FIRE ENGINEERING DA STATEMENT

FOR

MONDO PROJECT
WESTFIELD PENRITH

Report 2016 / 1422 – R2.0
25 February 2019

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REPORT HISTORY

Version	Status	Date	Purpose
Revision 0.0	Preliminary	10/07/2018	For internal review
Revision 1.0	Draft	11/07/2018	For Client review
Revision 2.0	Draft	25/02/2019	For Client review

REPORT AUTHORISATION

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		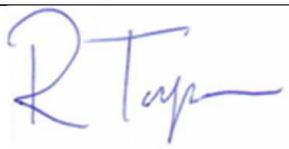
Date: 22/02/2019	Date: 25/02/2019	Date: 25/02/2019

1. EXECUTIVE SUMMARY

This report documents the findings of a preliminary high level fire safety engineering review carried out for the proposed Mondo Project construction on Level 1 and Level 2 at Westfield Penrith. Fire Engineering Professionals Pty Ltd (FEP) undertook this assessment at the request of Scentre Design & Construction, who are the Project Managers for the proposed development.

The proposed development involves alterations and additions to the existing Fresh Food Market and Food Court on Ground Level and associated plant areas on Level 2 of Westfield Penrith shopping centre building. The construction will also incorporate a two (2) storey tenancy adjacent to the carpark on the southern side of the main shopping centre building and a three (3) storey tenancy adjacent to the High Street carpark entry.

Fire Engineering Professionals Pty Ltd have been requested to review the proposed works with a view to providing Scentre Design & Construction with a summary of the potential major impacts on the fire safety systems serving existing building and any new fire services/ smoke management systems which may result from the proposed construction works. The report is also proposed to serve as a confirmation to the Penrith City Council for the intention of Fire Engineering Professionals to provide a Performance Solution for the identified list of non-compliances with the proposed design of the Mondo Project.

It must be noted that this is a general overview of the likely requirements from the proposed new works with regards to the existing and new fire services and not a detailed fire engineering review, which will be developed in consultation with relevant stakeholders as part of the detailed fire engineering study. All recommendations contained in this summary report will require agreement with relevant stakeholders and are subject to modifications based on a detailed assessment.

FEP have been supplied with a brief BCA assessment report prepared by Steve Watson & Partners (Report Reference 2018/0898) outlining the key issues of non-compliance with the BCA DTS provisions which are likely to require a detailed fire engineering assessment. This fire engineering review is based on the existing and proposed building configuration provided to FEP by Scentre Group Design and review of the previous base building fire engineering reports.

A comprehensive list of potential fire safety system requirements is included in Section 11 of this preliminary review report.

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2. INTRODUCTION

This report documents the findings of a preliminary high level fire safety engineering review carried out for the proposed construction of Mondo Project to be located on Level 1 and Level 02 at Westfield Penrith. Fire Engineering Professionals Pty Ltd (FEP) undertook this assessment at the request of Scentre Design & Construction, who are the Project Managers for the proposed development.

The proposed development involves alterations and additions to the existing Fresh Food Market and Food Court on Ground Level and associated plant areas on Level 2 of Westfield Penrith shopping centre building. The construction will also incorporate a two (2) storey tenancy adjacent to the carpark on the southern side of the main shopping centre building and a three (3) storey tavern style tenancy adjacent to the High Street carpark entry.

Fire Engineering Professionals Pty Ltd have been requested to review the proposed works with a view to providing Scentre Design & Construction with a summary of the potential major impacts on the fire safety systems serving existing building and any new fire services/ smoke management systems which may result from the proposed construction works. The report is also proposed to serve as a confirmation to the Penrith City Council for the intention of Fire Engineering Professionals to provide a Performance Solution for the identified list of non-compliances with the proposed design of the Mondo Project.

FEP have reviewed a preliminary BCA assessment report prepared by Steve Watson & Partners [Job Ref. 2018/0898 dated 04th May 2018] which outlines the key issues of non-compliance with the BCA DTS provisions which may require a detailed fire engineering assessment. This review is based on the existing and proposed building configuration provided to FEP by Scentre Design & Construction and based on a review of the previous base building fire engineering reports.

3. PURPOSE

The purpose of this preliminary review is to provide a brief on the likely impact of the proposed construction of Mondo Project to be located on Level 01, Level 02 and Level 03 of Westfield Penrith building on the fire safety systems serving the base building and any new fire safety requirements arising from the proposed works. The report is also proposed to serve as a confirmation to the Penrith City Council for the intention of Fire Engineering Professionals to provide an alternative solution for the identified list of non-compliances with the proposed building design.

This report is also likely to form the basis of a Fire Engineering Brief (FEB) for further discussions with Fire & Rescue NSW.

4. FIRE SAFETY OBJECTIVES

The core fire safety objectives of this review are:

- To review the likely non-compliances of the BCA with the building design that may require a “Performance Solution”; and
- To clarify the fire safety objectives of the preliminary assessment. The preliminary assessment will take into consideration the ability of the proposed building design and the fire safety measures in meeting the following fire safety objectives in the affected areas:

a. Prevention of fire spread within the building and to adjoining allotments; and

b. Facilitating safe evacuation of building occupants in the event of fire; and

c. Facilitating Fire Brigade access to the building and intervention in the event of fire.

Objectives such as protection of property; protection of furnishings; protection of reputation and ensuring business continuity; safety other than fire safety; have not been identified as design objectives of this assessment. However, by satisfying the core fire safety objectives some of the above objectives may also be satisfied.

5. ASSUMPTIONS AND LIMITATIONS OF THIS REVIEW

The following assumptions and limitations apply tho this review:

- This review is a preliminary high level review only and is not based on detailed site inspections or review of system design drawings or condition reports.
- This preliminary assessment is limited to a review of the proposed works taking into account the potential non-compliances identified by the BCA Consultant. Should additional non compliances to those which are noted in this report be identified at a later date, then these will need to be reviewed at that time and the likely impact on fire system requirements identified.
- FEP take no responsibility in respect to costing of the works and the accuracy of any budgets developed by Scentre Group.
- This review may not identify all fire safety system requirements accurately and is based on FEP's knowledge of Westfield Penrith building without any specific smoke and evacuation modelling being carried out.

6. PRINCIPAL BUILDING CHARACTERISTICS

Westfield Penrith is a typical metropolitan shopping centre comprised of two (2) distinct parts, the east and the west of Riley Street. The shopping centre comprises of two (2) retail levels and associated basement, at grade and above ground carparks. Refer to Figure 6-1 below for the general location of the shopping centre building.

The retail levels of the building consist of mall zones which incorporate a number of smoke zones and adjoining zones which are occupied by the mini-major and major stores. The shopping centre building incorporates numerous voids connecting the two retail levels.

In accordance with the DTS provisions of the BCA the building has the following characteristics:

Table 6-1: BCA descriptive characteristics for Westfield Penrith

Characteristic	Description
Building Use	Shopping Mall, Car Park, Cinema
Classification	Class 6 – Retail Class 7a – Carpark Class 9b – Cinemas
Type of Construction Required	Type A
Effective height	Less than 25m.

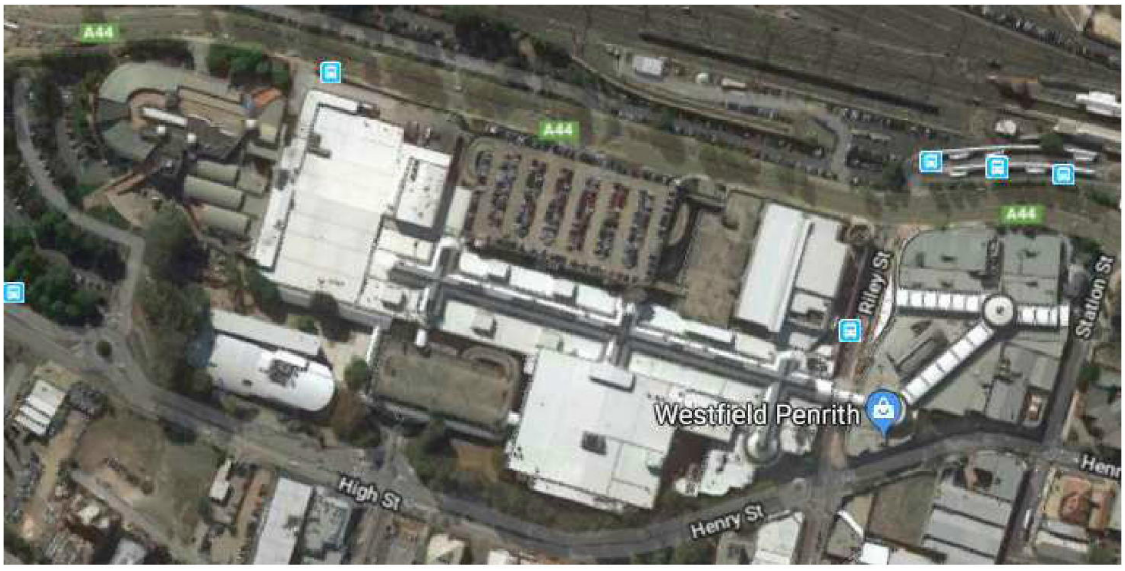


Figure 6-1: Aerial snapshot of the Westfield Penrith shopping centre and surrounding streets (courtesy Google Maps)

6.1 BRIEF DESCRIPTION OF THE PROPOSED WORKS

The proposed building works involve construction and reconfiguration of restaurant tenancies along the south western façade located adjacent to the existing Food Court and Fresh Food Market on Level 1 of the building and construction of a tavern style tenancy at the High Street end of the new construction on Level 1 (Ground Level). The proposed works also include the construction of two (2) storey tenancy located adjacent to the existing southern carpark.

The proposed works necessitate a relatively minor reconfiguration of the existing shopping centre entries from High Street. The emergency egress from the proposed new tenancies on Ground Level is to be provided via the existing 'open to sky' path which leads occupants to High Street. Due to the nature of the proposed construction, a reduction in the existing aggregate emergency egress width and extended travel distances occur which are proposed to be addressed as a 'Performance Solution'.

The location and the extent of the proposed construction is shown in Figure 6-3.

