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OUR REF: 6182
YOUR REF: 2404-40203 SRA

20 November 2024

The Chief Executive Officer
Gold Coast City Council
PO Box 5042
GOLD COAST MC 9729

Via email: mail@goldcoast.qld.gov.au

Dear Sir / Madam,

RE: NOTICE OF MINOR CHANGE TO AFFECTED ENTITY – COUNCIL OF CITY OF GOLD COAST
AT: 24 HOMESTEAD DRIVE, STAPYLTON QLD 4207 – LOT 122 ON SP329476 (FORMALLY 60 STAPYLTON JACOBS WELL ROAD, STAPYLTON QLD 4207, LOT 501 ON SP295994)

We act on behalf of the Applicant, FPI Queensland Pty Ltd, having recently lodged a Minor Change application to the Department of State Development, Manufacturing, Infrastructure and Planning (acting as the responsible entity) under s78 of the *Planning Act 2016* (the Act) for original concurrence agency response 2404-40203 SRA.

Under s80(1)(a) we are notifying you of this Minor Change as an Affected Entity.

If you have any further queries, please do not hesitate to contact the undersigned.

Yours faithfully,
GASSMAN DEVELOPMENT PERSPECTIVES

.....
FRASER GASSMAN
TOWN PLANNER

Cc: Department of State Development, Manufacturing and Infrastructure and Planning
SEQSouthPlanning@dsdmip.qld.gov.au

Enclosed: Attachment A – Request for Minor Change

Access Business Park
76 Business Street Yatala Q 4207
Phone (07) 3807 3333
Fax (07) 3287 5461

Web www.gassman.com.au
Email mail@gassman.com.au
Post PO Box 392 Beenleigh Q 4207
A.B.N 62 010 752 388

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OUR REF: 6182 - MC
YOUR REF: 2404-40203 SRA

20 November 2024

The Chief Executive Officer
Department of State Development, Manufacturing, Infrastructure and Planning
State Assessment and Referral Agency – SEQ South
PO Box 3290
SOUTHPORT QLD 4215

Dear Sir/Madam,

RE: REQUEST TO MAKE A MINOR CHANGE APPLICATION TO DEVELOPMENT PERMIT FOR MATERIAL CHANGE OF USE – HAZARDOUS CHEMICAL FACILITY

AT: 24 HOMESTEAD DRIVE, STAPYLTON QLD 4207 – LOT 122 ON SP329476 (FORMALLY 60 STAPYLTON JACOBS WELL ROAD, STAPYLTON QLD 4207, LOT 501 ON SP295994)

We act on behalf of the Applicant, FPI Queensland Pty Ltd, who seeks a request to make a minor change application under s78 of the *Planning Act 2016* (the Act) for the above-mentioned property.

We enclose the following:

- Forms. **Attachment A**;
- Consent, **Attachment B;**
- Current Approval Package 2404-40203 SRA**, Attachment C**; and
- Amended Preliminary Hazard Analysis, **Attachment D**.

As the application will be lodged electronically, the prescribed fee of **$1,817.00** (as per Schedule 15 of the *Planning Regulation 2017*) will be paid upon receipt of SARA's invoice.

Access Business Park
76 Business Street Yatala Q 4207
Phone (07) 3807 3333
Fax (07) 3287 5461

Web www.gassman.com.au
Email mail@gassman.com.au
Post PO Box 392 Beenleigh Q 4207
A.B.N 62 010 752 388

1.0 SITE DESCRIPTION

Table 1 - Site Summary	
Site Address	24 Homestead Drive, Stapylton QLD 4207 (Formally 60 Stapylton Jacobs Well Road, Stapylton QLD 4207)
Real Property Description	Lot 122 on SP329476 (formally Lot 501 on SP295994)
Total Site Area	2.09 ha
Current Site Use	Industry
Local Authority	Council of the City of Gold Coast
Zoning	Precinct B – General Impact Business and Industry

2.0 APPROVAL HISTORY

Table 2 below provides a targeted approval history relevant to the proposal minor change application.

Table 2 - Approval History	
Approval Reference	**Comment**
MCU201100650 Dated: 6 May 2013 Most recent minor change MIN/2023/64 (23 May 2023)	Overarching Preliminary Approval On 6 May 2013, Council approved a Preliminary Approval for making a Material Change of Use to override the Planning Scheme for industry uses. This Preliminary Approval includes an endorsed Place Code and Land Use Classification Plan and supports industrial land uses and industrial subdivision within the relevant industrial land use precincts. The original approval has been amended a number of times, with the most recent Minor Change (MIN/2023/64) approved on 23 May 2023. The subject site is wholly located within Precinct B – General Impact and Business Industry. A copy of the most recent version of the Preliminary Approval is included at Appendix C for Council's convenience.
COM/2023/162 Dated 4 December 2023	This is the original approval granted for the spec warehouse and ancillary office use over the subject site. Aswell as approval for the warehouse, the application included an aspect of Operational work for Change to ground level, seeking to create the level industrial pad.
COM/2024/125 Dated: 25 June 2024	COM/2024/125 saw an approval granted for a Infrastructure and Vehicle Access Work. This approval sought to modify the existing vehicular crossovers and any relevant infrastructure to allow for Heavy Duty Vehicle crossovers to be established. This included modification to existing footpaths, and altering existing the sewer manhole within the VXO to be trafficable Class D.
OTH/2024/20	OTH/2024/20

Dated: 14 August 2024 2404-40203 SRA Dated: 26 July 2024	On 14 August 2024, Council approved a change application for a change other than a minor change to COM/2023/162, seeking to provide the specifications for an end user of the warehouse use. This application included provisioning storage areas for Dangerous Goods within the warehouse, a change in use to include Low Impact Industry as well as a decrease to the GFA for the warehouse aspect, although the overall GFA did not change. 2404-40203 SRA The other change listed above also included a referral to the State Assessment and Referral Agency, for a Material Change of Use – Hazardous Chemical Facility. **This Minor change application seeks to change this concurrence agency response**
OPW/2024/734 Dated: 7 August 2024	This Operational Work approval granted the permit for Private landscape works associated with the spec warehouse development.

3.0 BACKGROUND

On 21 November 2023, Council approved a Material Change of Use for a Warehouse with ancillary office over the subject site (COM/2023/162). The Warehouse was intended to provide a storage and logistical hub for various goods. The approved Warehouse has a total Gross Floor Area (GFA) of 10,465m², which included a 10,005m² area for warehousing activities and 460m² office. Earthworks were also approved to ensure a level pad for the approved Warehouse.

The subsequent other change to this application sought to provide a 1,539m² Low impact industry use aspect within the warehouse for the storage of Dangerous goods. This change also resulted in a referral requirement to SARA for a Hazardous Chemical Facility use. The goods stored within the subject site are not for manufacturing purposes and consist solely of product ready for distribution commercially.

An extract of the approved site layout is provided in Figure 1 below. A copy of the stamped approved plans is provided within Appendix B.

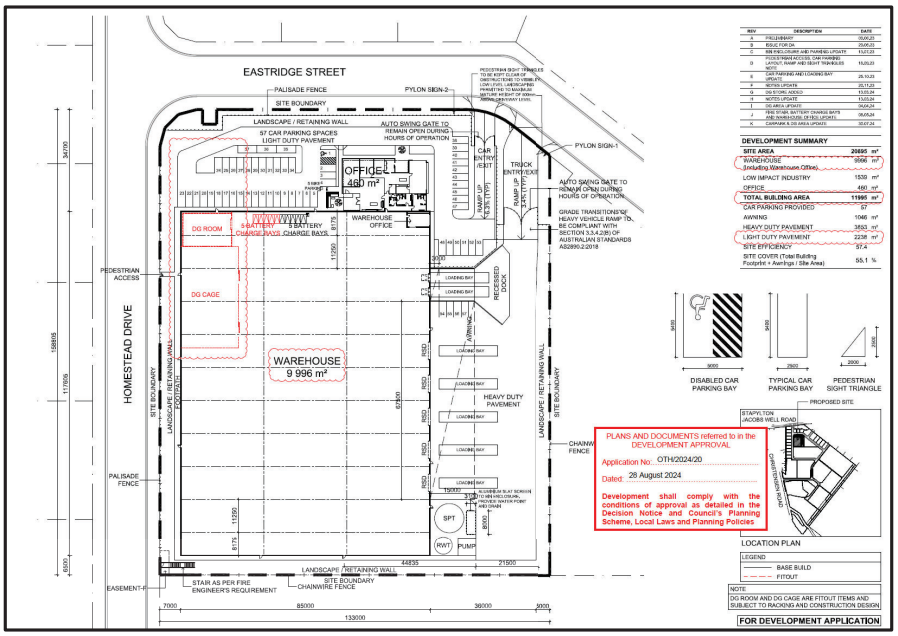


Figure 1: Approved Plans, OTH/2024/20 (GDP file, 2024)

4.0 CHANGES REQUESTED UNDER S.78 OF THE *PLANNING ACT 2016*

The changes related to this application are limited to the conditions prescribed for the use by the referral agency in their response for the MCU for a Hazardous Chemical Facility. The proposed changes are effectively operational in nature and do not require or result in any physical alterations to the approved use of the site.

The change proposed seeks to increase the individual container storage capacity of the dangerous goods within the site from 20L containers to 1,000L containers. The overall approved storage capacity of dangerous goods on the site is proposed to remain at 217,000L, regardless of the larger container size. This change reflects the user occasionally receiving larger 1,000L packages of the Dangerous

Good for storage and distribution. The use of the site will not be altered in any capacity outside of the larger container size presence.

Appropriate Hazard Assessment Analysis' have been undertaken inclusive of specific recommendations and management protocols to ensure the overall development maximises safety mitigation, and minimises potential risk and hazards as a result of the storage of the Dangerous Goods. A copy of the Amended Preliminary Hazard Analysis has been provided in **Attachment C.**

Based on the above changes, the Applicant proposes the conditions from the referral agency response (2404-40203 SRA) be amended as outlined below:

Table 3 Summary of Requested Condition Changes

Condition No.	Condition	Requested Change	Justification
General			
1	The total quantity of flammable liquid stored is limited to 217,000L in packages not exceeding 20L	Amend condition	Amend condition to reflect anticipated occasional 1,000L package receipt. Total quantity to remain.

4.1 Affected Entities

Under Section 80 of the Act, affected entities must be notified of minor changes if required. Under this section an affected entity is defined as:

> *if the assessment manager would be the responsible entity for the change application if it were made—a referral agency for the development approval other than the chief executive*

The original development application was referred for the following matters:

- Schedule 10, Part 7, Division 3, Table 1, Item 1 – Material change of use for a hazardous chemical facility (Planning Regulation 2017).

As the referral agency is the responsible entity for this change application, the assessment manager, in this instance being Gold Coast City Council, is considered an affected entity in this instance. As such, the Gold Coast City Council has been forwarded an Affected Entity letter notifying them of the proposed change.

5.0 *PLANNING ACT 2016* LEGISLATIVE AND STATUTORY CONSIDERATIONS

5.1 *PLANNING ACT 2016* – MINOR CHANGE ASSESSMENT PROVISIONS

To assist the determination of this minor change application, detailed assessment of the requested changes has been undertaken against the assessment provisions as outlined within section 81 of the Act in which the responsible.

The outcome of this assessment is as follows:

s.81(4) ***must assess against, or have regard to, the matters that applied when the development application was made; and***

Comment: The original development application was referred to SARA with assessment against State Code 21, which still applies.

s.81(5) ***may assess against, or have regard to, the matters that applied when the change application was made.***

Comment: State Code 21 is still the applicable assessment benchmark for a Hazardous Chemical Facility use as per the Planning Regulation 2017.

5.2 *PLANNING ACT 2016* SCHEDULE 2 (DICTIONARY)

Chapter 1 Section 6 of the Act provides the Definitions and meanings of particular words used throughout the Act, and refers specifically to the Dictionary in Schedule 2.

Schedule 2 provides the definition of 'minor change':

- (a) for a development application; and
- (b) for a development approval.

For this particular application request, a minor change 'for a development approval' is relevant.

The definition assists in providing a guideline to the compliance within meaning of minor change, and is presented in the below table.

Table 4 Minor Change	
(b) for a development approval-	**Comment/Compliance**
(i) would not result in substantially different development; and	**Complies** The proposal does not result in substantially different development, as indicated in Table 5 below. It is the same land use, within the same site area, in total, storing same quantities.

Table 4 Minor Change	
(b) for a development approval-	**Comment/Compliance**
	As such, the proposal is seen as generally consistent with the original approval.
(ii) if a development application for a development including the change, were made when the change application is made would not cause –	
(A) the inclusion of prohibited development in the development; or	**Complies** The proposed change would not result in prohibited development.
(B) referral to a referral agency, other than to the chief executive, if there were no referral agencies for the development application; or	**Complies** Referral was applicable to the original development application.
(C) referral to extra referral agencies, other than to the chief executive officer; or	**Complies** No extra referral agencies will be triggered for referral.
(D) a referral agency to assess the application against, or have regard to, matters prescribed by a regulation under section 55(2), other than matters the referral agency must have assessed the application against, or have had regard to, when the application was made; or	**Complies** No additional assessment matters are required to be assessed by a referral agency.
(E) public notification if public notification was not required for the development application.	**Complies** Public notification was not required for the original development application, nor will it be required because of the change.

Table 5 DA Rules Schedule 1 – Substantially different development	
A change may be considered to result in a substantially different development if the proposed change:	
Test	**Comment/Compliance**
(a) involves a new use; or	**Complies** Proposal does not involve a new use or additional impacts above what was originally approved.
(b) results in the application applying to a new parcel of land; or	**Complies** Whilst a new lot reference is applicable, the proposal is over the same parcel of land.
(c) dramatically changes the built form in terms of scale, bulk and appearance; or	**Complies** The proposal does not involve a dramatic change in built form in terms of scale, bulk and appearance.
(d) changes the ability of the proposed development to operate as intended; or	**Complies** The proposal does not change the ability of the land use to function or operate.
(e) removes a component that is integral to the operation of the development; or	**Complies** The proposal does not remove any integral component to the proposed development or operation of the development.
(f) significantly impacts on traffic flow and the transport network, such as increasing traffic to the site; or	**Complies** The proposed changes will not result in any alteration of traffic characteristics of the approved land use.
(g) introduces new impacts or increase the severity of known impacts; or	**Complies** The extent of the change will not introduce any new impacts, nor increase the severity of any known impacts.
(h) removes an incentive or offset component that would have balanced a negative impact of the development; or	**Complies** The proposal does not remove any incentive or offset component in relation to the proposed development.
(i) impacts on infrastructure provisions.	**Complies** The proposal does not involve a change that would impact on the provision of planned infrastructure.

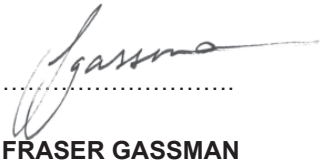
Given the above, we are of the position that the proposed changes generally comply with the relevant provisions under the Act.

6.0 CONCLUSION

Having consideration to the above compliance statement and attached information, it is considered that the proposed changes to the conditions of approval are relatively minor in nature and are consistent with those that are generally envisaged under s.78 of the Act.

