

REPORT

HAZARDS AND RISK

LOT 9 DP 1205673

28 MCPHERSON STREET, BANKSMEADOW

ORICA AUSTRALIA PTY LTD

PREPARED FOR: Orica Australia Pty Ltd
c/o DBL Property
Jeffrey Lord

DOCUMENT NO: 21280-RP-001
REVISION: 2
DATE: 18-Mar-2020

DOCUMENT REVISION RECORD

Rev	Date	Description	Prepared	Checked	Approved	Method of issue
A	11-Jan-19	Issued to Client for comments	O. Alim	J. Polich	S. Chia	Email [PDF]
0	21-Jan-19	Updated with Client comments	O. Alim	S. Chia	S. Chia	Email [PDF]
1	06-Mar-19	Updated to address DPE comments	O. Alim	J. Polich	G. Peach	Email [PDF]
2	18-Mar-19	Updated following NSW DPIE release of 2018 BIP QRA and to reflect final population case	O. Alim	J. Polich	S. Chia	Email [PDF]

RELIANCE NOTICE

This report is issued pursuant to an Agreement between Sherpa Consulting Pty Ltd ('Sherpa Consulting') and *Orica Australia Pty Ltd* which agreement sets forth the entire rights, obligations and liabilities of those parties with respect to the content and use of the report.

Reliance by any other party on the contents of the report shall be at its own risk. Sherpa Consulting makes no warranty or representation, expressed or implied, to any other party with respect to the accuracy, completeness, or usefulness of the information contained in this report and assumes no liabilities with respect to any other party's use of or damages resulting from such use of any information, conclusions or recommendations disclosed in this report.

Title: Report Hazards and Risk Lot 9 DP 1205673 28 McPherson Street, Banksmeadow	QA verified: N. Benova
	Date: 18-Mar-2020

CONTENTS

ABBREVIATIONS.....	5
1. INTRODUCTION	6
1.1. Background.....	6
1.2. Study objectives.....	6
1.3. Scope.....	7
1.4. Exclusions and limitations	7
2. SITE DESCRIPTION	8
3. SEPP 33 RISK SCREENING	11
3.1. Overview.....	11
3.2. Risk screening	11
3.3. Other risk factors	11
3.4. Conclusions	12
4. RISK ASSESSMENT	13
4.1. Overview.....	13
4.2. Development in vicinity of potentially hazardous facilities.....	13
4.3. Assessment - Qualitative risks	13
4.4. Assessment – Quantitative risks	14
4.5. Assessment of risks from the BIP complex	15
4.6. Societal Risk.....	21
5. BOTANY/RANDWICK AREA LUSS RECOMMENDATIONS	27
APPENDIX A. TFNSW TRAVEL ZONE DATA USED IN 2018 BIP QRA	
APPENDIX B. REFERENCES	

TABLES

Table 4.1: Assessment – HIPAP 10 qualitative risk criteria.....	13
Table 4.2: Applicable HIPAP 10 criteria.....	14
Table 4.3: Assessment of risks from the BIP (all criteria).....	16
Table 4.4: Population definition	21
Table 4.5: SRI estimate	26
Table 5.1: Botany/Randwick industrial area LUSS recommendations.....	27

FIGURES

Figure 2.1: Site aerial view	9
Figure 2.2: Site plan	10
Figure 4.1: Individual fatality risk contours.....	18
Figure 4.2: Damage and propagation risk contours – Heat radiation (23 kW/m ²).....	19
Figure 4.3: Damage and propagation risk contours – Explosion overpressure (14 kPa)	20
Figure 4.4: Comparison against BIP QRA 2018 ‘Current Development’	23
Figure 4.5: Comparison against BIP QRA 2018 ‘Approved Development’	23
Figure 4.6: Incremental societal risk profile – Proposed development	24

ABBREVIATIONS

ADGC	Australian Dangerous Goods Code
ALARP	As Low As Reasonably Practicable
BIP	Botany Industrial Park
DA	Development Application
DG	Dangerous Goods
DOP	(NSW) Department of Planning (now DPIE)
DP	Deposited Plan
DPE	(NSW) Department of Planning and Environment (now DPIE)
DPIE	(NSW) Department of Planning, Industry and Environment
DUAP	(NSW) Department of Urban Affairs and Planning (now DPIE)
EIS	Environmental Impact Statement
ha	Hectare
HIPAP	Hazardous Industry Planning Advisory Paper
HSE	(UK) Health and Safety Executive
LGA	Local Government Area
LUSS	Land Use Safety Study
OH&S	Occupational Health & Safety
PHA	Preliminary Hazard Analysis
SDS	Safety Data Sheet
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SRD	State and Regional Development
SRI	Scaled Risk Integral
SSD	State Significant Development

1. INTRODUCTION

1.1. Background

Orica Australia Pty Ltd (Orica) is the owner of the site (formerly part of the Orica Southlands Estate) located at 28 McPherson Street, Banksmeadow. The site is officially referred to as Lot 9 in Deposited Plan (DP) 1205673 in the Bayside Local Government Area (LGA).

Orica is proposing to establish a warehouse estate (the project) at the site for the storage and distribution of general merchandise including goods arriving from Port Botany.

The project is a State Significant Development (SSD) under the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP), which requires a Development Application (DA) to be submitted under the NSW Environmental Planning and Assessment Act 1979.

Orica has retained Sherpa Consulting Pty Ltd (Sherpa) to undertake a Hazards and Risk Assessment for input to the Environmental Impact Statement (EIS) required for the DA submission.

1.2. Study objectives

The overall study objective is to address the 'Hazards and Risk' component of the EIS outlined in the Secretary's Environmental Assessment Requirements (SEARs) (Ref.1), which includes:

1. A preliminary risk screening completed in accordance with *State Environmental Planning Policy No.33 (SEPP 33) - Hazardous and Offensive Development and Applying SEPP 33* (DOP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the development is "potentially hazardous", a Preliminary Hazard Analysis (PHA) must be prepared in accordance with NSW Department of Planning and Environment (DPE) *Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 – Guidelines for Hazard Analysis* (DOP, 2011) and *Multi-Level Risk Assessment* (DOP, 2011).
2. An evaluation and assessment of the risks posed by the Botany Industrial Park (BIP) complex on the development and demonstrate that the development complies with the risk criteria for development in the vicinity of potentially hazardous facilities published in *Hazardous Industry Planning Advisory Paper No. 10 – Land Use Safety Planning* (DOP, 2011). The assessment must be undertaken in consultation with BIP, must be based on the most recently available data and must demonstrate that the development would not result in any increase of the overall societal risk in the area.
3. Address all relevant recommendations published in Botany-Randwick Industrial Area Land Use Safety Study (DUAP 2001).