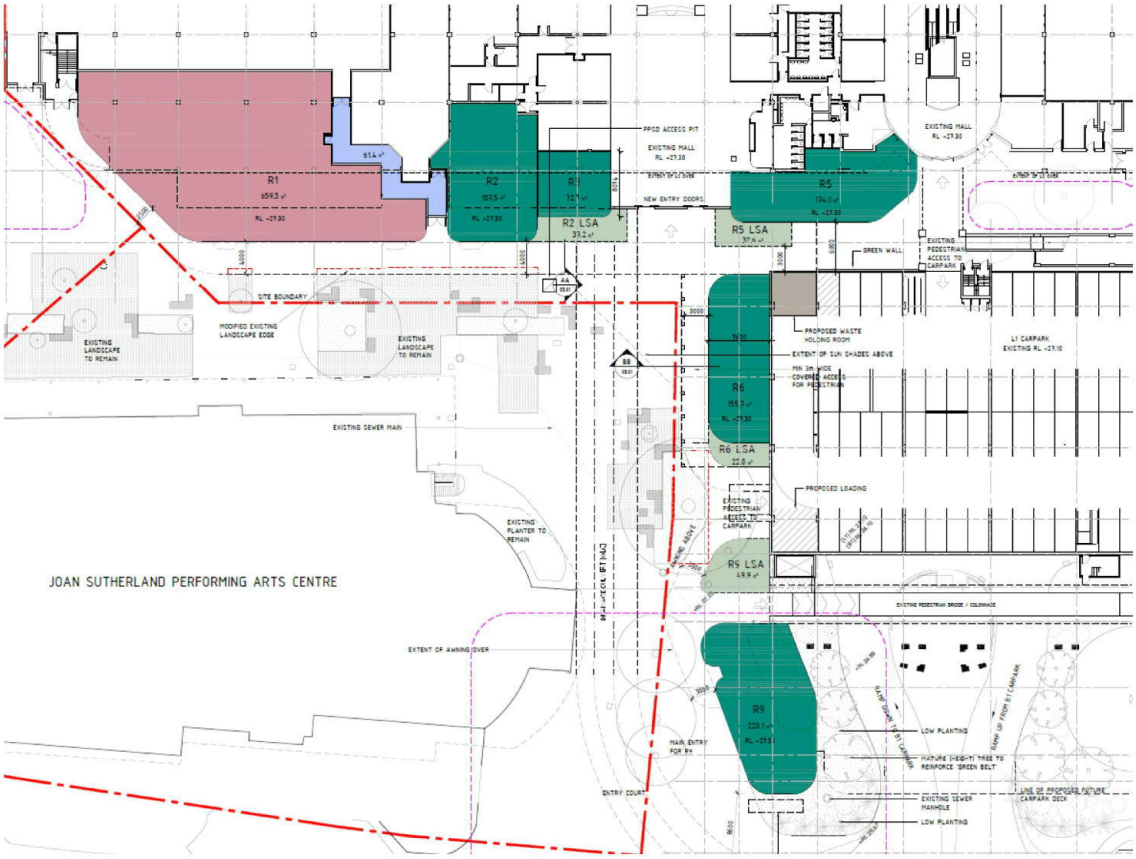


Figure 6-2 Part Level 1 plan showing the proposed new construction on Level 1

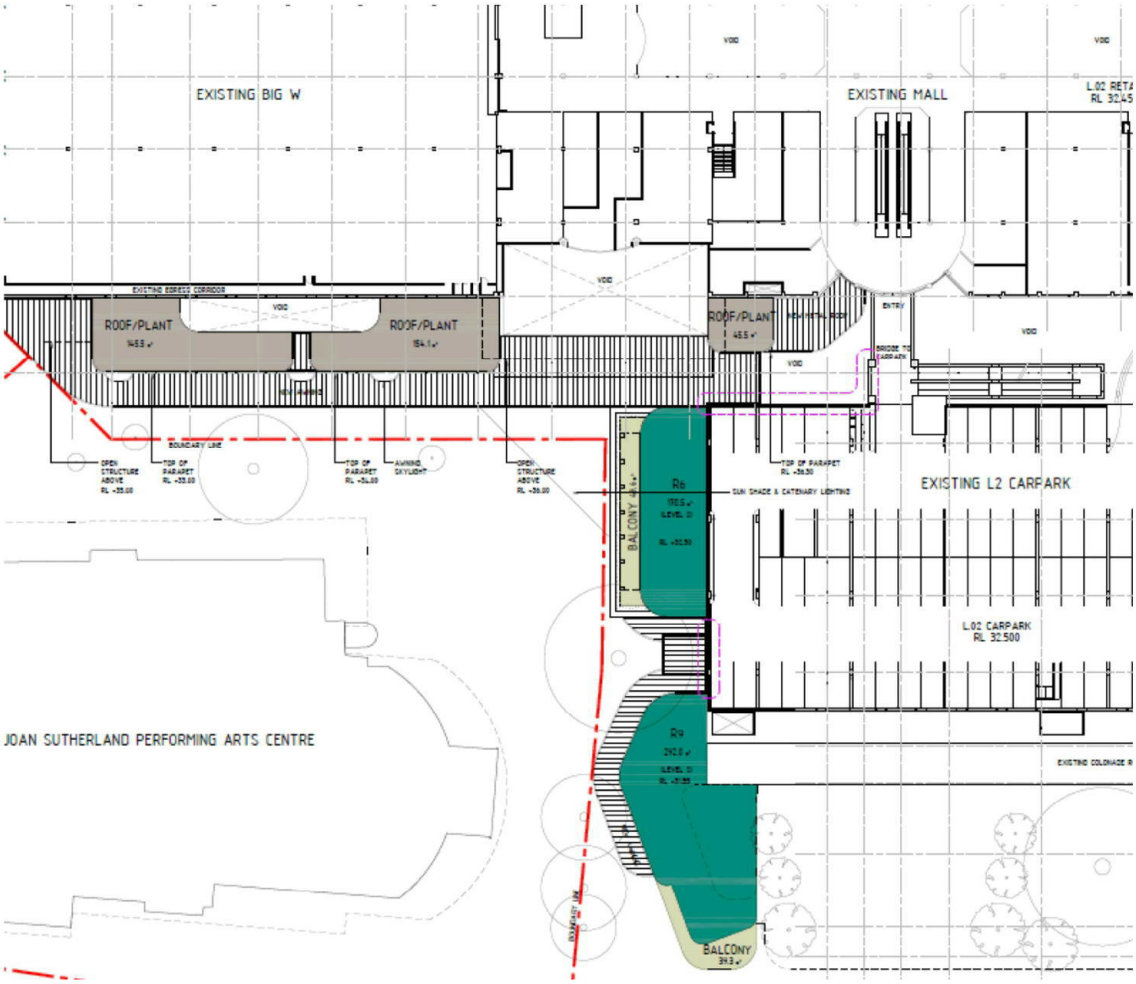


Figure 6-3 Part Level 2 plan showing the proposed new tenancy areas

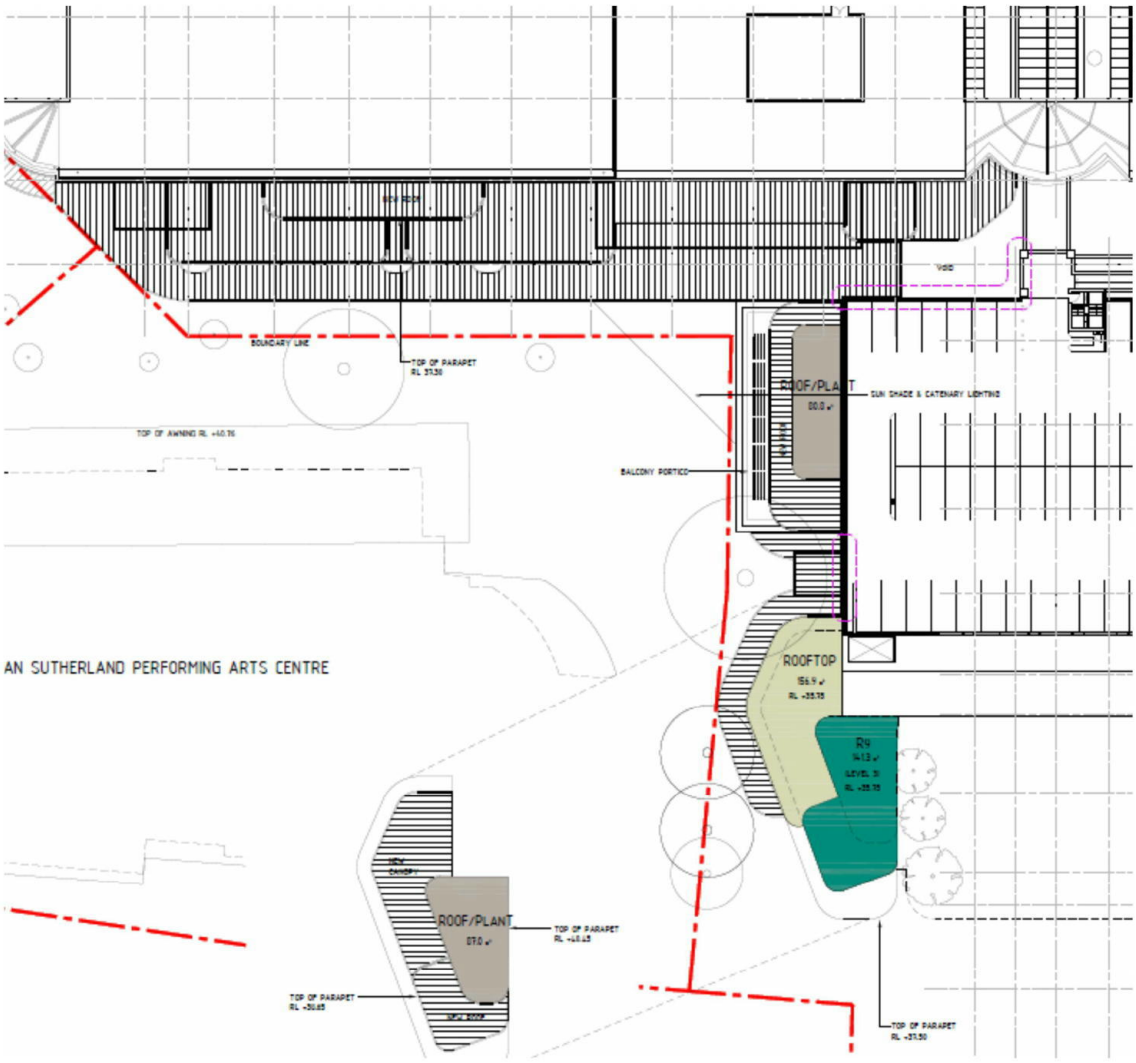


Figure 6-4 Part Level 3 and Roof plan showing the proposed new tenancy areas

The proposed works result in a net increase in the overall retail floor area and therefore the resulting overall increased building population (as shown in **Figure 6-5** below) will be considered as part of the proposed fire engineering study.

Level	Use	Class	Approx GFA (m^2)	Population Density @ (m^2/ person)	Population	Aggregate Exit Width required	Existing Exit width provided	Proposed Exit width after development	Status
Retail 1	Speciality retail, Mall and Kiosk	6	17,300	7.5	2307	20m	48m	39.2m (10.8m reduction)	Complies*
	Woolworths	6	3,578	7.5	477	4.5m	9m	5m (4m reduction)	Complies
	Aldi	6	1,613	7.5	215	2.5m	6m	No change	Complies
	MYER	6	6,789	7.5	905	8m	11m	No change	Complies
	Target	6	6,689	7.5	892	8m	12m	No change	Complies

* Path of travel to the road from the discharge point will need a performance solution.

