Eastern Creek Recycling Ecology Park

Recycling Infrastructure Optimisation Project

Appendix O
Fire Safety Strategy Report

June 2022

Bingo Recycling Ecology Park
1 Kangaroo Avenue, Eastern Creek NSW

Fire & Incident Management

Environmental Impact Statement

Prepared for: **BINGO Industries Pty Ltd**
Report No. **21728-R01**
Issue No. **2**
Issue Date: **15 February 2022**

INNOVA FIRE SAFETY SPECIALISTS

QUALITY SYSTEM

Report Register

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21728-R01	1	Initial issue	27/01/2022	BH
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1.0 EXECUTIVE SUMMARY

This Fire Safety Strategy Report has been prepared by Innova Services Australia Pty Ltd for BINGO Industries, and relates to the existing BINGO Recycling Eastern Creek Ecology Park site located at 1 Kangaroo Avenue, Eastern Creek NSW.

Innova Services Australia Pty Ltd has been commissioned to prepare a Fire Safety Strategy for the site to support a State Significant Development (SSD) application in accordance with Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The Proposal seeks approval to increase the throughput of the existing Eastern Creek Recycling Ecology Park (REP) (formerly known as the Genesis Waste Management Facility) from the current two million tonnes per annum (Mtpa) throughput by an additional 950,000 tonnes per annum (tpa) to a total of 2.95 Mtpa ('the Proposal').

This Report relates to Fire & Incident Management and covers the following aspects of the SEARS:

- Identification of the aggregate quantities of combustible waste products to be stockpiled at any one time. Refer to Section 5.0 of this Report.
- Technical information on the environmental protection equipment to be utilised on the premises such as air, water and noise controls, spill clean-up equipment and fire (including location of fire hydrants and water flow rates at the hydrant) management and containment measures. Refer to Section 6.0 of this Report.
- Details regarding the fire hydrant system and its minimum water supply capabilities appropriate to the site's largest stockpile fire load. Refer to Section 6.3 of this Report.
- Details of size and volume of stockpiles and their management and separation to minimise fire spread and facilitate emergency vehicle access. Refer to Section 5.0 of this Report.
- Consideration of consistency with NSW Fire & Rescue Fire Safety Guideline – Fire Safety in Waste Facilities (February 2020). Refer to Section 7.0 of this Report.
- Information relating to the proposed structures addressing relevant levels of compliance with Volume One of the National Construction Code (NCC). This is to be high-level only. Refer to Section 3.2 of this Report.

This document details a high-level fire safety strategy based on the information provided to Innova Services Australia by BINGO and is not intended for detail design development or construction.

A summary of recommendations is provided in Section 8.0 of this Report.

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this Report is to present a Fire Safety Strategy for the site for the purpose of Environmental Impact Statement (EIS) submission as part of a State Significant Development (SSD). This includes a review Fire and Rescue NSW Fire Safety Guidelines, with an aim to demonstrate the proposed development's capability of facilitating fire brigade intervention.

This report supports the EIS for the Proposal and has been prepared as part of an SSD Application for which approval is sought under Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) (SSD-11606719) for the Proposal, issued by NSW Department of Planning, Industry and Environment (DPIE) on 21 April 2021.

2.2 EXCLUSIONS

This Report does NOT cover the following:

- A detailed BCA assessment of the subject development.
- Access for people with disabilities (Part D3 of the BCA).
- System or engineering design of any part of the subject development.
- Operational checks of fire safety equipment, verification of construction techniques, fire resistance levels or the witnessing of fire drills.
- Compliance or conformance audit for any fire safety system inside the subject development.
- Arson (other than as a source of initial ignition), multiple ignition sources, acts of terrorism.
- Protection of property (other than adjoining property).
- Business interruption or losses or personal or moral obligations of the owner / occupier.
- Occupational Health and Safety, and Work Cover Authority Regulations.

3.0 DEVELOPMENT DESCRIPTION

3.1 GENERAL LAYOUT AND CONSTRUCTION

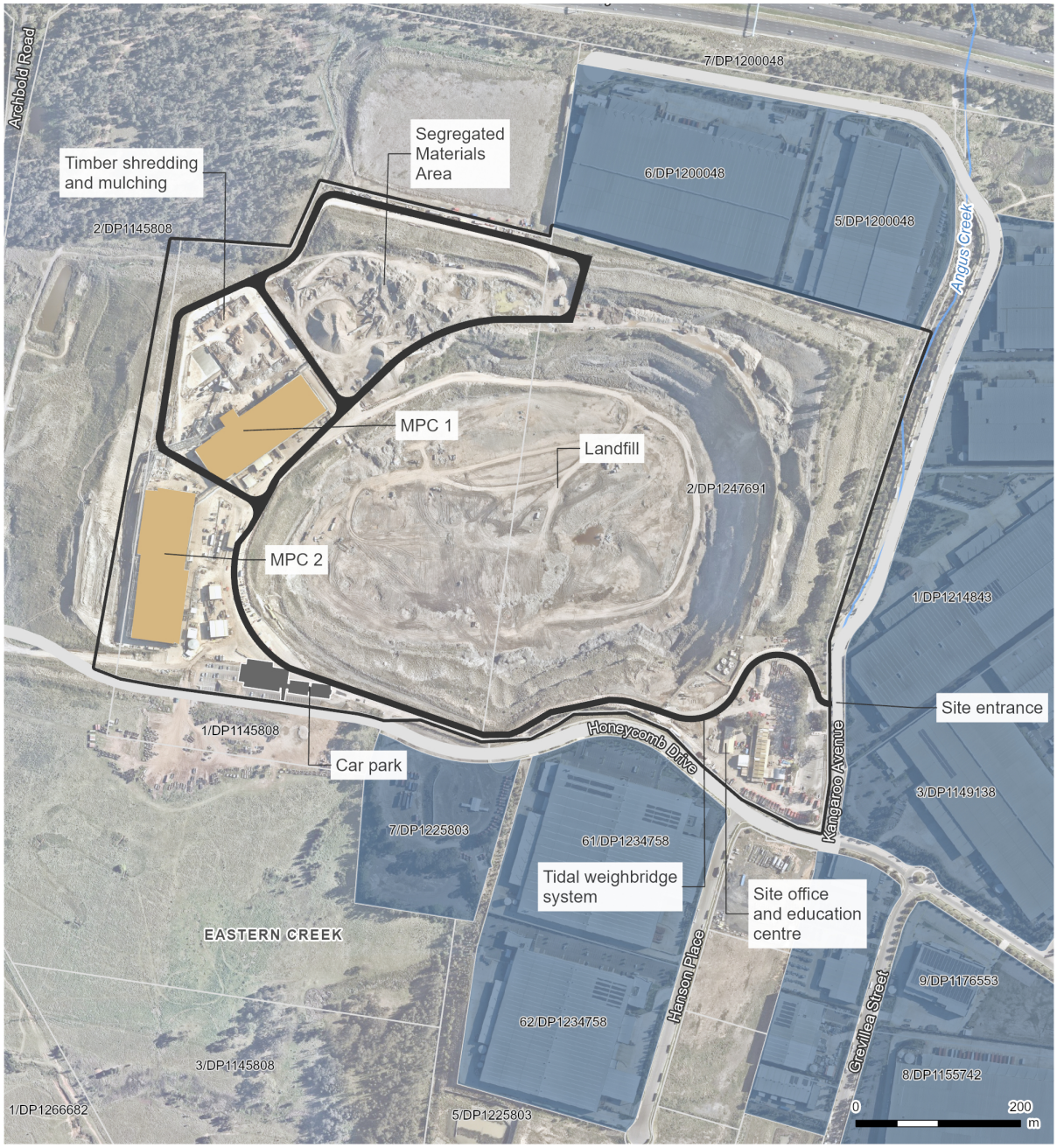
General

The subject site is the existing BINGO Eastern Creek Recycling Ecology Park located at 1 Kangaroo Avenue Eastern Creek. The site is bounded by Kangaroo Avenue on the east, existing industrial developments to the north, and undeveloped allotments to the south and west. Access within the site is from Kangaroo Avenue via an internal network of roads/hardstands.

The existing site comprises of the following:

- The landfill (former quarry void)
- Materials Processing Centre 1 (MPC 1)
- Materials Processing Centre 2 (MPC 2)
- Segregated Materials Area (SMA)
- Site Office

Bingo is proposing to enhance resource recovery outcomes across the Greater Sydney area by increasing throughput at the Eastern Creek REP to capitalise on the underutilised state-of -the-art processing facilities, namely MPC2, and plant and equipment within the Eastern Creek REP. The Applicant is therefore proposing to increase the total throughput of the Eastern Creek REP by 950,000 tpa and carry out minor infrastructure upgrades works across the Proposal Site. The Proposal would include the upgrade and construction of supporting infrastructure to optimise the current operation at Eastern Creek REP and facilitate the increased throughput proposed to be received at the Proposal Site. An overview of the Proposal is provided in the figures below.



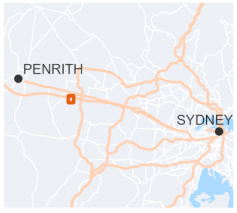
Legend

- Eastern Creek Resource Ecology Park operational area
- Cadastre
- Watercourse

Nearby sensitive receivers

- Industrial receiver
- Recreational area
- Sensitive residential receiver

- Existing site structure
- Internal road
- Existing infrastructure label



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Coordinate System: GDA2020 MGA Zone 56
Date issued: February 24, 2022
Imagery: Nearmap

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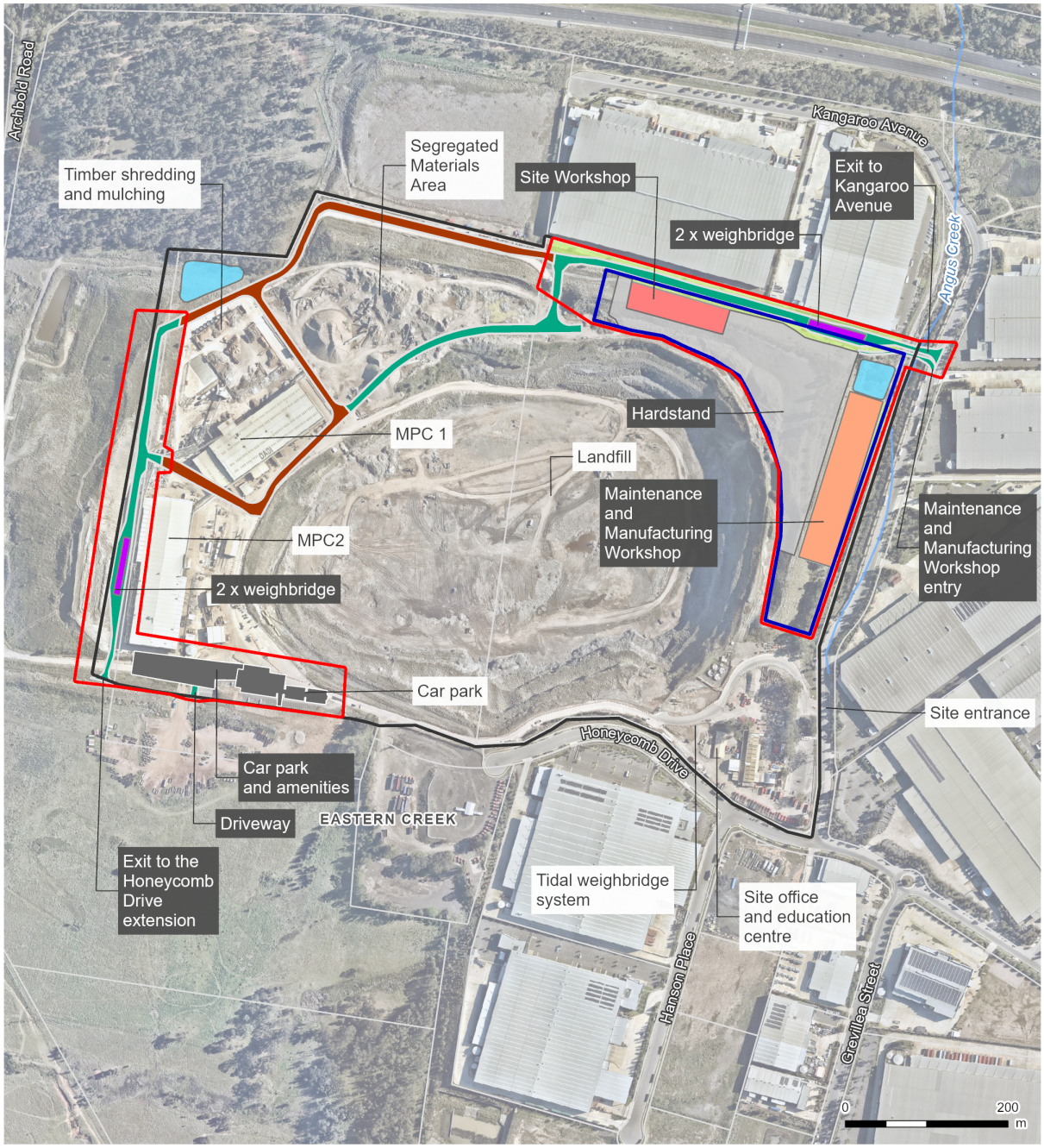
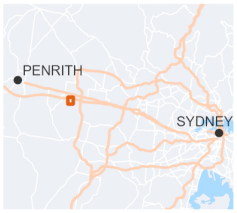
Figure 1: Proposal Site



Legend

- Eastern Creek Resource Ecology Park operational area
- Stage 2 boundary
- Stage 3 boundary
- Basin
- Landscaping
- Cadastre
- Existing road to be upgraded
- New road as part of the Proposal
- Proposed infrastructure label
- Existing infrastructure label
- Watercourse



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Imagery: Nearmap

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Figure 2: The Proposal

Materials Processing Centres (MPCs)

The existing Materials Processing Centres (MPC 1 and MPC 2) are located at the west of the site with floor areas exceeding 2,000m^2 and 3,500m^2 respectively, being deemed as Large Isolated Buildings. The buildings comprise internal waste collection and sorting areas. The buildings are not provided with perimeter access strictly in accordance with BCA Clauses C2.3 and C2.4, with access restricted to less than 6m in areas, and discontinuous vehicle pathways resulting from conveyor systems. The perimeter access is also noted to exceed 18m from the external walls of the MPCs in some areas.

The perimeter access provided to the existing buildings is discussed in the context of Fire and Rescue Guidelines in this Report.

Egress from the MPC buildings is available on all sides through non-fire-rated exit doors direct to open space.

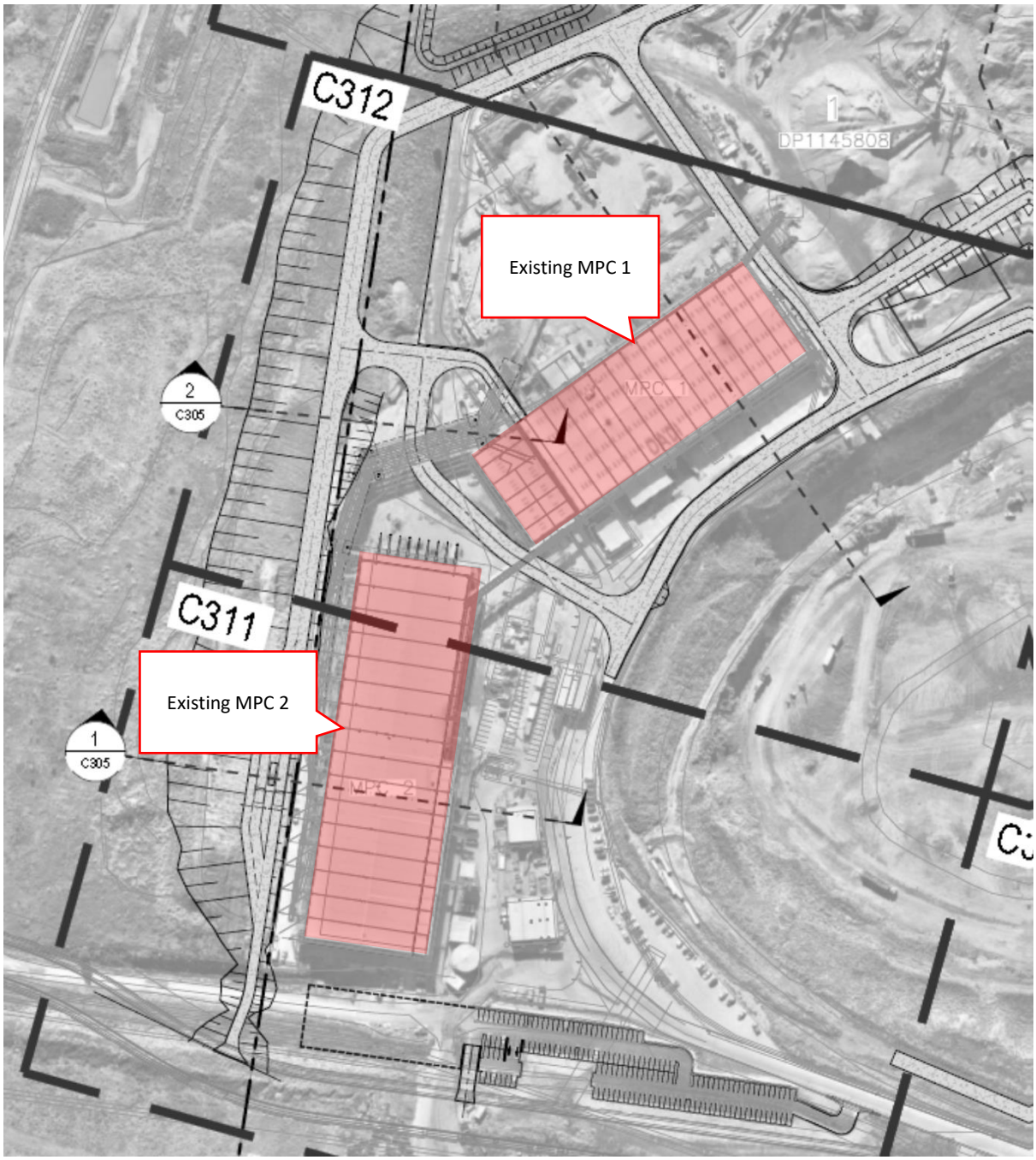


Figure 3: MPC Aerial View

Site and Maintenance Workshops

The site and maintenance and manufacturing workshops are proposed to be located at the north-east corner of the site adjacent Kangaroo Avenue.

The workshop buildings are not deemed large-isolated buildings under the National Construction Code (NCC), as they are not proposed to exceed the maximum fire compartment area limitation of 2,000m^2 for Type C Construction, and are therefore not required to be provided with emergency vehicle perimeter access. Furthermore, the buildings are not intended for material or waste processing and therefore the FRNSW Waste Management Facility Guidelines are not applicable.

The buildings shall be subject to compliance with the requirements of the Building Code of Australia (BCA) by way of deemed-to-satisfy compliance or Performance Solution.

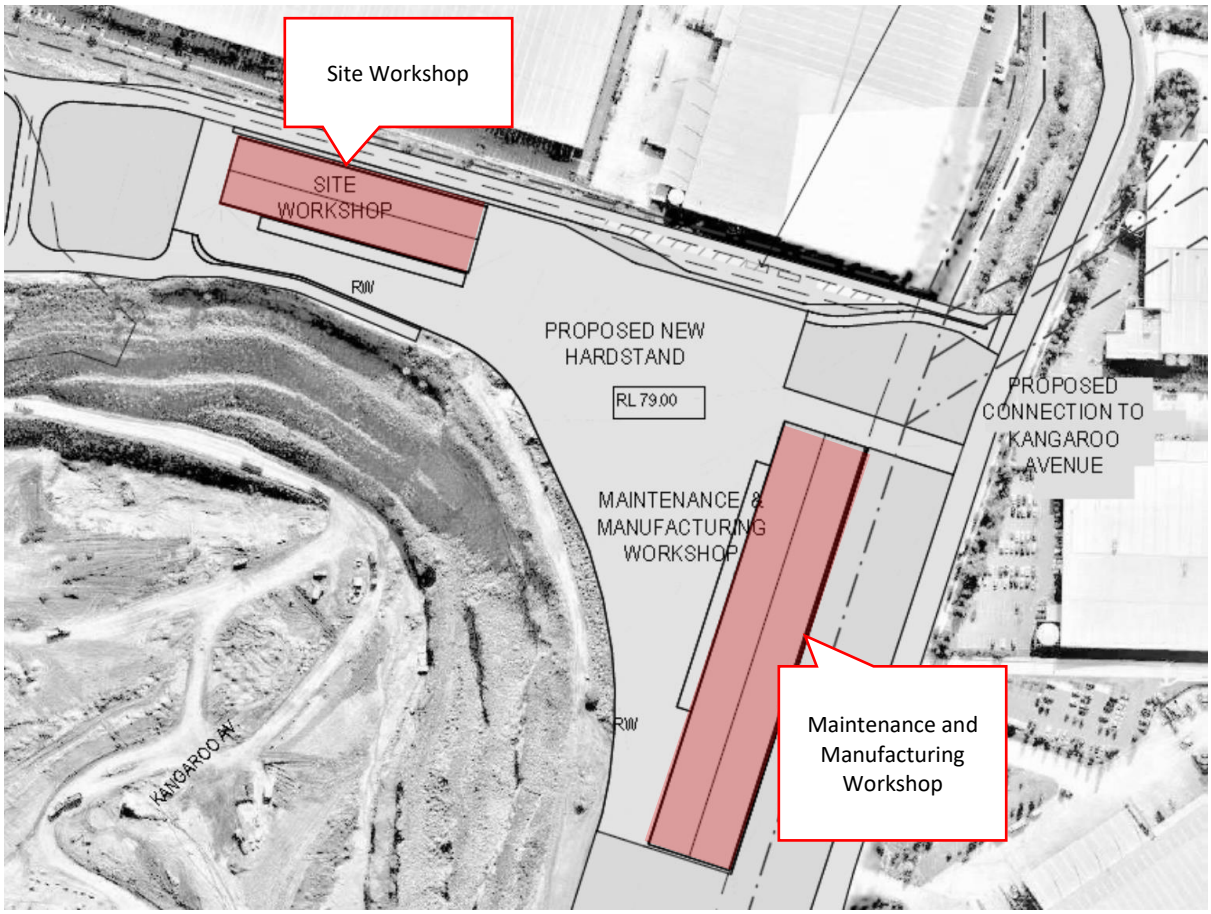


Figure 4: Workshop Aerial View

3.2 BCA Assessment Data

The below details the assumed BCA Assessment data applicable to the subject buildings. This is to be confirmed by a BCA Consultant.

Table 1: Relevant BCA Assessment Data – Material Processing Centre 1

BCA Reference	BCA Assessment
Classification	Class 7b (product storage) Class 8 (Waste Processing)
Rise in Storeys	1
No. of Levels Contained	1
Minimum Type of Construction Required	Type C
Effective Height	Less than 12m (0m)
Maximum Fire Compartment Size	Greater than 2,000m^2 and/or 12,000m^3 (Large Isolated Building)

Table 2: Relevant BCA Assessment Data – Material Processing Centre 2

BCA Reference	BCA Assessment
Classification	Class 7b (product storage) Class 8 (Waste Processing)
Rise in Storeys	3 (MPC 2)
No. of Levels Contained	3
Minimum Type of Construction Required	Type B
Effective Height	Less than 12m (approx. 7m)
Maximum Fire Compartment Size	Greater than 3,500m^2 and/or 21,000m^3 (Large Isolated Building)

Table 3: Relevant BCA Assessment Data – Maintenance Buildings

BCA Reference	BCA Assessment
Classification	Class 8 (Manufacturing)
Rise in Storeys	1
No. of Levels Contained	1
Minimum Type of Construction Required	Type C
Effective Height	Less than 12m (0m)
Maximum Fire Compartment Size*	Assumed to comply with BCA Table C2.2 (Less than 2,000m^2 and 12,000m^3)

** Note: it is assumed that the maintenance buildings will not exceed the fire compartment floor area limitations for Type C Construction under BCA Table C2.2 (2,000m^2) and therefore would not be considered Large Isolated Buildings under BCA Clause C2.3.*

3.3 PROVISIONS FOR FIRE BRIGADE INTERVENTION

Fire Station Locations

The two nearest fire stations to the subject development are:

- Huntingwood Fire Station (Permanent Staff) - approximately 8.7 km (by road)
- St Marys Fire Station (Permanent Staff) - approximately 12.5 km (by road)

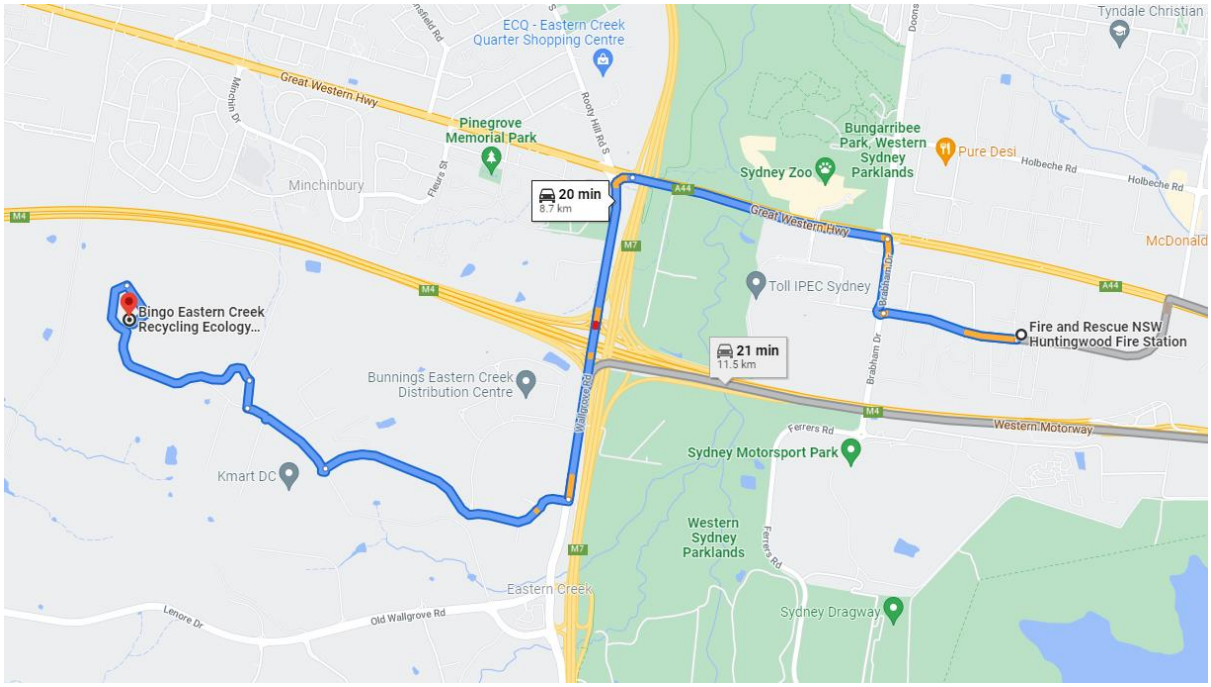


Figure 5: Fire Station Location

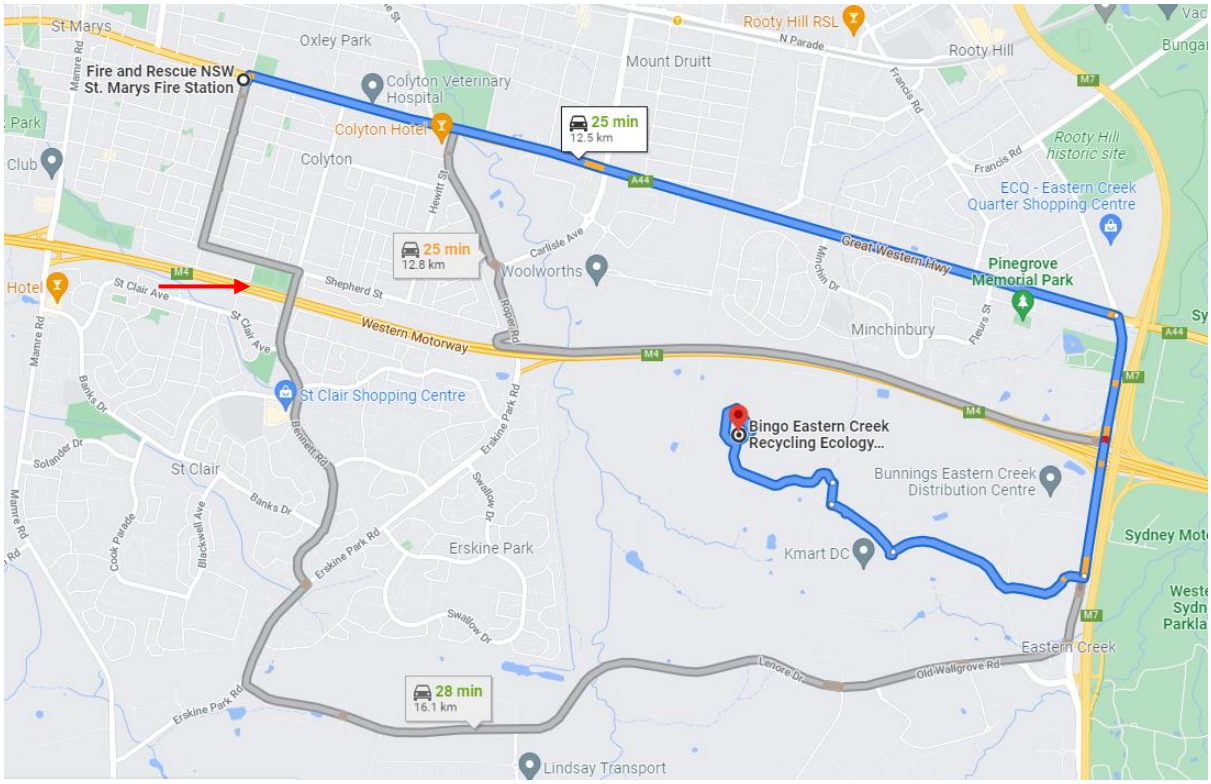


Figure 6: Fire Station Location

Emergency Services Access

Emergency services vehicular access to the site is via Kangaroo Avenue to the East of the site. Access is through the main site entry, with a by-pass adjacent the weigh bridge. Access will also be available through new proposed access points from Kangaroo Avenue and proposed Honeycomb Drive extension.

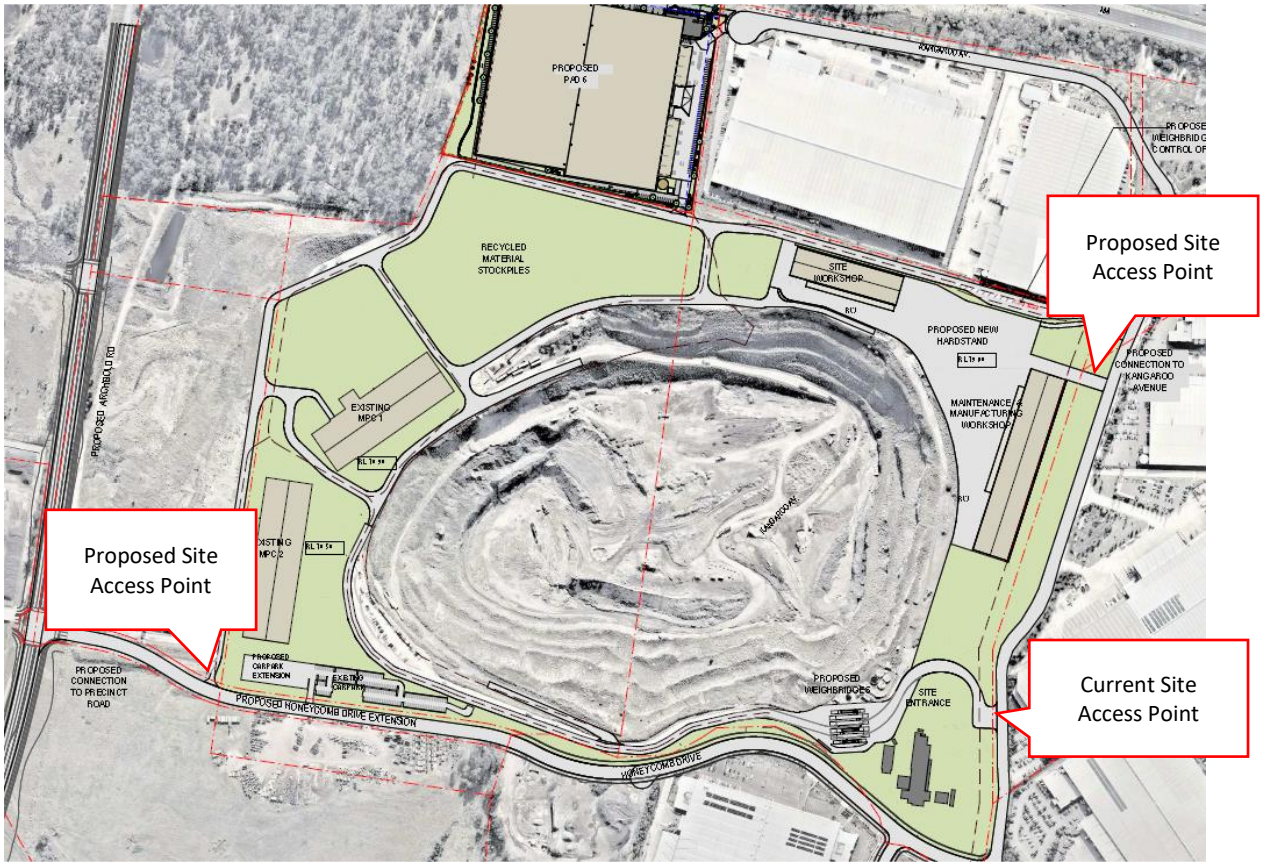


Figure 7: Site Plan

Fire Control Centre

The existing site is served by a fire control centre located within a dedicated enclosure adjacent the sprinkler pump enclosure and MPC 2. Note that MPC 2 is the only building served by an automatic smoke detection and building occupant warning system.

