Appendix F

Preliminary hazard analysis

Riskcon engineering

Preliminary Hazard Analysis

129 Mitchell Avenue, Kurri Kurri

Weston Aluminium Pty Limited
Document No. RCE-22145_WA_PHA_Final_14Apr25_Rev(5)
Date 14/04/2025

Preliminary Hazard Analysis

129 Mitchell Avenue, Kurri Kurri

Weston Aluminium Pty Limited

Prepared by

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Quality Management

Rev	Date	Remarks	Prepared By	Reviewed By
A	11 August 2022	Draft issue for comment	Renton Parker	Steve Sylvester
B	24 August 2022	Updated draft		
0	13 November 2022	Updated draft		
1	17 July 2023	Updated based on DPE comments		
2	28 July 2023	Updated based on Weston Comments		
3	7 December 2023	Updated site layouts		
4	26 March 2024	Altered storage design		
5	14 April 2025	Updated per comments	Ezra Bagaskara	Renton Parker

Executive Summary

Background

Weston Aluminium Pty Ltd (WA) have been operating their resource recovery facility since 1998, located at 129 Mitchell Avenue, Kurri Kurri. The facility was originally established to recover aluminium from dross, which is a by-product of the aluminium smelting process. The site also processes scrap metal and remelts aluminium scrap to produce deoxidant products which are used in the steel making industry. More recently, a dedicated thermal waste treatment plant was established on site, which is currently undergoing commissioning.

Due to changing market conditions, WA are now seeking to further diversify wastes streams which can be stored and treated on site. In addition, WA is seeking approval to establish new physiochemical treatment technologies within the proposed development. The proposal does not include an increase in waste tonnages currently authorised to be received at the facility (i.e. maintain activity within the combined 48,000 tonnes per annum). To facilitate the storage and treatment of additional waste streams, WA are seeking to repurpose the existing Aldex building (thereafter to be referred to as the Regulated Waste Processing (RWP) building).

Key aspects of the project include:

- Deletion of the Briquetting Plant (formerly established within the Aldex Building; decommissioned in 2020) from the Project Approval.
- Relocation of the crushing / sizing plant from the Aldex Building for operation at the Front Bay area of the Main Plant Building.
- Discontinuation of the storage and handling of DG Class 4.3 material (dross and spent pot linings) within the Aldex Building. Storage, handling and processing of these inputs is to be managed solely within the Main Plant Building.
- Repurposing of the Aldex building to undertake new activities as provided below (thereafter to be referred to as the RWP building).

The site already exceeds the thresholds contained within Chapter 3 of the State Environmental Planning Policy – Resilience & Hazards (SEPP-RH); hence, the risk profile of the site must be assessed for any amendment occurring at the site. As the new development includes the storage and handling of materials classified as Dangerous Goods (DGs) it is necessary to review the hazards and risks associated with this storage in the context of the existing site risk profile.

The risks are to be reviewed and assessed in the form of a Preliminary Hazard Analysis (PHA) in accordance with the Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 and No. 6 (Ref. [1] & [2]) for submission with the Development Application (DA).

WA has commissioned Riskcon Engineering Pty Ltd (Riskcon) to prepare the PHA for the facility. This document represents the PHA study for the site located at 129 Mitchell Avenue, Kurri Kurri.

Conclusions

A hazard identification table was developed for the Project to identify potential hazards that may be present at the site as a result of proposed operations or storage of materials. Based on the identified hazards, scenarios were postulated that may result in an incident with a potential for offsite impacts. Postulated scenarios were discussed qualitatively and any scenarios that would not impact offsite were eliminated from further assessment.

Due to the commodities proposed to be stored and the protection systems incorporated as part of the design, the potential for offsite impact is mitigated. Hence, the potential for injury or fatality beyond the site boundary would be unlikely and the risk at the site would subsequently be below the acceptable criteria published in HIPAP No. 4 (Ref. [1]).

Based on the analysis conducted, it is concluded that the risks at the site boundary are not considered to exceed the acceptable risk criteria; hence, the facility would continue to be classified as potentially hazardous and would be permitted within the current land zoning for the site.

Recommendations

Based on the analysis the following recommendations have been made:

- The air extracted from the neutralisation segment of the site shall be passed through a scrubber to remove any harmful fumes or vapours that are produced during the reaction.
- The warehouse and/or site boundaries shall be capable of containing 90 minutes of sprinkler discharge (i.e. ceiling mounted, in-racks, and drenchers where required) in addition to 90 minutes of hydrant hose discharge assuming three (3) hydrants are operating.
- The civil engineers designing the site containment shall demonstrate the design is capable of containing the required water volume.

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Abbreviations

Abbreviation	Description
ADG	Australian Dangerous Goods Code
AS	Australian Standard
DA	Development Application
DGs	Dangerous Goods
DGS	Dangerous Goods Store
DPE	Department of Planning and Environment
EPA	Environmental Protection Authority
ECU	Emissions Control Unit
HIPAP	Hazardous Industry Planning Advisory Paper
LPG	Liquefied Petroleum Gas
PHA	Preliminary Hazard Analysis
RWP	Regulated Waste Processing
SEPP	State Environmental Planning Policy

1.0 Introduction

1.1 Background

Weston Aluminium Pty Ltd (WA) have been operating their resource recovery facility since 1998, located at 129 Mitchell Avenue, Kurri Kurri. The facility was originally established to recover aluminium from dross, which is a by-product of the aluminium smelting process. The site also processes scrap metal and remelts aluminium scrap to produce deoxidant products which are used in the steel making industry. More recently, a dedicated thermal waste treatment plant was established on site, which is currently undergoing commissioning.

Due to changing market conditions, WA are now seeking to further diversify wastes streams which can be stored and treated on site. In addition, WA is seeking approval to establish new physiochemical treatment technologies within the proposed development. The proposal does not include an increase in waste tonnages currently authorised to be received at the facility (i.e. maintain activity within the combined 48,000 tonnes per annum). To facilitate the storage and treatment of additional waste streams, WA are seeking to repurpose the existing Aldex building (thereafter to be referred to as the Regulated Waste Processing (RWP) building).

Key aspects of the project include:

- Deletion of the Briquetting Plant (formerly established within the Aldex Building; decommissioned in 2020) from the Project Approval.
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The site already exceeds the thresholds contained within Chapter 3 of the State Environmental Planning Policy – Resilience & Hazards (SEPP-RH); hence, the risk profile of the site must be assessed for any amendment occurring at the site. As the new development includes the storage and handling of materials classified as Dangerous Goods (DGs) it is necessary to review the hazards and risks associated with this storage in the context of the existing site risk profile.

The risks are to be reviewed and assessed in the form of a Preliminary Hazard Analysis (PHA) in accordance with the Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 and No. 6 (Ref. [1] & [2]) for submission with the Development Application (DA).

WA has commissioned Riskcon Engineering Pty Ltd (Riskcon) to prepare the PHA for the facility. This document represents the PHA study for the site located at 129 Mitchell Avenue, Kurri Kurri.

1.2 Objectives

The objectives of the PHA project include:

- Complete the PHA according to the Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 – Hazard Analysis (Ref. [3]),

- Assess the PHA results using the criteria in HIPAP No. 4 – Risk Criteria for Land Use Planning (Ref. [1]), and
- Demonstrate compliance of the site with the relevant codes, standards and regulations (i.e. NSW Planning and Assessment Regulation 1979, WHS Regulation, 2011 Ref. [4]).

1.3 Scope of Services

The scope of work is to complete a PHA study for the proposed waste storage and processing operations at 129 Mitchell Avenue, Kurri Kurri required by the Planning Regulations. The scope does not include the assessment of any existing facilities or operations that have already been reviewed as part of previous PHA studies, however, the assessment of cumulative risks at the site is included within the scope. In addition, it does not include the assessment of other buildings that are being rebuilt 'as approved' (i.e. furnaces and associated buildings) as the risk profiles for these are expected to remain the same and would therefore be reviewed as part of the cumulative assessment.

2.0 Methodology

2.1 Multi-Level Risk Assessment

The Multi-Level Risk Assessment approach (Ref. [3]) published by the NSW Department of Planning and Environment, has been used as the basis for the study to determine the level of risk assessment required. The approach considered the development in context of its location, the quantity and type (i.e. hazardous nature) Dangerous Goods stored and used, and the facility's technical and safety management control. The Multi-Level Risk Assessment Guidelines are intended to assist industry, consultants and the consent authorities to carry out and evaluate risk assessments at an appropriate level for the facility being studied.

There are three levels of risk assessment set out in Multi-Level Risk Assessment which may be appropriate for a PHA, as detailed in **Table 2-1**.

Table 2-1: Level of Assessment PHA

Level	Type of Analysis	Appropriate If:
1	Qualitative	No major off-site consequences and societal risk is negligible
2	Partially Quantitative	Off-site consequences but with low frequency of occurrence
3	Quantitative	Where 1 and 2 are exceeded

The Multi-Level Risk Assessment approach is schematically presented in **Figure 2-1**.

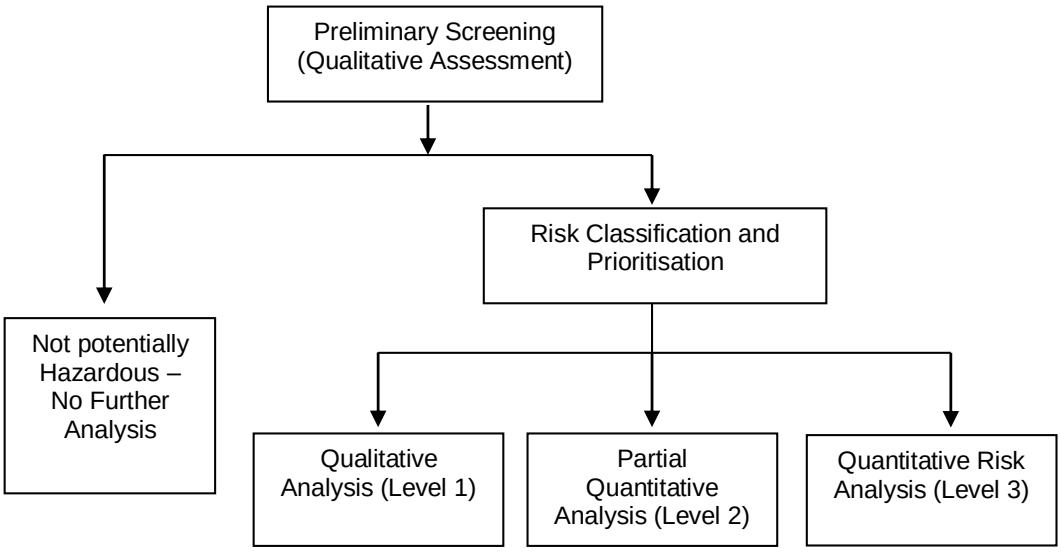

Figure 2-1: The Multi-Level Risk Assessment Approach

Based on the type of DGs to be stored and handled at the proposed facility, a **Level 2 Assessment** was selected for the Site. This approach provides a qualitative assessment of those DGs of lesser quantities and hazard, and a quantitative approach for the more hazardous materials to be used on-site. This approach is commensurate with the methodologies recommended in "Applying SEPP 33's" Multi Level Risk Assessment approach (DPE, 2011).

2.2 Risk Assessment Study Approach

The methodology used for the PHA is as follows;

Hazard Analysis – A detailed hazard identification was conducted for the site facilities and operations. Where an incident was identified to have a potential off-site impact, it was included in the recorded hazard identification table (**Appendix A**). The hazard identification table lists incident type, causes, consequences and safeguards. This was performed using the word diagram format recommended in HIPAP No. 6 (Ref. [2]).

Each postulated hazardous incident was assessed qualitatively in light of proposed safeguards (technical and management controls). Where a potential offsite impact was identified, the incident was carried into the main report for further analysis. Where the qualitative review in the main report determined that the safeguards were adequate to control the hazard, or that the consequence would obviously have no offsite impact, no further analysis was performed. **Section 3.1** of this report provides details of values used to assist in selecting incidents required to be carried forward for further analysis.

