Riskcon engineering

Fire Safety Study

88 Murrays Flat Road, Towrang NSW 2580

Towrang Metal Recycling Facility
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Date 29/09/2025

Fire Safety Study

88 Murrays Flat Road, Towrang NSW 2580

Towrang Metal Recycling Facility

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Quality Management

Rev	Date	Remarks	Prepared By	Reviewed By
A	23rd July 2025	Draft issued for comment	Jason Costa	Renton Parker
0	21st August 2025	Issued final	Zachary Cohn	
1	29th September 2025	Addressed client comments		

Executive Summary

Background

Sydney Metal Traders Pty Ltd has proposed to develop a new scrap metal waste recycling facility at 88 Murrays Flat Road, Towrang NSW 2580 (Lot 3 DP251779). The site has been subject to Secretary Environmental Assessment Requirements (SEARs) which require addressing Fire and Incident Management within the Environmental Impact Statement assessment. To address this requirement, it has been proposed to develop a Fire Safety Study in accordance with the guidance from the Department of Planning's Hazardous Industry Planning Advisory Paper (HIPAP) No. 2 - Fire Safety Study Guidelines (Ref. [1]), including review against the NSW Fire and Rescue guideline *Fire Safety in Waste Facilities 2020 (Ref.* [2]*)*.

Sincorp, on behalf of Sydney Metal Traders, has requested Riskcon to prepare the FSS for the site per HIPAP No. 2 and the FRNSW Guideline.

Conclusions

A Fire Safety Study developed per the HIPAP No. 2 guidelines was prepared for the Sydney Metal Traders Pty Ltd facility at 88 Murrays Flat Road, Towrang NSW 2580. The FSS assessed the potential for fire risks to occur at the site to determine whether the fire detection, prevention, protection and mitigation measures are adequate for the site. Where improvements could be made these are documented as recommendations.

Based on the assessment, it is concluded that the designs and proposed fire protections can adequately manage the risks, subject to the recommendations below.

Recommendations

Based on the analysis, the following recommendations have been made:

- Ensure a means of smoke or fire detection within stockpiles is provided for when personnel are not on site, such as with thermal cameras.
- Consider providing portable fire extinguishers to mobile plant involved with managing the stockpiles.
- Provide hydrant coverage for the unprocessed mixed metal stockpiles, ensuring hydrants are not within 10 m of the pile.
- The potential for the isolation valves to be automatically closed upon fire detection (i.e. alarm) shall be considered.
- Isolation valves shall be tested every six (6) months to ensure the valves do not seize and become stuck in the open position.
- A site emergency response plan and emergency services information booklet shall be prepared for the site to fully document the emergency scenarios and the appropriate responses to those emergency scenarios.
- Dry powder extinguishers shall be readily accessible from waste storages to provide quick response by site personnel in the event of a fire.
- Operators shall be trained in the use of site fire extinguishers.

- A detailed pressure loss calculation shall be prepared for the most disadvantaged hydrant to demonstrate compliance with AS 2419.1-2017.
- A fire equipment layout drawing shall be prepared for the site by a competent person, indicating all fire controls (extinguishers, hydrants, hose reels, etc.).
- Provide 288 m^3 water supply for firefighting purposes in the supply tanks.

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Abbreviations

Abbreviation	Description
AS	Australian Standard
BCA	Building Code of Australia
CBD	Central Business District
EPA	Environmental Protection Agency
FBIM	Fire Brigade Intervention Model
FSS	Fire Safety Study
FRNSW	Fire & Rescue New South Wales
HIPAP	Hazardous Industry Planning Advisory Paper
MCI	Mixed Commercial & Industrial

1.0 Introduction

1.1 Background

Sydney Metal Traders Pty Ltd has proposed to develop a new scrap metal waste recycling facility at 88 Murrays Flat Road, Towrang NSW 2580 (Lot 3 DP251779). The site has been subject to Secretary Environmental Assessment Requirements (SEARs) which require addressing Fire and Incident Management within the Environmental Impact Statement assessment. To address this requirement, it has been proposed to develop a Fire Safety Study in accordance with the guidance from the Department of Planning's Hazardous Industry Planning Advisory Paper (HIPAP) No. 2 - Fire Safety Study Guidelines (Ref. [1]), including review against the NSW Fire and Rescue guideline *Fire Safety in Waste Facilities 2020 (Ref.* [2]*)*.

Sincorp, on behalf of Sydney Metal Traders, has requested Riskcon to prepare the FSS for the site per HIPAP No. 2 and the FRNSW Guideline.

1.2 Objectives

The objectives of the FSS are to:

- Identify potential fire hazards by reviewing the site operations and storages for the potential to initiate or become involved in a fire including flammables or combustible materials which may be present at the site.
- Assess the consequence of incidents by identifying heat radiation impacts from potential fire sources at the site and determine the potential impacts on the surrounding areas and fire protection system.
- Ensure that the proposed fire prevention, detection, protection and fighting measures are appropriate for the specific fire hazards and adequate to meet the extent of potential fires. This includes estimating requirements for fire-fighting water supply based on demand, containment capacity of contaminated fire-fighting water, and first aid fire protection equipment.

1.3 Scope of Services

The scope of work is for the preparation of an FSS for the Sydney Metal Traders facility at 88 Murrays Flat Road, Towrang NSW 2580 to assess the potential hazards at the site to ensure the fire protection systems are commensurate with the identified hazards. Should any additional studies be required these are not included within the scope of works. No other sites are included within the scope of works.

1.4 Proposal Description

Sydney Metal Traders Pty Ltd proposes to develop and operate a Metal Recycling Facility (the Facility) at 88 Murrays Flat Road, Towrang NSW 2580 (Lot 3 DP251779) (the Site). The Facility is designed to process up to 30,000 tonnes per annum (tpa) of ferrous and non-ferrous scrap metals through receival, sorting, cutting, shredding and storage operations.

The Site is located within the Goulburn Mulwaree Local Government Area and is zoned E4 General Industrial under the *Goulburn Mulwaree Local Environmental Plan* 2009. Development of a metal recycling facility is permissible with consent in this zone. The total lot area is approximately 32.3 hectares, with the operational footprint occupying 6.6 hectares along the western portion of the

site. The Site is located within the Sydney Drinking Water Catchment, and the Proposal is therefore classified as Designated Development under Clause 45(4)(c) of Schedule 3 of the *Environmental Planning and Assessment Regulation* 2021. As a result, an Environmental Impact Statement (EIS) is required, and the application will be assessed by the Southern Regional Planning Panel as Regionally Significant Development.

2.0 Methodology

2.1 Fire Incident and Management Plan Approach

The following methodology was used in the preparation of the FSS for the facility. The methodology is to follow items required by HIPAP No. 2 and FRNSW *Fire Safety in Waste Facilities 2020*.

- The fire hazards associated with the facility were identified to determine whether there were any fire or explosion hazards that may impact offsite or result in a potential to escalate. Where fire hazards with the potential to impact offsite or escalate were identified, these were carried forward for consequence assessment.
- The heat radiation impacts or overpressure impacts (consequences) from each of the postulated incidents from the proposed equipment were then estimated and potential impacts on surrounding areas assessed.
- Impacts of the fires from the proposed equipment were plotted on a layout plan of the proposed facility, to determine whether heat radiation impacts any critical areas (i.e. adjacent storage areas, fire services, safety systems, etc.) and whether such impact affected the ability of fire fighters to respond to the postulated fire. The heat radiation impact from incidents at adjacent sites on the buildings and structures at the facility were then assessed against the maximum permissible levels in HIPAP No. 4 (Ref. [3]).
- The firefighting strategies were then assessed to determine whether these strategies require update in light of the location of the proposed equipment and storage areas.
- The response times for Fire & Rescue NSW (FRNSW) in the immediate vicinity were assessed. In addition, further out lying FRNSW stations were included to provide a ‘back-up plan’ in the event that the closest fire brigades were unable to attend.
- A report was then developed for submission to the client and the regulatory authority.

2.2 Limitations and Assumptions

In this instance, the FSS is developed based on applicable limitations and assumptions for the development which are listed as follows:

- The report is specifically limited to the project described in **Section 2.1**.
- The report is based on the information provided.
- The report does not provide guidance in respect of incidents that relate to sabotage or vandalism of fire safety systems.
- The assessment is limited to the objectives of the guidelines issued in HIPAP No. 2 and does not consider property damage such as building and contents damage caused by fire, potential increased insurance liability and loss of business continuity.

- Malicious acts or arson with respect to fire ignition and safety systems are limited in nature and are outside the scope of this report. Such acts can potentially overwhelm fire safety systems and therefore further strategies such as security, housekeeping and management procedures may better mitigate such risks.
- This report is prepared in good faith and with due care for information purposes only and should not be relied upon as providing any warranty or guarantee that ignition or a fire will not occur.