Fire Hydrant System

The site is served by an existing fire hydrant system. This system is noted to serve the existing MPCs only, with incomplete coverage provided to the existing stockpile area.

It is noted that fire hydrant coverage is not required to be provided to buildings that do not exceed 500m^2 as per Clause E1.3 of the BCA. As the site and maintenance workshop buildings exceeds 500m^2, fire hydrant coverage is to be provided in accordance with AS 2419.1-2005.

The existing hydrant booster assembly and pump is located to the east of MPC 2 adjacent the internal access road. A dedicated fire appliance hardstand is provided.

Fire hydrant coverage is provided to the MPCs via external fire hydrants. The fire hydrant system design is subject to Performance Solutions to demonstrate compliance with BCA Performance Requirement EP1.3.

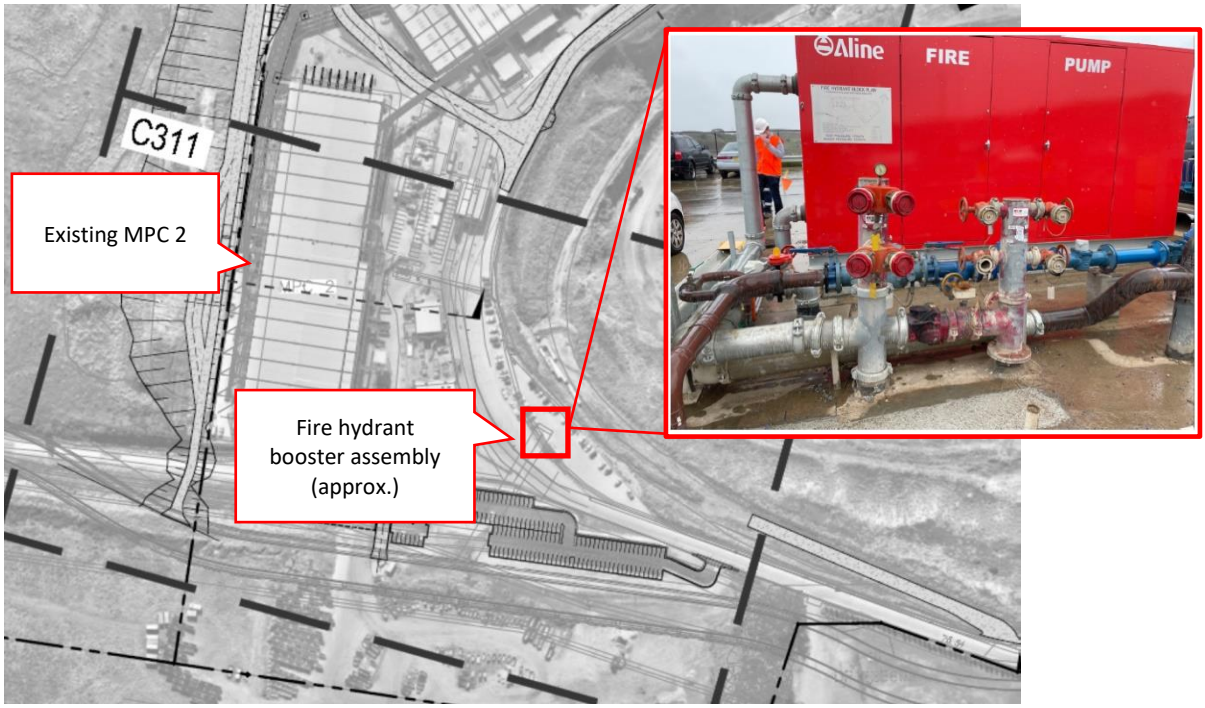


Figure 8: Site Part Plan - Hydrant Booster Assembly

Sprinkler System

Sprinkler systems are installed within the existing MPC 2 building in accordance with AS 2118.1-2017, and the respective Fire Engineering Report and Performance Solutions.

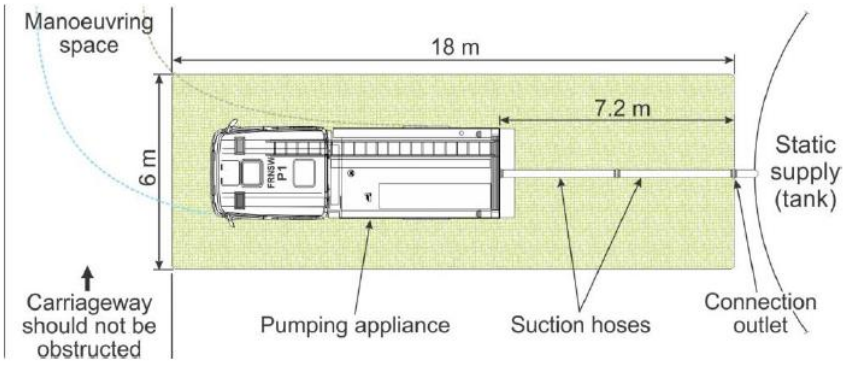
The proposed maintenance buildings are not deemed large-isolated buildings, as it is assumed that the maintenance buildings will not exceed the fire compartment floor area limitations for Type C Construction under BCA Table C2.2 and therefore would not be considered Large Isolated Buildings under BCA Clause C2.3. These are therefore not required to be provided with sprinklers under the deemed-to-satisfy provisions of the BCA.

The existing sprinkler pump, brigade booster and tank is located to the east of MPC 2, as shown below. A dedicated fire appliance hardstand is provided.

It is noted that the existing hardstand serving the suction connection outlet does not meet the requirements of the FRNSW Guideline as depicted below, however has been agreed through consultation with FRNSW.

8.1.5 Any *hardstand* serving a *suction-connection outlet* is to have a working space which extends a minimum of 18 m from the point of connection to allow semi-rigid suction hose to be connected to the rear of the *fire appliance* (see Figure 14).

Note: *Fire appliances* typically use three x 2.4 m or two x 3.6 m long suction hoses (i.e. combined length of 7.2 m). Some FRNSW 'aerial pumpers' have a mid-mounted pump where the suction hose is connected to the side of the vehicle.



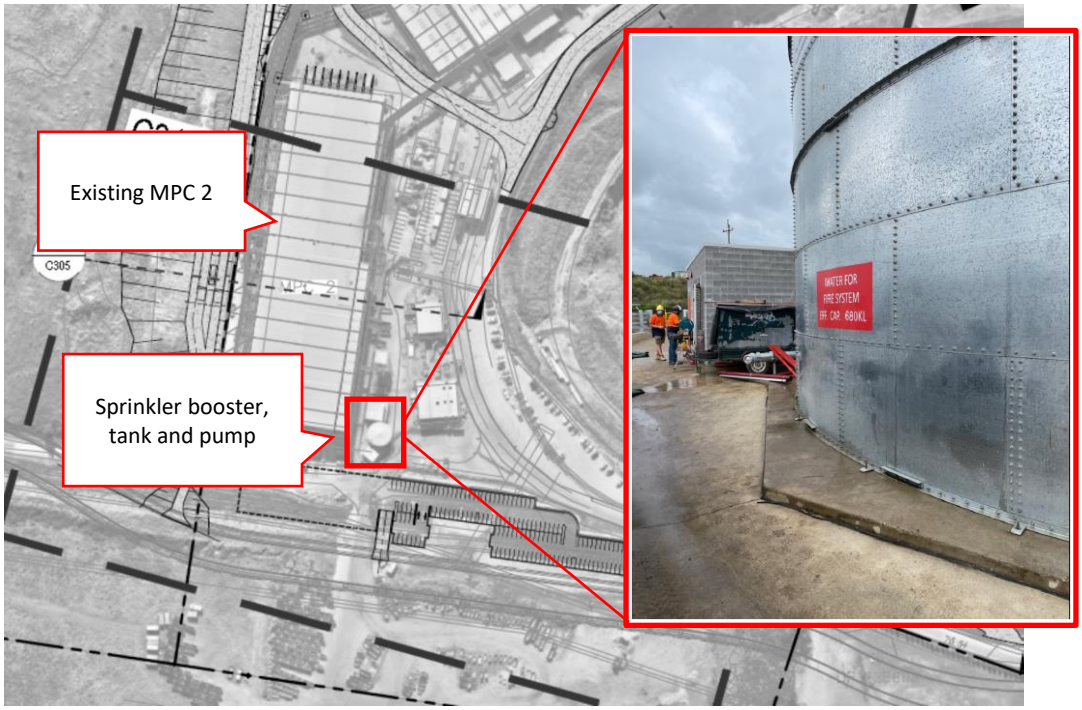


Figure 9: Site Part Plan - Sprinkler Booster Assembly, Tank and Pump

4.0 FIRE SAFETY STRATEGY

4.1 GENERAL

The below is high-level overview of the existing buildings and site level of fire safety in line with current Building Code of Australia (BCA) and emergency service expectations. Adoption of any recommendations does not guarantee compliance with the BCA, or endorsement by FRNSW. Any proposed upgrade works should be reviewed by a BCA Consultant and Fire Safety Engineer.

As outlined previously, it is assumed that the existing MPC 1 and MPC 2 buildings are large-isolated buildings whereby the fire compartment limitations of Table C2.2 of the BCA are permitted to be exceeded subject to the building being provided with an automatic sprinkler system and perimeter vehicular access in accordance with BCA Clause C2.3(a)(ii), noting that the subject buildings are not provided with not less than 18m open space around the perimeter of the building.

The Fire and Rescue NSW Guideline "Fire Safety in Waste Facilities" is also considered applicable to both existing MPC buildings. The purpose of this FRNSW Guideline is to "*provide guidance on fire safety in waste facilities that receive combustible waste material, including adequate provision for fire safety and facilitate safe fire brigade intervention to protect life, property and the environment*".

It should be noted that MPC1 was designed and constructed in accordance with the applicable requirements and Standards at the time, and was designed and approved prior to FRNSW Guideline "Fire Safety in Waste Facilities" being published.

Fire safety in waste facilities is recommended to be considered on a case-by-case basis in lieu of strictly adopting the Deemed-to-Satisfy (DtS) provisions of the BCA. Furthermore, FRNSW recommends that BCA Clauses E1.10 and E2.3 be considered and additional provision for special hazards made for the development.

E1.10 Provision for special hazards

Suitable additional provision must be made if special problems of fighting fire could arise because of-

- *(a) the nature or quantity of materials stored, displayed or used in a building or on the allotment; or*
- *(b) the location of the building in relation to a water supply for fire-fighting purposes.*

E2.3 Provision for special hazards

Additional smoke hazard management measures may be necessary due to the-

- *(a) special characteristics of the building; or*
- *(b) special function or use of the building; or*
- *(c) special type or quantity of materials stored, displayed or used in a building; or*
- *(d) special mix of classifications within a building or fire compartment*

which are not addressed in Tables E2.2a and E2.2b.

Developments are recommended to make adequate provision as outlined in the FRNSW Guideline, by either meeting the 'acceptable solution' under the Guideline, or via a Performance Solution that complies with the Performance Requirements of the National Construction Code (NCC).

4.2 MATERIAL PROCESSING CENTRE 1 (MPC 1)

Fire Hydrant System

The existing fire hydrant system comprises the following:

1. It is noted that the newer MPC 2 building is provided with a fire hydrant system in accordance with AS 2419.1-2005, including fire brigade booster assembly and pump. This system, including new infrastructure, serves the exiting MPC 1 building.
2. The exiting fire hydrants serving the MPC 1 building are depicted in the figure below.

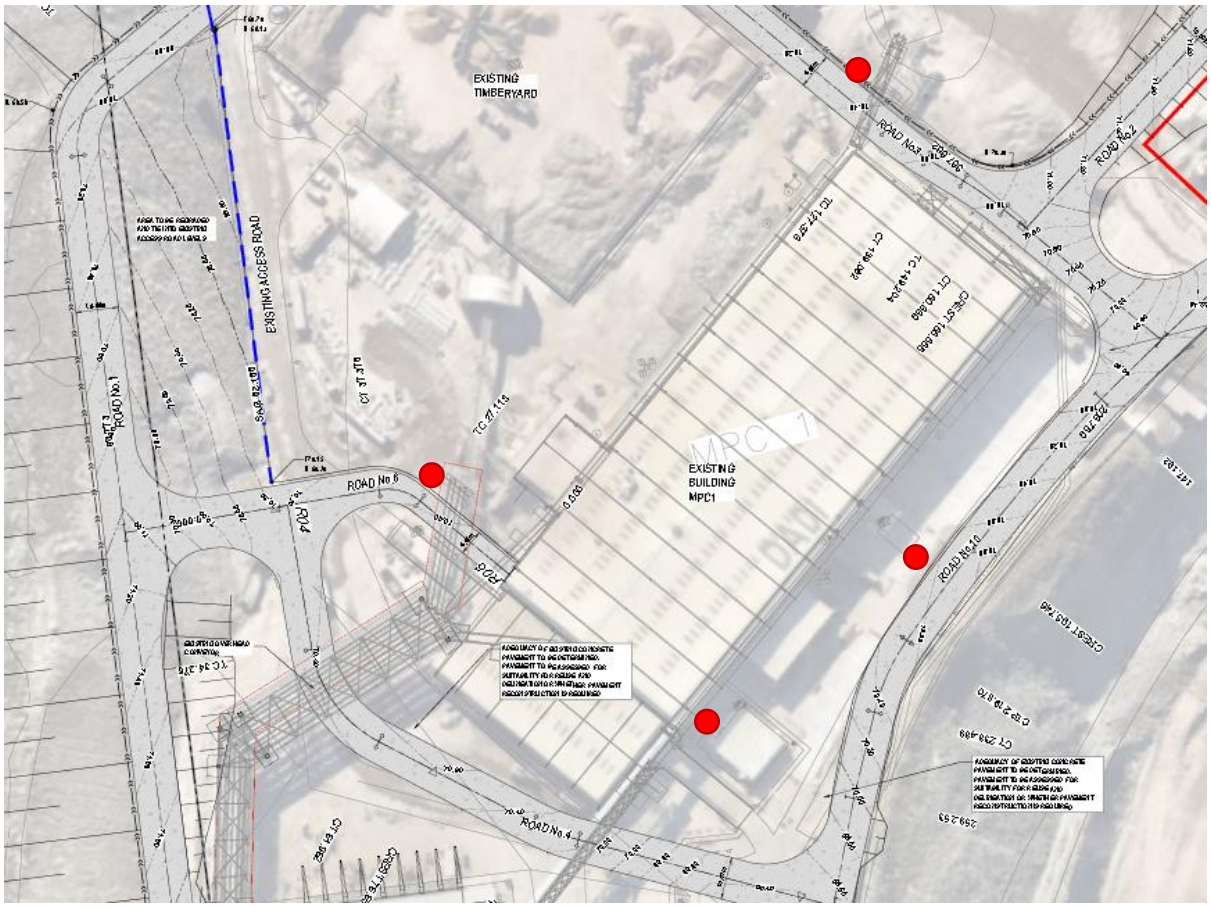


Figure 10: Site Plan - MPC 1

The existing fire hydrant system is recommended to include the following provisions:

1. Existing fire hydrants are recommended to be protected in accordance with the following:
    - Located greater than 10m from the non-fire-rated external walls of the building served; or
    - Protected by a shield wall in accordance with AS 2419.1-2017; or
    - Provided with a fallback fire hydrant in accordance with FRNSW recommendations (subject to FRNSW consultation)

    Note: it is unclear whether compliant fire hydrant coverage in accordance with AS 2419.1-2005 is provided within MPC 1. It is recommended this be reviewed by a system designer.

Fire Hose Reels

The existing MPC 1 is served by fire hose reels installed in accordance with AS 2441.

Fire Brigade Access – Perimeter Access

As per the requirements for a large-isolated building under BCA Clause C2.3, vehicular access is required to be provided in accordance with BCA Clause C2.4(b), being:

- Capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building; and
- Having a minimum unobstructed width of 6m with no part of its furthest boundary more than 18m from the building and in no part of the 6m width built upon or used for any purpose other than vehicular or pedestrian movement; and
- Providing reasonable pedestrian access from the vehicular access to the building; and
- Having a load bearing capacity and unobstructed height to permit the operation and passage of fire brigade vehicles; and
- Wholly within the allotment except that a public road complying with the above requirements may serve as the vehicular access or part thereof.

Fire brigade perimeter access to MPC 1 currently comprises the following:

- Permanent hardstand (paved road) on the north, east and southern sides, with paved road on the western side between MPC 1 and external stockpile location.
- The permanent hardstand between MPC 1 and MPC 2 to the south of MPC 1 does not strictly comply with the deemed-to-satisfy provisions of the BCA due to the overhead conveyors/gantries connecting MPC 1 and MPC 2. The clearances to the underside of the overhead structures are in accordance with FRNSW Guideline *Access for Fire Brigade Vehicles and Firefighters.*
- The proposed civil site works will improve the access for fire brigade vehicles throughout the site, including new site entries/exits and perimeter ring road along the western side of the site.

Figure 11: Proposed Site Plan

4.3 MATERIAL PROCESSING CENTRE 2 (MPC 2)

Fire Hydrant System

The existing fire hydrant system comprises the following:

1. The existing system is noted to be in accordance with AS 2419.1-2005, with the provision of external fire hydrants, ring main, booster assembly, and pumpset. This is considered appropriate for the subject building.
2. The building is protected by external attack fire hydrants, provided with fallback hydrants located within 70m of the primary hydrants that are located within 10m of the building or located beneath overhangs or conveyors.

The existing fire hydrant system is recommended to include the following provisions:

1. The fire hydrant system is recommended to be confirmed to have a minimum water supply capacity to supply the maximum hydraulic demand of the system (flow rate) for a duration of not less than 4 hours. This should consider simultaneous flow demands of the automatic sprinkler system where shared water supplies are proposed.

Automatic Fire Sprinkler System

Noting that the existing MPC 2 exceeds the maximum fire compartment floor area for a Class 7 or 8 building of Type B Construction (3,500m^2), it is subject to the requirements of BCA Clause C2.3 Large Isolated Building. As the building is not provided with open space of not less than 18m around the building, the building is required to be protected throughout with a sprinkler system complying with Specification E1.5 of the BCA.

The existing sprinkler system comprises the following:

1. An existing sprinkler system installed throughout the building in accordance with Specification E1.5 of the BCA, AS 2118.1-2017 and relevant requirements of the existing Fire Engineering Report.
2. The sprinkler booster assembly in accordance with Clause 4.14 of AS 2118.1-2017 and Clause 7.5.3 of AS 2419.1-2017 for connection to towns mains and Clause 7.5.7 of AS 2419.1-2017 for connection to tank suction from on-site water storage tank(s).

The existing sprinkler system is recommended to include the following provisions:

1. The sprinkler system is recommended to be confirmed to have a minimum water supply and capacity to provide the maximum hydraulic demand for not less than 2 hours. This should consider simultaneous flow demands of the fire hydrant system where shared water supplies are proposed.
2. The connection to the on-site water storage tank(s) is recommended to be confirmed to be in accordance with Clause 4.3.3 and H4.3 of AS 2419.1-2017, with a dedicated hardstand provided in accordance with Clause 8.2 of FRNSW Guideline "*Access for fire brigade vehicles and firefighters*". It is understood that the hardstand and connection was subject to consultation with FRNSW during MPC 2 design development.

Automatic Smoke Detection and Alarm System

BCA Table E2.2a requires one of the following be provided within a Class 7 or 8 large-isolated building that exceeds 18,000m^2 in floor area or 108,000m^3 in volume with a compartment ceiling height of not more than 12m:

- An automatic smoke exhaust system in accordance with BCA Specification E2.2b; or
- Automatic smoke-and-heat vents in accordance with BCA Specification E2.2c

Although MPC2 has a floor area of approximately 10,600m^2 performance-based smoke hazard management is provided through the provision of thirty (30) whirly birds evenly distributed along the ridgeline of the roof, as addressed in the existing Fire Engineering Report.

Building Occupant Warning System

The existing MPC 2 building is served by a building occupant warning system (BOWS) in accordance with BCA Specification E2.2a and AS 1670.1-2018.

Fire Brigade Access – Perimeter Access

As per the requirements for a large-isolated building under BCA Clause C2.3, vehicular access is required to be provided in accordance with BCA Clause C2.4(b), being:

- Capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building; and
- Having a minimum unobstructed width of 6m with no part of its furthest boundary more than 18m from the building and in no part of the 6m width built upon or used for any purpose other than vehicular or pedestrian movement; and
- Providing reasonable pedestrian access from the vehicular access to the building; and
- Having a load bearing capacity and unobstructed height to permit the operation and passage of fire brigade vehicles; and
- Wholly within the allotment except that a public road complying with the above requirements may serve as the vehicular access or part thereof.

Fire brigade perimeter access to MPC 2 currently comprises the following:

- The western perimeter road, 6m wide compacted road base, that is subject to a fire engineering performance solution in the existing Fire Engineering Report. This perimeter road is to be upgraded as part of the proposed civil works. This will improve the perimeter access provided for fire brigade intervention.
- The perimeter access around MPC 2 requires fire appliances to pass under overhead conveyors and gantries. The clearances to the underside of the overhead structures are in accordance with FRNSW Guideline *Access for Fire Brigade Vehicles and Firefighters.*
- The permanent hardstand between MPC 1 and MPC 2 to the south of MPC 1 does not strictly comply with the deemed-to-satisfy provisions of the BCA due to the overhead conveyors/gantries connecting MPC 1 and MPC 2. The clearances to the underside of the overhead structures are in accordance with FRNSW Guideline *Access for Fire Brigade Vehicles and Firefighters.*

4.4 SITE-WIDE STRATEGY

Fire Hydrant System

The existing fire hydrant system installed on the site serves both MPC 1 and MPC 2, and is provided with a pumpset and fire brigade booster assembly located on the access road within proximity of MPC 2. Refer to Section 6.3 of this Report for fire hydrant requirements for external stockpile protection.

Fire Brigade Access – Perimeter Access

The proposed civil works serves to improve the site-wide vehicle access for fire brigade intervention. The proposed civil works provide the following improvements:

- Multiple site entry / exit points
- Upgraded perimeter roadways serving the existing MPC 1 and MPC 2 buildings

Figure 12: Proposed Site Plan

The following is recommended to be considered to facilitate fire brigade intervention.

- Gates, barriers and bollards installed to inhibit vehicle access for security purposes are recommended to be removeable, retractable or foldable so that fire appliance access is not impeded.
- Weigh-bridges are recommended to be provided with emergency vehicle bypasses.
- Designated vehicle carriageways for emergency services access are recommended to be kept clear of stored materials, including permanent or temporary stockpiles, such that emergency vehicle access is not impeded.

5.0 WASTE PRODUCT STOCKPILES

5.1 GENERAL

Reference is made to the document prepared by InSitu Advisory "*Eastern Creek Recycling Ecology Park – Proposal for a Licence Variation (Authorised Amount Increase)*" Ref: ISA-314-21-22 dated 22 November 2021 that details the proposed internal and external stockpiling.

The stockpile materials / types that comprise of non-combustible materials, namely concrete, brick, aggregate, soil and ferrous metals, are considered to be outside the remit of the FRNSW Waste Management Facility Guideline, as confirmed by the Land and Environment Court of NSW in the case of Sell & Parker versus the Secretary for the Minister of Planning NSW that concluded "*the FRNSW Guideline do not apply to non-combustible stockpiles and as there were multiple other fire protection measures in place via other parts of the development consent. The stockpile dimension consideration therefore only applies to the potentially combustible materials stored outside.*"

The following material categories are identified:

Waste Type Code (Waste Levy Guideline 2018)	Material Category description	Combustibility
BC	Concrete – medium density	Non-combustible
BC	Brick	Non-combustible
FE	Ferrous Metals	Non-combustible
SOIL	Soil, sand, clean fill	Non-combustible
WOOD	Organics – timber / wood	Combustible
AGG	Aggregate	Non-combustible
BC	Non-crushed brick	Non-combustible
BC	Non-crushed concrete	Non-combustible
MIX	Mixed Waste (building and demolition waste)	Combustible

The following is a summary of the proposed stockpiles:

Stockpile	Waste Type Code (Waste Levy Guideline 2018)	Stockpile Volume (m^3)	Bulk Density (t/m^3)	Estimated Tonnage (t)
SP1	BC	203,000	2.00	406,000
SP1A	BC	21,910	2.00	43,820
SP2	BC	173,000	1.95	337,350
SP3	BC	37,300	1.90	70,870
SP4	BC	26,790	1.85	49,562
SP5	BC	9,660	1.90	18,354
SP6	WOOD	1,500	0.40	600
SP7	WOOD	1,400	0.40	440
SP7A	WOOD	600	0.40	240
SP8	WOOD	1,400	0.40	560
SP9	BC	N/A	-	-
SP10	WOOD	1,500	0.40	600

Stockpile	Waste Type Code (Waste Levy Guideline 2018)	Stockpile Volume (m^3)	Bulk Density (t/m^3)	Estimated Tonnage (t)
SP10A	WOOD	1,500	0.40	600
SP11	WOOD	1,500	0.40	600
SP12	MIX	870	0.60	522
SP13	MIX	5,088	0.60	3,053
SP14	MIX	870	0.35	522
SP15	FE	239	0.67	160
SP16A	MIX	1,000	0.60	600
SP16B	MIX	1,000	0.60	600
SP16C	MIX	1,000	0.60	600
SP17A	MIX	1,000	0.60	600
SP17B	MIX	1,000	0.60	600
SP17C	MIX	600	0.60	360
SP17D	MIX	600	0.60	360
SP18	FE	370	0.67	248
SP19	AGG	98	1.60	157
SP20	BC	300	2.00	600
SP21	AGG	30	1.60	48
SP22	AGG	38	1.60	61
SP23	SOIL	290	2.05	595
SP24	AGG	50	1.60	80
SP25	MIX	1,000	0.60	600

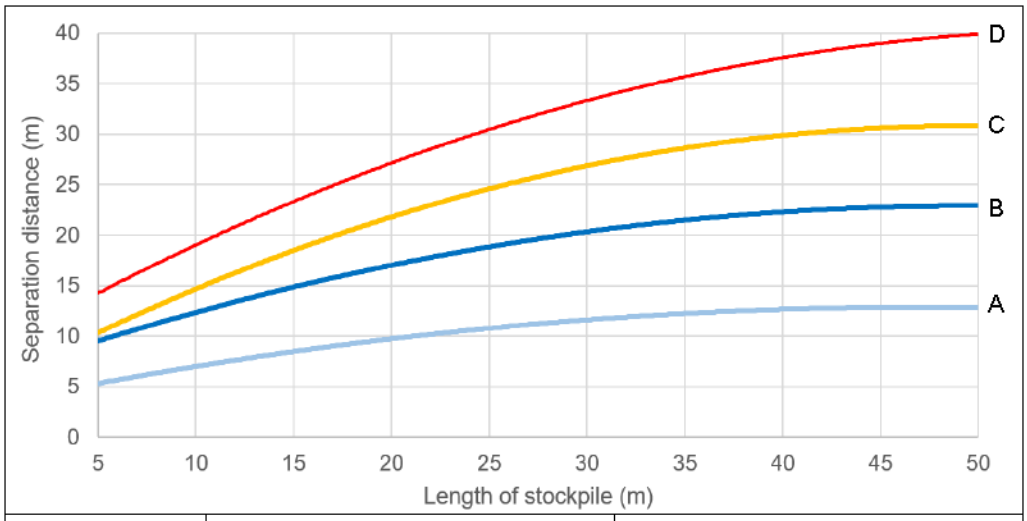
Note: rows in grey represent non-combustible material

Figure 13: Proposed Stockpile Layout

5.2 EXTERNAL STOCKPILES

The below is a summary of the recommended measures under the FRNSW Waste Management Facility Guideline to be implemented to reduce the fire hazard associated with external stockpiles.

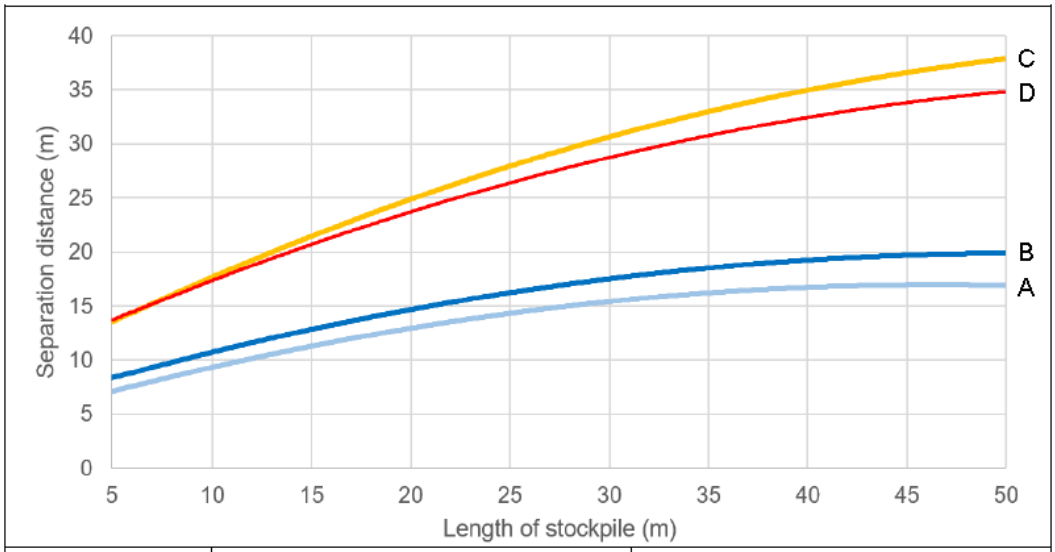
- The maximum height of any stockpile, loose piled or bales, should not exceed 4m.
- The uncontained vertical face of any stockpile (not retained by a masonry wall) should recede on a slope no greater than 45°.
- A separating masonry wall, revetment or pen should extend at least 1m above the stockpile height and at least 2m beyond the outermost stockpile edge.
- Stockpile boundary limits should be permanently marked to clearly identify limits that maintain maximum stockpile sizes and/or minimum separations.
- The maximum width of an external stockpile should be 20m if fire brigade vehicle access is provided down both sides of the stockpile, and 10m if access is provided down one side of the stockpile only.
- The maximum length of an external stockpile should be 50m, or as determined from required minimum separation distances.
- Minimum separation should be maintained between external stockpiles, depending on storage method and fire risk of materials (refer to below).



Length of stockpile (m)	Ordinary fire risk (i.e. ≤ 1000°C)		High fire risk (i.e. >1000°C)	
	Loose pile (A)	Baled (B)	Loose pile (C)	Baled (D)
5	5 m	9 m	10 m	14 m
10	7 m	13 m	15 m	19 m
15	9 m	15 m	18 m	24 m
20	10 m	17 m	23 m	27 m
30	11 m	20 m	26 m	34 m
50	13 m	23 m	31 m	40 m

Figure 14: Minimum Separation Distances between External Stockpiles

- Minimum separation should be maintained between external stockpiles and any fire-source feature, depending on storage method and fire risk of materials (refer to below).
- The minimum separation between external stockpiles or an external stockpile and any fire-source feature may be reduced when the stockpile is separated by masonry wall or protected by an automatic fire sprinkler system (i.e. drenchers).



Length of stockpile (m)	Ordinary fire risk (i.e. ≤ 1000°C)		High fire risk (i.e. >1000°C)	
	Loose pile (A)	Baled (B)	Loose pile (C)	Baled (D)
5	7 m	8 m	13 m	13 m
10	9 m	11 m	18 m	18 m
15	12 m	13 m	22 m	21 m
20	13 m	15 m	25 m	24 m
30	15 m	17 m	30 m	28 m
50	17 m	20 m	38 m	35 m

Figure 15: Minimum Separation between External Stockpile and any fire-source feature

In accordance with the above recommended measures the wood stockpiles within the Eco product processing area (SP6, SP7, SP7A, SP8, SP10, SP10A and SP11) shall have a maximum width of 20m and length of 30m, corresponding to a required minimum separation distance of 11m for an ordinary risk loose stockpile.

The height of the above stockpiles is noted to be 2.5m, which is in accordance with EPL condition L7.1a "*stockpiles of processed garden waste within the Green Waste/Timber Waste Area will not exceed the height of the existing surrounding concrete walls (2.5 metres).*" This meets the requirements of the FRNSW Guideline, being not in excess of 4m. The requirement for separating walls to extend 1m above the stockpile height is applicable only to stockpiles immediately adjacent and separated by a masonry wall, and not the subject stockpiles that are physically separated.