Consequence Analysis – For those incidents qualitatively identified in the hazard analysis to have a potential offsite impact, a detailed consequence analysis was conducted (**Appendix B**). The analysis modelled the various postulated hazardous incidents and determined impact distances from the incident source. The results were compared to the consequence criteria listed in HIPAP No. 4 (Ref. [1]). The criteria selected for screening incidents is discussed in **Section 3.1**.

Where an incident was identified to result in an offsite impact, it was carried forward for frequency analysis. Where an incident was identified to not have an offsite impact, and a simple solution was evident (i.e. move the proposed equipment further away from the boundary), the solution was recommended, and no further analysis was performed.

Frequency Analysis – In the event a simple solution for managing consequence impacts was not evident, each incident identified to have potential offsite impact was subjected to a frequency analysis. The analysis considered the initiating event and probability of failure of the safeguards (both hardware and software). The results of the frequency analysis were then carried forward to the risk assessment and reduction stage for combination with the consequence analysis results.

Risk Assessment and Reduction – Where incidents were identified to impact offsite and where a consequence and frequency analysis was conducted, the consequence and frequency analysis for each incident were combined to determine the risk and then compared to the risk criteria published in HIPAP No. 4 (Ref. [1]). Where the criteria were exceeded, a review of the major risk contributors was performed, and the risks reassessed incorporating the recommended risk reduction measures. Recommendations were then made regarding risk reduction measures.

Reporting – on completion of the study, a draft report was developed for review and comment by WA. A final report was then developed, incorporating the comments received by WA for submission to the regulatory authority.

3.0 Site Description

3.1 Site Location and Surrounding Land Uses

The current operations are located a 129 Mitchell Avenue, Kurri Kurri (Lot 61 DP 1237125). The site is located approximately 130 km north of Sydney and approximately 30 km west of Newcastle. The site is located on land zoned E5 Heavy Industry under the *Cessnock Local Environment Plan 2011.* The E5 zoning identifies development for the purpose of heavy industry and hazardous waste storage as permissible with consent

The suburb of Kurri Kurri and neighbouring Weston comprise mainly industrial facilities in the area where the Weston Aluminium site is located. The following land uses are located adjacent to the Weston Aluminium Site.

- North – Open rural land, Swamp Creek.
- South – Mitchell Avenue, Alfabs Engineering (steel fabricators) across Michell Avenue.
- East – Vacant lands and Allight Sykes (mine lighting structure manufacturer) to the southeast.
- West – Vacant Land, currently owned by Weston Aluminium.

Figure 3-1 shows the regional location of the Weston Aluminium facility and **Figure 3-3** shows the facility layout.

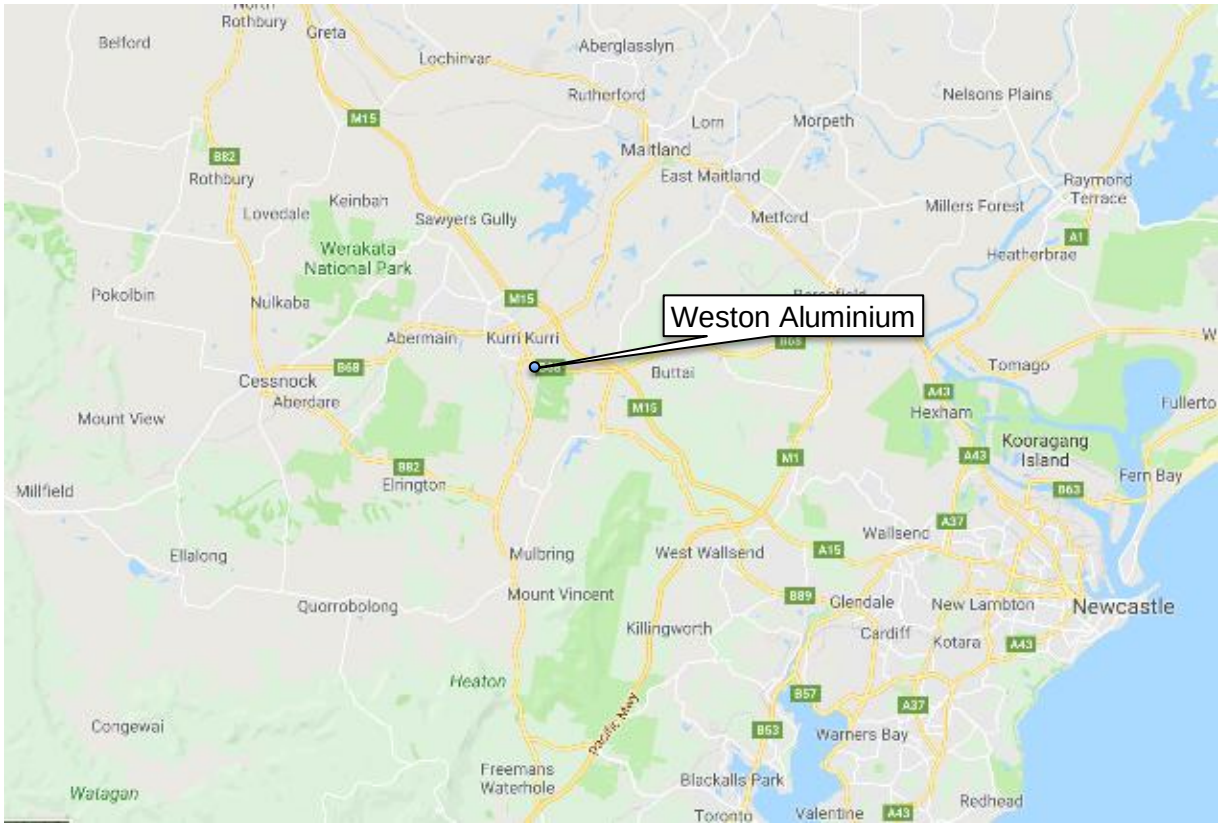

Figure 3-1: Regional Location of the Weston Aluminium Facility. – Kurri Kurri, NSW

Figure 3-2 shows the plant layout, including location of the Aluminium Recycling Plant, Thermal Processing Facility and the RWP Building which is to be repurposed as a waste storage, consolidation and processing area. **Figure 3-3** shows the layout of the proposed waste storage area within the RWP building.

Figure 3-2: Site Layout

3.2 Waste Storage

Provided in this addendum is an update on the waste management process to be implemented at Weston Aluminium (WA) as part of the proposed State Significant Development (SSD) 24668706 Additional Waste Streams project.

WA are seeking approval to receive, store and process additional waste streams at their Resource Recovery facility located at 129 Mitchell Ave, Kurri Kurri NSW. Wastes would be sourced from a range of industries and businesses and would be transported to the Project Area by road utilising the existing transport routes. The total amount of waste to be managed annually is 8,750 tonnes. However, this waste will not be in addition to the currently approved waste tonnages at the WA facility.

The key components of the Project comprise:

- Refit and modification of the existing Aldex Building (thereafter (and herein) to be referred to as the Regulated Waste Processing (RWP) Building).
- Receipt of waste to the site via road transport.
- Storage of waste within the RWP Building.
- Physio-chemical treatment of wastes within the RWP Building.
- Thermal treatment of compatible wastes in compliance with existing site approvals and licenses.
- Storage and consolidation of wastes for treatment at alternate licensed facilities.

A summary of the Project is provided in **Table 3-1**.

Table 3-1 Project Summary

Project Element	Summary of the Project
Waste Types	Both Dangerous Goods (DG) classified wastes and non-DG wastes will be managed at the facility.
Waste Tonnages	There will be no increase above the approved and existing 48,000 tpa development scale. Waste tonnages to be received as part of the Project will be 8,750 tpa.
Waste Transport	Waste will be delivered to the site via road utilising existing heavy vehicle routes.
Waste Storage	Wastes will be stored within the existing RWP Building (formerly Aldex Building) which will have internal alterations to meet dangerous goods storage requirements.

Project Element	Summary of the Project
Waste Treatment	Wastes will be either treated through proposed physio-chemical treatment processes, thermally-treated via existing site operations (for compatible and approved wastes), or otherwise consolidated into larger consignments for off site treatment.
General Infrastructure	A waste receival area covered by an awning and with security fencing is to be erected on the northern side of the building. A dedicated Non-DG decant area will also be established. Existing roads, amenities, carparking, office areas and drainage will remain.
Fire Protection	Smoke and fire detection devices will be fitted within the RWP Building. In support of existing measures (e.g. fire hydrant system), fire protection will be achieved through the installation of fire hose reels, portable fire extinguishers, fire sprinkler systems and the establishment of a building occupant warning system.
Operational Workforce	It is estimated that the Project will generate an additional 9 full time equivalents positions.
Hours of Operation	WA are currently licensed to operate 24 hours per day 7 days per week, with truck movements limited to 7 am to 10 pm Monday to Sunday. The Project does not propose to alter the current operating hours.
CIV	The CIV has been estimated at $3,296,470 excluding GST.

3.3 Waste Management

3.3.1 Waste Types to be Received

Provided in **Table 3-2** is the proposed waste types which are proposed to be received at the facility including estimated proposed tonnages for annual, weekly and daily frequency Provided in

Table 3-3 is the waste characteristics of each waste, including typical waste generators, form to be received, treatment and disposal fate. Waste storage areas are illustrated in **Figure 3-3**.