Figure 6-5 Area schedule for Retail Level 1 at Westfield Penrith – extracted from BCA Assessment report prepared by Steve Watson & Partners

6.2 PREVENTIVE AND PROTECTIVE MEASURES

The fire preventive and protective measures for Westfield Penrith involve various passive and active fire protection systems. The International Fire Engineering Guidelines (IFEG) indicate that to assist in analysing a fire safety system, it is convenient to consider the system as comprising six 'sub-systems' [ABCB, 2005a]. Therefore, preventive and protective measures detailed in Table 6-2 are grouped in accordance with the different 'sub-systems' recommended by the IFEG.

Table 6-2: Preventive and protective measures

Sub-System	Comment
Sub-System A Fire Initiation and Development and Control	Strict enforcement of the "No-Smoking" policy shall be implemented throughout the building; Strict enforcement of cleaning regimes for the restaurant tenancies, including regular cleaning and inspection of ductwork, to prevent accumulation of combustible residue in the ducts and rubbish in kitchens; Regular maintenance and inspection of all plant, electrical equipment and appliances shall be enforced in accordance with the relevant regulations.
Sub-System B Smoke Spread and Control	The existing portions of the building are currently provided with mechanical smoke exhaust as per the existing and proposed smoke management strategy. The proposed new specialty retail (restaurant) tenancies open on to open to sky areas which is to be utilised for natural smoke venting. The natural smoke venting is expected to maintain conditions tenable for the duration of occupant evacuation from these areas; All air-handling systems within the new areas shall comply with the DTS provisions of Part E2.2 of BCA 2014 and, if they do not form part of the smoke hazard management systems, shall shut-down on fire trip, which shall prevent smoke spread between different smoke zones; The inter-tenancy walls and other non-combustible and fire rated construction between different functional areas of the new portions of the building is expected to prevent smoke spread.
Sub-System C Fire Spread and Impact and Control	Westfield Penrith retail areas form a single fire compartment. Imperforate non-fire rated walls are proposed to separate the new tenancies from each other; Potential fire spread is expected to be controlled by the automatic fire sprinkler system provided which is to be fully compliant with BCA DTS provisions; Should the sprinkler system fail to operate as designed, fire-rated walls and non-fire-rated inter-tenancy walls shall provide temporary barrier in the path of spreading fire.
Sub-System D Fire Detection, Warning and Suppression	An automatic sprinkler system is understood to be provided throughout Westfield Penrith generally in accordance with AS2118.1-1999. All new areas shall be provided with sprinkler protection in accordance with BCA DTS provisions; A fire detection and alarm system is understood to be provided throughout the building in accordance with Clause 5 of BCA Specification E2.2a unless

Sub-System	Comment
	required by 'Alternative Solution' for specific tenancy or mall areas. Any new areas with extended travel distances shall be provided with smoke detection in accordance with BCA DTS provisions and AS1670.1 for early activation of occupant warning systems; The automatic fire sprinkler and fire detection and alarm systems serving the new areas are to be interfaced with the Fire Indicator Panel (FIP) and linked to a 24 hour Monitoring Station via Alarm Signalling Equipment (ASE); Portable fire extinguishers and fire hose reels are to be installed throughout the new areas in accordance with the DTS provisions of the BCA.
Sub-System E Occupant Evacuation	Emergency lighting and exit signage is understood to be installed throughout the building generally in accordance with AS/NZS2293.1-2005; Additional emergency lighting and exit signage shall be provided throughout the new areas and the egress paths via generally external open to sky areas to direct occupants to High Street. The existing exit signage shall be modified to direct occupants to the nearest exits where existing emergency egress provisions are modified. An occupant warning system is currently installed throughout the building. It is understood that this existing system is to be extended to provide coverage to the new areas of the building. The warning system shall be capable of providing pre-recorded evacuation messaging and allowing for live directives to be broadcast from the fire panel. Activation of either the fire detection and alarm or sprinkler systems shall activate the occupant warning system.
Sub-System F Fire Services Intervention	Professional fire service (Fire and Rescue NSW) available 24/7; Fire hydrant protection is provided from fire hydrants installed internally throughout the building. Internal fire hydrants are understood to be installed outside of the fire-isolated exits. Partial Fire & Rescue NSW vehicle access shall be available around all four sides of the building.

6.3 HAZARDS

Identification of hazards that are expected to affect life safety of building occupants is crucial to undertaking a fire safety engineering assessment. Special attention must be paid to those hazards that are not commonly associated with the type of the occupancy. Hazards associated with the general layout and activities as well as the ignition and fuel sources for the ELP construction at Westfield Penrith have been identified in Table 6-3 below:

Table 6-3: Hazards and ignition sources

Type	Comment
General Layout	No areas within the proposed works are currently identified with extended dead end travel distances. The proposed retail and restaurant tenancy areas are provided with alternative exits via the open to sky rooftop carpark which leads to fire isolated exits discharging at Ground Level; Due to the building layout and location of exits, extended travel distances to the nearest of the alternative exits and between alternative exits, when measured through the point of choice are present.
Activities	Activities associated with the day-to-day operation of Westfield Penrith are considered to present a medium fire risk in terms of the fire load and potential ignition sources.
Ignition Sources	The main ignition source throughout the areas forming part of the Mondo Project would be expected to be faulty electrical wiring; lighting and/or electrical equipment etc.; The main ignition source within the restaurant tenancies is expected to be open flame cooking and faulty cooking equipment etc; The main ignition sources through the existing adjoining car parks would be expected to be faulty motor vehicles; Potential for arson attack while remote is still possible.
Fuel Sources	The main fuel source throughout the commercial tenancies would be expected to be furniture; cellulosic items such as paper and other equipment associated with the tenancy; The main fuel source throughout any restaurant tenancy areas forming part of the new development would be expected to be combustible cooking oils equipment and furniture; The main fuel source throughout the car parks adjacent to the new construction would be expected to be motor vehicles.

6.4 OCCUPANT CHARACTERISTICS

The characteristics of the occupant groups expected to be present in the building during the day-to-day operations of Westfield Penrith are detailed below:

- Centre Management Staff and Security – Good familiarity with the building and the fire safety systems, fully trained in emergency procedures. This occupant group is expected to be mobile and able to take and implement decisions independently and require minimal assistance during evacuation in a fire emergency. This occupant group is expected to be awake and fully conscious at all times when inside the building; and
- Tenancy Staff – Good familiarity with the respective shops and the means of exits from within the shops. Generally familiar with the building and the location of main exits. This occupant group is also expected to be able to take and implement decisions independently and require minimal assistance during evacuation in a fire emergency. This occupant group is expected to be awake and fully conscious at all times when inside the building; and
- General Public (Customers) – May or may not be familiar with the layout of the building and may require assistance in locating the exits. This occupant group may require assistance with walking and may have hearing and visual impairment in line with general public; and
- External Maintenance Contractors – This occupant group is expected to have a reasonable familiarity with the building and contractors will be required to undergo emergency training prior to commencing work in any portion of the building (prior to signing in as contractors). This occupant group is also expected to be able to take and implement decisions independently and require minimal assistance during evacuation in a fire emergency. The contractors are expected to be awake and aware of their surroundings at all times when inside the building; and
- Fire & Rescue NSW Personnel – this occupant group will be equipped with safety equipment and will be educated in fire-fighting activities and the dangers associated with fire incidents. This occupant group would be expected to be in a position to assist other occupants requiring assistance to evacuate. It is not expected that this occupant group would be present in the building at the time of fire ignition; however, they are expected to enter the building at a later stage to assist with the evacuation of occupants, if required, and to undertake fire suppression activities.

The occupant densities used in determining the occupancy levels and required egress times are to be confirmed by the PCA.

An Emergency Management Plan complying with AS 3745-2010 must be developed by the Centre management so that retail staff and security personnel within Westfield Penrith are familiar with the fire safety systems and the egress provisions within the building for an efficient evacuation of the Centre during a fire emergency.

7. ASSESSMENT DATA

Information related to this analysis is taken from the documentation identified in Appendix “A” of this report.

8. RELEVANT STAKEHOLDERS

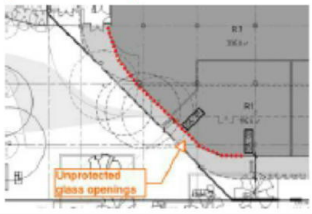
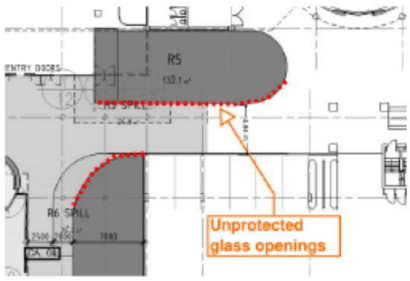
This Fire Engineering Report has been developed by Fire Engineering Professionals Pty Ltd in collaboration and consultation with the following relevant stakeholders as identified in Table 8.1 below:

Role	Company
Client	Scentre Developments
Project Managers	Scentre Design & Construction
Local Government Authority (LGA)	Penrith City Council
Building Regulations Consultants	Steve Watson & Partners

Table 8.1: Relevant stakeholders for the project

9. BCA REQUIREMENTS ASSOCIATED WITH THE PROPOSED ALTERNATIVE SOLUTION

Table 9.1 provides a description of the non-compliances with the BCA DTS provisions and BCA Performance Requirements associated with the Alternative Solution.

BCA Clause	Description	Issue	Performance Requirements
C3.2	Protection of openings	Glass openings are proposed within 3m of the allotment boundary. (measures 2m) 	CP2
		Glass openings are proposed with 6m of the adjacent carpark (measures 4.84m) 	CP2
D1.4	Exit Travel Distance	Shop R7 Travel distance in a straight line measures 29m. The BCA permits 30m. This is likely o be exceeded post fitout. Alternatively a rear exit door will elevate any issue.	DP4 & EP2.2
		Travel distance from the commercial unites to the single exit exceeds 20m	DP4 & EP2.2
D1.10	Discharge from exits	The path of travel to the public road from the exits has a choke point that is less than the widths of the exits. Choke point measures 2.5m (6m required) 	DP4

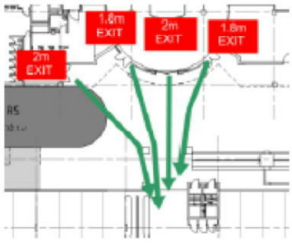
BCA Clause	Description	Issue	Performance Requirements
D1.7	Travel Via Fire Isolated Exits	Fire Isolated Exits discharging to covered area. The path of travel also necessitates passing by glass openings. 	DP4 & EP2.2
D1.7 & 1.10	Discharge from exits & Travel Via Fire Isolated Exits	The exits nominated below will now be required to discharge through the adjacent carpark. 	DP4 & EP2.2
E2.2	General Requirements	Smoke exhaust make up air will be effected by the new mall entry.	EP2.2

Table 9.1: BCA Requirements Associated with the "Alternative Solutions" (extracted from BCA report prepared by Steve Watson & Partners)

Note: In addition to the non-compliances identified above, it is understood that the fire hydrant system is required to comply with the requirements of AS2419.1-2005. Any identified non-compliances will require an agreement with Fire & Rescue NSW.

