PDG Security Infrastructure Design Guidelines
00MISC-A-DT0001	Curtin University Auto Door Interface Standard Requirements
000043 Knowledge	Building Services Labelling Examples
000260	Tool - Functional Statement Template
000513	Tool - Penetration Register Template

## APPENDIX E FUNCTIONAL STATEMENT EXAMPLE

Building Reference:	Curtin Building xxx
Building Location:	Bentley campus South of B342; north of B343 and west of Hayman Road
Building Code:	National Construction Code 2014 edition
Occupancy Classification:	5, 6, 9b
Rise in Storey:	5
Basement Present:	No
Effective Height:	21 m
Large Isolated Building:	No
Building Features of Note:	Ground to Level 2 are connected by a void at the building's main entry.
Compartmentation:	Each floor is a separate fire compartment with the exception of Ground, Level 1 and Level 2 which form a single compartment. Level 2 is smoke-separated in the event of a fire from Ground and Level 1 by the presence of a smoke curtain around the void.
Egress Strategy:	Three fire-isolated stairways are provided for emergency egress purposes adopting a one out, all out evacuation strategy
Fire Safety Strategy Philosophy:	The building is provide with a smoke curtain around the void at Level 2. The curtain is to drop upon activation of the building's detection system.

		The occupant warning system includes a pre-recorded voice message. Upon activation of a smoke detector the alarm is to go into alert mode. Activation of a second smoke detector is to initiate the evacuation mode alarm if this has not already occurred.			
Alternative Solutions					
Fire Safety Engineering Report:		160701FSER_Rev2	Developed By:	FS Consulting	Date: 15/12/2015
1	Extended travel distance of up to 25 m from Room 3.12		The building's alarm includes a pre-recorded voice message component		
2	Omission of Fire Hose Reels		Portable fire extinguishers are provided in lieu of fire hose reels		
Fire Safety System		Design Standards(s) (inc. year)	Company Designed By	Company Installed By	Comment
Fire Hydrant System	Initial Construction	AS2419 (2005)	ABC	XYZ	Internal hydrants operated off campus pumps and tanks
	Modification 1				
Fire Detection & Warning Systems	Initial Construction	AS1670.1 (2004) 160701FSER_Rev 2	ABC	XYZ	The system includes a pre-recorded voice message alarm.
	Modification				

	1				
Portable Fire Extinguishers & Fire Blankets	Initial Construction	AS2444 (2001) 160701FSER_Rev 2	ABC	XYZ	Additional PFE are provided as outlined in 160701FSER_Rev2 to address the omission of FHR.
	Modification 1				
Emergency Lighting & Exit Signage	Initial Construction	AS2293 (2003)	ABC	XYZ	
	Modification 1				

**REVISION REGISTER**

Revision Ref. No	Developed/Amended By	Date	Notes
0	FS Consulting	1/7/2016	



**APPENDIX F SYSTEM INTERFACE MATRIX EXAMPLE**

### AS1851-2012 FIRE SYSTEMS INTERFACE MATRIX

**Legend & Notes**

Required Operation

SVR = Sprinkler Valve Room

R/A = Return Air

FS = Sprinkler Flow Switch

S/A = Supply Air

PS = Sprinkler Pressure Switch


AZF = Alarm Zone Facility

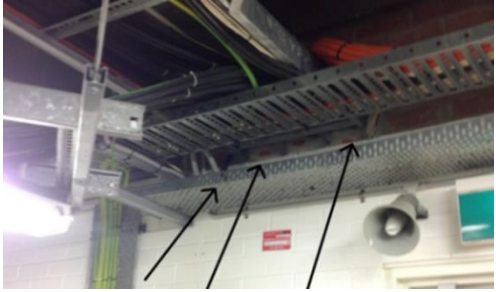
EFFECT CAUSE	EFFECT																				NOTES	OPERATION VERIFIED
	ASE Activation (Brigade Call)	Zoned E.W.I.S Activation	Zoned Fire Mode (Smoke Control) Activation	Electric Fire Bell	Relevant Hydraulic Fire Bell	Level 1 Magnetic Door Holder Release	Level 2 Magnetic Door Holder Release	Level 3 Magnetic Door Holder Release	Sprinkler Pumps Activation (Electric and Diesel)	Hose reel (Hydrant Jacking) Pump Activation	Hydrant Pump Activation (Diesel & Electric)	Indication on Main Fire Indicator Panel	Indication on Fire Indicator Mimic Panels							Non latching AS1858 Supply Air Detector Shuts Down Fan		
<b>SPRINKLER Zone</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	<b>SPRINKLER Pressure Switch</b>	
AZF 53 - SVR-1	●	●	●	●	●					●				●							PS - V1- Level 1 Offices	
AZF 57 - SVR -1	●	●	●	●	●					●				●							PS - V1-2 - Level 2 Offices	
AZF 59 - SVR -1	●	●	●	●	●					●				●							PS - V1-3 Level 3 Offices	
AZF 36 - SVR-2	●	●	●	●	●					●				●							PS - V2-1 - Building 2 Level 1	
AZF 37 - SVR-2	●	●	●	●	●					●				●							PS - V2-2 - Building 2 Level 2	
AZF 38 - SVR-2	●	●	●	●	●					●				●							PS - V2-3 - Building 2 Level 3	
<b>SPRINKLER Zone</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	<b>SPRINKLER Flow Switch</b>	
AZF 25 - SVR-1														●	●						FS - V1 - L1 -Plant Room	
AZF-26 - SVR-21														●	●						FS - V3 - L3 - Lecture Theatre	
<b>DETECTOR Zone</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	<b>DETECTION Area</b>	
AZF 01	●	●	●	●		●								●	●						Offices Level 1	
AZF 02	●	●	●	●		●								●	●						Offices Level 2	
AZF 03	●	●	●	●		●								●	●						Offices Level 3	
AZF 04	●	●	●	●		●								●	●						Offices Return Air Level 1	
AZF 05	●	●	●	●		●								●	●						Offices Return Air Level 2	
AZF 06	●	●	●	●		●								●	●						Offices Return Air Level 3	
AZF 07	●	●	●											●	●						Offices Top of Lift Shaft	
AZF 08	●	●	●	●			●							●	●						Building 2 Level 1	
AZF 09	●	●	●	●			●							●	●						Building 2 Level 2	
AZF 10	●	●	●	●			●							●	●						Building 2 Level 3	