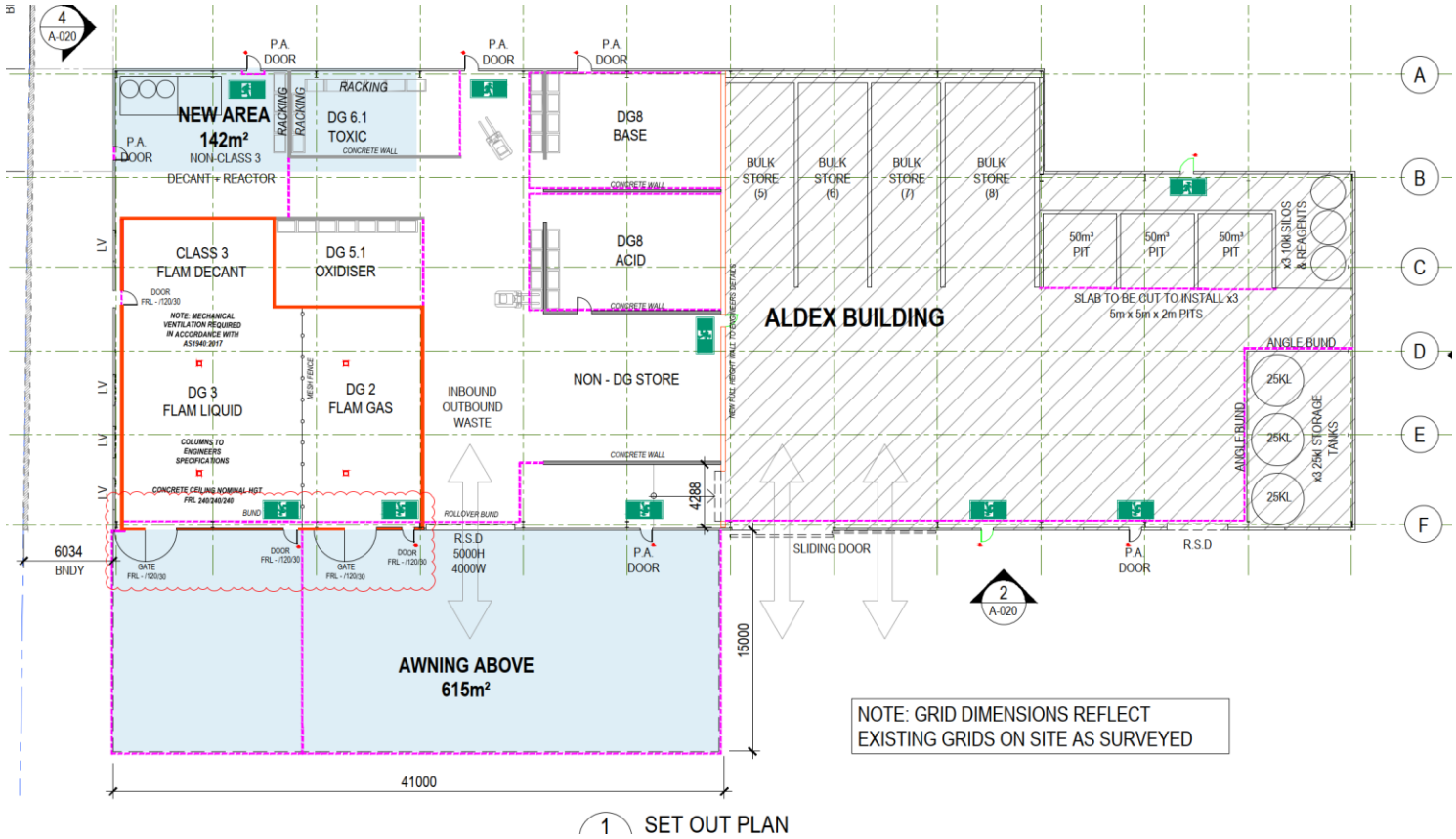

Figure 3-3: Proposed Regulated Waste Processing Building Layout

Table 3-2 Proposed Waste Types to be Received

Waste Type	Waste Code	DG Class	Other Potential DG Classes	Typical tonnes per annum (tpa)
Antimony: antimony compounds	D170	6.1	8	<20
Arsenic; arsenic compounds	D130	6.1	3	<20
Barium compounds (excluding barium sulphate)	D290	6.1	5.1	<20
Copper compounds	D190	6.1	3, 5.1, 8, 9	100-150
Beryllium; beryllium compounds	D160	6.1	N/A	<20
Boron compounds	D310	6.1	8	<20
Cadmium; cadmium compounds	D150	6.1	N/A	<20
Filter cake contaminated with residues of substances that are referred to in this part	N190	Non-DG	6.1, 8, 9	250-500
Fire debris and fire wash waters	N140	Non-DG	9	250-500
Fly ash	N150	Non-DG	N/A	100-200
Chromium compounds	D140	6.1	5.1, 8	100-250
Cobalt compounds	D200	6.1	N/A	<20
Inorganic sulfides	D330	Non-DG	5.1, 8, 9	<20
Lead; lead compounds	D220	6.1	5.1, 8, 9	250-500
Mercury; mercury compounds	D120	6.1	N/A	<20
Nickel compounds	D210	6.1	5.1, 8, 9	<20
Soils contaminated with a substance or waste referred to in this table	N120	Non-DG	5.1, 6.1, 8, 9	1000-1750
Thallium; thallium compounds	D180	6.1	N/A	<20
Vanadium compounds	D270	6.1	N/A	100-200

Waste Type	Waste Code	DG Class	Other Potential DG Classes	Typical tonnes per annum (tpa)
Waste from manufacture, formulation and use of wood-preserving chemicals	H170	Non-DG	3, 6.1, 8, 9	100-200
Zinc compounds	D230	Non-DG	3, 5.1, 6.1, 8, 9	<20
Acidic solutions or acids in solid form	B100	8	N/A	250-500
Basic solutions or bases in solid form	C100	8	N/A	250-500
Oxidising agents	E100	5.1	N/A	20-100
Perchlorates	D340	5.1	N/A	<20
Waste containing peroxides other than hydrogen peroxide	E100	5.1	N/A	<20
Waste from manufacture, formulation and use of biocides and phytopharmaceuticals	H100	Non-DG	3, 6.1, 8, 9	100-200
Halogenated organic solvents	G150	3	6.1	250-500
Organic solvents excluding halogenated solvents	G110	3	2.1	250-500
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	F100	Non-DG	2.1, 3, 6.1, 8, 9	250-500
Waste from the production, formulation and use of organic solvents	G160	Non-DG	3	250-500
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	F110	Non-DG	3, 6.1, 8, 9	250-500
Waste mineral oils unfit for their original intended use	J100	Non-DG	9	250-500
Waste oil/water, hydrocarbons/water mixtures or emulsions	J120	Non-DG	N/A	250-500

Waste Type	Waste Code	DG Class	Other Potential DG Classes	Typical tonnes per annum (tpa)
Waste tarry residues arising from refining, distillation, and any pyrolytic treatment	J160	Non-DG	3, 6.1, 9	250-500
Waste resulting from surface treatment of metals and plastics	A100	Non-DG	6.1, 8	100-200
Isocyanate compounds	M220	6.1	Non-DG, 3, 9	20-100
Surface active agents (surfactants), containing principally organic constituents and which may contain metals	M250	Non-DG	9	500-750
Residues from industrial waste treatment / disposal operations	N205	Non-DG	6.1, 8, 9	500-750
Cyanides (inorganic)	A130	6.1	N/A	<10
Cyanides (organic)	M210	6.1	N/A	<10
Highly odorous organic chemicals (including mercaptans and acrylates)	M260	Non-DG	3, 6.1	<10
Inorganic fluorine compounds excluding calcium fluoride	D110	Non-DG	9	250-350
Chlorates	D350	5.1	N/A	<20
Organic phosphorous compounds	H110	6.1	Non-DG, 3, 8, 9	20-100
Per- and poly-fluoroalkyl substances (PFAS) contaminated materials, including waste PFAS-containing products and contaminated containers	M270	9	3, 8	100-200
Phenols, phenol compounds including chlorophenols	M150	Non-DG & 3	3, 6.1, 8	<20
Phosphorous compounds excluding mineral phosphates	D360	6.1	8, 9	20-50

Waste Type	Waste Code	DG Class	Other Potential DG Classes	Typical tonnes per annum (tpa)
Waste substances and articles containing or contaminated with polychlorinated biphenyls, polychlorinated naphthalenes, polychlorinated biphenyls and/or polybrominated biphenyls	M100	9	N/A	100-150
Containers and drums that are contaminated with residues of substances referred to in this list (including aerosol cans, as defined by NSW EPA)	N100	2.1	3, 8, 9	100-200

Table 3-3 Waste Characteristics

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
Antimony: antimony compounds	D170	Laboratories, Education, Glass manufacturers	Solid	Packaged DG	Consolidation	General Solid or Restricted landfill Offsite treatment facility
Arsenic; arsenic compounds	D130	Agriculture Laboratories,	Solid	Packaged DG	Immobilisation	General Solid or Restricted landfill
Barium compounds (excluding barium sulphate)	D290	Gas Drilling Laboratories	Sludge Solid	Bulk Bays or Packaged DG	Consolidation	General Solid or Restricted landfill Offsite treatment facility
Copper compounds	D190	Timber Preservation Laboratories	Bulk solid Solid	Bulk Bays or Packaged DG	Consolidation	General Solid or Restricted landfill Offsite treatment facility
Beryllium; beryllium compounds	D160	Laboratories Manufacturing	Solid	Packaged DG	Immobilisation	General Solid or Restricted landfill
Boron compounds	D310	Timber Preservation Laboratories	Bulk solid Solid (<205L)	Bulk Bays Or Packaged DG	Consolidation	General Solid or Restricted landfill Offsite treatment facility
Cadmium; cadmium compounds	D150	Laboratories Electroplaters	Packaged solid (<205L)	Packaged DG	Immobilisation	General Solid or Restricted landfill
Filter cake contaminated with residues of substances that are referred to in this part	N190	Metal finishing Waste treatment	Bulk solid Solid (<205L)	Bulk Bays Or Packaged DG	Immobilisation	General Solid or Restricted landfill
Fire debris and fire wash waters	N140	Remediation projects	Bulk solid Packaged liquid	Packaged Non-DG Or Bulk Bays	Immobilisation or Solidification	General Solid or Restricted landfill Water treatment facilities

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
Fly ash	N150	Manufacturing	Packaged solid	Packaged Non-DG	Immobilisation	General Solid or Restricted landfill
Chromium compounds	D140	Metal finishing Demolition Timber preservation Laboratories	Packaged solid Bulk solid	Packaged DG	Immobilisation	General Solid or Restricted landfill
Cobalt compounds	D200	Laboratories	Packaged solid	Packaged DG	Consolidation	General Solid or Restricted landfill Offsite Treatment Facility
Inorganic sulfides	D330	Laboratories	Packaged solid	Packaged DG	Immobilisation	General Solid or Restricted landfill
Lead; lead compounds	D220	Industrial cleaning Batteries processing Demolition Remediation	Packaged solid Bulk solid	Packaged DG Or Bulk Bays	Immobilisation	General Solid or Restricted landfill
Mercury; mercury compounds	D120	Laboratories Remediation	Packaged solid Packaged liquid	Packaged DG	Immobilisation	General Solid or Restricted landfill Repository
Nickel compounds	D210	Laboratories Electrical utilities	Packaged solid	Packaged DG	Immobilisation	General Solid or Restricted landfill Battery recyclers
Soils contaminated with a substance or waste referred to in this table	N120	Demolition Remediation	Packaged solid Bulk solid	Packaged DG Or Bulk Bays	Immobilisation	General Solid or Restricted landfill Offsite treatment facility

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
Thallium; thallium compounds	D180	Laboratories	Packaged solid	Packaged DG	Consolidation	General Solid or Restricted landfill Offsite treatment facility
Vanadium compounds	D270	Chemical manufacturers Metallurgical facilities	Packaged solid	Packaged DG	Consolidation	General Solid or Restricted landfill Offsite treatment facility
Waste from manufacture, formulation and use of wood-preserving chemicals	H170	Timber preservation	Packaged solid Bulk Solid	Packaged DG Or Bulk Bays	Immobilisation	General Solid or Restricted landfill Offsite treatment facility
Zinc compounds	D230	Laboratories Electroplators	Packaged solid Bulk Solid	Packaged DG Or Bulk Bays	Consolidation	General Solid or Restricted landfill Offsite treatment facility
Acidic solutions or acids in solid form	B100	Laboratories Chemical manufacturers Metal Finishing Electroplating	Packaged liquid Bulk Liquid	Packaged DG	Neutralisation (pH)	Neutralised water to tradewaste General Solid or Restricted landfill
Basic solutions or bases in solid form	C100	Laboratories Chemical manufacturers Metal Finishing Electroplating	Packaged liquid Bulk Liquid	Packaged DG	Neutralisation (pH)	Neutralised water to tradewaste General Solid or Restricted landfill
Oxidising agents	E100	Laboratories Households	Packaged liquid	Packaged DG	Neutralisation (Redox)	Neutralised water to tradewaste Or offsite

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
			Packaged solid			
Perchlorates	D340	Laboratories	Packaged liquid Packaged solid	Packaged DG	Neutralisation (Redox)	Neutalised water to tradewaste Or offsite
Waste containing peroxides other than hydrogen peroxide	E100	Laboratories	Packaged liquid	Packaged DG	Neutralisation (Redox)	Neutralised water to tradewaste Or offsite
Waste from manufacture, formulation and use of biocides and phytopharmaceuticals	H100	Chemical manufacturers Agriculture	Packaged liquid	Packaged DG	Consolidation	Offsite treatment facility
Halogenated organic solvents	G150	Manufacturing Laboratories	Packaged liquid	Packaged DG	Consolidation Or Incineration	Onsite Thermal Or Offsite treatment facility
Organic solvents excluding halogenated solvents	G110	Manufacturing Laboratories	Packaged liquid	Packaged DG	Consolidation Or Incineration	Onsite Thermal Or Offsite treatment facility
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	F100	Manufacturing Laboratories	Packaged liquid	Packaged DG	Consolidation Or Incineration	Onsite Thermal Or Offsite treatment facility
Waste from the production, formulation and use of organic solvents	G160	Manufacturing Laboratories	Packaged liquid	Packaged DG	Consolidation Or Incineration	Onsite Thermal Or Offsite treatment facility