10. PERFORMANCE REQUIREMENTS

Performance Requirements of BCA 2016 identified in **Table 9.1** are provided in **Table 10.1** below:

Performance Requirement	Description
CP2	*(a) A building must have elements which will, to the degree necessary, avoid the spread of fire—* *(i) to exits; and* *(ii) to sole-occupancy units and public corridors; and* *(iii) between buildings; and* *(iv) in a building,* *(b) Avoidance of the spread of fire referred to in (a) must be appropriate to—* *(i) the function or use of the building; and* *(ii) the fire load; and* *(iii) the potential fire intensity; and* *(iv) the fire hazard; and* *(v) the number of storeys in the building; and* *(vi) its proximity to other property; and* *(vii) any active fire safety systems installed in the building; and* *(viii) the size of any fire compartment; and* *(ix) fire brigade intervention; and* *(x) other elements they support; and* *(xi) the evacuation time.*
DP4	*Exits must be provided from a building to allow occupants to evacuate safely, with their number, location and dimensions being appropriate to—* *(a) the travel distance; and* *(b) the number, mobility and other characteristics of occupants; and* *(c) the function or use of the building; and* *(d) the height of the building; and* *(e) whether the exit is from above or below ground level.*
DP5	*So that occupants can safely evacuate the building, paths of travel to exits must have dimensions appropriate to—* *(a) the number, mobility and other characteristics of occupants; and* *(b) the function or use of the building.*
EP2.2	*(a) In the event of a fire in a building the conditions in any evacuation route must be maintained for the period of time occupants take to evacuate the part of the building so that—* *(i) the temperature will not endanger human life; and* *(ii) the level of visibility will enable the evacuation route to be determined; and* *(iii) the level of toxicity will not endanger human life.* *(b) The period of time occupants take to evacuate referred to in (a) must be appropriate to—* *(i) the number, mobility and other characteristics of the occupants; and* *(ii) the function or use of the building; and* *(iii) the travel distance and other characteristics of the building; and* *(iv) the fire load; and* *(v) the potential fire intensity; and* *(vi) the fire hazard; and* *(vii) any active fire safety systems installed in the building; and* *(viii) fire brigade intervention.*

Table 10.1: Relevant Performance Requirements

11. SIGNIFICANT FIRE SAFETY SYSTEM IMPLICATIONS

The significant fire safety upgrade requirements for the construction of Mondo Project on Level 1, Level 2 and Level 3 are considered to be as follows:

GENERAL REQUIREMENTS

1. All existing non-refurbished portions of the building (i.e. all areas except for those proposed to form part of new works associated with the Mondo Project construction) shall comply with the approved fire safety strategy for those areas except those modifications which are to be assessed as part of the Mondo Project; and
2. The building works required for the construction of the Mondo Project to be located on Retail Level 1 and Level 2 of Westfield Penrith shall comply with the DTS Provisions of the BCA except where specifically identified by Steve Watson & Partners; and
3. The requirements listed in this Section are to form Essential Services and shall be identified as requiring maintenance and certification at appropriate intervals as per AS1851-2012 and the EP&A Regulation 2000.

11.1 FIRE RESISTANCE AND COMPARTMENTATION

4. Combustible materials shall not be used / applied to the external walls or form part of the roof sheeting/awnings throughout the areas forming part of the Mondo Project and associated areas except where permitted under BCA DTS provisions.
5. Where glazing or any other non-fire rated elements are located within 3m of the allotment boundary, the glazing and/or other non-rated elements shall be protected in accordance with BCA DTS provisions.
6. Where glazing is located within 3m of the path of travel from the discharge point of the fire isolated exits, the glazing shall be protected in accordance with BCA DTS provisions unless an easement is created to ensure that the travel path from the discharge point of the fire isolated exit is at a minimum distance of 3m.
7. All sprinkler protected retail areas shall be fire separated from the non-sprinkler protected carpark areas in accordance with BCA DTS provisions with the exception of the shopfront of Tenancy R6 which is located within 6m of the adjoining carpark openings. This portion of the shopfront which is proposed to be located within 6m of the carpark openings shall be protected in accordance with **Item 23** of **Section 11.3** below.

11.2 EMERGENCY EGRESS PROVISIONS

8. **Travel distances** throughout the proposed areas forming part of the Mondo Project including the common walkways and tenancy areas; associated back of house and other ancillary spaces at Westfield Penrith shall comply with the DTS provisions of BCA 2016.
9. **Aggregate emergency egress** width from the proposed new areas forming part of the Mondo Project including the tenancy areas and associated back of house and other ancillary spaces at Westfield Penrith shall comply with the DTS provisions of BCA 2016.
10. **Aggregate emergency egress** width from the existing mall areas which are impacted by the proposed works shall comply with BCA DTS provisions, however, the reduction

shall be re-assessed to ensure that the increased evacuation time from the mall areas does not result in untenable conditions during occupant evacuation.

11. Scentre Group shall satisfy themselves in respect to the ability of the design to satisfy any special needs for persons with disabilities which are not covered under current BCA 2011 fire safety provisions, including compliance with the Disability Discrimination Act 1992 etc.

12. Existing 'Open to sky' path of travel from the discharge point of fire isolated exits and/or new restaurant tenancies must remain as 'open space' i.e. no additional cover such as awning or roof structure is permitted over the egress path unless permitted by BCA DTS provisions.

13. A clearly identified path of travel (as shown in **Figure 11-1** below) shall be provided from the discharge point of the existing exits from Westfield Penrith via the south western carpark to reach 'open space'. This path shall be line marked as a 'shared zone'. Strobe lights, which are linked to the fire detection system serving the shopping centre, shall be provided at appropriate locations along this path of travel to warn drivers of occupant (pedestrian) evacuation in a fire emergency.

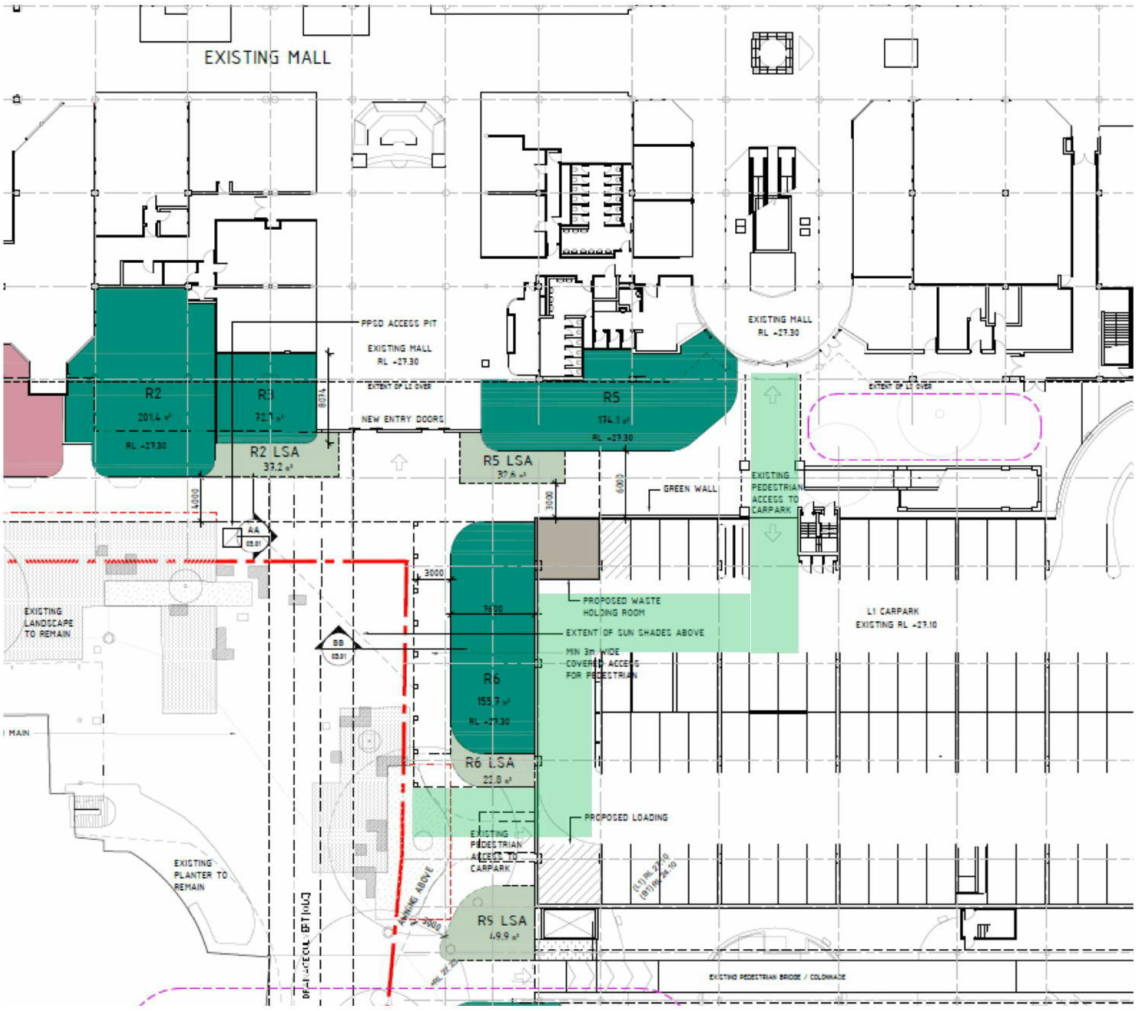


Figure 11-1 Path of travel from the existing shopping centre exits to reach 'open space'

14. Scentre Group shall be responsible for ensuring the safety and protection of occupants when passing through, or evacuating through parts of buildings where moving vehicles may be present (i.e. exits passing through carpark, driveway areas, etc.). This shall

take into account that these areas form major evacuation travel paths in the event of a fire emergency, and shall include the provisions of suitable safety features, warning devices, signage, crossings, barriers, etc.

15. The path of travel across the open to sky path of travel to reach High Street shall have a minimum clear width required under BCA DTS provisions the simultaneous evacuation of the building with the exception of the reduction in path width at the location identified in the BCA Assessment (Report Reference 2018/0898 dated 21 February 2019). The point with reduced width of the path of travel is shown in Figure 11-2 below.

