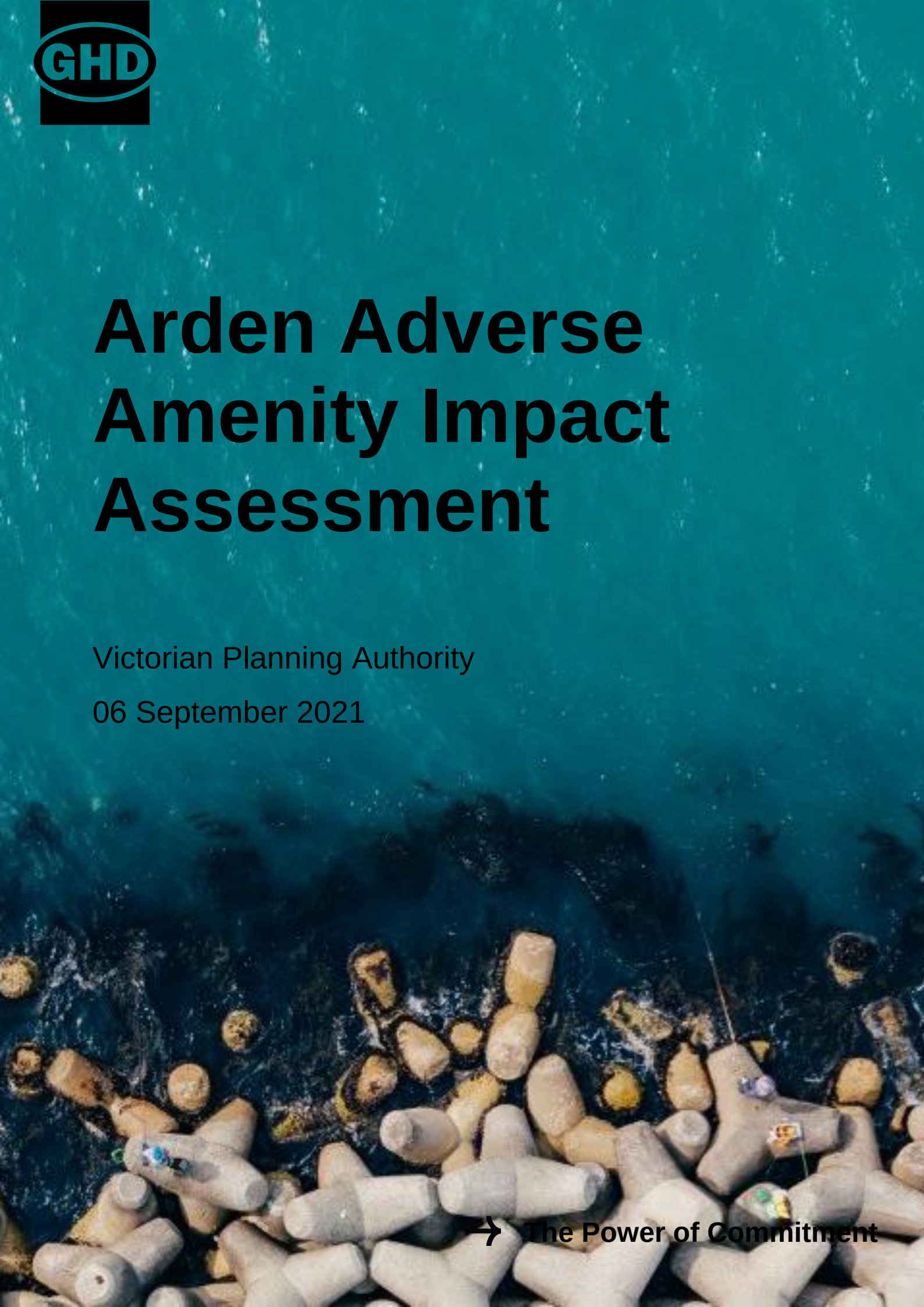
Arden Adverse Amenity Impact Assessment

Victorian Planning Authority

06 September 2021



The Power of Commitment

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Executive summary

GHD was engaged by the Victorian Planning Authority (VPA) to prepare an Adverse Amenity Impact Assessment (AAIA) for the Arden Urban Renewal Precinct (the Precinct).

Key focus areas of the AAIA assessment included the following:

– Identify industries within the Precinct and within a 2 km catchment area which attract a buffer and/or be a potential noise/vibration source which may affect the future development of the land.
– Utilise Section 9 of the EPA publication *Recommended separation distances for industrial residual air emissions* (March 2013) to determine site specific variation to the default buffers. This allowed for directional buffers to be developed using site-representative meteorology.
– Provide recommendations on which adverse amenity impacts can be mitigated through built form and planning controls for the Precinct, allowing for optimisation of the placing of sensitive land uses within the Precinct.
– Undertake a review of potential impacts associated with the identified noise and vibration sources.
– Provide general recommendations to assist with the land use planning, design and development of the Precinct.