3.0 Site Description

3.1 Site Location

The site is located at 88 Murrays Flat Rd, Towrang NSW 2580 which is approximately 7 km northwest of Goulburn, NSW. **Figure 3-1** shows the regional location of the site in relation to Goulburn. Provided in **Figure 3-2** and **Figure 3-3** is the layout of the site.

Further information relating to the site layout, description and operations can be found in the Scoping Report prepared by Jackson Environment and Planning.

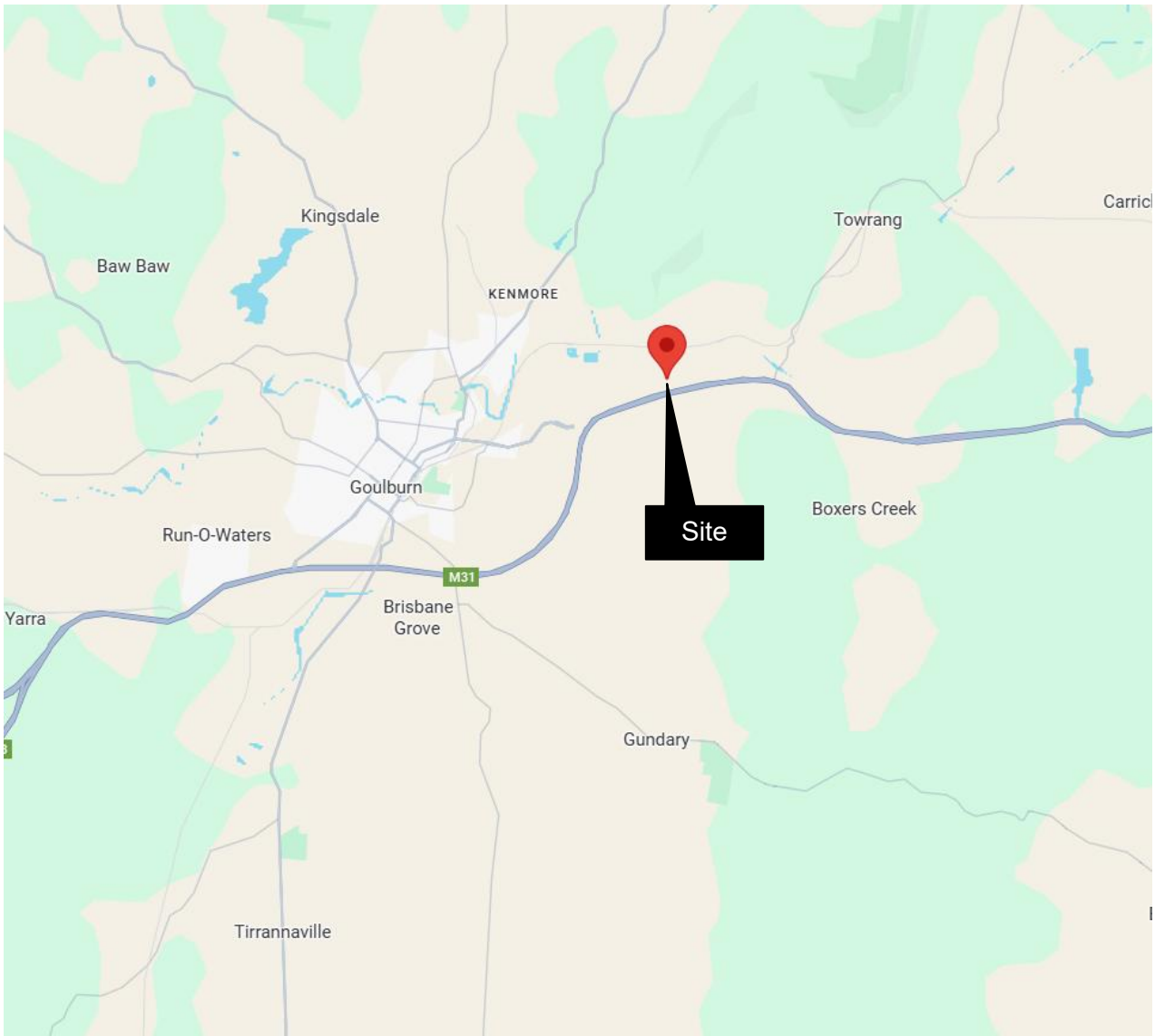

Figure 3-1: Site Location

3.2 Adjacent Land Uses

The land is located in a rural area surrounded by agricultural land, and the Hume Highway towards the south.

3.3 General Description

The Facility will include the following components and infrastructure:

- Receival and Sorting Areas – Bays for the tipping, inspection and initial sorting of incoming scrap metals;
- Fully enclosed purpose built building for removing oils and fuels from end of life vehicles, to enable them to be processed on site in an environmentally appropriate manner;
- Pre-Shredding and Shredding Zones – Equipped with pre-shredders, hammermill shredders, stationary shears and oxy-cutting facilities;
- Post-Processing Separation Facility – Bays for the separation, recovery, and temporary storage of processed ferrous and non-ferrous metals;
- Administrative Infrastructure – Adaptation of the existing on-site cottage into office and staff amenity space including staff parking area;
- Workshop and Maintenance Shed – A fully enclosed 32m x 15m x 12m structure for plant maintenance and operations;
- Mobile and Stationary Equipment – Including loaders, shears, conveyors, radiation detection equipment, and sorting systems;
- Weighbridges – Two entry/exit weighbridges for the accurate measurement of materials and heavy vehicle management and one internal weighbridge;
- Fuel Storage – A 50,000L self-bunded diesel tank, installed on a concrete hardstand with protective bunding, below ground spill containment rank and awning for weather protection;
- Landscaping and Visual Screening – A 20-metre-wide landscaped setback along the western and southern site boundaries;
- Traffic Management and Site Circulation – Paved hardstand access ways using existing access points with the addition of a new exit closer to the Hume Highway to minimise impacts on local roads and residential areas;
- Site Access and Intersection Upgrades – Vehicular access to the Facility will be maintained via Murrays Flat Road, with two key intersection treatments proposed to support safe and efficient traffic flow. A channelised left-turn (CHL) lane will be constructed at the northern intersection (for eastbound traffic), while a channelised right-turn (CHR) lane will be constructed at the southern intersection (for westbound traffic) to improve safe intersection sight distance (SISD) for vehicles turning onto the Hume Highway;
- Renewable Energy Infrastructure – The Facility will incorporate rooftop solar photovoltaic (PV) panels installed on the Workshop Shed, Post Shredder Processing Shed, Shredding Building and Storage, with power stored via an integrated Battery Energy Storage System (BESS);
- Stormwater Management – All operational areas will be constructed of compacted road base incorporating HDPE liners beneath operational areas, stormwater capture systems, and detention basins. The stormwater management system is designed to progressively capture and treat runoff through a series of infrastructure elements. Stormwater will first be directed to Sediment Basin #1 (surface area 1,500 m²), followed sequentially by Sediment Basin #2 (440 m²) and Sediment Basin #3 (1,200 m²), which allow for the settlement of suspended solids. From there, flows are conveyed to a Biofiltration Basin (1,000 m²), which provides secondary

treatment via vegetated media. Final treated water is directed to the on-site Dam for detention and controlled release.

- The Facility will receive and process scrap metal sourced from Sydney, Goulburn, the ACT, Southern Highlands, and surrounding regional areas. Processed materials will be transported to both local and overseas markets for recycling and end use.

3.4 Construction and Staging

Construction of the Facility is expected to take approximately six (6) months, commencing upon receipt of development consent. The works will be delivered in three key stages:

- Stage 1 – Site Preparation: Clearance of vegetation, demarcation of construction zones and preparation of access points;
- Stage 2 – Bulk Earthworks and Infrastructure: Installation of drainage systems, utilities, formation of HDPE-lined hardstand areas, and delivery and installation of mobile processing equipment; and
- Stage 3 – Building Adaptations: Conversion of the existing residential structure into office and staff amenity spaces.

3.5 Proposed Operating Hours

The proposed Site operations hours are:

- Monday to Friday between 6am – 6pm; and
- Saturdays from 7am – 4:30pm.

No operations are to occur on site on Sunday and public holidays. No operation of the hammermill shredder and pre-shredder will occur during the morning shoulder period 6am-7am. Operations during this time include inbound and outbound truck movements, material handlers, and maintenance of plant and equipment. While maintenance and cleaning activities can occur at any time of the day (24 hours), to maintain the efficiency of operations, they will occur predominantly during:

- Monday to Saturday between 6am – 6pm
- Sundays on a 24-hour basis.

3.6 Staffing

A maximum of 15 staff members will be on site- at any one time.

3.7 Main Uses and Activities

The following activities will occur on the Site at the Facility:

- Tipping and inspection of incoming scrap metals;
- Depollution of end of life vehicles;
- Primary sorting;
- Oxycutting and shearing;
- Pre-shredding;

- Shredding (hammermill);
- Post-shredding separation; and
- Storage of processed metals for off-site recycling.

