



Glenveagh
Living

**Building Regulations Part B 2006
Outline Fire Strategy Report**

For

Knocknacarra District Centre, Ragoon, Galway

CLIENT : Glenveagh Living Limited
PROJECT TITLE : Knocknacarra District Centre, Ragoon, Galway
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1.0 INTRODUCTION

1.1 SCOPE OF REPORT

This Report is prepared for the purpose of providing an outline of the proposed fire strategy for the residential element of the proposed mixed use development at the Knocknacarra District Centre, Ragoon, Galway. It is noted that the retail / commercial use at ground floor level of the proposed development will generally comply with the relevant recommendations of either BS 5588 Part 11 or BS 9999: 2017 (depending on which design approach is adopted) but those aspects of the proposed scheme will not give rise to any significant concerns regarding compliance with the Part B functional requirements of Building Regulations via Fire Safety and are therefore not specifically addressed in this report. This report will therefore focus on the residential aspect of the development, and set out a proposed route to compliance with the relevant recommendations of BS 9991: 2015 in respect of the residential scheme.

2.0 INTERNAL PLANNING OF APARTMENTS

2.1 BLOCK A, D, E & F

Apartment blocks A, D, E and F of the development are being designed on the basis of “open plan” living arrangements throughout, i.e. no entrance halls within the apartments. All apartments in the above Blocks will be designed with open plan layouts based on the recommendations of Section 9.7 of BS 9991:2015 as summarized below;

- Grade D LD1 fire alarm and detection system is provided in accordance with BS 5839-6:2013;
- An automatic water fire suppression system is provided in accordance with Table 2 of BS 9991;

It is noted that the recommendations contained within BS 9991:2015 are based on research (open plan flat layouts – assessing life safety in event of fire) commissioned by the NHBC Foundation and carried out by BRE (using BRE Risk Assessment Model Crisp). The recommendations in BS 9991 are limited to apartments less than 16 x 12m and where the apartment is greater than 8m x 4m the kitchen should be enclosed. The NHBC report states that these limitations were identified simply because layouts greater than the dimensions outlined above were not studied as part of the NHBC report.

Based on the above it is proposed that the apartment layouts in the Gateway development will be designed as follows:

- Grade D, LD1 Fire Alarm and Detection System will be provided in accordance with BS 5839-6:2013/IS 3218 2013.
- An automatic Residential Sprinkler System will be provided in each apartment in accordance with BS 9251:2015 and Table 2 of BS 9991:2015.
- Max size of single level open plan apartment will not exceed 12 x 16m i.e. 192m².
- The ceiling within the open plan apartment will have a minimum height of 2.25m.
- All apartments are larger than 8m x 4m, however kitchens will be open to living area. Hobs will not be located closer than 1.5 m to the entrance door/egress route within the apartment.

Although apartments are greater than 8m x 4m, the kitchen will remain open to the living area. This layout is acceptable based on the following:

- ❖ The NHBC study referenced above notes that the limitations imposed were based on the fact that studies were not carried out on apartments greater than 8m x 4m with open kitchens.
- ❖ The NHBC study shows that for all apartment layouts studied, open plan with a sprinkler system and an enhanced LD1 detection system can provide a level of safety that is at least as good as a conventional protected entrance hallway compliant design.

In order to provide further comfort in the design of these open-plan apartment layouts, BRE will be commissioned to analyse any apartment layouts which differentiated from those layouts tested in the NHBC study and from the recommendations of BS 9991:2015.

Based on our experience from studies carried out on similar analysis, the results from the BRE analysis will indicate that the risks in the Kocknacarra District Centre development open plan apartment layouts are very much less than those of a traditional protected entrance hallway design and therefore satisfies functional requirement B1 of the Building Regulations.

2.2 BLOCK B

The Block B development will comprise standard apartment layouts with internal entrance halls within each apartment.