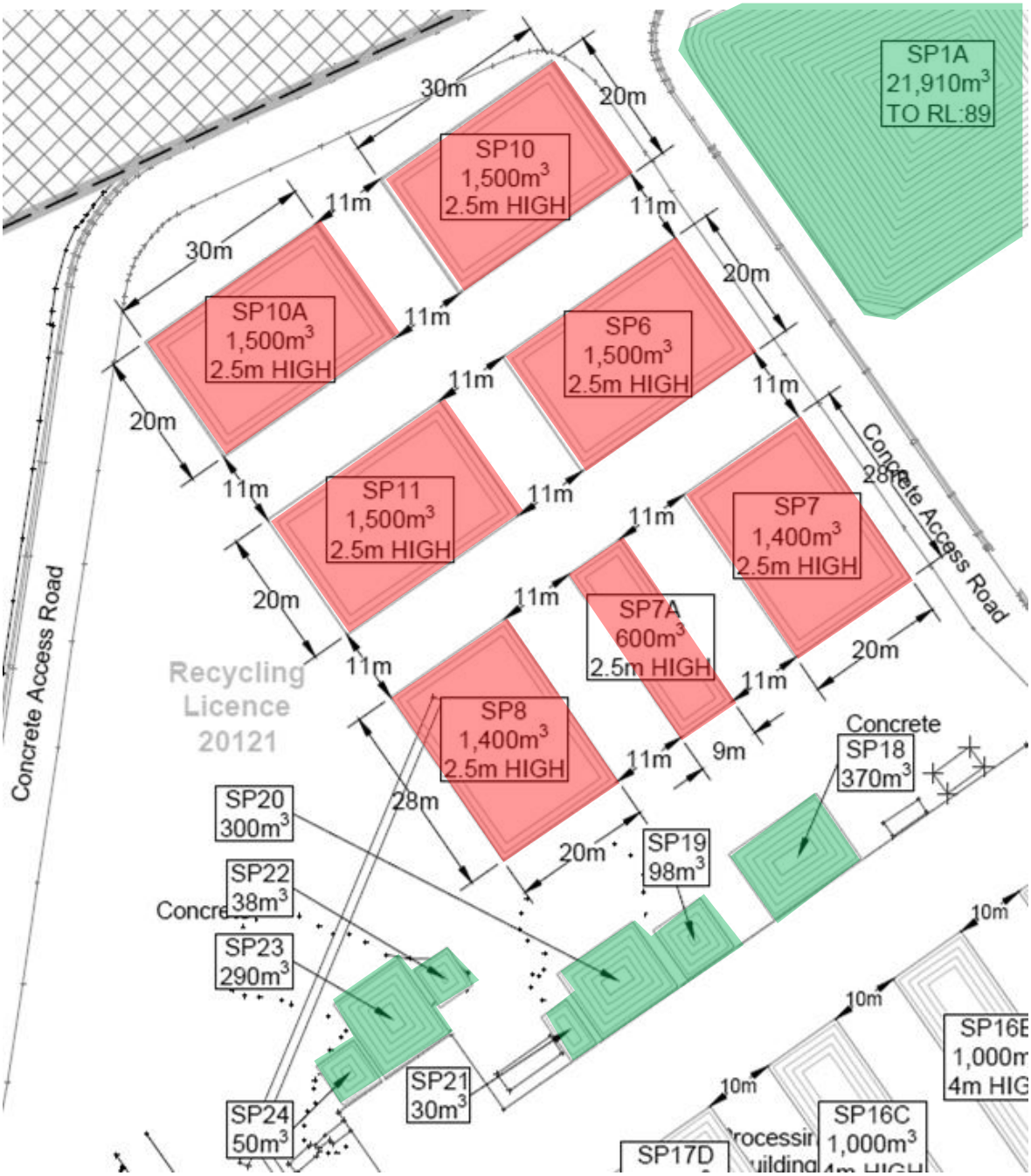


Figure 16: External Stockpile Proposed Layout

5.3 INTERNAL STOCKPILES

The below is a summary of the recommended measures under the FRNSW Waste Management Facility Guideline to be implemented to reduce the fire hazard associated with internal stockpiles.

- The maximum height of any stockpile, loose piled or bales, should not exceed 4m.
- The uncontained vertical face of any stockpile (not retained by a masonry wall) should recede on a slope no greater than 45°.
- A separating masonry wall, revetment or pen should extend at least 1m above the stockpile height and at least 2m beyond the outermost stockpile edge.
- The maximum internal stockpile size in a building fitted with an automatic fire sprinkler system should be 1,000m^3.

- The internal stockpile of a building not fitted with an automatic fire sprinkler system should be limited in size to be able to be moved to the dedicated external quarantine area using on-site resources only within one hour or less.
- Internal stockpiles should have a minimum of 6m unobstructed access on each accessible side in a building fitted with an automatic fire sprinkler system, or 10m in a building not fitted with an automatic fire sprinkler system.
- Internal stockpiles may be located side by side when separated by a masonry wall.

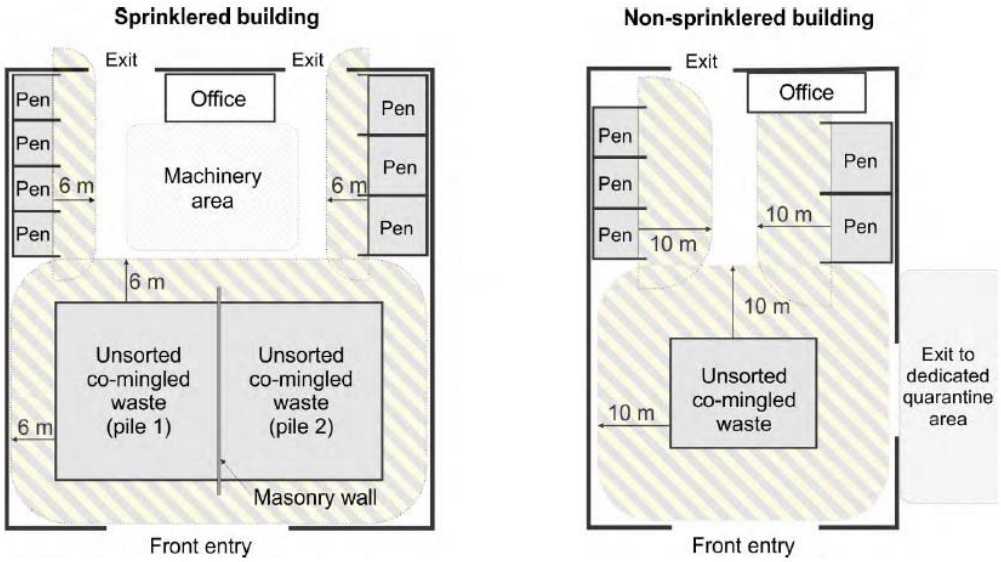


Figure 17: Access around Internal Stockpiles

Figure 18: Proposed Stockpile Layout MPC 1

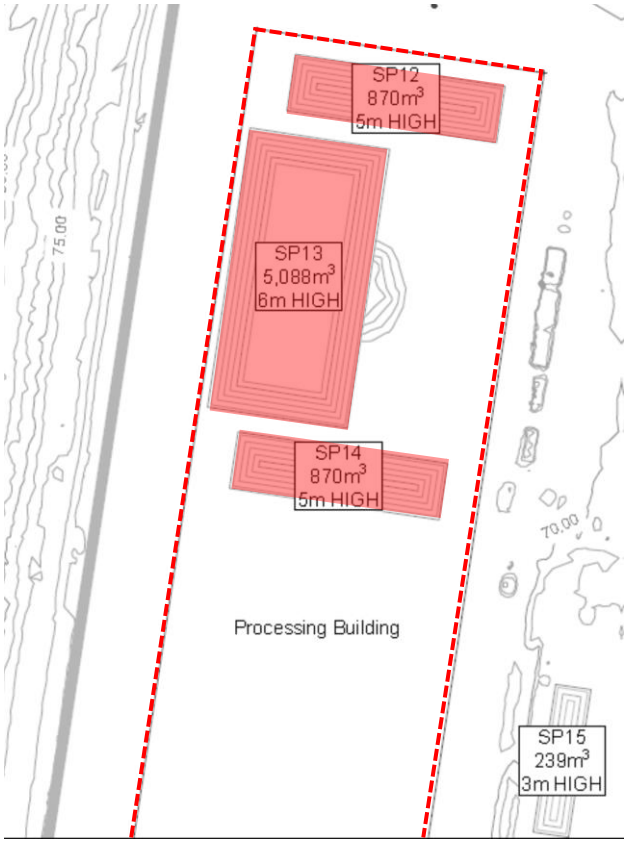


Figure 19: Proposed Stockpile Layout MPC 2

As shown in the Figure 19 above, SP13 exceeds both the height and volume limitations of the FRNSW Guidelines, being up to 5,088m^3 and height up to 6m, which significantly exceeds the recommended 1,000m^3 and 4m.

The internal stockpile within MPC2 is comprised of two storage methods

- Vehicles will enter the tip floor and deposit waste. This will be piled to a maximum height of 4m.
- This waste is to be continually lifted into the two 6m deep pits at the north and south end of the tipping floor. These pits are surrounded by 2m high walls, so the effective depth of waste within the pits can be up to 8m high.

It should also be noted that FRNSW Guidelines recommend smoke hazard management be provided within waste processing facilities to maintain a smoke layer height of at least 4m above floor level for 90% of the compartment to enable firefighting intervention and visibility of stockpile waste. This corresponds to the maximum recommended stockpile height. An increased height detrimentally impacts on fire brigade intervention and will require enhanced smoke hazard management to compensate.

The stockpiles within MPC2 have been considered in the fire engineering report performance solution assessment of smoke hazard management, as recommended as an alternative by FRNSW. Therefore, it is considered that no further action is required for the internal stockpiles.

FRNSW guideline recommends that, for buildings not fitted with an automatic fire sprinkler system, a dedicated external quarantine area should be provided that is not less than four times the floor area of the largest internal stockpile to receive, breakdown and extinguish that stockpile. This is not currently provided for the non-sprinkler protected MPC 1.

6.0 ENVIRONMENTAL PROTECTION EQUIPMENT

6.1 GENERAL

For the purpose of this Report the following definitions apply:

- *Emergency:* An event that arises internally, or from external sources, which may adversely affect the occupants or visitors in a facility, and which requires immediate response.
- *Incident:* An incident causing or threatening material harm to the environment, and/or an exceedance of the limits or performance criteria in this approval.
- *Pollution* means:
    - Water pollution; or
    - Air pollution; or
    - Noise pollution; or
    - Land pollution
- *Pollution Incident:* an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill, or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on a premises, but it does not include an incident or set of circumstances involving the emission of any noise.

Reference is made to the BINGO Industries Emergency & Pollution Incident Response Management Plan which has been developed to comply with work health and safety and environmental legislation in relation to Bingo Industries (Bingo) management of safety and pollution-related emergency management at sites under their control. To achieve integration between the two legislative frameworks, Bingo has adopted Australian Standard 3745-2010 Planning for emergencies in facilities in developing this EPIRMP where the term emergency is interchangeable between health and safety and environment events.

Pollution incidents will be notified if the incident causes or threatens to cause material harm to the environment. Notification must be:

1. carried out immediately after the nominated person becomes aware of the incident.
2. to each relevant authority, in the following order:
    - Local council authority.
    - NSW EPA.
    - NSW Health via the Local Health District.
    - NSW Fire and Rescue (if not already contacted by the Emergency Control Organisation).
    - SafeWork NSW.

The below is a summary of the identified site pollutants.

Location	Items	Maximum Quantity	Pollutant type / health hazard
Material Processing Centre (MPC)	Non-putrescible solid wastes	-	Airborne – particulate matter, smoke from fire event Water – contaminated stormwater and leachate Noise – plant and machinery
	Timber	-	Airborne – particulate matter, smoke from fire event Odour – leachate Water – contaminated stormwater and leachate Noise – plant and machinery

Location	Items	Maximum Quantity	Pollutant type / health hazard
	Tyres	50t on site at any time	Airborne – smoke from fire event
	Chemical storage – fuel	<1,000L	Airborne – smoke from fire event Water – contaminated stormwater and leachate
	Oils, lubricants	-	Water – contaminated stormwater and leachate
	Leachate tanks	2 x 50,000L	Water – contaminated stormwater
Crushing Yard	Demolition brick / concrete	-	Airborne – particulate matter, smoke from fire event Water – contaminated stormwater and leachate Noise – plant and machinery
	Chemical storage – fuel	<1,000L	Airborne – smoke from fire event Water – contaminated stormwater and leachate
	Oils, lubricants	-	Water – contaminated stormwater
Landfill	Non-putrescible solid wastes	700,000T per calendar year	Airborne – particulate matter, smoke from fire event Water – contaminated leachate Noise – plant and machinery
TORO	Oils, lubricants, process residue	-	Water – contaminated stormwater
	Chemical storage – LPG, oxy, acetylene, mig gases	-	Airborne – smoke from fire event, hazardous atmosphere Water – contaminated stormwater
General Areas	Diesel tank	97,500L	Airborne – smoke from fire event Water – contaminated stormwater
	General dusts	-	Airborne – particulate matter Water – sediment in stormwater
	LTP - leachate & effluent tanks	3 x 100,000L leachate 1 x 100,000L effluent	Water – contaminated stormwater, discharge to sewer above licence thresholds.

6.2 SAFETY EQUIPMENT

The following is a summary of the safety equipment available on site to manage emergency and pollution incidents.

Incident Type	Safety Equipment
Fire	▪ Onsite standpipe ▪ 2 x water carts ▪ Mobile plant ▪ Fill and cover material ▪ Manual call points (MCPs) ▪ Automatic Fire Sprinklers (MPC 2) ▪ Onsite water tanks ▪ Portable Fire Extinguishers

	▪ Fire hose reels ▪ Fire hydrants ▪ Fire blankets
Chemicals	▪ Eye protection ▪ Gloves ▪ Respiratory protection ▪ Emergency shower and eye wash stations
Spills	▪ Mobile plant (excavators) ▪ Fill and cover material ▪ Bunding ▪ General purpose spill kits ▪ Absorbent materials
Personal Protective Equipment	▪ Safety footwear ▪ Eye protection ▪ Hard hats ▪ Gloves ▪ High visibility clothing ▪ Respiratory protection ▪ Wet weather gear
First Aid	▪ First aid kits ▪ Defibrillators
Communications	▪ UHF Radios ▪ Mobile phones
General	▪ Sump pumps ▪ Generators ▪ Portable lighting ▪ Mobile plant ▪ Vehicle recovery chains / straps / shackles

6.3 FIRE INTERVENTION & CONTAINMENT

Fire Hydrant Design Requirements – Stockpiles

FRNSW Waste Management Facility Guidelines includes a recommendation for enhanced standard of performance for fire hydrant systems protecting unsprinklered buildings or open yard storage, including the requirement for additional fire hydrant outlets to operate simultaneously. The recommended number of hydrants to flow simultaneously in relation to the internal fire compartment area, or open yard area, is detailed in the table below based on FRNSW Guideline and AS 2419.1-2005 (for sprinklered buildings).

The proposed Eco product processing area is 6,390m^2, corresponding to 3 fire hydrants required to operate simultaneously.

The internal floor area of the sprinkler protected MPC 2 exceeds 10,000m^2 (approx. 10,600m^2), which requires 3 fire hydrants to operate simultaneously.

The internal floor area of the non-sprinkler protected MPC 1 exceeds 5,000m^2 but is less than 10,000m^2, which requires 4 fire hydrants to operate simultaneously.

The water supply available to the fire hydrant system shall be sufficient to cater for the maximum hydraulic demand (flow rate) for a period of not less than 4 hours as per the FRNSW Guideline.

Fire Compartment Floor Area of sprinklered building	Fire Compartment Floor Area of non-sprinklered building	Area of Open Yard (used for stockpiles)	No. of hydrants required to flow
≤ 500 m^2	-	-	1
> 500 m^2 ≤ 10,000 m^2	≤ 500 m^2	≤ 3,000 m^2	2
> 10,000 m^2	> 500 m^2 ≤ 5,000 m^2	> 3,000 m^2 ≤ 9,000 m^2	3
-	> 5,000 m^2 ≤ 10,000 m^2	> 9,000 m^2 ≤ 27,000 m^2	4
-	> 10,000 m^2	> 27,000 m^2	5 (or more)

External hydrants are to be located such that coverage is provided to all stockpile areas within 70m (60m + 10m water spray), with hydrants not located within 10m of the stockpiles protected by the subject hydrant. That is, hydrants may be located within 10m of stockpiles if they are not provided to cover these stockpiles.

Fire Water Run-off Containment

The Fire and Rescue NSW Guideline *Fire Safety in Waste Facilities* defines fire water run-off as residual water used in fighting the fire, which is contaminated with the products of combustion and unburnt materials washed off fire debris.

A fire involving a waste facility can produce a pollution incident which may cause injury or death or result in damage to property or the environment. In the event of fire FRNSW will enact their hazardous materials response protocol and notify NSW EPA as per the agreement under the joint memorandum of understanding.

In order to meet the recommendations of FRNSW Guideline *Fire Safety in Waste Facilities* the site should have effective and automatic means of containing fire water run-off, with a primary net containment capacity of not less than the total hydraulic demand of the installed fire safety systems. The total hydraulic demand should be taken as the net discharge of water from both the fire hydrant and sprinkler system.

The following requirements are recommended to be considered in providing fire water run-off containment:

- The containment system should wholly incorporate dedicated stockpile quarantine areas required to extinguish any internal stockpile from the building.
- The containment system, including base, should be impermeable to prevent contaminated fire water run-off from entering ground or surface water sources.
- Secondary or tertiary facilities such as bunds, storage lagoons, isolation tanks etc.
- Pollution control equipment such as isolation valves, diversion booms etc. should be provided as necessary for the emergency response procedures, and be readily accessible in the event of fire.

As part of the MPC 2 development, bunding is provided to the main waste stockpile and processing areas. Bunding to contain firewater is provided to the perimeter of the main waste storage and waste processing areas.

Externally, fire water will enter the stormwater system, however this is directed to a OSD pond within the site and discharge from this pond can be stopped in the event of a fire event.

7.0 ASSESSMENT AGAINST FRNSW GUIDELINES

Reference to made to the Fire and Rescue NSW Guideline *Fire Safety in Waste Facilities* which provides guidance on fire safety in waste facilities that receive combustible waste material, including provision for fire safety and safe fire brigade intervention. The below is a summary of applicable recommendations and comments within the FRNSW Guideline and an assessment of the subject development.

Note that the existing Material Processing Centres (MPC 1 and MPC 2) are subject to the recommendations within the FRNSW Guideline, however the proposed maintenance buildings are not intended for material or waste processing and therefore the FRNSW Waste Management Facility Guidelines are not applicable, except where applicable to the entire site.

Item(s)	*Fire Safety in Waste Facilities* recommendations/comments	Assessment of Development
7.2	**Designing for Special Hazards**	
7.2.2 7.2.4 7.2.5	Development should make adequate provision for fire safety as prescribed by this guideline and either meet the 'acceptable solution' defined in Appendix A or provide a performance solution that complies with NCC performance requirements and the requirements of this guideline. The development proponent is encouraged to engage a fire safety engineer or other suitably qualified consultant to develop a performance solution specific to the waste facility and its proposed operations. All reasonable and foreseeable combustible waste materials should be identified and considered in any performance solution (i.e. the fire engineered design should consider burn temperature, heat release rate and heat flux, total fire load and burn duration, ease of ignition and flame spread that would be expected from each stockpile).	The existing building MPC 1 and MPC 2 is subject to a performance solution within a Fire Engineering Report. The remainder of the site has not been subject to assessment against the Guidelines. The existing performance solution considers reasonable and foreseeable combustible waste materials stored within MPC 2. Reference is made to the document prepared by InSitu Advisory "Eastern Creek Recycling Ecology Park – Proposal for a Licence Variation (Authorised Amount Increase)" Ref: ISA-314-21-22 dated 22 November 2021 that details the proposed internal and external stockpiling.
7.4	**Firefighting Intervention**	
7.4.1 7.4.7	The waste facility is to provide safe, efficient and effective access as detailed in the FRNSW guideline for access. Fire fighter access should be provided to buildings, structures and storage areas including to any fire safety or equipment provided for fire fighting intervention.	Refer to sections 4.2, 4.3 and 4.4 of this Report that details the access provided for fire brigade intervention. The perimeter access proposed to be provided as part of the civil works will generally meet the requirements of the FRNSW Guideline for access.
7.4.3	Enhanced fire brigade vehicle access should be provided for firefighting intervention, including a perimeter ring road around any large non-sprinklered building and access roads between external stockpiles.	Refer to sections 4.2, 4.3 and 4.4 of this Report that details the perimeter access around each building and throughout the site. Refer to section 5.2 of this Report where access between and around external stockpiles is detailed. Access to, around and between external stockpiles is proposed to be provided in accordance with FRNSW Guidelines.
7.4.4	The facility should cater for a large emergency service response (e.g. multiple alarm and multiple agency) if the potential hazard may result in a large emergency.	The multiple hardstands and perimeter roads enable a multi-agency emergency. Containment of fire water run-off is recommended to be provided in accordance with section 6.3 of this Report.

	Note: This includes from any pollution event requiring a protracted hazardous materials response (e.g. contain and remove fire water run-off).	
7.4.5	A building not fitted with an automatic fire sprinkler system should have a dedicated external quarantine area not less than four times the floor area of the largest internal stockpile to receive, breakdown and extinguish that stockpile (refer to clause 8.5.3).	MPC 1 is not sprinkler protected. This is not currently provided for the non-sprinkler-protected MPC 1 and is recommended to be considered as part of the proposed works. It is recommended that an on site strategy be implemented to identify a dedicated quarantine area and emergency response procedures for the breakdown and extinguishment of stockpiles.
7.5	**Fire Hydrant System**	
7.5.1	The Waste facility is to have a fire hydrant system installed appropriate to the risks.	Refer to sections 4.2, 4.3, 4.4 and 6.3 of this Report. It is considered that the fire hydrant system is capable of meeting this subject to the recommendations of this Report.
7.5.2 7.5.3	The fire hydrant system should consider facility layout and operations, with fire hydrants being located to provide compliant coverage and safe firefighter access during a fire, including having external fire hydrants to protect any open yard storage (i.e. external stockpiles). The design of the fire hydrant system is to have enhanced standard of performance when combustible waste material is not protected by a fire sprinkler system, including having an additional fire hydrant outlet required to flow simultaneously for any open yard storage and for any non-sprinklered internal stockpiles, as given in Table 2 (of Waste Management Guideline).	Refer to sections 4.2, 4.3, 4.4 and 6.3 of this Report. Fire hydrant coverage is to be provided to the external stockpile area as detailed in Section 6.3 to meet the requirements of FRNSW Guideline. The fire hydrant system capacity is recommended to be in accordance with FRNSW Guideline for the non-sprinkler-protected MPC 1, as detailed in section 4.2 of this Report.
7.5.4	Fire hydrants are not to be located within 10 m of stockpiled storage and must be accessible to firefighters entering from the site and/or building entry points.	The external fire hydrants are not to be located within 10m of external stockpiles, as detailed in section 5.0 of this Report.
7.5.5	Where appropriate to protect against high hazards, suitable on-site external fire monitors may be provided as part of the fire hydrants system.	Building MPC 2 is equipped with both an automatic fire sprinkler system at roof level and a remote operated water monitor system. The provision of a thermal camera system within the area further provides a means of detection in the event of a deep-seated fire within the stockpile.
7.5.6	The fire brigade booster assembly is to be located within sight of the designated site entry point or other location approved by the fire brigade and be protected from radiant heat from any nearby stockpile.	The current fire hydrant booster assembly is located in accordance with the FRNSW Guideline.
7.5.7	The fire hydrant system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than four hours.	It is recommended that the required system capacity be assessed against the current system provisions within the detail design phase of the project. Refer to Sections 4.2, 4.3 and 6.3 of this Report.

7.5.8	The fire hydrant system should incorporate fire hose reels installed in accordance with Clause E1.4.	Fire hose reels are installed within the existing MPC 1 and MPC 2 buildings, and will be provided as applicable in accordance with BCA Clause E1.4 within the maintenance buildings.
7.6	**Automatic Fire Sprinkler System**	
7.6.1	The waste facility is to have an automatic fire sprinkler system installed in any compartment that has a floor area greater than 1000 m^2 and contains combustible waste material.	An automatic sprinkler system is installed within MPC 2 but not within the existing MPC 1.
7.6.2	The fire sprinkler system should be demonstrated as being appropriate to the risks and hazards identified for the building including externally as necessary.	To mitigate the risk associated with fire spread on the external conveyors, the underside of the conveyors will be sprinkler protected along the extent of conveyors which attach to MPC 2. Deluge protection will also be provided at locations to mitigate against spread along the conveyors to MPC 1.
7.6.3	The fire sprinkler system design should be appropriate to the hazard class (e.g. 'high hazard class') and have enhanced standard of performance as appropriate to the special hazard.	High Hazard sprinkler system is provided within MPC 2 at high level with a 98°C activation temperature provided at roof level.
7.6.5	The fire brigade booster assembly for the fire sprinkler system should be co-located with the fire hydrant booster within site of the designated site entry point or in a location approved by the fire brigade.	The sprinkler booster assembly is not co-located with the fire hydrant booster assembly, but is subject to a performance solution that has been subject to FRNSW comment. The sprinkler booster assembly hardstand is not currently installed in accordance with FRNSW Guidelines, as detailed in section 4.3 of this Report. It is recommended that the hardstand provided be confirmed as consistent with that agreed through consultation with FRNSW during the detail design phase of MPC 2.
7.6.6	The fire sprinkler system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than two hours.	A 680kL tank is provided on-site for the sprinkler system. This is understood to have been sized to meet the requirements of AS 2118.1-2017 and FRNSW Guideline.
7.7	**Fire Detection and Alarm System**	
7.7.1	The waste facility is to have a fire detection and alarm system installed appropriate to the risks and hazards identified for each area of the building.	The existing building MPC 1 is not provided with a fire detection and alarm system. The sprinkler system within MPC 2 is connected to an alarm system to provide notification of a fire. Thermal cameras are provided to the MPC 2 waste stockpile areas, which will provide early warning to hot spots deep within the waste stockpile Further, visual warning devices (strobe lights) are provided in high noise areas such that occupants to visually alert occupants in the facility.
7.7.2	The fire detection and alarm system should warn all occupants of fire and to evacuate the facility, with each component being appropriate to the environment (e.g. flame detector or infrared detector in sorting area, visual alarms around noisy machinery).	Visual warning devices (strobe lights) are provided in high noise areas of MPC 2 such that occupants to visually alert occupants in the facility.

		No occupant warning system is provided to MPC 1.
7.7.3	Upon positive detection of a fire, the system is to activate any required fire alarm fire suppression system, passive measures or plant machinery override.	In the event of a fire alarm activation within MPC 2, either via manual call points or automatically via the detection system, the doors utilised as part of the smoke management strategy for natural ventilation will automatically open. It is recommended that all automated plant and machinery automatically shut down on positive detection of fire.
7.7.4	Manual alarm points should be provided in clearly visible locations as appropriate to the environment so that staff can initiate early alarm of fire.	Manual call points are provided within MPC 2.
7.8	**Smoke Hazard Management**	
7.8.1 7.8.2 7.8.3	Buildings containing combustible waste material are to have an automatic smoke hazard management system appropriate to the potential fire load and the smoke production rate installed within the building. Under Clause E2.3 of the NCC, additional smoke hazard management measures should be provided to vent or exhaust smoke so that in at least 90% of the compartment, the smoke layer does not descend below 4 m above floor level. Natural low-level openings, either permanent or openable such as roller doors, should be provided on two or more walls to assist with venting de-stratified (i.e. cooled) smoke and ensure minimum visibility is maintained during a fire.	Smoke hazard management within MPC 2 is achieved via natural ventilation that is assessed in a performance solution. The performance of the ventilation system is understood to meet the required tenability criteria as recommended by FRNSW. Roller doors are utilised as part of the makeup air strategy and high level smoke louvres. Smoke hazard management is not currently provided within MPC 1.
7.8.4 7.8.5	Any smoke exhaust system installed should be capable of continuous operation of not less than two hours in a sprinkler-controlled fire scenario, or four hours in any non-sprinkler—controlled fire scenario. Automatic operation of the smoke hazard management system from smoke detection should not cause undue delay to the activation of any automatic fire sprinkler system.	Natural ventilation is provided to MPC 2. Smoke hazard management is not currently provided within MPC 1.
7.9	**Fire Water Run-off Containment**	
7.9.1 7.9.2 7.9.4 7.9.5 7.9.6	The waste facility should have effective and automatic means of containing the fire water run-off with primary containment having a net capacity not less than the total hydraulic demand of the installed fire safety systems. An alternative means of fire water containment may be proposed, particularly for developments of an existing waste facility including being validated by a hydrological engineering assessment. The containment system, which includes the base of any storage area, should be impermeable (i.e. sealed) and prevent fire water run-off from entering the ground or any surface	As part of the MPC 2 development, bunding is provided to the main waste stockpile and processing areas. Bunding to contain firewater is provided to the perimeter of the main waste storage and waste processing areas. Externally, fire water will enter the stormwater system, however this is directed to a OSD pond within the site and discharge from this pond can be stopped in the event of a fire event. It is recommended that the fire water run-off containment provided to MPC1 be reviewed by a hydraulics engineer.

	water course (e.g. river, stream, lake, estuary, open sea). The containment system should include secondary/tertiary facilities such as impermeable bunds, storage lagoons, isolation tanks or modified site design (e.g. recessed catchment pit, drainage basin) as appropriate to the facility. Pollution control equipment such as stormwater isolation valves, water diversion booms, drain mats, should be provided as necessary for the facility's emergency response procedures, and be kept readily accessible for the event of fire.	
7.9.3	The containment system is to wholly incorporate any dedicated external quarantine area required to extinguish any internal stockpile from a building (refer to clause 7.4.5).	External quarantine areas to serve MPC 1 are not currently provided. Fire water runoff containment measures are recommended to consider future quarantine areas as recommended by FRNSW Guidelines.
8.2	**Storage and Stockpiles**	
8.2.1 8.2.2 8.2.3	Storage and stockpiling of combustible waste material should be limited in size and volume appropriate to the given combustible waste material, fire risks, building design and installed fire safety systems. Variations to storage and stockpile requirements, including maximum size and volume, movement, separation distances etc., will be considered through an appropriate pathway such as a performance solution. The maximum height of any stockpile, loose piled or baled, should not exceed 4 m (see Figure 2).	Refer to section 5.0 of this Report for an assessment of the storage and stockpiling of combustible waste. The internal stockpile is comprised of two storage methods ▪ Vehicles will enter the tip floor and deposit waste. This will be piled to a maximum height of 4m. ▪ This waste is to be continually lifted into the two 6m deep pits at the north and south end of the tipping floor. These pits are surrounded by 2m high walls, so the effective depth of waste within the pits can be up to 8m high. Stockpiling within MPC 2 has been considered in a performance solution assessing the fire safety design of the building. MPC 1 stockpiles, which are not subject to a performance solution assessment, as recommended within the InSitu Report comply with FRNSW Guideline requirements. Refer to Section 5.3 of this Report..
8.2.4	The uncontained vertical face of any stockpile (i.e. any face not being retained by a masonry wall) should recede on a slope no greater than 45° to minimise the risk of collapse and fire spread (see Figure 2).	The waste within MPC 2 is stored in 6 m deep pits in the floor with a smaller pile in the Waste Collection Area. The pits have a slope of 55° hence it is unlikely that the stockpile would collapse. Most of the waste will be located within the pits and therefore is wholly contained. The only uncontained face will be the waste which has been deposited from trucks onto the tip floor. This face will be maintained at a slope less than 45°. MPC 1 stockpiles, which are not subject to a performance solution assessment, are to comply with FRNSW Guideline requirements.