Incoming vehicles will enter the Site from Murrays Flat Road, turn right to be weighed on the weighbridge. Unloading and sorting of unprocessed scrap metals will occur in one of two optional areas. One area is near the pre-shredding and shredding area, where most of the unprocessed metals will be tipped. The other area is near the oxycutting and fixed shearing area. If unprocessed metals require pre-shredding, the material will be moved from the primary tipping area to the unprocessed metal storage bays to await pre-shredding. Otherwise metals will go directly into the primary shredder (hammermill) for processing.

The final plant and equipment chosen for the Proposal will be based on requirements of the Facility and best practice to achieve all criteria and legislative requirements for air quality, noise and other amenities. Storage of processed metals will occur in various areas, depending on whether the material is shredded ferrous, shredded non-ferrous, large sheared or oxy-cut pieces, metal awaiting further shredding, or residual floc. Load out will occur regularly to export processed material off-site for further recycling.

Maximum quantities of wastes in stockpiles are 3,200 tonnes unprocessed small size in stockpiles, 3,520 tonnes unprocessed large size in stockpiles, 7,612 tonnes processed/sheared or shredded in stockpiles, 22 tonnes of processed metal stockpile recovery bases and 2 tonnes of floc.

Figure 3-2 and **Figure 3-3** may be used to assist in understanding the description.

Date	Plan Number	Survey and Site Analysis Plan
09-09-2025	102	88 Murrays Flat Road Towrang, NSW 2580 (Lot 3 DP251779)

JEP Environment & Planning
Strategy | Approvals | Compliance | Licensing
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JEP ENVIRONMENT & PLANNING

Client	Sydney Metal Traders Pty Ltd
Project	Proposed Metal Recycling Facility
Title	Survey and Site Analysis Plan
Scale	1:12000
Source	JEP Environment & Planning

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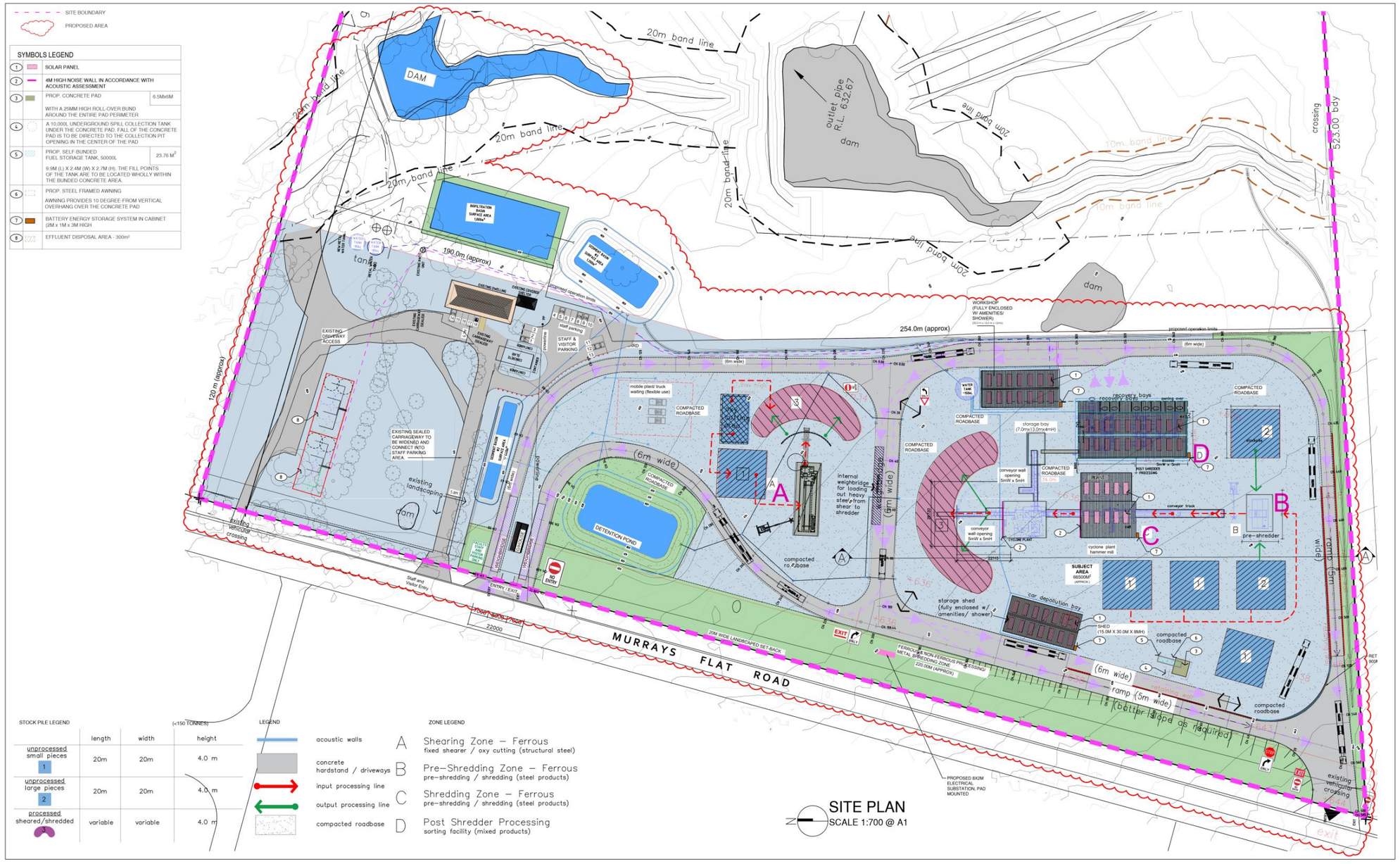
Figure 3-2: Site Area



Date	Plan Number	Site Plan
09-09-2025	103	88 Murrays Flat Road Towrang, NSW 2580 (Lot 3 DP251779)

JEP Environment & Planning
Strategy | Approvals | Compliance | Licensing
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
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JEP ENVIRONMENT & PLANNING

Client	Sydney Metal Traders Pty Ltd
Project	Proposed Metal Recycling Facility
Title	Site Plan
Scale	1:700
Source	JEP Environment & Planning

103

DA

Figure 3-3: Site Layout

4.0 Hazard Identification

4.1 Introduction

A hazard identification table has been developed and is presented at **Appendix A**. Those hazards identified to have a potential fire or explosion impact are assessed in the following sections of this document.

4.2 Properties of Waste Stored

The type of waste and quantities stored and used at the site has been described in **Section 3**. **Table 4-1** provides a description of each of the waste types encountered at the site. While the majority of the materials are not expected to be combustible, it is noted that mixed metal piles (small and large pieces) may contain combustible materials. This is due to the presence of small appliances (e.g. degassed air conditioning units, plastic parts) and larger appliances (e.g. fridges) with plastic combustible components. Processed and separated metals in piles are not considered combustible.

Table 4-1: Properties of Waste Stored and Handled

Type of Waste	Combustion Properties
Aluminium	Aluminium can burn with sustained combustion but is not considered a fire source.
Steel / Iron	Steel and iron will melt when exposed to heat but typical temperatures within a fire would not result in steel and iron burning.
Copper / Brass	Copper and brass will melt when exposed to heat but typical temperatures within a fire would not result in copper and brass burning.
Stainless Steel	Stainless steel will melt when exposed to heat but typical temperatures within a fire would not result in stainless steel burning.
Non-ferrous metals	Other non-ferrous metals are unlikely to readily burn or contribute to a fire scenario and will not increase ignition or fire risk at the site.
Mixed metals (large pieces)	Large mixed metal pieces are not expected to support combustion; however, plastics may be present which readily burn.
Mixed metals (small pieces)	Small mixed metal pieces are not expected to support combustion; however, plastics may be present which readily burn.
Shredder floc	Waste residue generated directly from scrap metal shredding, contains a mix of what remains after ferrous and nonferrous metals are removed and can include combustible materials like rubber, plastics and fibres.
Diesel	Diesel is a C1 combustible liquid and while the flash point of C1 diesel is high enough that it will not produce flammable vapours at ambient temperatures, there is the potential for ignition in the event of prolonged, high temperature heating.

4.3 Hazard Identification

Based on the hazard identification table presented in **Appendix A**, the following hazardous scenarios have been developed:

- Ignition of combustible waste within stockpiles.
- Ignition of shredder floc within bin.

- Storage of non-combustible wastes.
- Fire producing toxic biproducts of combustion, dispersion and community impact.
- Application of fire water and potential contamination with discharge to the environment.
- Incident related to diesel tank.

Each identified scenario is discussed in further detail in the following sections.