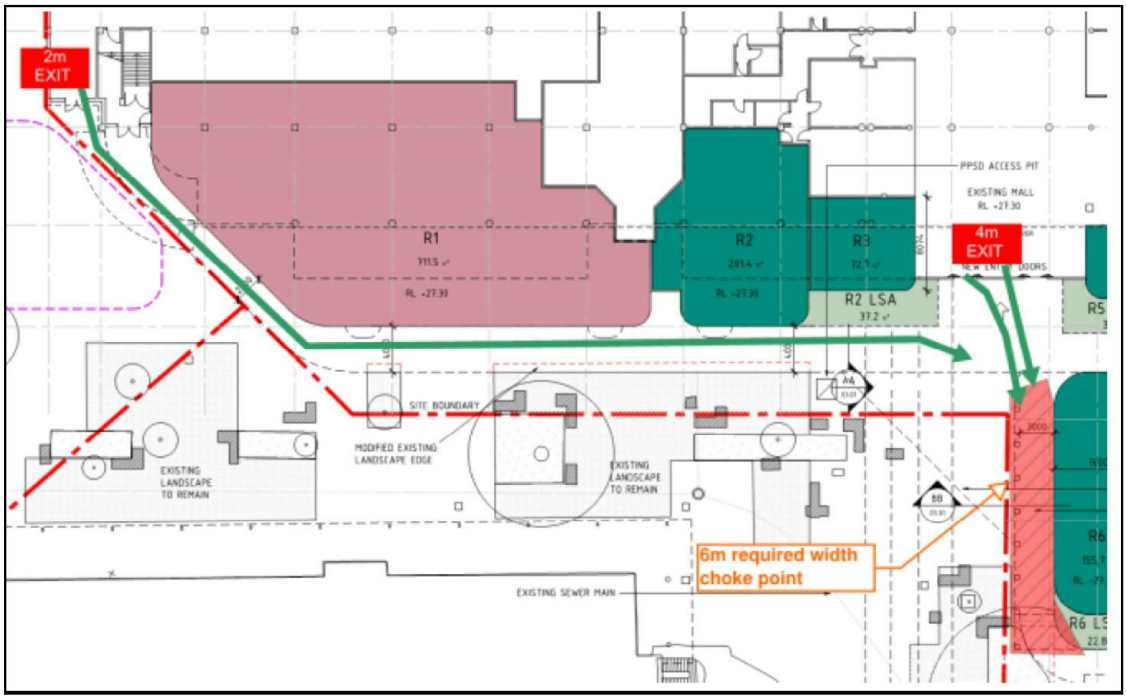


Figure 11-2 Part Ground Floor plan showing the location with the reduced width of the path of travel

16. It is understood that the path of travel from the discharge points of the exits from south western portions of Westfield Penrith necessitates passes along the allotment boundary. The Council Building (Joan Sutherland Performing Arts Centre) on the adjoining allotment is a significant distance (>6m) from this path of travel and from the new tenancies forming part of the Mondo Project. It is Scentre Group's responsibility to engage a suitably qualified Fire Safety Engineer for a reassessment of emergency egress provisions via the area along the allotment boundary if there are any modifications made to the adjoining Council building which encroach upon the existing open space between the two (Council and Westfield) buildings.

11.3 SERVICES

17. The portion of the fire hydrant system serving the new areas of the building shall comply fully with AS 2419.1 2005. Any non-conformances must be discussed with and approved by Fire & Rescue NSW.

18. The existing fire hydrant booster assembly which serves Westfield Penrith shall serve the new building extension associated with Mondo Project. This booster assembly shall comply with current BCA DTS and AS 2419.1 2005 requirements.

19. All fire hydrants proposed to serve the areas forming part of Mondo Project, including retail and ancillary areas shall be fitted with Storz hose couplings which comply with Clause 7.1 of AS2419.1-2005. This Clause states in part: "hose couplings shall be compatible with those used by the fire brigade serving the area". Storz hermaphrodite fire hose couplings must be fitted to all fire hydrants and fire hydrant booster assembly connections as required by Appendix E of AS2419.1-2005. The Storz fittings must be manufactured to DIN 14303, aluminium alloy delivery couplings, in accordance with Appendix A of AS2419.2-1994. Blank caps must be provided in accordance with Clause 2.8 of AS2419.2-1994.

20. The automatic sprinkler system shall be provided throughout the areas forming part of the new works on Level 1 and Level 2 (including any associated awning structures) in accordance with Clause E1.5 of BCA 2016 and AS2118.1-1999. The Sprinkler system shall comply fully with BCA DTS provisions.

21. All sprinkler heads throughout the including the new tenancies and associated areas which are adequately smoke separated from existing building areas must be "fast response" type with a temperature rating of 68°C, a maximum RTI of $50ms^{-1/2}$ and a maximum C-factor of $1ms^{-1/2}$.

22. Activation of sprinkler system in Tenancy R6 and R9 shall only activate the occupant warning system in the two tenancies i.e. the sprinkler activation in these tenancies shall not cause the activation of occupant warning system in the rest of the building.

23. All glazing forming part of the shopfront associated with Tenancy R6 which is located within 6m of the non-sprinkler protected carpark openings shall be protected with wall wetting sprinklers located on the carpark side of the glazing in accordance with the following:

    a. Wetted fixed toughened glazed construction must be capable of achieving 2 hours fire resistance in respect to integrity when exposed to a time temperature curve identified in either AS1530.4-2005 or ASTM E119. Protection to the glazed construction must be provided from a fire on the retail side of the glazing as per the Tyco data sheet TFP620 provided in Appendix "B" of this report or an equivalent system which has been tested to ASTM E119 (or equivalent) and has been shown to achieve a minimum integrity fire rating of 2 hours; and

    b. Any glazed doorways in this glazed bounding construction shall be self-closing or automatic closing doors protected with the same wall wetting system as required for the fixed glazing.

    c. The glazing system bounding the horizontal exits shall be installed, certified and maintained in accordance with Tyco specified requirements (or approved equal). Tyco (or approved equal) shall provide Westfield Design & Construction Pty Ltd with all specified design criteria for their wetted glazing system (mullion / glazing constraints / allowance for glazing expansion, minimum distance of any obstructions from glazing, etc.) prior to construction and shall review the design drawings and specifications for compliance with their requirements prior to construction; and

d. An accredited installer shall be responsible for certifying the complete wetted glazing system (excluding doors) upon completion of the work as being in accordance with the prototype system tested and found to be capable of achieving 2 hours integrity when subjected to the time temperature curve identified in either AS1530.4-2005 or ASTM E119. Tyco (or approved equivalent) shall provide a complete list of all requirements associated with the correct maintenance, inspection and certification of the wetted glazing system to maintain this required level of fire resisting performance. These requirements / recommendations for the glazing system shall be included in a management in use plan for the building; and

e. Tyco (or approved equal) shall provide Scentre Design & Construction Pty Ltd with certification that the toughened glass door and associated wetting system complies fully with the Tyco approved fire resisting wetted glazing system with the exception that these doors are operable in lieu of being fixed glass panels; and

24. Where glazing is to be protected with wall wetting sprinklers, the fire services designer and installer shall be responsible for certifying that the water supply to the sprinkler system takes into account the additional demand of wetted glazing systems within the building and shall be adequate to supply simultaneously all wall wetting sprinklers serving the glazing at any one exposure location in addition to any maximum sprinkler demand within that portion of the building.

25. A fully addressable fire detection and alarm system shall be provided throughout the areas forming part of new works where required by the DTS provisions of BCA 2016.

26. The sound and intercom system shall comply with Clause E4.9 of BCA DTS provisions and AS1670.4-2015. The sound and intercom system shall be capable of providing pre-recorded evacuation messaging and allowing for live directives to be broadcast from the fire panel and at a point within the security office. Activation of either the fire detection and alarm or sprinkler systems shall activate the sound and intercom system.

27. The automatic fire sprinkler and fire detection and alarm systems serving all areas of the shopping centre shall be interfaced with the Fire Indicator Panel (FIP) and shall be linked to a 24 hour Monitoring Station via Alarm Signalling Equipment (ASE.

28. Scentre Group shall ensure that additional to any BCA DTS provisions, sufficient exit signage and directional exit signage is provided and maintained from the discharge point of the exits from existing portions of the building and the new areas via the 'open to sky' egress path on Level 1 to clearly direct the occupants to reach High Street.

29. Where a travel path necessitates passing through a carpark, this path shall be suitably line marked with adequate lighting and directional signage installed to enable occupants to reach road or open space via the carpark.

30. Block Plans for all primary fire services serving the building including but not limited to fire hydrant system, automatic sprinkler system, smoke detection and EWIS system and smoke exhaust system shall be updated to include the new construction and any other modifications and provided within the Fire Control Centre, Sprinkler Valve Room, Hydrant and Sprinkler Pump Rooms, Hydrant and Sprinkler boosters.

11.4 SMOKE HAZARD MANAGEMENT

31. The existing smoke management systems serving Westfield Penrith building shall require reassessment due to the proposed modifications to the make-up air openings and emergency egress provisions serving the existing building.

32. The modified mall entry doorways located within or adjacent to the new works on Level 1 shall be programmed to open for the provision of make-up air for a fire scenario in the retail malls; and

33. All air handling systems serving the new tenancies shall comply with the DTS provisions of Part E2.2 of BCA 2016 such that any systems not required to operate during a fire shall be controlled to shut down in the event of a fire detection; and

11.5 MANAGEMENT PROCEDURES

34. An 'Emergency Management Plan' for the Westfield Penrith building shall incorporate the modifications due to the construction of the new areas forming part of the Mondo Project. This plan shall be implemented and audited on a regular basis to maximise the effectiveness of the fire safety systems provided in the new areas associated with the construction of the new areas and the rest of the building. The plan should minimise the potential for shut-down of fire safety systems during trading hours and should detail the exact location of all fire safety measures in and around the buildings. As a minimum, the plan is to include:

    a. Procedures to minimise the extent and duration of shut-down of any part of the sprinkler system when the shopping centre is trading. An approved Red Tag system shall be instigated for each shut down, which requires written permission from management before isolation can take place and a statement as to the length of isolation.

    b. Documented procedures which ensure that prior to sprinkler isolation for tenancy fit out, all merchandise is removed from any tenancy subject to fit out; and

    c. Documented procedures which ensure that prior to any authorised isolation of the ASE the Grade 1 Monitoring Company is notified of the extent and duration of any proposed isolation and is advised as soon as the shut-down has been completed; and

    d. Procedures shall be implemented to minimise any potential for the simultaneous isolation of the sprinkler and smoke detection systems; and

    e. Procedures shall be implemented for regular cleaning of the kitchen exhaust ductwork to minimise build-up of grease and other combustible materials within the ductwork; and

    f. Fire wardens in the shopping centre shall be trained to direct occupants away from the location of the fire horizontally before directing the occupants to the fire-isolated exits (i.e. occupants should not be directed to queue at exits that are in close proximity to the fire or smoke plume as there is an increased risk of these exits becoming untenable whilst occupants are queuing at these exits; and

    g. Fire wardens in the shopping centre shall be trained to respond to a fire identified in Tenancies R6 and/or R9 and direct building occupants to alternative exits from the shopping centre with do not pass along the subject tenancies; and

h. All full time Centre Management and Security staff shall be trained as fire wardens and shall be inducted in the tenancy emergency evacuation procedures; and

35. The requirements listed in this Section are Essential Services and, as all fire safety systems, should be identified as requiring maintenance and certification at appropriate intervals as per AS1851-2012 and the EP&A Regulation 2000; and

36. Should a change in use or building alterations and/or additions occur in the future, a reassessment will be needed to verify consistency with the analysis contained within this report.