8.2.5 8.2.6 8.2.7	The storage method and arrangement of stockpiles is to minimises the likelihood of fire spread and provide separation which permits access for firefighting intervention. A separating masonry wall, revetment or pen should extend at least 1 m above the stockpile height and at least 2 m beyond the outermost stockpile edge (see Figure 3). Stockpile boundary limits should be permanently marked to clearly identify limits that maintain maximum stockpile sizes and/or minimum separations.	Refer to section 5.0 of this Report for an assessment of the arrangement of stockpiles.
8.3	**Stockpile Movement**	
8.3.1 8.3.2 8.3.3 8.3.4	Stockpiles of combustible waste material should be rotated to dissipate any generated heat and minimise risk of auto-ignition as required. Any stockpile of combustible waste material prone to self-heating should have appropriate temperature monitoring to identify localised hotspots; procedures outlined in the operations plan should be implemented to reduce identified hotspots. Any processed or treated waste material, such as chipping, shredding, baling or producing crumb should be cooled before being stockpiled. Procedures for stockpile rotation and monitoring of temperature during hot weather are to be included in the operations plan (refer to section 8.6).	These processes are not currently undertaken. Thermal camera system is provided within the MPC 2 Waste Collection Area to detect hotspots within the stockpile and activate the water monitor system. No monitoring system is provided within MPC 1.
8.4	**External Stockpiles**	
8.4.1 8.4.2 8.4.3 8.4.4 8.4.5 8.4.6 8.4.7 8.4.8 8.4.9 8.4.10 8.4.11	The maximum width of an external stockpile should be 20 m if fire brigade vehicle access is provided down both sides of the stockpile, and 10 m if access is provided down one side of the stockpile only (see Figure 4). The maximum length of an external stockpile should be 50 m, or as determined from required minimum separation distances (refer to clauses 8.4.3 and 8.4.5). Minimum separation should be maintained between external stockpiles, depending on storage method and fire risk of materials, as given in Table 3 (see also Figure 5). If two separation distances apply between different stockpiles (i.e. due to different lengths of each stockpile), the greatest distance is to be used (see Figure 5). Minimum separation should be maintained between external stockpiles and any fire-source feature, depending on storage method and fire risk of materials, as given in Table 4 (see also Figure 6). Covered areas attached to buildings or structures, such as areas under awnings and undercrofts, should not encroach into the minimum separation distance unless protected	Refer to section 5.0 of this Report for an assessment of the external stockpiles. Reference is made to the document prepared by InSitu Advisory “Eastern Creek Recycling Ecology Park – Proposal for a Licence Variation (Authorised Amount Increase)” Ref: ISA-314-21-22 dated 22 November 2021 that details the proposed internal and external stockpiling.

	by an automatic fire sprinkler system (see Figure 7). The minimum separation between external stockpiles or an external stockpile and any fire-source feature may be reduced when the stockpile is separated by masonry wall or protected by an automatic fire sprinkler system (i.e. drenchers) (see Figure 8). External stockpile limits should be maintained and not exceeded as per the operations plan, and as appropriate to the facility, boundaries, exposures, buildings, terrain, drainage, vegetation, prevailing winds, vehicular access etc. External stockpiles should be protected from high or unnecessary external risks (e.g. bushfire, adjacent property fire, arson, self-combustion in hot weather). External stockpiles should be maintained so that all buildings access and egress points are always kept clear and unobstructed. External stockpiles should be maintained so that all required fire brigade vehicle access (e.g. around buildings, between stockpiles and to hardstand areas) is always kept clear and unobstructed.	
8.5	**Internal Stockpiles**	
8.5.1	Internal stockpiles of combustible waste material should be maintained as determined by the operations plan, and appropriate to the building size/layout, compartmentation, installed safety systems, process equipment and plant etc.	An updated operations plan is recommended to be developed to include the internal stockpiles within MPC 1 and MPC 2.
8.5.2 8.5.3 8.5.4	The maximum internal stockpile size in a building fitted with an automatic fire sprinkler system should be 1,000 m^3. The internal stockpile should have a minimum of 6 m unobstructed access on each accessible side in a building fitted with a sprinkler system. Internal stockpiles may be located side by side when separated by a masonry wall (refer to clause 8.2.6).	The maximum stockpile volume within the sprinkler protected MPC 2 exceeds 1,000 m^3. The waste is stored in 6 m deep pits in the floor with a smaller pile in the Waste Collection Area. The stockpile size has been considered within a fire engineering assessment in the Fire Engineering Report. Refer to section 5.3 of this Report.
8.5.5	The internal stockpile of a building not fitted with an automatic fire sprinkler system should be limited in size to be able to be moved to the dedicated external quarantine area using on-site resources only within one hour or less (refer to clause 7.4.5).	MPC 1 is not fitted with an automatic sprinkler system, and the internal stockpiles are proposed to be in accordance with FRNSW Guidelines. Reference is made to the document prepared by InSitu Advisory "Eastern Creek Recycling Ecology Park – Proposal for a Licence Variation (Authorised Amount Increase)" Ref: ISA-314-21-22 dated 22 November 2021 that details the proposed internal and external stockpiling. Refer to section 5.3 of this Report.

8.5.6	Internal stockpiles should be protected from high or unnecessary ignition risks (e.g. friction / heating from conveyors, waste movers, heaters, chippers, shredders, balers, other machinery etc.	It is recommended that a management in use and operational procedure be developed to ensure that stockpiles are adequately protected from ignition risks.
8.5.7	Internal stockpiles should be maintained so that all building egress points and required paths of travel are not blocked.	It is recommended that a management in use procedure be developed to ensure that all egress paths remain clear of stored materials.
8.5.8	Internal stockpiles should be maintained so that access to the dedicated external quarantine area is always kept clear and unobstructed (i.e. by waste handlers).	External quarantine areas are not provided for the non-sprinkler-protected MPC 1. It is recommended that an on site strategy be implemented to identify a dedicated quarantine area and emergency response procedures for the breakdown and extinguishment of stockpiles. Refer to Section 5.3 of this Report.

8.0 RECOMMENDATIONS

The below is a summary of recommendations made within this Report. Adoption of any recommendations does not guarantee compliance with the BCA, or endorsement by FRNSW. Any proposed upgrade works should be reviewed by a BCA Consultant and Fire Safety Engineer.

Item	Description	Recommendation
1	The fire appliance hardstand serving the existing sprinkler booster assembly, including tank suction point, is not in accordance with FRNSW Guidelines.	The connection to the on-site water storage tank(s) is recommended to be in accordance with Clause 4.3.3 and H4.3 of AS 2419.1-2017, with a dedicated hardstand provided in accordance with Clause 8.2 of FRNSW Guideline "*Access for fire brigade vehicles and firefighters*". It is noted that the hardstand has been provided in consultation with FRNSW and it is therefore recommended that it be confirmed that the hardstand is in accordance with what was agreed during this consultation. Refer to Section 3.3 and 4.3 of this Report.
2	The existing fire hydrant system serving MPC1 comprises of external fire hydrants that are within 10m of the building and not protected in accordance with the requirements of AS 2419.1-2005.	The existing fire hydrant system is recommended to include the following provisions: ▪ Located greater than 10m from the non-fire-rated external walls of the building served; or ▪ Protected by a shield wall in accordance with AS 2419.1-2017; or ▪ Provided with a fallback fire hydrant in accordance with FRNSW recommendations (subject to FRNSW consultation) Note: it is unclear whether compliant fire hydrant coverage in accordance with AS 2419.1-2005 is provided within MPC 1. It is recommended this be reviewed by a system designer.
3	The water supply capacity and flow duration available to the existing fire hydrant system serving MPC1 and MPC2 is not readily apparent and cannot be confirmed to be in accordance with FRNSW Guidelines for Waste Management Facilities.	The fire hydrant system is recommended to have a minimum water supply capacity to supply the maximum hydraulic demand of the system (flow rate) for a duration of not less than 4 hours. This should consider simultaneous flow demands of the automatic sprinkler system where shared water supplies are proposed. It is recommended this be reviewed by a system designer.
4	The water supply capacity and flow duration available to the existing sprinkler system serving MPC2 is not readily apparent and cannot be confirmed to be in accordance with FRNSW Guidelines for Waste Management Facilities.	The sprinkler system is recommended to have a minimum water supply and capacity to provide the maximum hydraulic demand for not less than 2 hours. This should consider simultaneous flow demands of the fire hydrant system where shared water supplies are proposed. It is recommended this be reviewed by a system designer.
5	The proposed works will improve emergency service vehicular access throughout the site. Specific details of the access are not currently available.	The following is recommended to be considered to facilitate fire brigade intervention. ▪ Gates, barriers and bollards installed to inhibit vehicle access for security purposes are recommended to be removeable, retractable

		or foldable so that fire appliance access is not impeded. ▪ Weigh-bridges are recommended to be provided with emergency vehicle bypasses. ▪ Designated vehicle carriageways for emergency services access are recommended to be kept clear of stored materials, including permanent or temporary stockpiles, such that emergency vehicle access is not impeded.
6	FRNSW guideline recommends that, for buildings not fitted with an automatic fire sprinkler system, a dedicated external quarantine area should be provided that is not less than four times the floor area of the largest internal stockpile to receive, breakdown and extinguish that stockpile.	This is not currently provided for the non-sprinkler protected MPC 1. It is recommended that an on site strategy be implemented to identify a dedicated quarantine area and emergency response procedures for the breakdown and extinguishment of stockpiles.

APPENDIX A – FRNSW GUIDELINE – FIRE SAFETY IN WASTE FACILITIES

Fire safety guideline

Fire safety in waste facilities

Version 02.02
Issued 27 February 2020

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1 Purpose

The purpose of this document is to provide guidance on fire safety in waste facilities that receive combustible waste material, including adequate provision for fire safety and facilitate safe fire brigade intervention to protect life, property and the environment.

2 Scope

This guideline details the requirements of Fire and Rescue NSW (FRNSW) for:

a) consideration of fire safety during all stages of a waste facility including site selection, planning, design, assessment and operation

b) fire safety systems to be adequate to the special hazards identified within a waste facility and which also meet the operational needs of firefighters

c) safe storage and stockpiling of combustible waste material based on expected combustibility and maximum pile size, and

d) workplace fire safety and fire safety planning, including procedures for the event of fire or emergency incident.

When this guideline is followed the likelihood and severity of fire should be reduced, assisting with firefighting intervention and protecting life, property and environment from fire.

3 Application

This guideline applies to any waste facility within NSW involved in the storage, processing or resource recovery of combustible waste material.

This guideline applies to any proposed development of a waste facility that involves a change of building use or building work that intends to meet the National Construction Code (NCC).

This guideline does not apply to any waste facility, or areas of, that are being used for:

a) landfill (but, may apply to a waste facility on the landfill site)

b) composting, including in-vessel, green waste and anaerobic digestion

c) liquid waste treatment

d) hazardous chemicals or special waste treatment (e.g. waste tyres), or

e) less than 50 m^3 of combustible waste material.

Note: Fire safety requirements still apply to waste facilities not covered by this guideline.

This guideline does not overrule any other requirement that specifically relates to the business or undertaking (e.g. guidelines for rubber tyre storage, dangerous goods code), nor does this guideline overrule any other specific condition that has been imposed on the waste facility.

This guideline is intended to be used by any person conducting a business or undertaking (PCBU), owner, development proponent (e.g. builder, fire engineer), planning/environmental consultant, regulatory authority, consent authority or certifier.

This guideline is not a statutory document and should be given due consideration by each stakeholder as it relates to their role and responsibility in operating, managing, planning, designing, consulting, assessing or determining the case of any applicable waste facility.

This guideline is developed in the public interest and should be taken into consideration by any consent authority when determining a development application for a waste facility (refer to *Section 4.15(1)(e)* of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*).

Note: Under *Section 4.17* of the *EP&A Act*, the consent authority may impose requirements from this guideline (in part or full) as a condition on the development consent.

Where appropriate, it is recommended that an external consultant be engaged to provide specialist advice and services on the application of this guideline to any given waste facility.

4 Definitions

The following definitions apply in this guideline:

acceptable solution – means a prescriptive solution as defined in Appendix A.

certifier – means a council or an accredited certifier who holds a certificate of accreditation as an accredited certifier under the *Building Professionals Act 2005.*

consent authority – means the same as in *Section 4.5* of the *EP&A Act*.

combustible waste material – means any solid waste material that can readily ignite and burn under normal conditions, which includes:

- paper and cardboard
- wood and wood-based products
- plastic
- rubber
- textiles
- waste derived fuels such as refuse derived fuels (RDF), solid recovered fuels (SRF) and processed engineered fuels (PEF)
- metal with combustible contaminants, and
- any other waste material which may pose a notable fire risk like above.

Department Planning, Industry and Environment (DPIE) – means the consent authority responsible for State Significant Development under *Division 4.7* of the *EP&A Act*.

emergency plan – means a written plan which details the actions required to be undertaken by occupants of a premises during a fire or other emergency incident.

emergency response procedures – means written procedures outlining the response to an emergency, such as evacuation and/or activation of the emergency response team etc.

emergency services information package (ESIP) – means a folder containing concise information necessary to allow emergency services to commence operations and develop effective strategies and tactics to manage a fire or other emergency incident.

fire brigade – means a statutory authority constituted under an Act of Parliament having as one of its functions, protect life and property from fire and other emergencies.

fire brigade booster assembly – means a connecting device enabling the fire brigade to pressurise or pump water into a fire hydrant or fire sprinkler system.

fire brigade station – means a state government operated premises which is a station for a *fire brigade* (i.e. a FRNSW or NSW Rural Fire Service fire brigade station).

fire brigade vehicle – means any vehicle that forms part of the equipment of a fire brigade and that is equipped with an audible warning device and flashing lights.

fire compartment – means the same as in the *NCC*.

fire hydrant – means an assembly installed on a mains water or private water pipeline, which provides a valved outlet to permit a supply of water to be taken for firefighting.

fire safety system – means an active and/or passive system which warns people of an emergency, provides safe evacuation, restricts or extinguishes fire.

fire-source feature – means:

a) the far boundary of a road, river, lake or the like adjoining the premises; or

b) a side or rear boundary of the premises; or

c) an external wall of another building which is not a Class 10 building.

fire water run-off – means residual water used in fighting the fire, which is contaminated with the products of combustion and unburnt materials washed off fire debris.

hazardous materials – means anything that, when produced, stored, moved, used or otherwise dealt with without adequate safeguards to prevent it from escaping, may cause injury or death or damage to property.

Note: Hazardous materials include hazardous chemicals under the *Globally Harmonised System* (*GHS*) and dangerous goods under *Australian Dangerous Goods Code*.

National Construction Code (*NCC*) – means the *National Construction Code (NCC) 2019, Building Code of Australia Volume One,* as amended.

NSW Environment Protection Authority (EPA) – means the regulatory authority responsible for protecting the environment within NSW.

performance solution – means a method of complying with the performance requirements of the *NCC* other than by a 'deemed-to-satisfy' solution.

person conducting a business or undertaking (PCBU) – means the person or company who owns and manages the waste facility business.

premises – means any applicable building, facility or site (land) comprising a waste facility.

owner – means the person or company who owns the premises being used as a waste facility.

regulatory authority – means an authority having the statutory responsibility to administer and enforce related legislative provisions as prescribed.

SafeWork NSW – means the regulatory authority of workplace health and safety in NSW.

stockpile – means any piled storage of waste material or processed waste product, whether loose, baled, sorted, and irrespective of storage duration (e.g. temporary or long-term).

waste – means the same as in the *Protection of the Environment Operations Act 1997.*

waste facility – means any premises used for the storage, treatment, processing, sorting or disposal of waste material, and includes both waste facilities that hold an environment protection licence and waste facilities that are unlicenced sites.

5 Background

Historically, fire brigades have attended numerous fires at waste facilities in NSW. These fires are often quite large and have a detrimental impact on firefighting intervention, the environment, local community and the waste industry itself. The potential fire size correlates with the nature of the combustible waste material being processed, stockpile arrangements, on-site fire safety systems and emergency procedures specific to each facility.

Examples of a waste facility include:

- recycling centres
- resource recovery
- materials recovery facility
- energy recovery centre, and
- transfer stations.

Processes undertaken at waste facilities have higher risks than for other industries and can result in greater frequency and severity of fires. A fire involving bulk storage of mixed, loose combustible waste material presents a high and volatile fire load and causes significant challenges for firefighting intervention.

Waste fires in NSW have demanded significant fire brigade resources and intervention over multiple days to extinguish the fire. The largest and longest-lasting fires often involve large stockpiles of unsorted waste with inadequate separation, where physical removal, separation and extinguishment is required. These fires also result in major pollution impact on the community, especially from smoke, which is unable to be contained.

Combustible waste therefore generally presents *'special problems of firefighting'* that warrant classification and consideration of 'special hazards' provisions under Clause E1.10 and E2.3 of the *NCC*. Fires in waste facilities present specific issues for firefighting, including:

a) the physical nature of combustible waste and waste by-products, including fire properties and ignition potential of both unsorted and sorted materials

b) unsuitable storage method, stockpile size, separation distances and accessibility

c) mechanised waste handling, sorting and processing systems, including vehicles

d) poor fire brigade vehicle and/or firefighter access for firefighting intervention

e) facilities having an inadequate or no fire hydrant system, including water capacity

f) facilities having an inadequate automatic fire suppression system installed

g) buildings having an inadequate smoke hazard management system installed, and

h) facilities having inadequate provision to contain fire water run-off.

Guidance on fire safety for waste facilities is generally limited due to the case-by-case considerations of the special hazards unique to each facility. It is the intention of this guideline to assist the responsible person to plan, manage, advise, assess or determine the risks and measures applicable to any given facility in the absence of any other requirements.

Specific requirements may be imposed on the waste facility, or any processes undertaken (e.g. storage, processing, transportation), by the relevant regulatory authority, such as local council, DPIE, NSW EPA or SafeWork NSW.

Note: A regulatory authority may impose requirements from this guideline on the waste facility as either a condition of consent, licensing or Development Control Order.

6 Legislated requirements

6.1 Protection of the Environment Operations Act 1997

A waste facility operator must hold an environment protection licence issued by NSW EPA when storing, processing or recovering waste above the licensing thresholds specified in *Schedule 1* of the *Protection of the Environment Operations Act 1997* (*POEO Act*).

NSW EPA have published a *Guide to licensing - Under the Protection of the Environment Operations Act 1997*, which outlines the requirements for an Environment Protection Licence for the PCBU of a waste facility.

Waste is classified using *Schedule 1* of the *POEO Act*. NSW EPA have published a *Waste Classification Guidelines - Part 1: Classifying waste* to assist the PCBU to classify waste.

Note: Waste is classified as either liquid, restricted solid, general solid (putrescible or non-putrescible), special or hazardous. These classifications only consider groups which pose similar environmental and health risks, and do not consider fire risks.

Any fire involving a waste facility can produce a pollution incident which may cause injury or death or result in damage to property or the environment. FRNSW will enact a hazardous materials response to any waste fire (e.g. to contain fire water run-off) and will notify NSW EPA as per agreement of the joint memorandum of understanding.

Note: A licenced waste facility must prepare a pollution incident response management plan that complies with *Part 5.7A* of the *POEO Act*.

6.2 Environmental Planning and Assessment Act 1979

Any development of a waste facility, new or existing, must be carried out in accordance with the legislated framework of the *EP&A Act* and corresponding regulations.

Environmental planning instruments (EPIs) are made under *Part 3* of the *EP&A Act,* and determine whether consent for the activity is required or not, the appropriate consent authority, and the assessment and approval process to be followed.

Note: An EPI can include either State environmental planning policy (SEPP) or Local environmental plans (LEPs).

The regulations and EPI will assist the planning authority determine if an Environmental Assessment, Environmental Impact Statement or a Statement of Environmental Effects is required, and whether development will be Designated Development, Integrated Development, State Significant Development or State Significant Infrastructure.

When assessing development, whether during the planning or approval stage, the relevant approval authority may require consultation with the fire brigade.

Note: The relevant approval authority, including the consent authority such as DPIE, may seek advice from the fire brigade and consider any recommendations provided when making their determination.

When reviewing any proposed development, the fire brigade will assess the 'special hazards' that impact on life, property and the environment during fire and may recommend additional provisions under Clause E1.10 and E2.3 of the *NCC*.

6.3 Work Health and Safety Act 2011

Any place of work has the legislated responsibility to ensure health and safety is maintained at the workplace at all times under the *Work Health and Safety Act 2011* (*WHS Act*) and corresponding *Work Health and Safety Regulation 2017* (*WHS Reg.*).

The *WHS Reg.* requires the PCBU to identify hazards and manage risks to health and safety by implementing a hierarchy of control measures at their facility. The PCBU must provide information, instruction and training to employees and other persons as necessary to ensure their health and safety.

Note: Refer to *Managing the work environment and facilities* by SafeWork NSW.

The PCBU should assess the nature of combustible waste material, and processes used, to determine the fire risks and potential fire load. Unprocessed mixed waste or processed renewable material and by-product may present risks similar to dangerous goods, and require consideration of specific controls as per *Part 7.1 Division 5* of the *WHS Reg*.

Clause 43 of the *WHS Reg*. requires the PCBU to provide an emergency plan for their workplace, detailing emergency procedures for staff and occupants of the premises.

Note: Refer to *AS 3745–2010 Planning for emergencies in facilities* for guidance on developing emergency plans and procedures.

6.4 National Construction Code

The *Environmental Planning and Assessment Regulation 2000* (*EP&A Reg.*) requires development to comply with the *Building Code of Australia* (i.e. *NCC*) in force at the time of application.

Deemed-to-Satisfy (DtS) provisions of the *NCC* are often applied to the waste facility. A waste facility is to be designed, constructed or adapted for use as a class 8 building. A warehouse (i.e. class 7 building) with standard fire safety systems may be ineffective and overwhelmed from fire involving stockpiles of combustible waste material.

Due to waste facilities presenting ‘special problems of firefighting’, Clause E1.10 and E2.3 of the *NCC* should be considered and additional provision for special hazards made for the development. Consent authorities and certifiers are often reluctant to impose Clause E1.10 and E2.3 due to lack of familiarity or expertise with such special hazards.

Note: The *NCC* does not specify any prescriptive DtS provisions for special hazards.

The lack of prescriptive requirements means development should be assessed holistically on a case-by-case basis, ensuring performance requirements are met. The provisions should be based on an assessment of fire risks, fire safety systems, intended operations, and made in consultation with the fire brigade to identify potential problems for fire brigade intervention.

7 Development and planning

7.1 General

7.1.1 This whole section, being ‘*Development and planning*’, applies to new development of any waste facility that is being determined by the relevant consent authority or certifier, such as DPIE or the local Council.

Note: Development includes any application for land use or building works involving demolition, erection, rebuilding, alteration, enlargement or extension.

7.1.2 This whole section may apply to an existing waste facility that is subject to a development control order issued by the relevant regulatory authority (e.g. Council fire safety order if the facility does not have adequate provision for fire safety).

7.1.3 This whole section takes guidance from the documents *Reducing fire risk at waste management sites* and *Waste fire burn trials summary non-technical report*, both published by the Waste Industry Safety and Health Forum.

7.1.4 This whole section addresses the *NCC* and its performance requirements to be determined by the relevant certifier, including Clause E1.10 and E2.3.

7.1.5 This whole section may be addressed by a performance solution under the *NCC*; the proposed performance solution may need to be referred to FRNSW under *Clause 144* of the *EP&A Reg.*

Note: FRNSW will provide comments to the certifier for consideration when determining development. The proponent is encouraged to consult with FRNSW when the performance-based design brief is developed.

7.1.6 The owner and/or PCBU should attain development and planning approval through the most appropriate pathway for their given circumstance (see Figure 1).

Note: Any leased premises must be fit for the intended use and have provision for fire safety appropriate to the business or undertaking.

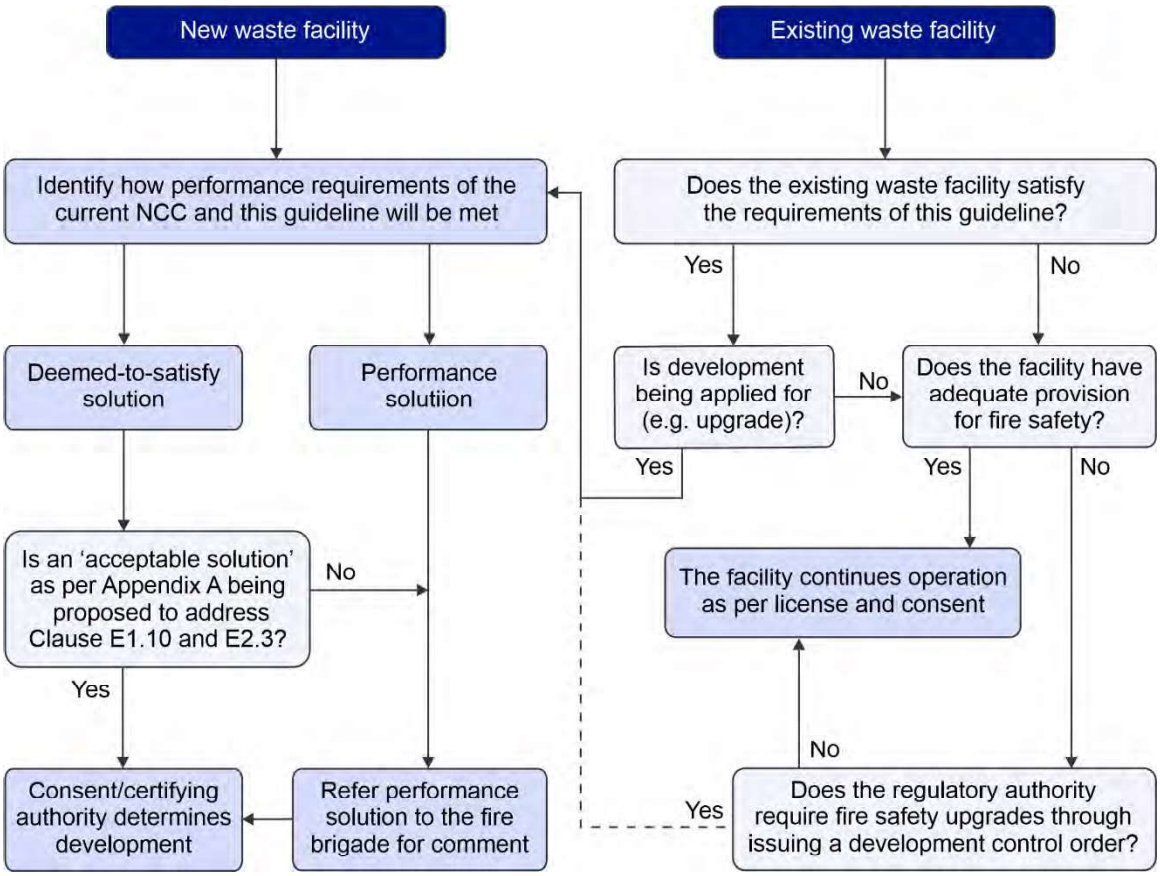


Figure 1 Development and planning pathways for waste facilities

7.2 Designing for special hazard

7.2.1 Combustible waste should be considered a special hazard and consent authorities should impose the condition on development that Clause E1.10 and E2.3 of the *NCC* be complied with to the satisfaction of the fire brigade.

7.2.2 Development should make adequate provision for fire safety as prescribed by this guideline and either meet the 'acceptable solution' defined in Appendix A or provide a performance solution that complies with *NCC* performance requirements and the requirements of this guideline (refer to clause 7.1.5).

Note: The fire brigade should be consulted on any performance solution.

7.2.3 All fire risks and hazards of the waste facility should be identified. A fire safety study is to be done in accordance with *Hazardous Industry Planning Advisory Paper No 2 Fire Safety Study Guidelines* if deemed appropriate by the relevant consent authority.

7.2.4 The development proponent is encouraged to engage a fire safety engineer or other suitably qualified consultant to develop a performance solution specific to the waste facility and its proposed operations.

Note: The design should consider all reasonable and foreseeable fire scenarios.

7.2.5 All reasonable and foreseeable combustible waste materials should be identified and considered in any performance solution (i.e. the fire engineered design should consider burn temperature, heat release rate and heat flux, total fire load and burn duration, ease of ignition and flame spread that would be expected from each stockpile).

Note: The maximum sizes and minimum separations of all stockpiles should be detailed in an operations plan for the waste facility (refer to section 8.6).

7.2.6 For simplification in designing for special hazards, the following surface burning temperatures and fire risk rating should be applied to stockpiles of common combustible waste materials, as given in Table 1[1].

Type of waste material	Burn temperature	Fire risk
Paper and carboard	850°C	Ordinary
Wood products	860°C	Ordinary
Plastic	1,200°C	High
Rubber	1,130°C	High
Refuse derived fuels	900°C	Ordinary
Solid recovered fuels	950°C	Ordinary

Table 1 Typical burn temperature and fire risk of combustible waste material

7.2.7 Where a stockpile contains a mixture of combustible waste materials, the burn temperature and fire risk of the most predominant waste material should be used for the whole stockpile, and in the case of no clear majority then the worst-case material should be used.

[1] Waste Industry Safety and Health Forum, *WISH INFO 05 Waste fire burn trials summary non-technical report version 2*

7.3 Development of existing waste facilities

7.3.1 When development is being applied for, the owner or PCBU should undertake an assessment of the design and performance of their existing waste facility against the requirements specified within this guideline and provide this to the relevant consent or regulatory authority for determination.

7.3.2 If the assessment determines that an upgrade is required to address a deficiency in the design or performance, the relevant authority should impose an appropriate condition (e.g. licensing) or direction (e.g. issue an Order) on the owner.

Note: Under *Section 9.35(d)* of the *EP&A Act*, FRNSW authorised fire officers are empowered to issue a fire safety Order.

7.3.3 When an existing waste facility undergoes demolition, erection, rebuilding, alteration, enlargement or extension (i.e. development), the relevant consent authority should consider imposing this guideline (in part or full) as a condition on the development.

7.3.4 When an existing waste facility has restrictions on stockpile sizes and separations, control measures should be implemented to maintain such limits and ensure the fire load remains appropriate to the building and installed fire safety systems.

Note: Restrictions may be imposed by an authority including condition of consent, an order, or a licence condition. Installing or upgrading fire safety systems may remove or reduce any restrictions on operations (e.g. larger stockpiles).

7.4 Firefighting intervention

7.4.1 The waste facility is to provide safe, efficient and effective access as detailed in FRNSW guideline *Access for fire brigade vehicles and firefighters*.

7.4.2 Performance requirement CP9 of the *NCC* requires access to be appropriate to the building function/use, fire load, potential fire intensity, fire hazard, active fire safety systems and fire compartment size.

7.4.3 Enhanced fire brigade vehicle access should be provided for firefighting intervention, including a perimeter ring road around any large non-sprinklered building and access roads between external stockpiles.

7.4.4 The facility should cater for a large emergency service response (e.g. multiple alarm and multiple agency) if the potential hazard may result in a large emergency.

Note: This includes from any pollution event requiring a protracted hazardous materials response (e.g. contain and remove fire water run-off).

7.4.5 A building not fitted with an automatic fire sprinkler system should have a dedicated external quarantine area not less than four times the floor area of the largest internal stockpile to receive, breakdown and extinguish that stockpile (refer to clause 8.5.3).

7.4.6 Any development application should be accompanied by a flow rate and pressure test of the water main connected to the fire hydrant system.

7.4.7 Firefighter access should be provided to buildings, structures and storage areas, including to any fire safety system or equipment provided for firefighting intervention.

7.5 Fire hydrant system

7.5.1 The waste facility is to have a fire hydrant system installed appropriate to the risks and hazards for the waste facility.

Note: A fire hydrant system is only required when a fire brigade station is within 50 km and equipped to utilise the system.

7.5.2 The fire hydrant system should consider facility layout and operations, with fire hydrants being located to provide compliant coverage and safe firefighter access during a fire, including having external fire hydrants to protect any open yard storage (i.e. external stockpiles).

7.5.3 The design of the fire hydrant system is to have enhanced standard of performance when combustible waste material is not protected by a fire sprinkler system, including having an additional fire hydrant outlet required to flow simultaneously for any open yard storage and for any non-sprinklered internal stockpiles, as given in Table 2.

Fire compartment floor area of non-sprinklered building	Area of open yard (used for stockpiles)	No. of fire hydrants required to flow
≤ 500 m²	≤ 3,000 m²	2
> 500 m² ≤ 5,000 m²	> 3,000 m² ≤ 9,000 m²	3
> 5,000 m² ≤ 10,000 m²	> 9,000 m² ≤ 27,000 m²	4
> 10,000 m²	> 27,000 m²	5 (or more)

Table 2 Minimum fire hydrants for non-sprinklered buildings and external storage

Note: Refer to *Australian Standard AS 2419.1-2005* for fire hydrant system design requirements of buildings that are protected by a fire sprinkler system.

7.5.4 Fire hydrants are not to be located within 10 m of stockpiled storage and must be accessible to firefighters entering from the site and/or building entry points.

7.5.5 Where appropriate to protect against high risks and hazards, suitable on-site fixed external fire monitors may be provided as part of the fire hydrant system.

7.5.6 The fire brigade booster assembly is to be located within sight of the designated site entry point, or other location approved by the fire brigade, and be protected from radiant heat from any nearby stockpile (e.g. by a masonry wall).

7.5.7 The fire hydrant system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than four hours.

7.5.8 The fire hydrant system should incorporate fire hose reels installed in accordance with Clause E1.4 of the *NCC* and externally to cover open yard storage areas to enable effective first attack of fires by appropriately trained staff.

Note: First attack firefighting is often critical to extinguishing minor fire ignitions.

7.6 Automatic fire sprinkler systems

7.6.1 The waste facility is to have an automatic fire sprinkler system installed in any fire compartment that has a floor area greater than 1000 m² and contains combustible waste material.

Note: Unsorted mixed combustible waste material generally presents a greater ignition hazard than most other combustibles.

7.6.2 The fire sprinkler system should be demonstrated as being appropriate to the risks and hazards identified for buildings, including externally as necessary (e.g. drenchers to protect plant/equipment, exposures, high-risk external storage).

7.6.3 The fire sprinkler system design should be appropriate to the hazard class (e.g. 'high hazard class') and have enhanced standard of performance as appropriate to the special hazard.

Note: Any system design limitation set by specifying content and percentages are to be maintained for the building's operating life unless the system is upgraded.

7.6.4 To protect vital systems, storages or equipment or protect against high risk hazards, a deluge, drencher, fast response, mist or foam system should be provided.

Note: A localised system may be installed to protect specific areas or equipment if the whole building is not sprinkler protected.

7.6.5 The fire brigade booster assembly for the fire sprinkler system should be co-located with the fire hydrant system booster within sight of the designated site entry point, or in a location approved by the fire brigade.

7.6.6 The fire sprinkler system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than two hours.

Note: The fire sprinkler system should contain fire spread and allow firefighters to enter the building, remove burning waste material and extinguish the fire.

7.7 Fire detection and alarm systems

7.7.1 The waste facility is to have a fire detection and alarm system installed appropriate to the risks and hazards identified for each area of a building.

7.7.2 The fire detection and alarm system should warn all occupants of fire and to evacuate the facility, with each component being appropriate to the environment (e.g. flame detector or infrared detector in sorting area, visual alarms around noisy machinery).

7.7.3 Upon positive detection of fire, the system is to activate any required alarm, fire suppression system, passive measure (e.g. fire door, fire shutter) or plant/machinery override (e.g. shutdown of conveyor, shredder) as appropriate to the detector.

Note: The system may incorporate multiple levels of detection (e.g. fast acting IR detector to shutdown machinery and activate a local deluge system, and medium acting aspirating system to provide broad area detection).