1.3. Scope

The study scope covered the proposed warehouse estate including the warehouse buildings and offices.

1.4. Exclusions and limitations

The exclusions and limitations of this study are as follows:

- The scope of work is limited to the requirements under the 'Hazards and Risks' component of the EIS specified in the SEARs. As such:
 - This report does not constitute a full EIS.
 - The scope of work excluded assessment of risks from other potential sources of risks apart from the BIP. Other potentially hazardous facilities in the vicinity of the proposed development include Solvay Interlox and United Initiators located on 22 McPherson Street. These facilities are located approximately 295 metres away from the proposed development (i.e. closest distance between site boundaries).
- The scope of work excludes assessment of risks to temporary facilities or populations (i.e. the construction stage of the project is outside the scope of assessment).

2. SITE DESCRIPTION

The site is located at 28 McPherson Street, Banksmeadow. The site is officially referred to as Lot 9 in DP 1205673 in the Bayside Local Government Area.

The site occupies a total area of 41,290 m² with surrounding sites characterised predominantly by industrial developments including several warehousing and distribution facilities.

The site is situated approximately 50 m south of the Nant Street tank farm (operated by Qenos) and 120 m south west of the BIP. Directly adjacent east of the site is an Australian Government office premises for detector dog functions facilities of the Australian Border Force, Australian Federal Police and Department of Agriculture and Water Resources and a new 8-unit industrial warehousing development currently under construction.

An aerial view of the site showing the site boundary and location in relation to the BIP is provided in Figure 2.1. The site plan is shown in Figure 2.2.

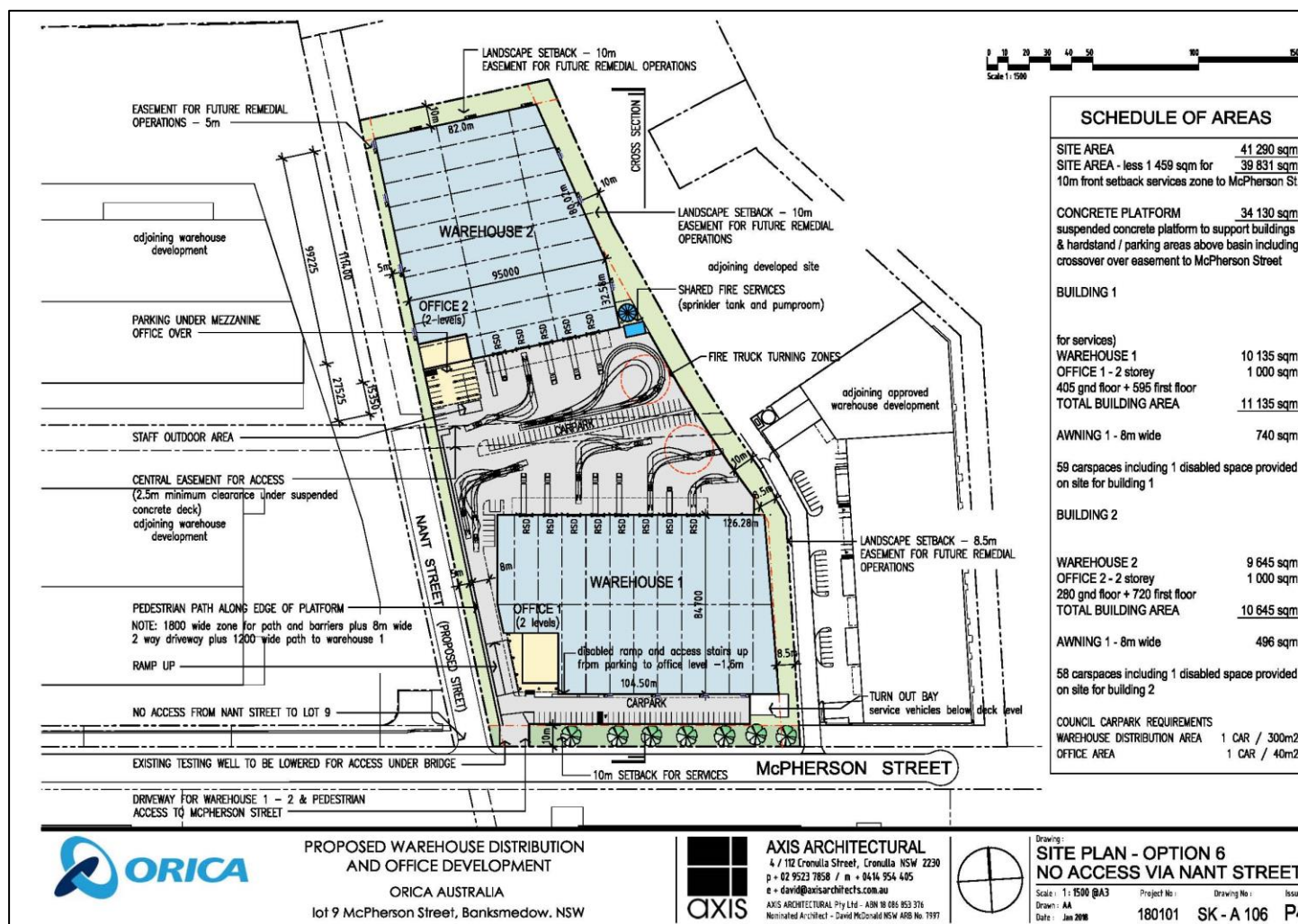
The proposed project will include development and construction of:

- A suspended concrete platform above the flood detention basin to support warehouse buildings and hardstand/parking areas.
- Construction of warehouse buildings for the storage and distribution of general merchandise including goods arriving from Port Botany.