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	F110	Manufacturing Laboratories	Packaged liquid	Packaged DG	Consolidation Or Incineration	Onsite Thermal Or Offsite treatment facility
Waste mineral oils unfit for their original intended use	J100	Mechanical workshops	Packaged liquid	Class C2 Non-DG	Consolidation	Offsite treatment facility
Waste oil/water, hydrocarbons/water mixtures or emulsions	J120	Mechanical workshops Manufacturing	Sludge	Bulk bays	Immobilisation or solidification	General Solid or Restricted landfill
Waste tarry residues arising from refining, distillation, and any pyrolytic treatment	J160	Remediation projects Coal tar distillation	Solid Sludge	Bulk bays	Immobilisation	General Solid or Restricted landfill
Waste resulting from surface treatment of metals and plastics	A100	Metal Finishing Electroplating	Packaged liquid Packaged solid Sludges	Packaged DG	Consolidation	General Solid or Restricted landfill
Isocyanate compounds	M220	Manufacturing Household Hazardous	Packaged liquid	Packaged DG	Consolidation	General Solid or Restricted landfill Or Offsite treatment facility
Surface active agents (surfactants), containing principally organic constituents and which may contain metals	M250	Chemical manufacturers and distributors Retail	Packaged liquid Sludges	Packaged Non-DG	Consolidation	General Solid or Restricted landfill Or Offsite treatment facility

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
Residues from industrial waste treatment / disposal operations	N205	Waste	Packaged liquid Packaged solid Bulk solid Sludges	Packaged Non-DG	Immobilisation, Stabilisation, Neutralisation	General Solid or Restricted landfill Or Offsite treatment facility
Cyanides (inorganic)	A130	Laboratories Metal processing	Packaged liquid Packaged solid	Packaged DG	Consolidation	Offsite treatment facility
Cyanides (organic)	M210	Laboratories Metal processing	Packaged liquid Packaged solid	Packaged DG	Consolidation	Offsite treatment facility
Highly odorous organic chemicals (including mercaptans and acrylates)	M260	Utilities Gas manufacturers and distributors	Gas (cylinder) Packaged liquid	Packaged DG	Consolidation	Offsite treatment facility
Inorganic fluorine compounds excluding calcium fluoride	D110	Laboratories Aluminium processing	Packaged solid Bulk solid	Packaged Non-DG	Immobilisation	General Solid or Restricted landfill Or Offsite treatment facility
Chlorates	D350	Laboratories	Packaged solid Packaged liquid	Packaged DG	Neutralisation (Redox)	Trade waste or Offsite treatment facility
Organic phosphorous compounds	H110	Agriculture Household Hazardous	Package solid Package liquid	Packaged DG	Consolidation	Offsite treatment facility

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
Per- and poly-fluoroalkyl substances (PFAS) contaminated materials, including waste PFAS-containing products and contaminated containers	M270	Fire protection Aviation Remediation	Packaged liquid	Packaged Non-DG	Consolidation	Offsite treatment facility
Phenols, phenol compounds including chlorophenols	M150	Laboratories Chemical industries	Packaged liquid	Packaged Non-DG	Consolidation	Offsite treatment facility
Phosphorous compounds excluding mineral phosphates	D360	Agriculture Chemical industries	Packaged liquid Packaged solid	Packaged DG	Consolidation	Offsite treatment facility
Waste substances and articles containing or contaminated with polychlorinated biphenyls, polychlorinated naphthalene's, polychlorinated biphenyls and/or polybrominated biphenyls	M100	Electrical Utilities Manufacturing	Packaged liquid	DG Packaged	Consolidation	Offsite treatment facility
Containers and drums that are contaminated with residues of substances referred to in this list (including	N100	Manufacturing Waste	Packaged liquid Packaged solid	Packaged Non-DG	Consolidation	Offsite treatment facility

Waste Type	Waste Code	Typical Generators	Form	Storage	Treatment	Indicative Fate
aerosol cans, as defined by NSW EPA)						

3.3.2 Waste Stream Sources

The source of the wastes will vary depending on the market conditions at the time. In general, it is anticipated that wastes to be brought to the site for storage, consolidation and treatment will be sourced from the following industry sectors:

- Construction and infrastructure related projects
- Community regulated wastes (e.g. schemes such as “paint back”)
- Defence
- Coal Mining
- Manufacturing
- Waste Industry
- Smelting
- Chemical Manufacturing
- Coal Seam Gas
- Environmental Services

3.3.3 Waste Transport

Each type of waste would be produced at its source industry and packaged in accordance with the requirements of the relevant codes and guidelines (e.g. the NSW Environment Protection Authority’s (EPA’s) guidance notes, ADG Code and relevant Australian Standards including AS/NZS 3816:1998).

The tracking of the waste during transportation would also be undertaken in accordance with the requirements of the NSW EPA.

All waste would be transported to the Project Area by road. Depending on the type of waste, its source location, business/industry and the transport contractor being used, the size and type of vehicle being used to transport waste to the WA Site may vary. It is anticipated that the average loads of waste being delivered to the Project Area would be approximately 8 tonne. A proposed annual waste processing volume of 8,750 tonnes per year equates to 1100 truckloads per year or approximately three to four loads per day delivered to the Project Area.

Vehicles accessing the Project Area would principally originate from within NSW, with the majority of vehicle expected to come from the Newcastle and Sydney metropolitan regions. Vehicles would enter the Project Area through the existing access off Mitchell Avenue. Access to and from the site would be from Mitchell Avenue to Government Road, then Hart Road which connects directly to the Hunter Expressway at the Loxford Interchange.

The Loxford Interchange is a half interchange which only provides an exit for westbound traffic on the Hunter Expressway and entry to the Expressway for eastbound traffic. With most of the traffic coming from the Sydney and Newcastle metropolitan area via the M1 Expressway, this interchange would provide ease of access to Hart Road and therefore the Project site. No waste movements would be transported through the township of Kurri Kurri.

In accordance with the requirements of the WA Site's existing Environment Protection Licence (EPL 6423) condition L5.1, truck deliveries to and from the Project Area would be between the hours of 7am and 10pm. No change in traffic/transport movements is sought by the proposed development.

3.3.4 Waste Receival

Trucks would access the project Site via the site's existing weighbridge for recording, and then proceed to the waste drop off zone / loading bay located on the northern side of the RWP Building (Refer to **Figure 3-3**). Trucks would back up to the loading bay where the waste would be unloaded. Depending on the nature of the waste being delivered and the type of delivery vehicle, waste may be unloaded by:

- Forklift, for large deliveries; or
- Hand wheeled waste bins up to 660L or receptacles for smaller waste deliveries.

Bulk tipping (e.g bulk soils) may also occur directly into the treatment bays within the RWP building.

Prior to receiving or unloading wastes at the Project Area, each load of waste would be individually screened by the facility operators (under the supervision of an Industrial Chemist) to confirm that the type and quantity of wastes scheduled for delivery is correct. Screening includes a visual inspection of the load (including packaging and labelling condition), documentation (origin, waste description, grading/classification, storage/processing fate, labelling and photographic record) and the use of devices such as Geiger Counters to ensure that wastes do not contain radioactive materials. If a non-conforming waste delivery is identified, the entire waste load would be quarantined and redirected back its point of origin for actioning by the generator. In accordance with existing Quality Management System protocols, WA would subsequently inform the transport contractor company and the waste originator of the non-conformance. WA would keep a record of any non-conforming wastes to allow its tracking.

Where wastes are not scheduled for immediate processing, they would then be moved to a dedicated waste storage location within the RWP Building which will be fully bunded and sealed from the outside environment.

3.3.5 Waste Handling

Flammable liquid wastes will be received as packaged waste in structurally intact UN Dangerous Goods receptacles. Once waste is received they will be assessed as part of WA quality control waste acceptance program. Wastes will then be transferred either manually or by forklift to the storage area. Flammable wastes will then be transferred by forklift to the dedicated decanting area. They will then be decanted by intrinsically rated pump or manually under a static electricity-controlled process to a receiving receptacle such as a 205L drum or Intermediate Bulk Container. These containers will then be secured and transferred to the DG storage area prior to being loaded out for offsite disposal.

Most bulk non-hazardous waste such as soils will be delivered in bulk bins or by bulk tipper truck. The trucks will be directed to reverse into the RWP building where they will tip their waste into the storage bays or pits depending on the resultant Disposal Pathway. All tipping activities will be performed within RWP building (i.e. no external tipping would occur). The

RWP building will be fully bunded, maintained under negative pressure and serviced by an emissions control system to avoid fugitive emissions.

All packaged waste will be contained within receptacles which will be clearly labelled and stored in accordance with the storage plan. These materials will only be transferred for decanting within the nominated area (e.g. flammable decanting area for flammable wastes) under the direction of an Industrial Chemist. Wastes will then be processed in accordance with the safe work method statements and a batch log recorded for each specific activity. Only wastes with the compatible physiochemical characteristics (e.g. compatible dangerous goods) will be consolidated together and dependent on the nominated disposal pathway.

Bulk solid, sludges and appropriate liquid wastes would be received within the RWP Building storage bays or pits. Bulk soil waste will be segregated with partitions (concrete bunkers/walls) where required. Wastes will only be transferred in parcels between storage areas using fit for purpose earth moving equipment with appropriate housekeeping standards in place to avoid the accumulation of residues.

3.3.6 Waste Storage

The location of waste storage areas is provided in **Figure 3-3**.

Flammable waste materials will be separated from the rest of the storage areas by a Fire Resistance Level (FRL) 240/240/240 walls 7 m high which has an FRL 240/240/240 roof. Where doors are installed within the fire walls they will have an FRL of -/120/30 in accordance with AS 1940:2017 (Ref. [4]). The flammable gases waste receptacles will further be separated from the flammable liquids waste receptacles by the inclusion of a chain mesh fence to ensure containment of aerosols in the event of accidental rupture or a fire originating in the flammable gas storage area.

Also contained within the bunker is a flammable liquid decanting area. Liquids in small containers (i.e. <20 L) will be decanted and aggregated into Intermediate Bulk Containers (IBCs; typically, 1,000L capacity). The bunker and decanting areas are proposed to be designed in accordance with AS 1940:2017 (Ref. [4]) including bunding, fire walls, mechanical ventilation, and hazardous area rated electrical equipment in accordance with AS/NZS 60079.14:2022 (Ref. [5]).

The other DG and non-DG storages will contain discrete bays for each class and waste type that is proposed to be stored. DG Class 8 wastes (bases and acids) have dedicated storage areas and will be separated by a concrete wall. Similarly, the storage area for DG 6.1 toxic materials will be stored within a designated area with concrete walls on three sides. Racking is proposed throughout the RWP Building on which IBCs and/or drums on pallets will be stored and may be accessed via forklift. The area will be bunded to contain any spills, should they occur. Each store will comply with the applicable standard covering the class of good stored.

The storage areas have been located so to allow for the ease of ingress and egress of machinery and personnel. As shown in **Figure 3-3**, there are personnel access doors located around the perimeter of the building. There is also a roller shutter door with a rollover bund for plant to enter the DG storage areas. A large sliding door is positioned to access the bulk store and treatment pit areas located in the western area of the building. A full height wall separates the DG storage areas, from the bulk store and treatment pit areas. The storage of the reagents within three 10 kL tanks is located at the opposing end of DG storage areas.

In the rear of the building will be a reactor for the treatment of non-flammable wastes, predominantly neutralisation of corrosive substances prior to disposal.

Wastes will be received within the unloading areas and transported to the class specific storage area associated with the goods that have been received. Wastes will be stored here until they can be transferred internally or dispatched externally for additional treatment / disposal.

3.3.6.1 Waste Storage Strategies

For packaged wastes the storage configuration is largely directed by the compatibility guidelines of the Australian Dangerous Goods Code. For example, all Class 5.1 wastes (e.g. oxidizing agents) would be stored within the dedicated Class 5.1 storage area regardless of their waste profile (e.g. NEPM code). Within these Dangerous Goods storage areas, waste with common waste categorisation (e.g. same waste code) will be segregated from each other to maintain wastes with like for like characteristics.

3.3.6.2 Waste Storage Capacity

Non-Dangerous Goods Storage

Of those wastes which are not classified as DGs, the maximum stockpile quantities would be limited to the amount of available storage capacity within the RWP Building, whilst still achieving the required segregation and separation requirements. In summary, maximum stockpiles for each storage area would be:

- 90 tonnes in each of the three 50 m^3 pits (i.e 270 tonnes);
- 250 tonnes in each of the four bulk storage areas (i.e 1,000 tonnes); and
- 240 tonnes in the Non-DG Store.

