Kembla Grange Waste Facility Fire Services Review

50 Wyllie Rd.

Kembla Grange, NSW 2526

Report on behalf of Bingo Industries

EWFW Pty Ltd

Century House

Level 4, 362 Kent St

Sydney NSW 2000

ABN: 48 130 395 827

Table of Contents

1. Introduction

1.1. Purpose

This report is to review the installed fire services on site at 50 Wyllie Rd. Kembla Grange and make comment on how they could be upgraded to meet some of the requirements for the new guideline “Fire Safety in Waste Facilities”.

Furthermore, the report seeks to address FRNSW comments on the SSD5300 Mod 2 application. It should be noted that a fire safety study was not a requirement under the original SSD5300 consent.

1.2. Authority

This report has been produced by EWFW Pty Ltd in response to a request from Ros Dent on behalf of Bingo Industries.

1.3. Objectives of Study

The objectives of the study were as follows:

- Recommendations for upgrades to meet the requirements set out in FRNSW document “Fire Safety Guideline – Fire Safety in Waste Facilities”. Note that this is a guideline for compliance for new and change of use facilities. As the Kembla Grange facility is undergoing a change of use we have reviewed the facility for what is reasonably possible to comply with and where not feasible for this site noted those items. The guideline does not offer a one size fits all solution but instead provides recommendations and possible alternate solutions to view the site heuristically.
- Review of FRNSW “Fire Safety Guideline – Emergency Vehicle Access” in relation to this facility and determine if full access was provided.

1.4. Outline

The following services have been assessed in this report:

- Fire Hydrant Systems
- Fire Hose Reel Systems
- Fire Extinguishers
- Fire Sprinklers when applicable
- Fire or Smoke detection if applicable

1.5. Terminology

The abbreviations and notations referred to within this report relate to the following:

FH	Fire Hydrant
FHR	Fire Hose Reel
FE	Fire Extinguisher
FER	Fire Engineering Report
FES	Fire Engineering Solution

2. Technical Information

2.1. Author Details

EWFW Pty Ltd
Level 4, Century House
360-362 Kent Street
Sydney NSW 2000
ABN: 48 130 395 827
Phone: + 61 2 9212 1000
E-mail: ewfw@ewfw.com.au

Author:	Myke McQuaid Fire Group Manager
Reviewer	Dominic De Gioia Director

2.2. Information Sources

- Information provided by Bingo
- Information provided by Dial Before You Dig.
- Information obtained during site inspections and from drawings provided.

2.3. Disclaimer of Liability

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2.5. Revision History

Revision	Date Issued	Comment
A	**09.08.19**	**Preliminary Issue**
B	**11.10.19**	**Progress Issue**
C	**17.01.2020**	**Final Issue**

3. Site Information

3.1. Site Location

Figure 1.1 Site Location View

The site is located at 50 Wyllie Rd., Kembla Grange NSW. It consists of a resource recovery facility and ancillary carpark.

4. Summary of Fire Services Recommendations

4.1. Fire Hydrant Services to be upgraded

We recommend the follow items be upgraded to better serve the future use of the building.

- Additional fire tank [150kL] to upgrade the site from warehouse only protection to yard hydrant protection.
- Replacement of the fire pumps to provide 30L/s @ 900kPa to the system
- Provision of 4 new external fire hydrants
- Provision of one new booster facility and block plan

4.2. Smoke detection Services to be upgraded

We recommend provision of a flame detection system be incorporated into the warehouse to assist in early detection or when the space is unoccupied.

Occupant warning will be provided to the warehouse coupled with the detection system. Manual call points will be provided adjacent exit doors to notify other occupants.

We recommend a flame detector be provided to address the plastics storage bay under the Outdoor picking station sorting area with associated alarms.