4.4 Ignition of Combustible Waste Within Stockpiles

Waste scrap metal delivered to the site is deposited into several stockpiles of varying size. The stockpiles are intentionally separated and segregated to assist in operational efficiency, as well as reduce the potential for propagation in the event that a fire does commence. Material received at the site is predominantly scrap metal, however combustible materials will be present within appliances (plastics in fridges, air conditioning units etc) which pose a fire hazard.

Pre-shredded/unprocessed mixed metal piles with either large or small pieces may include ignition sources (e.g. batteries) which could initiate a fire in the stockpiles, resulting in radiant heat and toxic smoke emission (toxic smoke discussed in **Section 4.7**). Stockpiled post-shredded materials are not expected to have substantial enough quantities of combustible materials to pose a notable fire risk as the combustibles are separated and collected as shredder floc within a dedicated bin (discussed in **Section 4.5**).

It is noted that since the majority of the pre-shredded materials are non-combustible, the radiant heat generated would be diminished and the fire burn temperature would be expected to be less than 1,000 ^{o}C, hence considered an ordinary fire risk per the FRNSW Fire Safety in Waste Facilities Guideline (the Guideline). To mitigate the radiant heat generated and reduce propagation potential, the maximum stockpile sizes detailed in the Guideline is to adhered to, with all unprocessed mixed metal stockpiles restricted to 20 m wide x 20 m long x 4 m high where access is available down both sides of the pile (as is the case for all piles in **Figure 3-3**).

These stockpiles would be considered loose ordinary fire risk stockpiles (Section 8.4 of the Guideline), hence for piles 20 m long, the Guideline prescribes a separation of 10 m between itself and any other loose ordinary fire risk stockpile (i.e. unprocessed mixed metals). Reviewing the separations of the proposed layout, it appears the current minimum separation is approximately 8 m, which is marginally less than the guideline recommends. However, these requirements are determined for piles in which the whole material is combustible, hence, given the low concentration of combustible materials within piles, it is considered that 8 m will adequately reduce the propagation potential between piles.

Similarly, separation from any such pile and any fire-source feature (i.e. premise boundary, fire hazard or external building wall) is prescribed in the Guideline as 13 m while separation from the nearest pile to the car depollution bay and the cyclone plant hammer mill are only 9 m, which is considered adequate given the low concentrations of combustibles within the piles. Separation between the closest pile and the diesel tank is approximately 14 m, exceeding this requirement. Separation at the shearing zone between the oxy cutting area and the stockpile is only approximately 3 m, however it is understood that this stockpile contains structural steel hence is not expected to contain combustibles and the 13 m separation requirement does not apply.

In the event of a fire in a stockpile, it is expected that smoke would be observed by personnel during operating hours, however it is unclear how fire will be detected when personnel are not present, therefore the following recommendation is made:

- Ensure a means of smoke or fire detection within stockpiles is provided for when personnel are not on site, such as with thermal cameras.

If the fire is noticed during the incipient stages, it is possible that trained personnel could respond to a small fire involving small pieces if safe to do so by isolating the burning material from the bulk of the pile and/or with application of an extinguisher, hence the following recommendation is made:

- Consider providing portable fire extinguishers to mobile plant involved with managing the stockpiles.

However, for fires involving larger appliances or that has propagated beyond personnel extinguisher control, to minimise exposure to radiant heat and toxic smoke, it is advised for personnel to evacuate and await the brigade rather than attempt extinguishment through other first-aid firefighting means such as by application of personnel fire hose reels. Therefore, to enable brigade extinguishment, the following recommendation is made in accordance with the Guideline:

- Provide hydrant coverage for the unprocessed mixed metal stockpiles, ensuring hydrants are not within 10 m of the pile.

This incident is carried forward to determine the number of hydrants required to flow simultaneously in **Section 8.0**.

4.5 Ignition of Shredder Floc Within Bin

Shredder floc containing particles of combustible materials (plastics, rubber etc) separated from the mixed metal waste post-shredding are collected in a dedicated 10 tonne capacity bin outside the shredder shed. Assuming a density of 1 tonne / m^3, the volumetric capacity of the bin is 10 m^3 which is below the 50 m^3 threshold at which the FRNSW Fire Safety in Waste Facilities Guideline applied. Notwithstanding this, there is potential for a fire to occur from inadvertent introduction of an ignition source (e.g. during hot works). It is noted that significant ignition energy is required to ignite solid plastics compared to flammable liquids and it is not expected that there would be significant energy sources present besides during hot works which are expected to be performed under a work permit following a safe operating procedure to prevent heating the floc, therefore it is considered unlikely that a fire would occur.

Notwithstanding this, should a fire occur, it would be expected to propagate quickly such that personnel would be unable to extinguish it through first-aid firefighting with extinguishers or hose reels, requiring intervention by the brigade. The bin is located outside separated from other combustible materials hence it is not expected that such a fire would propagate to the stockpiles. The site is to be provided with hydrant coverage as per AS 2419.1, enabling the brigade to extinguish the fire. Therefore, this incident has not been carried forward for further analysis.

4.6 Ignition of Waste During Shredding

Shredding of mixed metal wastes involves both low and high-speed hammermills which could ignite combustible materials within the waste such as by shorting a battery within an appliance. As the majority of the waste is not combustible, the resulting fire is not expected to be significant or long lasting and would be contained within the shredder material until it is ejected at the output conveyor. As such, it is possible for trained personnel to extinguish such a fire with portable extinguishers or hose reels, both of which are to be installed in accordance with the BCA.

However, if the fire propagates through the shredder floc, brigade intervention may be required. The site is to be provided with hydrant coverage as per the BCA and AS 2419.1, enabling the

brigade to extinguish the fire. Therefore, this incident has not been carried forward for further analysis.

4.7 Storage of Non-Combustible Wastes

Most of the wastes on the site (scrap metal) were identified to be non-combustible and are therefore unlikely to be involved in a fire due to the negligible potential for the wastes to be ignited and to sustain combustion. Wastes identified to fall into this category include:

- Aluminium
- Stainless Steel
- Lead
- Copper – pipes and similar
- Copper Cabling

Therefore, the risk of fire associated with these wastes and the associated processing and storage is not considered to be credible.

4.8 Fire Producing Toxic By-Products of Combustion, Dispersion and Community Impact

There is the potential for fire to occur at the site which may result in the formation of toxic biproducts of combustion which could be dispersed downwind of the site resulting in impact upon the community which could result in irritation, injury, or fatality.

The controls implemented at the site aim to reduce and eliminate the potential for a fire by eliminating all combustible material. Additional controls involve restricting storage piles to dimensions guided by the relevant guidelines. Smaller stockpiles assist in maintaining efficient combustion if a fire does occur. This occurs as oxygen is able to reach the central parts of the fire allowing for cleaner combustion as opposed to inefficient combustion which forms carbon and other biproducts which are emitted into the smoke plume.

Due to the low combustible content of the stockpiles and hence low risk of unclean smoke plumes, this incident is considered to be appropriately controlled.

4.9 Application of Fire Water and Potential Contamination with Discharge to The Environment

In the event of a fire at the site, fire water may be applied via hydrants, fire hoses or other brigade intervention. Water contacting a fire involving plastics and combustible wastes may be contaminated; hence, it should be contained and tested prior to discharge from the site. Fire water will be retained within the stormwater detention dam at the end of the sedimentation basins as described in **Section 3.3**. The dam is provided with isolation valves, enabling the containment of the potentially contaminated water for testing and treatment as required prior to discharge. The required containment capacity is estimated in **Section 8.0**.

Notwithstanding, the following recommendations have been made:

- The potential for the isolation valves to be automatically closed upon fire detection (i.e. alarm) shall be considered.

- Isolation valves shall be tested every six (6) months to ensure the valves do not seize and become stuck in the open position.

4.10 Incident Related to Diesel Tank

The site contains a 50 kL above-ground diesel tank with attached fuel bowser for the refuelling of vehicles and equipment on site. Diesel is considered a C1 combustible liquid and does not result in the production of flammable vapours at ambient temperatures due to its flash point which is greater than 63°C. Additionally, the diesel tank is integrally bunded and also located on an area of concreted and bunded hardstand and compliance with AS 1940:2017 (Ref. [4]) will be ensured.

Notwithstanding this, the above-ground bowser poses a potential fire hazard. However, the pumping system contains an isolation switch, and the fuel bowser has a 20 L drip tray in which to deposit the nozzle in the event of an uncontrolled release during the time to activate the isolation switch.

The highest fire risk relating to the diesel tank would therefore be during filling of the tank by fuel tankers at the site. Due to the high flash point and ignition temperature of diesel, as well as the limited potential for prolonged heating, ignition is not considered likely.

4.11 External Fire Impact

Fire originating offsite such as bushfire must be considered for its potential to impact the combustible materials as per the SEARs. The site is not located in a bushfire prone area with limited vegetation nearby. A grass fire could credibly occur, however the radiant heat generated would not be expected to occur over a long enough time to result in propagation on site, particularly considering the stockpiles containing combustible wastes are predominantly non-combustible and that they are separated from the site boundary. Similarly for the diesel tank, there is negligible potential for a grass fire to generate sufficient radiant heat for a long enough time to impact the tank or bowser and result in ignition. Therefore, it is considered that the risk of external fire impact on site is low and this incident has not been carried forward for further analysis.

