Riskcon engineering

Fire Incident Management Plan

40 Madeline St, Strathfield South NSW 2136

EME Advisory Pty Ltd
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40 Madeline St, Strathfield South NSW 2136

EME Advisory Pty Ltd

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A	24 January 2024	Draft issue for comment	Isaac Gates	Renton Parker
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Executive Summary

Background

EME Advisory Pty Ltd (EME Advisory) has been engaged by Re.Cycle Operations Pty Ltd (Re.Cycle) to prepare an Environmental Impact Statement (EIS) to accompany a State Significant Development Application (SSDA) for an increase in mixed waste processing capacity at the Strathfield South Materials Recovery Facility (MRF) located at 40 Madeline Street, Strathfield South, NSW.

As part of the EIS, a Fire Incident Management Plan (FIMP) is required for the site to assess the potential fire risks associated with the proposed development. It is necessary to review the potential sources of fire at the site and the fire protection to determine whether the protection is commensurate with the risks. The assessment has been prepared as a FIMP following the methodology provided in the Hazardous Industry Planning Advisory Paper (HIPAP) No. 2 and Fire and Rescue NSW (FRNSW) Fire Safety Guideline – Fire Safety in Waste facilities (February 2020) .

Conclusions

An FIMP has been prepared for the Strathfield South MRF at 40 Madeline Street, Strathfield South in accordance with HIPAP No. 2 as part of the requirements in SEARs to satisfy the fire and incident management requirements for the site.

The analysis was based on credible fire scenarios to assess whether the protection measures at the site were adequate to combat the hazards associated with the quantities and types of commodities being stored. Based on the review, the fire risks have been identified, and recommendations made regarding measures to minimize the fire risks at the site.

Recommendations

Based on the analysis outlined in the FIMP, the following recommendations have been made:

- Where possible, storages at the site shall alternate between combustible and non-combustible products to minimise the potential for incident propagation between storages.
- Dry powder extinguishers shall be available within 15 m of combustible waste storages.
- A fire hydrant system shall comply with Clause E1.3 of the BCA and the relevant provisions of AS 2419.1:2021. A fire engineer is to review fire systems and confirm compliance and performance solutions required.
- A fire hose reel system shall comply with Clause E1.4 of the BCA and the relevant provisions of AS 2441:2005. A fire engineer is to review fire systems and confirm compliance and performance solutions required.
- Portable fire extinguishers shall comply with Clause E1.6 of the BCA and the relevant provisions of AS 2444:2001. A fire engineer is to review fire systems and confirm compliance and performance solutions required.
- A building occupant warning system shall comply with the Building Code of Australia Clause E2.2a and AS 1670.1:2018. A fire engineer is to review fire systems and confirm compliance and performance solutions required.

- The evacuation signal 1 shall include the words such as “Fire” and “Evacuate” inserted in the time period provided in ISO 8201, or a site-specific voice message as provided for in AS 4428.16.
- An emergency Response Plan (ERP) shall be developed for the site in accordance with the Hazardous Industry planning Advisory Paper No.2
- An Emergency Service Information pack (ERP) shall be developed for the site in accordance with the Fire and Rescue NSW Fire Safety Guideline “Emergency Service Information Pack and Technical Fire Plans”.
- The hydrant system shall be reviewed by a fire protection engineer to confirm the number of hydrants that would be required to flow at the site and to demonstrate that the available pressure at the most disadvantaged hydrant will comply with AS 2419.1.

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Abbreviations

Abbreviation	Description
AS	Australian Standard
BA	Breathing Apparatus
BCA	Building Code of Australia
CBD	Central Business District
CDS	Container Deposit Scheme
CSP	Ceramic Stone and Porcelain
DGs	Dangerous Goods
EIS	Environmental Impact Statement
ERP	Emergency Response Plan
ESIP	Emergency Services Information Pack
FBIM	Fire Brigade Intervention Model
FIMP	Fire Incident Management Plan
FRNSW	Fire and Rescue New South Wales
FSS	Fire Safety Study
HIPAP	Hazardous Industry Planning Advisory Paper
MRF	Materials Recovery Facility
PCR	Paper and Cardboard Recycling
SEP	Surface Emissive Power
WCCFS	Worst Credible Case Fire Scenario
GBP	Glass Benefaction Plant

1.0 Introduction

1.1 Background

EME Advisory Pty Ltd (EME Advisory) has been engaged by Re.Cycle Operations Pty Ltd (Re.Cycle) to prepare an Environmental Impact Statement (EIS) to accompany a State Significant Development Application (SSDA) for an increase in mixed waste processing capacity at the Strathfield South Materials Recovery Facility (MRF) located at 40 Madeline Street, Strathfield South, NSW.

As part of the EIS, a Fire Incident Management Plan (FIMP) is required for the site to assess the potential fire risks associated with the proposed development. It is necessary to review the potential sources of fire at the site and the fire protection to determine whether the protection is commensurate with the risks. The assessment has been prepared as a FIMP following the methodology provided in the Hazardous Industry Planning Advisory Paper (HIPAP) No. 2 and Fire and Rescue NSW (FRNSW) Fire Safety Guideline – Fire Safety in Waste facilities (February 2020) .

1.2 Objectives

The objectives of the FIMP are to:

- Review the site operations for the potential to initiate or become involved in a fire including flammable or combustible materials which may be present at the site.
- Identify heat radiation impacts from potential fire sources at the site and determine the potential impacts on the surrounding areas and fire protection system.
- Review the proposed fire safety features and determine the adequacy of the fire safety systems based on the postulated fires.

1.3 Scope of Services

The scope of work is for the preparation of an FIMP for the facility to assess the potential hazards at the site to ensure the fire protection systems are commensurate with the identified hazards. This FIMP analyses potential hazards entering the site as well as potential hazards processed by the Glass Beneficiation Plant (GBP).

This document follows the methodology recommended in HIPAP No.2 (Ref. [1]). A review of the following components of the FIMP are within the scope of work:

- Determination of risk and consequences from fire or explosion scenarios throughout the facility.
- The preparation of a report on fire prevention, fire detection, fire alarm and fire suppression systems for the site.
- Firewater storage capacity for compliance with Australian Standards and Regulations.
- Hydrant hydraulic design screening calculations for the fire water system.
- Review of external fire hydrant configuration and locations.
- Recommendations based upon the study for implementation in the final design.

1.4 Secretary's Environmental Assessment Requirements

Provided in **Table 1-1** are the SEARs for the project.

Table 1-1: SEARs

SEAR	Requirement	Report Location
Fire and Impact Management	Technical information on the environmental protection equipment to be installed 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.	Throughout the report
	Identification of the aggregate quantities of combustible waste products to be stockpiled at any one time	Section 3.3
	Details regarding the fire hydrant system and its minimum capabilities appropriate to the site's largest stockpile fire load	Section 6.3
	Details of size and volume of stockpiles and their management and separation to minimise fire spread and facilitate emergency vehicle access	Section 3
	Consideration of consistency with NSW Fire & Rescue Fire Safety Guideline – Fire Safety in Waste Facilities (February 2020)	Section 9

2.0 Methodology

2.1 Fire Safety Study Approach

The following methodology was used in the preparation of the FIMP for the facility. The methodology is to follow items required by HIPAP No. 2 (Ref. [1]).

- 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 were 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 firefighters to respond to the postulated fire. The heat radiation impact from incidents at adjacent sites on the buildings and structures at the facility was 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 updating 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 outlying FRNSW stations were included to provide a ‘backup 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 FIMP 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 1.3**.
- 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 FIMP as provided in the guidelines issued as HIPAP No. 2 (Ref. [1]) 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 concerning 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 fire will not occur.

3.0 Site Description

3.1 Site Location

The site is located at 40 Madeline Street, Strathfield South, which is approximately 16 km Southwest of the Sydney Central Business District (CBD). **Figure 3-1** shows the regional location of the site in relation to the Sydney CBD.

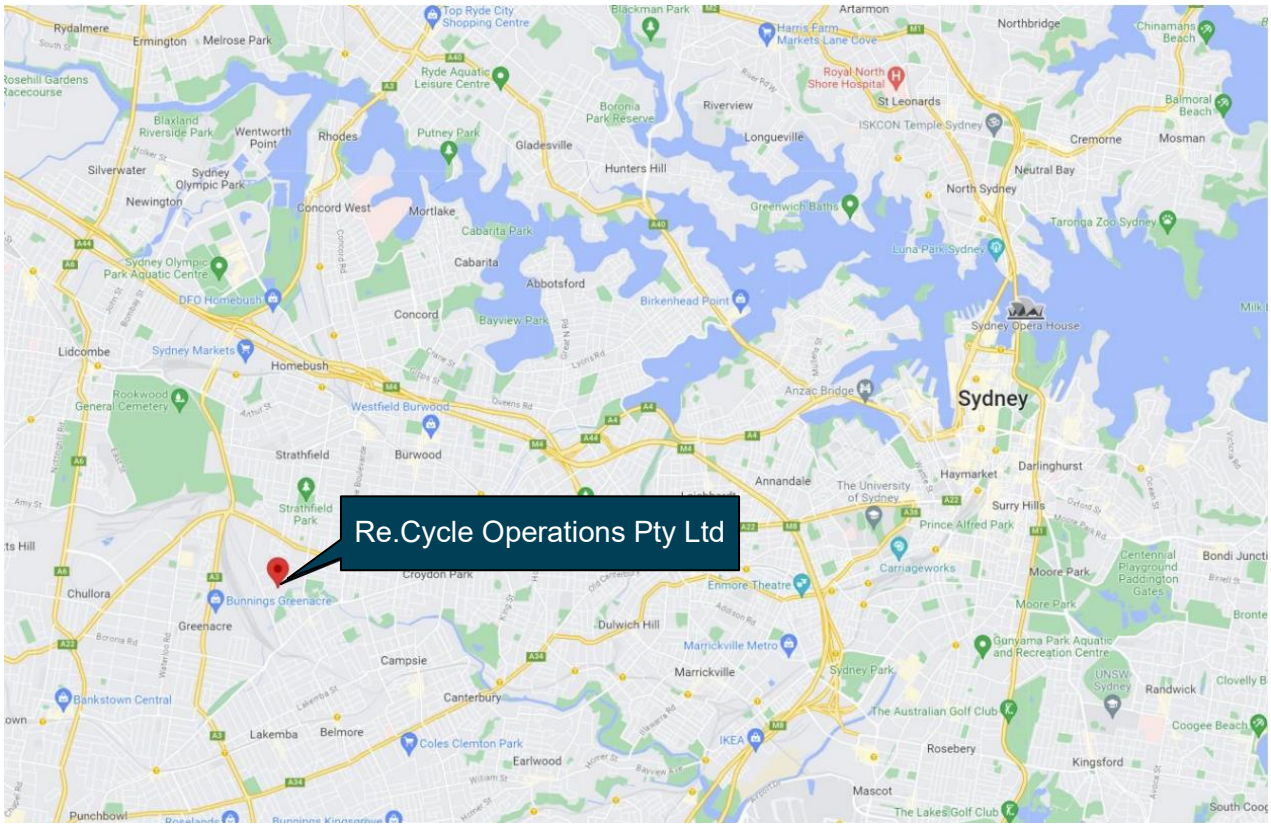

Figure 3-1: Site Location

3.2 Adjacent Land Uses

The land is located in an industrial precinct zoned E4, **Table 3-1** details the surrounding land uses.

Table 3-1: Surrounding Land Uses

Direction	Description
North	• E4 General Industry: a civil construction depot and a multi-unit industrial facility comprising multiple operators.
South	• E4 General Industry: multi-unit industrial facility with multiple operators.
East	• E4 General Industry: vacant land.
West	• E4 General Industry: transport and logistics facility and a smallgoods food provider.

3.3 Project Background & Description

The Strathfield South Re.Cycle site houses a MRF, GBP and Paper and Cardboard Recycling (PCR) plant. The site currently processes four recyclable waste streams: mixed metals, glass, mixed plastics and paper/cardboard. The MRF process involves the receipt of commingled recycling from kerbside and commercial recycling collections, which are cleaned, sorted into material groups, sized, and baled ready for transport off-site and subsequent manufacturing into recycled packaging and other products. The glass from the commingled stream is sent to the GBP for further processing into glass cullet - amber, flint, and green - as well as glass fines, are sold to off-takers.