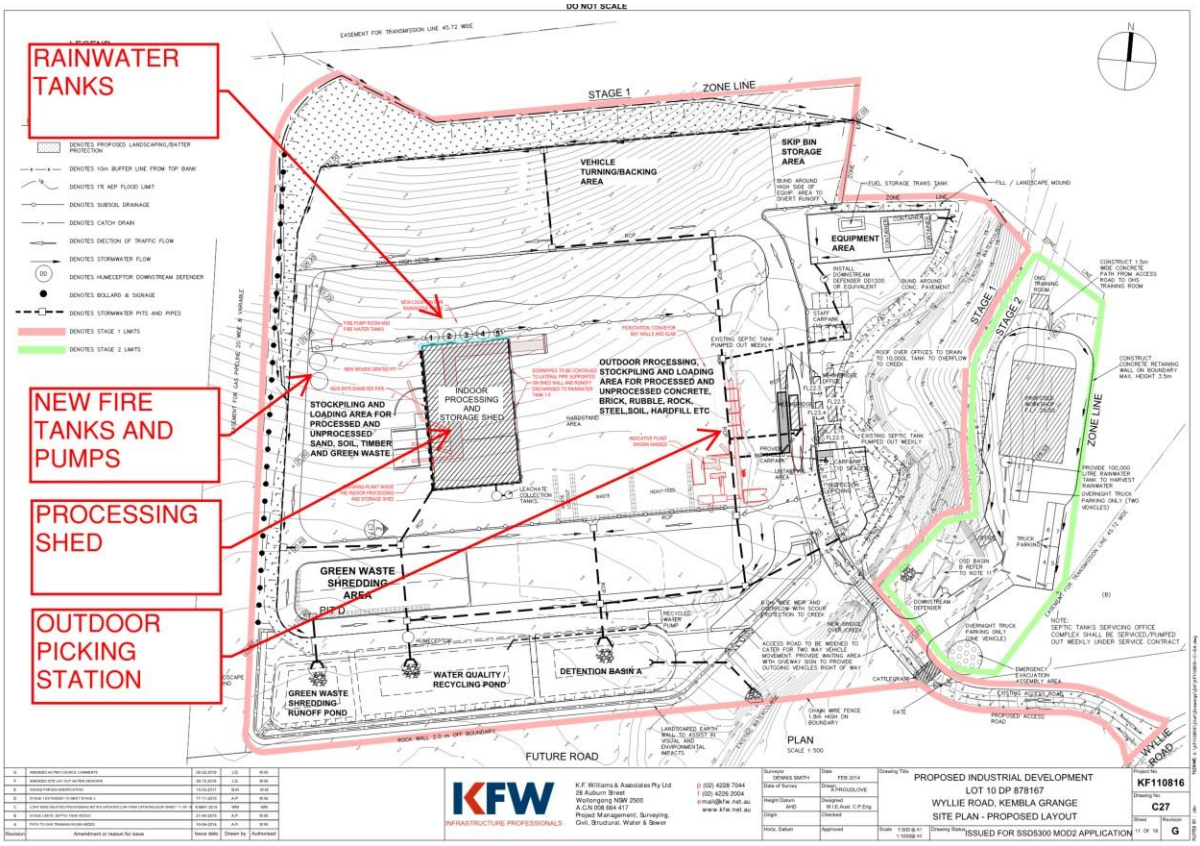
5. Description of the Facility

The site is a construction and demolition waste recycling facility located at 50 Wyllie Rd. Kembla Grange. The site has been operating since 2013.

In March of 2016 approval to expand the facility was provided to receive up to 230,000 tonnes per annum of construction, demolition, commercial and industrial wastes. A modification of the consent was approved to relocate the second weighbridge and enable installation of a larger office.

The facility is now seeking retroactive approval for the following items that were required at the time of occupation certificate.

- Installation of rainwater storage tanks on the premises in a location which differs from the approved plans.
- Installation of firewater storage tanks and a pump room on the premises.
- An outdoor picking station and associated processing equipment in the central processing area of the site



As part of the change of use FRNSW have made comments on the SSD5300 Mod 2 Application. Those recommendations are as follows:

1. That advice and recommendations contained within FRNSW's Fire Safety Guideline – Emergency Vehicle Access be addressed. This is required such that FRNSW are able to safely access all parts of the site where an incident may occur.
2. That a condition of Consent be included that would require the Fire Safety Systems for the site to be reassessed for adequacy in the event that either waste throughput is increased from 230,000tpa or the stream is changed such that an increased proportion is combustible in nature.

3. That provisions be made for the containment of contaminated fire water run-off based on the worst credible fire scenario for the site. Any system(s) provided is to be automatic in nature.
4. The Proponent develop an emergency plan for the waste facility in accordance with AS3745-2010 Planning for emergencies in facilities. An external consultant should be engaged to provided specialist advice and services in relation fire safety planning and developing an emergency plan.

In relation to these items we provide the following comments.

1. Vehicle Access has been confirmed and meets the requirements of FRNSW Guideline for Emergency Vehicle Access.
2. Conditions of Consent are a Department of Planning, Infrastructure and Environment requirement however the operator has no issue with this recommendation.
3. Some containment of contaminated water run off has been provided and detailed under part 8.
4. The operator has no issue with this requirement and will prepare an updated emergency plan as part of the works.