Refer to **Figure 3-3** for the location of the non-DG waste storage areas.

Dangerous Goods Storage

The DG classes and maximum quantities proposed to be stored and handled within the building are summarised in **Table 3-4**.

Table 3-4: Classes and Quantities of Dangerous Goods Stored and Handled

DG Class	Quantity (T)
2.1	30
2.2	
3	30
5.1	40
6.1	80
8 (acids)	30
8 (alkali)	30

3.4 Waste Treatment

3.4.1 Overview

The receipt of additional waste streams to the WA facility will also involve the introduction of new waste processing capabilities at the site. Provided in the following section is a description of the new waste treatment processing capability proposed.

3.4.2 Waste Treatment Locations

The locations of the proposed neutralisation and immobilisation/stabilisation areas are provided in **Figure 3-3**. Low concentration neutralisation (i.e pH >2 and pH <12) will be undertaken in the 50 m^3 treatment pits. High concentration neutralisation (i.e pH <2 and pH >12) will be undertaken in the dedicated decant and reactor area.

Immobilisation / stabilisation will be undertaken in the dedicated treatment area as indicated in **Figure 3-3**. Waste material destined for immobilisation/stabilisation will be transported into the area via the sliding door. The material will be feed through a hopper via a conveyor. Material will then be fed from the hopper into a high sheer mixer. Immobilisation will be undertaken in accordance with NSW EPA's "Immobilisation Technical Note – Process Equipment for Treatment of Contaminated Soil and Sludge Waste" [6].

Once sampling has been conducted and the required waste treatment has been achieved, the material will be placed back into the bulk store prior to offsite transport.

All waste treatment will be undertaken within the RWP building which will be fully enclosed with ventilation and pollution control equipment in operation.

3.4.3 Plant and equipment

The Project will involve the use of the plant and equipment outlined in **Table 3-5**. The location of equipment is provided in **Figure 3-3**.

Table 3-5 Plant and Equipment

Plant and Equipment	Site Use
Hydraulic Pusher (for shredder)	Mechanical push to feed material into shredder
Shredder	Shredding of packaging material such as metal or plastics for disposal.
Decant / reactor	Inorganic wastes are decanted into the decant. If required soluble/solid would be treated in the reactor.
Conveyor	Use for movement of waste off transport
Hopper	Temporary storage of waste material prior to placement into the high sheer mixer.
High sheer mixer	Provide positive agitation/stirring of the mix and achieve rigorous mixing of material
Drum Crusher	Crushing of drums delivered to site.
Liquid storage tanks (3 x 25 kL)	Storage of bulk liquids used in processing on site
Solid reagent storage silos (3 x 10 kL)	Storage of reagents required for physio-chemical treatment of waste.
Front-end Loader	Existing front end loaders will be used for bulk waste movements within the facility.
Intrinsically-safe Forklift Truck	Forklifts will be used to move packaged waste and IBCs around the facility, and for loading of vehicles.
Pollution Control System (ducting and fabric filter baghouse)	The existing Pollution Control System will be operated to manage process emissions, and to maintain the RWP Building under negative pressure to prevent fugitive emissions.
Laboratory	On site laboratory to undertake quality control assessment of wastes.
Scales	Weighing of wastes within the RWP Building prior to treatment or disposal.
Transfer Pumps	Transfer of liquid reagents to process areas.

3.4.4 Consolidation

Consolidation is a term used to describe the transfer of a waste type from a smaller receptacle to be bulked along with other similar waste types in a larger receptacle. For example, waste paint is often received in small commercial packages such as 4 L containers. The process of consolidation involves the decanting either manually or using mechanical aids (e.g., shredders) into a larger receptable such as an Intermediate Bulking Container (typically 1,000 L capacity). It is proposed that the consolidation will be undertaken both manually and using mechanical aids such as pumps, and automated de-packaging technologies including shredders.

The flow chart for the consolidation process is provided in **Figure 3-4**.

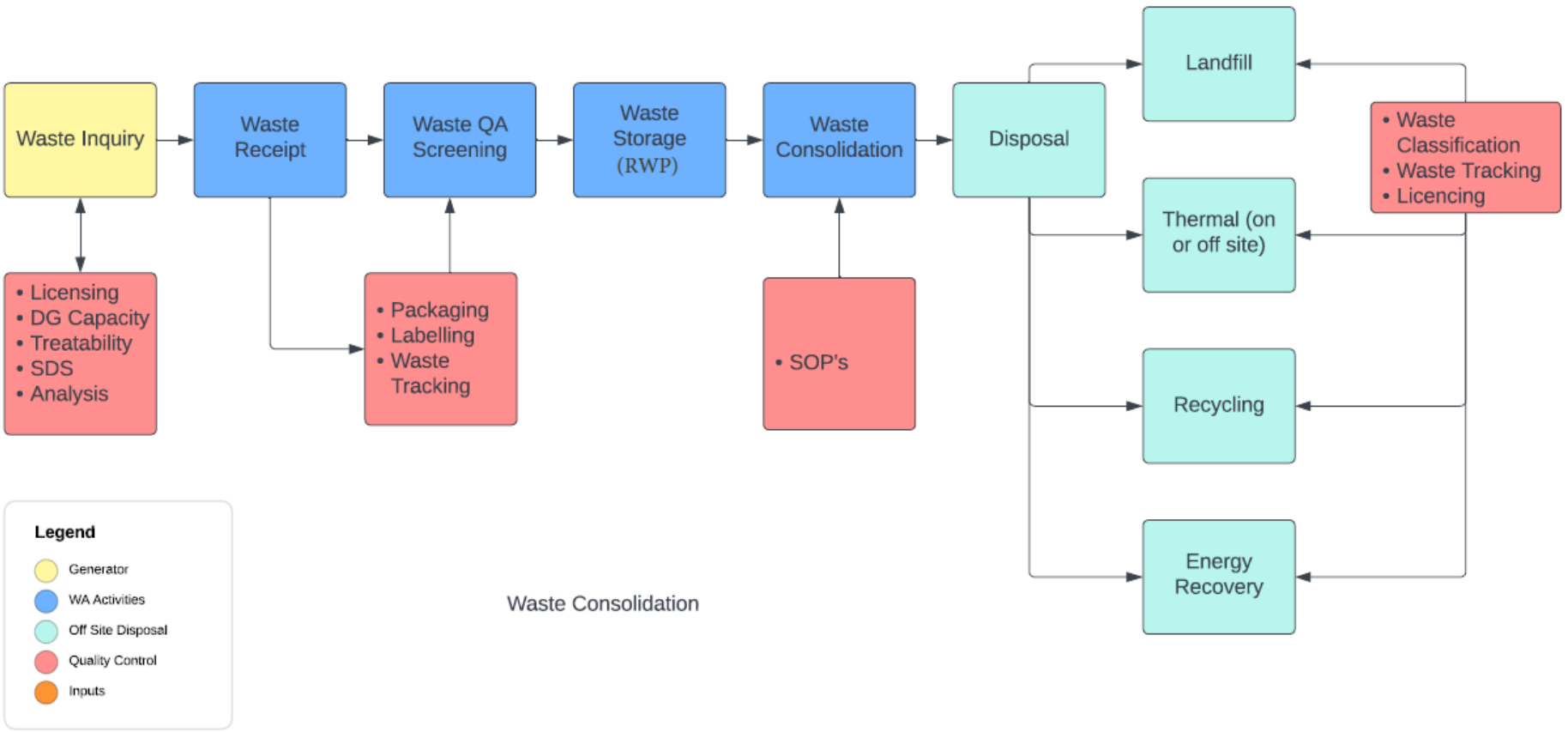

Figure 3-4 Consolidation Process Flow Chart

3.4.5 Physio-chemical Treatment

It is proposed that several new physio-chemical treatment activities be established within the RWP building to enhance the treatment capability at the WA site. These include established waste treatment processes including 1) Chemical Immobilisation and Solidification and 2) Chemical Neutralisation.

As noted previously, these new treatment activities will be incorporated into the existing RWP building through the retrofit activities. This would include some minor civil infrastructure modifications and establishment of some additional consolidation (e.g., shredder) and physiochemical treatment processes (e.g. tank farms). It is proposed that in addition to processing via the existing thermal treatment process, most wastes received (refer to **Table 3-2**) would be consolidated for offsite disposal or managed by way of physiochemical treatment activities.

Some further details on the consolidation and physiochemical treatment process are provided below.

3.4.6 Chemical Immobilisation and Solidification

Chemical immobilisation and/or Solidification may be used in combination or separately in the treatment process. This would depend on the nature of the contaminants within the incoming waste and their physical properties. Chemical immobilisation involves the introduction of chemical reagents, which convert the target contaminants contained in the waste so that they become chemically-stable and suitable for landfill disposal. Stabilisation or solidification involves the mixing of cement (or other suitable solidification reagents), which transforms the waste into a stabilized, non-leaching form suitable for landfill disposal. Where stipulated under NSW EPA regulations, suitable wastes would be processed by Chemical Immobilisation and Solidification under a valid General or Specific Immobilisation Approval. Wastes would be mixed with reagents using either an excavator or front-end loader, or using an approved high shear mixing device, as may be stipulated by a General or Specific Immobilisation Approval and in accordance with EPA's mixing policy.

Prior to disposal, the wastes would undergo sampling and analysis in accordance with the Waste Classification Guidelines Part 1: Classifying waste and/or Waste classification guidelines and/or Part 2: Immobilisation of waste, as required by the EPA's General Approval of the Immobilisation of Contaminants in Waste 2005.

The flow chart for wastes treated through immobilisation and/or stabilisation in provided in **Figure 3-5**.