The Site includes three large industrial sheds, office buildings, car parking areas, storage areas, two weighbridges and three site access points from the adjoining Madeline Street. The remainder of the Site consists of a sealed concrete hardstand. The site is displayed in **Figure 3-2.**

Glass processed is sourced from recovered mixed waste as well as the delivery of source-separated glass; an increase in glass throughput also involves a corresponding increase in mixed waste throughput. Polytrade is therefore seeking approval to increase the throughput of mixed waste, inclusive of glass, by 100,100 tpa and to increase waste storage from 4.2k tonnes to 8k tonnes to account for added waste throughput. For the purposes of this FIMP, the additional 100,100 tpa throughput has been assessed on the basis of mixed waste, which represents the physical driver of the throughput increase.

This undertaking will involve an increase in the onsite storage of glass, the operational hours of the facility and traffic movements associated with transporting the additional glass and the employment of six additional staff.

The GBP involves 4 stages.

- Stage 1 – Receival: Vehicles carrying comingled recyclables currently enter the Project Site from the adjoining Madeline Street via the main site access (‘Gate 1”) and pass over the weighbridge (‘Weighbridge 1’) to record tonnes received. After being weighed, incoming trucks containing mixed recyclables drive to the rear of the site and discharge their load at the MRF Receival Area at the rear of Building 2. The MRF includes a series of conveyors that provide a constant and controlled flow of material through the system. Mixed recyclable material is sent through a series of trommel screens, an optical sorting system and an eddy current to separate material according to size and type (plastics, paper/cardboard, steel, aluminium, glass and residual contaminants for disposal). Non-recyclable contaminants are removed, baled and disposed of by the approved methods. Once separated, plastics, metal (aluminium and steel) and paper/cardboard are sent via conveyor to a separate baler to be baled and temporarily stored.

  Once baled, recovered materials (excluding glass) are transferred by forklift and stored in the enclosed material bunkers located on the southern side of Building 1 (refer to Figure 2) before being loaded onto trucks and transferred to relevant destinations for further processing.

  Glass outputs from the MRF are transferred via internal conveyors to the GBP in Building 1, for further processing and separation into different colour fractions. Single-stream glass is sent directly to the GBP in Building 1. This includes glass from Container Deposit Scheme (CDS) collections or other independent collections of glass bottles. Inputs are deposited onto an intake stockpile on the floor of Building 1.

- Stage 2 - Cleaning: Glass is then subject to a cleaning process to remove lids, labels and other contaminants. Using optical equipment to remove plastic and paper, an x-ray machine to eliminate ceramic, stone and porcelain, magnets to extract ferrous metal, and eddy currents to repel non-ferrous metals.
- Stage 3 - Processing: Glass is then sorted by colour and size using advanced glass optical sorting technology. This system sorts the glass into three colour categories, green, amber and flint and into two size categories, being large glass (8 to 50 millimetres [mm]) and small glass (3 to 8 mm).
- Stage 4 - Offtake: The processed glass streams are stored in separate glass storage bunkers, located on the northern side of Building 1 (refer to Figure 2), before being transported via B-double trucks (up to 34 tonnes per load) to glass manufacturing facilities elsewhere to make new recycled glass bottles.

The GBP is currently working below its designed maximum processing capacity of 100,100 tpa. Approximately 26% of the materials currently received at the MRF is glass (i.e. 18,174 tpa), which is then processed at the GBP. The maximum throughput of mixed waste that will be processed at the MRF will not surpass 170,000 tpa. Due to the facility's designed processing capabilities, the following are not required; Amendments to site layout and infrastructure (changes to existing approved buildings, plant, or equipment).

Polytrade have reviewed the implications of increased mixed waste throughput, concluding that the increase does not materially change the required capacity of storage areas and configuration of processing equipment currently utilised at the facility, effectively operating under the current configuration. Inherent outcomes of the increased processing capacity include; increased traffic flow to deliver and transport the additional product, increased operational hours to process the product and an increase in staffing numbers to monitor and control increased operation. The current site layout will remain as is and is shown in **Figure 3-3.** Per day the facility will see an additional 13 B-doubles and/or semi-trailers delivering glass to the site, 3 B-doubles and/or semi-trailers collecting the processed glass to transport off-site and up to 6 additional staff vehicles. Six full-time staff members are to be employed, allowing for an additional 3 personnel per shift. To keep up with production, it is proposed that the existing approved hours of operation for the receipt of materials at the MRF are to be increased by 2 hours from Monday to Saturday 4:30 am to 3:00 pm (existing) to Monday to Saturday 4:30 am to 6:00 pm (proposed). These additional hours are to accommodate the additional daily truck movements delivering the additional source-separated glass and mixed waste to the site.

Figure 3-2: Aerial view of the site 40-42 Madeleine Street, South Strathfield NSW 2136

The site layout is shown in **Figure 3-3**.

3.4 Quantities of Waste Stored and Handled

There are no Dangerous Goods (DGs) handled in the glass beneficiation process, only waste is assessed. The maximum quantities of waste proposed to be stored at the site have been provided in **Table 3-2** along with the quantity of waste handled by the facility each year.

Table 3-2: Classes and Quantities of DGs Stored and Handled

Class	Description	PG	Current Approved Quantity	Proposed Additional Quantity*	Total Quantity
n/a	Materials Received (Glass, Plastic and Metal waste)	n/a	69,900 tpa	100,100 tpa	170,000 tpa
n/a	Paper and Cardboard	n/a	30,000 tpa	No addition proposed	30,000tpa
n/a	Waste permitted on site. (papers and cardboard, mixed plastics, steel, aluminium, ceramics and glass)	n/a	4,200 T	3,800 T	8,000 T

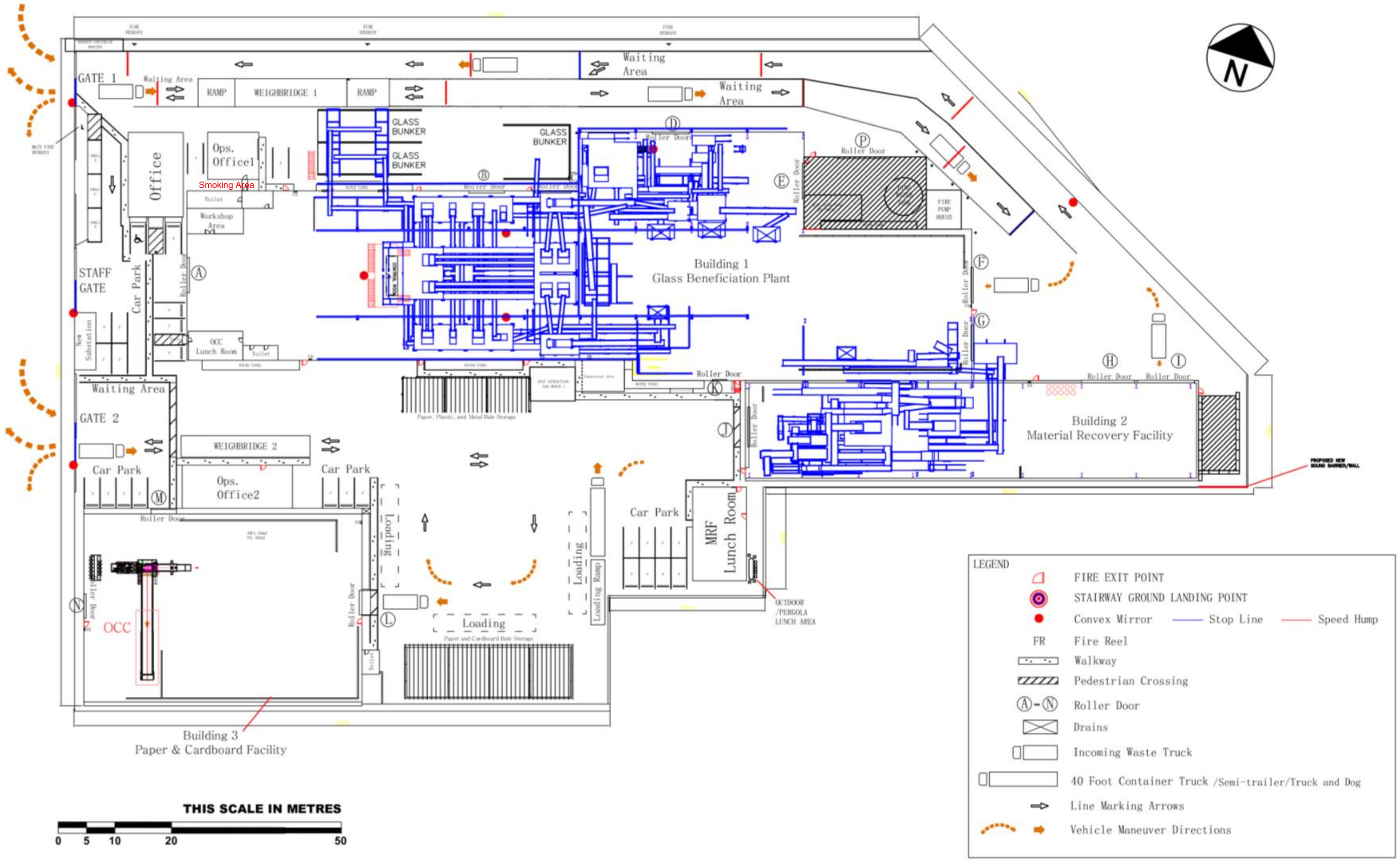

Figure 3-3: Site Layout

4.0 Hazard Identification

4.1 Introduction

A hazard identification table has been developed and is presented in **Appendix A** as required by HIPAP No. 2 (Ref. [1]). Those hazards identified are generally low risk and do not have the potential for explosion and low potential to ignite causing fire. The impact of these low-risk hazards is assessed in the following sections of this document.

4.2 Properties of Dangerous Goods

It has been highlighted in **Section 3** that there are no dangerous goods used or stored in the GBP. **Table 4-1** describes each of the waste types with an assessment of the combustibility of the waste stored and handled at the site.

Table 4-1: Waste Types and Combustion Properties

Type of Waste	Combustion Properties
Glass	Glass is considered non-combustible, and any potential contaminants are expected to be minimal, thus ruled as negligible.
Metal	Metal scraps such as steel, iron, copper, brass, or stainless steel will melt when exposed to heat but typical temperatures within a fire would not result in the combustion of these metals.
Ceramic and Porcelain	Ceramics and Porcelain waste products are non-combustible.
Plastic	Plastic is combustible depending upon the composition.
Paper/Cardboard	Paper/Cardboard are combustible, however, when stored in tightly bound bales the spread of ignition is dramatically reduced.

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 in MRF Receival Area.
- Ignition of combustible waste in outdoor Bale Storage Bunker Area
- Ignition of combustible waste in MRF building Bale Storage Bunker Area.
- Ignition of combustible waste within the GBP.
- Storage and processing of non-combustible wastes.
- Application of fire water and potential contamination with discharge to the environment.

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

4.4 Ignition of combustible waste in MRF Receival Hall.

Waste delivered to the site is unloaded in the enclosed receival hall in building 2. The waste is then inspected for any non-compliant materials (i.e. gas cylinders, batteries, etc.) which if identified, are removed. During this stage materials are categorised and sorted and sent into different streams.

The waste is variable in nature and may contain products such as gas bottles, aerosols or lithium-ion batteries (due to contamination) which may result in the release of flammable gas (in the case of bottles or aerosols) or thermal runaway of the lithium-ion batteries. Either source may result in ignition and fire at the point of release which could propagate throughout the storage.

If an ignition of the waste occurs, it may develop into a waste storage fire which could propagate through a bunker. The building is fitted with smoke detectors and infra-red screening, if a fire were to propagate it would be detected by the smoke alarms and alert FRNSW and site staff. The fire will continue to propagate until authorities or staff take action to suppress the fire using hose reels fire extinguishers or hydrants.

If the fire occurs deep within the pile, the waste overburden will provide shielding to the fire which will prevent it from being extinguished which then may propagate at the base of the pile throughout a bunker. In this scenario, the efforts to suppress the fire would be overburdened and would be unlikely to maintain suppression of the fire.