6. Existing Fire Services On site

6.1. Review against NCC 2019

As a basis we reviewed the requirements of the current NCC/BCA 2019 to determine what is required as a baseline for the buildings.

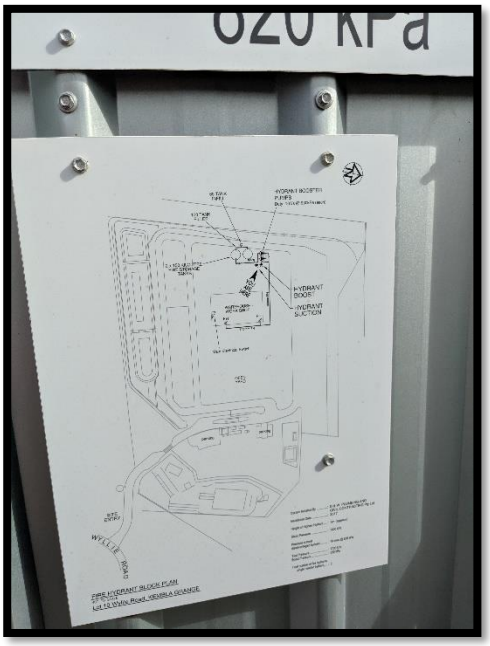
The only building of any significance is the warehouse and thus the only one that has fire services requirements. The building is a class 8 Lab single story warehouse. The area of the warehouse is approximately 1400m2.

The requirements for this building are

- Fire hydrants to AS2419.1-2005
- Fire Hose Reels to AS2441-2005
- Fire Extinguishers are not generally required for the building unless there is an emergency services switchboard or a class B fire risk of flammable liquids. Which at this stage neither apply. However, plant equipment may trigger the need for local extinguishers in the future.
- There is no requirement for sprinklers, smoke detectors or occupant warning in this building.
- There is no BCA requirement for a ring road as the building is not large enough to trigger a ring road.

6.2. Existing Fire Hydrant system

The site has been provided with a new fire hydrant system to serve the warehouse/processing shed. The system consists of two fire tanks, two fire pumps, a booster setup and one hydrant landing valve.



The site does not have a direct town main connection as there is no water supply under Wyllie Rd. Water is supplied via 2x 150kL fire tanks which are filled from a water truck. Two pumps are provided with duty of 10L/s @ 900kPa. The water supply would allow 2 hydrants to flow 4hrs @10L/s.

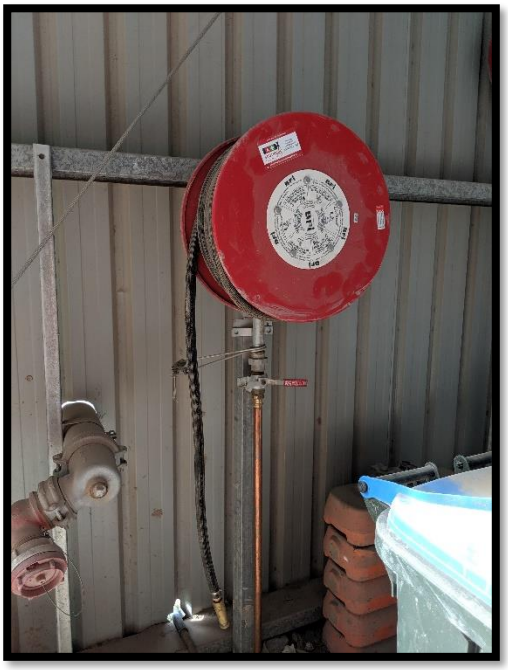
Coverage inside the shed is currently compliant with a single hydrant however the block plan is incorrect showing a second hydrant. The location inside the shed will require fire fighters to

enter the building before connecting a hose. This could be problematic if the fire is close to the landing valve.

6.3. Existing Fire Hose Reel system

The shed is provided with one fire hose reel. The water supply is from a fire hose reel pump in the main fire pump shed. The water is provided from the hydrant tanks. Supply runs adjacent the fire hydrant supply inground over to the fire hydrant.

Coverage in the current configuration is compliant from the single hose reel.



6.4. Existing Fire Extinguishers

The site is protected throughout with fire extinguishers. There are generators on site as well as switchboards so various types of extinguishers have been provided.

We noted no issues with the current installation of FEs on site and will review with regard to the final building consideration in the next section.