12. APPENDIX A – DOCUMENTATION

The following drawings were examined during the production of this report:

Drawing Description	Drawing No.	Revision	Drawn	Date
Existing & Demo Level 1 Floor Plan Mondo Precinct	SK01.02	A	Scentre Design & Construction Pty Limited	20/02/2019
Proposed Plan Level 1 (Ground) Mondo Precinct Scheme 12	SK02.02	N/A	Scentre Design & Construction Pty Limited	20/02/2019
Proposed Plan Level 2 Mondo Precinct Scheme 12	SK02.03	N/A	Scentre Design & Construction Pty Limited	20/02/2019
Proposed Level 3 Floor Plan and Roof Plan Mondo Precinct	SK02.04	N/A	Scentre Design & Construction Pty Limited	20/02/2019

APPENDIX B – WETTED GLAZING SYSTEM DATASHEET

The following is the Tyco Data Sheet TFP620 (issued December 2011) or equivalent that must be adhered to when providing a wall wetting system to protect the glazed portion of Tenancy R6 shopfront which is located within 6m of the adjoining carpark openings.

tyco

Technical Services | 800-381-9312 +1-401-781-8220 www.tyco-fire.com

Model WS Specific Application Window Sprinklers Horizontal and Pendent Vertical Sidewall 5.6 K-Factor

General Description

The TYCO 5.6 K-Factor Model WS Specific Application Window Sprinklers are fast response, glass bulb-type spray sprinklers available in Horizontal Sidewall and Pendent Vertical Sidewall models.

These sprinklers are the first to be specifically Listed to provide complete wetting and coverage for heat strengthened or tempered glass windows using closed sprinklers. As part of the testing, the gas flow required to achieve the time/temperature relationship specified in ASTM E119 was established in a test furnace without sprinkler protection. A window assembly protected with the TYCO Model WS Window Sprinklers was then installed in the test furnace, and the same gas flow conditions were maintained for a two-hour test period. No cracking or visible damage to the window was permitted during the test period, even when a hose stream was directed at the window.

The success of the Model WS Window Sprinkler is based on its fast response thermal sensitivity and on its specially designed deflector that ensures that the spray pattern wets the entire surface of the window.

Based on successful testing, the Model WS Window Sprinkler can be used as interior protection of windows or glazing in a sprinklered building or non-sprinklered building in accordance with Section 104 of the IBC ("Alternate Materials, Design and Methods of Construction and Eqiupment"). Also, the Model WS Window Sprinkler can be used as an open sprinkler for "Outside Sprinkler Protection against Exposure Fire", using the design requirements of NFPA.

As with any specific application sprinkler, the installation instructions included in this data sheet must be precisely followed. If there are additional local or jurisdictional installation standards/codes for window sprinklers on glazed window systems, this document does not relieve the designer/installer from these requirements. Consult your local jurisdiction to verify if or when these additional guidelines must be followed.

NOTICE

TYCO Model WS Specific Application Window Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards recognized by the approval agency, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

Owners are responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted with any questions.

IMPORTANT

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

Model/Sprinkler Identification Number (SIN)

TY3388 - Horizontal Sidewall
TY3488 - Pendent Vertical Sidewall

TY3388 is a redesignation for C3388.
TY3488 is a redesignation for C3488.

TFP620
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Technical Data

Approvals
- UL, C-UL, and ULC Listed
- NYC under MEA 289-04-E

Approvals only apply to the service conditions indicated in the Design Criteria section.

Additional Recognition
Ontario Building Code

Pipe Thread Connection
1/2 inch NPT

Discharge Coefficient
K=5.6 GPM/psi$^{1/2}$ (80,6 LPM/bar$^{1/2}$)

Temperature Ratings
- 155°F (68°C)
- 200°F (93°C)

Finish
- Polyester Coated
- Chrome Plated
- Natural Brass

Physical Characteristics

Frame	Brass
Button	Bronze/Copper
Sealing Assembly	Beryllium Nickel with TEFLON
Bulb	Glass (3 mm dia.)
Compression Screw	Brass
Deflector	Brass/Bronze

Operation

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and water to flow.

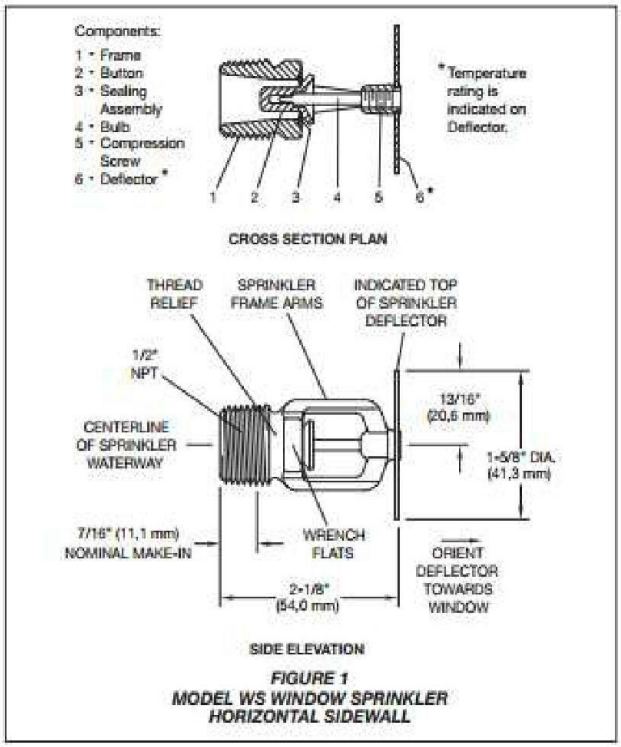

FIGURE 1
MODEL WS WINDOW SPRINKLER
HORIZONTAL SIDEWALL

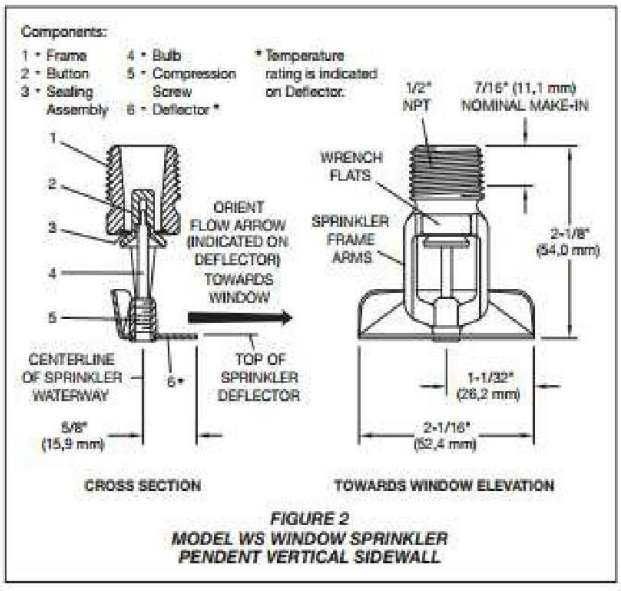

FIGURE 2
MODEL WS WINDOW SPRINKLER
PENDENT VERTICAL SIDEWALL

Design Criteria

The TYCO Model WS Window Sprinklers are UL and C-UL Listed and NYC Approved (MEA 335-01-E) for use as "Specific Application Window Sprinkler" and as open sprinklers for "Outside" use.

These sprinklers are also recognized by Underwriters Laboratories of Canada (ULC), and the Ontario Building Code for use in the Province of Ontario, Canada as providing a two-hour equivalency for a fire separation assembly when installed in accordance with this code.

Area of Use
When acceptable to the Authority Having Jurisdiction and unless modified by a local jurisdictional standard or code mentioned previously, the TYCO Model WS Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect non-operable window openings that are part of a fire separation provided:

- in an interior fire separation, the window sprinklers are installed on both sides of the window in the fire separation (Figure 3A-1),
- in jurisdictions where exterior spatial separation (that is, separation from adjacent space) is defined as protecting an adjacent building from a fire in your building, window sprinklers are installed on the interior side of the building (Figure 3A-2), or
- in jurisdictions where exterior spatial separation is defined as protecting your building from a fire in an adjacent building (that is, exposure protection), open window sprinklers are installed on the exterior side of the building (Figure 3A-3).

System Protection Type
- Interior: Wet Systems
- Outside Exposure: Deluge

Glass Type
In all three cases cited below, each individual pane of the window assembly must be at minimum 6 mm (1/4") thick.

- Non-operable, heat-strengthened, tempered, single-glazed (single pane)
- Non-operable, heat-strengthened, tempered, double-glazed (double pane or insulated); or,
- Non-operable, stronger glass window assemblies.

Type of Window Frame/Mullion
Non-combustible Frame with a standard EPDM rubber gasket seal

Vertical joints of glass panes must be connected by butt-joints using a silicone sealant between the individual panes or by Noncombustible Mullions

Refer to Figures 3B-1 and 3B-2.

Maximum Length of Window Assembly
Unlimited

Maximum Height of Window Assembly
13' (3,96 m)

Refer to Figures 3C and 3D.

Maximum Distance Between Window Sprinklers
8' (2,44 m)

Refer to Figures 3B-1 and 3B-2.

Minimum Distance Between Window Sprinklers
6' (1,83 m) unless separated by a baffle or mullion of sufficient depth to act as a baffle.

A mullion will act as a baffle, when in the case of the Pendent Vertical Sidewall, the mullion extends to the back of the sprinkler deflector, and in the case of the Horizontal Sidewall, the mullion extends to the sprinkler wrench flat.

Refer to Figures 3B-1 and 3B-2.

Minimum Distance from Standard Sprinklers
6' (1,83 m) unless separated by a baffle

Sprinkler Location
- Mullioned Glazing Assemblies: Locate window sprinklers within each mullioned glazing segment. Refer to Figure 3B-1.
- Butt-Jointed Glazing Assemblies: Locate window sprinklers on maximum 8' (2,44 m) centers. Refer to Figure 3B-2.

Maximum Distance from Vertical Mullion
4' (1,22 m)

Refer to Figure 3B-1.

Minimum Distance from Vertical Mullions
4" (101,6 mm)

Refer to Figure 3B-1.

Intermediate Horizontal Mullions
Intermediate Horizontal Mullions were not tested with the Model WS Window Sprinkler. Their use is outside the scope of the "Specific Application" Listing for the window sprinklers. Refer to Figure 3B-3.

Deflector Location
Sprinkler Deflectors must be located as described below in order to ensure that the entire surface of the glass window is covered. Sprinkler Deflectors are positioned with respect to the window frame, not the ceiling.