Figure 2.1: Site aerial view



Figure 2.2: Site plan



Document: 21280-RP-001
Revision: 2
Revision Date: 18-Mar-2020
File name: 21280-RP-001-Rev2

3. SEPP 33 RISK SCREENING

3.1. Overview

SEPP 33 (Ref.2) defines potentially hazardous industry as follows:

‘Potentially hazardous industry’ means a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

(a) to human health, life or property; or

(b) to the biophysical environment, and:

includes a hazardous industry and a hazardous storage establishment.

Development proposals that are classified as ‘potentially hazardous’ industry must undergo a PHA as per the requirements set in HIPAP No. 6 (Ref.3) to determine the risk to people, property and the environment. If the residual risk exceeds the acceptability criteria, the development is ‘hazardous industry’ and may not be permissible within NSW.

The risk screening process in the *Applying SEPP 33* guideline (Ref.4) considers the type and quantity of hazardous materials to be stored on site, distance of the storage area to the nearest site boundary, as well as the expected number of transport movements.

‘Hazardous materials’ are defined within the guideline as substances that fall within the classification of the Australian Dangerous Goods Code (ADGC), i.e. have a Dangerous Goods (DG) classification. Detail of the DG classification is typically obtained from the materials’ Safety Data Sheet (SDS).

Risk screening is undertaken by comparing the storage quantity and the number of road movements of the hazardous materials associated with the development against the screening threshold specified in the guideline. The screening threshold presents the quantities below which it can be assumed that significant off-site risk is unlikely.

3.2. Risk screening

As per the project description, the proposed warehouse estate will be used for storage and distribution of general merchandise. Approval is not being sought for storage and handling of hazardous materials or DGs in any of the warehouses. Therefore, the quantity of hazardous materials and DGs will not exceed the relevant risk screening thresholds for either storage or transport.

3.3. Other risk factors

Appendix 2 of *Applying SEPP 33* outlines other risk factors for consideration to identify hazards not addressed by the DG risk screening method.

A review of these risk factors was undertaken. The proposed warehouse estate development for general merchandise would not involve:

- Storage or transport of incompatible materials (i.e. hazardous and non-hazardous materials).
- Generation of hazardous waste.
- Generation of dusts within confined areas.
- Incompatible, reactive or unstable materials and process conditions that could lead to uncontrolled reaction or decomposition.
- Storage or processing operations involving high (or extremely low) temperature and/or pressures.

3.4. Conclusions

The assessment against the SEPP 33 guidelines are summarised as follows:

- The proposed warehouse development will not exceed the relevant SEPP 33 DG risk screening thresholds for storage or transport.
- No other risk factors were identified that could result in significant offsite impacts.
- Therefore, the proposed project is not 'potentially hazardous' with respect to storage and transportation within the meaning of SEPP 33 and does not require a PHA.

4. RISK ASSESSMENT

4.1. Overview

The following requirements for assessment of risks are specified in the SEARs:

- An assessment of the risks posed by the BIP complex on the development.
- Demonstrate that the development complies with the risk criteria for development in the vicinity of potentially hazardous facilities published in HIPAP No. 10 *Land Use Safety Planning*.
- The assessment must be undertaken in consultation with BIP, must be based on the most recently available data and must demonstrate that the development would not result in any increase of the overall societal risk in the area.

4.2. Development in vicinity of potentially hazardous facilities

HIPAP 10 *Land Use Safety Planning* (Ref 5) specifies qualitative and quantitative risk criteria for new development in the vicinity of potentially hazardous facilities (i.e. the BIP and Nant Street tank farm). Qualitative and quantitative risk assessment against the HIPAP 10 criteria are included and presented in the following sections.

4.3. Assessment - Qualitative risks

The HIPAP 10 qualitative risk criteria address certain qualitative principles to be adopted concerning the land use safety acceptability of the proposed development.

Assessment against HIPAP 10 qualitative risk criteria for the proposed development is presented in Table 4.1.

Table 4.1: Assessment – HIPAP 10 qualitative risk criteria

No	Suggested criteria	Assessment
1	<i>All 'avoidable' risks should be avoided.</i>	Risk avoidance in this case would mean avoiding any new population being exposed to the existing risk. Whilst this is an option, it means that any potentially affected land (i.e. all land within predicted consequence area at any level of risk) would be sterilised. Risk avoidance for this proposal is applied at the level of avoiding exposure of public or sensitive populations (i.e. choice of industrial land use) and scaling the development such that the number of people potentially exposed is inherently limited.
2	<i>The risk from a major hazard should be reduced wherever practicable</i>	Not applicable for the proposed development. The proposed development is not 'potentially hazardous' and approval is not being sought for hazardous materials/DG storage and handling. Risks from the BIP complex and Nant Street tank farm are managed by respective operators. This is outside of the proponent's control.

No	Suggested criteria	Assessment
3	<i>The consequences (effects) of the more likely hazardous events (i.e. those of high probability of occurrence) should, wherever possible, be contained within the boundaries of the installation.</i>	Not applicable for the proposed development. The proposed development is not 'potentially hazardous' and approval is not being sought for hazardous materials/DG storage and handling. Risks from the BIP complex and Nant Street tank farm are managed by respective operators. This is outside of the proponent's control.
4	<i>Where there is an existing high risk from a hazardous installation, additional hazardous developments should not be allowed if they add significantly to that existing risk.</i>	Not applicable for the proposed development. The proposed development is not 'potentially hazardous' (as per SEPP 33 screening) and approval is not being sought for hazardous materials and DG storage and handling.

4.4. Assessment – Quantitative risks

The proposed warehouse estate is an industrial development (i.e. not a commercial development) in the context of HIPAP 10. The applicable risk criteria and assessment outcomes for the proposed industrial development in the vicinity of a hazardous facility are presented in Table 4.2.

Commercial developments generally include developments that may have a public access component such as retail showrooms or warehouses (e.g. car yards, Bunnings, Costco, etc) or a large population density (e.g. commercial offices, call centres, shopping malls, entertainment complexes, etc) that may result in a significant societal risk increase or introduction of large numbers of the general public. These developments/land uses would typically be included under "commercial premises" in NSW land use planning instruments.