It is noted that the primary detection measure for fire in this scenario is via a smoke detection which will detect the presence of smoke in the early phases of fire growth which will then notify FRNSW of the presence of a fire at the facility.

To ensure fire protective equipment is located such that it can be used in the event of a fire, this incident has been carried forward for further analysis.

4.5 Ignition of combustible waste in outdoor Bale Storage Bunker Area.

The outdoor storage bunkers contain baled materials, specifically accommodating Paper/Cardboard, Metals (Steel/Aluminium), and plastics. The bales are organised into distinct groupings to prevent cross-contamination. The height of all stockpiles is limited to 4 meters. Notably, steel, a component of the stockpiled materials, is non-combustible. While baled Aluminium, baled paper/cardboard, and baled plastic are classified as combustible, the likelihood of ignition is extremely low due to the absence of ignition sources and the high level of ventilation.

The materials in question require prolonged exposure to heat and high temperatures for ignition to occur. Moreover, the outdoor storage location and the presence of open air mitigate the risk of ignition sources or the accumulation of heat/flammable vapours in the area. Consequently, the perceived risk of fire associated with these waste materials and their respective storage conditions is deemed insubstantial.

Therefore, no further analysis has been pursued for these materials in the context of fire risk assessment.

4.6 Ignition of combustible waste in MRF building Bale Storage Bunker Area.

Similar to **Section 4.5**, the likelihood of ignition of Paper/Cardboard, Metals (Steel/Aluminium), and plastics bales is extremely low due to the absence of ignition sources and the requirement of prolonged exposure to heat and high temperatures for ignition to occur. Consequently, the perceived risk of fire associated with these waste materials and their respective storage conditions is deemed insubstantial.

Therefore, no further analysis has been pursued for these materials in the context of fire risk assessment.

4.7 Ignition of combustible waste within the GBP.

Waste materials undergo a preliminary sorting into distinct material groups before entering the GBP. Exceptions to this predominantly glass stream include contaminants (i.e. plastic, ceramics, porcelain, and metal. These non-glass contaminants are extracted from the glass stream during the GBP processing and subsequently directed to other facilities for further processing. The glass stream typically contains only minimal amounts of contaminants at any given time, most of which are non-combustible. In instances where combustible materials are present, their ignition requires prolonged exposure to heat and high temperatures. Given the absence of ignition sources, the likelihood of combustion is extremely remote.

As a result, the perceived risk of fire associated with these waste materials and their corresponding storage conditions is deemed not credible. Accordingly, this incident has not been carried for further analysis.

4.8 Storage and processing of non-combustible wastes.

Nearly all the materials processed and stored within the GBP consist of glass. Given that glass is inherently non-combustible, the probability of it being involved in a fire is extremely low, attributed to the minimal potential for the wastes to ignite and sustain combustion. Consequently, the perceived risk of fire associated with these waste materials and their corresponding storage arrangements is considered not credible. As a result, this incident has not been carried forward for further analysis.

5.0 Consequence Analysis

5.1 Ignition of Combustible Waste within the Receival Hall

There is the potential for a fire to develop involving combustible waste within the receival area which may result in a full bunker fire. A detailed analysis has been conducted in **Appendix B** and the radiant heat impact distances estimated for the scenario are presented in **Table 5-1**.

The analysis focused on providing conservative results employing the model used by measuring the impact of the fire at a source that is located at ground level and the greater distance along the hypotenuse from an elevated flame results in more attenuation through the air space and thus a lower radiant heat is experienced. As the points of interest (i.e. the hydrants) are at heights <1 m, adopting the values at ground level is considered more conservative than the elevated flame results. The results for unelevated fires have been extracted from **Appendix B** and presented in **Table 5-1**.

Table 5-1: Heat Radiation from a Receival Hall Fire

Heat Radiation (kW/m²)	Distance (m)
	Full Bunker
35	3.6
23	6.5
12.6	12.2
4.7	26.8
3.0	36.0

Figure 5-1 represents the absolute worst-case scenario of a fire to occur in the receival hall.

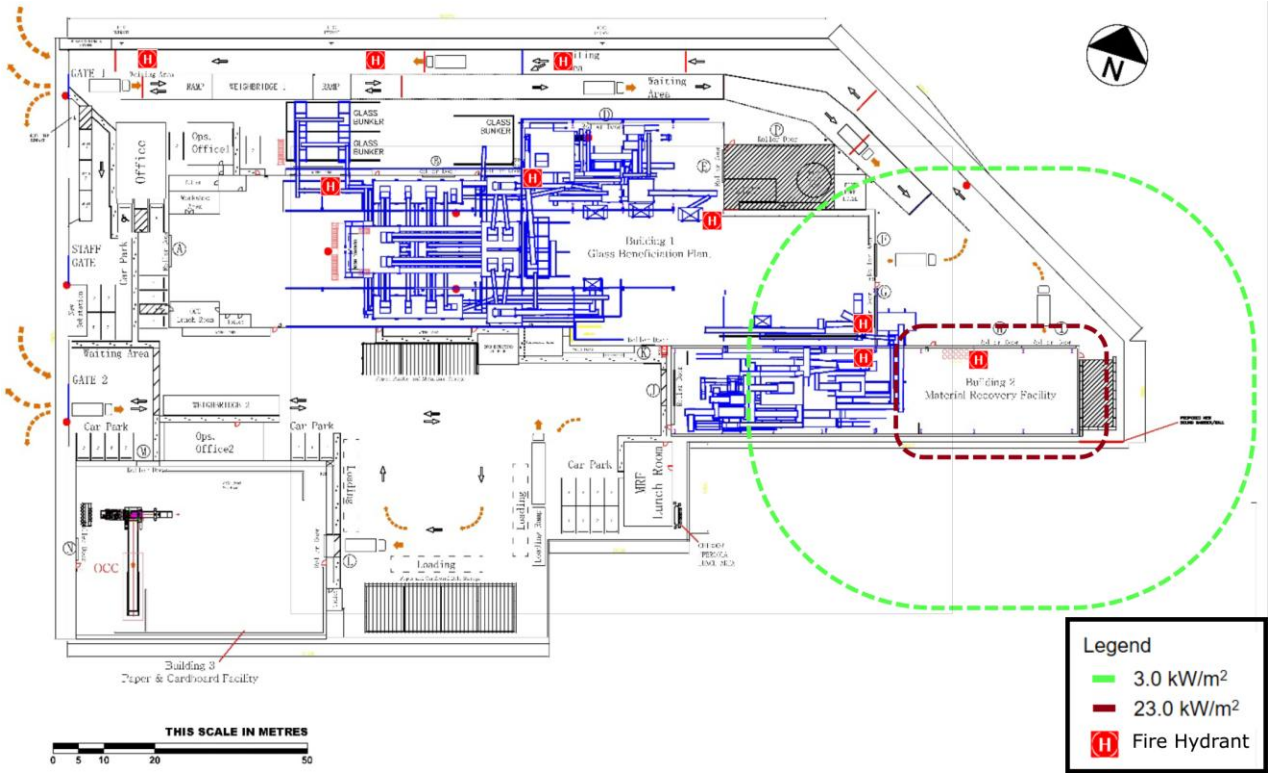

Figure 5-1: Receival Hall Fire Analysis

The 3.0 kW/m^2 contours can have substantial impact distances which may render hydrants inoperable; however, a review of the hydrant locations indicates there are sufficient hydrants located outside of the radiant heat impacts and would therefore be able to be used to combat an incident. The hydrant coverage provided is based on 2 hoses length yielding a distance of 60 m; however, the worst-case impact distance is 36 m; hence, there will be numerous hydrants that will be unaffected by a fire based on the conservative analysis. It is noted that the presented fires could occur in any location and is just shown in the worst-case location being closest to fire infrastructure.

It is noted that the analysis does not include the impact of the fire walls which would attenuate the radiant heat and control it within a bunker. Therefore, the conclusions drawn excluding the protection afforded by the firewalls provides a conservative analysis.

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 alarms 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. firewalls)
- **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, concerning 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. **Table 6-1** presents the potential ignition sources and incidents for the facility that 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 GBP and MRF) including processing and storage areas. Note: A designated smoking area is provided between Ops. Office 1 and the toilet bock viewed in **Figure 3-3**.
Housekeeping	The site will operate a housekeeping procedure to ensure accumulation of dust in delivery and processing areas does not occur. Limiting the accumulation of dust is an important method for minimising the potential for fires or dust dispersions.
Electrical	Fixed electrical equipment to be designed and installed to AS/NZS 3000:2018 (Ref. [4]).
Arson	The site has a security fence and is staffed during business hours. CCTV monitoring for intruders is conducted at the site.
Hot Work	A permit-to-work system and risk assessment before starting work are provided in **Appendix E** and filled out 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 should be separated by a minimum of 10 m between storages which minimises the potential

for incident propagation between separate storages. Nonetheless, the following recommendation has been made:

- Where possible, storages at the site shall alternate between combustible and non-combustible products to minimise the potential for incident propagation between 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. dust etc.) that is released during 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 adhered to
- Personal Protective Equipment
- Emergency response plan and procedures
- First aid fire equipment
- Personal hygiene requirements
- Security
- Training of personnel
- Compatibility, segregation and safe storage of wastes
- Procedures for reporting damaged goods/accidents.
- Compliance with the Work Health and Safety Regulation 2017 (Ref. [5]).

6.1.5 Emergency Plan

The site has an emergency plan to outline the responses to emergency incidents at the site. The plan will 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 a readiness response in the unlikely event of an incident at the site. To ensure this is captured, the following recommendation has been made:

- An Emergency Response Plan (ERP) shall be developed for the site in accordance with the Hazardous Industry Planning Advisory Paper No. 2.

6.1.6 Site Security

Maintaining a secure site reduces the likelihood of a fire being started maliciously by intruders or by accident. Access to the site will be always restricted 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 the detection of fire pre-conditions, detection of a fire

suppression-activated condition and prevention of propagation. This assessment includes the identification of the detection and protection systems required.

6.2.1 Detection

In the event of a fire in the facility, the fire detection system will detect the presence of fire via aspirated smoke detectors. In addition, the site utilises Very Early Smoke Detection Alarms (VESDA) beam detection. These systems activate alarms to notify building occupants and Fire and Rescue NSW (FRNSW). The site also utilises a night watch and fire rover system that provides active fire monitoring and rapid first-response capability. The fire rover is equipped with thermal imaging and visual cameras, enabling the early identification of abnormal heat signatures, smoke or flame development, including in outdoor or remote areas not fully covered by fixed detection systems. The combination of these systems allows for early-stage fire detection, real-time alerting and notification, prompting faster response times to limit fire spread. Manual alarm points should also be installed in clearly visible and accessible locations, allowing staff to initiate early alarms.

6.3 Fire Protection

6.3.1 Extinguishers

All staff undergo training it operator site 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 available within 15 m of combustible waste storages.
- Operators shall be trained in the use of fire extinguishers.

6.3.2 Fire Hydrants

It is expected that up to three (3) hydrant hoses would be required to operate at the site in the event of a fire. A pressure inquiry has been provided in Appendix C which indicates for 30 L/s demand for three hydrant hoses, the available pressure is 294 kPa. However, pressure losses exist in the system; hence, in the scenario where three hoses are operating the pressure losses from pipework, valves, and fittings may result in the available pressure at the most disadvantaged hydrant not being sufficient to exceed 250 kPa.

Based on the above discussion, the following recommendation has been made:

- The hydrant system shall be reviewed by a fire protection engineer to confirm the number of hydrants that would be required to flow at the site and to demonstrate that the available pressure at the most disadvantaged hydrant will comply with AS 2419.1.

The hydrant coverage is shown in **Figure 7-2.**

6.3.3 Fire Hose Reel

A fire hose reel system shall 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. The current layout of fire extinguishers is displayed in **Figure 7-2.** As processing remains unchanged and there is no addition of combustible materials the existing layout can be considered acceptable.

6.3.4 Sprinklers

FRNSW Fire safety guidelines – fire safety in waste facilities recommends automatic fire sprinkler systems should be installed in any fire compartment that has a floor area of 1000 m^2 and contains combustible material. The GBP processes non-combustible materials and therefore does not require a sprinkler system.