5.0 Performance Outcome for Controlling Fire Assessment

5.1 Introduction

FRNSW has developed a guideline to assist operators storing and handling combustible recyclable or waste materials to minimise the potential for fires to occur as part of the operations or to control the size of an incident should it occur. To demonstrate compliance with the guideline, an assessment has been prepared for the performance outcomes outlined within the guideline to determine whether the site complies.

5.2 Background

The configuration of a storage can drastically impact the potential for fire to spread or the size of the fire. For example, piles located diagonally from each other increases the distance between the bulk of the mass which allows for greater radiant heat attenuation and subsequently low radiant heat experience at the receptor. As high levels of radiant heat may result in incident propagation but decreasing this via efficient storage configurations the potential for an incident to escalate into a large incident is minimised. The effect of configuration is shown in **Figure 5-1**.

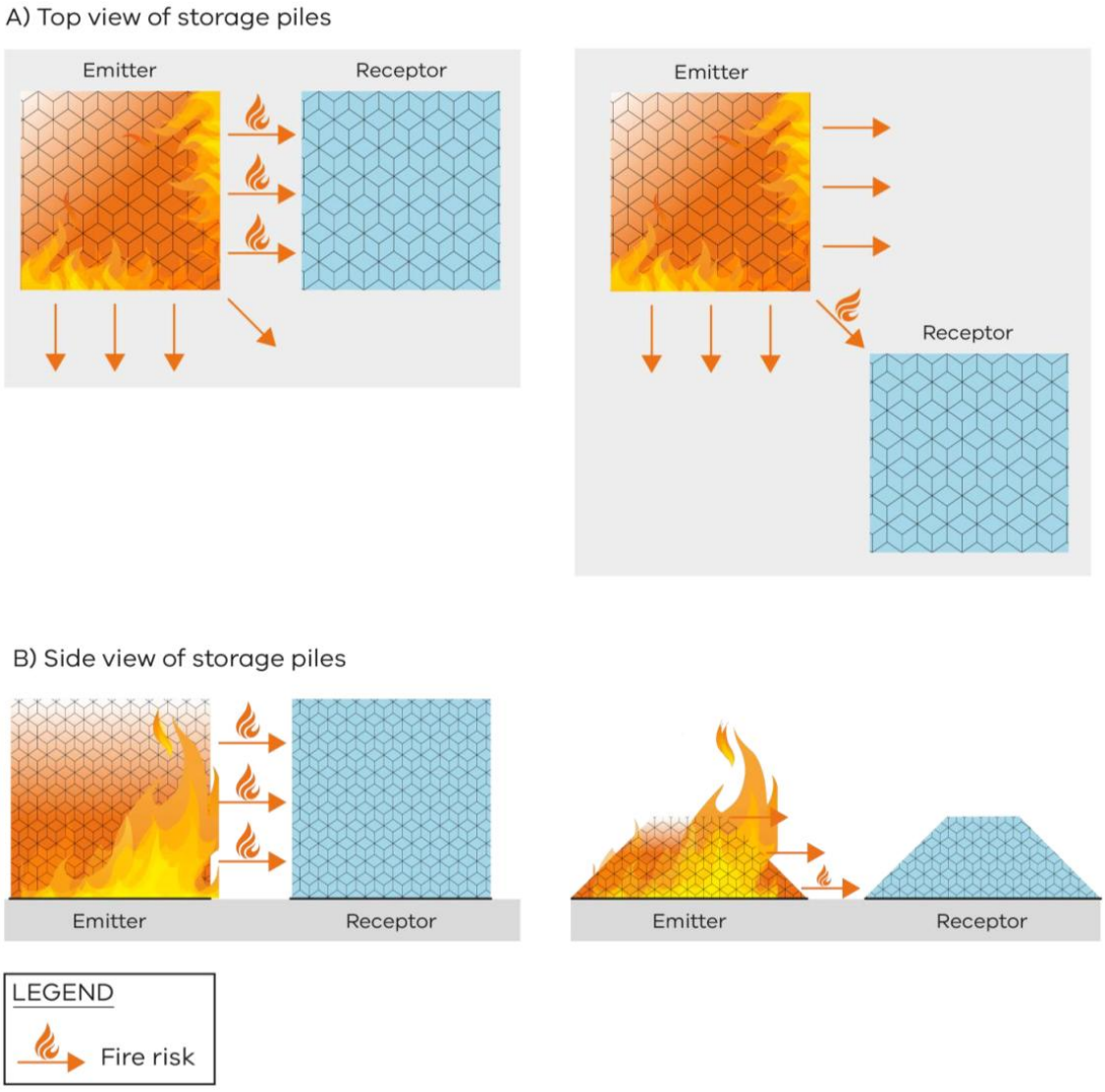


Figure 5-1: Impact of Storage Configuration of Fire Propagation

Section 8 of the FRNSW guideline *Fire safety in waste facilities* outlines general guidance surrounding stockpile arrangement. As noted in Section 8.2.1, the storage arrangement should be appropriate to the material stored, fire risks, building design and fire controls. Assessment of the stockpile arrangements is performed in **Section 4.4**. One such requirement of the guidelines limits the maximum storage height of a stockpile to 4 m with a 45° maximum vertical slope face to minimise risk of collapse as shown in **Figure 5-2**.

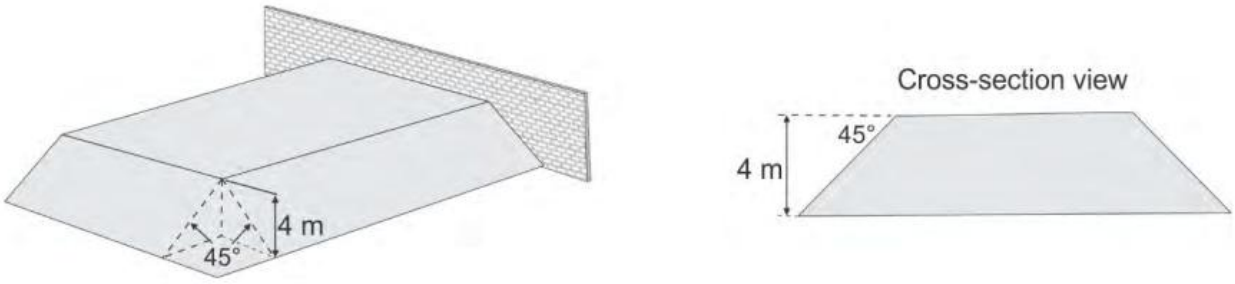


Figure 5-2: FRNSW Fire Safety in Waste Facilities Guideline Maximum Stockpile Height and Face Angle

5.3 Assessment

Assessment of the stockpile arrangements is performed in **Section 4.4**. Further, the site is to be protected by a hydrant system, extinguishers and hose reels which will allow first responders to enact a response to suppress and control a fire. Therefore, it is considered that the risks associated with the external storages will be mitigated via compliance so far as reasonably practicable with the FRNSW guidelines and the hydrant protection installed around the site.