Table 4.2: Applicable HIPAP 10 criteria

Risk type	Suggested criteria	Assessment
Individual fatality risk	<i>Individual fatality risk levels for industrial sites at levels of 50 in a million per year should, as a target, be contained within the boundaries of the site where applicable</i>	The development will not pose offsite fatality risks as approval is not being sought for hazardous materials and DG storage and handling (i.e. as per the SEPP 33 screening the development is not 'potentially hazardous'). Assessment of risks posed by the BIP complex and Nant Street tank farm on the proposed development is provided in Section 4.5.
Societal risk	<i>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 even if individual risk criteria are met.</i>	Assessment of societal risk due to intensification of population is provided in Section 4.6.

4.5. Assessment of risks from the BIP complex

Assessment of risks posed by the BIP complex (and Nant Street tank farm) on the proposed warehouse estate was undertaken using the most recent 2018 BIP QRA model (Ref.6). The risk results are available in the public domain. Consent from the BIP was obtained by Sherpa to use the latest QRA model for assessing the risk impact of population changes associated with the development.

Risks were assessed by comparison of risk levels at the proposed development site against the applicable NSW land use planning risk criteria as published in HIPAP 10.

Individual injury risk criteria (heat radiation, explosion overpressure, toxic injury and irritation) are applicable for residential and sensitive land uses only, i.e. are not applicable for industrial developments.

A summary of the assessment of the risks posed by the BIP complex on the proposed development against all individual risk criteria is presented in Table 4.3. Reference figures illustrating the BIP risk profiles used for assessment are included where relevant.

Assessment of societal risk impact due to the proposed development is included in Section 4.6.

Table 4.3: Assessment of risks from the BIP (all criteria)

Risk profile	Suggested criteria	Assessment	Reference
1. Individual fatality risk	<i>Individual fatality risk levels for industrial sites at levels of 50 in a million per year should, as a target, be contained within the boundaries of the site where applicable.</i>	The individual fatality risk at the 50 in a million per year level is contained within the BIP and Nant Street tank farm boundaries. The risk posed by the BIP at the proposed development is less than 0.5 in a million per year.	Figure 4.1
2. Injury risk (heat radiation)	<i>Incident heat flux radiation at residential and sensitive use areas should not exceed 4.7 kW/m² at a frequency of more than 50 chances in a million per year.</i>	This criterion is not applicable for the proposed development (industrial use).	-
3. Injury risk (explosion overpressure)	<i>Incident explosion overpressure at residential and sensitive use areas should not exceed 7 kPa at frequencies of more than 50 chances in a million per year.</i>	This criterion is not applicable for the proposed development (industrial use).	-
4. Damage and propagation (heat radiation)	<i>Incident heat flux radiation at neighbouring potentially hazardous installations or at land zoned to accommodate such installations should not exceed a risk of 50 in a million per year for the 23 kW/m² heat flux level.</i>	The heat radiation damage and propagation risk at the 50 in a million per year level from either the BIP or Nant Street tank farm does not encroach on the proposed development. <u>Note:</u> there are no contours shown for Nant Street as the frequency is below the criterion of 50 in a million per year.	Figure 4.2
5. Damage and propagation (explosion overpressure)	<i>Incident explosion overpressure at neighbouring potentially hazardous installations, at land zoned to accommodate such installations or at nearest public buildings should not exceed a risk of 50 in a million per year for the 14 kPa explosion overpressure level.</i>	The explosion overpressure damage and propagation risk at the 50 in a million per year level from either the BIP or Nant Street tank farm does not encroach on the proposed development. <u>Note:</u> there are no contours shown for Nant Street as the frequency is below the criterion of 50 in a million per year.	Figure 4.3

Risk profile	Suggested criteria	Assessment	Reference
6. Toxic injury risk	<i>Toxic concentrations in residential and sensitive use areas should not exceed a level which would be seriously injurious to sensitive members of the community following a relatively short period of exposure at a maximum frequency of 10 in a million per year.</i>	This criterion is not applicable for the proposed development (industrial use).	-
7. Toxic irritation risk	<i>Toxic concentrations in residential and sensitive use areas should not cause irritation to eyes or throat, coughing or other acute physiological responses in sensitive members of the community over a maximum frequency of 50 in a million per year.</i>	This criterion is not applicable for the proposed development (industrial use).	-