6.3.5 BCA Fire Protection Requirements

In addition to the previously discussed requirements, the Building Code of Australia (BCA) specifies further fire protection requirements. The relevant clauses have been summarised in **Table 6-2.**

Table 6-2: BCA Fire Protection Requirements

	Description
Fire Hydrants	A fire hydrant system shall comply in accordance with Clause E1.3 of the BCA, and the relevant provisions of AS 2419.1:2021.
Fire Hose Reels	A fire hose reel system shall comply in accordance with Clause E1.4 of the BCA, and the relevant provisions of AS 2441:2005
Portable Fire Extinguisher	Portable fire extinguishers shall comply in accordance with Clause E1.6 of the BCA, and the relevant provisions of AS 2444:2001.
Sprinkler System	The fire sprinkler system shall comply in accordance with Clause E1.5 of the BCA, and the relevant provisions of AS 2118.1
Smoke Detection	A smoke detection system shall comply in accordance with BCA E2.2, Clause 4 of BCA Specification E2.2a and AS 1670.1:2018.
Building Occupant Warning System	A building occupant warning system shall comply in accordance with the Building Code of Australia Clause E2.2a and AS 1670.1:2018. The evacuation signal 1 shall include the words such as “Fire” and “Evacuate” inserted in the period provided in ISO 8201, or a site-specific voice message as provided for in AS 4428.16.
Emergency Lighting and Exit Signs	Emergency lighting and exit signs shall comply in accordance with Clauses E4.2, E4.4, E4.5, E4.6 and E4.8 of the BCA, and the relevant provisions of AS 2293.1:2005.

6.4 Fire Mitigation

6.4.1 Fire Water Supply

The street mains will provide a fire water supply to the site hydrants with pressure availability tested by Obrien Fire Protection provided in **Appendix C**. Based on the review of FRNSW – Fire Safety Guideline - Fire safety in waste facilities, the water provided by the water mains shall be sufficient. However, as previously recommended hydrant system shall be reviewed by a fire protection engineer to confirm the number of hydrants that would be required to flow at the site and to demonstrate that the available pressure at the most disadvantaged hydrant will comply with AS 2419.1.

7.0 Local Brigade Access and Egress

7.1 Overview

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. [6]). **Figure 7-1** illustrates the site showing access available from the street.

Figure 7-1: Fire Brigade Access and Site Facilities

Figure 7-2 depicts a detailed site layout with entry points to the site and fire services infrastructure.

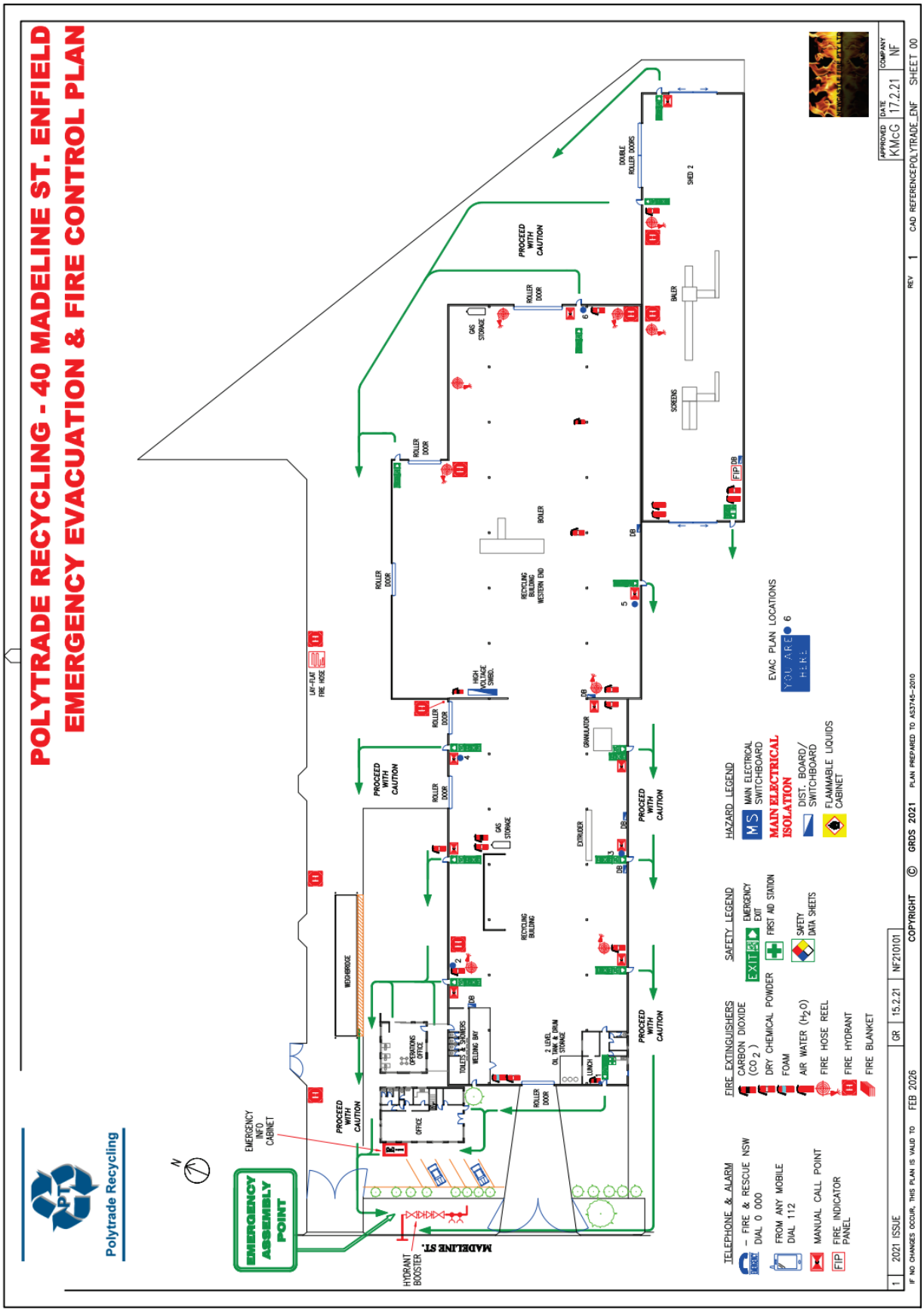

Figure 7-2: Fire Brigade Access and Fire Service Infrastructure

The closest FRNSW stations to the site are described in **Table 7-1**. The expected routes from the stations to the site are illustrated in **Figure 7-3**.

Table 7-1: Station Locations

Station Name	Station Address	Distance (km)
FRNSW Headquarters	1 Amarina Ave, Greenacre NSW 2190	3.6
FRNSW Burwood Fire Station	12b Livingstone St, Burwood NSW 2134	5.4
FRNSW Campsie Fire Station	294 Beamish St, Campsie NSW 2194	4.8
FRNSW Lakemba Fire Station	208 Haldon St, Lakemba NSW 2195	3.8

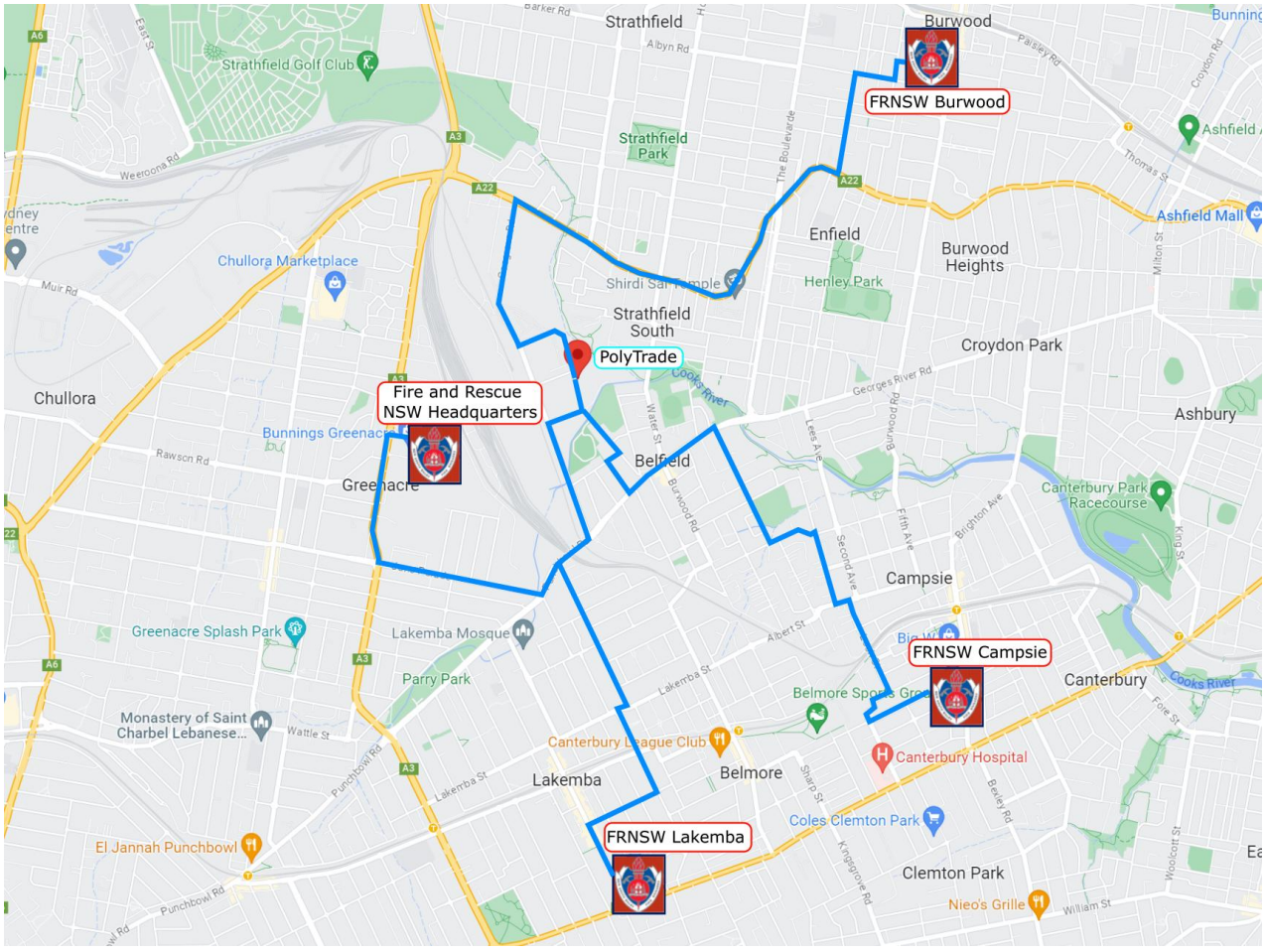

Figure 7-3: Location of Site with Respect to Closest Fire Brigade Stations

7.2 Response Time – Fire Brigade Intervention Model (FBIM)

Due to the nature of the Fire Brigade Intervention Model (FBIM, Ref. [6]), 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, the time to respond and dispatch resources, the time for resources to reach the fire scene, the time for the initial determination of the fire location, time to assess the fire, time for firefighter travel to the 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:

7.2.1 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.

7.2.2 Time between Ignition and Detection

- 36 smoke detectors are set at a height of 15m throughout the facility accompanied with 3 thermal cameras that are monitored by ADACS. A layout plan could not be attained of this system, so for conservatism, It is assumed that the initial brigade notification will occur by site personnel raising the alarm. It is expected that following ignition, site personnel would identify the fire within 5 minutes (300 s) of ignition due to the presence of a visible smoke plume detected by an operator.

7.2.3 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 (Ref. [6]).
- Therefore, the time from ignition at which the fire brigade will be notified is (300+20) = 320 seconds after flaming combustion has commenced.

7.2.4 Time to Dispatch Resources

- The fire station is considered to be manned at the time of the fire.
- Based on FRNSW response times statistics from the 2022/2023 annual report (Ref. [7]), the 90th percentile of response time for the fire brigade to respond to an emergency call (including call processing, turnout time and travel time) is approximately 12 minutes as shown in **Figure 7-4**.