7.7.4 Manual alarm points should be provided in clearly visible locations as appropriate to the environment so that staff can initiate early alarm of fire.

7.8 Smoke hazard management

7.8.1 Buildings containing combustible waste material are to have an automatic smoke hazard management system appropriate to the potential fire load and smoke production rate installed within the building.

7.8.2 Under Clause E2.3 of the *NCC*, additional smoke hazard management measures should be provided to vent or exhaust smoke so that in at least 90% of the compartment, the smoke layer does not descend below 4 m above floor level.

Note: To undertake firefighting intervention, visibility is needed so that piled waste can be safely removed using machinery.

7.8.3 Natural low-level openings, either permanent or openable such as roller doors, should be provided on two or more walls to assist with venting de-stratified (i.e. cooled) smoke and ensure minimum visibility is maintained during a fire.

Note: Roller doors should have manual override so that the door can be opened in the event of electrical isolation or failure during fire.

7.8.4 Any smoke exhaust system installed should be capable of continuous operation of not less than two hours in a sprinkler-controlled fire scenario, or four hours in any non-sprinkler-controlled fire scenario.

7.8.5 Automatic operation of the smoke hazard management system from smoke detection should not cause undue delay to the activation of any automatic fire sprinkler system.

7.9 Fire water run-off containment

7.9.1 The waste facility should have effective and automatic means of containing fire water run-off, with primary containment having a net capacity not less than the total hydraulic demand of installed fire safety systems.

Note: The total hydraulic demand is the net discharge of water from both the fire hydrant system and fire sprinkler system.

7.9.2 An alternative means of fire water run-off containment may be proposed, particularly for development of an existing waste facility, including being validated by hydrological engineering assessment where appropriate.

Note: Bunding of the processing areas may be a containment option.

7.9.3 The containment system is to wholly incorporate any dedicated external quarantine area required to extinguish any internal stockpile from a building (refer to clause 7.4.5).

7.9.4 The containment system, which includes the base of any storage area, should be impermeable (i.e. sealed) and prevent fire water run-off from entering the ground or any surface water course (e.g. river, stream, lake, estuary, open sea).

7.9.5 The containment system should include secondary/tertiary facilities such as impermeable bunds, storage lagoons, isolation tanks or modified site design (e.g. recessed catchment pit, drainage basin) as appropriate to the facility.

Note: Any external pit/basin used to breakdown and extinguish burning waste from within a building must form part of the containment system.

7.9.6 Pollution control equipment such as stormwater isolation valves, water diversion booms, drain mats, should be provided as necessary for the facility's emergency response procedures, and be kept readily accessible for the event of fire.

Note: Failure to contain fire water run-off can result in significant pollution of the environment, which may incur substantial remediation costs and/or fines.

7.10 Bush fire prone land

7.10.1 The NSW RFS *Planning for Bush Fire Protection – A guide for councils, planners, fire authorities and developers* (PBP) applies to all development on 'bush fire prone land'.

7.10.2 Bush fire prone land is mapped by each respective council under *section 146* of the *Environmental Planning and Assessment Act 1979*.

7.10.3 Suitable fire brigade vehicle access is to be provided to within 4 m of any static water supply if no reticulated water supply is otherwise available (e.g. bulk water tank, dam).

8 Facility operation and management

8.1 General

8.1.1 This whole section, being '*Facility operation and management*', applies to new and existing waste facilities as determined by the relevant regulatory authority, such as NSW EPA as a condition of licence or the local Council as a condition of consent.

Note: NSW EPA regulate waste facilities through an environment protection licence issued under the *POEO Act*.

8.1.2 This whole section takes guidance from the documents *Reducing fire risk at waste management sites and Waste fire burn trials summary non-technical report*, both published by the Waste Industry Safety and Health Forum.

8.1.3 This whole section addresses the operation and management of a waste facility to ensure the fire hazard from combustible waste material fire is controlled.

8.1.4 This whole section should not override any existing licence or consent in-force if the conditions are being met.

8.1.5 This whole section may be addressed by performance outcomes identified through risk management, including identification of fire hazards, assessment of risks, implementation of controls, and documented review/audit process.

8.2 Storage and stockpiles

8.2.1 Storage and stockpiling of combustible waste material should be limited in size and volume appropriate to the given combustible waste material, fire risks, building design and installed fire safety systems.

Note: The size, volume and type of waste of all stockpiles should be identified on a site/floor plan and submitted with any development application.

8.2.2 Variations to storage and stockpile requirements, including maximum size and volume, movement, separation distances etc., will be considered through an appropriate pathway such as a performance solution.

8.2.3 The maximum height of any stockpile, loose piled or baled, should not exceed 4 m (see Figure 2).

8.2.4 The uncontained vertical face of any stockpile (i.e. any face not being retained by a masonry wall) should recede on a slope no greater than 45° to minimise the risk of collapse and fire spread (see Figure 2).

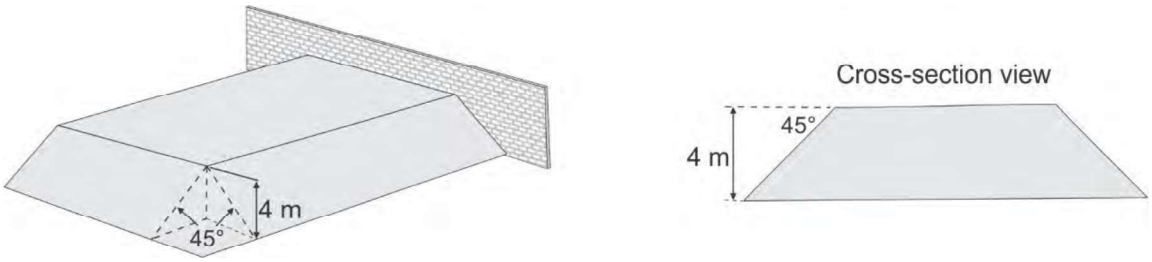


Figure 2 Maximum stockpile height and face angle

8.2.5 The storage method and arrangement of stockpiles is to minimises the likelihood of fire spread and provide separation which permits access for firefighting intervention.

Note: Fire separating masonry walls (e.g. bunkers) and automatic fire sprinkler systems may allow larger stockpile sizes and/or shorter separation distances.

8.2.6 A separating masonry wall, revetment or pen should extend at least 1 m above the stockpile height and at least 2 m beyond the outermost stockpile edge (see Figure 3).

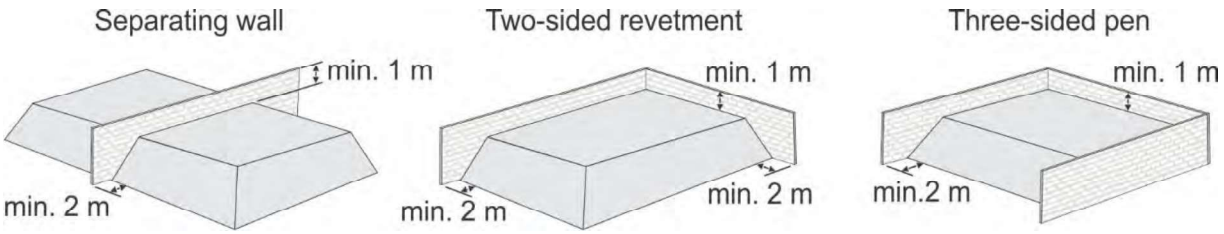


Figure 3 Example separating masonry wall, revetment or pen

8.2.7 Stockpile boundary limits should be permanently marked to clearly identify limits that maintain maximum stockpile sizes and/or minimum separations.

8.3 Stockpile movement

8.3.1 Stockpiles of combustible waste material should be rotated to dissipate any generated heat and minimise risk of auto-ignition as required.

8.3.2 Any stockpile of combustible waste material prone to self-heating should have appropriate temperature monitoring to identify localised hotspots; procedures outlined in the operations plan should be implemented to reduce identified hotspots.

Note: Temperature should ideally be measured at the core of the stockpile where thermal confinement will be highest.

8.3.3 Any processed or treated waste material, such as chipping, shredding, baling or producing crumb should be cooled before being stockpiled.

8.3.4 Procedures for stockpile rotation and monitoring of temperature during hot weather are to be included in the operations plan (refer to section 8.6).

8.4 External stockpiles

8.4.1 The maximum width of an external stockpile should be 20 m if fire brigade vehicle access is provided down both sides of the stockpile, and 10 m if access is provided down one side of the stockpile only (see Figure 4).

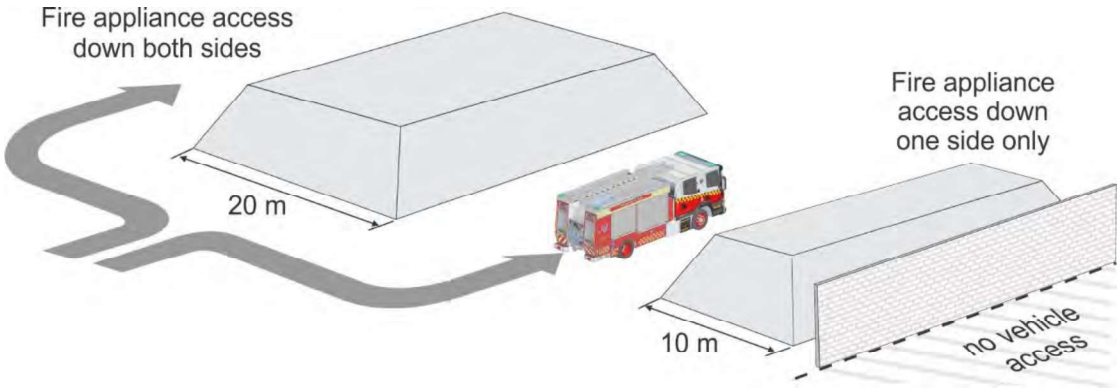
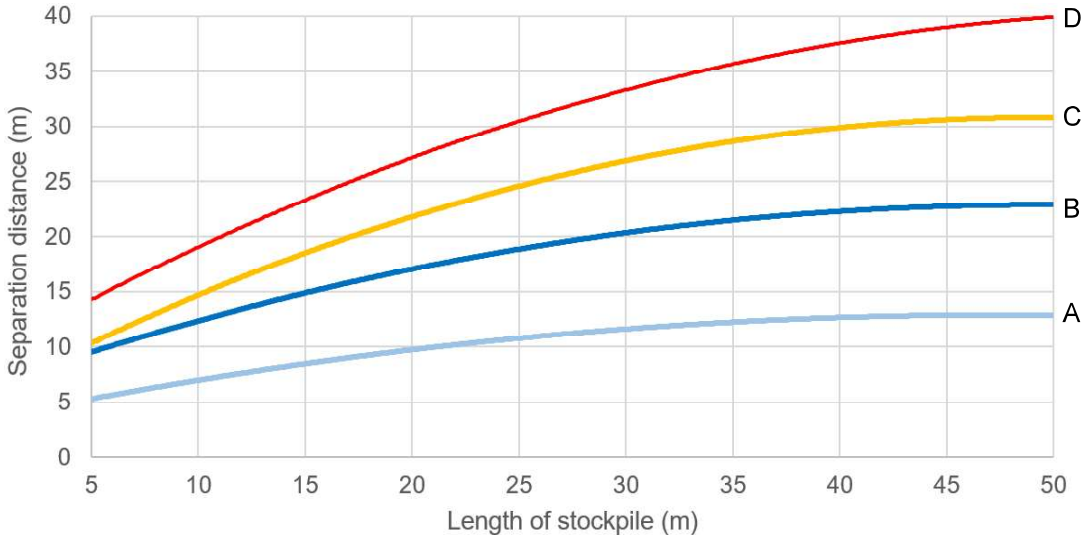


Figure 4 Maximum external stockpile widths

8.4.2 The maximum length of an external stockpile should be 50 m, or as determined from required minimum separation distances (refer to clauses 8.4.3 and 8.4.5).

8.4.3 Minimum separation should be maintained between external stockpiles, depending on storage method and fire risk of materials, as given in Table 3 (see also Figure 5).



Length of stockpile (m)	Ordinary fire risk (i.e. ≤ 1000°C)		High fire risk (i.e. >1000°C)	
	Loose pile (A)	Baled (B)	Loose pile (C)	Baled (D)
5	5 m	9 m	10 m	14 m
10	7 m	13 m	15 m	19 m
15	9 m	15 m	18 m	24 m
20	10 m	17 m	23 m	27 m
30	11 m	20 m	26 m	34 m
50	13 m	23 m	31 m	40 m

Table 3 Minimum separation distances between external stockpiles

8.4.4 If two separation distances apply between different stockpiles (i.e. due to different lengths of each stockpile), the greatest distance is to be used (see Figure 5).

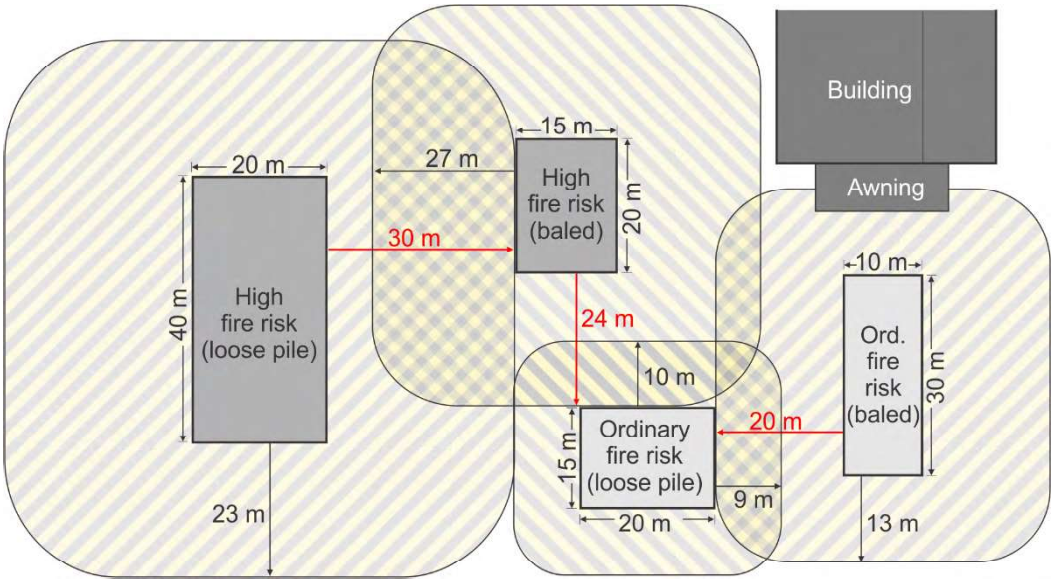
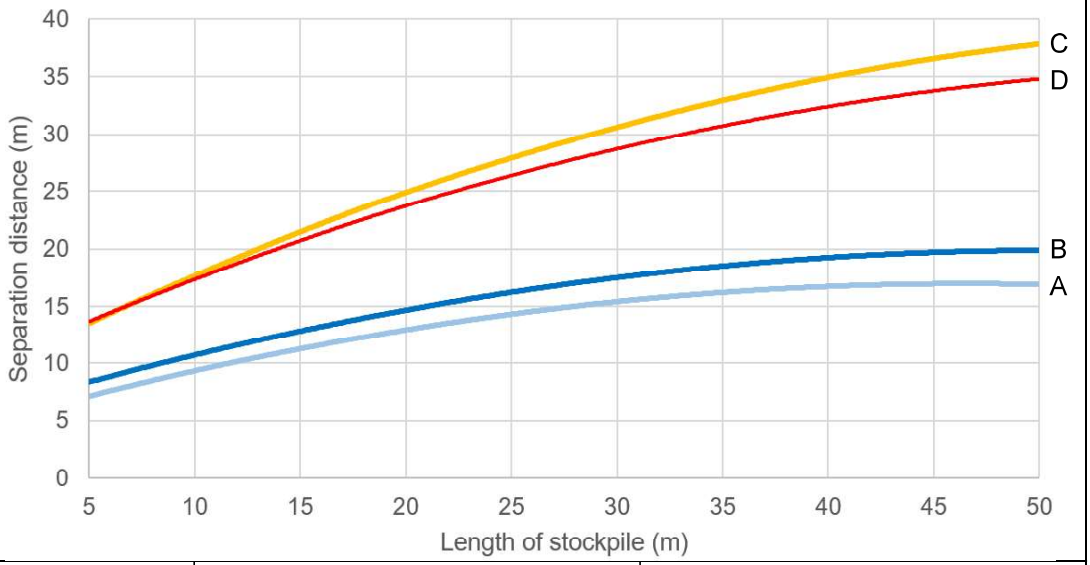


Figure 5 Examples of minimum separation between external stockpiles

8.4.5 Minimum separation should be maintained between external stockpiles and any fire-source feature, depending on storage method and fire risk of materials, as given in Table 4 (see also Figure 6):



Length of stockpile (m)	Ordinary fire risk (i.e. ≤ 1000°C)		High fire risk (i.e. >1000°C)	
	Loose pile (A)	Baled (B)	Loose pile (C)	Baled (D)
5	7 m	8 m	13 m	13 m
10	9 m	11 m	18 m	18 m
15	12 m	13 m	22 m	21 m
20	13 m	15 m	25 m	24 m
30	15 m	17 m	30 m	28 m
50	17 m	20 m	38 m	35 m

Table 4 Minimum separation between external stockpile and any fire-source feature

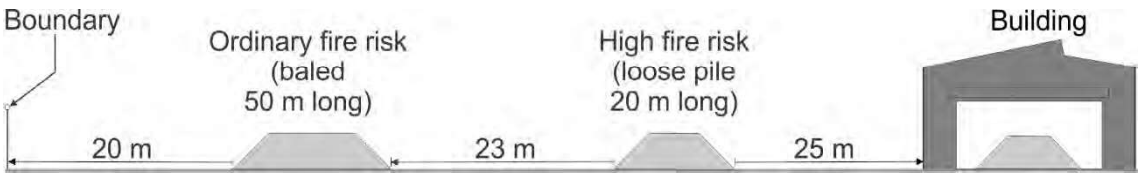


Figure 6 Examples of separation between stockpile and fire-source features

8.4.6 Covered areas attached to buildings or structures, such as areas under awnings and undercrofts, should not encroach into the minimum separation distance unless protected by an automatic fire sprinkler system (see Figure 7).

Figure 7 Example of separation from any covered building part or structure

8.4.7 The minimum separation between external stockpiles or an external stockpile and any fire-source feature may be reduced when the stockpile is separated by masonry wall or protected by an automatic fire sprinkler system (i.e. drenchers) (see Figure 8).

Note: The masonry wall should intersect the direct line between the fire source feature (e.g. building) and top of the stockpile, and be located to provide fire appliance access as necessary.

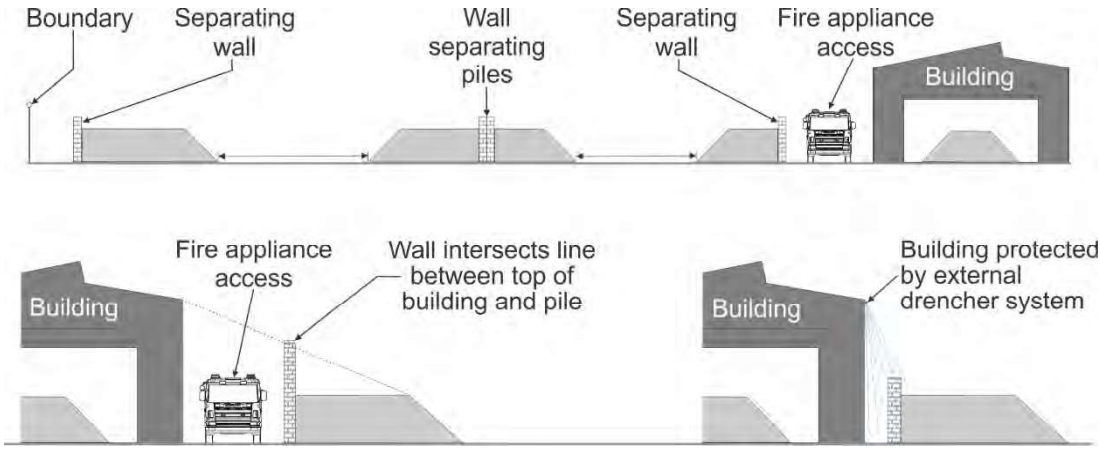


Figure 8 Examples of reduced separation using masonry wall or sprinkler system

8.4.8 External stockpile limits should be maintained and not exceeded as per the operations plan, and as appropriate to the facility, boundaries, exposures, buildings, terrain, drainage, vegetation, prevailing winds, vehicular access etc.

8.4.9 External stockpiles should be protected from high or unnecessary external risks (e.g. bushfire, adjacent property fire, arson, self-combustion in hot weather).

8.4.10 External stockpiles should be maintained so that all buildings access and egress points are always kept clear and unobstructed.

8.4.11 External stockpiles should be maintained so that all required fire brigade vehicle access (e.g. around buildings, between stockpiles and to hardstand areas) is always kept clear and unobstructed.

8.5 Internal stockpiles

8.5.1 Internal stockpiles of combustible waste material should be maintained as determined by the operations plan, and appropriate to the building size/layout, compartmentation, installed safety systems, process equipment and plant etc.

8.5.2 The maximum internal stockpile size in a building fitted with an automatic fire sprinkler system should be 1,000 m^3.

8.5.3 Internal stockpiles should have a minimum of 6 m unobstructed access on each accessible side in a building fitted with an automatic fire sprinkler system, or a 10 m in a building not fitted with an automatic fire sprinkler system (see Figure 9).

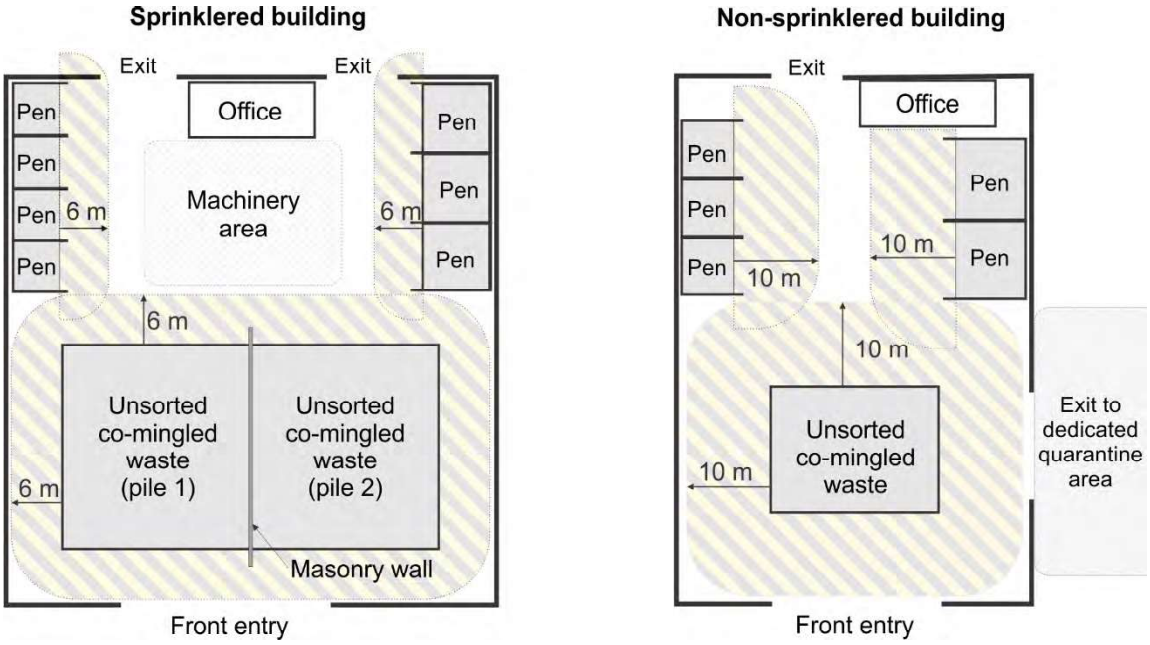


Figure 9 Example of unobstructed access around internal stockpiles

8.5.4 Internal stockpiles may be located side by side when separated by a masonry wall (refer to clause 8.2.6).

8.5.5 The internal stockpile of a building not fitted with an automatic fire sprinkler system should be limited in size to be able to be moved to the dedicated external quarantine area using on-site resources only within one hour or less (refer to clause 7.4.5).

Note: By example, two waste handlers with 5 m^3 bucket capacity taking two minutes per return trip can move a 300 m^3 stockpile in an hour (i.e. 2 x 5 m^3 x 30 trips).

8.5.6 Internal stockpiles should be protected from high or unnecessary ignition risks (e.g. friction/heating from conveyors, waste movers, heaters, chippers, shredders, balers, sorters, other machinery etc.).

8.5.7 Internal stockpiles should be maintained so that all building egress points and required paths of travel are not blocked or impeded at any time.

8.5.8 Internal stockpiles should be maintained so that access to the dedicated external quarantine area is always kept clear and unobstructed (i.e. by waste handlers).

Note: Any door opening (e.g. roller door) providing access to the quarantine area must be able to be readily opened at any time, including when power is lost.

8.6 Operations plan

8.6.1 The waste facility should develop and implement a written operations plan outlining the daily operations of the waste facility, including describing the combustible waste materials likely and the method of storage, handling or processing at the facility.

8.6.2 The operations plan should include a site plan drawing that identifies the layout of the waste facility and all locations of storage, handling and processing of combustible waste material.

8.6.3 The operations plan should identify the expected daily and holding inventory of combustible waste material including daily capacities and maximum stockpile limits.

8.6.4 The operations plan should define procedures that ensure maximum stockpile limits are not exceeded by operations at the waste facility.

8.6.5 The operations plan site plan should identify separate and clearly designated areas for materials drop-off, transfer and storage method of combustible waste materials (e.g. internal or external, sorted or unsorted, loose stockpile, bailed stockpile, binned, bundled, bunkered, container etc.).

8.6.6 The operations plan should identify all primary and secondary methods of combustible waste material transfer and stockpile movement (e.g. operational and reserve plant and equipment available at the waste facility).

8.6.7 The operations plan should include procedures for turnover of stockpiles to dissipate internal heat confinement, with the frequency determined by the combustible waste material, storage environment and ambient conditions.

Note: Turnover may relate to temperature monitoring where provided. Consideration should be given to periods of hot weather and high ambient temperature, where heat generation and self-combustion is more likely.

8.6.8 The operations plan should be regularly reviewed and updated (i.e. annually from the date of implementation) upon any change in combustible waste materials, storage, handling, processes or other conditions affecting daily operations.

8.6.9 The operations plan should be stored on site at the waste facility and kept in a readily accessible location (e.g. with the emergency plan).

8.6.10 A copy of the operations plan should be placed within the ESIP (refer to section 9.4).

Note: If the operations plan is prescribed and daily inventory constant, such details can be directly added to the ESIP rather than a copy of the operations plan.

9 Workplace fire safety

9.1 General

9.1.1 This whole section, being '*Workplace fire safety*', applies to any person who conducts the business or undertaking of owning, operating or managing a waste facility.

Note: SafeWork NSW regulate workplace safety under the *WHS Act*.

9.1.2 This whole section addresses the requirements on the PCBU to operate the waste facility as a safe workplace, especially regarding provision of fire safety.

9.1.3 This whole section does not override any other existing statutory requirement, code of practice or guideline that directly applies to the PCBU.

Note: SafeWork NSW publish a range of documents applicable to all PCBUs.

9.1.4 This whole section is to be addressed by thorough risk management, including identification of hazards, assessment of risks, implementation of controls, and documented review/audit process.

9.2 Risk assessment and mitigation

9.2.1 The PCBU should implement a hierarchy of control measures for the waste facility including providing information, instruction and training to employees and other persons as necessary to ensure health and safety (e.g. an emergency plan).

9.2.2 The PCBU should implement management procedures for general safety including staff induction, safe plant/equipment use, maintenance checks, safety inspections, clear reporting and communication, emergency drills etc.

9.2.3 The PCBU should implement housekeeping procedures to ensure all emergency access, equipment and exits are kept clear, including regular cleaning undertaken to prevent stockpile creep or litter build-up.

9.2.4 The PCBU should implement procedures to control potential ignition sources (e.g. friction, sparks, heating) including 'no open fire' policy, smoking restricted to designated areas or banned, 'hot-works permit' procedures in place.

Note: Plant and equipment such as conveyors, waste movers, heaters, chippers, shredders, balers, sorters etc. should be regularly inspected and maintained.

9.2.5 Vehicles and other machinery (e.g. waste movers) are to have appropriate heat shrouds and spark arrestors fitted and be kept, maintained and refuelled in designated areas away from combustible waste materials.

9.2.6 The PCBU should implement procedures to ensure hazardous materials and highly combustible materials (e.g. gas cylinders, fuels, paints, solvents) are stored in accordance with any relevant statutory requirement, code or standard and away from combustible waste material.

9.2.7 The PCBU should implement appropriate signage and markings, including facility layout plan at main site entry, warning signs (e.g. 'no smoking'), stockpile and clear space markings, emergency and evacuation area signs, fire safety system signs etc.

9.2.8 The PCBU should implement security arrangements (e.g. fencing with locked gate, lighting, alarm system, video surveillance, 24/7 security) to restrict unauthorised access and deter arson, including after-hours when staff have left the facility.

Note: Firefighter access must not be prevented (e.g. non-hardened metal chain and lock with key deposited at two nearest fire brigade stations or 24/7 security).

9.3 Emergency plan

9.3.1 The PCBU is required to develop an emergency plan for the waste facility, which is done in accordance with *AS 3745–2010 Planning for emergencies in facilities*.

Note: The emergency plan is developed for staff and occupants in the workplace. An external consultant should be engaged to provide specialist advice and services in relation to fire safety planning and developing an emergency plan.

9.3.2 The emergency plan is to assess fire safety risks and identify appropriate responses and controls (i.e. a fire safety management plan) and include emergency response procedures for staff and other persons at the waste facility in the event of fire.

9.3.3 The emergency plan is to identify an emergency control organisation for the facility including staff nominated as fire wardens in the emergency response procedures.

9.3.4 The emergency plan is to identify safe evacuation routes and assembly area (and alternates), shutdown processes, firefighting team activation, removal of uninvolved vehicles, activation of pollution control measure etc.

9.3.5 The PCBU is to ensure all staff receive appropriate training in fire safety including emergency response procedures, use of first attack firefighting equipment (e.g. fire hose reels, fire extinguishers), evacuation drills etc.

Note: Training in the use of first attack firefighting equipment must include education of fire awareness, including when to cease firefighting and to evacuate.

9.3.6 The emergency plan is to identify a process of regular fire safety audits to ensure fire safety requirements are being met, including reviewing stockpile limits, safe work practices, clear access, firefighting and emergency equipment.

Note: The PCBU should nominate a responsible person to conduct the fire safety audit, including check first attack firefighting equipment, stockpiles, access are kept clear and free of obstructions.

9.4 Emergency services information package (ESIP)

9.4.1 An ESIP, as detailed in FRNSW guideline *Emergency services information package and tactical fire plans*, should be developed and provided by the PCBU.

Note: The ESIP is intended for use by emergency service personnel only and supplements the emergency plan.

9.4.2 The ESIP should provide firefighters with specific information that can be used to develop strategies and tactics for firefighting intervention, including:

- the operations plan (refer to section 8.6)
- facility processes and systems including emergency shutdown procedures
- facility evacuation plan including ward areas and safe assembly area/s
- fire safety systems including on-site fixed fire monitors, deluge or drenchers static water supplies, special extinguishing agents or systems
- firewater containment system including secondary/tertiary facilities
- pollution control equipment including location and procedures, and
- machinery available for waste removal (e.g. waste movers) and location of designated quarantine area/s.

9.5 Fire safety statements

9.5.1 Under *clause 177* and *clause 180* of the *EP&A Reg*. the premises owner is to have fire safety systems inspected and maintained by a competent fire safety practitioner, then issue a fire safety statement to the local Council and provide a copy to FRNSW.

Note: The fire safety statement is a record of maintenance of the fire safety system. Information on this process including the *Fire Safety Statement* form to be used is available on the DPIE website at *www.planning.nsw.gov.au*.

9.5.2 An annual fire safety statement must be completed once every year for all essential fire safety measures installed, and where applicable, a supplementary fire safety statement completed for all critical fire safety measures installed (e.g. every six months).

9.5.3 The premises owner is responsible for choosing the competent fire safety practitioner to undertake the inspection and maintenance and must provide a written opinion that the person or persons chosen are competent to perform the fire safety inspection.

9.5.4 The PCBU is to make allowance for the premises owner to arrange the inspection and maintenance of fire safety systems for the purpose of a fire safety statement.

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Appendix A – Acceptable solution

This acceptable solution intends to assist the consent authority make determination on a proposed waste facility without specific referral to the fire brigade.

The adoption and compliance with the prescriptive requirements outlined by this acceptable solution will ensure that the provisions of Clause E1.10 and E2.3 of the NCC are adequately addressed to the satisfaction of the fire brigade in this given case.

This acceptable solution applies to the case of a typical waste facility that handles unprocessed co-mingled recyclable waste material which includes plastics. For any other case, a performance solution should be undertaken and referred to the fire brigade.

