



Determination 2009/29

The fire alarm requirements for a tenancy situated in a new commercial building at 67A Courtney Road, Tauranga

1 The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of the Department. The applicant is the owner of the building, Keholder Properties Ltd (“the applicant”). The other party is Tauranga City Council (“the authority”) carrying out its duties and functions as a territorial authority and a building consent authority.
- 1.2 By way of consultation under section 170 I also sent the draft to the New Zealand Fire Service.
- 1.3 I take the view that the matter for determination, in terms of sections 177(a) and 188², is whether a fire-alarm system is required in a recently completed commercial building, and if so, the type required.
- 1.4 In making my decision, I have considered the submissions of the parties and the other evidence in this matter.

2 The building work

- 2.1 The building work consists of a steel-framed single storey commercial building (“the building”) that is constructed as two separate fire cells and which contains a total of eight separate tenancies, generally as shown in Figure 1.
- 2.2 The outer walls of the building consists of 2.5m high concrete block spandrels, above which are timber framed walls lined with either proprietary fibre-cement linings with expressed joints or pre-coated corrugated steel fixed horizontally. The internal walls are timber framed and lined with Gibraltar board that is in part fire-rated. The

¹ The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

² In this determination unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

mezzanine floors of the tenancies are timber framed and the underside of the floors and the supporting beams have a G8FC45 fire-rating. The exposed post supports have a 30 minute fire rating.

2.3 The overall floor area is approximately 1950 square metres ie 975 square metres either side of the fire rated dividing wall along gridline B. The overall area of the mezzanine floors compared with the overall area of the firecells is approximately 16% for Firecell 1 (Tenancies 1-6) and approximately 9.5% for Firecell 2 (Tenancies 7 and 8). The mezzanine floor in Tenancy 6 is approximately 24% of the lower floor area.

2.4 According to the applicant’s “Fire Safety Report” (refer to paragraph 3.5), the Purpose Group and FHC of the various sections of the building is as follows (with the Industrial being the predominant purpose group in each case):

Industrial	Purpose group WM	FHC 3
Offices	Purpose group WL	FHC 2
Staffrooms	Purpose group WL	FHC 2
Ablutions	Purpose group IA	FHC 1

2.5 The report also noted that an F0 firecell rating was determined for the firecells and a minimum FRR 30/30/30 rating was required to be provided between the fire cells in Purpose Group WM. The fire-resistance rating for the intermediate floors and their supporting structures was FRR 30/30/30. The report also stated that the occupant load for Firecell 1 was 48, and for Firecell 2 it was 42.