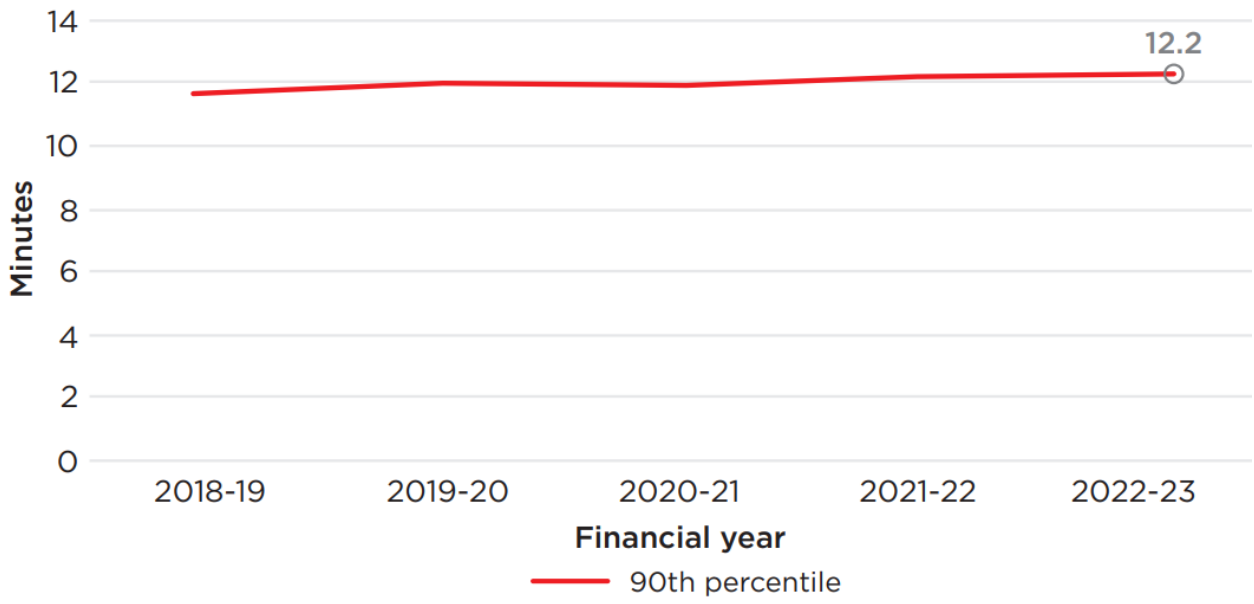

Figure 7-4: FRNSW Response Time from 2022/2023 Annual Report

- As the site is located within the FRNSW turnout districts it is expected that arrival at the site would be within the 90th percentile. The travel time has been assumed to be 12 minutes (720 seconds), as per **Figure 7-4**.
- Therefore, with a brigade call-out time of 320 seconds, and a response time of 720 seconds, the fire brigade can be expected to arrive on site 1040 seconds after fire ignition.

7.2.5 Time for Initial Determination of Fire Location

- On arrival, the fire location may not be visible to the approaching brigade personnel, thus requiring information to be obtained from the site.
- Fire brigade personnel assemble in the site office area.
- 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.

7.2.6 Time to Assess the Fire

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

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 a full hazardous incident suit in BA	0.8	0.5

*Standard Deviation

Horizontal travel distances will include the following:

- Travel from the kerb side adjacent to the main building and to the office is approximately 20 m.
- Travel from the office to the farthest point is 180 m along the most conservative route.
- Based on the above, the total horizontal travel distance of 200 m coupled with an egress speed of 0.63 m/s results in a horizontal travel time of up to 318 seconds.

7.2.7 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 (Ref. [6]), 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 + (1.28x17.1) = 68 s.

7.2.8 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 400 - 600 m of travel depending on routes taken. Using 600 m at a speed of 0.63 m/s, will take firefighting personnel approximately 953 seconds.

7.2.9 Summary

As summarised in **Table 7-3** the FBIM (Ref. [6]) indicates that the arrival times of the brigade from the nearest fire stations is approximately 17.4 minutes after fire ignition, and it is estimated that it takes another 6.4 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 23.8 minutes after fire ignition (note rounding affects the basic addition of the reported figures).

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
Lakemba or NSW Fire HQ	320 s	720 s	318 s	68 s	1,426 s (23.8 minutes)	953 s

7.3 Building Access

FRNSW will be required to enter the building to identify the fire source and undertake combat measures; hence, it is necessary to provide clear access to the building. Egress paths are provided for occupants to evacuate the building which could subsequently be used by FRNSW to access the building to undertake their assessment within the building.

8.0 Fire Water Supply & Contaminated Fire Water Retention

8.1 Detailed Fire Water System Assessment

It is extremely unlikely for a fire to occur in the GBP due to the limited supply of combustible materials and ignition sources. However, the receival hall in the facility would present the worst Credible Case Fire Scenario (WCCFS), at 1,300 m^2 this would be managed by 3 hydrant hoses. Provided in **Figure 7-2** is the location of all hydrants accessible from the street. The furthest onsite point from a hydrant is 12 m; hence, there would be sufficient coverage for the whole site from the multiple hydrants installed using a hydrant hose with 10 m of throw.

It is expected that up to three (3) hydrant hoses would be required to operate at the site in the event of a fire. A pressure inquiry has been provided in Appendix C which indicates for 30 L/s demand for three hydrant hoses, the available pressure is 294 kPa. However, pressure losses exist in the system; hence, in the scenario where three hoses are operating, the pressure losses exist from pipework, valves, and fittings may result in the available pressure at the most disadvantaged hydrant not being sufficient to exceed 250 kPa.

Based on the above discussion, the following recommendation has been made:

- The hydrant system shall be reviewed by a fire protection engineer to confirm the number of hydrants that would be required to flow at the site and to demonstrate that the available pressure at the most disadvantaged hydrant will comply with AS 2419.1.

8.2 Contaminated Water/Fire Water Retention

In the event of a fire within the building, while the wastes stored are relatively benign there may be the potential for some contamination (i.e. products of combustion, waste variability, etc.); hence, the fire water may be potentially contaminated and should be tested before discharge from the site. Alternatively, a fire may occur within a bunker where hydrant or fire monitor water is applied which too may become potentially contaminated and would require verification before discharge from the site.

Following a risk assessment methodology as outlined by the Department of Planning document "*Best Practice Guidelines for Potentially Contaminated Water Retention and Treatment Systems"* the following flows have been allowed for: three (3) hydrant hoses for 4 hours of operation (Direct from FRNSW Code for waste facilities)

The demand for the various protection systems has been summarised in **Table 8-1.**

Table 8-1: Potentially Contaminated Water Retention

Source	Rate (L/s)	Rate (m^3/min)	Duration (minutes)	Item Total (m^3)
Hydrants	30 (3 hydrant hoses)	1.8	240	432
			Total	432

The on-site stormwater management system has a proprietary gross pollutant trap in the gully pit inlets – contaminated firewater would go into a Stormwater 360 filtration pit. Once captured, the run-off is filtered through the patented Storm Filter cartridge that removes a range of pollutants to meet stringent regulatory requirements, including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, oil and grease, and organics. The cartridge is vacuumed out for treatment

and/or suitably disposed of. The system is located within an underground tank in the northwest of the site before being discharged into the Cooks River. There is no current way of containing the water to be assessed post-fire prior to release.

The Stormwater 360 filtration pit system has a designed water-quality treatment flow rate of 1.86 m³/min and a peak flow capacity of 5.16 m³/min. As the system is capable of effectively filtering contaminated water at 1.86 m³/min, it is expected to manage the anticipated contaminated fire water flow of 1.8 m³/min. On this basis, additional containment is not considered necessary, as the system would drain and treat the fire water at a rate equal to or greater than the application rate in the worst-case fire scenario.

While **Table 8-1** provides the hydraulic demand for containing potentially contaminated fire water in line with *Best Practice Guidelines for Potentially Contaminated Water Retention and Treatment Systems*, the operational profile of the facility indicates that the site presents a low risk of generating environmentally harmful contaminants. The wastes processed on-site, paper, cardboard and comingled recyclables, do not contain hazardous liquids, fuels or chemicals, and are therefore unlikely to produce toxic or persistent contaminants in fire water beyond the products of combustion already captured by the existing filtration system.

All stormwater on-site is currently directed through the proprietary Storm360 filtration system prior to discharge to the Cooks River. As previously noted, this system is specifically designed to remove suspended solids, gross pollutants, hydrocarbons, nutrients, soluble heavy metals, oil and grease and organics, the same contaminant classes reasonably expected to be present in fire water generated from the materials stored at the facility. Given this, the measures in place provide a risk-proportionate treatment method, even though the system does not allow for post-fire segregation or batch testing prior to release.

Given the facility's approval under NCC 2016 and the fact that the NSW Fire Safety in Waste Facilities Guideline did not apply at the time (issued in 2020), requirements for large-scale containment must be considered through a performance-based, risk-focused lens. In this context, retrofitting such infrastructure is neither practicable nor proportionate to the environmental risk presented, particularly within the site's constrained footprint. Accordingly, the existing stormwater treatment arrangement is considered appropriate and commensurate with the risk and represents a suitable management measure for this facility.

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9.0 FRNSW Fire Safety in Waste Facility Guidelines Review

It is necessary to review the facility against the FRNSW Fire Safety in Waste Facilities Guidelines, to ensure the facility is designed with the appropriate fire protection. A detailed review of the guidelines has been carried out in **Appendix D.**

10.0 Conclusion and Recommendations

10.1 Conclusions

An FIMP has been prepared for the Strathfield South MRF at 40 Madeline Street, Strathfield South in accordance with HIPAP No. 2 as part of the requirements in SEARs to satisfy the fire and incident management requirements for the site.

The analysis was based on credible fire scenarios to assess whether the protection measures at the site were adequate to combat the hazards associated with the quantities and types of commodities being stored. Based on the review, the fire risks have been identified, and recommendations made regarding measures to minimize the fire risks at the site.

10.2 Recommendations

The site will operate a housekeeping procedure to ensure accumulation of dust in delivery and processing areas does not occur. Limiting the accumulation of dust is an important method for minimising the potential for fires or dust dispersions.

Based on the analysis outlined in the FIMP, the following recommendations have been made:

- Where possible, storages at the site shall alternate between combustible and non-combustible products to minimise the potential for incident propagation between storages.
- Dry powder extinguishers shall be available within 15 m of combustible waste storages.
- A fire hydrant system shall comply with Clause E1.3 of the BCA and the relevant provisions of AS 2419.1:2021. A fire engineer is to review fire systems and confirm compliance and performance solutions required.
- A fire hose reel system shall comply with Clause E1.4 of the BCA and the relevant provisions of AS 2441:2005. A fire engineer is to review fire systems and confirm compliance and performance solutions required.
- Portable fire extinguishers shall comply with Clause E1.6 of the BCA and the relevant provisions of AS 2444:2001. A fire engineer is to review fire systems and confirm compliance and performance solutions required.
- A building occupant warning system shall comply with the Building Code of Australia Clause E2.2a and AS 1670.1:2018. A fire engineer is to review fire systems and confirm compliance and performance solutions required.
- The evacuation signal 1 shall include the words such as “Fire” and “Evacuate” inserted in the time period provided in ISO 8201, or a site-specific voice message as provided for in AS 4428.16.
- An emergency Response Plan (ERP) shall be developed for the site in accordance with the Hazardous Industry planning Advisory Paper No.2
- An Emergency Service Information pack (ERP) shall be developed for the site in accordance with the Fire and Rescue NSW Fire Safety Guideline “Emergency Service Information Pack and Technical Fire Plans”.

- The hydrant system shall be reviewed by a fire protection engineer to confirm the number of hydrants that would be required to flow at the site and to demonstrate that the available pressure at the most disadvantaged hydrant will comply with AS 2419.1.

11.0 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 Guideline: Fire Safety in Waste Facilities,” Fire and Rescue NSW, Sydney, 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/NZS 3000:2018 - Wiring Rules,” Standards Australia, Sydney, 2018.

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

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

[7] Fire & Rescue NSW, “Annual Report 2022/2023,” Fire & Rescue NSW, Sydney, 2023.

[8] I. Cameron and R. Raman, Process Systems Risk Management, San Diego: Elsevier, 2005.