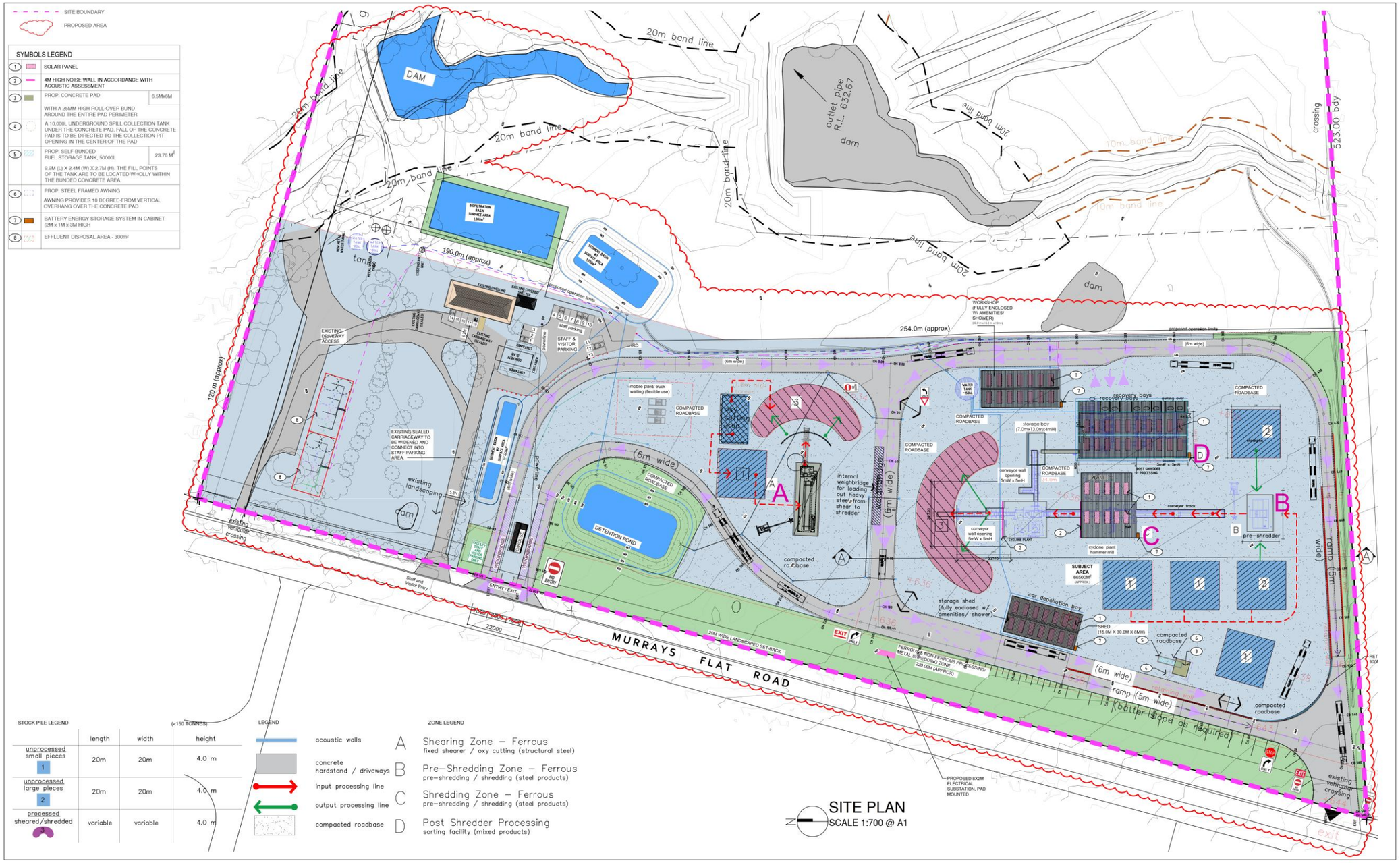
Notwithstanding the above, it is necessary to review the facility against the Fire & Rescue NSW (FRNSW) Fire Safety in Waste Facilities Guidelines, to ensure the facility is designed with the appropriate fire protection. A review of the relevant sections of the guideline is shown in **Table 5-1.**

Table 5-1: Summary of FRNSW Fire Safety in Waste Facility Guidelines Requirements

Clause	Waste Facility Guidelines Requirement	Details of Compliance
7.2	Designing for a special hazard	This report satisfies the requirements outlines in this Section, by virtue of preparation of an FSS in accordance with HIPAP No.2.
7.3	Development of existing waste facilities	n/a
7.4	Firefighting Intervention Firefighter access should be provided to the facility, including to any fire safety system or equipment provided for firefighting intervention. The facility should cater for large emergency service responses, including containment of fire water run-off.	These requirements have been addressed in the following sections: • **Section 7.0** – Brigade access • **Section 6.0** – Fire detection and alarm • **Section 6.0** – Fire protection
7.5	Fire Hydrant System 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.	It is recommended that a detailed pressure loss calculation shall be prepared for the most disadvantaged hydrant to demonstrate compliance with AS 2419.1-2017 and complete hydraulic analysis prepared to ensure compliance with Table 2 in Section

Clause	Waste Facility Guidelines Requirement	Details of Compliance
	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.	7.5.3 of the Guideline. It is tentatively assumed that up to 5 hydrants may be required to flow simultaneously for four hours.
7.6	Automatic Fire Sprinkler Systems The waste facility is to have an automatic fire sprinkler system installed in any fire compartment that has a floor area greater than 1,000 m^2 and contains combustible waste materials. The fire sprinkler system is to have minimum water supply and capacity providing maximum hydraulic demand for not less than two hours.	The cyclone plant hammermill is the only fire compartment containing combustible waste and it does not have a floor area greater than 1,000 m^2, hence sprinklers are not required per this clause. All other stockpiles and stores containing combustible wastes are understood to be external.
7.7	Fire Detection and Alarms The waste facility is to have a fire detection and alarm system installed appropriate to the risks and hazards identified. The alarm should activate any required alarm (warning occupants of fire, evacuation etc.), and activate the fire suppression system and warn all occupants of the fire.	Details of detection have been outlined in **Section 6.2**
7.8	Smoke Hazard Management 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.	Subject to review by fire engineers but unlikely to be necessary due to predominant outdoor storage.
7.9	Fire-Water Run-off Containment The 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.	Details of containment and recommendations have been outlined in **Section 8.2.**
8.2 / 8.3	Storages and Stockpiles The guidelines limit the size, volume and location of combustible waste stockpiles to ensure FRNSW access in the event of a fire. It also outlines requirements for monitoring the temperature of self-heating stockpiles to minimise the risk of autoignition	The size, volume and location of stockpiles is detailed throughout this report and is compliant so far as is reasonably practicable as per **Section 4.4**.
8.4	External Stockpiles	The size, volume and location of stockpiles is detailed throughout this report and is compliant so far as is reasonably practicable as per **Section 4.4**.
8.5	Internal Stockpiles	n/a

Clause	Waste Facility Guidelines Requirement	Details of Compliance
	The guidelines limit the size, volume and location of combustible waste stockpiles to ensure FRNSW access in the event of a fire. It also outlines requirements for monitoring the temperature of self-heating stockpiles to minimise the risk of autoignition.	
9.3	Emergency Plan The PCBU is required to develop an emergency plan for the waste facility, in accordance with AS 3745-2010.	An Emergency Response Plan (ERP) shall be prepared.
9.4	Emergency Services Information Package (ESIP) An ESIP, as detailed in the FRNSW guideline Emergency services information package and tactical fire plans, should be developed and provided by the PCBU.	An ESIP shall be prepared.
9.5	Fire safety certificate requirements	Fire safety certificates are required for the facility and will be assessed annually as required.



Date	Plan Number	Site Plan
09-09-2025	103	88 Murrays Flat Road Towrang, NSW 2580 (Lot 3 DP251779)

JEP Environment & Planning
Strategy | Approvals | Compliance | Licensing
A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060
E: admin@jacksonenvironment.com.au
T: 02 8056 1849
W: http://www.jacksonenvironment.com.au

JEP ENVIRONMENT & PLANNING

Client	Sydney Metal Traders Pty Ltd
Project	Proposed Metal Recycling Facility
Title	Site Plan
Scale	1:700
Source	JEP Environment & Planning

103
DA

Figure 5-3: Site Layout indicating stockpile separation

6.0 Details of Prevention, Detection, Protection and Mitigation Measures

The fire safety systems at the site can be split into four main categories:

- **Fire Prevention** – systems, installed to prevent the conditions that may result in initiating fire.
- **Fire Detection** – systems installed to detect fire and raise alarm so that emergency response can be affected (both evacuation and firefighting)
- **Fire Protection** – systems installed to protect against the impacts of fire or explosion (e.g. fire walls)
- **Fire Mitigation** – systems installed to minimise the impacts of fire and to reduce the potential damage (e.g. fire water application)

Each category has been reviewed in the following sections, with respect to the existing systems incorporated into the design and those to be provided as part of the recommendations herein.

6.1 Fire Prevention

This section describes the fire prevention strategies and measures that will be undertaken at the site.

6.1.1 Control of Ignition Sources

The control of ignition sources reduces the likelihood of igniting a release of material. The site has a number of controls for ignition sources. These include controls for fixed potential ignition sources and controls for introduced ignition sources.

- A permit to work or clearance system will be used – any hot or electrical work will be controlled as part of the permit to work system.
- Minimal electrical systems required in processing area.
- Designated smoking areas within the site (i.e. external from warehouse areas).

Table 6-1 presents the potential ignition sources and incidents for the facility which may lead to ignition and fire. The table also summarises the controls that will be used to reduce the likelihood of these potential sources of ignition and incidents resulting in a fire.

Table 6-1: Summary of Control of Ignition Sources

Ignition Source	Control
Smoking	No smoking policy for the site (i.e. within the transfer station area) including processing and storage areas. Note: A designated smoking area is provided).
Housekeeping	The site will operate a housekeeping procedure to minimize potential accumulation of non-sorted combustible wastes (i.e. wastes not stored in a defined location). Housekeeping occurs around the site boundaries every afternoon to prevent accumulation of wastes.
Arson	The site will have a security fence and will be staffed during business hours.
Hot/Electrical Work	A permit to work system and risk assessment prior to starting work will be provided for each job involving the introduction of ignition sources.