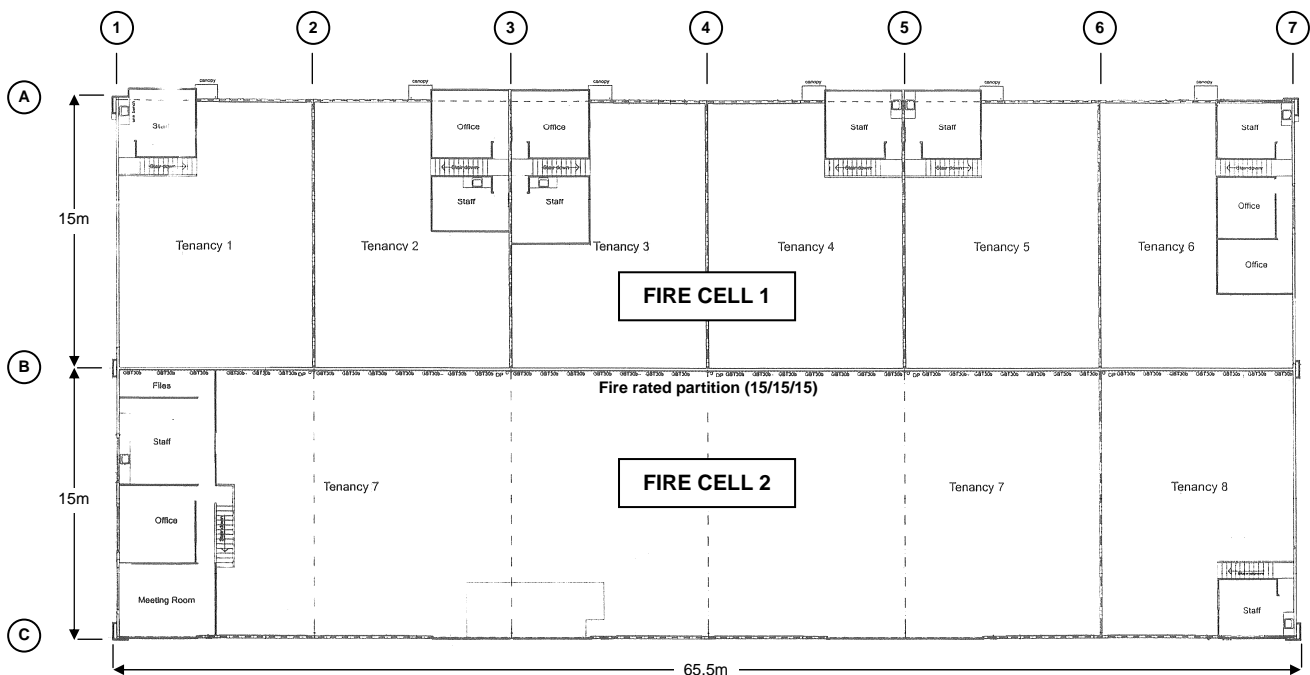


Figure 1: Ground floor plan

3 Background

- 3.1 The authority issued a building consent (No 24774) sometime in 2007. I have not seen a copy of the consent. On 8 September 2008 an inspection company, acting on behalf of the authority, carried out a final inspection of the building on behalf of the authority.
- 3.2 The inspection company wrote to the applicant on 10 November 2008, noting that the inspection had been carried out and that a code compliance certificate could not be issued for the building until a producer statement for a Type 4 alarm was supplied.
- 3.3 The applicant responded in a letter dated 12 January 2009, stating that following discussions with ‘different parties all of whom are fire engineering professionals’ the applicant did not agree that a fire alarm was required in the building. The applicant noted that there were intermediate floors that were ‘greater than 20 percent of the (individual) tenanted unit (smoke cell) but not of the fire cell’.
- 3.4 The inspection company faxed the applicant on 13 January 2009, stating that the fire design for the building called for the installation of a Type 4 alarm in order to comply with C/AS1 6.21.6(b)(ii). The inspection company did not accept the reasoning set out in the applicant’s letter of 12 January 2009, because:
- As the building was divided into fire cells as defined in Acceptable Solution C/AS1, each unit was an individual fire cell with an F rating of 10/10/-.
 - C/AS1 6.21.6 is designed to give people protection from the effects of smoke in a situation where it may take a given period of time to leave an upper floor before the smokecell/firecell became untenable. The intention of subparagraph (b)(ii) was to achieve early notification of fire rather than the control of smoke.
- It was also noted by the inspection company that the applicant had the option of providing an alternative solution as an amendment to the existing consent.
- 3.5 A consultant provided a revised “Fire Safety Report” (“the fire report”) dated 16 February 2009 on behalf of the applicant that provided a detailed analysis of the fire safety of the commercial building. The summary at the conclusion of the report stated:
1. A fire alarm system is not required as an acceptable solution for this building.
 2. The firecell separation walls and the underside of all intermediate floors are required to have a fire rating of FRR 30/30/30 along with the supporting structure.
 3. Check the location of all egress doors to ensure compliance and that all required signage is provided. Exit signs are to be placed above all exit doors.
 4. All locking devices on the exit doors are to comply with NZBC, ie. they cannot be key locked from the inside.
- 3.6 Following email correspondence with the Department, the applicant made an application for a determination that was received by the Department on 23 February 2009.

3.7 The draft determination was sent to the parties for comment on 19 March 2009. The authority accepted the draft without comment. The applicant accepted that a type 4 fire alarm was unnecessary, but did not accept draft determination's findings that 60/60/60 fire separation was required between fire cells 1 and 2 as discussed in paragraph 6.2.2. In particular, the applicant said:

... we do not agree that the determination should include other comments such as the fire wall being constructed as a 30/30/30 instead of a 60/60/60. All other requirements of the building permit [sic] have been met and approved. We believe that the determination should only be concerned with the requirement for the type 4 alarm system in Unit 6.

3.8 In response I note that the lesser fire rating is a matter that compromises the fire safety of the building's occupants. I therefore consider it would be remiss of me not to bring this matter to the attention of the authority. I continue to hold the view that the matter should remain in the determination.