Figure 4.1: Individual fatality risk contours

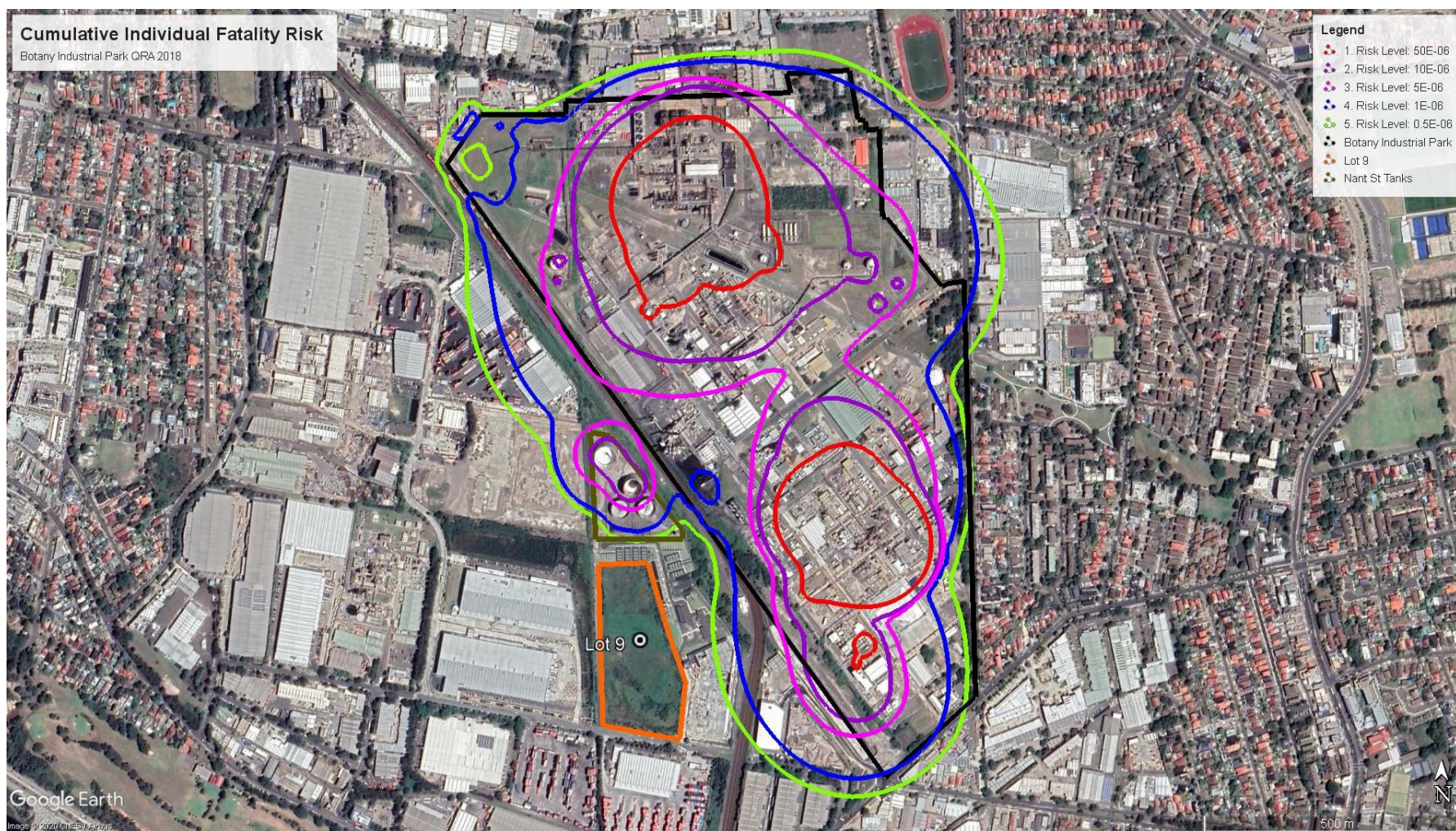


Figure 4.2: Damage and propagation risk contours – Heat radiation (23 kW/m²)



Figure 4.3: Damage and propagation risk contours – Explosion overpressure (14 kPa)



4.6. Societal Risk

4.6.1. Overview

Societal risk is a measure of the probability of incidents affecting an actual person/population. In accordance with the HIPAP 10 requirement, where a development proposal involves a significant intensification of population in the vicinity of a potentially hazardous facility, the change in societal risk needs to be accounted for, even if individual risk criteria are met.

For this study, the following assessments on societal risk were undertaken:

- Impact to cumulative societal risk due to the proposed development.
- Incremental societal risk from the proposed development.

The societal risk profiles were evaluated against the HIPAP 10 societal risk criteria.

Provided the incremental societal risk lies within the negligible region, development should not be precluded. If incremental risks lie within the ALARP (As Low As Reasonably Practicable) region, options should be considered to relocate people away from the affected areas. Finally, if there is still a significant portion of the societal risk plot within the ALARP region, the proposed development should only be approved if benefits clearly outweigh the risks.

4.6.2. Population definition

The proposed development will be used for general goods warehousing activities (i.e. storage and distribution). Typically, storage and distribution warehouses would have a low population, for example the 2012 City of Sydney Floor Space and Employment Survey (Ref.7) suggests a density of 27.8 people per hectare (ha).

The highest industrial/employment density for the industrial areas in the vicinity of the BIP was identified in the 2018 BIP QRA (Appendix 8, Table A8.3, Ref.6) as 41 people/ha. The Transport for NSW travel zone data (TZP2016 employment projections) used in the 2018 BIP QRA are reproduced in APPENDIX A. Therefore, 41 people/ha has been used in this assessment to estimate the total population for the proposed development based on the total site area.

As per Table 4.4, the proposed development may introduce an additional employment population of up to 170 people (day time) and 34 people (night time). This is above the number of parking spaces required for this development (i.e. 117 spaces).

Table 4.4: Population definition

Activity	Definition			Area (ha)	Onsite Population	
	Density (per ha)	Day	Night		Day	Night
Storage and distribution	41.2	100% day	20% day	4.13	170	34

4.6.3. BIP QRA 2018 societal risk profiles

For the 2018 BIP QRA, two societal risk profiles were assessed. These include:

1. *Current Development* – this refers to the societal risk profile assessed for populations on existing developments which were based on the latest 2016 census data (residential) and journey to work data (employment).
2. *Approved Development* – this refers to the societal risk profile assessed for *Current Development* plus population estimates for developments that have been approved around the BIP, but are not yet occupied or were likely to be occupied after the collection data of the 2016 census. These include:
 - BIP subdivision on Denison Street and Corish Circle
 - Bunnings Warehouse on Denison Street (opposite the BIP)
 - Meriton redevelopment of the former British-American Tobacco site adjacent to Westfield Eastgardens.

It was noted that the populations assumed for these developments are thought to be conservative estimates (i.e. likely to overestimate the populations once occupancy commences).

4.6.4. Impact to cumulative societal risk

The cumulative societal risk profile was compared against the 2018 BIP QRA societal risk profile for both (1) Current Development and (2) Approved Development to determine the impact of the proposed development (population density of 41 people/ha) to the overall societal risk and evaluation against the HIPAP societal risk criteria.

The cumulative societal risk comparison and evaluation are presented as follows:

- Comparison against BIP QRA 2018 'Current Development' (Figure 4.4)
 - There is a very slight increase in the overall societal risk. However, this is insignificant to the overall societal risk in the area.
- Comparison against BIP QRA 2018 'Approved Development' (Figure 4.5)
 - There is a very slight increase in the overall societal risk. However, this is insignificant to the overall societal risk in the area.

Overall, the assessment demonstrates that the proposal has very little impact on the overall societal risk from the BIP.