If you require any further information or have any queries, please contact the undersigned.

Yours faithfully,
GASSMAN DEVELOPMENT PERSPECTIVES PTY LTD



.....

FRASER GASSMAN
TOWN PLANNER

Enclosed: Attachment A: Forms
Attachment B: Consent
Attachment C: Current Approval Package – 2404-40203 SRA
Attachment D: Amended Preliminary Hazard Analysis

ATTACHMENT A

FORMS

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Change application form

Planning Act Form 5 (version 1.2 effective 7 February 2020) made under Section 282 of the Planning Act 2016.

This form is to be used for a change application made under section 78 of the *Planning Act 2016*. It is important when making a change application to be aware of whether the application is for a minor change that will be assessed under section 81 of the *Planning Act 2016* or for an other change that will be assessed under section 82 of the *Planning Act 2016*.

An applicant must complete all parts of this form, and provide any supporting information that the form identifies as being required to accompany the change application, unless stated otherwise. Additional pages may be attached if there is insufficient space on the form to complete any part.

***Note**: All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).*

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	FPI Queensland Pty Ltd
Contact name *(only applicable for companies)*	c/- Gassman Development Perspectives
Postal address *(P.O. Box or street address)*	PO Box 392
Suburb	Beenleigh
State	QLD
Postcode	4207
Country	Australia
Email address *(non-mandatory)*	mail@gassman.com.au
Mobile number *(non-mandatory)*	
Applicant's reference number(s) *(if applicable)*	6182

2) Owner's consent - Is written consent of the owner required for this change application?
***Note**: Section 79(1A) of the Planning Act 2016 states the requirements in relation to owner's consent.*

☒ Yes – the written consent of the owner(s) is attached to this change application
☐ No

PART 2 – LOCATION DETAILS

3) Location of the premises *(complete 3.1) or 3.2), and 3.3) as applicable)*

3.1) Street address and lot on plan

☒ Street address **AND** lot on plan (*all lots must be listed*), ***or***
☐ Street address **AND** lot on plan for an adjoining or adjacent property of the premises *(appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).*

a)	Unit No.	Street No.	Street Name and Type	Suburb
		10	Homestead Drive	Stapylton
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
	4207	122	SP329476	Council of City of Gold Coast
b)	Unit No.	Street No.	Street Name and Type	Suburb
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)

3.2) Coordinates of premises *(appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)*

***Note**: Place each set of coordinates in a separate row.*

☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) *(if applicable)*
		☐ WGS84 ☐ GDA94 ☐ Other:	

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) *(if applicable)*
		☐ 54 ☐ 55 ☐ 56	☐ WGS84 ☐ GDA94 ☐ Other:	

3.3) Additional premises

☐ Additional premises are relevant to the original development approval and the details of these premises have been attached in a schedule to this application

☒ Not required

PART 3 – RESPONSIBLE ENTITY DETAILS

4) Identify the responsible entity that will be assessing this change application

***Note**: see section 78(3) of the Planning Act 2016*

Department of State Development, Manufacturing, Infrastructure and Planning (State Assessment and Referral Agency)

PART 4 – CHANGE DETAILS

5) Provide details of the existing development approval subject to this change application

Approval type	Reference number	Date issued	Assessment manager/approval entity
☒ Development permit ☐ Preliminary approval	2404-40203 SRA	26 July 2024	State Assessment and Referral Agency
☒ Development permit ☐ Preliminary approval	COM/2023/162	4 December 2023	Council of City of Gold Coast

6) Type of change proposed

6.1) Provide a brief description of the changes proposed to the development approval *(e.g. changing a development approval for a five unit apartment building to provide for a six unit apartment building)*:

Changing a development to allow for larger packages of Dangerous Goods to be accepted on site.

6.2) What type of change does this application propose?

☒ Minor change application – proceed to Part 5

☐ Other change application – proceed to Part 6

PART 5 – MINOR CHANGE APPLICATION REQUIREMENTS

7) Are there any affected entities for this change application

☐ No – proceed to Part 7
☒ Yes – list all affected entities below and proceed to Part 7

***Note**: section 80(1) of the Planning Act 2016 states that the person making the change application must give notice of the proposal and the details of the change to each affected entity as identified in section 80(2) of the Planning Act 2016.*

Affected entity	Pre-request response provided? (*where a pre-request response notice for the application has been given, a copy of the notice must accompany this change application)*	Date notice given *(where no pre-request response provided)*
Council of City of Gold Coast	☒ No ☐ Yes – pre-request response is attached to this change application	19 November 2024
	☐ No ☐ Yes – pre-request response is attached to this change application	
	☐ No ☐ Yes – pre-request response is attached to this change application	

PART 6 – OTHER CHANGE APPLICATION REQUIREMENTS

***Note**: To complete this part it will be necessary for you to complete parts of DA Form 1 – Development application details and in some instances parts of DA Form 2 – Building work details, as mentioned below. These forms are available at https://planning.dsdmip.qld.gov.au.*

8) Location details - Are there any additional premises included in this change application that were not part of the original development approval?

☐ No
☐ Yes

9) Development details

9.1) Is there any change to the type of development, approval type, or level of assessment in this change application?

☐ No
☐ Yes – the completed Sections 1 and 2 of Part 3 (Development details) of *DA Form 1 – Development application details* as these sections relate to the new or changed aspects of development are provided with this application.

9.2) Does the change application involve building work?

☐ No
☐ Yes – the completed Part 5 (Building work details) of *DA Form 2 – Building work details* as it relates to the change application is provided with this application.

10) Referral details – Does the change application require referral for any referral requirements?

***Note**: The application must be referred to each referral agency triggered by the change application as if the change application was the original development application including the proposed change.*

☐ No
☐ Yes – the completed Part 5 (Referral details) of *DA Form 1 – Development application details* as it relates to the change application is provided with this application. Where referral is required for matters relating to building work the Referral checklist for building work is also completed.

11) Information request under Part 3 of the DA Rules

☐ I agree to receive an information request if determined necessary for this change application
☐ I do not agree to accept an information request for this change application

***Note**: By not agreeing to accept an information request I, the applicant, acknowledge:*

- *that this change application will be assessed and decided based on the information provided when making this change application and the assessment manager and any referral agencies relevant to the change application are not obligated under the DA Rules to accept any additional information provided by the applicant for the change application unless agreed to by the relevant parties*
- *Part 3 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules.*

Further advice about information requests is contained in the DA Forms Guide: Forms 1 and 2.

12) Further details

☐ Part 7 of *DA Form 1 – Development application details* is completed as if the change application was a development application and is provided with this application.

PART 7 – CHECKLIST AND APPLICANT DECLARATION

13) Change application checklist

I have identified the: • responsible entity in 4); and • for a minor change, any affected entities; and • for an other change all relevant referral requirement(s) in 10) ***Note**: See the Planning Regulation 2017 for referral requirements*	☒ Yes
For an other change application, the relevant sections of *DA Form 1 – Development application details* have been completed and is attached to this application	☐ Yes ☒ Not applicable
For an other change application, where building work is associated with the change application, the relevant sections of *DA Form 2 – Building work details* have been completed and is attached to this application	☐ Yes ☒ Not applicable
Supporting information addressing any applicable assessment benchmarks is attached to this application ***Note**: This includes any templates provided under 23.6 and 23.7 of DA Form 1 – Development application details that are relevant as a result of the change application, a planning report and any technical reports required by the relevant categorising instrument(s) (e.g. the local government planning scheme, State Planning Policy, State Development Assessment Provisions). For further information, see DA Forms Guide: Planning report template.*	☒ Yes
Relevant plans of the development are attached to this development application ***Note**: Relevant plans are required to be submitted for all relevant aspects of this change application. For further information, see DA Forms Guide: Relevant plans.*	☒ Yes

14) Applicant declaration

☒ By making this change application, I declare that all information in this change application is true and correct.

☒ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the responsible entity and any relevant affected entity or referral agency for the change application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001*.

***Note**: It is unlawful to intentionally provide false or misleading information.*

Privacy – Personal information collected in this form will be used by the responsible entity and/or chosen assessment manager, any relevant affected entity or referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the change application.

All information relating to this change application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website.

Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where:

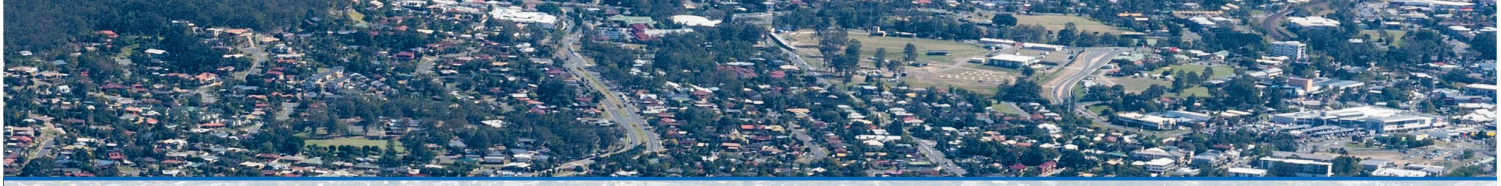
- such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or
- required by other legislation (including the *Right to Information Act 2009*); or
- otherwise required by law.

This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002*.

PART 8 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received: | Reference number(s):

QLeave notification and payment *Note: For completion by assessment manager if applicable*			
Description of the work			
QLeave project number			
Amount paid ($)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			



ATTACHMENT B

CONSENT

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Company owner's consent to the making of a development application under the *Planning Act 2016*

I, Samantha Wilson (Planning Manager) acting as Power of Attorney for the company mentioned below.

Australand Industrial No 89 Pty Limited (ACN: 107 355 715)

the company being the owner of the premises identified as follows:

Lot 122 on SP329476

consent to the making of a development application under the *Planning Act 2016* by:

FPI Queensland Pty Ltd and/or Gassman Development Perspectives

on the premises described above for:

Development applications required under the *Planning Act 2016*

Company Name and ACN: Australand Industrial No 89 Pty Limited (ACN: 107 355 715)

DocuSigned by:
Samantha Wilson
B02F7F40DD634B8...
Signature of Power of Attorney

18-Jul-2023
Date

ATTACHMENT C

CURRENT APPROVAL PACKAGE – 2404-40203 SRA

gassman development perspectives

Queensland Government

SARA reference: 2404-40203 SRA
Council reference: OTH/2024/20

26 July 2024

Chief Executive Officer
Gold Coast City Council
mail@goldcoast.qld.gov.au

Dear Sir/Madam

SARA response – 10 Homestead Drive, Stapylton

(Referral agency response given under section 56 of the *Planning Act 2016*)

The development application described below was confirmed as properly referred by the State Assessment and Referral Agency (SARA) on 30 April 2024.

Response

Outcome:	Referral agency response with conditions
Date of response:	26 July 2024
Conditions:	The conditions in **Attachment 1** must be attached to any development approval.
Advice:	Advice to the applicant is in **Attachment 2.**
Reasons:	The reasons for the referral agency response are in **Attachment 3**.

Development details

Description:	Request for a change application, other than a minor change, to a development approval pursuant to section 82 of the *Planning Act 2016*, to Development Permit for a Material change of use for Warehouse and Development Permit for Operational work for Change to ground level.
SARA role:	Referral Agency
SARA trigger:	Schedule 10, Part 7, Division 3, Table 1, Item 1 – Material change of use for a hazardous chemical facility (Planning Regulation 2017)
SARA reference:	2404-40203 SRA
Assessment Manager:	Gold Coast City Council
Street address:	10 Homestead Drive, Stapylton
Real property description:	Lot 122 on SP329476
Applicant name:	FPI Queensland Pty Ltd

South East Queensland (South) regional office
Level 9, 12-14 Marine Parade, Southport QLD 4215
PO Box 3290 Southport BC QLD 4215

Applicant contact details:	c/- Gassman Development Perspectives Pty Ltd mail@gassman.com.au
Human Rights Act 2019 considerations:	A consideration of the 23 fundamental human rights protected under the *Human Rights Act 2019* has been undertaken as part of this decision. It has been determined that this decision does not limit human rights.

Representations

An applicant may make representations to a concurrence agency, at any time before the application is decided, about changing a matter in the referral agency response (s. 30 Development Assessment Rules). Copies of the relevant provisions are in **Attachment 4**.

A copy of this response has been sent to the applicant for their information.

For further information please contact Elly Wong, Planning Officer on (07) 5644 3215 or via email SEQSouthPlanning@dsdilgp.qld.gov.au who will be pleased to assist.

Yours sincerely

Karley Lawler
Manager, Planning and Development Services (SEQ South)

cc FPI Queensland Pty Ltd c/- Gassman Development Perspectives Pty Ltd, mail@gassman.com.au

enc Attachment 1–Referral agency conditions
Attachment 2–Advice to the applicant
Attachment 3–Reasons for referral agency response
Attachment 4–Representations about a referral agency response provisions
Attachment 5–Documents referenced in conditions

Attachment 1—Referral agency conditions

(Under section 56(1)(b)(i) of the *Planning Act 2016* the following conditions must be attached to any development approval relating to this application) (Copies of the plans and specifications referenced below are found at Attachment 5)

No.	Conditions	Condition timing
Development Permit for Material change of use		
Schedule 10, Part 7, Division 3, Table 1, Item 1 (Planning Regulation 2017) — The chief executive administering the *Planning Act 2016* nominates the Director-General of the Department of Education to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following conditions:		
1.	The total quantity of flammable liquid stored is limited to 217,000L in packages not exceeding 20L.	Prior to the commencement of use and to be maintained at all times.
2.	The spillage capacity must be in accordance with the Proposed Dangerous Goods Strategy, prepared by HL Architects Pty Ltd, dated 19/06/2024, reference no. SK-01 and revision 2.	Prior to the commencement of use and to be maintained at all times.
3.	All building component joints required to contain spilled liquids (wall to floor, wall panel to wall panel, rollover bund to floor, rollover bund to wall) must be sealed with a fire and chemical resistant material.	Prior to the commencement of use and to be maintained at all times.
4.	Any drain valves that connect the spillage containment system to the stormwater system must be manually operable and accessible from outside of the spill containment area. The valves shall be clearly identifiable to emergency services by signage.	Prior to the commencement of use and to be maintained at all times.
5.	Any drain valves that connect the spillage containment system to the stormwater system must close automatically on activation of the fire alarm.	Prior to the commencement of use and to be maintained at all times.
6.	The emergency plan must clearly identify scenarios when the stormwater drain valves should be closed and the valves must be clearly identified on the emergency services manifest.	Prior to the commencement of use and to be maintained at all times.
7.	The emergency plan must clearly identify actions that should be taken to minimise the possibility of a fire in the flammable liquid bunker spreading to the main warehouse e.g., by stipulating that foam application *inside* the bunker should be stopped if the underground tanks are full.	Prior to the commencement of use and to be maintained at all times.
8.	The underground spillage tanks shall be fitted with clearly visible level indication.	Prior to the commencement of use and to be maintained at all times.
9.	If deemed safe and practical by the applicant's engineers, the	Prior to the

	underground spillage tanks should be fitted with a riser pipe overflow that causes liquid in the bottom of the tanks to overflow first.	commencement of use and to be maintained at all times.
10.	The underground tanks should be designed and constructed in accordance with AS1940:2017 *The storage and handling of flammable and combustible liquids.* Accordingly, the tank vents should be located away from potential ignition sources.	Prior to the commencement of use and to be maintained at all times.