For apartments <4.5m above ground level : Apartments are designed in accordance with Clause 9.3 of BS 9991 : 2015 in that there are no inner room conditions arising with all apartments accessed from an entrance hall

For apartments >4.5m above ground level : Apartments are designed in accordance with Clause 9.4.2(b) of BS 9991 : 2015 in that all apartment accommodation are accessed from a protected entrance enclosed in half hour fire rated walls and FD30S rated fire doorsets with the entrance hall not exceeding 9m in length

3.0 COMMON AREAS (HORIZONTAL AND VERTICAL ESCAPE)

3.1 BLOCK A & D

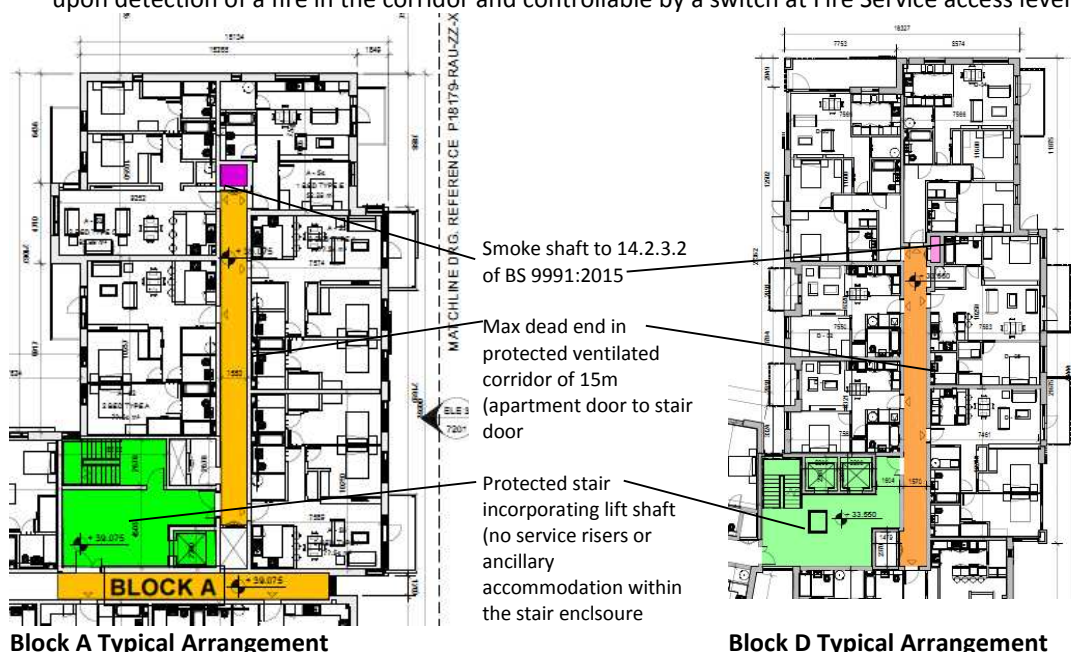
The design layouts of Block A & D are broadly similar and will attract a similar design strategy. As such the approach outlined below applies equally to both blocks. Within each block, two conditions arise

- (i) Single stair access condition (to the north west of each block) with a building height greater than 11m but not exceeding 18m
- (ii) Two stair access condition with a building height greater than 11m but not exceeding 18m. In the two stair access condition, a dead end corridor section is also proposed.

3.1.1 Single Stair Condition > 11m and < 18m

The design of the common horizontal escape routes for the building in a single stair scenario is in accordance with Section 7.4, Figure 6(b) and Section 14.1.3 and 14.2.3 of BS9991:2015 as detailed below. It should be noted that each of the residential units will be sprinkler protected to a category 2 standard, in accordance with BS 9251:2015:

- The maximum travel distance from the furthest flat entrance door to the stair door shall not exceed 15m in a single direction (the extension of the dead end travel from 7.5 to 15m being permitted by Fig 6(b) on the basis of sprinkler protection to the apartments, and venting of the corridor at the remote end of the corridor;
- The common corridor will be enclosed in at least 60 minutes fire resisting construction.
- Self-closing FD30s fire doors will be provided to flat entrances.
- The stair core will serve a protected escape stair; therefore, it will be provided with 60 minutes fire resistance with FD30s doorsets.
- The common corridor will be provided with a natural ventilation in accordance with Section 14.1.3(b) by way of a natural smoke shaft designed in accordance with 14.2.3.2 of BS9991. The shaft is being located at the remote end of the corridor in accordance with 14.2.3.2 (j), with a 1m² AOV into the 1.5m² natural smoke shaft. An AOV 1.5m² will be provided at the end of the corridor at the topmost floor level such that the smoke shaft need not serve the top floor level, thus avoiding the need for the smoke shaft to extend 2.5m above the ceiling of the topmost apartment, i.e. the 2.5m criteria will be satisfied in respect of the floor level below top level, with the shaft extending a minimum 0.5m above roof level, all in accordance with the principles in 14.2.3.2 (b) and (c).
- A 1m² AOV shall be provided at the head of each stair. The vent will be automatically activated upon detection of a fire in the corridor and controllable by a switch at Fire Service access level.