Key findings

Key findings of this report are summarised below:

– Various existing premises with the potential for odour, dust, noise and vibration were identified within and surrounding the Precinct.
– The Precinct is largely constrained by the default buffers for the industries identified.
– The significant industries and their potential amenity impact identified as constraining the Precinct are:
    - Citywide (odour, dust and noise)
    - Holcim (dust and noise)
    - Irwin stockfeed (dust)
    - Western Milling (dust and noise)
– There was a distinct asphalt odour associated with Citywide registered beyond the site boundary at the time of GHD site inspection.
– Local meteorology was used to develop directional buffers to assess protection from disamenity in the event of a process upset. The adjustments to take account of local meteorology shows a slight reduction of the default buffer towards the west, while there is an increase beyond the default buffer to the east and southeast.
– Key noise and vibration sources with potential to impact the sensitive uses within the Precinct were identified as:
    - Industrial and commercial premises within the Precinct and surrounding area
    - Traffic noise from the existing road network (Citylink) and occasional noise from heavy vehicles servicing industrial facilities (i.e. warehouses and general factories)
    - Rail corridor noise and vibration due to passenger passbys (Upfield rail line)
– During the site visit, local traffic and intermittent heavy vehicles servicing industrial facilities were observed to be the dominant sources of noise within the ambient noise environment.
– The existing industrial sites within the Precinct such would have been required to comply with the Noise Protocol at the existing noise sensitive receivers and are not required to mitigate further if new sensitive land encroach on their site.

Recommendations

The following recommendations are provided within this report:

- It is recommended that a detailed analysis of the constraining industries be undertaken which may result in a variation of the default buffer.
- Contact existing industries that pose a constraint to organise a transition strategy for the Precinct (utilising the transitioning of the industry criteria within EPA Publication 1518).
- Careful strategic planning of land uses, to:
  - Plan where different types of land uses can be located using a setback strategy (directional buffers).
  - Manage and minimise noise impact from sensitive and non-sensitive land use interfaces including but not limited to consideration of in-principle noise mitigation strategies outlined in this report.
- The implementation of design controls within the Melbourne Planning Scheme (the planning scheme) and where appropriate development approval process to:
  - Where appropriate place specific planning requirements as part of planning scheme amendments or planning permit conditions (i.e. control of air quality and noise emission) on proposed sensitive land use and developments in particular areas and implementing buffer areas.
  - Require any proposed sensitive land uses to undertake external noise intrusion assessment to demonstrate that the development is designed and constructed to achieve recommended noise amenity targets outlined in VPP Clause 58.04-3 and sleep disturbance criteria as defined by World Health Organisation from external noise sources.
  - Require any noise sensitive land use within close proximity of the rail track line, to undertake external noise intrusion assessment to demonstrate that the development is designed and constructed to achieve recommended noise amenity targets outlined in VPP Clause 58.04-3 and sleep disturbance criteria as defined by World Health Organisation from rail noise.
  - Require developments with potential to generate noise to undertake further acoustic assessment to demonstrate that the development is designed and constructed to comply with the Noise Protocol requirements at surrounding sensitive uses (including within the Precinct).
- Consider staging the development of the land to provide the opportunity to consider the changing (transitioning) industrial context for the surrounding Precincts.
- Locate complimentary commercial and other business uses within the specified buffer distances to industrial developments and adjacent to arterial roads. This could apply spatially at a horizontal level as well as a vertical level. The commercial and business land uses would act as a physical buffer between industrial activities and more sensitive land uses.
- Manage and minimise existing odour and dust emissions at source.
- Implementation of recommended buffer distances for control of rail noise and vibration as outlined in Sections 6.5.6 and 6.7.1.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.4 and the assumptions and qualifications contained in section 1.5 and throughout the report.

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1. Introduction

1.1 Context

The Arden Urban Renewal Precinct (the Precinct) forms part of the Arden and Macaulay urban renewal area of North Melbourne. The Precinct has the potential for more intensive mixed use and residential living following the development of the Metro Tunnel and new North Melbourne Station. The *Arden Vision* document was open to public consultation in 2016 and forms the basis for more supporting documents (i.e. a structure plan) to be prepared in 2019. As part of the 2019 works, GHD was engaged by the Victorian Planning Authority (VPA) to conduct an adverse amenity impact assessment (AAIA) for the Precinct.

GHD has prepared this report assessing potential sources of adverse amenity impacts including noise, dust, odour and air emissions against relevant regulations to assist VPA in their decision making regarding land use and built form requirements under the proposed structure plan. The assessment area included the Precinct itself and features within a 2 km radius of the Precinct boundary.

A number of existing industries currently exist within the Precinct which may have the potential to constrain future planning by virtue of amenity impacts.