Attachment 2—Advice to the applicant

General advice	
1.	Terms and phrases used in this document are defined in the *Planning Act 2016* its regulation or the State Development Assessment Provisions v3.0 (SDAP). If a word remains undefined it has its ordinary meaning.

Attachment 3—Reasons for referral agency response

(Given under section 56(7) of the *Planning Act 2016*)

The reasons for SARA's decision are:

The proposed development has been assessed against and complies with State code 21: Hazardous chemical facilities of the SDAP, with conditions. In particular:

- The proposed development is designed so as reasonably practicable to ensure human health and safety, and the built environment are protected from off-site risks resulting from physical or chemical hazards. The proposed development will be fitted with smoke detection that can detect a fire in its early stages and notify an emergency responder at all times.
- Storage and handling areas for packages of liquid hazardous chemicals are provided with a spill containment system with a working volume capacity that exceeds 100 percent of all packages within the area. Conditions are imposed to ensure the spill containment system is effective.

Material used in the assessment of the application:

- The development application material and submitted plans.
- *Planning Act 2016.*
- Planning Regulation 2017.
- SDAP, version 3.0, as published by SARA.
- Development Assessment Rules.
- SARA DA Mapping system.
- Section 58 of the *Human Rights Act 2019.*

Attachment 4—Representations about a referral agency response provisions

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Attachment 5—Documents referenced in conditions

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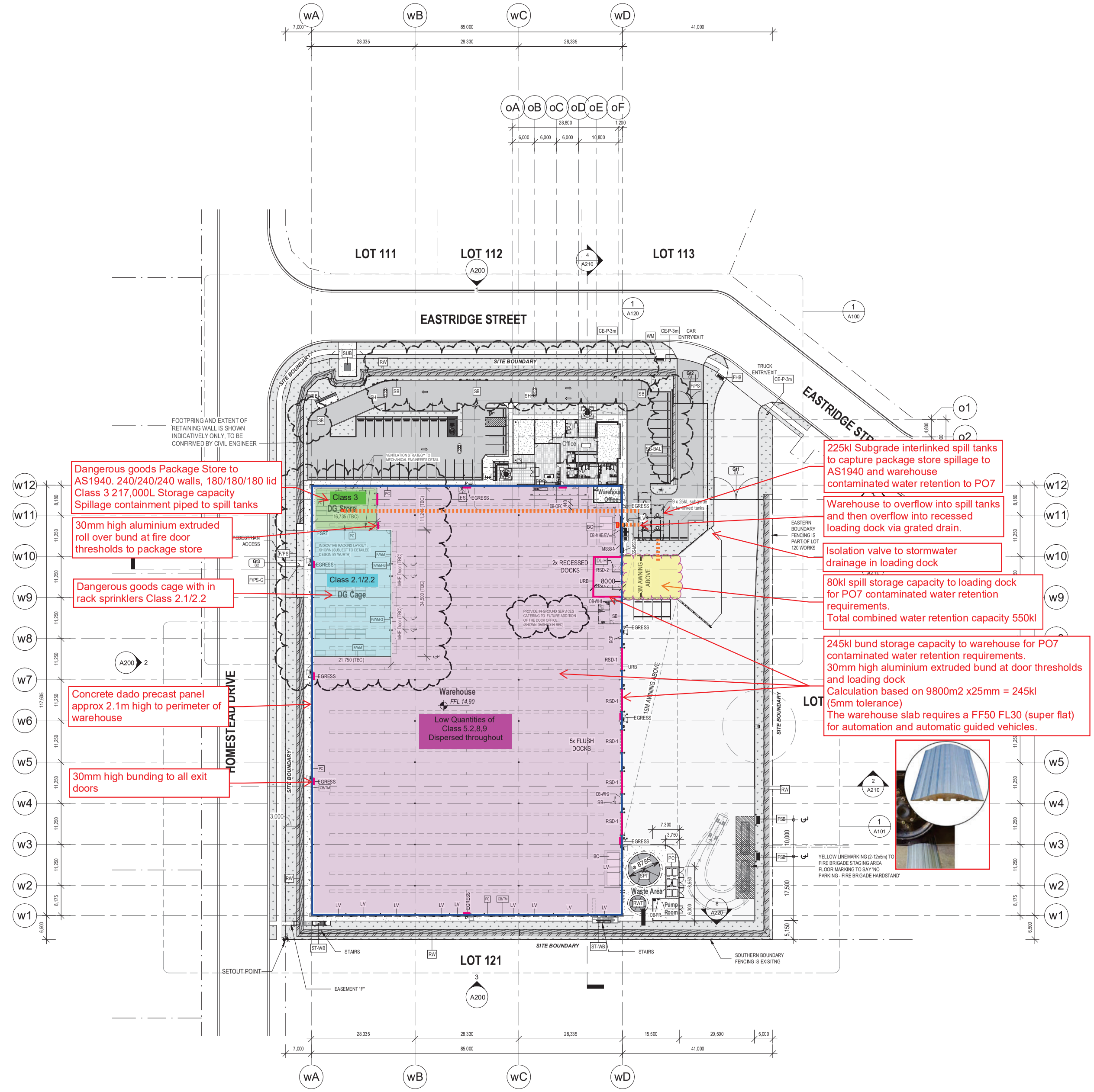

1 Site Plan (Overall)
A200 1 : 500 @B1

PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE

Queensland Government

SARA ref: 2404-40203 SRA

Date: 26 July 2024

DEVELOPMENT TABLE	
SITE AREA	20,895 sqm
WAREHOUSE (Inclusive of WH Amenities & Dock Office)	10,064 sqm
OFFICE GF	463 sqm
SPRINKLER PUMP ROOM	45 sqm
WASTE AREA	32 sqm
TOTAL BUILDING AREA	10,604 sqm
CAR PARKING PROVIDED	57 Spaces
15M AWNING	1,018 sqm
3M AWNING	35 sqm
HEAVY DUTY PAVEMENT	3,871 sqm
LIGHT DUTY PAVEMENT	2,225 sqm

NOTES ON METHOD OF AREA MEASUREMENT

1.This is a pre-completion as-designed area measurement survey only, and does not represent the final as-built conditions when the build is completed.
2. The 'Dominant Wall' of the warehouse is taken to be at the outside face of the wall girt / inside face of the Trimdek wall cladding.
3. The 'Dominant Wall' of the Main Office is taken to be at the outside face of the external solid aluminium panel & curtain wall.
4. Concurrence on the definition of 'Dominant Wall' as noted above must be obtained from the qualified surveyor conducting the as-built survey to ensure consistency in interpretating PCA Guidelines, PRIOR to commencing steel fabrication and construction.

Car Parking Schedule

Type	Description	Spaces
PK-CP1	PK-CP1_5.5 x 2.5m - 90 deg (Disable)	1
PK-CP2	PK-CP2_5.5 x 2.5m - 90 deg	38
PK-CP3	PK-CP3_6.6m x 2.2m Parallel	2
PK-CP4	PK-CP4_6.3m x 2.2m Parallel	1
PK-CP5	PK-CP5_5.5 x 2.5m - 90 deg Staff Parking	4
PK-CP EV	PK-CP_5.5 x 2.5m - EV Charging Bay	1
PK-CP FEV	PK-CP_5.5 x 2.5m - 90 deg Future EV	10
Grand total		57

General Legend

All drawings must be read in conjunction with Architectural Specifications Document No. 231212-CC-A600- Architectural D&C Specifications & Schedule of Finishes.

BC	Battery Charge Bay
CB	Steel framed wall with 0.42 BMT Colorbond cladding in Trimdek Profile. Colorbond finish as specified.
CB/TM	Steel framed wall with 0.42 BMT Colorbond cladding in Trimdek Profile. Colorbond finish as specified. Toe of wall cladding to incorporate ventilated toe mould details at concrete dado wall junction to mechanical engineer's requirements.
CE-P-3m	3.0m high x 0.9m wide pylon signage in accordance with FPI Signage Guidelines
DL-H	Standard pit mounted dock levellers equivalent to Rite Hite Genisys HL700 or approved equivalent installed in accordance with manufacturers requirements. Include steel angle surrounds and rubber bumpers. Dock leveller to interface with roller shutter door.
EGRESS	Egress door.
ES	Emergency Shower & Eyewash
F/PS	Black powdercoated 'Palisade' style fencing 2,100mm high.
F/PS-G	Black powdercoated 'Palisade' style security gates. Gap below gate to NOT exceed 100mm. Height to match adjacent fence.
F/WM	Wire Mesh for storage cage as specified. Galvanised finish.
F/WM-G	
FHB	Fire Hydrant Booster
FSB	Fire Sprinkler Booster
FSRT	Fire Sprinkler Remote Test Point. Provide drainage pit where required by hydraulic and fire services engineers.
LV	2-stage ventilation louvres sizes as shown. Min. 55% free area. Louvre assembly to be weatherproof and vermin-proof with dust filter.
MSB	Main Switch Board to electrical engineer's details.
PC	Precast concrete wall panel with sealed joints to engineer's details. paint finish as specified
RSD-1	Roller Shutter Door (Flush Docks) (6.0m W x 5.5m H) attached to steel PFC perimeter door trim. Motorised with manual chain override and wind lock. Finish as specified.
RSD-2	Roller Shutter Door (Recessed Docks) (2.7m W x 3.3m H). Motorised with manual chain override and wind lock. Finish as specified .
RW	Retaining wall to engineer's details.
RWT	Rainwater to engineer's details.
SB	Safety barrier to be Armco steel guardrail or equivalent approved. Stubby nose wrapped around ends. Painted safety yellow.
SB-BAL	Safety barrier to be Armco steel guardrail or equivalent approved with galvanised handrail/balustrade above to an overall height of 1200mm a.ffl. Stubby nose wrapped around armco ends. Painted safety yellow.
SH	Speed Hump to be min.900mm wide and max.75mm high, UV-rated & anti-slip rubber with embedded black & yellow strips.
SPT	Sprinkler Tank to fire engineer's details.
ST-WB	Galvanised steel stairs with serrated steel grating treads equivalent to Webforge Pattern 'C', open risers & grating landing to engineer's details. Provide nosing strip with contrasting colours to AS requirement.
SUB	Substation to electrical engineer's details.
URB	25mm Urethane floor bunding
WM	Water meter

- ALL LEVELS AREA INDICATIVE AND SHOULD BE READ IN CONJUNCTION WITH CIVIL ENGINEER'S DRAWINGS FOR FINAL LEVELS OF ALL EARTHWORKS.
- ALL LEVELS SHOWN TO BE ±1000mm

CUSTOMER: WÜRTH

DEVELOPER: FRASERS PROPERTY
FRASERS PROPERTY GROUP QUEENSLAND
Greenhouse, West Village
Level 8, 97 Boundary St
West End, QLD 4101
Tel: 07 3249 7400

BUILDER: mcnab relationship builders

PROJECT: WURTH INDUSTRIAL FACILITY
ADDRESS: LOT 122 VANTAGE YATALA EASTRIDGE STREET STAPYLTON, QUEENSLAND
PROJECT NUMBER: 231212

Rev	Description	Date
P5	Prop column grid adjusted as per KD Engineer's design info. Warehouse cladding colour to match design brief. Aerial downpipe arrangement as per Hydraulic design info. Waste Room details added.	08.04.24
P6	Additional ventilation louvres added. DBs added. Office AC plant area nominated. Main Office overflow strategy updated, office roof access stairs changed to proprietary aluminium system.	10.05.24
P7	Fit-out to client's requirements. Office column setout added.	27.05.24
P8	DG Store & DG Cage area added.	28.05.24
P9	Curtain wall sill/slab edge details updated. Guardrails and wheelstops added. Dock Office front facade details deleted upon relocation to warehouse internal.	31.05.24

General Notes:-
Architectural drawings to be read in conjunction with all other consultants detailed drawings, specifications & reports.
Do not scale this drawing. Verify all dimensions on site.
Refer all discrepancies to HLA before commencing any work.

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SK-01 Rev.2
Proposed Dangerous Goods Strategy
19/06/2024

31/05/2024 5:48:37 PM Autodesk Docs://Lot 122 Spec Vantage/Lot 122 Spec Vantage Yatala.rvt

Development Assessment Rules—Representations about a referral agency response

The following provisions are those set out in sections 28 and 30 of the Development Assessment Rules[1] regarding **representations about a referral agency response**

Part 6: Changes to the application and referral agency responses

28 Concurrence agency changes its response or gives a late response

28.1. Despite part 2, a concurrence agency may, after its referral agency assessment period and any further period agreed ends, change its referral agency response or give a late referral agency response before the application is decided, subject to section 28.2 and 28.3.

28.2. A concurrence agency may change its referral agency response at any time before the application is decided if—

(a) the change is in response to a change which the assessment manager is satisfied is a change under section 26.1; or

(b) the Minister has given the concurrence agency a direction under section 99 of the Act; or

(c) the applicant has given written agreement to the change to the referral agency response.[2]

28.3. A concurrence agency may give a late referral agency response before the application is decided, if the applicant has given written agreement to the late referral agency response.

28.4. If a concurrence agency proposes to change its referral agency response under section 28.2(a), the concurrence agency must—

(a) give notice of its intention to change its referral agency response to the assessment manager and a copy to the applicant within 5 days of receiving notice of the change under section 25.1; and

(b) the concurrence agency has 10 days from the day of giving notice under paragraph (a), or a further period agreed between the applicant and the concurrence agency, to give an amended referral agency response to the assessment manager and a copy to the applicant.

---

1 Pursuant to Section 68 of the *Planning Act 2016*

2 In the instance an applicant has made representations to the concurrence agency under section 30, and the concurrence agency agrees to make the change included in the representations, section 28.2(c) is taken to have been satisfied.

Part 7: Miscellaneous

30 Representations about a referral agency response

30.1. An applicant may make representations to a concurrence agency at any time before the application is decided, about changing a matter in the referral agency response.[3]

[3] An applicant may elect, under section 32, to stop the assessment manager's decision period in which to take this action. If a concurrence agency wishes to amend their response in relation to representations made under this section, they must do so in accordance with section 28.

ATTACHMENT D

AMENDED PRELIMINARY HAZARD ANALYSIS

gassman development perspectives

Riskcon engineering

Preliminary Hazard Analysis

Lot 122, Vantage Estate, Stapylton

Wurth Australia Pty Ltd
Document No. RCE-24075_Wurth_PHA_Final_1Oct24_Rev(2)
Date: 1/10/2024

Preliminary Hazard Analysis

Lot 122, Vantage Estate, Stapylton

Wurth Australia Pty Ltd

Prepared by

Riskcon Engineering Pty Ltd
37 Pogson Drive
Cherrybrook NSW 2126
www.riskcon-eng.com
ABN 74 626 753 820

Quality Management

Rev	Date	Remarks	Prepared By	Reviewed By
A	24 March 2024	Draft issue for comment	Renton Parker	Steve Sylvester
0	5 April 2024	Issued final		
1	28 June 2024	Updates in response to SARA		
2	1 October 2024	Class 3 package size change		

Executive Summary

Background

Wurth Australia Pty Ltd (Wurth) has proposed to lease a new warehouse to house their distribution operations to be located at Lot 122 within the Vantage Estate at 60 Stapylton Jacobs Well Rd, Stapylton. The centre will store a range of goods including some materials classified as Dangerous Goods (DGs).