Block A Typical Arrangement

Block D Typical Arrangement

3.1.2 Two Stair Condition > 11m and < 18m

The design of the common horizontal escape routes for the building in a two-stair scenario is in accordance with Section 7.4, Figure 7(a/b) and Section 14.1.3, 14.1.4 and 14.2.2 of BS9991:2015 as detailed below. It should be noted that each of the residential units will be sprinkler protected to a category 2 standard, in accordance 9251:2015:

- The common corridor will be provided with a natural ventilation in accordance with Section 14.1.3(a) with automatic opening vents at the remote ends of the corridors having a free area of 1.5m².
- A 1m² AOV shall be provided at the head of each stair opening on detection of smoke in the stair with a manual override facility provided at fire service access level.
- The common corridor will be enclosed in at least 60 minutes fire resisting construction.
- Self-closing FD30s fire doors will be provided to flat entrances.
- The corridor will be sub-divided to separate the dead end corridor section from the remainder of the corridor
- The stair core will serve a protected escape stair; therefore, it will provided with 60 minutes fire resistance with FD30s doorsets.

Block A Typical Plan



Protected stairs (green shaded) including lift shaft but no service shafts within the stair enclosure

Naturally ventilated dead end corridor (orange shaded) with AOV 1.5m² at the remote end of the corridor. Max dead end of 15m

Either a vent shaft shall be located at the end of the corridor or a minor modification to the enclosure to the stair to allow natural venting of the remote end of the corridor by way of the external facade

Block D Typical Plan

3.2 BLOCK B

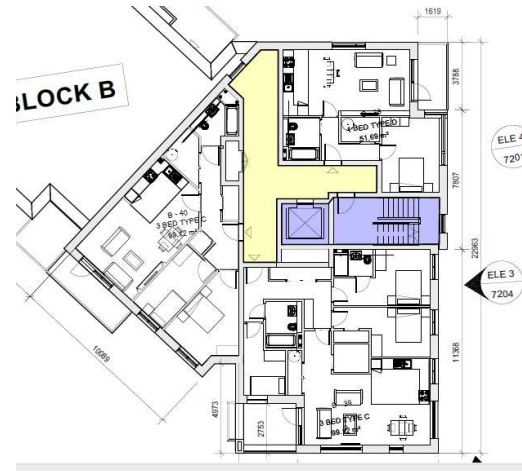
The design layouts of Block B comprises two elements, a lower level (< 18m) balcony deck approach apartment layout, with an adjacent higher block extending above 18m, The lower section has access to an enclosed protected stair toward the end of the balcony deck. As the high rise block exceeds 18m to the top floor level, the block is being provided with a fire fighting stairs and fire fighting lift if accordance with Fig 35 of BS 9991: 2015

3.1.3 Single Stair Condition > 11m and > 18m

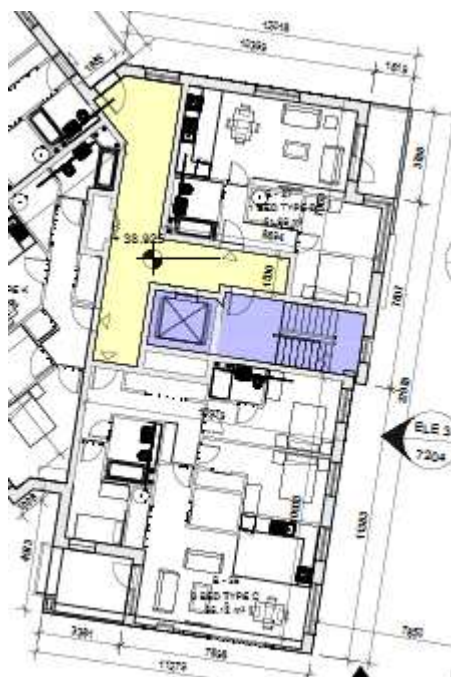
The design of Block B (enclosed lobby approach to apartments in the high rise section) in a single stair scenario is in accordance with Section 7.4, Figure 6(b) and Section 14.2.3 of BS9991:2015. The maximum travel distance from the furthest flat entrance door to the stair door shall not exceed 7.5m in a single direction (as permitted by Fig 6(b) with no sprinkler protection to the apartments), and venting of the corridor as described below;