4 The submissions

4.1 Neither party made a formal submission and the applicant forwarded copies of:

- the plans
- the fire report dated 16 February 2009
- the correspondence with the inspection company and the Department
- an extract from C/AS1

5 The legislation

5.1 The relevant clauses of the Building Code are:

Clause C2—MEANS OF ESCAPE

OBJECTIVE

C2.1 The objective of this provision is to:

- (a) Safeguard people from injury or illness from a fire while escaping to a safe place, and
- (b) Facilitate fire rescue operations.

Clause C3—SPREAD OF FIRE

OBJECTIVE

C3.1 The objective of this provision is to:

- (a) Safeguard people from injury or illness when evacuating a building during fire.

FUNCTIONAL REQUIREMENT

C3.2 Buildings shall be provided with safeguards against fire spread so that:

- (a) Occupants have time to escape to a safe place without being overcome by the effects of fire,

PERFORMANCE

C3.3.2 Fire separations shall be provided within buildings to avoid the spread of fire and smoke to:

- (a) Other firecells,

C4 - STRUCTURAL STABILITY DURING FIRE**OBJECTIVE**

C4.1 The objective of this provision is to:

- (a) Safeguard people from injury due to loss of structural stability during fire, and...

FUNCTIONAL REQUIREMENT

C4.2 Buildings shall be constructed to maintain structural stability during *fire* to:

- (b) Allow people adequate time to evacuate safely,

PERFORMANCE

C4.3.1 Structural elements of buildings shall have fire resistance appropriate to the function of the elements, the fire load, the fire intensity, the fire hazard, the height of the buildings and the fire control facilities external to and within them.

5.2 The relevant paragraphs of C/AS1 are:

Table 2.2 Occupant Densities

Table 2.2: Occupant Densities (<i>continued</i>) Activity	Occupant density (Users/m ²) (see Note 1)
WORKING BUSINESS AND STORAGE ACTIVITIES	
Aircraft hangars	0.02
Bulk storage (e.g. solid stacked)	0.01
Commercial laboratories, laundries	0.1
Computer rooms (not used as classrooms for training)	0.04
Factory space in which layout and normal use determines the number as approved of people using it in working hours	(see Note 3)
Heavy industry	0.03
Interview rooms	0.2
Kitchens	0.1
Manufacturing and process areas, staffrooms	0.1
Offices and staffrooms	0.1
Personal service facilities	0.2
Reception areas	0.1
Workrooms, workshops	0.2
Warehouse storage (e.g. racks and shelves)	0.03

Table 4.1 Fire Safety Precautions

Fire safety precautions		Special applications
Type	Description	
1	Domestic smoke alarm system.	a Not required where:
2	Manual fire alarm system.	i) the <i>escape routes</i> serve an <i>occupant load</i> of no more than 50 in <i>purpose groups</i> CS (excluding <i>early childhood centres</i>), CM, WL, WM, WH and WF, or
3	Automatic fire alarm system with heat detectors and manual call points.	ii) the <i>escape routes</i> are for <i>purpose group</i> SA
4	Automatic fire alarm system with smoke detectors and manual call points.	

More than one purpose group on a floor

- 4.5.2** Where different purpose groups are each located in separate firecells, each purpose group shall adopt the requirements of Table 1 that apply to that group. This means a single floor level can have different fire safety precautions in each firecell. ...
- 4.5.3** Where according to table 4.1, any firecell on a floor level requires a Type 2 alarm, all other firecells on that floor shall have no less than a Type 2 alarm.
- 4.5.4** Where by table 4.1, any firecell on a floor requires a Type 3, 4, 5, 6 or 7 alarm, all other firecells on that floor level shall have no less than a Type 3 alarm.

Firecells with limited area intermediate floors

- 6.21.5** A firecell with intermediate floors satisfying the following conditions may be treated as a single floor fire cell and a smoke control system Type 10 or Type 11 is not required where:
- d) The total area of the intermediate floors is no greater than allowed by Paragraph 6.21.6.
- 6.21.6** The total area of limited area intermediate floors within the firecell shall not exceed:
- a) 20% of the area of the firecell, not including the area of the intermediate floor(s), where the intermediate floor(s) are enclosed or partitioned,

- 5.3 The relevant performance statements deriving from the objectives of Clauses C2.1 and C3.1 are incorporated in clauses C2.3 and C3.3 of the Building Code. I note that the applicant is required to satisfy these latter performance requirements in order to comply with the Building Code.

6 Discussion**6.1 The occupant load of the building**

- 6.1.1 The approach in determining whether building work complies with clauses C2 and C3 is to examine the design of the building and the design features that are intended to prevent the loss of life. I have described this process previously in Determination 2005/109, which addressed a similar matter, and I have taken that material into account in this Determination.