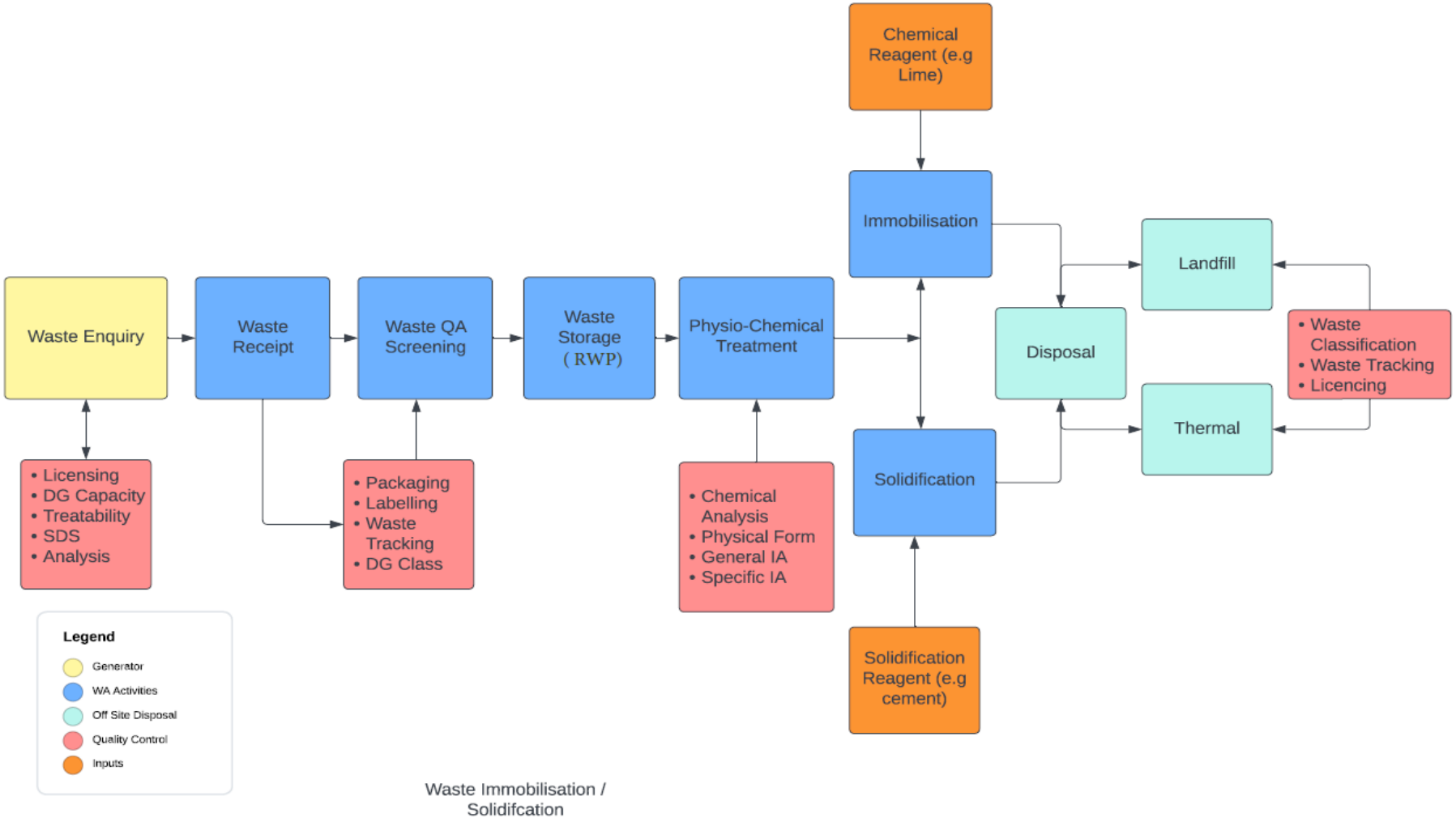

Figure 3-5 Chemical Immobilisation / Stabilisation Process

3.4.7 Chemical Neutralisation

Chemical Neutralisation is a term where a particular chemical characteristic is neutralised to produce an inert by-product. The most common example is the neutralisation of waste acids and alkalis to produce a pH-neutral salty effluent. Other types of neutralisation target changes in the redox potential. It is proposed that small scale Chemical Neutralisation be undertaken focused largely on packaged waste. The infrastructure would include a small tank farm including a filtration system for the recovered solids. This is proposed to be located in the north-western corner of the RWP Building. The small tank farm of three 25 kL tanks will be surrounded by angle bunds.

The resultant liquid waste would either be disposed to trade waste under an updated agreement with Hunter Water or transferred off site for disposal. The resultant solids would be solidified and sent to landfill or treated by Chemical immobilisation and/or Solidification, as required.

Prior to disposal, the wastes would undergo sampling and analysis in accordance with the Waste Classification Guidelines Part 1: Classifying waste and/or Waste classification guidelines and/or Part 2: Immobilisation of waste as required by the EPA's General Approval of the Immobilisation of Contaminants in Waste 2005.

Provided **Figure 3-6** is a flow chart of the Neutralisation process including QA/QC hold points.

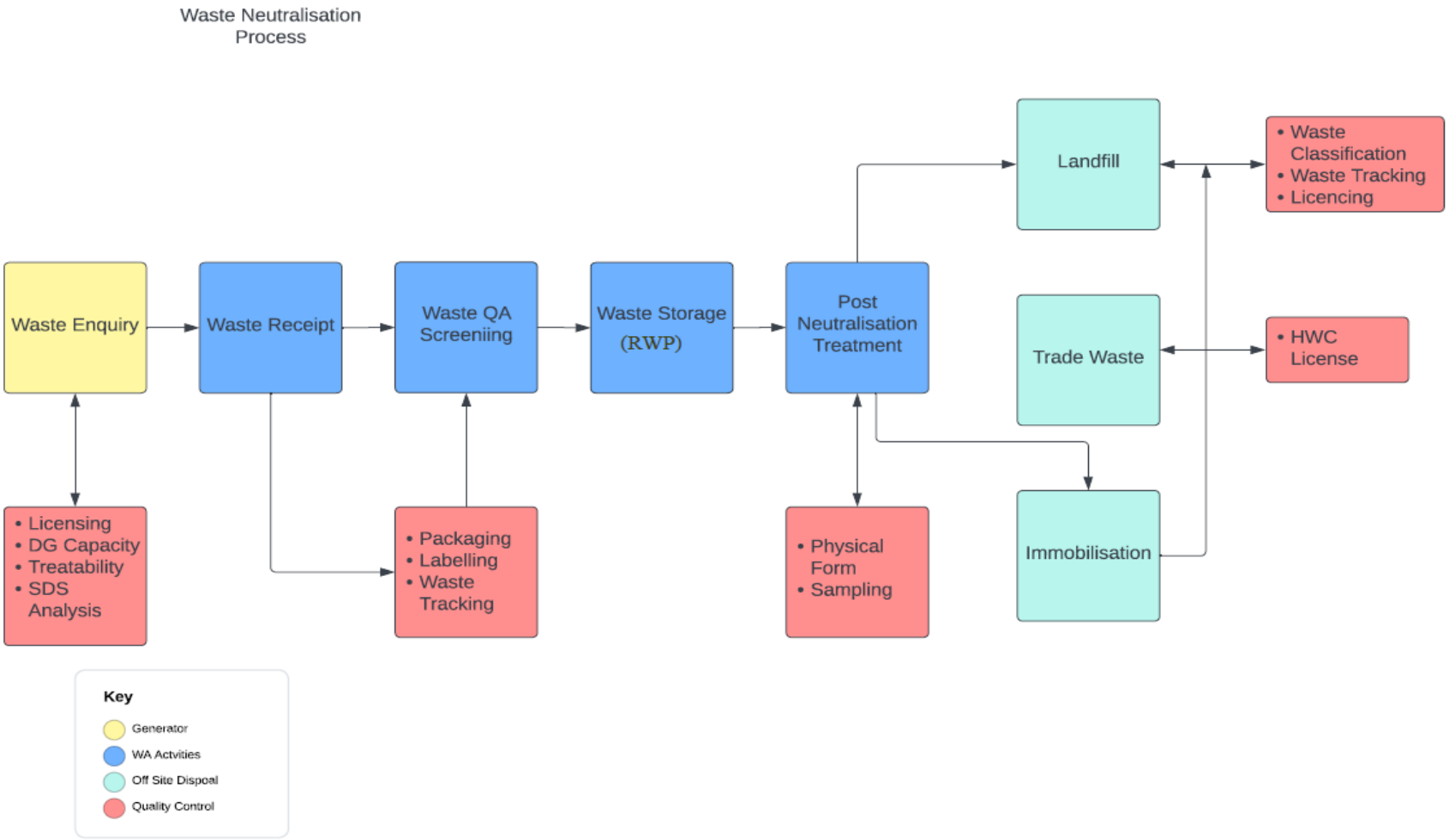

Figure 3-6 Waste Neutralisation Process

3.5 Waste Disposal Locations

As provided in **Figure 3-4** to **Figure 3-6**Table 3-6, there are three pathways in terms of waste disposal off site and one on-site disposal pathway. These are explained in further detail in the following sections.

3.5.1 On-Site Thermal Treatment

Consolidated wastes that are approved for thermal treatment in WA's onsite Thermal Processing Facility (e.g. medical wastes) may be transferred internally within the site (typically by forklift truck) for treatment. Tonnages to be treated on site will remain within the currently-approved 8,000 tpa.

3.5.2 Off-site Thermal Treatment

Wastes which have been treated at WA through the stabilisation process (and categorised as general solid waste or restricted solid waste) or wastes which have been consolidated and are suitable for offsite treatment, may be sent for thermal disposal offsite. Waste would be transported offsite via truck for disposal. Thermal desorption facilities include:

- Solve - Altona Victoria.
- Renex - Dandenong Victoria.
- Ventia - Dandenong South, Victoria.

3.5.3 Off-Site Disposal – Landfill

Those wastes which have undergone physio-chemical treatment either through immobilisation or neutralisation may be disposed at a suitably licensed landfill as general solid waste or restricted solid waste.

3.5.4 Energy Recovery

Some waste types which will be consolidated on-site will be disposed via energy recovery. Operations such as Geocycle located in Victoria and Northern Oil in Queensland may be used for this purpose. Wastes which may be consolidated at WA and sent to these facilities may include:

- Petroleum products, including oils, greases and distillation residues;
- Resins, paints, inks and solvent based materials; and
- Chemicals, including pesticides and herbicides.

3.5.5 Consolidation Off-Site Disposal

Those wastes which are not treated on site, but rather stored on site for consolidation (refer to **Table 3-2**) will be transported via road adhering to the NSW waste tracking requirements. Those wastes which will be stored on site will remain until a full load can be achieved.

3.5.6 Quality Control

It is imperative for any waste treatment facility to have a robust quality control system in place throughout the waste receipt, treatment and disposal process. Waste screening is an important component of the quality control process. Prior to any wastes being received on site, each load will be inspected by the site's dedicated chemist. If wastes are not suitable for receipt at the facility they will be rejected and returned to the waste generator. Examples of waste which would not be

accepted on site would include those presented with damaged or inappropriate packaging and labelling, incorrect waste tracking information or wastes for which WA are not licensed to receive.

Provided in **Table 3-6** below is a summary of Quality Control that will be implemented through the process. This is also shown in **Figure 3-4** to **Figure 3-6**.

Table 3-6 Waste Quality Control

Issue	Quality Control
Waste Enquiry	
WA Licensing	Confirmation prior to the receipt of any waste that WA is authorized through planning consents and EPL to receive the nominated waste.
Capacity	Prior to receipt, confirmation that the facility has sufficient capacity to receive and store the nominated wastes.
Treatability	Confirmation that the proposed waste stream is in a form which can be treated at the facility.
SDS Analysis	Review of SDS to be undertaken prior to receipt.
Waste Receipt / Screening	
Packaging & Labelling	Prior to accepting an inspection of packaging and labelling is to be undertaken in accordance with established SOPs.
Waste Tracking	Review of waste tracking documentation, confirming the source and nature of the waste.
DG Class	Confirmation of DG class determined through waste tracking documentation prior to placement within the RWP building. Wastes to be stored in the appropriate location for the given DG class.
Post Treatment	
Physical Form	Physical check of form of the waste (e.g. spadable) for final disposal. For example, verification of solid form needs to satisfy the following: • it has an angle of repose greater than of 15 degrees (15º); • it has no free liquids when tested; and • it liberates no free liquids when transported.
Waste Sampling	Treated waste sampled to ensure it satisfies disposal requirements.
General Immobilisation Approval	General immobilization approvals are provided by the EPA for specific waste types. An application is not required to dispose of waste under a general immobilisation approval.
Specific Immobilisation Approval	Specific immobilisation approvals are issued to a nominated person for a particular waste which meets the non-liquid criteria contained in the Waste Classification Guidelines.
Waste Disposal	
Waste Classification	Based on sampling results post treatment, undertake waste classification based on NSW EPA Waste Classification Guidelines [7]
Waste Tracking	Prepare waste tracking information for transport and receipt to nominated facility, as required.
Facility Licencing	In coordination with the waste tracking documentation, confirmation that the receiving facility is licensed to receive the waste as classified.

Issue	Quality Control
Trade Waste Licence	If output of waste treatment is approved to enter the Hunter Water system, ensure it is of appropriate quality in accordance with WA's Trade Waste license.

WA have a series of Standard Operating Procedures (SOPs) which are currently implemented at the facility. Where appropriate these will be amended or expanded upon to cater for the receipt, storage, handling, treatment and disposal of the additional waste streams.

4.0 Hazard Identification

4.1 Introduction

A hazard identification table has been developed and is presented at **Appendix A**. This table has been developed following the recommended approach in Hazardous Industry Planning Advisory Paper No .6, Hazard Analysis Guidelines (Ref. [2]). The Hazard Identification Table provides a summary of the potential hazards, consequences and safeguards at the site. The table has been used to identify the hazards for further assessment in this section of the study. Each hazard is identified in detail and no hazards have been eliminated from assessment by qualitative risk assessment prior to detailed hazard assessment in this section of the study.