6.5. Ring road

The plans for the site allow ring road access to all parts with the one minor exception of the ponds being on the outside of the ring road. As they are by nature inert, we would not expect this to be an issue.

The ring road has been shown on the SSD5300 Mod 1 plans for reference. This road should comply with the Emergency Vehicle Access requirements of any of the FRNSW appliances without issue.

7. Identification of Fire Hazards on the Site

This report is focused on the upgrades and modifications surrounding the change of use and as such does not delve into some of the existing buildings on the site that are unaffected. For example, the diesel storage and filling area is existing and is not affected by the change of use. It has its own fire protection and bunding system so has been excluded from this analysis. Like wise some of the small buildings on site are existing and protected with extinguishers and warrant no further review. The following lists out the identified hazards that are affected by the change of use of the shed from timber mulching, indoor composting and a picking station for 12 people for sorting waste materials (as approved under SSD5300) to an Indoor Processing Plant for crushing bricks and concrete only.

Hazard	**Description**	**Prevention/Detection/ Protection**
Plant or product fire inside the shed	Inside the shed the fixed plant will have motors and belts and will be processing the recycled construction materials. Largely concrete and other inert materials however there may be some flammable material as well.	Flame Detection system to be provided.
Fire in the Piles outside the shed	Piles of material awaiting processing	Installation of yard fire hydrants to assist in fighting a fire.
Green Waste shredding area	Green waste and garden materials	Installation of yard fire hydrants to assist in fighting a fire.
Plastic storage bay beneath the outdoor picking station	There will be a plastics pile under the hand sorting area against a push wall.	Flame detector to be provided above the plastics storage bay.

8. Review of the Guidelines for fire protection of waste facilities in regard to what is possible at this facility.

Fire Fighting Requirements under parts 7 and 8 of the Guidelines for fire safety in waste facilities Version 01			
Guideline Reference	Description	Complies	Comments
7.4.1	Access for emergency vehicles	Yes	DA drawings show compliance with the access requirements
7.4.2	Access to be appropriate to the building.	Yes	DA drawings show compliance with the access requirements
7.4.3	Access for emergency vehicles – Ring Road	No	A ring road has been provided. The only non-compliance is the ponds are located on the outside of the perimeter road.
7.4.4	Facility should cater for a large service response	Yes	The site is well setup for multiple truck access
7.4.5	Dedicated external quarantine area is to be provided to extinguish the largest sized internal stockpile of combustible waste stored within any building.	N/A	No pile storage of combustible material in the shed area.
7.4.6	Pressure and Flow test required.	N/A	No street main available. Three-hour water storage on site.
7.4.7	Adequate access for fire fighters	Yes	No special requirements, no difficult areas for access.
7.5.1	Fire hydrant system to be installed appropriate to the risks.	Yes	The existing system is to be upgraded to provide yard coverage.
7.5.2	Fire hydrants to be provided to open yard storage	Yes	Hydrant system to be upgraded to provide hydrants for open yard storage.

7.5.3	Enhanced standard of performance	Yes	Three hydrants are required to flow simultaneously.
7.5.4	Fire hydrants are not to be located within 10m of stockpiled storage.	No	Hydrants positioned along a block wall within 10m of non-combustible piles
7.5.5	Where appropriate fixed fire monitors should be provided	N/A	Not appropriate for this site
7.5.6	Booster facility to be within sight of the main entrance	Yes	Provision shall be made for a secondary booster facility to be provided at the main entry. Water supply shall be from the Hytrans High Volume Mobile Water Supply System Pod connected to West Dapto Road.
7.5.7	Fire hydrant design performance is to consider worst case	Yes	System designed for 3 yard hydrants at 10L/s for 4 hours.
7.5.8	Fire Hose reels to be provided to open yard storage to enable first attack by personnel on site.	No	Water truck on site has an adjustable nozzle to provide first attack. Staff are trained in first response techniques. Hose reels are provided inside the shed.
7.6.1	Sprinkler system required for buildings greater than 1000m2	No	Existing facility with no sprinklers to the shed. Limited combustibles in shed. Less than the 200m^3 trigger of combustible waste material.
7.6.2	Sprinkler system appropriate to the risks and hazards.	N/A	Sprinkler system not required.
7.6.3	Sprinkler system appropriate to the hazard class.	N/A	Sprinkler system not required.
7.6.4	Protection to vital equipment or systems	N/A	No vital equipment