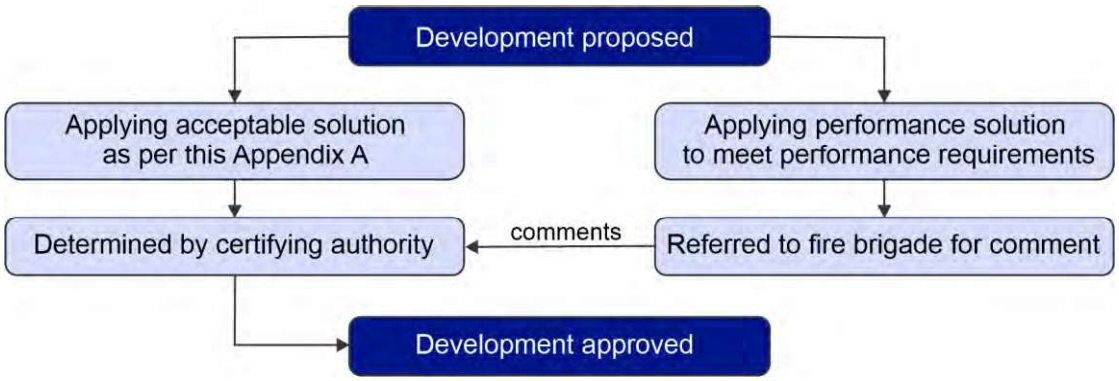

Figure 10 Pathways involving acceptable solution or performance solution

The following provisions specifically address special hazards for this typical waste facility:

Performance requirement	Description of provision	Guideline reference
CP9	'Specialist fire appliance' access is provided to satisfy performance requirement CP9 of the NCC and FRNSW guideline *Access for fire brigade vehicles and firefighters*.	Clause 7.4.1
CP9	Adequate firefighter access is provided to the building, fire safety systems and equipment.	Clause 7.4.7
EP1.3	A fire hydrant system is installed to Australian Standard *AS 2419.1* and provides coverage for both internal and external stockpiles.	Clause 7.5.1
EP1.3	The fire hydrant system incorporates enhanced standard of performance for external stockpiles (i.e. one additional hydrant to flow).	Clause 7.5.3
EP1.3	Fire hydrants are not located within 10 m of any stockpiled storage (or vice versa), whether being internal or external.	Clause 7.5.4
EP1.3	The fire hydrant system delivers the required number of fire hydrants to flow simultaneously for a minimum of four hours duration.	Clause 7.5.7
EP1.3	A fire brigade booster connection is installed within sight of the designated site entry point.	Clause 7.5.6
EP1.1	A fire hose reel system is installed to Australian Standard *AS 2441* and provides coverage for both internal and external stockpiles.	Clause 7.5.8
EP1.4	An automatic fire sprinkler system is installed to Australian Standard *AS 2118.1* and designed for special hazard (e.g. 'high hazard' class).	Clause 7.6.1

EP1.4	A fire brigade booster connection is installed for the automatic fire sprinkler system and is co-located with the hydrant system booster.	Clause 7.6.5
EP1.4	The fire sprinkler system delivers not less than the total hydraulic demand for a minimum of two hours duration.	Clause 7.6.6
EP2.2	A fire detection and alarm system is installed to Australian Standard *AS 1670.1* and designed for the fire scenarios and environment (e.g. visual flame detectors, infrared detectors, heat detectors/probes).	Clause 7.7.1
EP2.2	Manual alarm points are installed for staff to initiate alarm of fire.	Clause 7.7.4
EP2.2	An automatic smoke hazard management system is installed and designed so the smoke layer does not descend below 4 m above floor level.	Clause 7.8.1
EP2.2	Low level openings (e.g. roller doors) on two or more walls to assist with venting de-stratified smoke.	Clause 7.8.3
EP2.2	The automatic smoke hazard management system is capable of continuous operation for a minimum of two hours duration.	Clause 7.8.4
N/A	An automatic fire water run-off containment system is provided and designed to contain the total hydraulic demand of the fire hydrant and fire sprinkler systems.	Clause 7.9.1
N/A	Pollution control equipment is provided to divert fire water run-off and isolate stormwater drainage in the event of fire.	Clause 7.9.6
NSW PBP	The waste facility complies with NSW RFS *Planning for Bush Fire Protection* when located on bush fire prone land.	7.10.1
CP2	Any separating masonry wall, revetment or pen is to extend at least 1 m above and at least 2 m beyond the stockpile.	Clause 8.2.6
N/A	Any stockpile prone to self-heating is to be monitored and rotated as necessary to dissipate any hotspots.	Section 8.3
CP2	Any external stockpile is to be limited in size and maintain minimum separations to prevent fire spread, including reduced separation when protected by a masonry wall or an automatic fire sprinkler system.	Section 8.4
CP9	Fire brigade vehicle access is provided between external stockpiles.	Clause 8.4.11
CP2	Each internal stockpile is to be limited in size to 1,000 m³.	Clause 8.5.2
CP9	Internal stockpiles are to be maintain a minimum of 6 m unobstructed access on each accessible side.	Clause 8.5.3
N/A	An operations plan is to be documented and implemented for stockpile management and a copy is be included within the Emergency Services Information Package (ESIP).	Section 8.6
WHS Reg.	An emergency plan is to be provided for staff and other persons at the waste facility in the event of fire.	Section 9.3
N/A	An Emergency Services Information Package (ESIP) is provided for firefighters in accordance with FRNSW guideline *Emergency services information package and tactical fire plans*.	Section 9.4
EP&A Reg.	Fire safety systems are to be inspected and maintained with corresponding fire safety statements being issued; The provision of maintenance should be covered in any leasehold contract.	Section 9.5

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APPENDIX B – FRNSW GUIDELINE – ACCESS FOR FIRE BRIGADE VEHICLES AND FIREFIGHTERS

Fire safety guideline

Access for fire brigade vehicles and firefighters

Version 05
Issued 4 October 2019

Fire Safety Branch
Community Safety Directorate

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1 Purpose

The purpose of this document is to provide safe, efficient and effective access for *fire brigade vehicles* (i.e. a *fire appliance*) to any *premises* and allow firefighters to rapidly intervene when fire or other *emergency incident* occurs.

2 Scope

This guideline details the requirements of Fire and Rescue NSW (FRNSW) for:

a) identifying areas within NSW that are protected by the diverse types of *fire appliances* used by *fire brigades* within NSW

b) providing access for *fire brigade vehicles* to any *premises* using public roads

c) providing access for *fire brigade vehicles* to any building, structure or site using a privately-owned road system

d) providing *hardstand* areas that are suitable for firefighting operations

e) roads and structures to support the weights and loads of *fire appliances*

f) consideration of operational limitations when planning *fire brigade vehicles* access for any proposed development

g) *fire brigade vehicle* access on land that is designated as bush fire prone land, and

h) planning and implementing local area traffic management.

When this guideline is followed, the *fire brigade* will be able to undertake their statutory duty and function to protect and save life and property during an emergency in the speediest and most efficient manner.

3 Application

This guideline applies to any land subdivision, proposed development, change of building use, or building construction that is intended to meet the *National Construction Code* (*NCC*[1]), and which is located within NSW.

Note: Performance requirement CP9 of the *NCC* requires *fire brigade vehicle* access be provided to the degree necessary (this guideline) to facilitate *fire brigade* intervention.

This guideline is intended to be used by owners, developers, designers, engineers, urban planners, regulatory and consent authorities when planning, assessing or determining any application pertaining to any applicable land or *premises*.

Access for *fire brigade vehicles* and firefighters is relevant to all *premises* and is to be commensurate to the potential level of risk; it should be considered even when not specifically identified by any planning instrument, regulation or Act.

Note: The relevant consent authority can impose conditions on development or issue orders when provision for access is inadequate.

[1] *National Construction Code 2019, Building Code of Australia Volume One*

Developers, designers, engineers and planners are to ensure that adequate access is given to an *aerial appliance* when appropriate to the development (e.g. multiple-storeys and located within the coverage area of an *aerial appliance*).

This guideline has been developed in the public interest and is intended to be used by any consent authority considering any proposed development (refer to *Section 4.15(1)(e)* of the *Environmental Planning and Assessment Act 1979*).

Note: Under *Section 4.17* of the *EP&A Act*, the consent authority may impose requirements from this guideline (in part or full) as a condition on the development consent.

This guideline is to be used for any land or development within NSW as deemed applicable by the consent authority. Access requirements are generally consistent across all emergency services, but reference should be made to other guidelines where appropriate (e.g. NSW Rural Fire Service (RFS) *Planning for Bush Fire Protection* in bush fire prone land).

4 Definitions

The following definitions apply in this guideline:

aerial appliance — means a specialised type of *fire appliance* fitted with an *aerial apparatus* which elevates to given heights to provide fire suppression and rescue capabilities.

aerial apparatus — means a purpose-built device which can elevate, extend, articulate and slew within a field of operations to provide operational functions at elevated height (e.g. water stream, cage rescue, stairway rescue, observation, gear lift, water supply, work platform).

alternative solution (or performance solution) – means a method of complying with the *NCC* performance requirements other than by a 'deemed-to-satisfy' solution.

carriageway – means any public road, *private road*, shared traffic zone, laneway, access way or the like, whether having a sealed surface layer or not, that is intended for the carriage of vehicles. A carriageway may comprise one or more vehicle lanes.

complex development – means any development comprising one or more buildings or structures of higher than normal risk (e.g. infrastructure, podiums, precincts and shared zone or a *major facility*).

designated building entry point (DBEP) – means the entry point into a building providing firefighter access when fire or other *emergency incident* occurs.

Note: Typically, the *DBEP* will be the main building entrance. The *DBEP* is identified when the building has a fire detection, warning, control and intercom system installed.

designated site entry point (DSEP) – means the entry point into a site that provides access to emergency vehicle when fire or other *emergency incident* occurs.

effective height – means the same as in the *National Construction Code*.

emergency incident – means any abnormal and dangerous situation that has caused, or threatens to cause, harm persons, property or the environment, and requires a response by an emergency service to manage back to safe and normal condition.

fire appliance – means any vehicle that forms part of the equipment of a *fire brigade* and that is equipped with an audible warning device and flashing lights.

fire brigade – means a statutory authority constituted under an Act of Parliament having as one of its functions, protect life and property from fire and other emergencies.

fire brigade vehicle – means any *fire appliance* being used by firefighters from a *fire brigade*.

fire brigade station – means a state government operated premises which is a station for a *fire brigade* (i.e. FRNSW fire brigade station or NSW RFS fire brigade station).

fire district – means an area which the *Fire and Rescue NSW Act 1989* applies in relation to fires and contributions of costs.

Note: Fire districts are constituted by the Governor under *Section 5* of the *Fire and Rescue NSW Act 1989* by order published in the NSW Gazette.

hardstand – means an apron or section of *carriageway* specifically designated for use by a stationary *fire appliance* (e.g. for a *fire appliance* at the fire hydrant booster assembly).

local area traffic management (LATM) – means the analysis of traffic characteristics and the implementation of *traffic control devices* within a local area.

national construction code (NCC) – means the *National Construction Code (NCC) 2019, Building Code of Australia Volume One*, as amended.

major facility – means any large building or complex of related buildings on any given site and having multiple designated site or building entry points for emergency response. Any facility having a network of *private roads* providing building access may be considered major.

premises – means any building, facility or site (land).

private road – means a *carriageway* located within the boundary of privately-owned *premises* and not under the care and management of a council or public authority.

rural fire district – means an area which the *Rural Fires Act 1997* applies in relation to the area of the responsible local authority or authorities (e.g. Councils).

Note: Rural fire districts are constituted under *Section 6* of the *Rural Fires Act 1997* and published in the NSW Gazette.

stabiliser – means a hydraulic operated stabilising jack fitted to an *aerial appliance* to provide stability when the vehicle's centre of gravity shifts during operation of the *aerial apparatus*.

suction-connection outlet – means a connection outlet for suction hose that draws water from a static water supply (e.g. tank, reservoir, dam, lake, river).

traffic control device – means any sign, signal, pavement markings or other installation placed or erected by an authority having jurisdiction, for the purpose of regulating, warning or guiding road users.

turning circle radius – means the minimum arc radius that provides wall-to-wall clearance of a fire appliance turning at full steering lock (e.g. to negotiate corners or turnaround areas).

wheelbase – means the distance between the centre-point of the front steer axle (or group) and rear drive axle (or group).

5 Background

Under *Section 5A* of the *Fire and Rescue NSW Act 1989* and *Section 9* of the *Rural Fires Act 1997*, *fire brigades* in NSW have the duty to protect persons from injury or death and property from damage from fires and other emergencies. A fundamental factor to achieving this is the ability of firefighters to respond and undertake intervention activities as quickly as possible.

During an emergency, firefighters require efficient and effective access for a rapid and unhindered response. Poor or inadequate access to any *premises* will result in delays to response and intervention and may directly impact on the life safety of occupants.

Access to a given *premises* is primarily provided by a public road network in accordance with *Austroads Guide to Road Design*. On the given *premises*, vehicular access around buildings and structures may be provided by way of *private roads*.

Planners and designers sometimes only consider local traffic (i.e. minor vehicles) and typically exclude the carriage of heavy vehicles. *Fire brigade vehicles* are larger and heavier types of vehicles that may require access to any given *premises* at any time, without notice.

Note: When designing for local traffic, access for *fire appliances* should not be prohibited.

Owners of existing *premises* must ensure *fire brigade vehicle* access provisions are maintained at all times (e.g. access is not obstructed by parked vehicles or stored goods).

6 Fire appliances

6.1 Types of fire appliance

6.1.1 Both FRNSW and NSW RFS have several types of *fire appliances*, each specifically designed to perform a different range of functions at any given emergency.

6.1.2 Most general *fire appliances* comprise a purpose-built body fitted on a two axle truck chassis. Depending on the primary function, various levels of firefighting, rescue and hazardous materials equipment will be carried (see Figure 1).

Note: While the core function of a 'general' *fire appliance* is firefighting, some may provide only rescue or hazardous materials capability.

Figure 1 General fire appliances: tanker, pumper and rescue (from l to r)

6.1.3 FRNSW operates a fleet of *fire appliances* that are fitted with an *aerial apparatus* that elevates, rotates and extends to a given height to access an emergency in a building or structure. In this guideline, an *aerial appliance* is a 'specialist' fire appliance.

Note: An *aerial appliance* is commonly, even though incorrectly, referred to as a 'cherry picker' by the media and public.

6.1.4 Both FRNSW and NSW RFS operate specialist *fire appliances* to undertake specific functions at a given incident. These *fire appliances* are larger and heavier and may be on either a two, three or four axle truck chassis (see Figure 2).

Note: Specialist fire appliances are strategically located across NSW to protect key assets and community places as required.

Figure 2 Specialist fire appliances: bulk water, command and aerial appliance (from l to r)

6.1.5 Both FRNSW and NSW RFS operate articulated heavy vehicles (e.g. prime mover with trailer) which are excluded from the scope of this guideline.

6.2 Overall parameters for design

6.2.1 While specifications vary between *fire appliances*, for the purpose of design overall parameters are broadly categorised into two distinct *fire appliance* types as follows:

General fire appliance	
Gross vehicle mass	15 000 kg
Overall length	10.0 m
Overall width (incl. mirrors)	3.0 m
Body width (excl. mirrors)	2.5 m
Overall height	3.7 m

Specialist fire appliance	
Gross vehicle mass	29 300 kg
Overall length	12.5 m
Overall width (incl. mirrors)	3.0 m
Body width (excl. mirrors)	2.5 m
Overall height	4.3 m

Table 1 Overall parameters of fire appliances

Note: A medium rigid (MR) licence or higher is required for a general *fire appliance*, while a heavy rigid (HR) licence is required for a specialist *fire appliance*.

6.3 Coverage area by types of fire appliance

6.3.1 A general *fire appliance* will offer fire protection to any *premises* located within a *fire district* or *rural fire district*; *fire brigade vehicle* access commensurate to parameters given for 'general' *fire appliance* is to be provided for all *premises* in NSW.

Note: The fire may be attended by FRNSW, NSW RFS or both (e.g. mutual aid) and may also be supported by other emergency vehicles.

6.3.2 Any *complex development* may be attended by a specialist *fire appliance*; *fire brigade vehicle* access commensurate to parameters given for 'specialist' *fire appliance* is to be provided as appropriate to the risk.

Note: A non-fire emergency may require attendance of a specialist *fire appliance* (e.g. for rescue, aerial access or hazardous materials incident).

6.3.3 Any building having an *effective height* greater than 9 m (e.g. more than three storeys above ground) and located within the coverage area of an *aerial appliance* should be provided with *fire brigade vehicle* access commensurate to the parameters given for 'specialist' *fire appliance* as appropriate to the risk (refer to section 10.4).

Note: The portable extension ladder carried on a fire appliance can only reach 10 m high. An *aerial appliance* can provide a means of emergency escape in any building that only has a single required exit.

6.3.4 *Aerial appliances* are strategically located within *fire districts* for optimum response in areas of greatest fire risk, and cover the greater metropolitan regions of Sydney, Newcastle and Wollongong, and the regional cities of Albury and Wagga Wagga.

Note: FRNSW can be consulted to identify when development is located within the coverage area of an *aerial appliance* and 'specialist' access applies.

6.3.5 Clause E1.3 of the *NCC* requires a fire hydrant system (e.g. *AS 2419.1–2005*) be provided only when a *fire brigade station* is no more than 50 km away and is equipped to utilise the fire hydrant. The fire hydrant system is only required when the *fire brigade station* has a *fire appliance* not less than shown in Table 2.

Note: The *fire appliance* must have appropriate personnel available (i.e. crew cabin) and carry self-contained breathing apparatus. Refer to Appendix A for typical pump performance of *fire appliances*.

No. of hydrants required to flow simultaneously	Min. system design flow rate	Operating pressure	Available fire brigade station	Type of fire appliance available (as stationed within 50 km)
1	10 L/s (600 L/min.)	900 kPa	FRNSW	Any Pumper or Tanker
			NSW RFS	Any Category 1, 3, 10 or 11
2	10 L/s (1,200 L/min.)	1,000 kPa	FRNSW	Any Pumper or Tanker
			NSW RFS	Any Category 10 or 11
3	10 L/s (1,800 L/min.)	1,000 kPa	FRNSW	Any Class 2, 3 or Aerial pumper
			NSW RFS	Any Category 10 or 11
4	10 L/s (2,400 L/min.)	1,000 kPa	FRNSW	Any Class 2, 3 or Aerial pumper
			NSW RFS	None (FRNSW mutual aid only)
5 or more	≥50 L/s (≥3,000 L/min.)	1,000 kPa	FRNSW	Two or more pumpers
			NSW RFS	None (FRNSW mutual aid only)

Table 2 Types of fire appliance suitable to operate a fire hydrant system

7 Vehicle access requirements

7.1 Carriageway width

7.1.1 A *carriageway* is to be wide enough to allow easy negotiating by the *fire appliance* and provide room around the vehicle to allow firefighters to exit and work with equipment.

Note: During an *emergency incident*, the *fire appliance* will be positioned (i.e. parked) in the most tactically advantageous position.

7.1.2 Along any straight *carriageway* section, the minimum width is 4.5 m for general *fire appliance* access, or 6 m for specialist *fire appliance* access (see Figure 3).

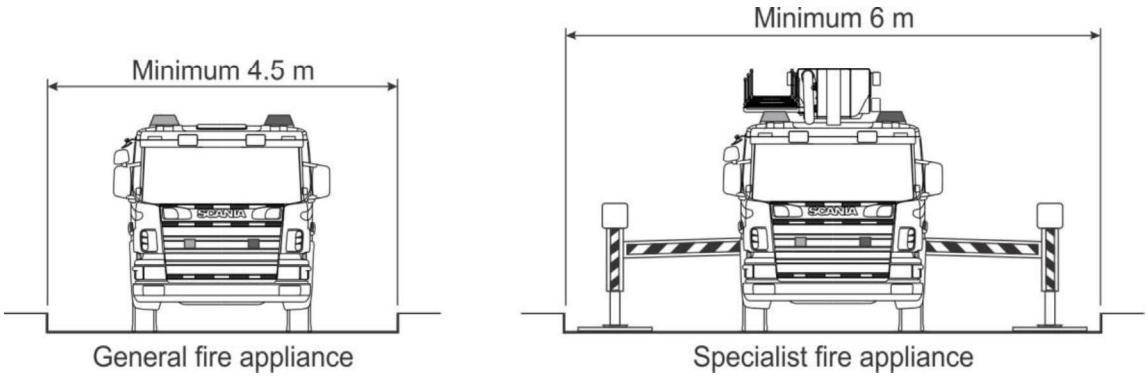


Figure 3 Minimum carriageway width (straight section)

Note: An *aerial appliance* requires additional width to extend *stabilisers* and operate. A designated *aerial appliance hardstand* area may be considered if continuous minimum width clearance cannot be achieved (see Figure 13).

7.1.3 When the *carriageway* is curved, including a corner around a building or structure, consideration is to be given to the *turning circle radius* and the minimum wall to wall clearances from both inner and outer body sections (including overhangs).

7.1.4 The minimum *turning circle radius* of any curved *carriageway* section is to be 6.5 m (inner) and 11.5 m (outer) for general *fire appliance* access, or 7.5 m (inner) and 14.6 m (outer) for specialist *fire appliance* access (see Figure 4).

Note: These turning circles provide wall to wall clearance from the vehicle body and overhangs. They are not the turning circles for the vehicle's wheel tracks.

7.1.5 The distance between inner and outer *turning circle radius* is to provide body swing clearance (i.e. vehicle swept path), and not be less than 5 m for general *fire appliance* access and 7.5 m for specialist *fire appliance* access (see Figure 4).

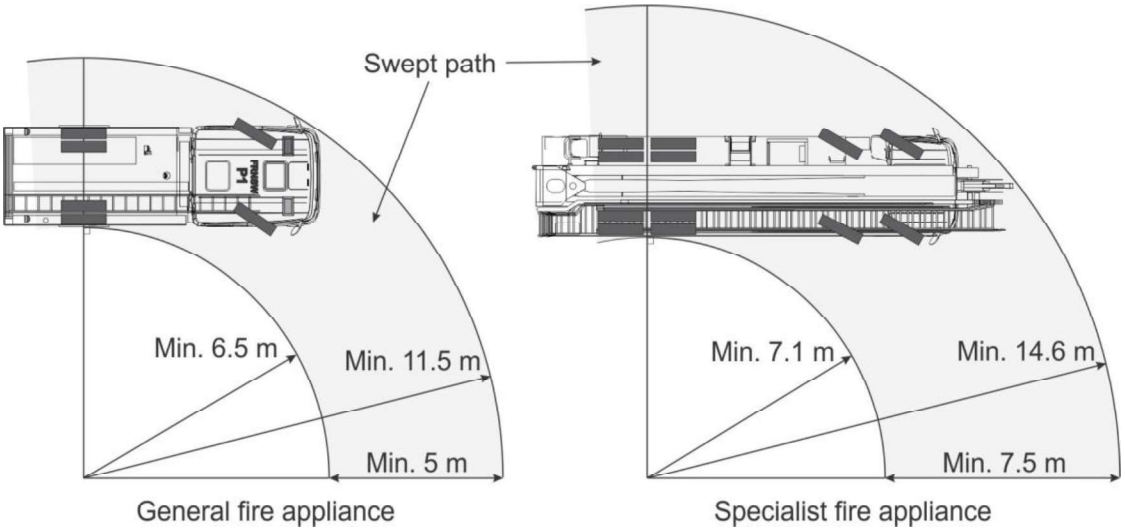


Figure 4 Minimum turning circle radius (curved section)

7.1.6 Body swing on turn entry and exit is to be considered, particularly when going around a building (see Figure 5). The pivot is tangential to the centre of the drive axle/s.

Note: The body swing arc changes with forward travel to full steering lock and back and arc created by the front opposite corner needs to clear any obstructions.

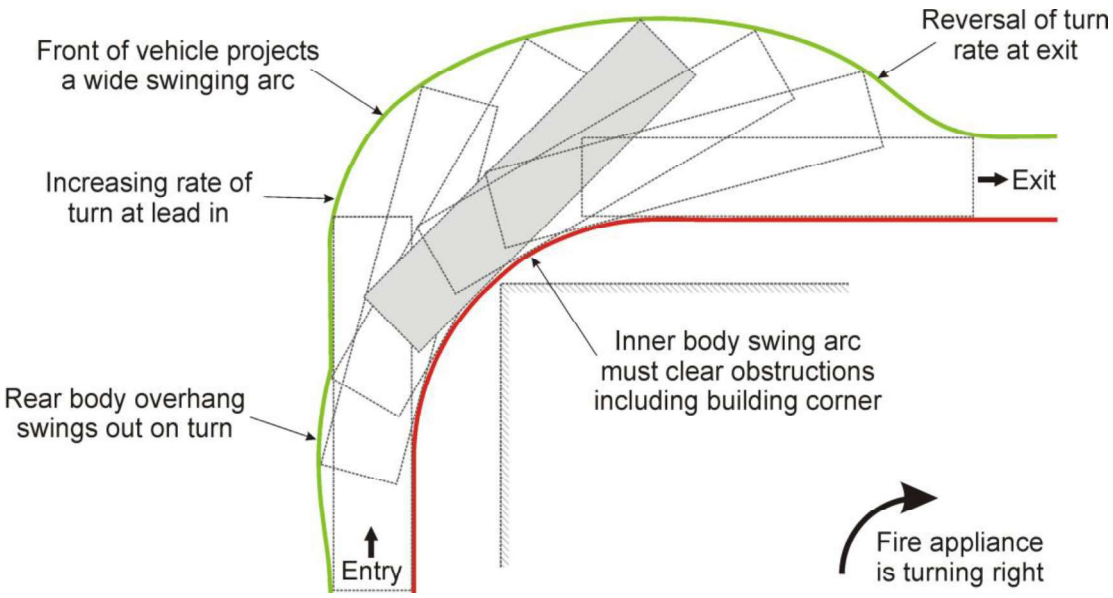


Figure 5 Typical body swing on entry and exit of turn

7.1.7 The design vehicle from *AS 2890.2:2018 Parking facilities Off-street commercial vehicle facilities* should be used for swept path analysis, with 'medium rigid vehicle' used for a general *fire appliance* and 'heavy rigid vehicle' for specialist *fire appliance*.

Note: The front overhang of some *aerial appliances* results in an increased swept circle diameter of 29.2 m instead of 27.8 m for the design heavy rigid vehicle.

7.2 Turnaround area

7.2.1 Any carriageway that extends longer than 120 m from an intersection and does not lead directly to an exit or connecting *carriageway* (i.e. dead end) is to have a suitable turnaround area so that a *fire appliance* does not need to reverse out (see Figure 6).

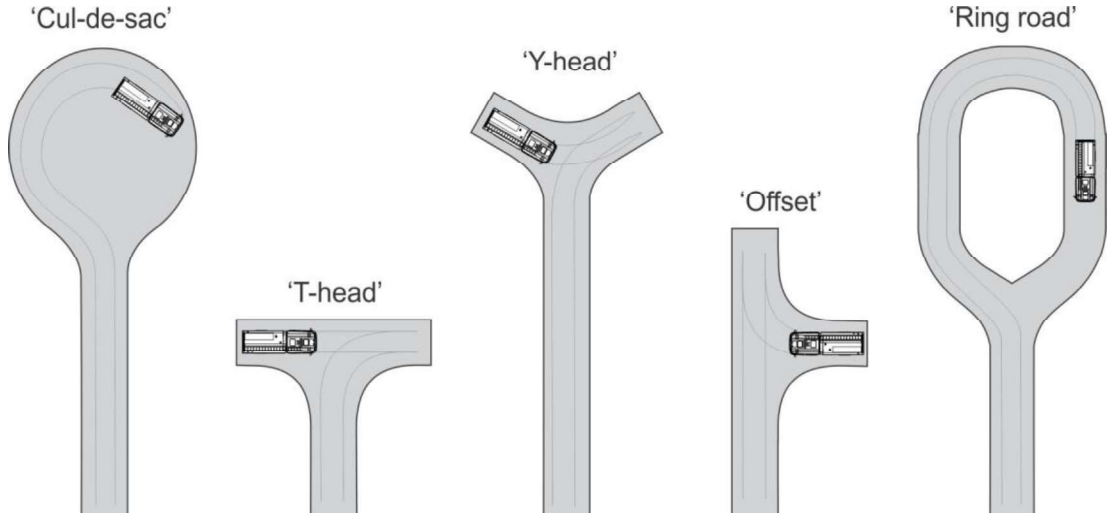


Figure 6 Examples of typical turnaround area configurations

7.2.2 The turnaround area must allow for body swing bias to the front of the *fire appliance*. If a multiple-point turn is required due to space restriction, the turning area is to be large enough to not require more than three points of turn (see Figure 7).

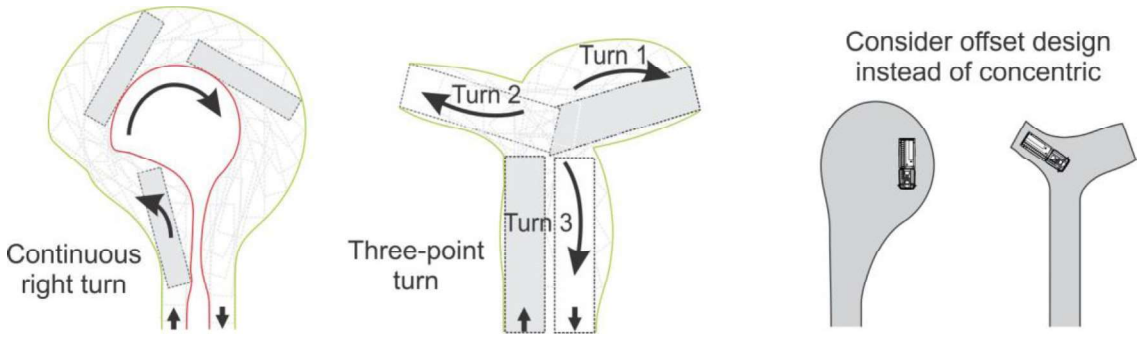


Figure 7 Turnaround body swing; continuous (left) or multiple point (right)

7.3 Constricted access (i.e. pinch point)

7.3.1 Constricted access is any narrow pinch point around an immovable object (e.g. building, structure, bridge, bollard, pylon, gate, vehicle barrier, *traffic control device*, utility pole, drain, fence, tree etc.) that provides less than 4.5 m width.

Note: A pinch point has insufficient width for firefighters to exit the *fire appliance* and work with equipment. A *fire appliance* is not able to stop at any pinch point.

7.3.2 The carriageway is not to have any constricted access providing less than 3.2 m width (see Figure 8).

Note: A *fire appliance* is unable to negotiate past a pinch point less than 3.2 m wide.

7.3.3 Any constricted access along a straight *carriageway* section is not to be longer than 50 m (see Figure 8).

Note: A 50 m long pinch point allows two lengths of fire hose.

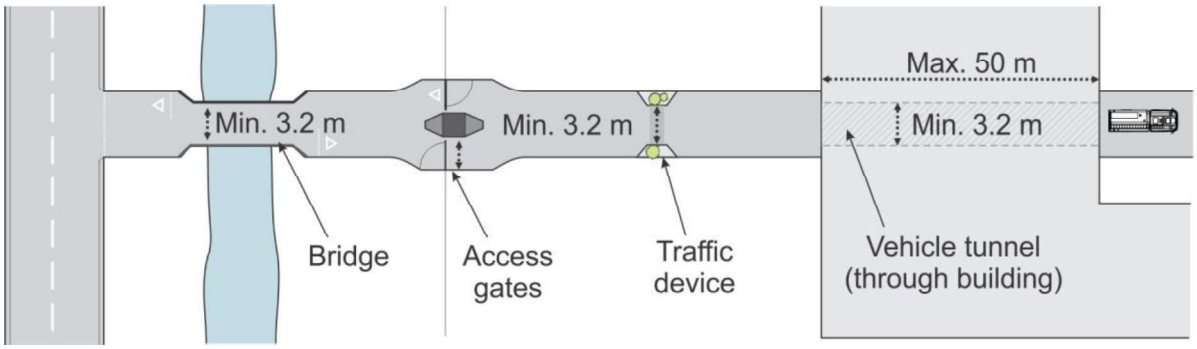


Figure 8 Examples of constricted access (typical pinch points)

7.3.4 Site managers are to ensure *fire brigade vehicle* access is not blocked by non-permanent obstructions including by parked vehicles, freight containers, pallets, stored goods, stored waste, bins, temporary structures etc.

7.4 Underbody clearance

7.4.1 All raised kerbs along the edge of a *carriageway* are to be no higher than 200 mm and be free of vertical obstructions at least 300 mm back from the kerb face, to allow clearance from and body overhang when turning (see Figure 9).

7.4.2 Kerbs in the centre of a *carriageway* (e.g. splitter islands and median strips) should be no higher than 200 mm and no wider than 500 mm, and be free of obstruction along their length, to allow the *fire appliance* to drive over the kerb (see Figure 9).

Note: A *fire appliance* responding to an *emergency incident* may need to manoeuvre onto opposing traffic lanes to get past stationary built up traffic.