[9] F. P. Lees, Loss Prevention in the Process Industries, London: Butterworth-Heinemann, 2005.

[10] Design Instutute for Physical Properties, “Project Data Base,” Design Institute of Physicasl Properties, 2023.

Appendix A

Hazard Identification Table

A1. Hazard Identification Table

Table 11-1: Hazard Identification Table

Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
MRF Receival/Sorting Area	• Receival of non-conforming waste	• Ignition of flammables e.g., aerosol cans or batteries in recyclables awaiting processing or in finished product bales. • Fire already started in incoming paper/cardboard delivery truck	• Any non-conforming waste identified will be dealt with in accordance with the Procedure for Non-Conforming Waste. • Waste received on-site will be processed within 10 hours of receipt. • Waste onsite will remain under the prescribed limit. • Fire extinguishers • Staff trained to use fire extinguishers. • Fire hoses
Baled Storage Bunker	• Storage of Paper/cardboard, Plastic, and metals	• Paper/Cardboard is combustible. • Plastic is combustible depending on its composition.	• When baled the combustibility of the paper/cardboard and plastic is dramatically reduced • Waste onsite will remain under the prescribed limit. • Fire extinguishers • Fire hose • Fire hydrants • Staff trained to use fire extinguishers
GBP Cleaning	• No significant hazards identified due to non-combustible wastes being processed.	• n/a	• Waste onsite will remain under the prescribed limit. • Majority of waste is Glass which is non-combustible. • Fire extinguishers • Fire hose • Fire hydrants • Staff trained to use fire extinguishers.

Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
GBP Processing	• No significant hazards identified due to non-combustible wastes being processed.	• n/a	• Waste onsite will remain under the prescribed limit. • Majority of waste is Glass which is non-combustible. • Fire extinguishers • Fire hose • Fire hydrants • Staff trained to use fire extinguishers.
GBP Storage Bunker	• No significant hazards identified due to non-combustible wastes being processed.	• n/a	• Waste onsite will remain under the prescribed limit. • Majority of waste is Glass which is non-combustible. • Fire extinguishers • Fire hose • Fire hydrants • Staff trained to use fire extinguishers.
GBP Offtake	• No significant hazards identified due to non-combustible wastes being processed.	• n/a	• Waste onsite will remain under the prescribed limit. • Majority of waste is Glass which is non-combustible. • Fire extinguishers • Fire hose • Fire hydrants • Staff trained to use fire extinguishers.
Fire areas	• Application of fire water and potential contamination of water	• Discharge of potentially contaminated water to the environment	• Stormwater isolation system at the site • Minimal potential: for contamination of water at the site from waste stored

Appendix B

Consequence Analysis

B1. Incidents Assessed in Detailed Consequence Analysis

The following incidents are assessed for consequence impacts.

- Ignition of combustible waste in the receival hall.

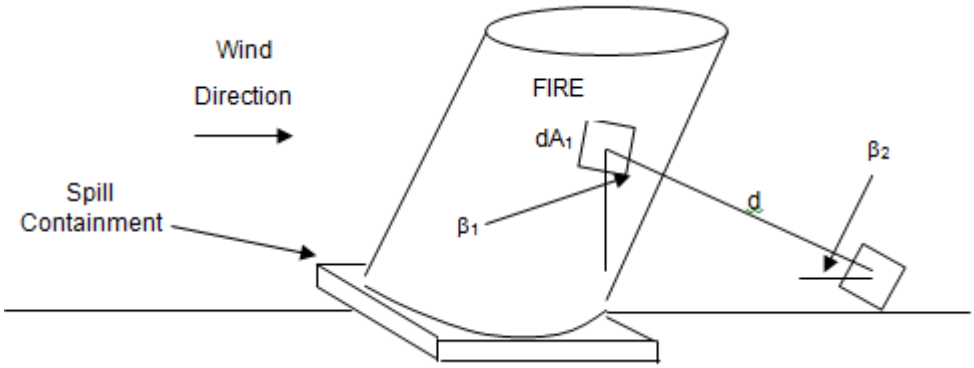
Each incident has been assessed in the sections below.

B2. Gexcon - Effects

The modelling was prepared using Effects which is proprietary software owned by Gexcon and has been developed based on the TNO Coloured books and updated based on CFD modelling tests and physical verification experiments. The software can model a range of incidents including pool fires, flash fires, explosions, jet fires, toxic dispersions, warehouse smoke plumes, etc.

B3. Fire Physical Effects

This section provides an overview of how radiant heat modelling of fires occurs from a first principles approach which is the underlying information that is used in Gexcon effects / TNO coloured books. The liquid flame area is calculated as if it is a circle to find the radius for input into the model. **Appendix Figure B-1** shows a typical pool fire, indicating the target and fire impact details.



Appendix Figure B-1: Heat Radiation on a Target from a Cylindrical Flame

The fire is modelled as a cylinder with the heat from the cylindrical flame radiating to the surrounding area. Several mathematical models may be used for estimating the heat radiation impacts at various distances from the fire. The point source method is adequate for assessing impacts in the far field; however, a more effective approach is the view factor method, which uses the flame shape to determine the fraction of heat radiated from the flame to a target. The radiated heat is also reduced by the presence of water vapour and the amount of carbon dioxide in aithe r. The formula for estimating the heat radiation impact at a set distance is shown in **Equation B-1** (Ref. [8]).

$$Q = EF\tau$$ **Equation B-1**

Where:

- Q = incident heat flux at the receiver (kW/m^2)
- E = surface emissive power of the flame (kW/m^2)
- F = view factor between the flame and the receiver
- τ = atmospheric transmissivity

The calculation of the view factor (F) in **Equation B-1** depends upon the shape of the flame and the location of the flame to the receiver. F is calculated using an integral over the surface of the flame, S (Ref. [8]). The formula can be shown as:

$$F = \int\int s \frac{\cos\beta_1 \cos\beta_2}{\pi d^2}$$ **Equation B-2**

Equation B-2 may be solved using the double integral **or** using a numerical integration method.

For the assessment of pool fires, the model calculates the view factor based on the basis of finite elements. The liquid flame area is calculated as if the fire is a vertical cylinder, for which the flame diameter is estimated based on the fire characteristics (e.g. contained within a bund). Once the flame cylindrical diameter is estimated, it is input into the model or is calculated based on the polygon of the fire dimensions. The model then estimates the flame height, based on diameter, and develops a flame geometric shape (cylinder) on which is performed the finite element analysis to estimate the view factor of the flame. **Appendix Figure B-1** shows a typical pool fire, indicating the target and fire impact details.

The model integrates the element dA_1 by varying the angle theta θ (the angle from the centre of the circle to the element) from zero to 90° in intervals of 2.5 degrees. Zero degrees represents the straight line joining the centre of the cylinder to the target (x0, x1, x2) while 90° is the point at the extreme left-,hand side of the fire base. In this way the fire surface is divided up into elements of the same angular displacement. Note the tangent to the circle in plain This tangent lies at an angle, gamma, with the line joining the target to where the tangent touches the circle (x4). This angle varies from 90° at the closest distance between the liquid flame (circle) and the target (x0) and gets progressively smaller as θ increases. As θ increases, the line x4 subtends an angle phi Φ with x0. By similar triangles ,we see that the angle gamma γ is equal to 90- θ - Φ . This angle is important because the sine of the angle gives us the proportion of the projected area of the plane. When γ is 90°, sin(γ) is 1.0, meaning that the projected area is 100% of the actual area.

Before the value of θ reaches 90° the line x4 becomes tangential to the circle. The fire cannot be seen from the rear and negative values appear in the view factors to reflect this. The model filters out all negative contributions.

For the simple case, where the fire is of unit height, the view factor of an element is simply given by the expression in **Equation B-3** (Derived from **Equation B-2**):

$$VF = \Delta A \frac{\sin\gamma}{\pi \times X4 \times X4}$$ **Equation B-3**

Where ∆A is the area of an individual element at ground level.

Note: the denominator (π. x4. x4) is a term that describes the inverse square law for radiation assumed to be distributed evenly over the surface of a sphere.

Applying the above approach, we see the value of x4 increase as θ increase, and the value of sin(γ) decreases as θ increase. This means that the contribution of the radiation from the edge of the circular fire drops off quite suddenly compared to a view normal to the fire. Note that the model adds up the separate contributions of **Equation B-3** for values theta between zero until x4 makes a tangent to the circle.

It is now necessary to do two things: (i) to regard the actual fire as occurring on top of a firewall (store) and (ii) to calculate and sum all of the view factors over the surface of the fire from its base

to its top. The overall height of the flame is divided into 10 equal segments. The same geometric technique is used. The value of x4 is used as the base of the triangle and the height of the flame, is the height. The hypotenuse is the distance from target to the face of the flame (called X4'). The angle of elevation to the element of the fire (alpha α) is the arctangent of the height over the ground distance. From the cos(α) we get the projected area for radiation. Thus, there is a new combined distance and an overall equation becomes in **Equation B-4 (**(Derived from **Equation B-3**):

$$VF = \Delta A \frac{\sin\gamma \times \cos\alpha}{\pi \times X4 \times X4}$$ **Equation B-4**

The model now turns three-dimensional. The vertical axis represents the variation in θ from 0 to 90° representing half a projected circle. The horizontal axis represents increasing values of flame height in increments of 10%. The average of the extremes is used (e.g. if the fire were 10 m high then the first point would be the average of 0 and 1 i.e. 0.5 m), the next point would be 1.5 m and so on).

Thus, the surface of the flame is divided into 360 equal area increments per half cylinder making 720 increments for the whole cylinder. Some of these go negative as described above and are not counted because they are not visible. Negative values are removed automatically.

The sum is taken of the View Factors in **Equation B-3**. Actually, the sum is taken without the ΔA term. This sum is then multiplied by ΔA which is constant. The value is then multiplied by 2 to give both sides of the cylinder. This is now the integral of the incremental view factors. It is dimensionless so when we multiply by the emissivity at the "face" of the flame (or surface emissive power, SEP), which occurs at the same diameter as the firebase (pool), we get the radiation flux at the target.

The SEP is calculated using the work by Mudan & Croche (Ref. [9] & Ref. [8]) which uses a weighted value based on the luminous and non-luminous parts of the flame. The weighting is based on the diameter and uses the flame optical thickness ratio where the flame has a propensity to extinguish the radiation within the flame itself. The formula is shown in **Equation B-5**.

$$SEP = E_{max} e^{-sD} E_s (1 - e^{-sD})$$ **Equation B-5**

Where;

E_{max} = 130

S = 0.12

E_s = 20

D = pool diameter

The only input that is required is the diameter of the pool fire which is automatically calculated in the model.

The flame height is estimated using the Thomas Correlation (Ref. [8]) which is shown in **Equation B-6**.

$$H = 42 d_p \left[\frac{\dot{m}}{\rho_a \sqrt{g d_p}}\right]^{0.61}$$ **Equation B-6**

Where;

d_p = pool diameter (m)

ρ_a = density of air (1.2 kg/m^3 at 20^{o}C)

$\dot{m}$ = burning rate (kg/m^2.s)

g = 9.81 m/s^2

B4. Radiant Heat Physical Impacts

Appendix Table B-1 provides noteworthy heat radiation values and the corresponding physical effects of an observer exposed to these values (Ref. [3]).

Appendix Table B-1: Heat Radiation and Associated Physical Impacts

Heat Radiation (kW/m^2)	Impact
35	• Cellulosic material will pilot ignite within one minute's exposure • Significant chance of a fatality for people exposed instantaneously
23	• Likely fatality for extended exposure and chance of a fatality for instantaneous exposure • Spontaneous ignition of wood after long exposure • Unprotected steel will reach thermal stress temperatures which can cause failure. • Pressure vessel needs to be relieved, or failure will occur
12.6	• Significant chance of a fatality for extended exposure. High chance of injury • Causes the temperature of the wood to rise to a point where it can be ignited by a naked flame after long exposure. • Thin steel with insulation on the side away from the fire may reach a thermal stress level high enough to cause structural failure
4.7	• Will cause pain in 15-20 seconds and injury after 30 seconds exposure (at least second-degree burns will occur)
2.1	• Minimum to cause pain after 1 minute

B5. Ignition of Combustible Waste Within the Receival Hall

In the event that combustible waste in the receival hall is ignited and propagates into a fire, heat and smoke is generated from the fire. As heat accumulates at roof level, the ceiling-mounted fire alarms will alert FRNSW and staff. As there are no sprinklers the fire can only be suppressed manually by hose reels, hydrants and fire extinguishers. One fire scenario is assessed, which is a full bunker fire.