7.6.5	Fire Sprinkler booster at main entry	NA	No sprinkler system installed
7.6.6	Sprinkler system shall have 2hr of water supply and be sized for the worst demand area	NA	No sprinkler system installed
7.7.1	Fire detection and alarm facility installed appropriate to the risks in each area of the facility	yes	Provision of new flame detection system in the warehouse. Provision of flame detector to the plastics pile.
7.7.2	Occupant warning facility	Yes	Provision of new OWS system in the warehouse.
7.7.3	Detection of a fire is to activate fire mode	Yes	OWS to sound.
7.7.4	Manual alarm points provided	Yes	Will be provided to the warehouse system.
7.8.1	smoke hazard management	No	This would be in-appropriate for the limited about of combustible material in the shed. Roller doors can be opened to maintain visibility should this become an issue.
7.8.2	smoke hazard management to maintain smoke layer to 4m above floor	No	This would be in-appropriate for the limited about of combustible material in the shed. Roller doors can be opened to maintain visibility should this become an issue.
7.8.3	Natural low-level openings to be provided	Yes	Roller doors are provided on the east and west sides of the buildings.
7.8.4	Smoke exhaust to run for 2 hrs	N/A	No smoke exhaust provided

7.8.5	Smoke control shall not delay sprinkler activation	N/A	No smoke control provided, no sprinkler system provided.
7.9.1	Fire Water runoff containment.	Partial compliance	The existing site has a stormwater retention tank that would catch the first round of fire water runoff. Sizing and methodology to be reviewed.
7.9.2	Alternative run off containment may be possible	Yes	The site is provided with a 780m3 Green Waste Shredding Pond, a 3,428 m3 Water Quality Recycling Pond and a 1,923 m3 detention basin, providing a total runoff containment capacity of 6,161 m3 to contain peak discharges to pre-development levels. If it is assumed that that site will require up to 4 hours of fire fighting water provided through three hydrants and 3 x 150kL tanks, the site will need to contain at least 450 m3 of fire fighting water. Based on the demand for water from the ponds for dust suppression (75% of demand is met by the ponds), and that a worst case scenario fire is likely to occur in dry weather when pond levels are low, the site has significant excess storage of fire water in the unlikely event of a worst case scenario fire event. In the event of a fire, ponds containing firewater will be pumped and and

			the water disposed at a licensed water treatment facility.
7.9.3	Containment system to incorporate quarantine area that is required to extinguish internal stock plies.	Yes	The Green Waste Shredding Area drains to the Green Waste Shredding Pond which has a containment volume of 780m3.
7.9.4	Containment system to be impermeable	Yes	All ponds are lined with an impermeable liner to prevent movement of firewater into groundwater
7.9.5	Secondary containment facilities	Yes	The Green Waste Shredding Pond (780m3) overflows into a secondary containment pond (Water Quality Recycling Pond) with an additional containment volume of 3,428m3. Both ponds are serviced by a third pond (Detention Basin A) with a containment volume of 1,953 m3.
7.9.6	Pollution control equipment	Yes	Site is provided with a geotextile membrane under all operational pad areas, to provide full groundwater protection. Site fully drains to the pond system for containment and treatment.
8.2.1	Storage and stockpiling of combustible waste material to be limited by size and volume.	Yes	Operations plan to detail the size limit, location and combustibility of all piles on site.
8.2.2	Variations to stockpile requirements are to be considered via Alternative solution	Yes	No Issues

8.2.3	Max stockpile height not to exceed 4m	Yes	No Issues
8.2.4	The uncontained face of a stockpile is not to exceed 45 degrees	Yes	Complies
8.2.5	Storage method shall limit fire spread	Yes	Combustibles not to be stored adjacent each other. Separation with non-combustibles required.
8.2.6	A separating masonry wall shall extend 1m above and 2m beyond the stockpile edge	Yes	Will comply
8.2.7	Stockpile boundary limits to be permanently marked.	Yes	Will comply
8.3.1	Stockpiles of combustible waste material are to be rotated to dissipate any generated heat. Max duration 6months.	Yes	Stockpiles do not sit for 6 months.
8.3.2	Any waste prone to self-heating should have temperature monitoring	No	Not Proposed
8.3.3	Any processed or treated waste material shall be cooled before stockpiled.	No	Not Proposed
8.3.4	Operations plans are to include stockpile rotation, temperature monitoring during hot weather.	No	Not Proposed
8.4.1	Max width of external stockpiles 20m for access both sides, 10m for access one side	Yes	Will Comply
8.4.2	external stockpile not to exceed 50m in length	Yes	Will Comply
8.4.3	Separation between piles subject to Heat Release Rate. Table lists out the requirements.	No	Largely not applicable to this site due to the low volume of combustible materials.