- 6.1.2 The fire report shows calculated occupant loads of 48 for Firecell 1 and 42 for Firecell 2 for a building basically assessed as a Purpose Group WM. These loadings would mean that, in accordance with special application (a)(i) in table 4.1 of C/AS1 and taking into account an occupant load of no more than 50, a manual fire alarm (Type 2) system would not be required. However, I note that the fire report has allocated only percentages of occupants rather than a whole number analysis, which in my opinion should have been applied. I do not believe that the minimalistic approach set out in the report accurately reflects the true occupancy of the building. If the whole-number approach is taken I calculate that the total occupant loads should be:
- For Firecell 1 62 (rather than 48)
 - For Firecell 2 52 (rather than 42)
- 6.1.3 If these revised figures are applied to the building, as they exceed an occupant load of 50, the special application (a)(i) no longer applies, and accordingly, a Type 2 fire alarm system is required to be installed in the building.
- 6.1.4 In addition, the fire report based the occupant loads primarily on an occupancy rate of 0.03m² per person, which applies to a “heavy industry” classification. However, I note that while no specific use has been allocated to the various tenancies, the concrete ground bearing slab shown on the structural drawings is 125mm thick, and relatively lightly reinforced, consistent with its intended use being “industrial” rather than “Heavy industrial”. In addition, the layout of at least one tenancy (Tenancy 7) indicates that its use will be manufacturing. The occupancy rate for manufacturing as set out in Table 2.2 of C/AS1 is 0.1m² per person, which would make the occupancy rate for this tenancy at least three times higher than that set out in the report.
- 6.1.5 If this occupancy rate of 0.1 was substituted for the 0.03 applied generally in the fire report, the occupant loads would be revised to 116 for Firecell 1 and 110 for Firecell 2. This in turn, would for the Purpose group classification of WM, require the installation of a Type 3 fire alarm system.
- 6.1.6 In order to establish whether a type 2 or type 3 alarm systems should be installed, the applicant should provide the authority with full classification details of each tenancy to enable the correct occupancy loading to be established for the building as a whole.
- 6.1.7 The inspection company is of the opinion that each tenancy is an individual smoke cell and accordingly that each tenancy is a firecell with an F rating of 10/10/-. Accordingly, as the mezzanine floor area of Tenancy 6 exceeds 20% of the ground floor area of that tenancy, the requirements of paragraph 6.21.6 of C/AS1 applies. This in turn would require the installation of a Type 4 fire alarm system.
- 6.1.8 The applicant holds the view that there are only two main firecells and therefore the mezzanine should be considered in terms of a much larger area than is contained within Tenancy 6.
- 6.1.9 As noted in paragraph 2.3, the area of the mezzanine floor in Tenancy 6 is 24% of the Tenancy 6 floor area, whereas the total mezzanine floor areas, taking into account the areas of each main firecell, are less than the 20% criterion.

6.1.10 I do not accept the opinion of the inspection company that each tenancy is an individual smoke cell and therefore an individual firecell. In this respect I am of the opinion that there is no requirement for the individual tenancies to be separate smokecells and I agree with the submission from the applicant. As the overall mezzanine area in each of the two firecells is less than 20% of their overall area, clause 6.21.6 does not apply. This means that there is no necessity for a Type 4 alarm system to be installed in the building.

6.2 The firecell separation

6.2.1 The application for determination has specifically mentioned the fire alarm requirements for the building. However, I note that the fire report has stated that the division wall between the two main fire cells is required to have a 30/30/30 minimum rating. This is based on a FSP rating the specified fire safety precautions relating to an escape height of 0m.

6.2.2 However, a perusal of the plans leads me to believe that the true escape height is 2629 mm, based on the height from the ground floor to the height of the various mezzanine floors above the ground floor. Applying the fire-safety precautions set out in table 4.1 as against a WM purpose group I arrive at an F rating of F60. In terms of paragraph 5 of C/AS1, this would require the dividing wall between the two fire cells to be at least 60/60/60.

6.2.3 In view of the conclusion that I have reached, I suggest that the authority further investigate this matter and take what appropriate action it considers necessary.

7 The decision

7.1 In accordance with section 188 of the Act I determine that the building:

- does not require a type 4 fire alarm system to be installed
- does require either a type 2 alarm system or a type 3 alarm system installed depending upon the occupancy loadings agreed between the parties.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 27 April 2009.

John Gardiner
Manager Determinations