Based upon the quantities of materials classified as Dangerous Goods (DGs) stored and handled at the site, it is necessary to prepare a Preliminary Hazard Analysis (PHA) as part of the Development Application submission in accordance with State Code 21, specifically the Performance Outcomes PO1 to PO11 and the policy intent of State Code 21 (Ref. [1]).

Frasers Property (Frasers), on behalf of Wurth, has commissioned Riskcon Engineering Pty Ltd (Riskcon) to prepare a PHA for the facility in support of the Development Application. This document represents the PHA study for the Wurth Distribution Centre (DC) at Stapylton.

Conclusions

A hazard identification table was developed for warehouse facility to identify potential hazards that may be present at the site as a result of 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. Scenarios not eliminated were then carried forward for consequence analysis.

Incidents carried forward for consequence analysis were assessed in detail to estimate the impact distances. Impact distances were developed into scenario contours and overlaid onto the site layout diagram to determine if an offsite impact would occur. The consequence analysis showed that two of the scenarios (combustible liquids fire and full warehouse fire) would impact over the site boundary and into the adjacent land use; hence, these incidents was carried forward for frequency analysis and risk assessment.

The frequency analysis and risk assessment showed the cumulative risk at the site boundary in the worst location was 3.53 pmpy. State Code 21 (Ref. [1]) publishes acceptable risk criteria at the site boundary of 50 pmpy (for industrial sites). Therefore, the probability of a fatality from the warehouse fire at the site boundary is within the acceptable risk criteria.

In addition, incidents exceeding 12.6 kW/m^2 were reviewed which indicated there was a slight offsite impact on the southern and western boundaries; however, this was not expected to result in a dangerous dose to infrastructure.

Review of the estate proposal indicates this development is the only contributor to the risk profile; hence, cumulative risk is not a consideration at this stage. The cumulative risk at the site is therefore the reported 3.53 chances pmpy which is below the 50 chances pmpy limit. Therefore, the development of the warehouse does not increase the cumulative risk of the estate to an unacceptable level.

Recommendations

Notwithstanding the conclusions following the analysis of the facility, the following recommendations have been made:

- Multiple spill kits be provided around the DG storage areas to ensure spills can be cleaned up immediately following identification.
- Aerosols shall be stored in a dedicated storage area which prevents rocketing cans from escalating the incident (i.e. storage in an aerosol cage, separate storage area, or in palletised aerosol cages).
- The site shall be designed to contain any spills or contaminated water from a fire incident within the boundaries of the site.
- The site shall be capable of retaining 533,800 L of potentially contaminated water within the site boundaries.

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Abbreviations

Abbreviation	Description
ADG	Australian Dangerous Goods Code
AS	Australian Standard
CBD	Central Business District
DA	Development Application
DGs	Dangerous Goods
DSTO	Defence Science and Technology Organisation
HIPAP	Hazardous Industry Planning Advisory Paper
HSE	Health and Safety Executive
LPG	Liquefied Petroleum Gas
PHA	Preliminary Hazard Analysis
pmpy	Per million per year
SEP	Surface Emissive Power
SMSS	Storage Mode Sprinkler System

1.0 Introduction

1.1 Background

Wurth Australia Pty Ltd (Wurth) has proposed to lease a new warehouse to house their distribution operations to be located at Lot 122 within the Vantage Estate at 60 Stapylton Jacobs Well Rd, Stapylton. The centre will store a range of goods including some materials classified as Dangerous Goods (DGs).

Based upon the quantities of materials classified as Dangerous Goods (DGs) stored and handled at the site, it is necessary to prepare a Preliminary Hazard Analysis (PHA) as part of the Development Application submission in accordance with State Code 21, specifically the Performance Outcomes PO1 to PO11 and the policy intent of State Code 21 (Ref. [1]).

Frasers Property (Frasers), on behalf of Wurth, has commissioned Riskcon Engineering Pty Ltd (Riskcon) to prepare a PHA for the facility in support of the Development Application. This document represents the PHA study for the Wurth Distribution Centre (DC) at Stapylton.

1.2 Objectives

The objectives of the PHA project, for the proposed facility at the Vantage Estate, Stapylton 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 State Code 21 (Ref. [1]).
- Demonstrate compliance of the site with the relevant codes, standards and regulations (i.e. QLD Planning Regulation 2017, WHS Regulation, 2011 Ref. [2]).

1.3 Scope of Services

The scope of work is to complete a PHA study for the Wurth DC located Lot 122 the Vantage Estate in Stapylton, required by the Planning Regulations for the proposed development.

2.0 Methodology

2.1 Multi-Level Risk Assessment

The Multi-Level Risk Assessment approach (Ref. [3]), although 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**.

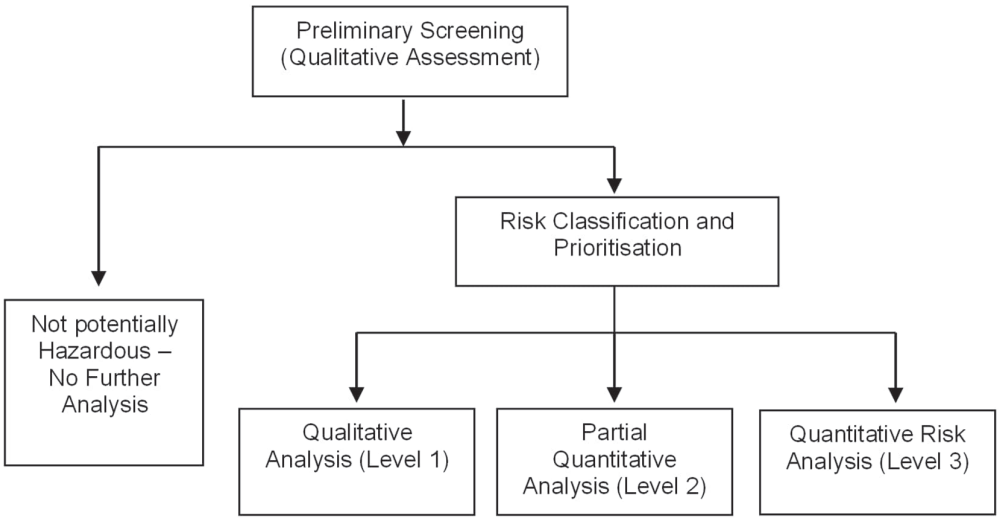

Figure 2-1: The Multi-Level Risk Assessment Approach

Based on the type of DGs to be used 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.

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 word diagram (**Appendix A**). The hazard identification word diagram lists incident type, causes, consequences and safeguards. This was performed using the word diagram format recommended in HIPAP No. 6 (Ref. [4]).

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. 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 State Code 21 (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 State Code 21 (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 Wurth / Frasers. A final report was then developed, incorporating the comments received by Wurth / Frasers, for submission to the regulatory authority.

3.0 Site Description

3.1 Site Location

The site is located at Vantage Estate, which is located at 60 Stapylton Jacobs Well Rd, Stapylton which is approximately 38 km south of the Brisbane Central Business District (CBD). **Figure 3-1** shows the regional location of the site in relation to the Brisbane CBD. Provided in **Figure 3-2** is the layout of the site.

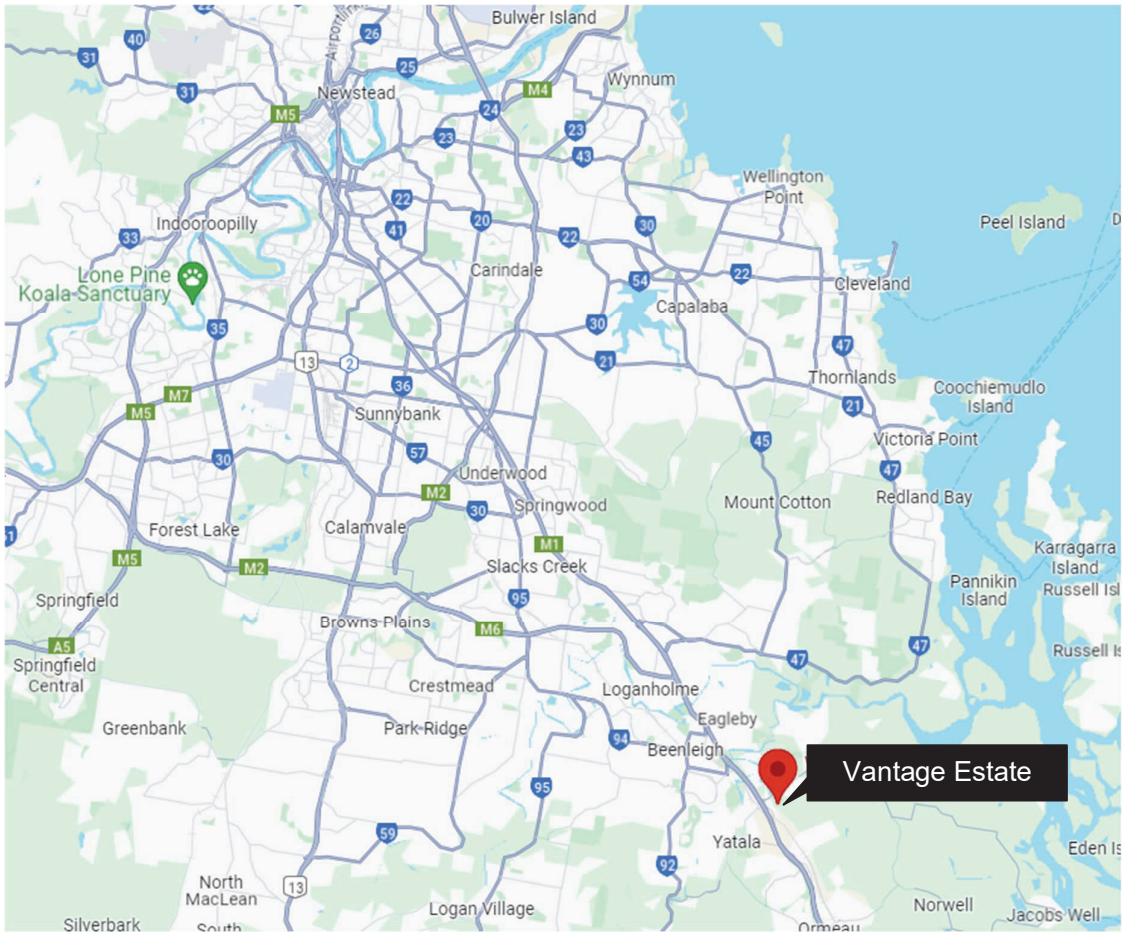

Figure 3-1: Site Location

3.2 Adjacent Land Uses

The land is located in an industrial area surrounded by the following land uses, which are adjacent to the site:

- North – Industrial
- South – Industrial
- East – Industrial
- West – Industrial

3.3 Quantities of Dangerous Goods Stored and Handled

The dangerous goods stored at the warehouse are for various customers and may fluctuate with customer requirements. The classes and quantities to be approved in the facility are summarised in **Table 3-1.** The location of the DGs within the warehouse are shown in **Figure 3-2.**

Table 3-1: Maximum Classes and Quantities of Dangerous Goods Stored

Class	Description	PG	Quantity (kg)
2.1	Flammable Gas (Aerosols)	n/a	198,000 / 49,500*
2.2	Non-Flammable, Non-Toxic (aerosols)	n/a	22,000
3	Flammable Liquids	II	150,000
		III	50,000
5.2	Organic peroxides	II	1,000
8	Corrosive substances	II	3,000
		III	3,000
9	Miscellaneous DGs	III	10,000

^Assumed 400 kg/pallet

*Based upon 25% of the aerosol being an LPG propellant

The site will store materials classified as DGs in packages limited to the sizes shown in **Table 3-2**.

Table 3-2: Maximum Package Size of DG Classes Stored

Class	Maximum Package Size
2.1	1 L
2.2	120 ml
3	1,000 L
5.2	125 ml or 500 g
8	PG II – 5 kg or 5 L PG III – 20 kg or 20 L
9	20 kg or 20 L

3.4 Warehouse Detailed Description

The warehouse will serve as distribution centre for Wurth, for the receival, warehousing, sorting and distribution of products. Products delivered to the site will be sorted in the sorting and packaging area, and stored in palletised, plastic wrapped containers.

Flammable liquids will be stored in a dedicated DG Store, which will be designed to comply with AS/NZS 1940:2017 (Ref. [5]). This store shall be constructed of fire walls with an FRL of 240/240/240. The store will be mechanically ventilated, which will provide adequate ventilation flow for preventing accumulation of any vapours released from packages in storage as required by AS/NZS 1940:2017 (Ref. [5]).

Aerosol packages will be stored on racks in an aerosol cage within the warehouse away from the main racking. The aerosol racks will be fitted with in-rack sprinklers per AS 2118.1:2017 (Ref. [6]). The storage of aerosols will be compliant with AS/NZS 3833:2007 (Ref. [7]).

The warehouse will be protected by an automatic sprinkler system involving both ceiling mounted and in-rack sprinklers depending on commodities stored. The sprinklers which will activate upon fire detection which will suppress and control any fire that may occur. All DG areas (Aerosol store, flammable liquid store) will be protected by base building specified Storage Mode Sprinkler System (SMSS) sprinklers and by in-rack sprinklers.

The whole site will be capable of containing 100% of the liquid volume of DGs stored in addition to 90 minutes of potentially contaminated fire water to comply with the PO7.

The site will be subject to a hazardous area classification per AS/NZS 60079.10.1:2022 (Ref. [8]) and any electrical equipment within the hazardous zone will be compliant per AS/NZS 60079.14:2022 (Ref. [9]) to minimise the potential for ignition of flammable vapours which may be released during storage.

3.5 Aggregate Quantity Ratio

Where more than one class of dangerous goods are stored and handled at the site an AQR exists. This ratio is calculated using **Equation 3-1:**

$$AQR = \frac{q_x}{Q_x} + \frac{q_y}{Q_y} + [\ldots] + \frac{q_n}{Q_n}$$ **Equation 3-1**

Where:

x,y […] and n are the dangerous goods present

q_x, q_y, […] and q_n is the total quantity of dangerous goods x, y, […] and n present.

Q_x, Q_y, […] and Q_n is the individual threshold quantity for each dangerous good of x, y, […] and n

Where the ratio AQR exceeds a value of 1, the site would be considered a Major Hazard Facility (MHF). The threshold quantities for each class have been taken from Schedule 15 of the Work Health and Safety (WHS) Regulation 2011 (Ref. [2]). These are summarised in **Table 3-3,** noting Class 8 and 9 are not subject to MHF legislation.