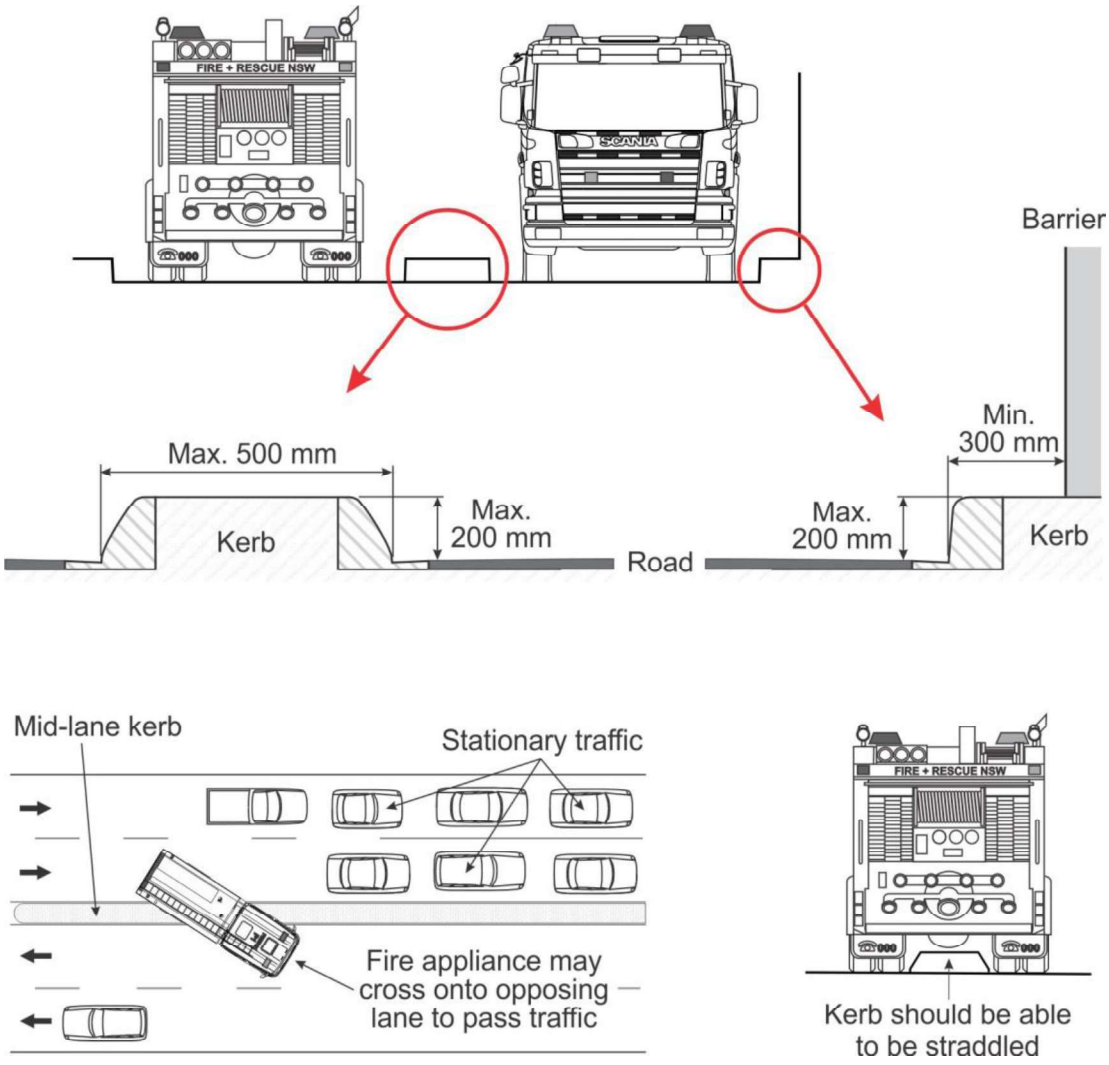


Figure 9 Kerb clearance dimensions

7.4.3 *Traffic control devices* that have integrated kerbs to slow traffic (e.g. speed hump, chicane slow point, small roundabout) are to have low profile mountable kerbing with 40 mm bull nose edge to allow easy negotiation by a *fire appliance*.

7.5 Overhead clearance

7.5.1 The *carriageway* is to have a minimum overhead clearance height of 4 m for general *fire appliance* access or 4.5 m for specialist *fire appliance* access (see Figure 10).

Note: The maximum vehicle height under the *Road Transport (Vehicle Registration) Regulation 2017* is 4.3 m. *AS 2890.2:2018 Parking facilities, Part 2: Off-street commercial vehicle facilities* prescribes a clearance height of 4.5 m.

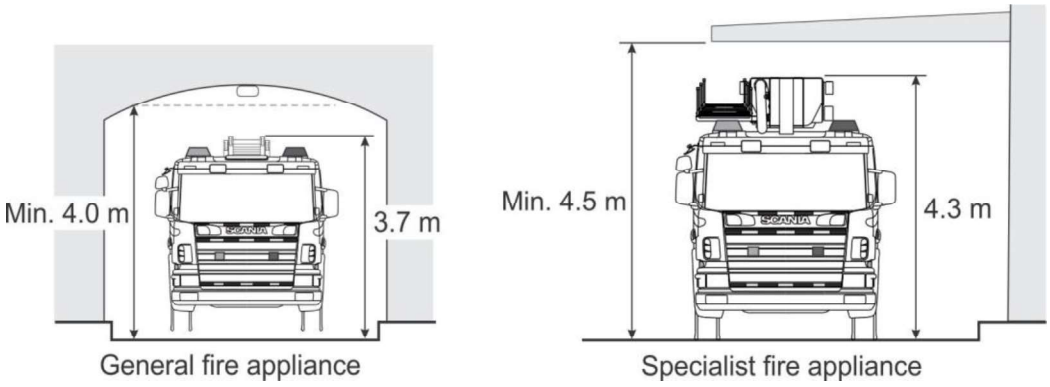


Figure 10 Minimum clearance height

7.5.2 Overhead clearance is to be free of any obstructions including building element (e.g. ceiling, beam, truss) bridge, archway, tunnel, walkway, barrier and any ceiling or overhanging fixtures such as lights, signs, poles, pipes, ducts, sprinkler heads etc.

7.5.3 Any restricted height clearance due to unavoidable overhead obstacle (e.g. low bridge) is to be clearly signed and indicate the actual maximum height clearance.

7.6 Grades and ramps

7.6.1 The grade of a *carriageway* or ramp is to be no steeper than 1:6 (16.6%).

Note: A grade of 1:8 (12.5%) or less is preferred for easier access. *AS 2890.2:2018* prescribes a maximum roadway/ramp grade of 1:6.5 (15.4%).

7.6.2 If the *carriageway* or ramp follows a curved or circular path, the maximum grade is to be no greater than 1:8 (12.5%) as measured along the centre line.

Note: The vehicle's chassis and body will twist and flex when negotiating a circular path, increasing with vehicles that have a longer *wheelbase*.

7.6.3 Ramps are to have transition grades between entry and exit which have a maximum rate of change of 1:16 (6.25%) for every 7 m of travel (see Figure 11 below).

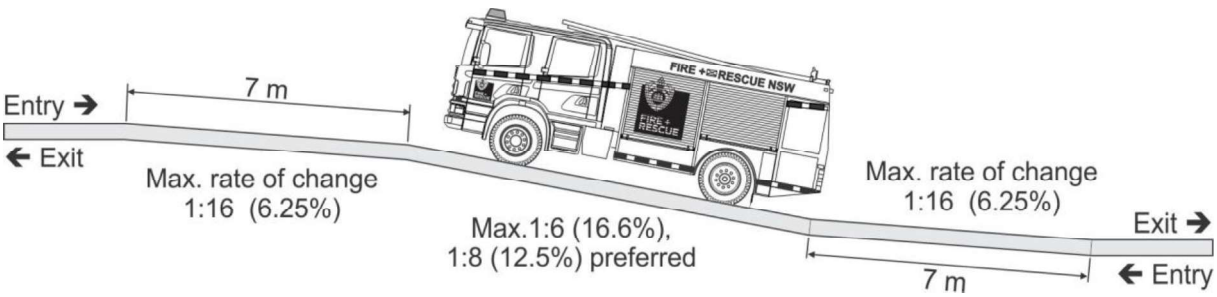


Figure 11 Maximum gradients of access ramps

7.6.4 Ramps that do not have a transition grade of at least 7 m are to have an approach and departure angle not exceeding 8° to ensure front and rear body overhang of a *fire appliance* does not contact the ground when negotiating the gradient change.

7.6.5 If any gradient change incorporates a recessed threshold (e.g. gutter or drain at site entrance driveway), the design should consider any reduced entry and exit clearance for the *fire appliance* (see Figure 12).

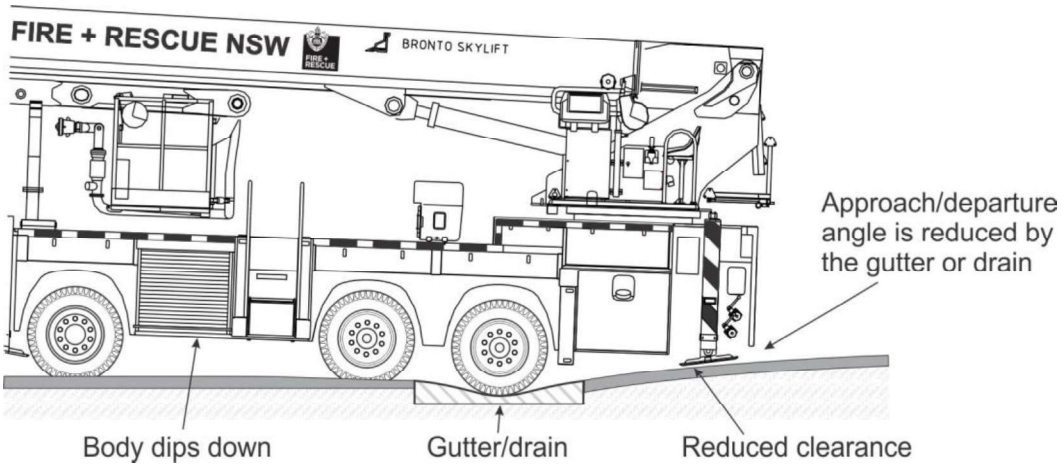


Figure 12 Reduced gradient clearance from recessed gutter

Note: Wheels will recede into any gutter or drain and reduce the effective approach and departure angle. Clearance is impacted most on *fire appliances* having long front and rear overhanging body sections (e.g. specialist *fire appliance*).

7.7 Security points and barriers

7.7.1 Gates, barriers and bollards installed to inhibit vehicle access for security purposes are to be either removeable, retractable or foldable so that a *fire appliance* can gain access to the site during an *emergency incident*, including access after-hours.

Note: A bypass should be provided for any weighbridge, vehicle station, loading bay or the like, if likely to be obstructed by a vehicle during normal operations.

7.7.2 Any vehicle access gate that is required to be locked, including any alternate vehicle access gate, should be secured with a non-hardened metal chain and lock (e.g. galvanised mild steel).

Note: Firefighters may need to force entry through the vehicle access gate using standard bolt cutters on the chain or lock.

7.7.3 All locks fitted to vehicle access gates and security devices are to be keyed alike, and a copy of the key deposited with the two nearest FRNSW *fire brigade stations* or kept with the site security if 24/7 security is provided for the site.

Note: *Premises* keys can be deposited directly with the local FRNSW *fire brigade stations* (see clause 10.5.5).

7.7.4 Any electrically operated vehicle access gate or security device should incorporate either mechanical override, fail-safe open mode, or activation by site security so that fire appliances can access the site in the event of fire.

8 Hardstand area

8.1 Design requirements

8.1.1 Designated *hardstand* areas are to provide a safe working space for firefighters to exit the vehicle and move around the fire appliance to remove and use equipment, including connecting fire hoses to the *fire appliance* (see Figure 13).

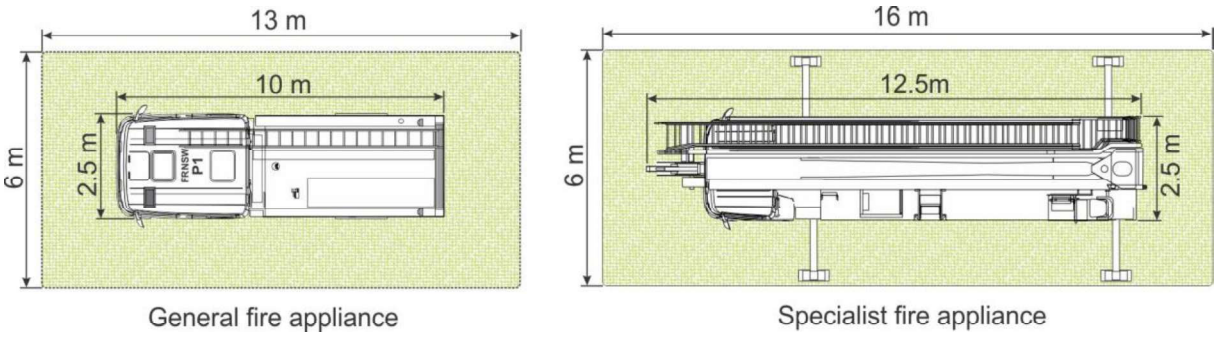


Figure 13 Minimum working space for hardstand area

8.1.2 The designated *hardstand* area is to be flat and level all weather surface which is clear of any obstructions that could be hazardous during operations (e.g. bollard, railing, fencing, sign, kerb, gutter, fixed structure, parked vehicle, storage, rubbish).

8.1.3 The designated *hardstand* area is to provide easy manoeuvring for the *fire appliance* to be positioned onto the *hardstand* from the *carriageway*.

8.1.4 Any section of *carriageway* may be used as a designated *hardstand* area only when the passing traffic flow will not be blocked by the positioned *fire appliance*.

Note: A minimum clearance of 3.5 m should be provided. A turnaround area may be used as a hardstand only when another fire appliance can safely turn around.

8.1.5 Any *hardstand* serving a *suction-connection outlet* is to have a working space which extends a minimum of 18 m from the point of connection to allow semi-rigid suction hose to be connected to the rear of the *fire appliance* (see Figure 14).

Note: *Fire appliances* typically use three x 2.4 m or two x 3.6 m long suction hoses (i.e. combined length of 7.2 m). Some FRNSW 'aerial pumpers' have a mid-mounted pump where the suction hose is connected to the side of the vehicle.

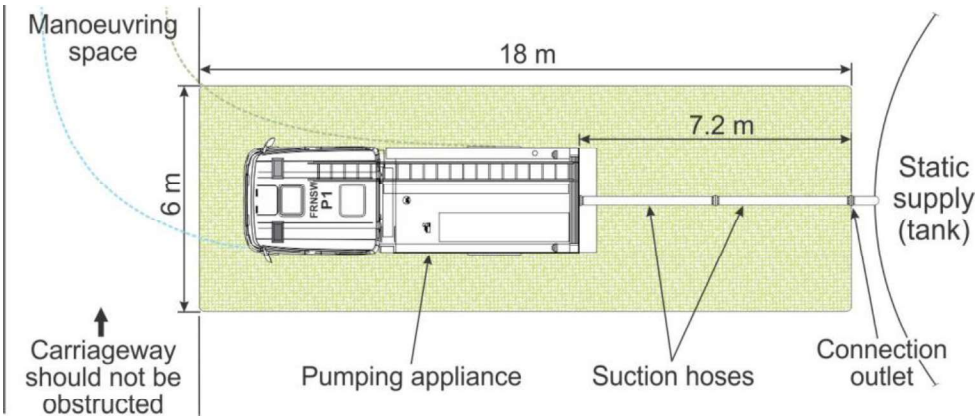


Figure 14 Hardstand area serving a suction-connection outlet

8.1.6 Any designated *hardstand* area serving a pumping *fire appliance* for firefighting operations (e.g. pumper using a feed fire hydrant) is to have appropriate guttering and drainage to remove any continuous water discharge from the *fire appliance*.

8.2 Hardstand locations

8.2.1 A *hardstand* is to be provided as required by *AS 2419.1—2005 Fire hydrant installations – System design, installation and commissioning*, and as otherwise nominated by the relevant authority having jurisdiction, including:

- within 20 m of any feed fire hydrant
- within 8 m of any fire hydrant booster assembly
- within 50 m of an external attack fire hydrant
- within 20 m of the access door to any external fire pumproom
- in front of any *suction-connection outlet* (e.g. tank, river, lake, dam, sea).

Note: The location must also consider other required factors such as firefighter access to the building and maximum hose coverage requirements.

8.2.2 Any *hardstand* area serving a *suction-connection outlet* is to be positioned at an angle not greater than 45º from the outlet's longitudinal direction (see Figure 15).

Note: Suction hoses are semi-rigid and only allow slight bending, therefore the *fire appliance* must be positioned relative to the connection outlet. The working space must be kept unobstructed at all times.

8.2.3 If multiple *fire appliances* are required to connect to *suction-connection outlets*, the *hardstand* areas should allow each *fire appliance* to operate independently without encroaching onto the other's working space (see Figure 15).

Note: *Suction-connection outlets* are not be located within 5 m of each other.

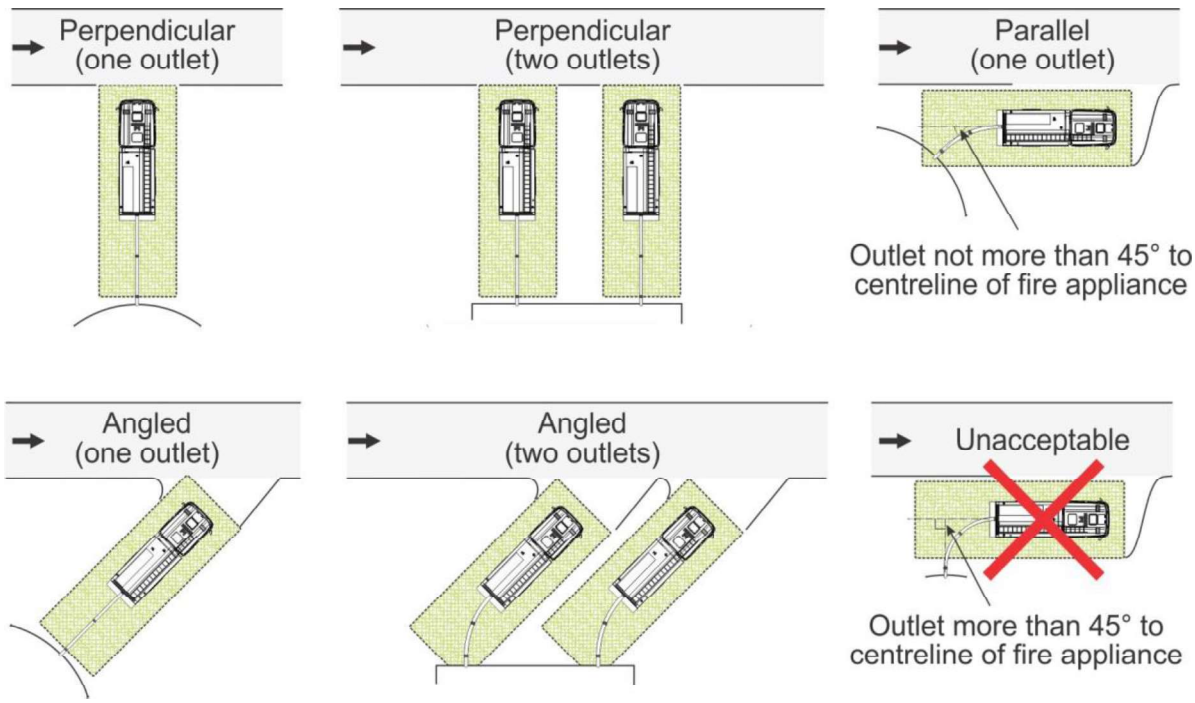


Figure 15 Example of orientation of hardstand area for suction-connection outlets

9 Weights and loads

9.1 Design requirements

9.1.1 All *carriageways* and *hardstand* areas are to be suitably formed and constructed having an all-weather sealed surface capable of supporting the *fire appliance*.

Note: Refer to the *Austroads Guide to Road Design* for best practice *carriageway* design and construction.

9.1.2 All *carriageways* and *hardstand* areas are required to maintain structural adequacy under load from a *fire appliance*, including when supported, elevated or reinforced by structural members (e.g. bridge, ramp, apron, suspended floor, wharf etc.).

Note: Load limited bridges unable to support a *fire appliance* should be avoided, particularly when alternate routes involve much longer distances.

9.2 Weight (static load)

9.2.1 The maximum weight of a general *fire appliance* is 15 tonnes, and 28 tonnes for a specialist *fire appliance*. The static load should be used when determining forces acting through load bearing structures and surfaces (see Figure 16).

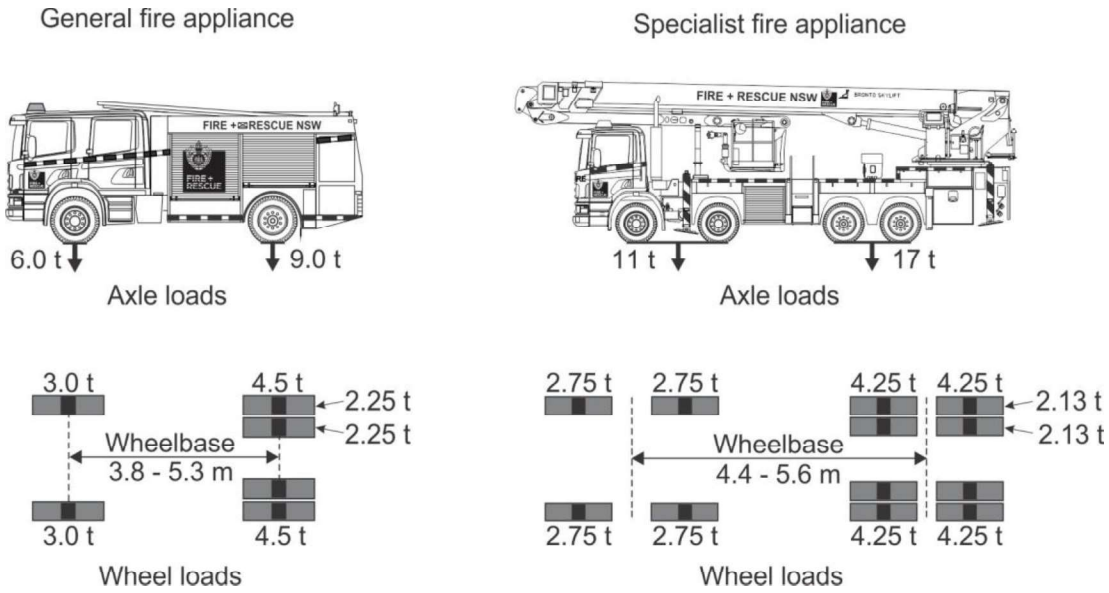


Figure 16 Static loads from fire appliances

9.2.2 The *Bronto Skylift F44 RLX aerial appliance* is the heaviest *fire appliance* in the FRNSW fleet and exceeds legal mass limits (i.e. operates by special permit).

9.2.3 The surface of any *carriageway* and *hardstand* area is to have enough binding and hardness to withstand point loads exerted thought each tyre (i.e. tyre pressure contact point as represented by black squares in Figure 16).

Note: Tyres are typically inflated around 850 kPa pressure. If the *carriageway* or *hardstand* has insufficient surface integrity, the point load will result in localised damage to the road surface (i.e. cracking of surface layer).

9.3 Dynamic load (of an aerial appliance)

9.3.1 An *aerial appliance* is fitted with hydraulically actuated *stabilisers* to support the vehicle when the *aerial apparatus* is operating and will either have two stabilisers at both the front and rear or just two *stabilisers* at the rear only (see Figure 17).

Note: *Stabilisers* extend out and lift the *fire appliance* to provide a stable operating base and prevent overbalancing. If any *stabiliser* cannot be fully extended the field of operations of the *aerial apparatus* will be restricted accordingly.

9.3.2 Movement of the *aerial apparatus* results in changing weight distribution and dynamic forces being exerted through the *stabilisers* (e.g. momentum from rotation, torsion from elevation/extension, weight from rescued persons, water stream reaction).

9.3.3 A bearing plate is positioned under each *stabiliser* to increase ground contact surface area and lower the pressure exerted on the ground. A *stabiliser* will only be deployed without a bearing plate when it is opposite to the intended working side.

Note: The lower pressure assists maintain surface integrity and minimises the likelihood of the *stabiliser* being pushed through the ground surface.

9.3.4 Bearing plates do not reduce the point load from each *stabiliser*. Designers need to consider the foundation and structural support under the *carriageway* surface, particularly when supported, elevated or reinforced by structural members (e.g. bridges, ramps, aprons, suspended floors, wharfs etc.).

Note: Consideration should be given to relocating or reinforcing underground services that may be damaged from high point loads (see Figure 17).

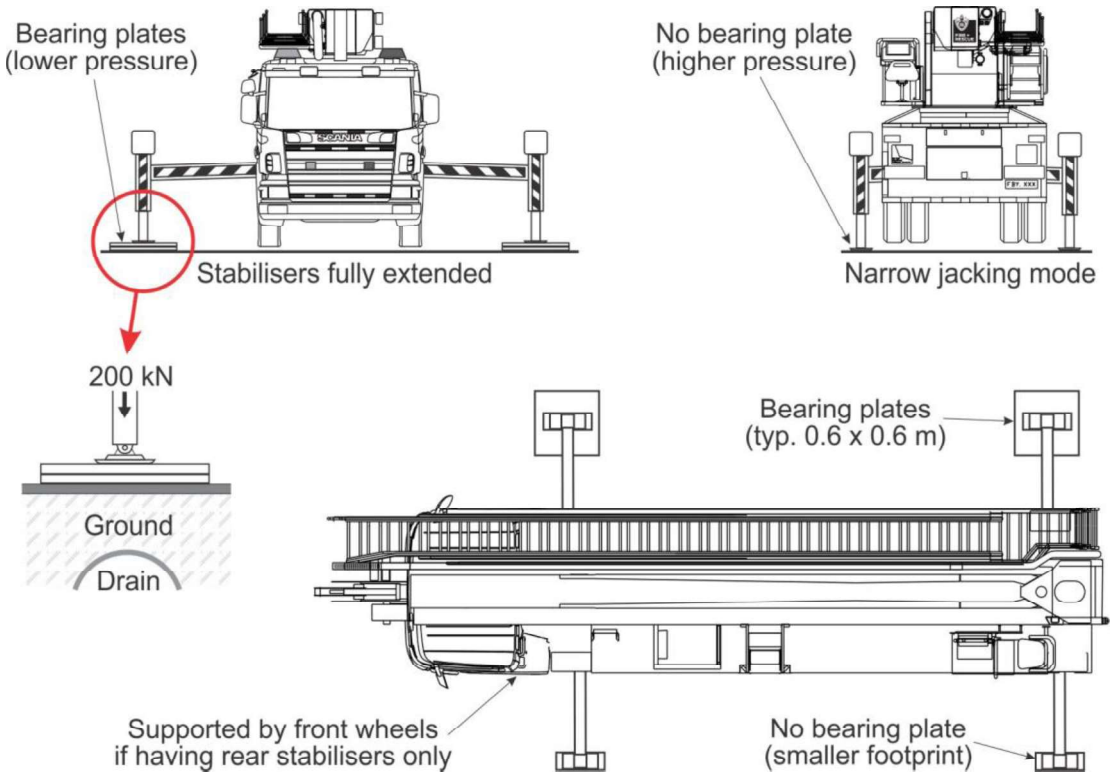


Figure 17 Typical operation of stabilisers and bearing plates

9.3.5 When the *Bronto Skylift F44 RLX aerial appliance* has a fully loaded cage (500 kg) at maximum extension and worst-case rotation angle (I.e. over a rear *stabiliser*), the maximum load exerted though a single *stabiliser* is shown in Table 3 (see Figure 18).

Maximum load through single stabiliser	
Force	200 kN
Mass	20,400 kg
Percentage of vehicle mass	70% of gross
Footplate pressure	11 kg/cm² (1080 kPa)
Bearing plate pressure	2.8 kg/cm² (275 kPa)

Table 3 Maximum dynamic loads of an aerial appliance

Note: Dynamic loads should be considered when determining forces acting through load bearing surfaces and structures, particularly when being supported, elevated or reinforced by structural members.

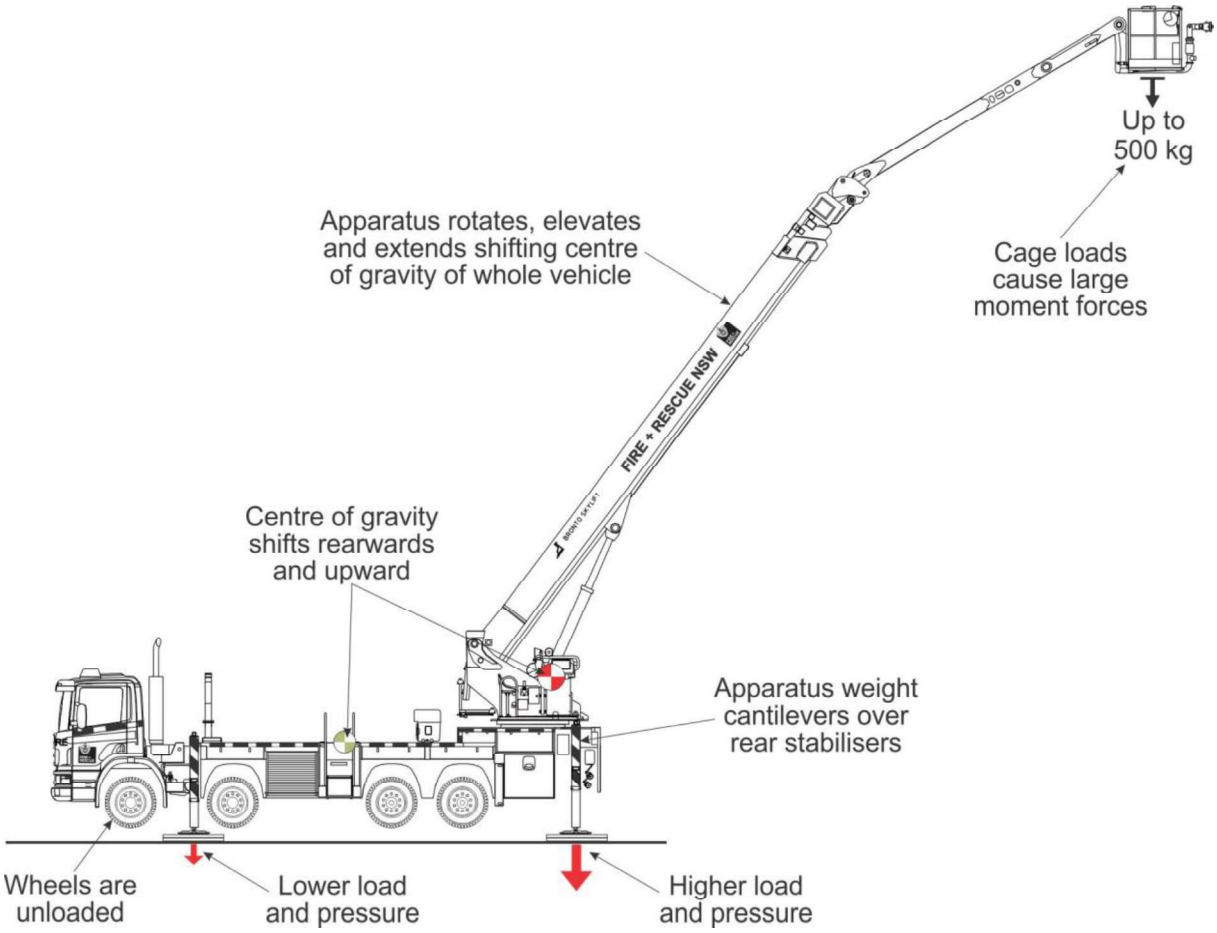


Figure 18 Dynamic loads exerted during aerial appliance operation

10 Considerations for development

10.1 NCC requirements

10.1.1 Performance requirement CP9 of the *NCC* states:

*Access must be provided to and around a building, to the degree necessary, for fire brigade **vehicles** and **personnel** to facilitate fire brigade intervention appropriate to –*
a) the function or use of the building; and
b) the fire load; and
c) the potential fire intensity; and
d) the fire hazard; and
e) any active fire safety systems installed in the building; and
f) the size of any fire compartment.

10.1.2 *Fire brigade vehicle* access is critical to *fire brigade* intervention. Performance requirement CP9 is to be considered in any performance-based design (i.e. *alternative solution*) where *fire brigade* intervention is to be verified.

Note: When identifying relevant performance requirements under clause A2.2(3)(b) of the *NCC*, CP1, CP2, CP9, DP5, EP1.3, EP1.5, EP1.6, EP2.2 and GP4.4 all require verification of *fire brigade* intervention and/or firefighting operations.

10.1.3 Except for Clause C2.3 of the *NCC*, there are no deemed-to-satisfy provisions directly applicable to the provision of *fire brigade vehicle* access to comply with performance requirement CP9.

Note: The *NCC* deemed-to-satisfy provisions deal with general firefighter access.

10.1.4 Design and planning of development should holistically consider *fire brigade vehicle* access for any type of major *emergency incident* (e.g. fire, explosion, accident, gas leak, hazardous material, structural damage or collapse, bomb threat, terrorism etc.).

Note: A major *emergency incident* will require a multiple alarm response; good *fire brigade vehicle* access will assist *fire brigades* and other emergency services to manage the incident and treat casualties.

10.2 Large isolated building

10.2.1 Clause C2.3 of the *NCC* allows the size of a fire compartment in a building to exceed that specified in Table C2.2 when the building is provided with perimeter vehicular access complying with Clause C2.4(b) of the *NCC*.

10.2.2 Clause C2.4(b) of the *NCC* requires the vehicular access to:

- provide continuous forward direction vehicular access around the building
- have a minimum unobstructed width of 6 m, with no part being more than 18 m from the building
- provide reasonable pedestrian access to the building
- have a load bearing capacity and unobstructed height suitable to permit the operation and passage of *fire brigade vehicles*, and
- be wholly within the allotment, except when a complying public road is used.