- Horizontal Sidewall: Locate within the outside edge of the window frame from 1/2" to 4" (12,7 mm to 101,6 mm) away from the glass and 2" ± 1" (50,8 mm ± 25,4 mm) down from the top of the exposed glass. Refer to Figure 3C.
- Pendent Vertical Sidewall: Locate 4" to 12" (101,6 mm to 304,8 mm) from the face of the glass and 3" ± 1" (76,2 mm ± 25,4 mm) down from the top of exposed glass. Refer to Figure 3D.

Minimum Clearance from Face of Glass to Combustible Materials
All combustible materials shall be kept 2" (50,8 mm) from the front face of the glass. This can be accomplished by a minimum 36" (914,4 mm) pony wall or other method acceptable to the Authority Having Jurisdiction.

Escutcheon Assemblies
The Model WS Window Sprinklers can be used with any metallic flush or extended escutcheons, provided the dimensions from the sprinkler deflector to the window frame and glass surface as specified in this data sheet are maintained. These sprinklers are not listed for recessed applications.

Recommended Hydraulic Requirements
The Authority Having Jurisdiction should be consulted to determine the hydraulic requirements for each installation.

Interior Protection Sprinklered Building
Identify which compartmented area has the most hydraulically demanding window sprinklers. Calculate up to the most demanding 46.5 linear feet of Model WS Window Sprinklers on one side of the glazing. The 46.5 linear feet (14,2 linear meters) is based upon 1.2 x the square root of the system area of operation, when the system area of operation is 1500 sq.ft. in accordance with NFPA 13 Light/Ordinary Hazard density curves.

Where the area of Glazing is less than 14.2 linear meters, all window sprinklers on one side shall be calculated.

If an area reduction for quick response sprinklers is utilized, the linear length of the calculated window sprinklers may be reduced, but in no case shall be less than 36 linear feet (1.2 x √900).

If a single fire can be expected to operate Model WS Window Sprinklers and sprinklers within the design area of a hydraulically calculated system, the water demand of the window sprinklers shall be added to the water demand of the hydraulic calculations and shall be balanced to the calculated area demand.

If the window sprinklers are located in an area other than the hydraulic design area, the demand of the window sprinklers is not required to be added to the demand of the remote hydraulic design area. However, it is necessary to prove hydraulically the simultaneous operation of the Model WS Window Sprinklers and the ceiling sprinklers adjacent to the window sprinklers.

Interior Protection Non-Sprinklered Building
Calculate all sprinklers on the most demanding side of the glazing assembly within the enclosure.

Exterior Exposure Protection
Calculate all sprinklers controlled by the deluge valve using the design requirements of NFPA.

Duration of Water Supply
Duration of water supply must comply with requirements of NFPA. If window sprinklers are used to provide the equivalency of a fire rating, the water supply must be capable of supplying water for the required rating period.

Minimum Flow per Sprinkler
20 GPM (75,7 LPM) for sprinkler spacing of 6 to 8 ft. (1,83 to 2,44 m) or 15 GPM (56,8 LPM) for sprinkler spacing less than 6 ft, (1,83 m).

Maximum Pressure per Sprinkler
- Horizontal Sidewall: 70 psi (4,83 bar)*

* The 70 psi is only for cold solder purposes. If there is a baffle or a mullion of sufficient depth to act as a baffle, separating the sprinklers, the maximum pressure is 175 psi.

- Vertical Sidewall: 175 psi (12,07 bar)

When acceptable to the Authority Having Jurisdiction the Model WS Specific Application Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect nonoperable window openings that are in an interior fire separation, the window sprinklers are installed on both sides of the window in the fire separation.

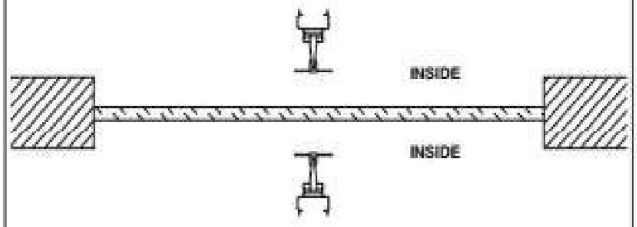

FIGURE 3A-1 - INTERIOR FIRE SEPARATION

When acceptable to the Authority Having Jurisdiction the Model WS Specific Application Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect nonoperable window openings that are part of a fire separation provided in jurisdictions where exterior spatial separation is defined as protecting an adjacent building from a fire in your building, window sprinklers are installed on the interior side of the glass.

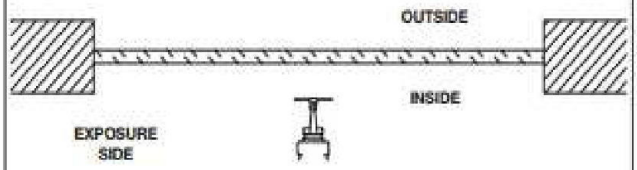

FIGURE 3A-2 -- EXTERIOR FIRE SEPARATION - SPRINKLERS INSIDE

When acceptable to the Authority Having Jurisdiction the Model WS Specific Application Window Sprinklers may be used in either a sprinklered or unsprinklered building to protect nonoperable window openings that are part of a fire separation provided in jurisdictions where exterior spatial separation is defined as protecting your building from a fire in an adjacent building, open window sprinklers are installed on the exterior side of the glass.