Table 3-3: Major Hazard Facility Thresholds

Class	Description	Packing Group	Stored (tonnes)		QR
			Stored	Threshold	
2.1	Flammable Gas (Aerosols)	n/a	49.5	200	0.248
2.2	Non-Flammable, Non-Toxic (aerosols)	n/a	22	n/a	0
3	Flammable Liquids	II & III	200	50,000	0.018
5.2	Organic peroxides	II	1	200	0.005
8	Corrosive substances	II & III	6	n/a	0
9	Miscellaneous DG	III	10	n/a	0

Class	Description	Packing Group	Stored (tonnes)		QR
			Stored	Threshold	
				AQR	0.257

A review of the assessment conducted in **Table 3-3** indicates the AQR for the site is <1; hence, the site would not be classified as an MHF. However, the site does exceed 10% of the MHF and would therefore be required to notify WorkSafe QLD the site is a potential MHF. Therefore, the following recommendation has been made:

- Prior to operation, the site shall notify WorkSafe QLD that the site exceeds 10% of the MHF threshold as required by the WHS Regulation.

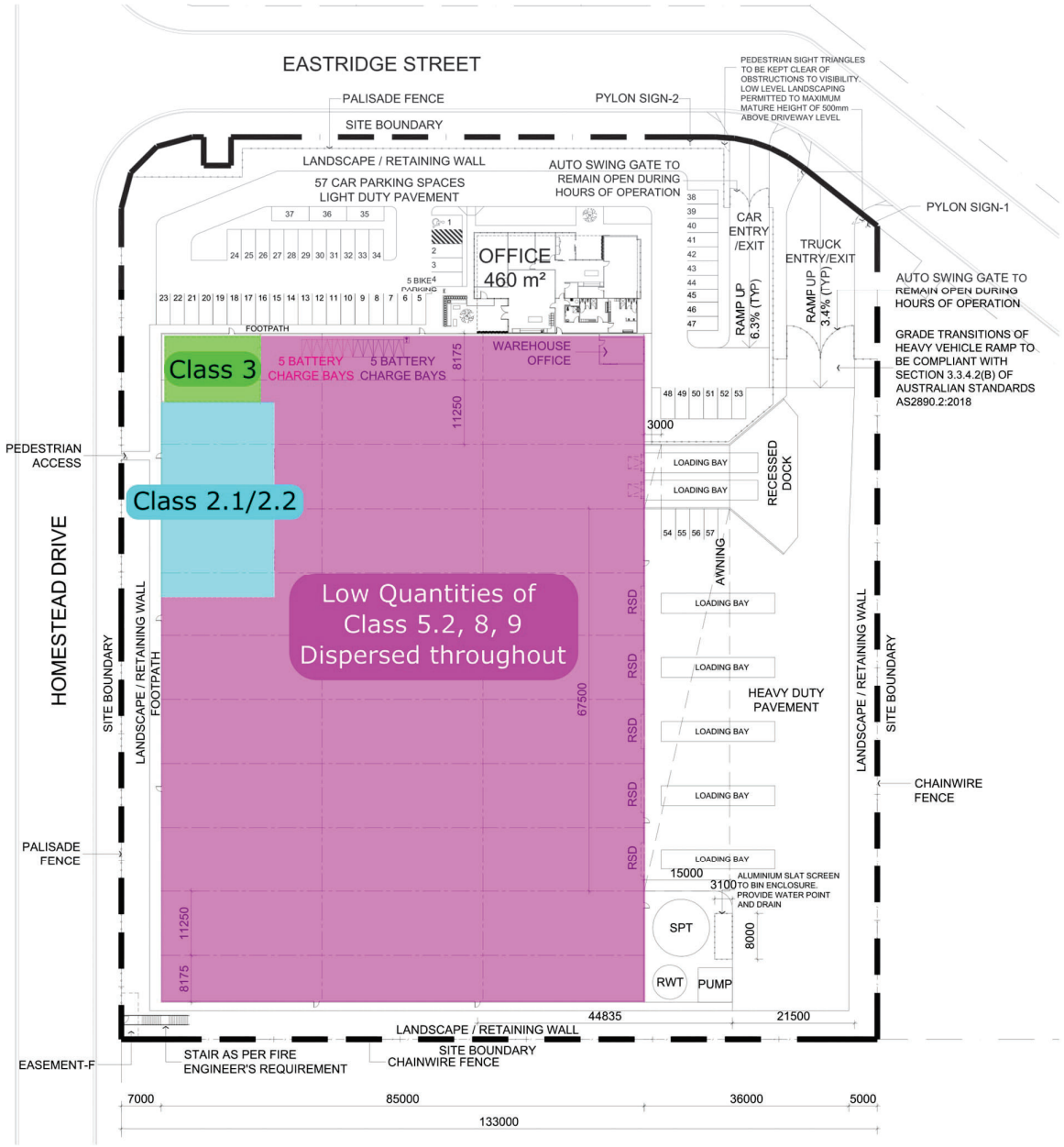

Figure 3-2: Site Layout

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. [4]). 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 State Code 21 (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).
- *Explosion* - It is noted in State Code 21 (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).
- *Toxicity* – Toxic substances are not proposed to be stored and have therefore not been assessed.
- *Property Damage and Accident Propagation* - State Code 21 (Ref. [1]) requires 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* – State Code 21 (Ref. [1]) discusses the application of societal risk to populations surrounding the proposed potentially hazardous facility. It is noted 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, 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 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.
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°C closed-cup test or not more than 65.6°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.
5.2 – Organic Peroxide	Organic peroxides are highly reactive due to the weak O-O bond, which can easily decompose resulting in the formation of highly reactive free radicals. Organic peroxides find wide applications in various industries, including pharmaceuticals, plastics, and polymer production, as initiators for polymerization reactions and as bleaching agents. However, their reactive nature also poses significant safety hazards, as they can decompose violently under certain conditions such as heat, shock, or contamination, potentially leading to fires, explosions, or hazardous chemical releases. Therefore, careful handling, storage, and transportation protocols are essential to mitigate the risks associated with organic peroxides.
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.
9 – Miscellaneous DGs	Class 9 substances and articles (miscellaneous dangerous substances and articles) are substances and articles which, during transport present a danger not covered by other classes. 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. [10]

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 racking fire.
- LPG release (from aerosol), ignition and racking fire.
- Full warehouse fire and radiant heat.

- Full warehouse fire and toxic smoke emission.
- Dangerous goods liquid spill, release and environmental incident.
- Warehouse fire, sprinkler activation and potentially contaminated water release.
- Organic peroxide decomposition and fire.

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**, flammable liquids will be held at the site for storage and distribution. There is potential that a flammable liquid spill could occur in the warehouse area due to an accident (packages dropped from forklift, punctured by forklift tines) 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. pallet racking 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 Liquefied Petroleum Gas (LPG) from an aerosol; however, the formation of a gas cloud would occur immediately as the LPG would instantly flash to gas following release from the canister. It is noted that the potential for a release of LPG is low as aerosol canisters are pressure tested during manufacture and filling, hence, release would predominately result from damaged product rather than deterioration.

The flammable liquid products are stored in a dedicated DG store in accordance with AS 1940:2017 (Ref. [5]) in packages up to 1,000 L. The store will have a mechanical ventilation system; hence, in the event of a loss of containment, the volume of vapour generated that could accumulate would be insufficient to result in an incident that would have offsite impacts. Aerosols stored in the general warehouse will be stored in packages <1 L in accordance with retail storage requirements of AS/NZS 3833:2007 (Ref. [7]). In the event of a release, the worst-case scenario is 1 L of gas which would be insufficient to result in offsite impacts from ignition.

Packages are inspected for damage upon receipt at the loading dock before they are transported into the warehouse. This minimises the likelihood a damaged package is incorrectly stored. Once stored inside the warehouse, deterioration or damage are unlikely to occur.

To minimise the likelihood a flammable vapour cloud may contact an ignition source, the electrical equipment within the DG store hazardous zone will be installed according to the requirements of AS/NZS 60079.14:2022 (Ref. [9]).

It has been proposed to seek approval to operate the site 24 hours a day 7 days a week however the site will be unlikely to be used for these proposed hours of operation. Therefore, if a spill occurred, it would be identified by personnel working in the warehouse where it could be immediately cleaned up. To ensure appropriate cleaning equipment is available, the following recommendation has been made:

- Multiple spill kits be provided around the DG storage areas to ensure spills can be cleaned up immediately following identification.

Based on the warehouse design (controlled ignition sources, etc.), operation practices and the storage of small packages, the risk of a vapour cloud being generated that is large enough to ignite and impact over the site boundary, by way of a vapour cloud explosion or a flash fire, is considered to be low (if not negligible); hence, this hazard has not been carried forward for further analysis.

4.5 Flammable Material Spill, Ignition and Racking Fire

As noted in **Section 4.4**, it is considered that there is a low potential for a package to leak resulting in a flammable material spill and there are several controls in place to minimise the likelihood of a damaged container entering the warehouse and additional controls to minimise the potential that ignition of a flammable material spill could occur.

If a flammable material spill was to occur (e.g. dropped pallet or package during handling) and it was ignited (e.g. by a forklift), the fire may initially be small due to the volume restriction of the retail packages. Notwithstanding this, heat generated may impact adjacent packages which may deteriorate and release their contents contributing additional fuel to the fire. The DG bunker is bounded by fire walls with an FRL of 240/240/240 and has an FLR 180/180/180 lid; hence, in the event of a fire the flames would be contained within the bunker eliminating the flaming portion from the fire from being observed above the warehouse walls.

Without a radiating surface, there would not be an observable radiant heat impact over the site boundary from this incident. Therefore, this incident has not been carried forward for further analysis.

4.6 LPG Release (from Aerosol), Ignition and Racking Fire

As noted in **Section 4.4**, the potential for release of LPG from an aerosol is considered low due to the quality assurance testing on aerosol canisters during the filling process. The release of LPG would likely result from damage to aerosols during transport and storage rather than from deterioration. Packages are inspected upon delivery and an accident involving aerosols would trigger an additional inspection to verify that damage had not occurred prior to storage within the warehouse.

Notwithstanding this, there is the potential for a release of LPG to occur within the storage racking. Due to the hazardous area rated equipment within the area and protocols, it is considered unlikely for an ignition to occur; however, in the event that an ignition of an LPG release did occur a fire could result.

The fire would consume the packaging with the generated heat impacting the adjacent aerosols. As the LPG within the adjacent aerosols expands the canisters may rupture releasing LPG which would ignite and rocket the canister throughout the aerosol cage potentially spreading the fire.

As the fire grows, the SMSS is expected to activate to suppress the fire and cool adjacent packages to minimise the potential for aerosol rupture and rocketing. Activation of this system would control the fire within the sprinkler array.

A sprinkler-controlled fire within the aerosol racking would be unlikely to impact over the site boundary; notwithstanding this, this incident has been carried forward for consequence analysis.

Notwithstanding the above, the following recommendation has been made:

- Aerosols shall be stored in a dedicated storage area which prevents rocketing cans from escalating the incident (i.e. storage in an aerosol cage, separate storage area, or in palletised aerosol cages).

4.7 Full Warehouse Fire and Radiant Heat

There is potential that if a fire occurred and the fire protection systems failed to activate, a small fire may escalate as radiant heat impacts adjacent packages resulting in deterioration and release of additional fuel. While it is considered unlikely for a fire to occur simultaneously with the sprinkler system failing to operate there is the potential for this scenario to occur. Therefore, this incident has been carried forward for further analysis.

4.8 Full Warehouse Fire and Toxic Smoke Emission

As discussed in **Section 4.7** there is the potential for a full warehouse fire to occur in the event of sprinkler failure. A review of the commodities indicates that toxic substances are not stored; hence, the potential for toxic smoke to be generated is considered to be negligible and would not be expected to be substantially different from a standard warehouse fire. Therefore, this incident has not been carried forward for further analysis.

4.9 Dangerous Goods Liquid Spill, Release and Environmental Incident

There is potential that a spill of the liquid DGs (Class 3, 5.2, 8, and 9) 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 per the requirements of AS/NZS 3833:2007 (Ref. [7]) or AS 1940:2017 (Ref. [5]) as applicable. Notwithstanding this, the following recommendation has been made:

- The site shall be designed to contain any spills or contaminated water from a fire incident within the boundaries of the site.

As a spill would be contained within the bund / site premises there is no potential for an environmental incident to occur; hence, this incident has not been carried forward for further analysis.

4.10 Warehouse Fire, Sprinkler Activation and Potentially Contaminated Water Release

In the event of a fire, the SMSS will activate discharging fire with 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 approximately 6 m^3/min 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.

PO7 of State Code 21 requires that the site contains 100% of the volume of liquid DGs stored at the site in addition to 90 minutes of sprinkler discharge. The volume of liquid DGs stored is 217,000 L. The sprinkler discharge has been based on the high risk DGs (i.e. aerosols and flammable liquids) which are protected by in-rack sprinklers. The design criteria for these areas are for eight (8) sprinkler heads to operate at a flow rate of 215 L/min.head. Therefore, the total discharge rate

is 8 x 215 = 1,720 L/min. As noted, the capacity of the retention system is for 90 minutes of discharge; hence, the sprinkler containment volume is 1,720 x 90 = 154,800 L.

Three (3) hydrants would be expected to be required to protect the facility which have a flow rate of 600 L/min.hydrant. Therefore, over a period of 90 minutes a total flow rate of 3 x 600 x 90 = 162,000 L would be required.

Provided in **Table 4-2** is a summary of the liquid volumes for each component along with the total volume required for the site.

Table 4-2: Potentially Contaminated Water Retention

Source	Volume (L)
Chemical storage	217,000
Sprinkler	154,800
Hydrant	162,000
Total	**533,800**

Table 4-3 summarises the containment areas that have been provided at the site.

Table 4-3: Contaminated Water Retention Areas

Area	Containment Volume (L)
Flammable liquid bunker	245,000
General warehouse	225,000
Loading dock	80,000
Underground tanks	225,000

The underground tank can back flow into the bunker and into the general warehouse and loading dock. The aerosol fire can be contained in the general warehouse, the underground tank, and the loading dock. The total containment for each area is provided in **Table 4-4**.

Table 4-4: Total Retention Based on Incident

Area	Containment Volume (L)
Flammable liquid fire in bunker	767,000
General warehouse (aerosols)	550,000

Based on the recommendation made, the volume of water and chemical contained would comply with the requirements of PO7; hence, this incident has not been carried forward for further analysis.

4.11 Organic Peroxide Decomposition and Fire

Organic peroxides will be stored at the site in retail sized packages in a quantity of approximately 1,000 L. The risk posed by organic peroxides is that they can be sensitive to shock and heat resulting in decomposition and release of oxygen. Due to the decomposition, the pressure inside the container can increase resulting in rupture and release of oxygen and residual organic peroxide. The presence of oxygen may result in the exacerbation of a fire or if there is sufficient oxygen it may enable combustible materials to ignite.

It is noted that organic peroxide come in a range from Type A to Type G with Type A being very reactive / sensitive down to Type G which are stable by comparison. The products stored at Wurth are able to be stored in the warehouse without any additional protection (i.e. temperature control); hence, the potential for these products to decompose is low. In addition, the maximum volume of the products is 125 mL; hence, in the unlikely event that they did decompose the oxygen released would be a minimal volume and would not significantly impact the oxygen concentration in the area and would therefore not result in ignition of combustible materials (i.e. packaging) within the area.