6.1.2 Separation of Incidents

The separation of incidents is used to minimise the impacts of a hazardous incident on the surrounding operations or the generation of potential “domino” effects. The waste storages around the site will be separated by the requirements of the FRNSW Guideline which minimises the potential for incident propagation between separate storages.

6.1.3 Housekeeping

The risk of fire can be significantly reduced by maintaining high standards of housekeeping. The site shall maintain a high housekeeping standard, ensuring all debris (e.g. waste packaging, etc.) that is released during transport, storage and processing is cleaned up and removed from the areas.

6.1.4 Work Practices

The following work practices will be undertaken to reduce the likelihood of an incident. They include;

- Placarding & signage within the site
- Safe work practices
- Personal Protective Equipment
- Emergency response plan and procedures
- First aid fire equipment
- Security
- Training of personnel
- Compatibility, segregation and safe storage of wastes

6.1.5 Emergency Plan

An emergency plan, prepared in accordance with HIPAP No. 1 – Industry Emergency Planning Guidelines (Ref. [5]), will be developed for the site as required by the Work Health and Safety Regulations 2017 (Ref. [6]). The emergency plan will clearly identify potential hazardous fire or explosion incidents and develop procedures fire response.

The plan will also include evacuation procedures and emergency contact numbers as well as an onsite emergency response structure with allocated duties to various personnel on site. This will provide readiness response in the unlikely event of an incident at the site. Notwithstanding this, the following recommendation has been made:

- A site emergency response plan and emergency services information booklet shall be prepared for the site to fully document the emergency scenarios and the appropriate responses to those emergency scenarios.

6.1.6 Site Security

Maintaining a secure site reduces the likelihood either of a fire being started maliciously by intruders or by accident. Access to the site will be restricted at all times and only authorised personnel will be permitted within the site.

6.2 Detection Procedures and Measures

This section discusses the detection and protection from fires for the hazardous incidents previously identified. These include detection of fire pre-conditions, detection of a fire suppression activated condition and prevention of propagation. This assessment includes identification of the detection and protection systems required.

6.2.1 Detection

A fire scenario will likely be detected by personnel working within the vicinity of a stockpile which has been ignited. If the fire cannot be controlled by site personnel, FRNSW will be contacted to attend the site. Based on the operation of various equipment and machinery at the facility, it is recommended that fire detection requirements are investigated further to ensure appropriate shutdowns are incorporated as required.

6.3 Fire Protection

The fire protection requirements are summarised in the following subsections.

6.3.1 Fire Hydrants

A fire hydrant system is to be installed in accordance with Clause E1.3 of the BCA, and the relevant provisions of AS 2419.1:2005.

6.3.2 Fire Hose Reels

A fire hose reel system is to be installed in accordance with Clause E1.4 of the BCA, and the relevant provisions of AS 2441:2005.

Coverage shall be achieved by providing not more than 2 changes in direction on any hose run.

6.3.3 Portable Fire Extinguishers

Portable fire extinguishers shall be installed in accordance with Clause E1.6 of the BCA, and the relevant provisions of AS 2444:2001. Notwithstanding this, the following recommendation has been made:

- Dry powder extinguishers shall be readily accessible from waste storages to provide quick response by site personnel in the event of a fire.
- Operators shall be trained in the use of site fire extinguishers.

6.4 Fire Mitigation

6.4.1 Fire Water Supply

The street mains will provide fire water supply to the site storage tanks which will be used to supply the hydrant ring main. The supply shall allow 4 hours of hydrants operating concurrently as per the FRNSW Waste Guidelines. This volume is determined in **Section 8.0**.

7.0 Local Brigade Access and Egress

7.1 Overview

In order to assess the likely fire brigade response times an indicative assessment of fire brigade intervention has been undertaken based on the methods defined in the Fire Brigade Intervention Model (FBIM, Ref. [7]).

The site is located within the Fire & Rescue NSW jurisdictional turnout area. The closest stations to the site are described in **Table 7-1**.

Table 7-1: Station Locations

Station Name	Station Address	Distance (km)
NSWRFS - Goulburn Brigade	10 Crundwell St, Goulburn NSW 2580	5.5
FRNSW Goulburn Fire Station	161/157 Bourke St, Goulburn NSW 2580	8.0

Due to the nature of the Fire Brigade Intervention Model, it is necessary to justify the results through the inclusion of assumptions. The accuracy of results weighs heavily upon the measure of which assumptions are made and the sources from which they are derived. The model produced details the time it will take for brigade personnel within the aforementioned location to receive notification of a fire, time to respond and dispatch resources, time for resources to reach the fire scene, time for the initial determination of the fire location, time to assess the fire, time for fire fighter travel to location of fire, and time for water setup such that suppression of the fire can commence. The following are details of the assumptions utilised in this FBIM:

7.1.1 Location of Fire

This FBIM will only be an indicative model of one fire scenario within the facility. For conservative purposes, the FBIM will consider a fire in the furthest incident from the point of entry.

7.1.2 Time between Ignition and Detection

It is assumed that the initial brigade notification is via site personnel detection and alarm. Time from ignition to alarm is taken to be 270 seconds per the average of the detection times.

7.1.3 Time for Initial Brigade Notification

- Fire brigade notification is expected to occur via a direct monitored alarm.
- Time for alarms/fire verification and any notification delays is 20 seconds based on Table B of the Fire Brigade Intervention Model.
- Therefore, the time from ignition at which the fire brigade will be notified is (270+20) = 290 seconds after flaming combustion has commenced.

7.1.4 Time to Dispatch Resources

- The fire station is assumed to be manned at the time of the fire.
- Based on FRNSW statistics of response times from the 1st of January to the 31st of March 2021, the average time for the fire brigade to respond to a structure fire is less than 7.7 minutes. This

time has been taken (462 seconds) to represent the time required to react to a fire signal and reach the site.

- Therefore, with a brigade call out time of 462 seconds fire brigade can be expected to arrive on site 752 seconds after fire ignition.

7.1.5 Time for Initial Determination of Fire Location

- On arrival, the fire location is not visible to the approaching brigade personnel, thus requiring information to be obtained from the Fire Indicator Panel (FIP) and evacuating occupants.
- Fire brigade personnel assemble at the FIP in the office area where clear signage is provided.
- Fire brigade tactical fire plans will be provided.
- It is assumed that a fire would occur during business hours and that staff are present on-site providing assistance to fire brigade personnel in relation to identifying the fire location and entry into the building. As such, forced entry into the building is not required.

7.1.6 Time to Assess the Fire

- Horizontal egress speeds have been based on fire brigade personnel dressed in turnout uniform in BA. An average travel speed of 1.4m/s with a standard deviation of 0.6m/s are utilised. As such, for the purposes of the calculations, a horizontal travel speed of 1.40-(1.28x0.6) = 0.63m/s is utilised as shown in **Table 7-2**.

Table 7-2: FBIM data for Horizontal Travel Speeds

Graph	Travel Conditions	Speed	
		Mean	SD*
Q1	Dressed in turnout uniform	2.3	1.4
Q2	Dressed in turnout uniform with equipment	1.9	1.3
Q3	**Dressed in turnout uniform in BA with or without equipment**	**1.4**	**0.6**
Q4	Dressed in full hazardous incident suit in BA	0.8	0.5

*Standard Deviation

Horizontal travel distances will include the following:

- Travel from kerb side adjacent to the building and to Fire Indicator Panel is 20 m.
- Travel from FIP to the farthest point is 80 m.
- Based on the above, the total horizontal travel distance of 100 m coupled with an egress speed of 0.63 m/s results in a horizontal travel time of up to 63 seconds.

7.1.7 Time for Water Setup

- The first appliance would be expected to commence the initial attack on the fire.
- Time taken to connect and charge hoses from on-site hydrants to the fire area is based on V3 Table V of the Fire Brigade Intervention Model Guidelines, which indicates an average time of 45.3 seconds, and a standard deviation of 17.1 seconds. Using a 90th percentile approach as documented in the FBIM, the standard deviation is multiplied by a constant *k*, in this case being equal to 1.28. Therefore, the time utilised in this FBIM is 45.3 + (1.28 x 17.1) = 68 seconds.

7.1.8 Search and Rescue

Search and Rescue of the site will consist of a perimeter search of storage and processing areas. This will provide firefighting personnel with an additional 200 m of travel. At a speed of 0.63 m/s, this will take firefighting personnel approximately 126 seconds.

Table 7-3: Summary of the Fire Brigade Intervention Model (FBIM)

Fire Station	Alarm Time	Travel Time	Time for Access & Assessment	Set-up Time	Time of Attack	Time for Search & Rescue
Closest Fire Station	270 s	462 s	63 s	68 s	**863 s (14 Minutes)**	**126 s**

As summarised in **Table 7-3**, the FBIM indicates that the arrival times of the brigade from the nearest fire station is approximately 12 minutes after fire ignition, and it is estimated that it takes another 2 minutes for the fire brigade to carry out activities including the determination of fire location and preparation of firefighting equipment. As such, the initial attack on the fire is expected to commence approximately 14 minutes after fire ignition (note rounding affects the basic addition of the reported figures).