The waste storage bunker has an area of 1,300 m^2 with a 4 m wall. A maximum of 180 tonnes of waste is stored in the receival hall at any one time limited to a height of 3 m to allow for safe containment. These dimensions are used to estimate the flame height and SEP for the fire scenarios. To estimate the flame height and SEP the following information was substituted into the models.

- Equivalent fire diameter:
  - Full bunker – 1,300 m^2

- Burning rate – 0.034 kg/m^2.s (burning rate for based upon a low burning rate as the waste stored is not a flammable or combustible liquid and thus would not burn as quickly as a solid is required to phase change from solid to liquid to gas to burn as opposed to one phase change for a liquid to a gas. Subsequently, more energy is required to phase change a solid to a gas than a liquid to a gas which translates into reduced burning rates. Therefore, a combustible liquid burning rate has been selected which is considered conservative.). Burning rate values obtained for chemicals obtained from the Design Institute for Physical Properties database (Ref. [10])

Provided in the **Appendix Table B-2** are all other inputs that have negligible impacts on modelling.

Appendix Table B-2: Additional Inputs Included in Receival Fire Modelling

Input	Value	Justification
Chemical name	Fuel / bunker	Chemical input required. This provides a conservative burning rate.
Type of pool fire calculation	Rew & Hulbert	The model has been developed for modelling fires based on the radiant heat emitted from the radiant surface. The model uses the clear and sooty portions of the flame to estimate the radiant heat at the target. The terminology (i.e. pool fire) is because these models were originally developed from liquid pool fires. However, the model actually works by looking at the flame surface to estimate the radiant heat that is emitted from that surface. The flame surface is present irrespective of the material burning (i.e. a solid or liquid pool will have a flame that will have a clear and sooty portion). Based on the above discussion, it is considered that the Rew & Hulbert model is appropriate for modelling the fire.
Type of pool fire source	Instantaneous	Conservative as it assumes full fire immediately
Soot definition	Calculated	Calculated
Total mass released	180,000 kg	Doesn't factor into modelling as these only impacts duration, which is not considered in the assessment
Temperature of pool	20^{o}C	Conditions expected to be observed regularly. Also, negligible impact on results.
Type of pool	Circular	Modelled as a circle since the result gets converted to a circle anyway
Max pool surface area	Pool diameter of scenario being modelled	Scenarios to be modelled are outlined above this table.
Height of confined pool above ground level	0 m	Fire at ground level is more conservative due to the shorter distance to the receiver.
Include shielding to the bottom side of the flame	No	Modelling without shielding has been included as the shielding has negligible impact due to the gutter of the flame.
Height of shielding	1 m	Height of bunker wall above the burning mass.
Wind speed	2 m/s	Fire seat enclosed in building and unlikely to be impacted by wind at fire seat.

Input	Value	Justification
Wind direction	Any direction	Not applicable as software images are not being used.
Ambient temperature	20°C	Conditions are expected to be observed regularly. Also, negligible impact on results.
Ambient pressure	1.0151 bar	Atmospheric pressure
Ambient relative humidity	60%	Typical humidity in Sydney
CO2 concentration	0.0004	CO2 concentration in the atmosphere

The inputs summarised in **Appendix Table B-2** were input to calculate the radiant heat from a receival hall fire shown in **Appendix Table B- 3**.

Appendix Table B- 3: Heat Radiation from a Receival Hall Fire

Heat Radiation (kW/m^2)	Distance (m)
	Full Bunker
	Unshielded
35	3.66
23	6.44
12.6	12.07
4.7	26.44
3.0	35.63

Appendix C

Hydraulic Analysis

Statement of Available Pressure and Flow

Services Sparks
91 George Street
Parramatta, 2150

Attention: Services Sparks Date: 07/03/2022

Pressure & Flow Application Number: 1361877
Your Pressure Inquiry Dated: 2022-03-03
Property Address: 40-42 Madeline Street, Strathfield South 2136

The expected maximum and minimum pressures available in the water main given below relate to modelled existing demand conditions, either with or without extra flows for emergency fire fighting, and are not to be construed as availability for normal domestic supply for any proposed development.

ASSUMED CONNECTION DETAILS

Street Name: Madeline Street	Side of Street: West
Distance & Direction from Nearest Cross Street	30 metres South from Pilcher Street
Approximate Ground Level (AHD):	14 metres
Nominal Size of Water Main (DN):	250 mm (Target Point as per sketch provided)

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	61 metre head
Minimum Pressure	31 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	31
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	10 15 20 25 30 40 50	32 31 30 29 27 24 20
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	10 15 20 25 30 40 50	29 27 26 24 22 18 14
Maximum Permissible Flow	56	10

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

swtapin@sydneywater.com.au

Sydney Water Corporation ABN 49 776 225 038
1 Smith St Parramatta 2150 | PO Box 399 Parramatta 2124 | DX 14 Sydney | T 13 20 92 | www.sydneywater.com.au
Delivering essential and sustainable water services for the benefit of the community

General Notes

This report is provided on the understanding that (i) the applicant has fully and correctly supplied the information necessary to produce and deliver the report and (ii) the following information is to be read and understood in conjunction with the results provided.

1. Under its Act and Operating Licence, Sydney Water is not required to design the water supply specifically for fire fighting. The applicant is therefore required to ensure that the actual performance of a fire fighting system, drawing water from the supply, satisfies the fire fighting requirements.

2. Due to short-term unavoidable operational incidents, such as main breaks, the regular supply and pressure may not be available all of the time.

3. To improve supply and/or water quality in the water supply system, limited areas are occasionally removed from the primary water supply zone and put onto another zone for short periods or even indefinitely. This could affect the supply pressures and flows given in this letter. This ongoing possibility of supply zone changes etc, means that the validity of this report is limited to one (1) year from the date of issue. It is the property owner's responsibility to periodically reassess the capability of the hydraulic systems of the building to determine whether they continue to meet their original design requirements.

4. Sydney Water will provide a pressure report to applicants regardless of whether there is or will be an approved connection. Apparent suitable pressures are not in any way an indication that a connection would be approved without developer funded improvements to the water supply system. These improvements are implemented under the Sydney Water 'Urban Development Process'.

5. Pumps that are to be directly connected to the water supply require approval of both the pump and the connection. Applications are to be lodged online via Sydney Water Tap in™ system - Sydney Water Website – www.sydneywater.com.au/tapin/index.htm. Where possible, on-site recycling tanks are recommended for pump testing to reduce water waste and allow higher pump test rates.

6. Periodic testing of boosted fire fighting installations is a requirement of the Australian Standards. To avoid the risk of a possible 'breach' of the Operating Licence, flows generated during testing of fire fighting installations are to be limited so that the pressure in Sydney Water's System is not reduced below 15 metres. Pumps that can cause a breach of the Operating Licence anywhere in the supply zone during testing will not be approved. This requirement should be carefully considered for installed pumps that can be tested to 150% of rated flow.

Notes on Models

1. Calibrated computer models are used to simulate maximum demand conditions experienced in each supply zone. Results have not been determined by customised field measurement and testing at the particular location of the application.

2. Regular updates of the models are conducted to account for issues such a urban consolidation, demand management or zone change.

3. Demand factors are selected to suit the type of fire-fighting installation. Factor 1 indicates pressures due to system demands as required under Australian Standards for fire hydrant installations. Factor 2 indicates pressures due to peak system demands.

4. When fire-fighting flows are included in the report, they are added to the applicable demand factor at the nominated location during a customised model run for a single fire. If adjacent properties become involved with a coincident fire, the pressures quoted may be substantially reduced.

5. Modelling of the requested fire fighting flows may indicate that local system capacity is exceeded and that negative pressures may occur in the supply system. Due to the risk of water contamination and the endangering of public health, Sydney Water reserves the right to refuse or limit the amount of flow requested in the report and, as a consequence, limit the size of connection and/or pump.

6. The pressures indicated by the modelling, at the specified location, are provided without consideration of pressure losses due to the connection method to Sydney Water's mains.

OBrien FIRE PROTECTION SERVICE PTY LTD

26 October 2023

Polytrade Operations Pty Ltd
40-42 Madeline St
STRATHFIELD SOUTH NSW 2136

Attention: **Nathan**
Via Email: nathan.ung@polytrade.com.au

Dear Nathan,

RE: 40-42 MADELINE STREET STRATHFIELD SOUTH
Annual Hydrant Flow Test

This is to confirm that on Wednesday 26th October 2023 we carried out an Annual Hydrant Flow Test, we have pleasure in submitting the following report.

Date: 25th October 2023

Time: 8.45AM

Test Equipment: Ambit Hydrant Flow Tester

Flow Requirements: Ordinance 70 part 27.3
Min Spec 10
i.e 270 L/Min @ 275kPa

Results:

FLOW (L/MIN)	PRESSURE (KPA)
0	450
300	360
600	305
1200	170

Conclusion:

- PASS

FPA AUSTRALIA Corporate Silver Member

O'Brien Fire Protection Service Pty Ltd Unit 2, 13 York Rd, Ingleburn NSW 2565 • PO Box 1009, Ingleburn NSW 1890
ABN: 98 001 882 677 • Ph: (02) 9618 6633 • Fax: (02) 9618 6500 • Email: info@obrienfire.com.au

Should you require any further information, please do not hesitate to contact us.

Yours faithfully

John Moore
SERVICE MANAGER

OBrien FIRE PROTECTION SERVICE PTY LTD

26 October 2023

Polytrade Operations Pty Ltd
40-42 Madeline St
STRATHFIELD SOUTH NSW 2136

Attention: **Nathan**
Via Email: nathan.ung@polytrade.com.au

Dear Nathan,

RE: 40-42 MADELINE STREET STRATHFIELD SOUTH
Hose Reel Flow Test Report

This is to confirm that on Wednesday 25th October 2023 we carried out an Annual Hose Reel Flow Test, we have pleasure in submitting the following report.

Three (3) separate flow tests were undertaken, one for each warehouse as there are three (3) separate feeds (some with pumps)

1. Main warehouse – north side (no pump)
   Requirements – minimum .66 l/sec (2 hose reels)
   Results - .66 l/sec (20 l in 30 secs)
   PASS.

2. Main warehouse – south side and rear warehouse (automatic jacking pump)
   Requirements – Minimum .66 l/sec (9 hose reels)
   Results - .80 l/sec
   PASS.

3. Dome Warehouse (Auto jacking pump)
   Requirements - minimum .66 l/sec (5 hose reels)
   Results - .66 l/sec (with pump)
   PASS with pump.

   N.B. ***As previously reported*** someone keeps turning off power to pump.
   To achieve design, pump power must be kept on.

FPA AUSTRALIA Corporate Silver Member

O'Brien Fire Protection Service Pty Ltd Unit 2, 13 York Rd, Ingleburn NSW 2565 • PO Box 1009, Ingleburn NSW 1890
ABN: 98 001 882 677 • Ph: (02) 9618 6633 • Fax: (02) 9618 6500 • Email: info@obrienfire.com.au

Should you require any further information, please do not hesitate to contact us.