Based on the review of the products stored, it is considered that the risk posed by the organic peroxides is unlikely to contribute to incidents that may occur at the site and subsequently are unlikely to impact the overall risk profile. Therefore, this incident has not been carried forward for further analysis.

5.0 Consequence Analysis

5.1 Incidents Carried Forward for Consequence Analysis

The following incidents were identified to have potential to impact off site:

- LPG release (from aerosol), ignition and racking fire.
- Full warehouse fire and radiant heat impacts

Each incident has been assessed in the following sections.

5.2 LPG Release (from Aerosol), Ignition and Racking Fire

As discussed in **Section 4.6,** a damaged aerosol canister could result in the release of LPG which if ignited, may result in a fire. As the fire grows the radiant heat may impact adjacent aerosol storage heating the LPG within aerosol cans which may rupture rocketing the canisters around the aerosol store. The heat generated from the fire will activate the SMSS which will suppress and control the fire while cooling adjacent packages minimising the potential for lateral fire spread due to radiant heat. A detailed analysis has been conducted in **Appendix B4** and the radiant heat impact distances estimated for this scenario are presented in Table **5-1.**

Table 5-1: Heat Radiation from an Aerosol Racking Fire

Heat Radiation (kW/m^2)	Distance (m)	
	Base Case	Sensitivity
35	3.0	7.0
23	3.0	8.0
12.6	3.0	11.0
4.7	10.0	17.0

The closest site boundary to the warehouse is to the west. As can be seen in **Figure 5-1** the contours at 4.7 and 12.6 kW/m^2 for the sensitivity case impact over the site boundary; hence, there may be an offsite impact. Therefore, this incident has been carried forward for further analysis.

It is noted that the 12.6 kW/m^2 contour impacts over the site boundary; however, this is a marginal impact offsite and predominantly impacts the site fencing and the landscaping. It is considered that the offsite impact would be insufficient to cause any significant damage to the surrounding area and would be acceptable.

It is also noted that the sprinkler activation would provide attenuation of the radiant heat as the water droplets reduce the transmission of radiant heat through air. Therefore, it would be expected that in reality the radiant heat impact at the site boundary would be less than what has been calculated.

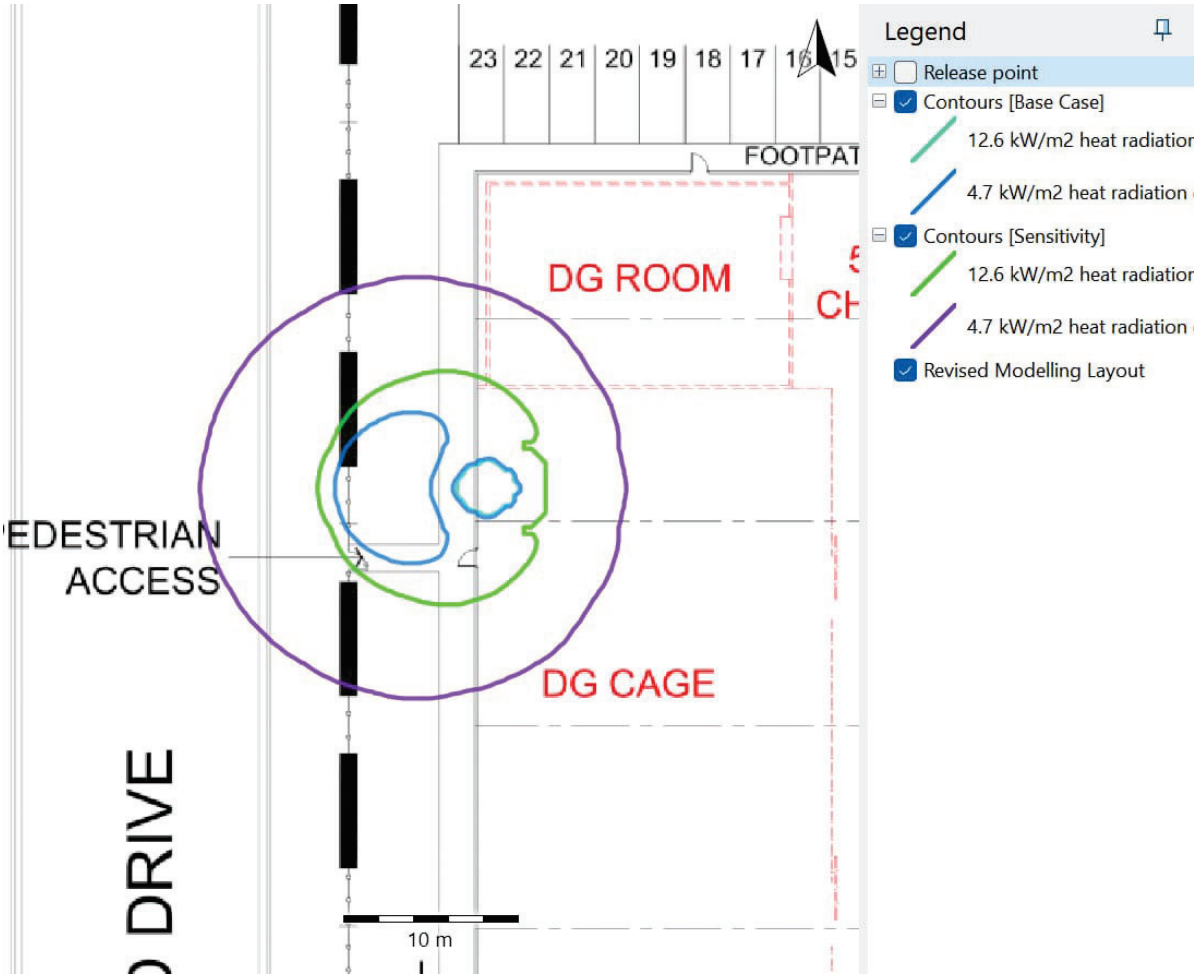

Figure 5-1: Sprinkler Controlled Aerosol Fire Radiant Heat Contours

5.3 Full Warehouse Fire and Radiant Heat

If a fire occurs within the DG store and the sprinkler systems fail to activate, the fire may spread throughout the warehouse and is unlikely to be contained and would likely consume the entire warehouse. A detailed analysis has been conducted in **Appendix B5** and the radiant heat impact distances estimated for this scenario are presented in **Table 5-2**. It is noted that the full warehouse scenario has been modelled of the longest racks adjacent to the warehouse walls to understand the true impact of the burning material.

Table 5-2: Radiant Heat Impact Distances from a Full Warehouse Fire

Heat Radiation (kW/m^2)	Southern Rack (m)		Northern Rack (m)	
	Long Side	Short Side	Long Side	Short Side
35	0	0	<0.1	0.8
23	0	0	0.4	1.2
12.6	8.5	<1*	14	1.6
4.7	21.8	4.4	61	7.7

*The distance from the base case aerosol fire has been adopted as this better represents the bulk of racks running along the western wall.

As shown in **Figure 5-2**, the radiant heat impacts at 4.7 kW/m^2 from a full warehouse fire extend over the site boundary; hence, there is the potential for a fatality at the site boundary to occur. The 12.6 kW/m^2 contours are predominantly onsite with the exception of the southern boundary where there is a slight extension across the boundary. However, this is not expect to impact any buildings and would therefore not result in a dangerous dose to infrastructure.

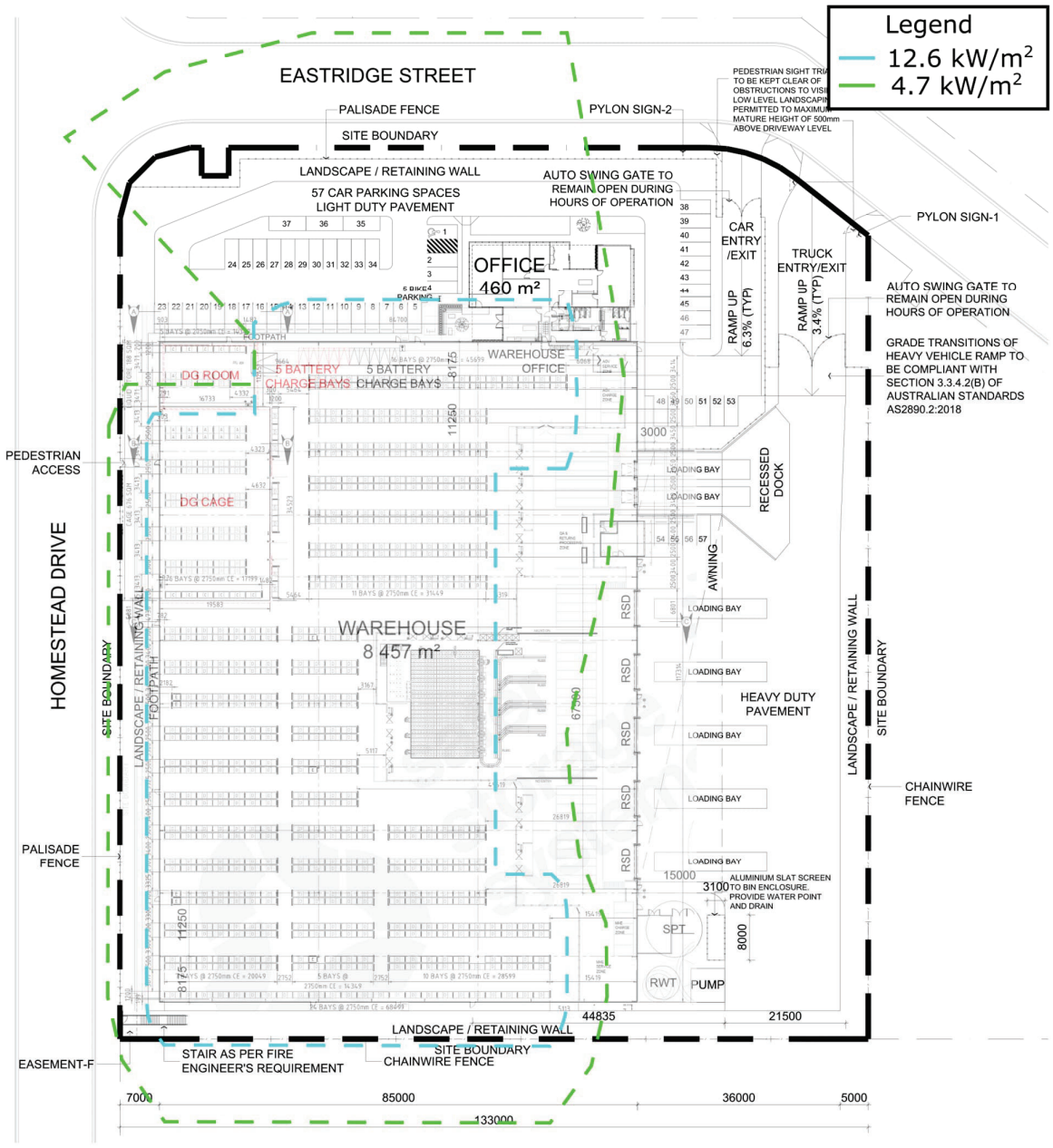

Figure 5-2: Full Warehouse Fire Radiant Heat Contours

6.0 Frequency Analysis

6.1 Incidents Carried Forward for Frequency Analysis

The following item has been carried forwards for frequency analysis:

- LPG release (from aerosol), ignition and racking fire.
- Full warehouse fire and radiant heat.

These incidents have been assessed in the following section.

6.2 Probability of Failure on Demand

The failure rates for each component identified in the safety systems which protect against the scenarios in the following sections were sourced from 3rd party databases such as; OREDA, Exida, UK Health and Safety Executive (HSE). A summary of the failure rate information has been conducted in **Appendix C**. Also included in this appendix are the calculations for the probability of failure on demand (PFD) for each component which is estimated using **Equation 7-1**.

$$PFD = \frac{1}{2}\lambda_{du}t$$ **Equation 7-1**

Where:

- λ_{du} = dangerous undetected failures of a component
- t = 1/number of test intervals per annum

6.1 LPG Release (from Aerosol), Ignition and Racking Fire

To determine whether a fatality or injury will occur it is necessary to estimate the susceptibility of a person which may be exposed at the site boundary to the radiant heat emitted from the scenario.

To estimate the probability of fatality it is necessary to review the susceptibility to personnel exposed to radiant heat that may occur at the site boundary. Tolerance to an exposure (i.e. radiant heat or toxicity) differs across a population which may be estimated using Probit analysis. For radiant heat exposure, the Probit equation is shown in **Eqn 6-1**.

$$Y = K_1 + K_2 lnV$$ **Eqn 6-1**

Where:

- K1 = -36.38
- K2 = 2.56
- V = I4/3t
- I = radiant heat intensity (W/m^2)
- t = time (seconds)

The value obtained from the Probit equation is then read from the graph shown in **Figure 6-1**. Which yields the percentage of fatality for personnel exposed to the input radiant heat.

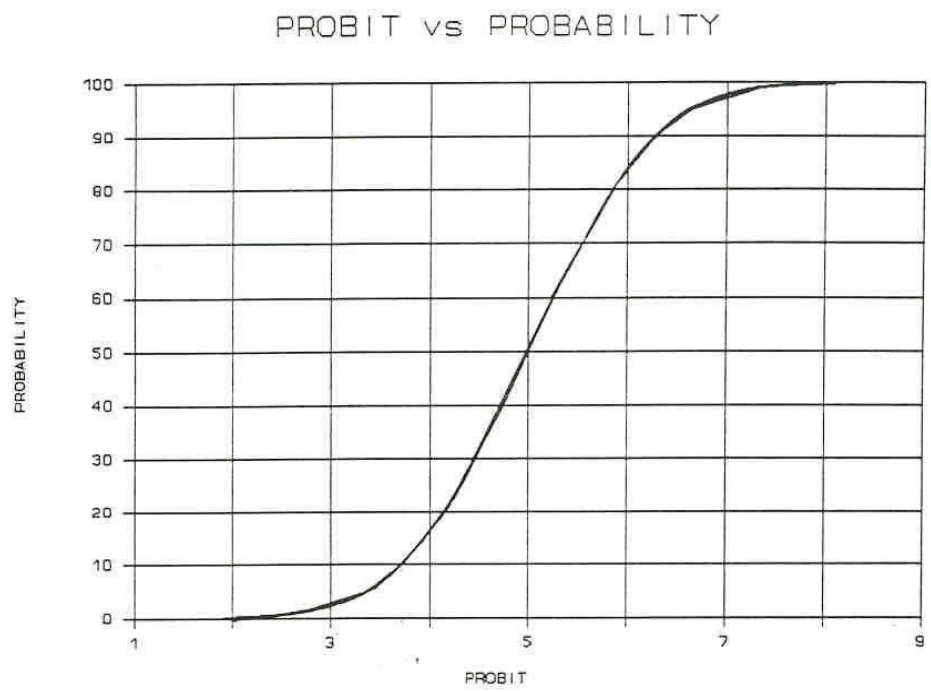

Figure 6-1: Probit vs Probability

Before calculating the radiant heat experienced at the site boundary it's necessary to identify any mitigating circumstances with respect to the radiant heat experienced. The sprinkler system operates by discharging a 'wall' of water around the fire with the aim of suppressing the preventing propagation to adjacent areas. Water is a very effective method for attenuating radiant heat and thus the activation of the sprinklers will actually reduce the radiant heat experienced outside of the sprinklers.