8.4.4	Separation distances are based on the greatest distance	No	Largely not applicable to this site due to the low volume of combustible materials.
8.4.5	Minimum separation required between external stock piles and fire source features	No	Hand picking area has small piles beneath.
8.4.6	Covered areas attached to buildings are not to encroach on separation distance.	Yes	No Issues
8.4.7	Minimum separation may be reduced when separated by masonry wall or sprinklers	Yes	Masonry Wall used
8.4.8	External stockpiles are to be maintained to the operations plan	Yes	Operations plan to detail the size limit, location and combustibility of all piles on site.
8.4.9	External stockpiles are to be protected from external risks.	Yes	Combustible materials not to be located adjacent the surrounding bush areas.
8.4.10	External stockpiles are to be maintained not to restrict access and egress from buildings	Yes	Operations plan to detail egress requirements.
8.4.11	External stockpiles are to be maintained not to restrict emergency vehicles access	Yes	Operations plan to detail roadways and clearances
8.5.1	Internal stockpiles are to be maintained as determined by the operations plan.	Yes	Materials to be stored inside the Indoor Processing Plant is expected to be minimum, and will comprise non-combustible materials such as brick and concrete only.
8.5.2	Max internal stockpile size in sprinklered building to be 1000m3	N/A	No Sprinklered buildings

8.5.3	Internal stockpiles should have 10m access.	Yes	No Issues
8.5.4	Internal stockpiles may be located side by side when separated by masonry	N/A	No such situation
8.5.5	Internal stockpile shall be limited in size to being able to be moved within 1hr.	Yes	Internal piles are small in nature as most of the internal space is processing equipment.
8.5.6	Internal stockpiles are to be protected from ignition risk	Yes	Operations plan to limit ignition risks.
8.5.7	Internal stockpiles are to be maintained not to restrict access and egress from buildings	Yes	Operations plan to detail egress requirements.
8.5.8	Internal stockpiles are to be maintained not to restrict plant vehicles access to the quarantine area	Yes	Operations plan to detail roadways and clearances

9. Recommendations

As the site is an existing facility full compliance with new guidelines would be difficult to achieve. This facility largely receives concrete and other non-combustible building material wastes. Due to the low risk of fire ignition and fire spread we recommend some additional fire measures be put in-place to bring the facility largely in-line with the intent of the Guidelines for Fire Safety in Waste Facilities.

The site has an unusual situation of not having a town main water supply to the site. This difficulty can be mitigated by having four hours of water storage onsite to enable three fire hydrants to flow simultaneously. During this time if further water is required the Hytrans High Volume Mobile Water Supply System Pod will be required to attend site to draw water from West Dapto road 700m to the south. This requirement will be listed on all block plans and communicated to the local fire brigade.

The fire hydrant system will be upgraded to provide yard hydrants to the site instead of just internal protection to the warehouse building. This would allow fire fighters to attack any of the piles onsite directly from a local attack hydrant. The upgrades will provide a secondary booster location for connection of the Hytrans truck at the main entry.

The fire hydrant system should be further upgraded to include an additional 150kL fire tank and replacement of the existing pumps to provide full flow supply in line with the new fire hydrant code 2419.1-2017

We recommend a new detection system be installed in the warehouse building to provide early detection in a fire event. If the facility is unmanned this will limit the ability of a fire to grow unmitigated. As part of this system we recommend provision of an occupant warning system to the building and manual pull stations to initiate fire mode operations.

We recommend a new flame detection and alarm system be installed in the plastic sort area under the hand-picking station.

There are numerous requirements for the internal and external piles in the Guidelines. The combustible materials should be limited to those recommendations set out in the guidelines for pile size and length as well as access requirements. The non-combustible piles must meet the requirements for access and egress, where they cannot meet the pile limits such as 4m max height an alternate solution should be considered.

10. Estimate of Costs

The following lists cost estimates for the recommended items.

Description of Item	Cost Estimation (inc. GST)
Upgrade of the hydrant systems with the addition of four new yard hydrants and additional booster setup.	$35,000
Upgrade the water supply to replace the existing pumps with new 30L/s capacity pumps.	$40,000
Flame detection system, occupant warning system and manual call points in the shed.	$15,000
Flame detection system, occupant warning system and manual call points below the hand-picking building.	$11,000
Installation of an additional fire water tank of 150kL capacity to serve the hydrant system.	$45,000
Total Estimate of works	**$146,000**