Figure 4.4: Comparison against BIP QRA 2018 'Current Development'

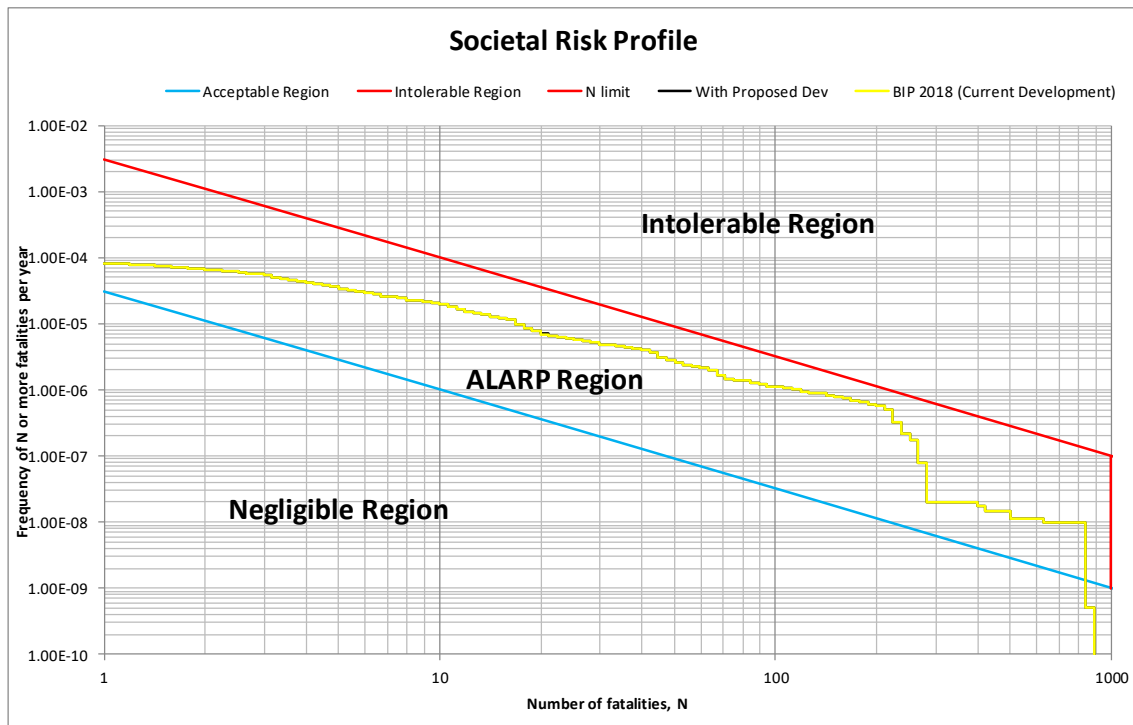
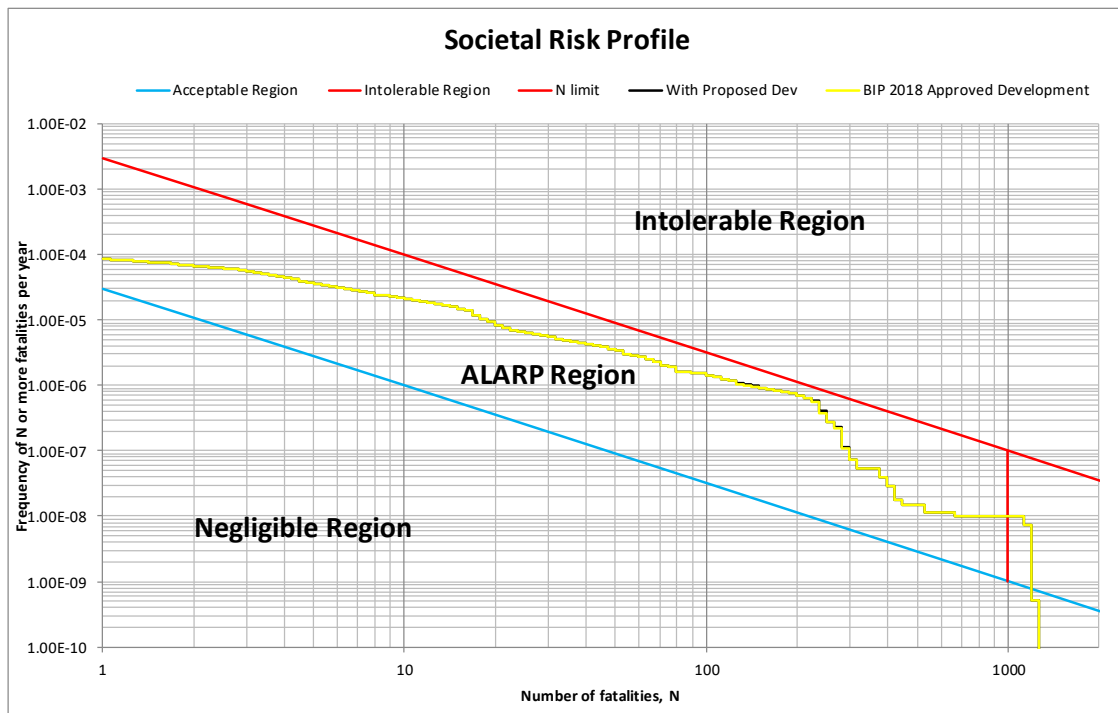


Figure 4.5: Comparison against BIP QRA 2018 'Approved Development'



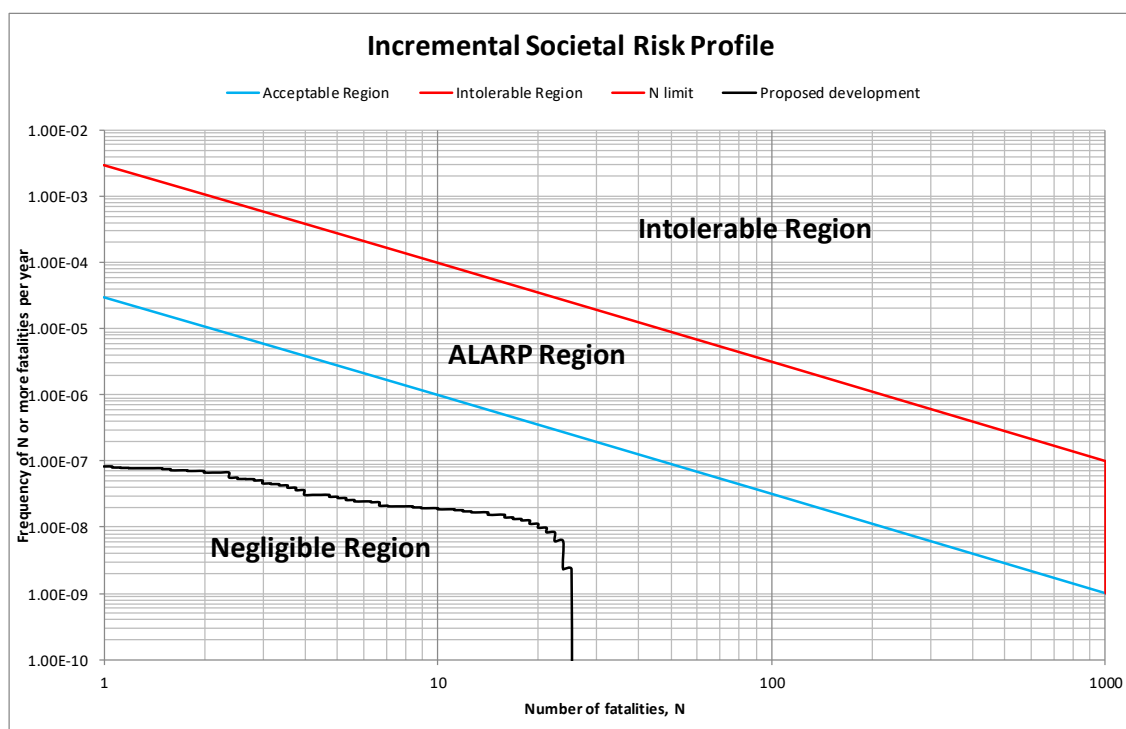
4.6.5. Incremental societal risk from the proposed development