The Defence Science and Technology Organisation (DSTO) has conducted research into the effect of sprinkler sprays and the attenuation of radiant heat impacting a target (Ref. [11]). The analysis was prepared for a range of droplet sizes (fog – 10 µm, mist – 50 µm, spray – 100 µm and rain - 500 µm). **Figure 6-2** is an excerpt from the study which shows the effect of each of radiant heat attenuation vs water droplet loading for each of the droplet sizes.

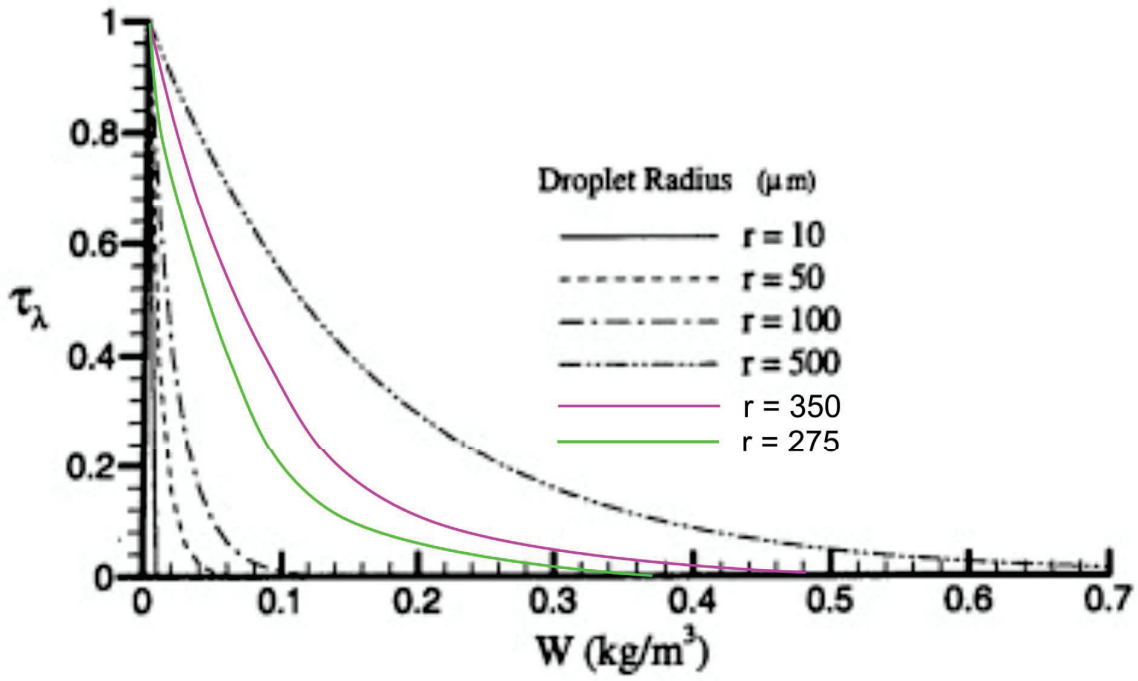

Figure 6-2: Attenuation of Radiant Heat vs Water Droplet Loading

For small droplets, (<100 um) radiant heat is completely blocked at water loadings of 0.1 kg/m^3 while for large droplets (500 um) 0.7 kg/m^3 of water loading is required to fully attenuate radiant heat.

To estimate the water loading it is necessary to know the mass of water released in a volume of air per unit time. The sprinkler heads selected discharge water at a rate of 455 L/min or 7.6 L/s. It has been assumed that the downward velocity of the water spray will be converted entirely horizontally once the spray strikes the deflector plate. Therefore, vertical velocity is 0 m/s. The height of the sprinklers is 12 m; hence, the time taken to for the spray to fall to ground level has been calculated using **Equation A-1**.

$$D = \frac{1}{2} g t^2$$ **Equation A-1**

Where;

- D = distance (12 m)
- G = acceleration due to gravity (9.81 ms^{-2})
- t = time (s)

Substituting in distance of 12 m and solving for t yields travel time of 1.56 seconds. The spray has a circular impact with a diameter of approximately 3 m; hence the volume of air is:

$$V = 12 \times \frac{\pi \times 3^2}{4} = 84.8\, m^3$$

The volume of water discharged in this time is 1.56 x 7.6 = 11.9 L. Water has a density of 1,000 kg/m^3; hence, approximately 11.9 kg of water is discharged. Dividing the mass of water by the volume of air yields a water loading of 11.9/84.8 = 0.14. Review of the average drop size for an

SMSS system indicates a diameter of 700 um or a radius of 350 um. The transmissivity is found to be 0.22 (i.e. 22% of the radiant heat passes through the curtain).

The radiant heat value at the site boundary is 34 kW/m^2 which is then multiplied by the attenuation of the sprinkler curtain 21 x 0.22 = 4.6 kW/m^2.

Exposure time is taken to be 30 seconds which is considered conservative as personnel in the area would feel the intensity of the flame and would be able to evacuate the area to an area of lower radiant heat within 30 seconds. Substituting these values into the Probit equation results in a Probit value of 1.1. When read from the graph shown in **Figure 6-1** the probability of fatality is 0%. As there is no potential for a fatality no further analysis is required.

6.2 Full Warehouse Fire Frequency and Risk Assessment

A detailed fire frequency analysis has been conducted in **Appendix C**. The result of this analysis indicates an initiating fire frequency would be in the order of 1x10^{-3} p.a which has been taken as the base case frequency and this must progress to the sensitivity scenario. It is assumed that 50% of the time the fire propagates beyond the primary array (i.e. the primary array either works or it does not) which results in an initiating event frequency of 1x10^{-3} x 0.5 = 5x10^{-4} p.a.

It is noted that the site is fitted with multiple automatic sprinkler systems that will initiate on fire detection, controlling the fire and preventing the fire growth to a full warehouse fire. The Centre for Chemical Process Safety (CCPS) provides failure rate data for water fire protection systems including all components (pump, distribution system, nozzles, seals, piping, controls and base plate) of 9.66 per 10^6 hours (Ref. [12]). The hourly failure rate is converted to failures per annum by:

Failures per Annum = Failures per hour x 8760 hours per year

Failures per Annum = 9.66x10^6 x 8760 = 0.085

The system will only operate when a fire is detected; hence, the system operates in demand mode. The protection system will be tested monthly totalling 12 tests per annum. The probability of failure on demand (PFD) is estimated using:

$$PFD = \frac{1}{2}\lambda_{du}\left(\frac{1}{t}\right)$$

Where:

λ_{du} = dangerous undetected failures of a component

t = 1/number of test intervals per annum

$$PFD = \frac{1}{2} \times 0.085 \times \left(\frac{1}{12}\right) = 0.00353$$

Hence, the frequency of a full fire within the warehouse is the frequency of an initiating fire x the probability of fail on demand (PFD) of the automatic fire fighting system as shown in **Figure 6-3**.

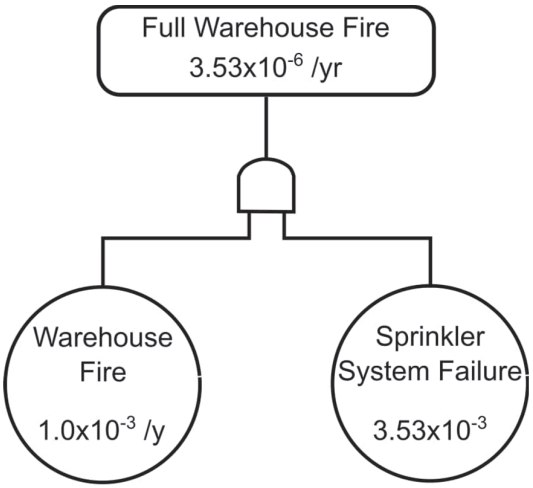

Figure 6-3: Full Warehouse Fire Fault Tree

Conservatively assuming a 100% chance of fatality at the site boundary for a person exposed to radiant heat from a full warehouse fire, the probability of fatality at the site boundary becomes $3.53x10^{-6}$ x 1 = $3.53x10^{-6}$ chances of fatality per year or 3.53 chances of a fatality in a million per year (pmpy).

6.3 Total Fatality Risk

Provided in **Table 6-1** is a summary of the incidents which may result in a fatality at the site boundary. The total fatality risk at the site boundary was calculated to be 3.53 chances per million per year (pmpy)

Table 6-1: Total Fatality Risk

Incident	Fatality Risk
Aerosol (sensitivity) fire	0
Full warehouse fire	$3.53x10^{-6}$
Total	**$3.53x10^{-6}$**

6.4 Comparison Against Risk Criteria

6.4.1 Fatality Risk

The acceptable criteria have been taken from the State Code 21 (Ref. [1]). The acceptable risk criteria published in the guideline relates to injury, fatality and property damage. The values in the guideline present the maximum levels of risk that are permissible at the land use under assessment as defined in **Table 6-2**.

Table 6-2: Individual Fatality Risk Criteria

Land Use	Suggested Criteria (risk in million per year)
Hospitals, schools, child-care facilities, old age housing	0.5
Residential, hotels motels and tourist resorts	1
Commercial developments including retail centres, offices and entertainment centres	5

Land Use	Suggested Criteria (risk in million per year)
Sporting complexes and active open spaces	10
Industrial	50

The area surrounding the proposed warehouse is classified as industrial sites. Therefore, the risk criteria of 50 pmpy for industrial land use was used.

The fatality risk estimated for the immediate vicinity was calculated to be 3.53 pmpy which is below the criteria of 50 pmpy. Therefore, from a fatality risk perspective the development does not result in an exceedance of the criteria and would be considered acceptable for the proposed location.

6.4.2 Injury / Irritation

There are no toxic dispersions; hence, the potential for injury or irritation to occur is negligible.

6.5 Risk of Escalation

It was identified that the 12.6 kW/m^2 contour impacts slightly over the southern boundary; however, this is not expected to result in any significant impact due to the minimal incursion.

6.6 Cumulative Assessment

A review of the surrounding area indicates there are no other DG warehouses in proximity; hence, the cumulative impacts are not required to be assessed.

6.7 State Code 21

Provided in **Table 6-3** is an assessment of each of the Performance Outcomes (PO) under the State Code 21 (Ref. [1]) to demonstrate that the development complies with the POs and also the policy intent of the document. Based upon the review, it is considered that the facility complies with the policy intent and the PO of State Code 21.

Table 6-3: State Code 21 Performance Outcome Review

PO	Requirement	Assessment	Compliant (y/n)
1	The hazardous chemical facility does not create a dangerous dose to human health at vulnerable land use or land zoned for a vulnerable land use.	The facility does not result in impacts at land zoned for vulnerable land uses.	Y
2	The hazardous chemical facility does not create a dangerous dose to human health at sensitive land use or land zoned for a sensitive land use.	The facility does not result in impacts at land zone for sensitive land uses.	Y
3	The hazardous chemical facility does not create a dangerous dose to human health at a commercial or community activity land use or land zoned for a commercial or community activity land use.	The facility does not result in impacts at land zoned for commercial or community land uses.	Y
4	The hazardous chemical facility does not create; a) A dangerous dose to human health at open space land use or land zoned for an open space land use, or b) Where (a) cannot be achieved, an individual fatality risk level of $10x10^{-6}$/year and the societal risk criteria in figure 21.1	The facility does not result in impacts at land zoned for open space land use.	Y
5	The hazardous chemical facility does not create either of the following at: a) A dangerous dose to the built environment at industrial land use or land zoned for an industrial land use, and b) An individual fatality risk level of $50x10^{-6}$/year	The facility does not result in a dangerous dose at industrial land uses; and The fatality risk at the stie boundary is $3.53x10^{-6}$ which is below the threshold limit.	Y
6	The storage and handling areas for fire risk hazardous chemicals are provided with 24-hour monitored fire detection system that has the ability to detect a fire in its early stages and notify an emergency response at all times.	The facility will be fitted with smoke detection which will alarm at the FIP and alert the local fire brigade.	Y
7	Storage and handling areas for packages of liquid or solid fire risk hazardous chemicals are provided with a spill containment system with a working volume capable of containing a minimum of 100 percent of all packages (prescribed hazardous chemicals and/or non-hazardous chemicals) within the area plus the output of any fixed firefighting system provided for the area over a minimum of 90 minutes.	The has sufficient retention as outlined in **Section 4.10**.	Y

PO	Requirement	Assessment	Compliant (y/n)
8	Storage and handling areas for liquid or solid fire risk hazardous chemicals in tanks are provided with a spill containment system with a working volume capable of containing a minimum of: a) 110 percent of the largest tank within a spill compound or 25 percent of the aggregate where multiple tanks are located within a spill compound, whichever is the greater; and b) the output of any fixed firefighting system provided for any bulk tank within a spill compound over a minimum of 90 minutes.	No tanks are stored at the site.	n/a
9	Storage and handling areas for prescribed hazardous chemicals that, if in contact with each other, may react to produce a fire, explosion or other harmful reaction, or a flammable, toxic or corrosive vapour are designed to prevent contact between the prescribed hazardous chemicals.	No incompatible DGs are stored in proximity to each other.	Y
10	Development is designed and sited to mitigate impacts on storage and handling areas from natural hazard including, but not limited to: a) flood; b) bushfire; c) erosion; d) storm tide inundation; e) landslide; f) earthquake; g) wind action.	The site has been designed in accordance with applicable criteria to cover off flood, bushfire, erosion, storm tide inundation, landslide, earthquake and wind action.	Y
11	Development is designed and sited to mitigate the risks from hazard scenarios occurring at existing hazardous chemical facilities.	Currently there are no hazardous chemical facilities adjacent to this facility.	Y

7.0 Conclusion and Recommendations

7.1 Conclusions

A hazard identification table was developed for warehouse facility to identify potential hazards that may be present at the site as a result of 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. Scenarios not eliminated were then carried forward for consequence analysis.

Incidents carried forward for consequence analysis were assessed in detail to estimate the impact distances. Impact distances were developed into scenario contours and overlaid onto the site layout diagram to determine if an offsite impact would occur. The consequence analysis showed that two of the scenarios (combustible liquids fire and full warehouse fire) would impact over the site boundary and into the adjacent land use; hence, these incidents was carried forward for frequency analysis and risk assessment.

The frequency analysis and risk assessment showed the cumulative risk at the site boundary in the worst location was 3.53 pmpy. State Code 21 (Ref. [1]) publishes acceptable risk criteria at the site boundary of 50 pmpy (for industrial sites). Therefore, the probability of a fatality from the warehouse fire at the site boundary is within the acceptable risk criteria.

In addition, incidents exceeding 12.6 kW/m^2 were reviewed which indicated there was a slight offsite impact on the southern and western boundaries; however, this was not expected to result in a dangerous dose to infrastructure.

Review of the estate proposal indicates this development is the only contributor to the risk profile; hence, cumulative risk is not a consideration at this stage. The cumulative risk at the site is therefore the reported 3.53 chances pmpy which is below the 50 chances pmpy limit. Therefore, the development of the warehouse does not increase the cumulative risk of the estate to an unacceptable level.