Block B Typical Plan (@ Level 03)



Tower Block B Plan @ Level 05



Block B FF Shaft

Block B Stair Core is being designed in accordance with relevant requirements of Clause 50 and Fig 35 of BS 9991: 2015

Fire fighting stair enclosed in 120mins construction and FD60S rated doorset

Fire fighting lift enclosed in 120mins construction and FD60 rated lift landing doorset located within 7.5m of the stair door

Common lobby / fire lobby enclosed in 60mins construction and FD30S rated apartment doorsets

Dry riser landing valves in the fire fighting stair

The common lobby (shaded yellow) will be provided with natural ventilation in accordance with Section 14.1.3(b) by way of a natural smoke shaft designed in accordance with 14.2.3.2 of BS9991 with a 1m² AOV into the 1.5m² natural smoke shaft.

The balcony deck approach apartments within the Block B development shall be in accordance with Section 7.3, and Figure 5(b) of BS9991:2015. The maximum travel distance from the remotes area of the flat at the end of the balcony deck to the dry riser landing valve in the fire fighting stair shall not exceed 45m (as permitted by Fig 5(b)).

Block B Balcony Deck Approach

Open Balcony arrangement to apartments with alternative escape available by way of protected escape stair (green) and fire fighting stair (blue) within the tower block section of Block B



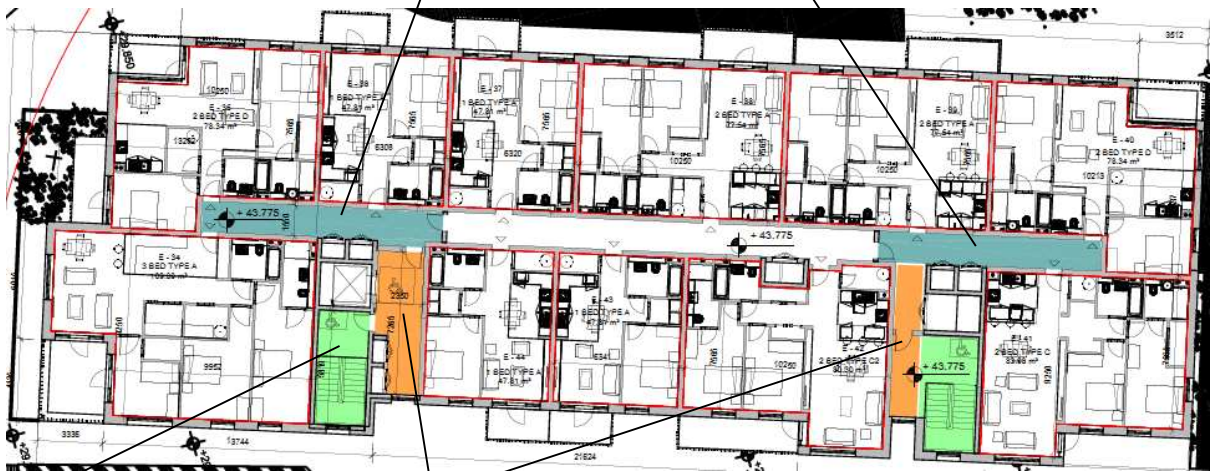
3.3 BLOCK E

The design of the common horizontal escape routes for the building in a two-stair scenario, with a top floor height not exceeding 18m. Compliance is in accordance with Section 7.4, Figure 7(a/b) and Section 14.1.3, 14.1.4 and 14.2 of BS9991:2015 as detailed below. It should be noted that each of the residential units will be sprinkler protected to a category 2 standard, in accordance 9251:2015:

- The common corridor will be provided with a natural ventilation in accordance with Section 14.1.3(a) with automatic opening vents at the remote ends of the corridors having a free area of 1.5m².
- A 1m² AOV shall be provided at the head of each stair opening on detection of smoke in the stair with a manual override facility provided at fire service access level.
- The common corridor will be enclosed in at least 60 minutes fire resisting construction.
- Self-closing FD30s fire doors will be provided to flat entrances.
- The corridor will be sub-divided to separate the dead end corridor section from the remainder of the corridor
- The stair core will serve a protected escape stair; therefore, it will provided with 60 minutes fire resistance with FD30s doorsets.
- A non vented dead end corridor is permitted by reference to Fig 7(c) of BS 9991 : 2015 as illustrated in the typical Block E plan below

Block E Typical Plan

Unvented dead end corridor of not more than 7.5m in length (between apartment door and point where alternative escape is available) permitted by reference to Fig 7(c) of BS 9991: 2015



Protected stairs (green shaded) including lift shaft but no service shafts within the stair enclosure

Naturally ventilated dead end corridor (orange shaded) with AOV 1.5m² to the outside

3.4 BLOCK F

The design layouts of Block F comprises two scenarios

- (iii) Single stair access condition levels 04 and 05 with a building height greater than 11m but not exceeding 18m
- (iv) Two stair access condition up to level 03

3.4.1 Single Stair Condition > 11m and < 18m

The design of the common horizontal escape routes for the building in a single stair scenario is in accordance with Section 7.4, Figure 6(b) and Section 14.1.3 and 14.2.2 of BS9991:2015 as detailed below. It should be noted that each of the residential units will be sprinkler protected to a category 2 standard, in accordance with BS 9251:2015:

- The maximum travel distance from the furthest flat entrance door to the stair door shall not exceed 15m in a single direction (the extension of the dead end travel from 7.5 to 15m being permitted by Fig 6(b) on the basis of sprinkler protection to the apartments, and venting of the corridor at the remote end of the corridor (natural vent by way of AOVs in the external façade at the remote end of the corridor at Level 04 and 05, and lift lobby vent at Level 03 and below
- The common lobby/corridor will be enclosed in at least 60 minutes fire resisting construction.
- Self-closing FD30s fire doors will be provided to flat entrances.
- The stair core will serve a protected escape stair; therefore, it will be provided with 60 minutes fire resistance with FD30s doorsets.
- A 1m² AOV shall be provided at the head of each stair. The vent will be automatically activated upon detection of a fire in the corridor and controllable by a switch at Fire Service access level.

Block F Level 04 Plan



Block F Level 05 Plan



Block F Part Level 01-03 Plan



Ventilated dead end corridor (1.5m² AOV at the remote end of the corridor) leading to protected stair (incorporating lifts at the upper two floor levels, i.e. level 04 & 05). Extended travel permitted to a max of 15m within the corridor