In order to determine acceptable impact criteria for incidents that would not be considered for further analysis, due to limited impact offsite, the following approach has been applied:

- *Fire Impacts* - It is noted in Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 (Ref. [1]) that a criterion is provided for the maximum permissible heat radiation at the site boundary (4.7 kW/m^2) above which the risk of injury may occur and therefore the risk must be assessed. Hence, to assist in screening those incidents that do not pose a significant risk, for this study, incidents that result in a heat radiation less that at 4.7 kW/m^2, at the site boundary, are screened from further assessment.

  Those incidents exceeding 4.7 kW/m^2 at the site boundary are carried forward for further assessment (i.e. frequency and risk). This is a conservative approach, as HIPAP No. 4 (Ref. [1]) indicates that values of heat radiation of 4.7 kW/m^2 should not exceed 50 chances per million per year at sensitive land uses (e.g. residential). It is noted that the closest residential area is more than several hundred meters from the site, hence, by selecting 4.7 kW/m^2 as the consequence impact criteria (at the adjacent industrial site boundary) the assessment is considered conservative.

- *Explosion* - It is noted in HIPAP No. 4 (Ref. [1]) that a criterion is provided for the maximum permissible explosion over pressure at the site boundary (7 kPa) above which the risk of injury may occur and therefore the risk must be assessed. Hence, to assist in screening those incidents that do not pose a significant risk, for this study, incidents that result in an explosion overpressure less than 7 kPa, at the site boundary, are screened from further assessment. Those incidents exceeding 7 kPa, at the site boundary, are carried forward for further assessment (i.e. frequency and risk). Similarly, to the heat radiation impact discussed above, this is conservative as the 7 kPa value listed in HIPAP No. 4 relates to residential areas, which are over more than several hundred meters from the site.

- *Toxicity* – Toxic substances have been proposed to be stored at the site; hence, toxicity has been assessed.

- *Property Damage and Accident Propagation* - It is noted in HIPAP No. 4 (Ref. [1]) that a criterion is provided for the maximum permissible heat radiation/explosion overpressure at the site boundary (23 kW/m^2/14 kPa) above which the risk of property damage and accident propagation to neighbouring sites must be assessed. Hence, to assist in screening those incidents that do not pose a significant risk to incident propagation, for this study, incidents that result in a heat radiation heat radiation less than 23 kW/m^2 and explosion over pressure less than 14 kPa, at the site boundary, are screened from further assessment. Those incidents

exceeding 23 kW/m^2 at the site boundary are carried forward for further assessment with respect to incident propagation (i.e. frequency and risk).

- *Societal Risk* – HIPAP No. 4 (Ref. [1]) discusses the application of societal risk to populations surrounding the proposed potentially hazardous facility. It is noted that HIPAP No. 4 indicates that where a development proposal involves a significant intensification of population, in the vicinity of such a facility, the change in societal risk needs to be taken into account. In the case of the facility, there is currently no significant intensification of population around the proposed site. The adjacent land uses are zoned heavy industrial; hence, there will be no residential housing located in proximity of the site; therefore, societal risk has not been considered in the assessment.

4.2 Properties of Dangerous Goods

The type of DGs and quantities stored and used at the site has been described in **Section 3**. **Table 4-1** provides a description of the DGs proposed to be stored and handled at the site, including the Class and the hazardous material properties of the DG Class.

Table 4-1: Properties* of the Dangerous Goods and Materials Stored at the Site

Class	Hazardous Properties
2.1 – Flammable Gas	Class 2.1 includes flammable gases which are ignitable when in a mixture of 13 per cent or less by volume with air or have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Ignited gas may result in explosion or flash fire. Where gas released under pressure from a hole in a pressurised component is ignited, a jet fire may occur.
2.2 – Non-Flammable, Non-Toxic Gas	Class 2.2 includes non-flammable and non-toxic gases which are asphyxiant (dilute or replace the oxygen normally in the atmosphere).
3 – Flammable Liquids	Class 3 includes flammable liquids which are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers, etc.) which give off a flammable vapour at temperatures of not more than 60^{o}C closed-cup test or not more than 65.6^{o}C open-cup test. Vapours released may mix with air and if ignited, at the right concentration, will burn resulting in pool fires at the liquid surface.
5.1 -Oxidising Agents	Class 5.1 materials will not combust but these materials include substances which can, in a fire event liberate oxygen, and could accelerate the burning of other combustible or flammable materials. Releases to the environment may cause damage to sensitive receptors within the environment.
6.1 – Toxic Substances	Substances liable either to cause death or serious injury or to harm human health if swallowed or inhaled or by skin contact.
8 – Corrosive Substances	Class 8 substances (corrosive substances) are substances which, by chemical action, could cause damage when in contact with living tissue (i.e. necrosis), or, in case of leakage, may materially damage, or even destroy, other goods which come into contact with the leaked corrosive material. Releases to the environment may cause damage to sensitive receptors within the environment.

* The Australian Code for the Transport of Dangerous Goods by Road and Rail (Ref. [8]).

4.3 Hazard Identification

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

- Flammable liquid or gas release, delayed ignition and flash fire or explosion.

- Flammable material spill, ignition and fire.
- Decanting release, ignition and flash fire or explosion.
- Decanting release, ignition and pool fire.
- Dangerous goods liquid spill, release and environmental incident.
- Entire building fire and radiant heat.
- Entire building fire and toxic smoke emission.
- Warehouse fire, sprinkler activation and potentially contaminated water release.
- Neutralisation reaction, exothermic reaction, and escalation.
- Neutralisation reaction, toxic fumes / vapours, and dispersion.

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

4.4 Flammable Liquid or Gas Release, Delayed Ignition and Flash Fire or Explosion

As noted in **Section 3.0**, it is proposed that flammable liquids will be held at the site for storage and aggregation. During storage, there is the potential that a flammable liquid spill could occur due to an accident (packages dropped from forklift, punctured by forklift tynes) or deterioration of packaging. If a flammable liquid spill occurred, the liquid may begin to evaporate (depending on the material flashpoint and ambient temperature). Where materials do evaporate, there is a potential for accumulation of vapours, forming a vapour cloud above the spill.

If the spill is not identified, the cloud may continue to accumulate, eventually contacting an ignition source. If the cloud is confined (i.e. block stacked IBCs and stored products) the vapour cloud may explode if ignited, or, if it is unconfined, it may result in a flash fire which would burn back to the flammable liquid spill, resulting in a pool fire.

A similar scenario could occur with the release of flammable gases (predominantly Liquefied Petroleum Gas (LPG) from aerosols); however, the formation of a gas cloud would occur immediately as the flammable gas would instantly flash to gas following release from the canister.

It is proposed that the store will contain waste storage ranging up to Intermediate Bulk Containers (IBCs; typically up to 1,000L); hence, the release of flammable liquid could result in a substantial spill which could generate sufficient vapour to form a vapour cloud.

The store will be mechanically ventilated at low level in accordance with AS 1940:2017 (Ref. [3]) which will capture any vapours and extract for discharge external to the facility. Therefore, the potential for accumulation of gases or vapours to the LEL is considered unlikely to occur.

For ignition to occur, a suitable ignition source must be present at the same time that a flammable atmosphere occurs. The area will be subject to hazardous area classification in accordance with AS/NZS 60079.10.1:2022 (Ref. [9]) with electrical equipment operating within the zone installed in accordance with AS/NZS 60079.14:2022 (Ref. [10]); therefore, the potential for ignition to occur is low.

For an explosion to occur, stagnant air would be required along with an ignition source; however, the area also requires sufficient confinement. By virtue of the natural and active ventilation design, the store is relatively open; hence, there would be insufficient confinement for the incident to result

in an explosion. Therefore, it is considered that an explosion is not a credible outcome; however, such an incident could result in a flash fire.

The same conditions would be required for a flash fire to occur; however, for the flash fire to impact offsite, it must be dispersed downwind which would not occur in the scenario where the ventilation is stagnant (i.e. downwind dispersion would result in air movement through the store preventing accumulation to above the flammable limit). Therefore, it is considered that a flash fire impacting over the site boundary is unlikely to occur.

As the potential for offsite impacts are not considered to be likely outcomes, this incident has not been carried forward for further analysis.

4.5 Flammable Material Spill, Ignition and Fire

As noted in **Section 4.4**, there is the potential for loss of containment to occur of a flammable material (gas or liquid) which could ignite. In the event that ignition does occur, the fire would propagate throughout the store resulting in a full bunker fire. The existing bunker is designed in accordance with AS 1940:2017 (Ref. [3]) which includes walls with an FRL of 240/240/240 separating the bunker from the rest of the building; hence, propagation outside of the bunker is not expected to occur (i.e. fire would not impact on remaining areas within which other DG and non-DG wastes are being stored and handled). In addition, the fire wall runs along the boundary side of the store prevent incident propagation across the site boundary. The walls fully enclose the storage on all sides and the store includes an FRL 180/180/180 roof as required by AS 1940:2017.

Regardless of whether the fire initiates in the flammable gas or liquid side of the store, as these areas are only separated by a chain mesh fence, it is expected that propagation between the stores will occur resulting in a substantially sized fire.

As the store contains a fire wall at the boundary side the potential for offsite impact is considered negligible and propagation outside of the store into the main building is also not considered credible due to the presence of the fire wall. A review of other areas around the storage indicates that there are no processes or storage where radiant heat from a fire would impact to enable incident propagation internally within the site. As the potential for offsite radiant heat impacts is prevented due to the fire compartmentation, this incident has not been carried forward for further analysis. Furthermore, as there isn't any potential for incident propagation within the site due to the fire compartmentation and / or lack of processes or storages within the vicinity of the non-fire rated portions of the store, this incident has not been carried forward for further analysis.

4.6 Decanting Release, Ignition and Flash Fire or Explosion

Flammable liquids will be decanted from small containers received at the site into IBCs. While decanting, there is the potential for vapours to be displaced from the IBCs and also arising from the small containers themselves. In addition, there is the potential for a loss of containment of a flammable liquid which could result in an evaporating pool which could ignite resulting in a vapours which could ignite, resulting in a flash fire or explosion.

A review of the design indicates the area will have dedicated mechanical ventilation extracting away from the decanting area capturing vapours and discharging them externally. Therefore, the potential for accumulation of vapours would be negligible. In the event of a spill, a trained operator is present and is able to clean up the spill noting that while this occurs the ventilation will remain active preventing accumulation of vapours.

Based upon the protection systems in place for the decanting area, the potential for vapour accumulation is considered negligible. In addition, the volume of vapour produced would be unlikely to result in a sufficient atmosphere to ignite and/or explode based upon the lack of confinement in the area and a vapour barrier exists between the decanting area and the site boundary which would prevent the potential for a flash fire to impact off site.

As the potential for vapour accumulation and offsite impacts to occur are considered negligible, this incident has not been carried forward for further analysis.

4.7 Decanting Release, Ignition and Pool Fire

As noted in **Section 4.6,** there is the potential for a flammable liquid spill to occur while decanting liquids within the building. In the event such a spill is ignited it would result in a pool fire that would emit radiant heat which could impact offsite. As small containers (i.e. 20 L) are being decanted into IBCs the volume of liquid that could potentially be spilled would only result in a small pool.

The area is mechanically ventilated which would prevent the accumulation of vapours while the spill is cleaned up. Further, the area will be subject to hazardous area classification in accordance with AS/NZS 60079.10.1:2022 (Ref. [9]) with electrical equipment operating within the zone installed in accordance with AS/NZS 60079.14:2022 (Ref. [10]); therefore, the potential for ignition to occur is low.

Based upon the small spill size and the other protections in place, the potential for a fire to occur that would result in sufficient radiant heat to impact over the site boundary is considered negligible. Therefore, this incident has not been carried forward for further analysis.

4.8 Dangerous Goods Liquid Spill, Release and Environmental Incident

There is potential that a spill of the liquid DGs (Class 3, 5.1, 6.1, and 8) could occur at the site which, if not contained, could be released into the public water course resulting in a potential environmental incident.

To prevent spills escaping from the site the dedicated DG storages will be bunded in accordance with the applicable standards to contain spills within the local area of the spill. In addition, the site has a stormwater containment and detention area which captures site runoff allowing it to be tested and treated as necessary. No environmental discharges occur from this containment system (flows are detained for Trade Waste discharge).