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 only be classified as potentially hazardous and would be permitted within the current land zoning for the site.

7.2 Recommendations

Notwithstanding the conclusions following the analysis of the facility, the following recommendations have been made:

- Multiple spill kits be provided around the DG storage areas to ensure spills can be cleaned up immediately following identification.
- Aerosols shall be stored in a dedicated storage area which prevents rocketing cans from escalating the incident (i.e. storage in an aerosol cage, separate storage area, or in palletised aerosol cages).
- The site shall be designed to contain any spills or contaminated water from a fire incident within the boundaries of the site.

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8.0 References

[1] Workplace Health and Safety Queensland, “Planning Guildeline State Code 21: Hazardous Chemical Facilities,” Workplace Health and Safety Queensland, Brisbane, 2022.

[2] WorkSafe Queensland, “Work Health and Safety Regulation,” WorkSafe Queensland, 2011.

[3] Department of Planning, Multi-Level Risk Assessment, Sydney: Department of Planning, 2011.

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

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

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

[7] Standards Australia, “AS/NZS 3833:2007 - Storage and Handling of Mixed Classes of Dangerous Goods, in Packages and Intermediate Bulk Containers,” Standards Australia, Sydney, 2007.

[8] 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.

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

[10] National Transport Commission (NTC), “Australian Code for the Transport of Dangerous Goods by Road & Rail, 7th Edition,” 2011.

[11] C. Doolan, “The Effect of Water Mist and Water Spray on Radiative Heat Transfer for Stored Ordinance,” Defence Science and Technology Organisation, 2003.

[12] Centre for Chemical Process Safety, “Guidelines for Process Equipment Reliability Data with Data Tables,” Centre for Chemical Process Safety, 1989.

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

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

Appendix A

Hazard Identification Table

A1. Hazard Identification Table

ID	Area	Hazard & Cause	Hazard Consequence	Safeguards	Carried Forward?
1	Aerosol Cage	• Heating of aerosol containers (containing Class 2.1 gas) from a general warehouse fire	• Rupture, ignition and explosion / rocketing of cylinder within warehouse • Spreading fire	• All aerosols are stored in a cage, limiting spread of fire. • In-rack sprinklers and suppression mode sprinklers according to AS 2118.1. • Automatic fire protection system • Aerosol storage area compliant with AS/NZS 3833-2007 (Ref. [7])	Yes
2	Aerosol Cage	• Heating of aerosol containers (containing Class 2.1 gas) from a general warehouse fire	• Delayed ignition and flash fire / explosion • Spreading fire	• All aerosols are stored in a cage, limiting spread of fire. • In-rack sprinklers and suppression mode sprinklers according to AS 2118.1. • Automatic fire protection system • Aerosol storage area compliant with AS/NZS 3833-2007 (Ref. [7]) • Warehouse ventilation	No
3	Warehouse	• Dropped pallet • Damaged packaging (receipt or during storage) • Deterioration of packaging	• Release of Class 2.1, 3, 5.2, 8 and 9 to the environment • Minor environmental release	• Small retail sized packages (< 20 L) for general warehouse store and 1,000 L for AS 1940:2017 storage. • Inspection of packages upon delivery to the site. • Trained forklift operators (including spill response training). • Storage of DGs within AS/NZS 3833:2007 compliant store (Ref. [7]) • Trained staff & spill kits • DG store is bunded • Site stormwater containment (penstock valve)	No

ID	Area	Hazard & Cause	Hazard Consequence	Safeguards	Carried Forward?
4	Warehouse	• Dropped pallet • Damaged packaging (receipt or during storage) • Deterioration of packaging • Loss of containment of incompatible dangerous goods	• Potential for incompatible DGS to come into contact with each other, resulting in exothermic reactions • Potential for injuries/property damage	• Storage to comply AS/NZS 3833:2007 (Ref. [7]) • Segregation between incompatible materials • Small retail sized packages (< 20 L) • Inspection of packages upon delivery to the site. • Trained forklift operators (including spill response training). • Trained staff & spill kits	No
5	Warehouse	• Fire in DG storage areas and sprinkler failure	• Full warehouse fire	• Aforementioned protection systems to prevent initiating fire events. • Sprinkler system pump tested monthly	Yes
6	Warehouse	• Activation of sprinkler system	• Potentially contaminated water released to the environment	• Site designed to contain 90 minutes of sprinkler & hydrant discharge.	No
7	DG Bunker	• Dropped pallet • Damaged packaging (receipt or during storage) • Deterioration of packaging	• Spill of flammable liquids • Immediate ignition and racking fire • Flash fire / explosion	• Storage of DGs within AS 1940:2017 compliant store (Ref. [5]) • Mechanical ventilation • Bunded storage area • Inspection of packages upon delivery to the site • Hazardous Area Classification (HAC) in accordance with AS/NZS 60079.10.1:2022 (Ref. [8]) & control of ignition sources according to AS/NZS 60079.14:2022 (Ref. [9]). • Automatic fire protection system (SMSS)	Yes

ID	Area	Hazard & Cause	Hazard Consequence	Safeguards	Carried Forward?
				• First attack fire-fighting equipment (e.g. hose reels & extinguishers) • Fire detection systems • FRL 240/240/240 walls.	
8	DG Bunker	• Dropped pallet • Damaged packaging (receipt or during storage) • Deterioration of packaging	• Release of Class 3 products to the environment • Minor environmental release	• Inspection of packages upon delivery to the site. • Trained forklift operators (including spill response training). • Storage of DGs within AS/NZS 3833:2007 compliant store (Ref. [7]) • Trained staff & spill kits • DG store is bunded	No

Appendix B

Consequence Analysis

B1. Incidents Assessed in Detailed Consequence Analysis

The following incidents are assessed for consequence impacts.

- LPG release (from aerosol), ignition and racking fire.
- Full warehouse fire and radiant heat impacts

Each incident has been assessed in the sections below.

B2. Gexcon - Effects

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

B3. Radiant Heat Physical Impacts

Appendix Figure B-1 provides noteworthy heat radiation values and the corresponding physical effects of an observer exposed to these values (Ref. [13]).

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

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

B4. LPG Release (From Aerosol), Ignition and Racking Fire

The release of LPG from a damaged package could result in a fire if the release ignited. The fire would begin to grow expanding LPG within other aerosols which may rupture, ignite and rocket around the aerosol store. The store is fitted with SMSS and in-rack sprinklers to suppress the fire and cool adjacent packages to minimise the potential for rocketing.

As heat and smoke is generated from the fire, the in-rack sprinklers and the SMSS will activate. Two sprinkler activation scenarios have been assessed:

- A bas case scenario whereby the first row of the SMSS activates and controls the spread of a fire.
- A sensitivity scenario whereby the first row of sprinklers fails to activate and the fire is instead controlled by the second row of the SMSS.

Under the base case scenario, four (4) pallets spaces would be involved in the fire and for the sensitivity scenario this becomes twelve (12). A pallet has approximate dimensions of 1.2 m x 1.2 m. The area occupied by these pallet spaces have been converted into an equivalent diameter for the purposes of modelling and summarised in **Appendix Figure B-2**.

Appendix Figure B-2: Equivalent Diameter Data

Value	Base Case	Sensitivity
Area (m^2)	4 x 1.2 x 1.2 = 5.76	12 x 1.2 x 1.2 = 17.28 m^2
Equivalent diameter (m)	2.7	4.7

- Burning rate – 0.099 kg/m^2.s (the burning rate for LPG, Ref. [14]).
- Wind direction: 0.1 m/s in direction of closest boundary for incident location. The fire is fully contained within the building and would not be impacted by wind.

The selection of an LPG burning rate is considered appropriate and conservative as a fire involving aerosols will be composed predominantly of packaging (i.e. plastic wrapping and cardboard) which will be punctuated by rupturing of cans and combustion of the released LPG. The packaging is a solid material that will yield a lower burning rate than selected as it requires an additional phase change prior to combustion reducing the rate at which the product burns.

Furthermore, the analysis is considered incredibly conservative as it assumes a 100% burning area; however, as the subject areas will encompass aisle spaces, there will be no combustible material stored in these locations. Therefore, it is considered the results generated from this analysis would substantially overestimate the radiant heat impacts from the identified scenarios.

The external walls are dado construction which is composed of a concrete component with sheet metal above. The concrete portion of the wall will provide shielding from the fire seat; hence, a 2.4 m high concrete portion has been included as a shielding component.

The inputs dimensions were input into Effects with the results for each scenario shown in **Appendix Figure B-3**.

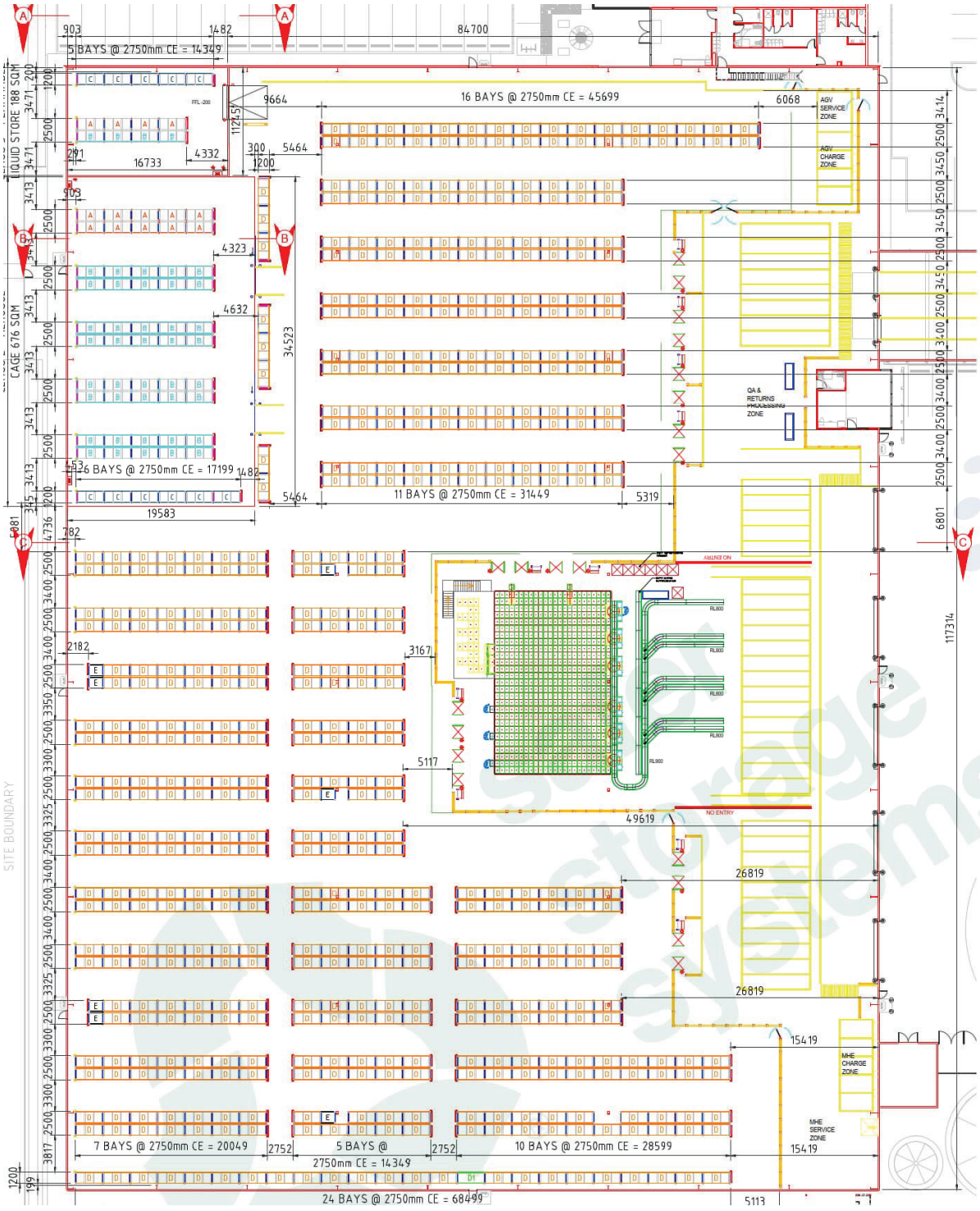
Appendix Figure B-3: Heat Radiation from Class 2.1 Sprinkler Controlled Scenarios

Heat Radiation (kW/m^2)	Distance (m)	
	Base Case	Sensitivity
35	3.0	7.0
23	3.0	8.0
12.6	3.0	11.0
4.7	10.0	17.0

B5. Full Warehouse Fire

The warehouse is composed of numerous warehouse racks which would be involved in the fire with each rack being a source of radiant heat. Provided in **Appendix Figure B-4** is a layout of the

warehouse racking. It can be seen that along the southern and northern sides are the longest racks. The dimensions of these racks will be modelled, to understand the impact



Appendix Figure B-4: Warehouse Racking Layout

The southern and northern racks running along the walls were modelled using Effects with the radiant heat impact distances summarised **Appendix Table B-1**.

Appendix Table B-1: Radiant Heat Impacts from Rack Fires

Heat Radiation (kW/m^2)	Southern Rack (m)		Northern Rack (m)	
	Long Side	Short Side	Long Side	Short Side
35	0	0	<0.1	0.8
23	0	0	0.4	1.2
12.6	8.5	<1	14	1.6
4.7	21.8	4.4	61	7.7

Appendix C

Warehouse Fire Frequency Estimation

C1. Estimation of the Frequency of a Full Warehouse Fire

A review of readily available warehouse fire frequency information was conducted, and a number of direct sources were identified. These were:

- Health and Safety Executive (HSE) in the United Kingdom [Hymes & Flynn, UKAEA - SRD/HSE R578, 2002] – this document lists the major warehouse fire frequency to be $2.5x10^{-3}$ p.a.;
- Baldwin, Accident Analysis and Prevention (Vol.6) – indicates a serious fire frequency in warehouses to be in the order of $1x10^{-3}$ p.a.;
- Environmental Impact Assessment Report for the Commission of Inquiry into Proposed Manufacturing Plant by WR Grace Australia Ltd., Kurnell, Sydney, October 1987 – indicates a fire frequency of $4.6x10^{-3}$ per warehouse year; and
- VROM 2005, Guidelines for quantitative risk assessment CPR 18E (Purple Book), Publication Series on Dangerous Substances (PGS 3), The Netherlands. – $4x10^{-4}$ p.a.

It is noted that the mix of overseas data and local data (albeit some is dated) correlates to indicate a fire frequency in warehouses to be in the order of $1x10^{-3}$ to $4x10^{-4}$. The data presented in the reports reviewed was for general warehouses, where stringent controls for spill and ignition sources (such as flame and explosion proof fittings, bunding, smoking and naked flame controls, isolation of power supplied on warehouse closure, etc.) were not part of the warehouse hazard controls. Hence, for a DG warehouse, containing specific ignition and fire control systems, it would be expected that a major fire would occur with a lesser frequency than that of general warehouses. Notwithstanding this, to ensure a conservative assessment has been provided within the study, the estimated initiating fire frequency for the DHL facility has been estimated as $1x10^{-3}$ p.a. (i.e. the upper end of the range).

Selected Initiating Fire Frequency = $1x10^{-3}$ p.a.