The incremental societal risk reflects the societal risk profile for the proposed development population only. As per requirement of HIPAP 10, the incremental societal risk was compared against the HIPAP societal risk criteria.

The incremental societal risk for the proposed development population is presented in Figure 4.6.

The assessment found that the incremental societal risk for the proposed development lies within the negligible region. Therefore, the development should not be precluded within the context of HIPAP 10.

Figure 4.6: Incremental societal risk profile – Proposed development



4.6.6. Scaled Risk Integral

In addition to qualitative and quantitative risk assessment against HIPAP 10 criteria, DPIE also requested (meeting 19 February 2019) that the incremental societal risk for the proposed development be determined using the Scaled Risk Integral (SRI) technique as described in HIPAP 10.

The SRI method has been used by the UK Health and Safety Executive (UK HSE) to assess the significance of increases in population in the vicinity of a Major Hazard Facility.

This method is derived from the standard societal risk FN plot concept (as was adopted for the area wide BIP 2018 QRA), but uses the following simplified information to determine a single SRI value for a proposed development:

- Average individual risk results
- The land use category of each site (e.g. housing, retail, industrial etc.)
- Details of the number of persons (n) at each site
- The proportion of time each site is occupied by n persons
- The area of each site.

The number of persons ('n') at each site is adjusted by a factor ('c') to accommodate differing categories of development. For developments where the general public may be present (e.g. housing; hotel or holiday accommodation; retail facilities; community or leisure facilities; etc.) a value of 'c' of 1 is suggested by the HSE. Similarly, for developments where vulnerable populations may be present (e.g. hospitals; homes for the elderly; schools; etc.) a value of 4 is suggested, and for industrial, commercial or rural developments where working populations may be present (e.g. factories; warehouses; offices; farm buildings; etc.) a value of 0.25 is suggested.

A 'comparison value' is used for assessment purposes. The basis for the lower 'comparison value' adopted by the HSE is that an individual risk of exposure to a 'dangerous dose' is broadly acceptable at 1 per million per year for a development involving up to 75 people. Assuming an average of 2.5 people per dwelling, 75 people equates to 30 dwellings with a typical land area of 1.2 hectares and the SRI equals $0.5 \times (75+752) \times 1 / 1.2 = 2,375$. This limiting case (suitably rounded) gives a lower 'comparison value' of 2500 (Ref 8). When the SRI is calculated on the basis of individual fatality risk (as per the NSW HIPAPs) rather than a 'dangerous dose', the 'comparison value' is reduced from 2500 to 1100 (Ref 5).

Note that in Sherpa's view the site is too large to apply this methodology successfully as the risk levels vary significantly across the site from north to south. However, a conservative estimate of SRI has been made based on the overall proposed development area using:

- The calculated population case (i.e. 170 people/employment introduced for the proposed development as per Table 4.4).
- The highest risk level at the site (i.e. northern end of the proposed development), i.e. 9×10^{-8} per year.

The SRI inputs and results are shown in Table 4.5. The estimated SRI is 10, well below the comparison value of 1100. Hence the conclusion is the same as that reached from the FN curve analysis, i.e. the societal risk will not change significantly as a result of the proposed Lot 9 development.

Table 4.5: SRI estimate

Sensitivity Cases

Comparison Value (acceptable risk if SRI value below this) < 1100

Basis for Population Area	Approx Area	No of people	Basis for population	Site Category	Factor (c)	Adjusted pop (N)	Pop factor (P)	Average Risk over area	Assumed probability of	SRI	Acceptable
	(m2)					=no of people x factor	$0.5x (N+N^2)$	(pmpy)	Assumed probability of presence-day only		
Total											
Lot 9 overall area - Day	41534	170	As per Table 4.4	Industrial	0.25	43	924	0.09	0.50	10	
Lot 9 overall area - Night	41534	34	Assume 20% of daytime population remains at night	Industrial	0.25	9	40	0.09	0.50	0	
Total - accounts for 20% population at night time										10	OK

5. BOTANY/RANDWICK AREA LUSS RECOMMENDATIONS

The relevant recommendations published in Botany-Randwick Industrial Area Land Use Safety Study (LUSS) (Ref.9) are addressed in Table 5.1.

Table 5.1: Botany/Randwick industrial area LUSS recommendations

Recommendations	Applicable (Y/N)	Remarks
Future developments within the Botany/Randwick industrial area should be subject to full risk assessment, following the seven-stage approval process. In addition, proposed developments should undergo comprehensive environmental impact assessment to conclusively demonstrate that the development will not produce off-site risks that are inappropriate for surrounding land uses.	Yes	The SEPP 33 risk screening review demonstrates that the development will not pose offsite fatality risks as no hazardous materials and DGs are proposed. The general warehousing development is not 'potentially hazardous', therefore a PHA is not required and the full seven-stage approval process is not required.
Any future development in the vicinity of the Botany/Randwick industrial area should generally provide a buffer between the industrial area and surrounding residential zones. In assessing a proposed development, residential intensification should not be considered in the shaded region of Figure 1 until the new Orica chlorine plant is operational and bulk chlorine storage on the site has ceased. The Department should be consulted regarding proposed development within the 'consultation region' of Figure 1. It would also be prudent for the Department to be consulted regarding these regions after the replacement of the existing (pre-2001) Orica chlorine plant, at least during the early stages of plant operation.	No	No residential intensification associated with the proposed development (i.e. industrial land use).
As this study has not included the impacts of dangerous goods traffic along Stephen Road and Denison Street, or the operations of Port Botany and the Sydney Airport, it is strongly recommended that these activities be taken into account in the assessment of any development in the Botany/Randwick area.	No	The development will not result in increased DG transport as there will be no hazardous materials and DGs (i.e. not 'potentially hazardous').