Based upon the proposed design and existing site protections, it is considered that the potential for an offsite environmental release is not considered credible; hence, this incident has not been carried forward for further analysis.

4.9 Entire Building Fire and Radiant Heat

As flammable materials are stored and handled at the site, there exists a greater potential for fire to occur. In the event a fire occurs, it could propagate throughout the building resulting in an entire building fire.

The flammable wastes are proposed to be located in a dedicated bunker which will be designed in accordance with AS 1940:2017 (Ref. [3]) which consists of walls having an FRL of 240/240/240 which separates this storage area from the rest of the building and full encloses the DG store and has an FRL 180/180/180 ceiling. Therefore, in the event of a fire, it would be expected that the fire

would be contained within this bunker and be unable to impact the storages in the rest of the building.

Therefore, it is considered that incident propagation beyond the immediate flammable storage area is unlikely to occur; hence, an entire building fire has not been carried forward for further analysis.

4.10 Entire Building Fire and Toxic Smoke Emission

As discussed in **Section 4.9**, the potential for an entire building fire to occur is not considered a credible scenario given the containment and isolation of the flammable materials within the warehouse. Therefore, if an entire building fire cannot occur, the associated toxic smoke generated from the fire would also not occur. Accordingly, this incident has not been carried forward for further analysis.

4.11 Warehouse Fire, Sprinkler Activation and Potentially Contaminated Water Release

In the event of a fire, the SMSS will activate, discharging water to control and suppress the fire. Contact of the fire water with DGs may result in contamination which, if released to the local watercourse, could result in environmental damage. The SMSS system delivers substantial volumes of water which, if operated for a long period, may result in overflow of site bunding and potential release. The facility has been designed to be able to contain all DG spills and liquid effluent resulting from the management of an incident (i.e. fire) within the premises.

The site will hold 60 minutes of water storage on site as required by FM Global standards; hence, to allow for additional conservatism, following a risk assessment methodology as outlined by the Department of Planning document "*Best Practice Guidelines for Potentially Contaminated Water Retention and Treatment Systems"* (Ref. [11]), an allowance of 90 minutes of potentially contaminated water has been selected noting this includes all sources of application (i.e. onsite storage and towns mains) thus far exceeding the 60 minute on site storage.

To ensure sufficient contaminated water can be contained the following recommendations have been made:

- The warehouse and/or site boundaries shall be capable of containing 90 minutes of sprinkler discharge (i.e. ceiling mounted, in-racks, and drenchers where required) in addition to 90 minutes of hydrant hose discharge assuming three (3) hydrants are operating.
- The civil engineers designing the site containment shall demonstrate the design is capable of containing the required water volume.

Should the above recommendations be adopted, the likelihood for potentially contaminated water to be discharged from the site is considered low; hence, this incident has not been carried forward for further analysis.

4.12 Neutralisation Reaction, Exothermic Reaction, and Escalation

A reactor will be used to neutralise product as part of proposed waste treatment activities within the facility. As chemicals will be mixed, there is the potential for incorrect mixing of chemicals to occur (i.e. high pH with low pH) which could result in an exothermic reaction.

A review of the process indicates that chemicals will be tested prior to mixing to understand the pH of the chemicals prior to addition into the reactor. The reactor will dose the chemicals into the reactor via a controlled and automated system, which will monitor the pH and add acid or base accordingly to minimise the potential for a strong incompatible reaction to occur.

In the event the system fails, the reaction could result in rapid boiling of the liquid which could boil over resulting in discharge of hot product into the vicinity. The reactor is located within the fully-bunded building; hence, any boil-over or loss of containment would be contained within the building itself and would therefore not be able to impact offsite.

As no offsite impact would be expected to occur from this area, this incident has not been carried forward for further analysis.

4.13 Neutralisation Reaction, Toxic Fumes / Vapours, and Dispersion

Neutralisation of acids and bases will occur at the site which reacts these wastes together such that the pH is balanced to a neutral level. Due to the sources of waste, there is the potential for variability / mislabelling, etc. of wastes to occur which may result in reactions that result in by-products that could be toxic or harmful if released.

The facility will be equipped with an extraction system to handle with vapours produced from the reaction; however, to ensure that any harmful products are removed prior to the extracted air being released from the stack and dispersed into the atmosphere the following recommendation has been made:

- The air extracted from the neutralisation segment of the site shall be passed through a scrubber to remove any harmful fumes or vapours that are produced during the reaction.

Based on the inclusion of a scrubber, it would be expected that any harmful products would be removed from the air stream prior to discharge such that any residual components would be adequately dispersed before the air settles to ground level. Therefore, the potential for an offsite release from any vapours / fumes produced during the reaction are considered negligible; hence, this incident has not been carried forward for further analysis.

5.0 Conclusion and Recommendations

5.1 Conclusions

A hazard identification table was developed for the Project to identify potential hazards that may be present at the site as a result of proposed operations or storage of materials. Based on the identified hazards, scenarios were postulated that may result in an incident with a potential for offsite impacts. Postulated scenarios were discussed qualitatively and any scenarios that would not impact offsite were eliminated from further assessment.

Due to the commodities proposed to be stored and the protection systems incorporated as part of the design, the potential for offsite impact is mitigated. Hence, the potential for injury or fatality beyond the site boundary would be unlikely and the risk at the site would subsequently be below the acceptable criteria published in HIPAP No. 4 (Ref. [1]).

Based on the analysis conducted, it is concluded that the risks at the site boundary are not considered to exceed the acceptable risk criteria; hence, the facility would continue to be classified as potentially hazardous and would be permitted within the current land zoning for the site.

5.2 Recommendations

Based on the analysis the following recommendations have been made:

- The air extracted from the neutralisation segment of the site shall be passed through a scrubber to remove any harmful fumes or vapours that are produced during the reaction.
- The warehouse and/or site boundaries shall be capable of containing 90 minutes of sprinkler discharge (i.e. ceiling mounted, in-racks, and drenchers where required) in addition to 90 minutes of hydrant hose discharge assuming three (3) hydrants are operating.
- The civil engineers designing the site containment shall demonstrate the design is capable of containing the required water volume.

6.0 References

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

[2] Department of Planning, “Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis,” Department of Planning, Sydney, 2011.

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

[4] AS 1940:2017, “The storage and handling of flammable and combustible liquids”.

[5] AS/NZS 60079.14:2022, “Explosive atmospheres, Part 14: Design selection, erection and initial inspection”.

[6] NSW EPA, “Immobilisation Technical Note - Process Equipment for Treatment of Contaminated Soil and Sludge Waste.,” 2017.

[7] NSW EPA, “Waste Classification Guidelines,” 2014.

[8] Road Safety Council, The Australian Code for the Transport of Dangerous Goods by Road and Rail Edition 7.7, Canberra: Road Safety Council, 2020.

[9] Standards Australia, AS/NZS 60079.10.1:2022 - Explosive Atmospheres Part 10.1: Classification of Areas, Explosive Gas Atmospheres, Sydney: Standards Association of Australia, 2022.

[10] Standards Australia, AS/NZS 60079.14:2022 - Explosive Atmospheres Part 14: Electrical Installations, Design, Selection and Erection, Sydney: Standards Australia, 2022.

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

[12] Standards Australia, “AS 2118.1:2017 - Automatic Fire Sprinkler Systems General Systems,” Standards Australia, Sydney, 2017.

[13] Environmental Protection Authority, “Waste Classification Guidelines Part 1: Classifying Waste,” Environmental Protection Authority, Sydney, 2014.

[14] Environmental Protection Authority, “Waste Classification Guidelines Part 2: Immobilisation of Waste,” Environmental Protection Authority, Sydney, 2014.

Appendix A

Hazard Identification Table

A1. Hazard Identification Table

ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
1	RWP building storage areas (Former Aldex)	• Dropped IBC • Punctured IBC with forklift tynes	• Release of Class 3, 5.1, 6.1, 8 to the environment	• Inspection of packages upon delivery to the site. • Trained forklift operators (including spill response training). • Bunded storage areas prevent release from immediate vicinity. • Site stormwater containment system. • Storage of DGs compliant with applicable standards.
2			• Spill of flammable liquids, evolution of flammable vapour cloud ignition and vapour cloud explosion/flash fire • Spill of flammable liquids, ignition and pool fire/racking fire	• Inspection of packages upon delivery to the site • Hazardous area classification in accordance with AS/NZS 60079.10.1:2022 (Ref. [9]). • Control of ignition sources according to AS/NZS 60079.14:2022 (Ref. [10]) • Automatic fire protection system (in-rack and SMSS per AS 2118.1:2017 (Ref. [12])) • First attack fire-fighting equipment (e.g. hose reels & extinguishers) • Fire detection systems • Ventilated storage area • Storage of DGs compliant with applicable standards. • Fully enclosed bunker with FRL 240/240/240 walls providing fire separation from the main building. • FRL 180/180/180 ceiling.

ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
3		• Class 2.1 packages (i.e. aerosols)	• Release of flammable gas, ignition and vapour cloud explosion/flash fire • Rupture, ignition and explosion/rocketing of aerosol cans and fire	• Inspection of packages upon delivery to the site • Hazardous area classification in accordance with AS/NZS 60079.10.1:2022 (Ref. [9]). • Control of ignition sources according to AS/NZS 60079.14:2022 (Ref. [10]) • Automatic fire protection system (in-rack and SMSS per AS 2118.1:2017 (Ref. [12])) • First attack fire-fighting equipment (e.g. hose reels & extinguishers) • Fire detection systems • Ventilated storage area • Storage of DGs compliant with applicable standards. • Caged area • Waste acceptance procedures / and refusal of damaged cylinders. • Fully enclosed bunker with FRL 240/240/240 walls providing fire separation from the main building. • FRL 180/180/180 ceiling.
4	Sprinkler activation	• Fire activates SMSS resulting in fire water release and potential contaminated fire water offsite	• Environmental impact to surrounding areas (e.g. stormwater drainage)	• All storage areas within the RWP Building to be bunded for spill and primary fire water containment • Maintain detention pond at low-level at all times to optimise secondary containment volume

ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
				• Site drainage to comply with the Best Practice Guide for Potentially Contaminated Water Retention and Treatment Systems (Ref. [11])
5	Pallet Loading/Unloading	• Dropped containers from the pallet • Impact damage to containers on the pallet (collision with racks or other forklifts)	• Spill of flammable liquids, evolution of flammable vapour cloud ignition pool, fire under the pallet • Full pallet fire as a result of fire growth	• Trained & licensed forklift drivers • Spill response implementation • Control of ignition sources according to AS/NZS 60079.14:2022 (Ref. [10]) • First attack fire-fighting equipment (hose reels & extinguishers) • SMSS if incident occurs internally • No potential for fire growth beyond the single pallet
6	Decanting	• Transfer of flammable liquids from small containers into larger IBCs	• Spill of flammable liquids, evolution of flammable vapour cloud ignition and vapour cloud explosion/flash fire • Spill of flammable liquids, ignition and pool fire	• Hazardous area classification in accordance with AS/NZS 60079.10.1:2022 (Ref. [9]). • Control of ignition sources according to AS/NZS 60079.14:2022 (Ref. [10]) • Automatic fire protection system (in-rack and SMSS per AS 2118.1:2017 (Ref. [12])) • First attack fire-fighting equipment (e.g. hose reels & extinguishers) • Fire detection systems • Ventilated storage area • Storage of DGs compliant with applicable standards. • Static earthing • Trainer operators

ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
				• Fully enclosed bunker with FRL 240/240/240 walls providing fire separation from the main building. • FRL 180/180/180 ceiling.
7	Neutralisation Tank	• Mixing of acids, bases, etc.	• Potential for incompatible mixing resulting in exothermic reaction	• pH testing of substances • Automated dosing to balance pH in a safe level • Emergency stop
8		• Formation of toxic vapours or fumes	• Dispersion and downwind impact	• Extraction system to remove vapours • Recommendation to include a scrubber to remove vapours / fumes prior to discharge to atmosphere