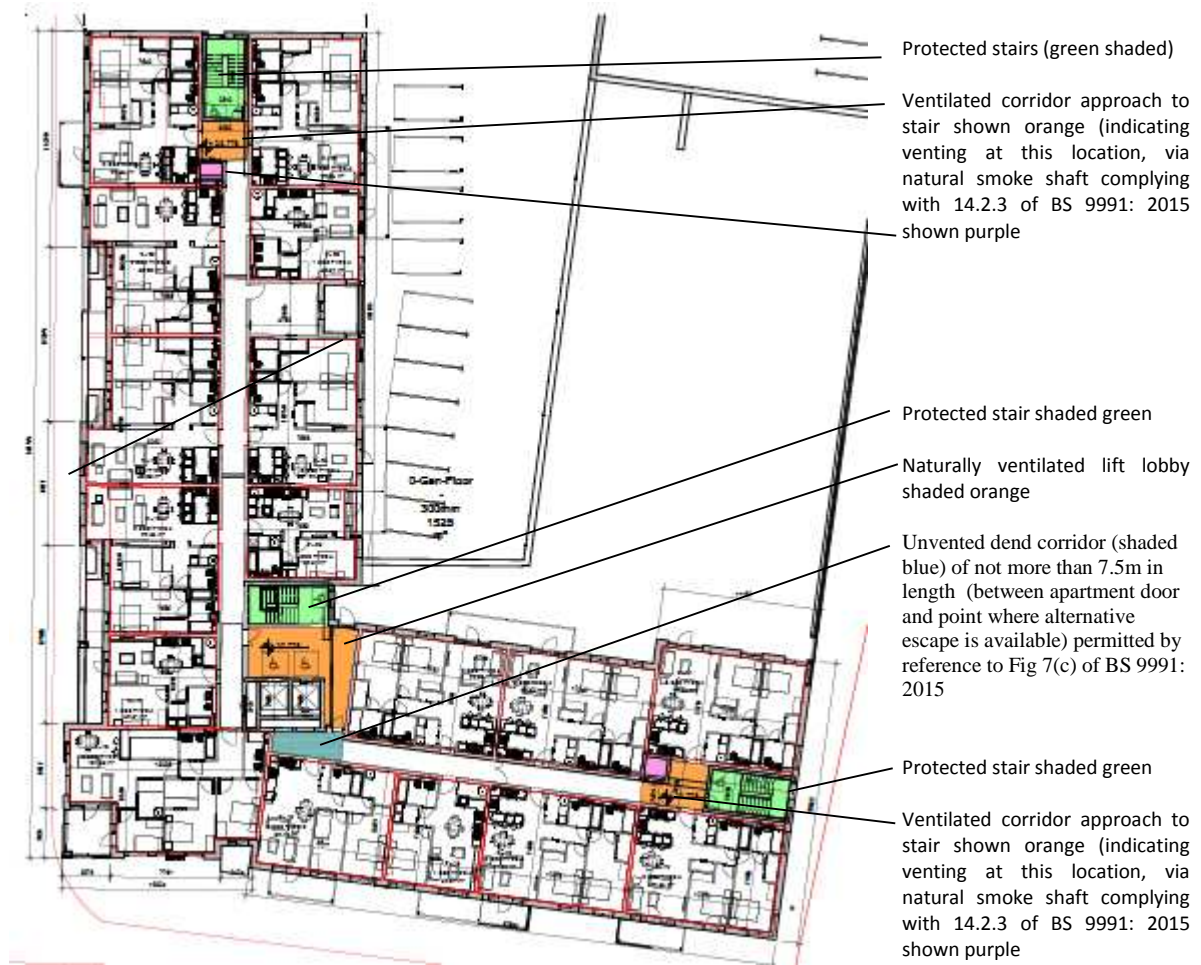
Ventilated lift lobby, to stair enclosure at lower floor levels of enlarged footprint (Levels 01-03). Venting by way of an AOV 1.5m² direct to external from lift lobby

3.42 Two Stair Condition

The design of the common horizontal escape routes for the building in a two-stair scenario is in accordance with Section 7.4, Figure 7(a/b) and Section 14.1.3, 14.1.4 and 14.2.2 (AOV to external) and 14.2.3 (natural smoke shaft) of BS9991:2015 as detailed below. It should be noted that each of the residential units will be sprinkler protected to a category 2 standard, in accordance 9251:2015:

- The common corridor will be provided with a natural ventilation in accordance with Section 14.1.3(a) with automatic opening vents at the lift lobby having a free area of 1.5m². or (b) natural smoke shafts at the remote end of the corridors
- A 1m² AOV shall be provided at the head of each stair opening on detection of smoke in the stair with a manual override facility provided at fire service access level.
- The common corridor will be enclosed in at least 60 minutes fire resisting construction.
- Self-closing FD30s fire doors will be provided to flat entrances.
- The corridor will be sub-divided to separate the dead end corridor section from the remainder of the corridor
- The stair core will serve a protected escape stair; therefore, it will provided with 60 minutes fire resistance with FD30s doorsets.

Block F Level 01-03 Plan



4.0 VEHICULAR ACCESS FOR FIRE TENDER / HIGH REACH APPLIANCE)

Vehicular access for a fire tender / high reach appliance will be provided by way of the bounding access roads and internal circulation road between Blocks as indicated on the accompanying plan.

Where the turning facility for a high reach appliance cannot be satisfied within the car parking area at Block E & F, the fire fighting facilities can be enhanced by the provision of dry rising mains within stairwells to provide ease of fire fighting internally within the various block.

Access routes and hardstanding will be in compliance with the requisite requirements of Part B5 for a fire tender / high reach appliance as appropriate.

Fire hydrants shall be provided to meet the one hydrant per 1000m²/footprint area across the six individual blocks. Where fire mains are provided within specific stairs to meet fire fighting requirements, access to the dry riser inlet shall be within 18m of and in line of sight of the fire tender hardstanding locations along the fire tender access route.

Site Layout Plan



Access routes for a fire tender / high reach appliance shall be along the routes indicated in green on the above site plan.