**AS1851-2012 FIRE SYSTEMS INTERFACE MATRIX**

EFFECT  CAUSE	EFFECT																				NOTES	OPERATION VERIFIED	
	ASE Activation (Brigade Call)	Zoned E.W.I.S Activation	Zoned Fire Mode (Smoke Control) Activation	Electric Fire Bell	Relevant Hydraulic Fire Bell	Level 1 Magnetic Door Holder Release	Level 2 Magnetic Door Holder Release	Level 3 Magnetic Door Holder Release	Sprinkler Pump Activation (Electric and Diesel)	Hose reel (Hydrant Jacking) Pump Activation	Hydrant Pump Activation (Diesel & Electric)	Indication on Main Fire Indicator Panel	Indication on Fire Indicator Mimic Panels	Non latching AS1668 Supply Air Detector Shuts Down Fan									
DETECTOR Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	DETECTION Area		
AZF 11	●	●	●	●			●						●	●								Building 2 Return Air Level 1	
AZF 12	●	●	●	●			●						●	●								Building 2 Return Air Level 2	
AZF 13	●	●	●	●			●						●	●								Building 2 Return Air Level 3	
AZF 14	●	●	●										●	●								Building 2 Top of Lift Shaft	
DETECTOR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	AS 1668 Supply Air Fan		
S/A Smoke Detector													●								●	Offices Level 1	
S/A Smoke Detector													●								●	Offices Level 2	
S/A Smoke Detector													●								●	Offices Level 3	
S/A Smoke Detector													●								●	Building 2 Level 1	
S/A Smoke Detector													●								●	Building 2 Level 2	
S/A Smoke Detector													●								●	Building 2 Level 3	
OTHER Zones	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	OTHER Functions		
SVR-1													●	●								SVR No 1 Sprinkler Valve Monitoring	
SVR-2													●	●								SVR No 2 Sprinkler Valve Monitoring	
Electric Spk Pump													●	●								Electric Sprinkler Pump Run Monitoring	
Electric Spk Pump													●	●								Electric Sprinkler Pump Fail Monitoring	
Diesel Spk Pump													●	●								Diesel Sprinkler Pump Run Monitoring	
Diesel Spk Pump													●	●								Diesel Sprinkler Pump Fail Monitoring	
Electric Hyd Pump													●	●								Electric Hydrant Pump Run Monitoring	
Electric Hyd Pump													●	●								Electric Hydrant Pump Fail Monitoring	
Diesel Hyd Pump													●	●								Diesel Hydrant Pump Run Monitoring	
Diesel Hyd Pump													●	●								Diesel Hydrant Pump Fail Monitoring	
HYDRANT H Reel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	HYDRANT Hose reel		
Any Hose reel											●											Hose reel / Hydrant Jacking Pump Run	
Any Hydrant											●	●										Hydrant Electric / Diesel Pump Run	

## APPENDIX G PENETRATION REGISTER EXAMPLE

Building Name:		Architecture						
Building Number:		100						
Penetration ID	Floor Level	Room Location	Penetrating Element	Penetration Through	Protection Method (include specific brand)	Installed By	Installed Date	Images
100-FCB-01-0001	1	Electrical switchboard cupboard E 104	Electrical cables	Floor	Fire sealant xzy	Building Works ABC	2/1/2016	

100-FCB-02-0002	2	Electrical switch room E 201	Electrical cables and cable tray	Wall	Fire pillows ABC	Building Works ABC	2/1/2016	
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