10.2.3 Any external panel walls must be designed to minimise the likelihood of external collapse onto the vehicular access *carriageway*, with emphasis on Clause 3(g) of Specification C1.11 of the *NCC*.

10.2.4 The unobstructed width of a *carriageway* may be less than 6 m only when:

a) the development is in an area where a specialist *fire appliance* is unlikely to attend (i.e. outside of major metropolitan areas)

b) the unobstructed width is not less than 4.5 m and the external wall adjacent the *carriageway* is a fire wall having a suitable fire resistance level (see Figure 19)

c) a performance-based design (i.e. *alternative solution*) has been undertaken and agreed to by FRNSW

d) openings in the fire wall are passenger doors only and suitably protected to maintain the required fire rating.

Note: A carriageway having a reduced unobstructed width will impact on *fire brigade* intervention, accessibility and safety.

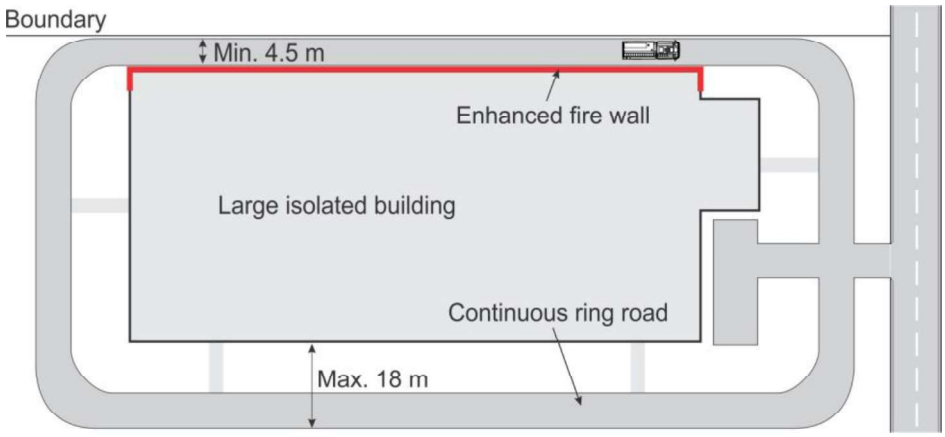


Figure 19 Large isolated building with reduced carriageway width

10.2.5 If the building is protected by an automatic fire sprinkler system, any awning over the *carriageway* is to also be protected by sprinkler system (see Figure 20).

Note: The sprinkler system is to be appropriate to the hazard and minimum clearance is to be maintained under the awning for *fire appliance* access.

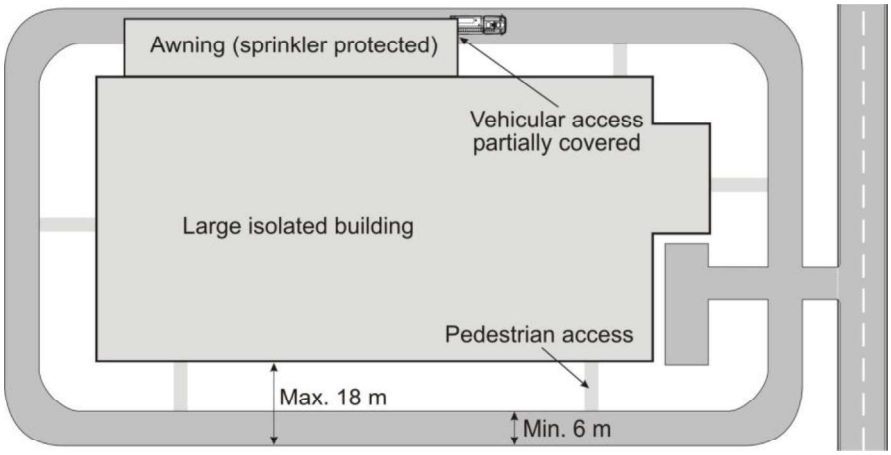


Figure 20 Large isolated building with awning over carriageway

10.2.6 If continuous forward travel around the building is not possible, a performance-based design (i.e. *alternative solution*) should be undertaken and agreed to by FRNSW.

10.3 Complex development

10.3.1 Development typically has a building adjacent to a public road providing easy access; modern development may be complex in design and require firefighters to negotiate a complicated route through the premises to undertake *fire brigade* intervention.

10.3.2 *Complex development* may involve several buildings which may be united (e.g. podium), clustered (e.g. urban precinct), or be a *major facility*. Such development is likely to have higher than normal occupation levels and/or risks.

10.3.3 *Complex development* may not require any specific *fire brigade vehicle* access other than to a designated entry point. However, this can have a significant adverse impact on operations during any *emergency incident*, including:

- increased *fire brigade* intervention times
- congestion of emergency vehicles and personnel at the designated entry
- not being able to position an *aerial appliance* within its field of operations
- confusion and delay from complicated routes through building, facility or site
- the need to carry equipment over greater distance to/from *fire appliances*
- greater dispersal of evacuees at multiple building evacuation points
- the need to move casualties over more distance to triage areas or ambulances

Note: A holistic assessment of *fire brigade vehicle* access for possible or likely major emergencies should be considered during the design phase, including provision of accessible *private roads* and *hardstand* areas as appropriate.

10.4 Buildings under 25 m effective height

10.4.1 Performance requirement CP9 of the *NCC* requires access be provided for *fire brigade vehicles* to facilitate *fire brigade* intervention. The *Guide to NCC Volume One* also states 'access for the *fire brigade* must be appropriate to their needs and the type of vehicles and equipment to be used'.

10.4.2 In regard to the 25 m *effective height*, Clause D1.2(b)(i) of the *Guide to NCC Volume One* states that 25 m is 'the effective operating height of *fire brigade* ladders and other firefighting and rescue equipment'.

Note: The *Guide to NCC Volume One* further identifies the role of the *fire brigade* 'to undertake external rescue or firefighting from ladders' in clauses D1.2(d)(i), D1.8 and E1.8(a), performance requirement EP1.4, and Table E1.5.

10.4.3 All buildings should have suitable 'provision for escape' from each storey, such as multiple required exits (e.g. building over 25 m) or a single required exit with an alternate means of emergency escape (e.g. fire brigade ladders).

Note: During *fire brigade* intervention, a portable extension ladder can only reach up to 10 m and an *aerial appliance* up to 25 m (see Figure 21).

10.4.4 Any non-sprinklered building more than three storeys above ground, and having a single stairway serving each storey (i.e. under 25 m building), should demonstrate that an *aerial appliance* can be positioned to provide means of emergency escape.

Note: If an *aerial appliance* cannot be suitably positioned to provide means of emergency escape, an *alternative solution* should be sought to demonstrate compliance with performance requirement CP9 of the *NCC*.

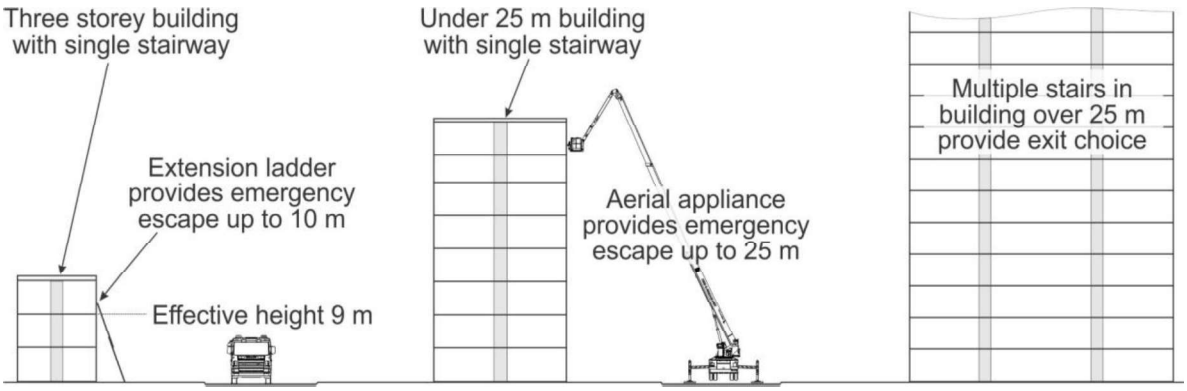


Figure 21 Using fire brigade ladders to provide emergency escape

10.4.5 An *aerial appliance* has a limited field of operations that requires it to be positioned adjacent to and near the building; any part of a building that is set back from the *carriageway* may be outside the reach of the *aerial appliance* (see Figure 22).

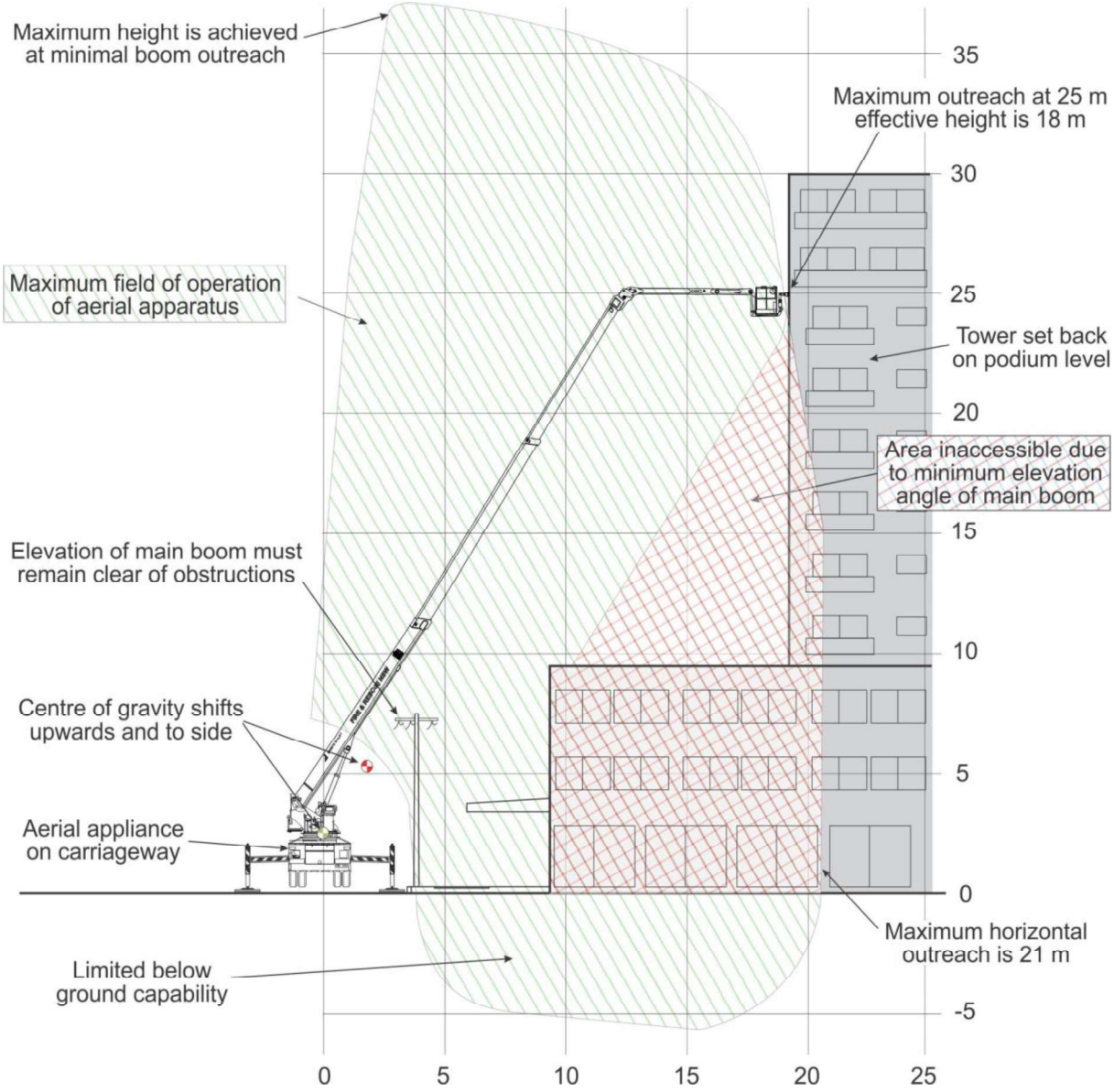


Figure 22 Typical field of operations of an aerial appliance

10.5 Building access

10.5.1 Buildings with a monitored automatic fire alarm system are to provide firefighters access into the *DBEP* and to the fire control centre (e.g. if located within a room off the main entrance) including after-hours.

Note: Any delay in gaining access during an *emergency incident* may be life critical.

10.5.2 When building access through an emergency exit door is necessary in an emergency (e.g. to enter a fire isolated stairway to access upper storeys), the emergency exit door is to be openable from the outside using either a key, fob or security passcode.

10.5.3 Doors to essential services and systems including pump room, sprinkler control valve room, fire control room, facility emergency control centre etc. are to be kept unlocked or accessible using either a key, fob or security passcode.

10.5.4 If the building has an emergency lift, a copy of the fire service lift key is to be kept at the fire control centre and clearly identified.

10.5.5 A copy of all *premises* keys, fire service lift keys, electronic access fob or security passcode should be deposited with the two nearest FRNSW *fire brigade stations*.

Note: Keys are kept in a wire sealed bag within a locked cabinet until needed during notification of alarm. The owner may apply their own seal if they wish.

10.5.6 When multiple *premises* keys are being kept or deposited, individual keys are to be readily identifiable (e.g. engraved, numbered or colour coded).

10.6 Signage and wayfinding

10.6.1 Clear signage should be provided at the *DSEP* to direct *fire brigade vehicles* around the site (e.g. buildings, structures, roadways, access points, fire safety systems, *hardstand* areas, assembly areas, storage areas, hazardous chemicals etc.).

10.6.2 Clear signage should be provided at the *DBEP* to direct emergency service personnel around the building (e.g. access/egress points, emergency lifts, refuge areas, fire safety systems, control rooms, utilities and services etc.).

10.6.3 A block plan located at the fire control centre is to clearly indicate how and where firefighters are to access different areas of the building including upper storeys, especially when exiting the *DBEP* to enter via an emergency exit.

10.6.4 When multiple exits discharge at a common point, each exit door should have signage identifying the area/floors the exit will provide access to (see Figure 23).

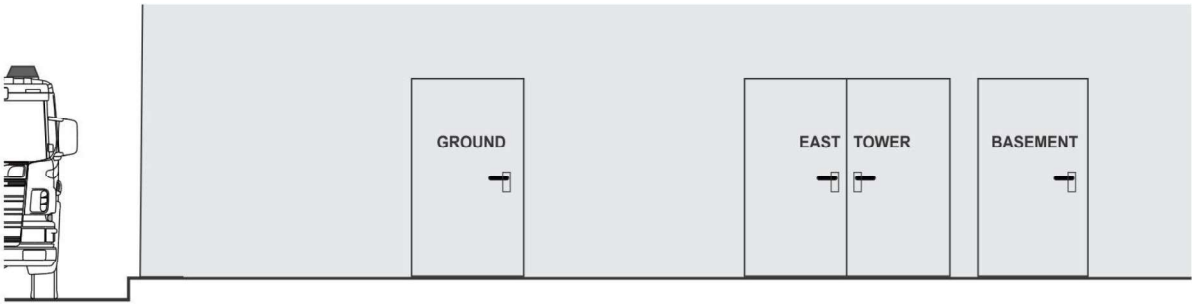


Figure 23 Example of exit door signage to assist firefighters

10.6.5 All buildings, towers, areas and floors are to be adequately labelled to assist with wayfinding, including corresponding identification provided on the safety side of emergency exit doors (e.g. 'East Tower – Level 3' sign being in the lift lobby as well as on the reverse side of all emergency exit doors on the same storey).

Note: Firefighters ascending fire stairs must be able to readily identify their actual location (e.g. floor level).

10.6.6 Signage is to be permanently affixed, weather resistant if external, high contrasting (e.g. black on white), clearly visible and readable at the expected viewing distance.

Note: Font height of signage is to be not less than 10 mm per metre of viewing distance as per *AS 1319–1994 Safety signs for the occupational environment*.

10.7 Other operational issues

10.7.1 The scale of response by *fire brigades* and other emergency services is proportional to the nature of the emergency. A major *emergency incident* will require a multiple alarm response by multiple combat and support agencies.

10.7.2 Any *complex development* having multiple site access points to deal with an *emergency incident* is to have all *DSEPs* clearly identified with signage to ensure it does not get obstructed (e.g. 'Emergency vehicle access – do not block').

10.7.3 Additional *fire brigade vehicles* may be responded to provide extra personnel for the *emergency incident*. These vehicles will likely be staged at an assembly area nearby.

Note: *Fire appliances* generally have a crew of four to six firefighters. At a large fire, many *fire appliances* will respond to provide additional firefighters.

10.7.4 An *aerial appliance* will be positioned in the most operationally advantageous position having clear overhead working space to safely operate within its field of operation.

10.7.5 When fire occurs in a building not having a fire-resisting roof, the risk of roof collapse may require firefighters to not enter the building and fight the fire externally.

10.7.6 When fire occurs in a building not having Type C construction, the risk of wall collapse may require firefighters to fight the fire defensively outside collapse zones.

Note: When external walls are tilt-slab panels, the collapse zone is 1.5 time the height of the wall. *Fire appliances* will be strategically positioned at corners.

10.7.7 When significant firefighting operations is being undertaken *carriageways* and *hardstand* areas may be partly or fully obstructed by fire hose running between *fire appliances*, water sources and buildings.

Note: If fire hose is required to cross the carriageway (e.g. to access a street fire hydrant), passing road traffic may be stopped for safety reasons

10.7.8 Development comprising multiple privately-owned dwellings, where not all dwellings have direct frontage onto a public road, is to have *fire brigade vehicle* access as outlined within *Firefighting access and water for minor residential development*.

11 Bush fire prone land

11.1 The NSW RFS *Planning for Bush Fire Protection – A guide for councils, planners, fire authorities and developers* (PBP) applies to all development on 'bush fire prone land' within NSW.

Note: Bush fire prone land is mapped by each respective council under *section 146* of the *Environmental Planning and Assessment Act 1979*.

11.2 As all general *fire appliances* have comparable specifications, complying with the requirements of this guideline will ensure PBP requirements are also satisfied.

11.3 Suitable *fire brigade vehicle* access is to be provided to within 4 m of a static water supply if no reticulated water supply is available (e.g. 10,000 L tank).

11.4 Perimeter roads on a bush fire interface are to provide not less than 8 m clear width (i.e. exclusive of parking) so that firefighters can safely operate when heavy smoke reduces visibility across the road.

11.5 Access roads are to allow traffic to pass by having passing bays at least 20 m long by 2 m wide provided every 200 m if the *carriageway* does not allow traffic to freely pass (see Figure 24).

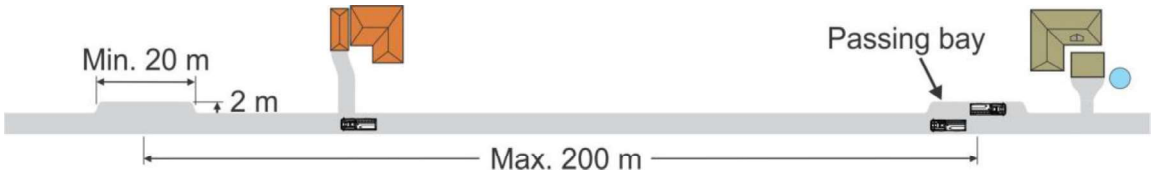


Figure 24 Example of passing bays on road in bush fire prone land

12 Local area traffic management (LATM)

12.1 Design requirements

12.1.1 *LATM* is the installation of *traffic control devices* to purposely modify speed, volume and composition of traffic in a local area. LATM devices will slow or restrict all traffic including *fire appliances* that are responding with speed to an *emergency incident*.

12.1.2 Traffic engineers and planners should consider the effects of *LATM* on *fire brigade* response. *LATM* should be implemented strategically to achieve optimum balance of managing traffic without detrimentally delaying response times.

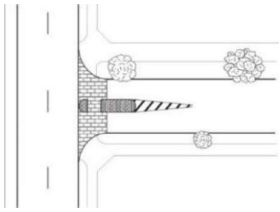
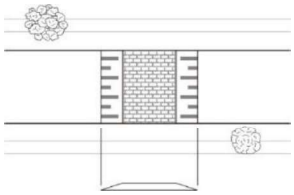
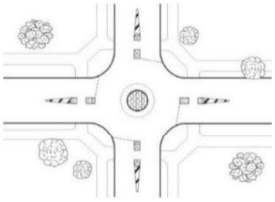
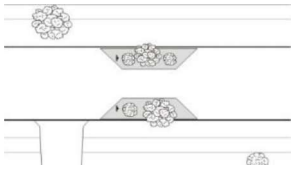
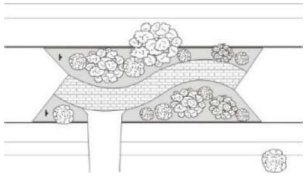
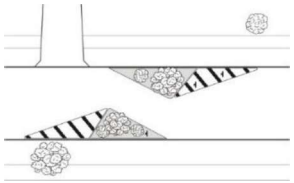
12.1.3 *LATM* impact on both public and *private roads*. Roads that prohibit heavy vehicles (i.e. trucks) still need to be accessible by *fire brigade vehicles*, including by a specialist *fire appliance*, that is responding to an *emergency incident*.

Note: Improper *LATM* design may delay or terminate the response of a *fire appliance* and potentially result in loss of life and/or property.

12.2 LATM devices

12.2.1 *LATM* devices are to comply with *AS 1742.13 Manual of uniform traffic control devices - Local area traffic management*.

12.2.2 *Fire brigades* prefer *LATM* device that are easily negotiated by a *fire appliance*. The impact on *fire appliance* access by each *LATM* device is provided in Table 3 below.

LATM device	Impact to fire appliance access
Perimeter treatment 	• Street entry is at very low speed as extra caution is required. • The treatment should not reduce entry/departure angles. • Any island should allow negotiation by turning fire appliances. • Any island should not exceed kerb clearance dimensions. • Non-mountable islands may impede fire appliance response. • Traffic bank up may occur on street exit, impeding response. • Landscaping should not restrict visibility at intersection.
Road hump 	• Actual design will greatly impact on negotiating speed. • Flat top hump (shown) preferred over Watts profile hump. • Shallow entrance/exit allow better negotiating and reduce delays. • Short humps require slow negotiating and results in delays. • Humps will strain vehicle suspension and increase wear and tear. • Should be installed strategically; significant delays to response times will result if many are installed locally.
Roundabout 	• Design should allow negotiation by turning fire appliances. • Roundabout should not exceed kerb clearance dimensions. • Approach islands should not exceed kerb clearance dimensions. • Non-mountable roundabouts and/or approach islands may impede fire appliance response. • Traffic bank up may occur if through traffic is constant. • Landscaping should not restrict visibility at intersection.
Single-lane slow point 	• Minimum width of 3.2 m required. Width of 4.0 m preferred to allow easier and speedier negotiating by fire appliance. • Conflict with opposing traffic may occur if road is dual direction. • Should not be used with another *LATM* device (e.g. road hump) • Landscaping should not adversely restrict visibility past device.
Driveway link 	• Design should allow easy negotiation and constant line of sight. • Negotiation speed very slow because of manoeuvring required. • If negotiation is not possible for a specialist appliance an alternative route is needed significantly delaying response times. • Surfaces must be suitable for loads from fire appliances. • Conflicts with opposing traffic may occur. • Landscaping should not adversely restrict visibility past device.
Single-lane angled slow point 	• Design should allow easy manoeuvring on approach and exit, especially for a specialist fire appliance. • Any kerbs should not exceed kerb clearance dimensions. • Should be installed strategically; significant delays to response times will result if many are installed locally. • Access may be restricted by improperly parked vehicles. • Conflicts with opposing traffic may occur. • Landscaping should not adversely restrict visibility past device.

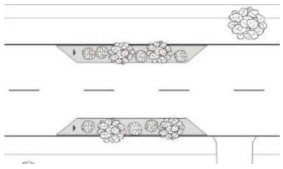
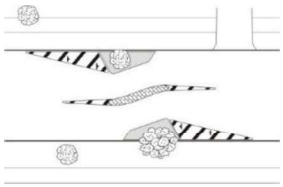
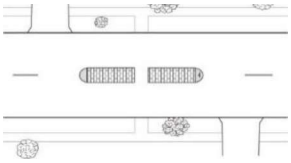
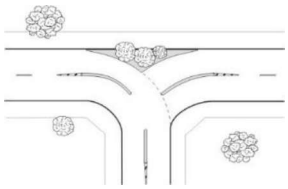
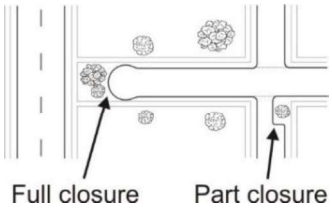
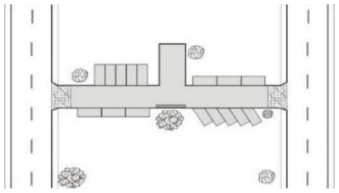
LATM device	Impact to fire appliance access
Two-lane slow point 	• Preferred method of speed reduction (i.e. over road humps). • Should not be used with another *LATM* device (e.g. mid-block island, road hump). • Landscaping should not adversely restrict visibility past device.
Two-lane angled slow point 	• Design should allow easy manoeuvring on approach and exit, especially for a specialist fire appliance. • Kerbs or islands should not exceed kerb clearance dimensions. • Non-mountable islands may impede fire appliance response. • Should be installed strategically; significant delays to response times will result if many are installed locally. • Access may be restricted by improperly parked vehicles. • Landscaping should not adversely restrict visibility past device.
Mid-block island 	• Preferred method of speed reduction (i.e. over road humps). • Island is generally used for pedestrian refuge. • Any island should not exceed kerb clearance dimensions. • Non-mountable islands may impede fire appliance response. • Landscaping should not restrict visibility; pedestrians require unobstructed view of traffic and vice-versa.
Modified intersection 	• Design should allow easy manoeuvring through intersection • Intersection priority can be confusing when responding emergency vehicles are encountered. • Any island should allow negotiation by turning fire appliances. • Any island should not exceed kerb clearance dimensions. • Non-mountable islands may impede fire appliance response. • Traffic bank up may occur, impeding response. • Landscaping should not restrict visibility at intersection.
Road closure 	• Diverts traffic onto adjacent roads which may increase congestion and result in delays to response times. • Detour and alternative route required when full road closure. • Suitable turnaround area for fire appliance should be provided if full road closure is used. • Minimum width of 3.2 m required if part road closure is used. • Landscaping should not restrict visibility at intersection when part road closure is used.
Shared zone 	• Careful design required to ensure negotiation by fire appliances. • Negotiation speed very slow due to conflicts with pedestrians, traffic and parked vehicles being encountered. • Access may be restricted by improperly parked vehicles. • Surfaces must be suitable for loads from fire appliances. • Generally avoided unless *emergency incident* is in shared zone. • Local traffic bank up may occur, impeding response.

Table 4 Impact of LATM on fire appliance access and response

13 References

Australian Building Codes Board, *National Construction Code 2019, Building Code of Australia Volume One*, 2019, Canberra ACT, Australia.

Austroads, *Guide to Road Design* (document set), 2014, CanPrint Communications, Fyshwick ACT, Australia.

National Heavy Vehicle Regulator, *National heavy vehicle mass and dimension limits*, 2016, Fortitude Valley QLD, Australia.

National Heavy Vehicle Regulator, *National heavy vehicle inspection manual Version 2.3*, 2018, Fortitude Valley QLD, Australia.

NSW Rural Fire Service, *Planning for bush fire protection – A guide for councils, planners, fire authorities and developers*, 2017, Lidcombe NSW, Australia.

Standards Association of Australia, *AS 2419.1–2005 Fire hydrant installations. Part 1: System design, installation and commissioning*, Standards Australia, 2005, Sydney NSW, Australia.

Standards Association of Australia, *AS 1319–1994 (R2018) Safety signs for the occupational environment*, Standards Australia, 1994, Sydney NSW, Australia.

Standards Association of Australia, *AS 1742.13–2009 Manual of uniform traffic control devices - Local area traffic management*, Standards Australia, 2009, Sydney NSW, Australia.

Standards Association of Australia, *AS 2890.2:2018 Parking facilities, Part 2: Off-street commercial vehicle facilities*, Standards Australia, 2018, Sydney NSW, Australia.

Appendix A – Pump performance of fire appliances

A1 General

Most *fire appliances* are fitted with a fire pump that have varying pumping capacity depending on the type of pump, installation, connections and efficiency (i.e. condition) of the fire pump. When boosting a fire hydrant and/or sprinkler system, the highest capacity pump available at the scene will be typically be used.

A standard urban *fire appliance* has a maximum of four 65 mm inlets and outlets, so fire brigade booster inlets are grouped into a maximum of four per *fire appliance*. Under *AS 2419.1–2005*, fire brigade booster inlets are calculated to flow at 10 L/sec per inlet.

Note: If the required fire hydrant and/or sprinkler system performance exceeds 40 L/sec, then a second *fire appliance* will be required to boost the additional inlets.

A standard urban *fire appliance* also has a single large bore suction inlet to take water from a static water source (e.g. on-site storage tank). A *suction-connection outlet* is required for each *fire appliance* required to boost the system.

Under *AS 2419.1–2005*, if more than eight fire brigade booster inlets are required for the system (i.e. exceeds 80 L/sec), then a separate fire brigade booster assembly and third *fire appliance* is required.

A standard urban *fire appliance*, being an FRNSW Class 3 pumper, is capable of delivering 50 L/sec through four fire hydrant booster inlets. A performance-based design (i.e. *alternative solution*) may be sought to increase the flow rate per booster inlet to 12.5 L/sec.

Note: If the required fire hydrant and/or sprinkler system performance is 50 L/sec (normally five booster inlets), an alternative solution can remove the need for the fifth booster inlet, second *fire appliance* and second *suction-connection outlet*.

A performance-based design (may also be sought for increased flow rate per booster inlet (at 12.5 L/sec) to remove the need for a separate fire brigade booster assembly.

Note: If the required fire hydrant and/or sprinkler system performance is 100 L/sec (i.e. ten booster inlets), an alternative solution can remove the need for a third *fire appliance*, third *suction-connection outlet* and second fire brigade booster assembly.

Any performance-based design proposing an alternative solution as discussed in this Appendix should be referred to FRNSW for consultation.

A2 FRNSW fire appliances

Class 1 Tanker
- Min. 1,500 L/min at 1,000 kPa
- Min. 2,200 L water
- Two 65 mm outlets
- Two 65 mm inlets
- One 100 mm inlet (at rear)
- 4x4 crew-cab chassis

Maximum hydrant design
- 20 L/sec (1,200 L/min)
- 2 inlet/outlet design
- One large bore *suction-connection* (using a 150-100 mm Storz reducer)

Note: Light tankers used for hazard reduction role are excepted.

Class 2 Pumper
- Min. 2,900 L/min at 1,000 kPa
- Min. 2,000 L water
- Four 65 mm outlets
- Four 65 mm inlets
- One 125 mm inlet (at rear)
- 4x2 crew-cab chassis

Maximum hydrant design
- 40 L/sec (2,400 l/min)
- 4 inlet/outlet design
- One large bore *suction-connection* (using a 150-125 mm Storz reducer)

Class 3 Pumper
- Min. 3,500 L/min at 1,000 kPa
- Min. 1,800 L water
- Four 65 mm outlets
- Four 65 mm inlets
- One 150 mm inlet (at rear)
- 4x2 crew-cab chassis

Maximum hydrant design
- 40 L/sec (2400 l/min)
- 4 inlet/outlet design
- One large bore *suction-connection*
- Up to 50 L/sec possible (via *alternative solution* of 12.5 L/sec per inlet/outlet)

Aerial Pumper
- Min. 5,000 L/min at 1,000 kPa
- or 2,500 L/min at 2,000 kPa
- 2,000 L water
- Four 65 mm outlets
- Four 65 mm inlets
- 150 mm inlets (side or rear)
- 6x4 crew-cab chassis

Maximum hydrant design
- 40 L/sec (2400 l/min)
- 4 inlet/outlet design
- One large bore *suction-connection*
- Up to 50 L/sec possible (via *alternative solution* of 12.5 L/sec per inlet/outlet)

A3 NSW RFS fire appliances

Category 1 or 3

- Min. 1,100 L/min at 1,000 kPa
- 3,500 L water
- One 65 mm outlet, and
- two 38 mm outlets
- One 75 mm inlet (at rear)
- 4x4 crew-cab chassis (Cat 1)
- 4x2 crew-cab chassis (Cat 3)

Maximum hydrant design

- 10 L/sec (600 L/min)
- 1 inlet/outlet design
- One small bore *suction-connection* (using a 75-65 mm Storz reducer)

Category 10

- Min. 2,100 L/min at 1,000 kPa
- 1,800 L - 2,400 L water
- Two 65 mm outlets, and one 38 mm outlet
- Two 65 mm inlets
- One 100 mm inlet (at rear)
- 4x2 crew-cab chassis

Maximum hydrant design

- 20 L/sec (1,200 L/min)
- 2 inlet/outlet design
- One large bore *suction-connection* (using a 150-100 mm Storz reducer)

Category 11

- Min. 2,000 L/min at 1,000 kPa
- 1,800 L water
- Two 65 mm outlets, and one 38 mm outlet
- Two 65 mm inlets
- One 100 mm inlet (at rear)
- 4x4 crew-cab chassis

Maximum hydrant design

- 20 L/sec (1,200 L/min)
- 2 inlet/outlet design
- One large bore *suction-connection* (using a 150-100 mm Storz reducer)

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