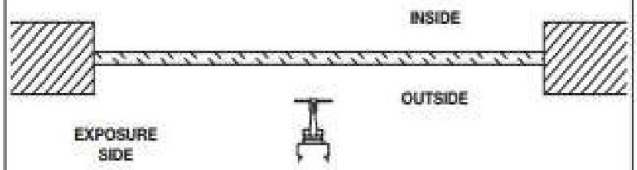

FIGURE 3A-3 - EXTERIOR FIRE SEPARATION - SPRINKLERS OUTSIDE

FIGURE 3A (A-1 TO A-3)
TYPICAL NON-OPERABLE WINDOW OPENINGS

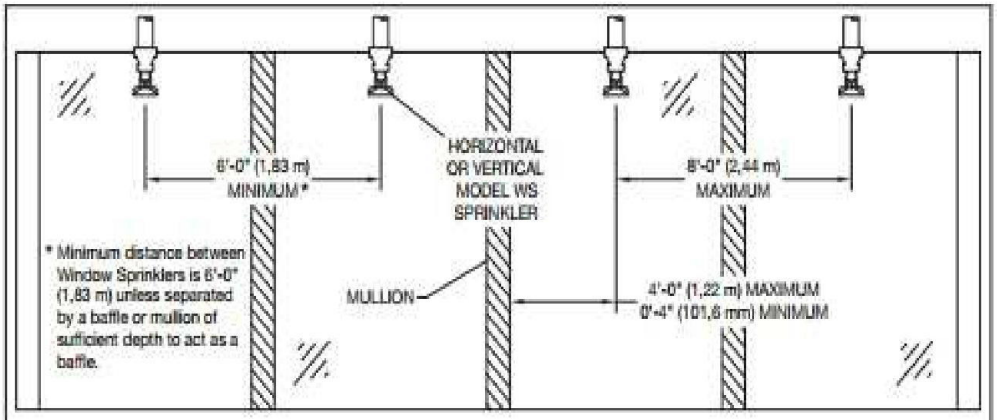

FIGURE 3B-1 - MULTIPLE WINDOWS SEPARATED BY MULLIONS

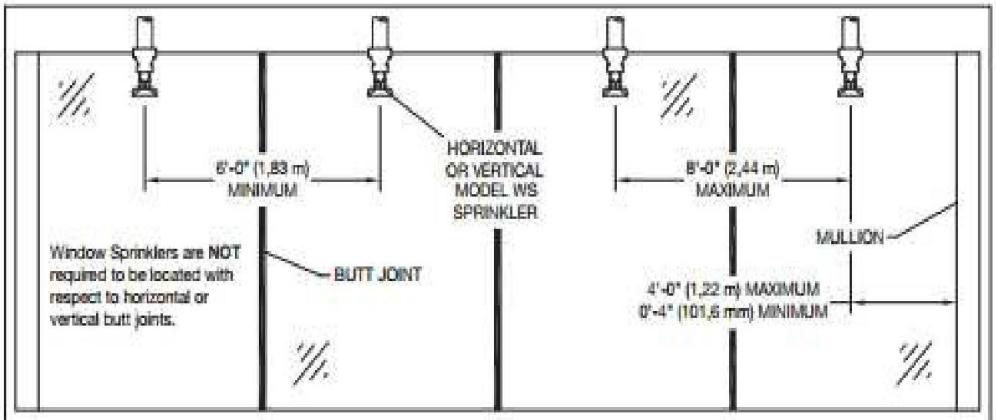

FIGURE 3B-2 - MULTIPLE WINDOWS SEPARATED BY BUTT JOINTS

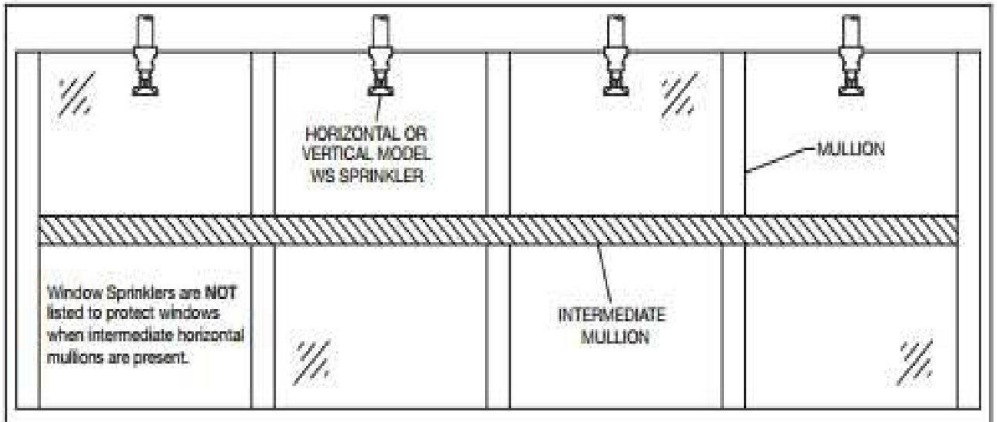

FIGURE 3B-3 - WINDOWS WITH HORIZONTAL MULLIONS

FIGURE 3B (B-1 TO B-3)
WINDOW MULLIONS AND BUTT JOINTS

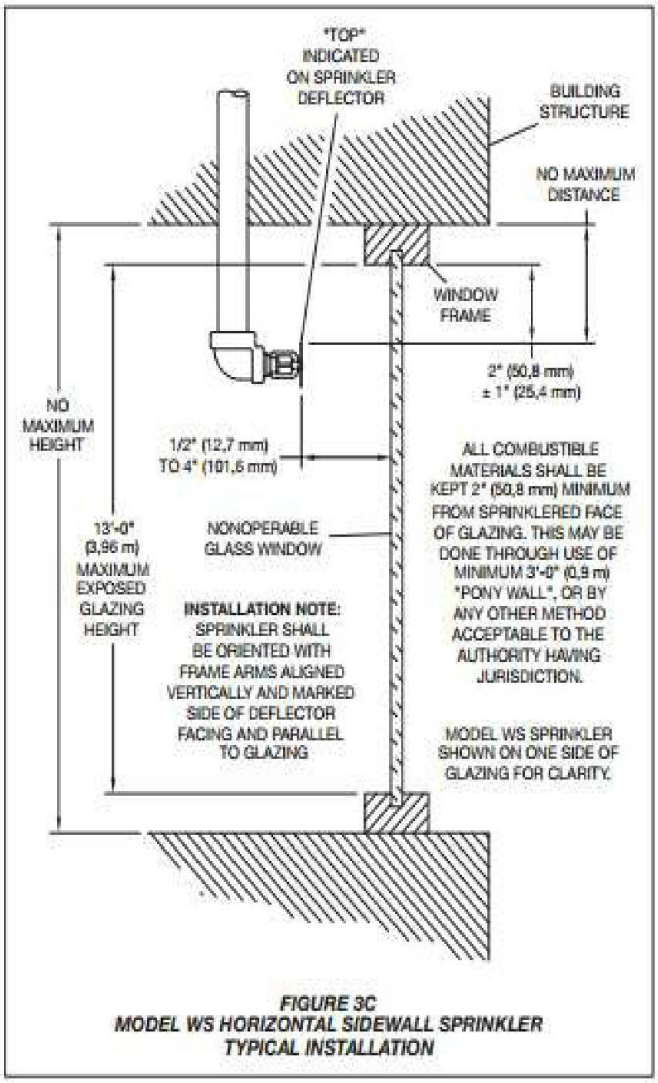

FIGURE 3C
MODEL WS HORIZONTAL SIDEWALL SPRINKLER
TYPICAL INSTALLATION

Installation

The TYCO Model WS Window Sprinklers must be installed in accordance with the following instructions.

NOTICE

Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch (1,6 mm).

Obtain a leak-tight 1/2 inch NPT sprinkler joint by applying a minimum-to-maximum torque of 7 to 14 ft.lbs. (9,5 to 19,0 Nm). Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

1. Install the pendent vertical sidewall sprinkler only in the pendent position with the center-line of the sprinkler parallel to the glass surface. Orient the sprinkler so that the direction of flow indicated on the sprinkler deflector is facing the window.
2. Install the horizontal sidewall sprinkler only in the horizontal position with the center-line of the sprinkler perpendicular to the glass surface. Orient the sprinkler so that the word "Top" indicated on the sprinkler deflector is facing the top of window frame.
3. With pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.
4. Wrench-tighten the sprinkler using only the W-Type 20 (End A) Sprinkler Wrench (Figure 4). Appy the W-Type 20 (End A) Sprinkler Wrench to the Sprinkler Wrench flats only.

Care and Maintenance

The TYCO Model WS Window Sprinklers must be maintained and serviced in accordance with the following instructions.

NOTICE

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Exercise care to avoid damage to sprinklers before, during, and after installation. Never paint, plate, coat, or otherwise alter automatic sprinklers after they leave the factory.

Replace sprinklers that:

- were modified or over-heated.
- were damaged by dropping, striking, wrench twisting, wrench slippage, or the like.
- are leaking or exhibiting visible signs of corrosion.
- were exposed to corrosive products of combustion but have not operated, if you cannot easily remove combustion by-products with a cloth.
- have a cracked Bulb or have lost liquid from the Bulb. Refer to the Installation section in this data sheet.

Responsibility lies with the owner for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards recognized by the Approval agency (for example, NFPA 25), in addition to the standards of any authorities having jurisdiction. Contact the installing contractor or sprinkler manufacturer regarding any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

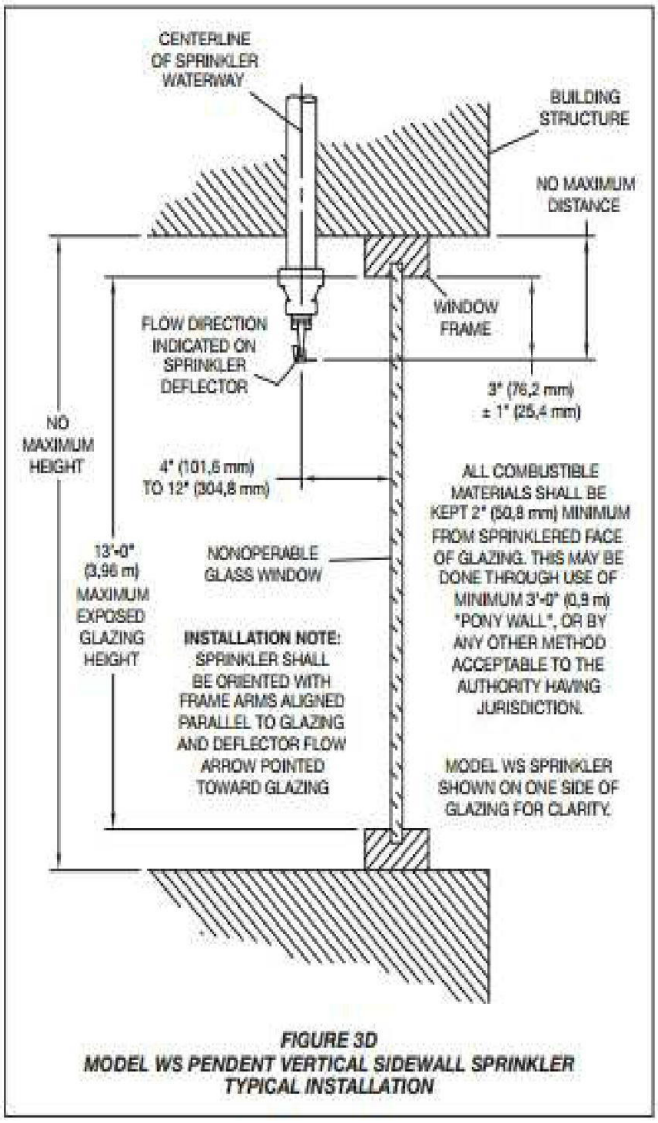

FIGURE 3D
MODEL WS PENDENT VERTICAL SIDEWALL SPRINKLER
TYPICAL INSTALLATION

Limited Warranty

Products manufactured by Tyco Fire Protection Products (TFPP) are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by TFPP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFPP or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by TFPP to be defective shall be either repaired or replaced, at TFPP's sole option. TFPP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFPP shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

In no event shall TFPP be liable, in contract, tort, strict liability or under any other legal theory, for incidental, indirect, special or consequential damages, including but not limited to labor charges, regardless of whether TFPP was informed about the possibility of such damages, and in no event shall TFPP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

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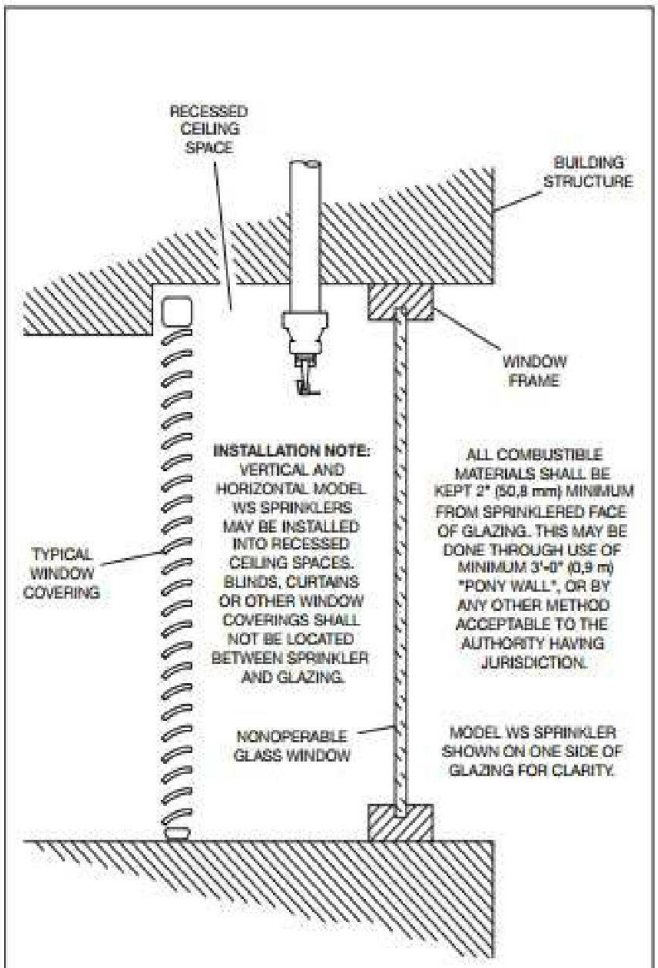

FIGURE 3E
MODEL WS PENDENT VERTICAL SIDEWALL SPRINKLER
RECESSED CEILING TYPICAL INSTALLATION

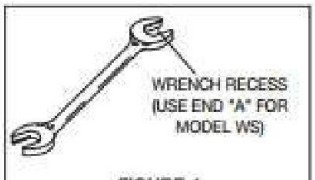

FIGURE 4
W-TYPE 20 SPRINKLER WRENCH

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N). Refer to the Price List for a complete listing of P/Ns.

Model WS HSW Window Sprinkler with NPT Thread Connections
Specify Model WS Specific Application Window Sprinkler TY3388, Horizontal Sidewall, with (temperature rating), (finish), and P/N (below).

155°F (68°C)
Natural Brass ..... P/N 50-305-1-155

155°F (68°C)
Chrome Plated ..... P/N 50-305-9-155

155°F (68°C)
White Coated ..... P/N 50-305-4-155

200°F (93°C)
Natural Brass ..... P/N 50-305-1-200

200°F (93°C)
Chrome Plated ..... P/N 50-305-9-200

200°F (93°C)
White Coated ..... P/N 50-305-4-200

* Eastern Hemisphere sales only.

Model WS Pendent Vertical Sidewall Window Sprinkler with NPT Thread Connections
Specify Model WS Specific Application Window Sprinkler TY3488, Pendent Vertical Sidewall, with (temperature rating), (finish), and P/N (below).

155°F (68°C)
Natural Brass ..... P/N 50-304-1-155

155°F (68°C)
Chrome Plated ..... P/N 50-304-9-155

155°F (68°C)
White Coated ..... P/N 50-304-4-155

200°F (93°C)
Natural Brass ..... P/N 50-304-1-200

200°F (93°C)
Chrome Plated ..... P/N 50-304-9-200

200°F (93°C)
White Coated ..... P/N 50-304-4-200

* Eastern Hemisphere sales only.

Sprinkler Wrench
Specify W-Type 20 Sprinkler Wrench, P/N 56-000-1-106.