8.0 Fire Water Supply & Contaminated Fire Water Retention

8.1 Detailed Fire Water System Assessment

A complete hydrant design has not been prepared; hence, a detailed pressure calculation has not been able to be conducted. Therefore, the following recommendation has been made:

- A detailed pressure loss calculation shall be prepared for the most disadvantaged hydrant to demonstrate compliance with AS 2419.1-2017.

Additionally, fire equipment layout drawings have not been provided. Therefore, the following recommendation has been made:

- A fire equipment layout drawing shall be prepared for the site by a competent person, indicating all fire controls (extinguishers, hydrants, hose reels, etc.).

Section 7.5 of the FRNSW Fire Safety in Waste Facilities Guideline (the Guideline) provides guidance around hydrant requirements as a function of open yard area used for stockpiles of combustible wastes, hence it has been applied here. There are five stockpiles containing unprocessed mixed metals which may contain varying levels of combustible materials, each occupying 400 m^2 of ground area totalling 2,000 m^2. The Guideline prescribes two hydrants are required to flow simultaneously for areas less than 3,000 m^2, hence this is the requirement.

The fire hydrant system is to have a minimum water supply of 4 hours, hence, at 10 L/s per hydrant, the required supply capacity is 288 m^3 for 2 hydrants. The following recommendation is therefore made:

- Provide 288 m^3 water supply for firefighting purposes in the supply tanks.

8.2 Contaminated Water/Fire Water Retention

Conservatively assuming the full 288 m^3 firewater supply is used would result in 288 m^3 of containment capacity within the stormwater retention dam to prevent this leaving offsite. This is in accordance with Clause 7.9.2 of the Guideline. There are four retention basins for sedimentation and biofiltration prior to discharge from the site which will be used for contaminated water retention. The combined containment capacity provided by these basins is 2,800 + 1,900 + 330 + 300 = 5,330 m^3 which well exceeds this requirement. Therefore, the sufficient contaminated water retention capacity is provided.

9.0 Conclusion and Recommendations

9.1 Conclusions

A Fire Safety Study developed per the HIPAP No. 2 guidelines was prepared for the Sydney Metal Traders Pty Ltd facility at 88 Murrays Flat Road, Towrang NSW 2580. The FSS assessed the potential for fire risks to occur at the site to determine whether the fire detection, prevention, protection and mitigation measures are adequate for the site. Where improvements could be made these are documented as recommendations.

Based on the assessment, it is concluded that the designs and proposed fire protections can adequately manage the risks, subject to the recommendations below.

9.2 Recommendations

Based on the analysis, the following recommendations have been made:

- Ensure a means of smoke or fire detection within stockpiles is provided for when personnel are not on site, such as with thermal cameras.
- Consider providing portable fire extinguishers to mobile plant involved with managing the stockpiles.
- Provide hydrant coverage for the unprocessed mixed metal stockpiles, ensuring hydrants are not within 10 m of the pile.
- The potential for the isolation valves to be automatically closed upon fire detection (i.e. alarm) shall be considered.
- Isolation valves shall be tested every six (6) months to ensure the valves do not seize and become stuck in the open position.
- A site emergency response plan and emergency services information booklet shall be prepared for the site to fully document the emergency scenarios and the appropriate responses to those emergency scenarios.
- Dry powder extinguishers shall be readily accessible from waste storages to provide quick response by site personnel in the event of a fire.
- Operators shall be trained in the use of site fire extinguishers.
- A detailed pressure loss calculation shall be prepared for the most disadvantaged hydrant to demonstrate compliance with AS 2419.1-2017.
- A fire equipment layout drawing shall be prepared for the site by a competent person, indicating all fire controls (extinguishers, hydrants, hose reels, etc.).
- Provide 288 m^3 water supply for firefighting purposes in the supply tanks.

10.0 References

[1] Department of Planning, “Hazardous Industry Planning Advisory Paper No. 2 - Fire Safety Study Guidelines,” Department of Planning, Sydney, 2011.

[2] Fire and Rescue NSW, Fire safety in waste facilities, Sydney: NSW Government, 2020.

[3] Department of Planning, “Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning,” Department of Planning, Sydney, 2011.

[4] Standards Australia, AS 1940:2017 - Storage and Handling of Flammable and Combustible Liquids, Sydney: Standards Australia, 2017.

[5] Department of Planning, “Hazardous Industry Planning Advisory Paper No. 1 - Industry Emergency Planning,” Department of Planning, Sydney, 2011.

[6] SafeWork NSW, “Work Health and Safety Regulation,” SafeWork NSW, Lisarow, 2017.

[7] Australasian Fire Authorities Council, “Fire Brigade Intervention Model V2.2,” Australasian Fire Authorities Council, 2004.

[8] NSW Department of Planning, “Best Practice Guidelines for Contaminated Water Retention and Treatment Systems,” NSW Department of Planning, Sydney, 1994.

[9] Standards Australia, “AS 2419.1:2017 - Fire Hydrant Installations - System Design, Installation and Commissioning,” Standards Australia, Sydney, 2017.

Appendix A

Hazard Identification and Risk Register

Appendix A

A1. Risk Matrix

0-5 = Low Risk 6-10 = Moderate Risk 11-15 = High Risk		Severity of the Potential injury / Damage				
		Insignificant damage to Property, Equipment or Minor Injury	Non-Reportable Injury, minor loss of Process or slight damage to Property	Reportable Injury, moderate loss of Process or limited damage to Property	Major Injury, Single Fatality, critical loss of Process / damage to Property	Multiple Fatalities, Catastrophic Loss of Business
16-25 = Extremely High Unacceptable Risk		1	2	3	4	5
Likelihood of the hazard happening	Almost Certain 5	5	10	15	20	25
	Will probably Occur 4	4	8	12	16	20
	Possible to Occur 3	3	6	9	12	15
	Remote Possibility 2	2	4	6	8	10
	Extremely Unlikely 1	1	2	3	4	5

A2. Metal Storage Stockpiles

Area / Operation:	Metal Storage Stockpiles
Hazard Cause:	Ignition of combustible material within stockpile

Initial Risk		Controls Implemented	Residual Risk		How Controls will be Checked	Further Controls will be Checked	Actions	
Consequence	Likelihood		Consequence	Likelihood			Date Due	Date Complete
Radiant heat impact upon adjacent areas and incident propagation and potential injury or fatality from radiant exposure to onsite and potential injury to offsite personnel	Very low due to lack of combustible material	• Hydrant protection • First-attack fire equipment • Stockpile separation	Potential for fire is still present due to combustible waste however it is reduced by fire response	Likelihood is still considered low due to the nature of the waste	• Hydrant pumps tested monthly by an independent 3rd party • Stockpiles checked daily to confirm incompatible or higher hazard wastes aren't present • Management to review checklists weekly to ensure checklists are being undertaken by site personnel	• Development of checklists to assess waste within a stockpile	• 14/12/22	
{2}	{2}		{1}	{1}				
Score {4}			Score {1}					

A3. Fire Areas (Environmental Incident)

Area / Operation:	Fire Areas							
Hazard Cause:	Application of fire water (i.e. sprinklers or hydrants) and potential contamination of water							
Initial Risk		Controls Implemented	Residual Risk		How Controls will be Checked	Further Controls will be Checked	Actions	
Consequence	Likelihood		Consequence	Likelihood			Date Due	Date Complete
Discharge of potentially contaminated water to the environment	Application of fire water may still occur due	• Minimal potential for contamination of water at the site from wastes stored	Hazard is still present due to potential for fire water application	Likelihood is reduced due to controls reducing potential for large fires which require substantial application of water	• Management to review checklists weekly to ensure checklists are being undertaken by site personnel	• N/A	• 14/12/22	
{2}	{3}		{2}	{2}				
Score {6}			Score {4}					

A4. Fire Areas (Smoke)

Area / Operation:	Fire Areas							
Hazard Cause:	Fires producing toxic bi-products of combustion							
Initial Risk		Controls Implemented	Residual Risk		How Controls will be Checked	Further Controls will be Checked	Actions	
Consequence	Likelihood		Consequence	Likelihood			Date Due	Date Complete
Dispersion of toxic bi-products over surrounding community and irritation or injury to the community. A fatality is far less likely.	No combustible material. Therefore, low potential for fire and smoke generation	• Controls discussed for all previous incidents • Segregated wastes reduce fire load and potential for toxic bi-products to be emitted	Hazard is still present; however, the size of the fires are reduced resulting in lesser smoke plume with less harmful effects and less dispersion distance	Likelihood remains the same	• All controls discussed previously to mitigate against fire	• N/A	• 14/12/22	
{3}	{1}		{2}	{1}				
Score {3}			Score {2}					