Recommendations	Applicable (Y/N)	Remarks
It is recommended that all facilities investigated as part of this study review and strengthen safety management systems. These systems should be monitored by periodic independent compliance audits at intervals of not less than two years. As part of the review of safety management systems, incident/near miss reporting and follow-up procedures should be updated to be consistent with best practice. Training arrangements should be reviewed to ensure that a safety management system is supported by an employee understanding of operational hazards and emergency procedures.	No	This relates to the BIP as the potentially hazardous facility generating the risk. It does not apply to the proposed warehousing development.
Emergency procedures for facilities within the industrial area should be reviewed and updated with the aim of establishing greater consistency between the procedures at different sites. There should also be a greater level of integration between facilities in terms of regional emergency planning. An integrated emergency plan for the area should be developed and mutual aid agreements established.	Yes	Suitable emergency response procedures will be developed for the proposed development. The proponent will liaise with the BIP to ensure the emergency plan for the warehousing site accounts for the required response to an incident in the BIP or at the Nant Street tank farm. It is noted that this could be achieved via a condition of consent.
The community should be adequately informed about activities, associated risks and safety management measures adopted within the Botany/Randwick industrial area. A formal mechanism needs to be established to implement a community right-to-know program. Community Consultative Committees should be established for developments, or groups of developments, in the industrial complex to act as an interface between the community and industry, particularly in regard to safety issues.	Yes	The proponent will consult with the (1) community and relevant stakeholders as part of the DA application process (i.e. public exhibition period) and (2) liaise with the BIP in regard to associated emergency planning.

APPENDIX A. TFNSW TRAVEL ZONE DATA USED IN 2018 BIP QRA

Transport NSW TZP2016 Employment Projections

TZ	Description	Area (m2)	Employment (2016)	Population (Day time)	Pop Density (psn per 2500m2)	Pop Density (psn per ha)	Population (Night time)	Adjustments made
400	Orica Australia	1388925	3052	0	0.0	0.0	0	remove BIP population of 505 and allocate remainder over remainder of TZ area
401	Discovery Cove Industrial Park	1175009	2741	2741	5.8	23.3	0	
402	Caltex Sydney Terminal	803974	781	781	2.4	9.7	0	
406	Botany William St	410737	476	476	2.9	11.6	0	
408	Botany Industrial Area	1724401	2930	2930	4.2	17.0	0	
421	Bonnie Doon Golf Club	941517	187	187	0.5	2.0	0	
422	Pagewood_Wentworth Av and Page St	605693	440	440	1.8	7.3	0	
423	Eastgardens Shopping Centre	300664	3479	0	0.0	0.0	0	Split into shape for Eastgardens and shape for Meriton (former BAT/ Wills). Remove tobacco workers from data (616 people). All remaining population to Eastgardens. For Meriton residential density ('approved case' only) as per DPE advice and construction workers as per Urbis report ('current case' only)
424	South Point Shopping Centre	512840	1041	0	0.0	0.0	0	Split into shape for Bunnings and remainder polygon. 200 extra people to Bunnings and all TZ population to remaining shape
425	Matraville Public School	270005	181	181	1.7	6.7	0	
428	Port Botany Business Park_West	347920	917	917	6.6	26.4	0	
429	Military Rd	1275115	2521	2521	4.9	19.8	0	
430	Port Botany_Southern Container Terminal	1180796	1721	1721	3.6	14.6	0	
624	Matraville_Eastern Rd and Beauchamp Rd	527346	187	187	0.9	3.5	0	
625	Matraville	405871	1672	1672	10.3	41.2	0	
627	Matraville_Menin Av and Flinders St	686839	278	278	1.0	4.0	0	
628	Port Botany Business Park_East	454679	293	293	1.6	6.4	0	
629	Matraville High School	1339005	426	426	0.8	3.2	0	
640	South Sydney High School	852112	740	740	2.2	8.7	0	
645	Heffron Park	789884	25	25	0.1	0.3	0	
				16516			0	
				Max	10.3	41.2		
				Min	0.0	0.0		

Document number: 21280-RP-001
Revision: 2
Revision Date: 18-Mar-2020
File name: 21280-RP-001-Rev2

APPENDIX B. REFERENCES

- 1 NSW Department of Planning and Environment (2018): Secretary's Environmental Assessment Requirements, SSD 9691.
- 2 NSW State Government (1992): State Environmental Planning Policy No 33 – Hazardous and Offensive Development.
- 3 NSW Department of Planning (2011): Hazardous Industry Planning Advisory Paper No.6: Hazard Analysis.
- 4 NSW Department of Planning (2011): Applying SEPP 33.
- 5 NSW Department of Planning and Environment (2011): Hazardous Industry Planning Advisory Paper No 10 – Land Use Safety Planning.
- 6 Sherpa Consulting Pty Ltd (2018): Botany Industrial Park Quantitative Risk Assessment (QRA) Report, Document Number: 21158-RP-001, Rev 1.
Webpage: https://www.planning.nsw.gov.au/Policy-and-Legislation/Hazards/Industrial-Hazards?acc_section=sites_of_interest
- 7 City of Sydney (2012): Local Government Area Summary Report, City of Sydney Floor Space and Employment Survey, Table 10 and Table 11, Pp 25-26.
- 8 Carter D A (1995) *The Scaled Risk Integral*, Proceedings of the 8th International Symposium on Loss Prevention & Safety Promotion in the Process Industries, Antwerp, June Elsevier Science, 1995
- 9 NSW Department of Urban Affairs and Planning (2001): Botany/Randwick Industrial Area Land Use Safety Study.