Yours faithfully

John Moore
SERVICE MANAGER

Appendix D

Review of FRNSW Fire Safety in Waste Facility Guidelines

Table 11-2:Detailed Review of FRNSW Fire Safety in Waste Facility Guidelines

Clause	FRNSW Waste Facility Guideline Requirement	Details of Compliance
	7.2 Designing for Special Hazard	
7.2.1	Combustible waste should be considered a special hazard and consent authorities should impose the conditions on development that Clause E1.10 and E2.3 of the NCC be complied with to the satisfaction of the fire brigade.	Noted
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 HIPAP No. 2 if deemed appropriate by the relevant consent authority.	This report satisfies the requirement for a FIMP. **Section 4.0** and **Section 5.0** identify and assess all fire risks and hazards
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	A fire engineer is to be engaged to assess the project for compliance.
7.2.5	All reasonable and foreseeable combustible waste materials should be identified and considered in any performance solution.	Combustible materials have been identified in **Section 3.0** and assessed.
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 (table in the guideline)	These values do not apply to the assessments conducted within a FIMP which does not require flame temperature as input to determine the outputs required by HIPAP No. 2
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.	Not applicable as above.
	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*.	Brigade access is provided in the vehicle access drawings in **Figure 7-1**
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	Brigade access is provided in the vehicle access drawings in **Figure 7-1**.
7.4.3	Enhanced fire brigade vehicle access should be provided for firefighting intervention, including a permitter ring road around any large non-sprinklered building and access roads between external stockpiles.	Brigade access is provided in the vehicle access drawings in **Figure 7-1.**
7.4.4	The facility should cater for large emergency service response, if the potential hazard may result in a large emergency, including containment of fire water run-off.	The facility has been designed to cater for large fires by providing water volumes and flows in accordance with the waste guidelines "*Fire Safety in Waste Facilities*". The site has also been designed to filter potentially

Clause	FRNSW Waste Facility Guideline Requirement	Details of Compliance
		contaminated water to limit off-site discharge.
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.	A Sydney Water Pressure and Flow Test has been provided in **Appendix C.**
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	Details of brigade access have been outlined in **Section 7.0.** A detailed drawing has been provided in **Figure 7-2**.
	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 of the waste facility.	Recommendations have been made to have a hydrant system review.
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	Fire risks associated with the GBP are negligible; hence, hydrants would be available.
7.5.3	The design of the fire hydrant system is to have an 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 guideline)	The building is not protected by sprinklers and does not require additional flow as combustible waste is not stored or processed in the GBP facility.
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.	Noted
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	High-risk hazards not stored on site.
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 booster assembly is located away from the potential fire sources and radiant heat impacts.
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.	The details of the fire water supply have been outlined in **Section 6.0.** A detailed hydraulic pressure assessment has been conducted in **Appendix C**
7.5.8	The fire hydrant system should incorporate fire hose reels installed in accordance with Clause E1.4 of the NCC to enable effective first attack of fires by appropriately trained staff.	Fire hose reels have been provided in conjunction with the hydrants as required. Compliance requirements

Clause	FRNSW Waste Facility Guideline Requirement	Details of Compliance
		from the NCC for Clause E1.4 have been outlined in **Section 6.0.**
	7.6 Automatic Fire Sprinklers 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 m^2 and contains combustible waste materials	The building is not protected by sprinklers as combustible waste is not stored or processed in the GBP facility.
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)	n/a
7.6.4	To protect visual systems, storages or equipment or protect against high-risk hazards, a deluge, drencher, fast response, mist or foam system should be provided.	n/a
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	n/a
7.6.6	The fire sprinkler system is to have minimum water supply and capacity providing maximum hydraulic demand for not less than two hours.	n/a
	7.7 Fire Detection and Alarms	
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 facility has fire detection and alarm systems.
7.7.2	The fire detection and alarm system should warn all occupants of the fire and evacuate the facility, with each component being appropriate to the environment.	The fire detection and alarm systems have been designed to alert occupants to the presence of smoke/fire.
7.7.3	Upon positive detection of fire, the system is to activate any required alarm, fire suppression system, passive measures (e.g., fire door, fire shutter) or plant/machinery override as appropriate to the detector.	The fire detection systems will notify FRNSW via the FIP of the presence of smoke/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 alarms of fire.	Manual call points, where installed will be located in clearly visible locations.
	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	Non-combustible material stored/processed.
7.8.2	Under Clause E2.3 of the NCC, additional smoke hazard management measures should be	

Clause	FRNSW Waste Facility Guideline Requirement	Details of Compliance
	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	
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.	
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.	
	7.9 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	Recommendations have been made to filter potentially contaminated water.
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.	The site has been designed to filter potentially contaminated water to prevent external discharge.
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	The containment system is composed of a primary containment area to capture the potentially contaminated water before filtering and discharging from the site.
7.9.6	Pollution control equipment such as stormwater isolation valves, water diversion, booms, and drain mats, should be provided as necessary for the facility's emergency response procedures, and be kept readily accessible in the event of a fire.	Drain mats are to be provided in the facility within proximity to drains.
	Bushfire Prone Land	
7.10.1	The NSW RFS Planning for Bush Fire Protection – A Guide for Councils, planners, Fire Authorities and Developers apply to all development on bushfire-prone land	The site is located in Strathfield South and is not surrounded by bushland and is therefore not within bushfire-prone land.
7.10.2	Bush fire prone and s mapped by each respective council under Section 146 of the Environmental Planning and Assessment Act 1979	Noted.
7.10.3	Suitable fire brigade vehicle access is to be provided within 4 m of any static water supply if no reticulated water supply is otherwise available (e.g. bulk water tank, dam).	N/a - Reticulated water system provided.
	8.2 Storages and Stockpiles / 8.3 Movement of Stockpiles	
8.2.1	Storage and stockpiling of combustible waste material should be limited in size and volume appropriate to the given combustible waste	The waste is non-combustible

Clause	FRNSW Waste Facility Guideline Requirement	Details of Compliance
	material, fire risks, building design and installed fire systems	
8.2.3	The maximum height of any stockpile, loose piled or bales, should not exceed 4 m.	The stockpiles are limited to 3 m high in the MRF receival hall and are separated from other stockpiles by non-combustible walls having a height of 4 m. Baled materials are stacked to 4m in height in storage bunkers/areas.
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	The walls are contained by masonry in the bunkers.
8.2.5	The storage method and arrangement of stockpiles is to minimise the likelihood of fire spread and provide separation which permits access to firefighting intervention	The stockpiles are separated into fire bunkers to prevent propagation between bunkers
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.	The MRF separating walls have been designed to a height of 4 m with storage limited to 3 in height. External storage is limited to 4 m in height with 6 m separating walls. The waste will not be stored within 2 m of the end of the bunkers.
8.2.7	Stockpile boundary limits should be permanently marked to clearly identify the limits that maintain maximum stockpile sizes and/or minimum separations	The stockpile limit within the bunkers will be marked to prevent storage within 2 m of the bunker end.
8.3.1	Stockpiles of combustible waste material should be rotated to dissipate any generated heat and minimise the risk of auto-ignition as required.	N/a – waste is processed before any significant heat is developed.
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.	The waste stored is not self-heating so temperature monitoring is not required.
8.3.3	Any processed or treated waste material, such as chipping, shredding, baling or producing crumb should be cooled before being stockpiled	The baled waste does not heat up and does not require cooling. No other processing that may generate heat is used within the sorting process.
8.3.4	Procedures for stockpile rotation and monitoring of temperature during hot weather are to be included in the operations plan.	N/a
	8.4 External Stockpiles	
8.4	Clauses specific to external stockpiles	No external stockpiles at the site.
	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	The internal stockpiles are non-combustible

Clause	FRNSW Waste Facility Guideline Requirement	Details of Compliance
	size/layout, compartmentation, installed safety systems, process equipment and plant	
8.5.2	The maximum internal stockpile size in a building fitted with an automatic fire sprinkler system should be 1,000 m^3	n/a - Non-combustible stockpiles
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 10 m in a building not fitted with an automatic fire sprinkler system.	n/a -Non-combustible stockpiles
8.5.4	Internal stockpiles may be located side by side when separated by a masonry wall	The stockpiles are separated by a masonry wall
8.5.5	The internal stockpile of a building not fitted with an automatic fire sprinkler system should limited in size to be able to be moved to the dedicated external quarantine area using onsite resources only within one hour or less	n/a – Non-combustible
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	Stockpiles are contained within defined bunkers such that egress paths are not obstructed.
8.5.8	Internal stockpiles should be maintained so that access to the dedicated external quarantine area is always kept clear and unobstructed	Stockpiles are accessible by defined points into the bunkers
	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 process at the facility.	N/a - Non-combustible waste
	9.3 Emergency plan	
9.3.1	The PCBU is required to develop an emergency plan for the waste facility, in accordance with AS 3745-2010	An ERP shall be prepared, as recommended in **Section 6.0**.
	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	An ESIP shall be prepared, as recommended in **Section 6.0**.
	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.	These are regulatory requirements that Re.Cycle will have to comply with to be operational.

Clause	FRNSW Waste Facility Guideline Requirement	Details of Compliance
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)	These are regulatory requirements that Re.Cycle will have to comply with to be operational.
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	These are regulatory requirements that Re.Cycle will have to comply with to be operational.
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 purposes of a fire safety statement.	These are regulatory requirements that Re.Cycle will have to comply with to be operational.

Appendix E

Hot Work Permit

Hot Work Procedure – Form 1

Document Number RE-WHS-FRM-011-V1.0
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Hot Work Permit

THE ISSUING RESPONSBILE OFFICER SHALL COMPLETE PARTS 1 & 2 PRIOR TO AUTHORISING HOT WORK

INSERT SITE # HOT: _____

PART 1: DETAILS – ORIGINAL COPY RETAINED BY PERSON PERFORMING HOT WORK & RETURNED TO RESPONSBILE OFFICER UPON COMPLETION.

Nominated Person		Work Location		Work Description			
Date:		Start Time:		Finish Time:		Signature:	
				Firewatch person 1		Signature:	
				Firewatch person 2		Signature:	

1.	List equipment to be used (Electrical / Welding / Tools / Gas etc.	
2.	List fire fighting equipment to be used:	
3.	List protective equipment to be used (face shield, Gloves, welding screen, etc.	

PART 2: INSPECTION – DO NOT PROCEED IF YOU ANSWER "NO" TO ANY QUESTION

		Yes	No			Yes	No
1.	All equipment in compliant & good condition (tagged / Tested)?	☐	☐	2.	All fire equipment checked & laid out ready for use?	☐	☐
3.	Area & Floor clear of all combustible material / flammable goods?	☐	☐	4.	Combustible materials unable to be move are shielded?	☐	☐
5.	Contaminated ground, or floor or wall openings are covered?	☐	☐	6.	Immediate areas have been wet-down (electrical caution)?	☐	☐
7.	Leaks from valve & pump glands, flanges etc. are controlled?	☐	☐	8.	Drains, pits, depressions checked, isolated & sealed?	☐	☐
9.	Tanks, valves, vents & pipelines blanked off or isolated?	☐	☐	10.	Pressure relief valves have been vented to safe areas?	☐	☐
11.	Spark & flash screens are in place?	☐	☐	12.	Covers suspended if welding overhead?	☐	☐
13.	Power isolated if using flame in proximity to live conductors?	☐	☐	14.	Movement in area, temporarily ceased & area roped off?	☐	☐
15.	Confined space entry * not required (SWP + Permit will be required)?	☐	☐	16.	Ventilation is adequate?	☐	☐
17.	Gas testing * not required (testing results will be required)?	☐	☐	Date Calibrated: Safe yes / no	Test Results % L.E.L Signature: _____	Test Date:	Test time: am/pm

NO SMOKING IS ALLOWED DURING HOT WORK
HOT WORK IS PROHIBITED DURING MAINTENANCE TO EMERGENCY SYSTEMS

NO HOT WORK IS PERMITTED OUTSIDE ON FIRE BAN DAYS
NO HOT WORK IS PERMITTED OUTSIDE DURING EXTREME WINDS

PART 3: AUTHORITY – PERMISSION IS ONLY GRANTED WHEN ALL INSPECTIONS & PRECAUTIONS ARE IMPLEMENTED AND ONLY FOR THE PERIOD SPECIFIED → **(WHICH SHALL NOT EXCEED 8 HOURS)**

Responsible Officer	Signature	Work Performed by	Signature

PART 4: COMPLETION – I HAVE THOROUGHLY INSPECTED THIS AREA & SURROUNDS 30 MINUTES AFTER EXPIRY / COMPLETION OF HOT WORK & DECLARE IT SAFE. ALL FIRE FIGHTING EQIPMENT IS RETURNED AND IN OPERATIONAL STATE (ORIGINAL PERMIT RETURNED) HAVE YOU NOTIFIED WORKERS IN THE AREA THAT HOT WORKS HAVE BEEN COMPLETED (Y/N)

Responsible Officer	Signature	Position	Date	Time