As part of the AAIA, GHD has undertaken a buffer assessment with respect to air quality. The purpose of an air quality buffer assessment is to provide sufficient separation between sensitive land uses (such as residences) and industries that have the potential to generate emissions of dust and/or odour so that on the occasion of an upset or malfunction, the off-site dis-amenity is minimised.

This report also includes a desktop noise and vibration impact review of potential noise and vibration sources that may affect development within the Precinct. General advice on mitigation considerations prior to construction is also provided to aid in the development design to mitigate these impacts through the proposed built form.

The report draws upon Clause 53.10 of the Victorian Planning Provisions (VPP) 'Uses with Adverse Amenity Potential' and the EPA separation distance guideline, Publication 1518 dated March 2013, as part of this assessment.

In reading this report, it is significant to note that the terms 'buffer distance' and 'separation distance' have been used interchangeably in this report – the former is the commonly understood term while the latter was introduced in 2013 and is currently the latest EPA guideline.

1.2 Purpose of this report

The purpose of this report is to assess the potential for adverse amenity impact from noise, dust, odour and air emissions to new sensitive receptors that may be planned for within the Precinct. The assessment in this report has been conducted in accordance with the scope of works presented in Section 1.4 of this report.

The findings, conclusions and recommendations of this assessment should be read in conjunction with the limitations presented in Section 1.3 of this report.

1.3 Scope of limitations

This report has been prepared by GHD for Victorian Planning Authority and may only be used and relied on by Victorian Planning Authority for the purpose agreed between GHD and the Victorian Planning Authority as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Victorian Planning Authority arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in section 1.5 and throughout this report. GHD disclaims liability arising from any of the assumptions being incorrect. The results of the analysis presented in this report are also subject to any limitations of the AERMOD modelling software package.

GHD has prepared this report on the basis of information provided by Victorian Planning Authority and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based in part on an onsite inspection undertaken by GHD in July 2019, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

1.4 Scope of works

This assessment was prepared in accordance with the following scope of works:

General

1. An inception meeting was held with the VPA and Council to clarify and confirm objectives, reporting, program and discuss any outstanding issues or queries.
2. A site visit was undertaken to inspect the Precinct and identify potential industries within the Precinct and within a 2 km catchment area (surrounding area) which may attract a buffer and/or be a potential noise source which may have the potential to result in adverse amenity impact at the Precinct. The site visit was also supplemented by desktop searches including using NPI website and the EPA website.

Buffer distances

1. Assess any constraints on the Precinct from any existing industry, and plot the relevant separation distances.
2. Based on existing industry sizes and known or estimated throughputs, review any options for de-rating the individual industries default buffers.
3. Characterise the meteorology at the site by means of wind roses. This enables directions of good and poor dispersion to be developed.
4. Use the site-representative meteorological data and dispersion modelling to develop directional buffers for the identified industries and plot on an aerial image.
5. Provide conclusions as to any buffer constraints that may impact the Precinct.
6. Identify the requirements for further assessment work at the Precinct with regards to air quality.

Noise and vibration

1. Undertake a review of the relevant noise and vibration guidelines and standards applicable to the Precinct and 2 km catchment.
2. Undertake a review of potential impacts associated with the identified noise and vibration sources.

3. Provide general recommendations in relation to noise and vibration to assist with planning, use, design and development of the Precinct.
4. Identify the requirements for further assessment work at the Precinct with regards to noise.

Mitigation

1. Assess which adverse amenity impacts can be mitigated through design and built form interventions.
2. Provide high level recommendations on how these can be translated into land use and built form planning controls for the Precinct.

Reporting

1. Present the findings of the Adverse Amenity Impact Assessment.

1.5 Assumptions

The following assumptions have been used in this report:

– The ambient noise environment on the day of the site visit is representative of typical conditions in the area.
– The most site representative available meteorological data is from the EPA automatic weather station (AWS) located at Footscray.
– Where throughputs or capacity of industries within the Precinct are unknown, GHD has taken a conservative approach.
– The surrounding industries site boundaries are based off publicly available information provided by the Victorian State Government Department of Environment, Land, Water and Planning (DELWP).
– Information on the operations and throughput of the identified industries are from publicly available information, site visits, planning permit data (where available) and not through direct contact with local industry or industry bodies except with the following businesses:
    - Dairy Technical Services (DTS)
    - Irwin Stockfeeds
    - OE & DR Pope
    - Olsson's Pacific Salts

2. Project description

2.1 Location and land use

The Precinct is located in North Melbourne and encompasses the land bordered by Macaulay Rd, Dryburgh St and the Upfield rail corridor. The centre of the Precinct area, bordered to the west by the Citylink roadway and Upfield rail line, is zoned for public use-transport. The north of the site includes Industrial Zone 1 and Industrial Zone 3 land. The Precinct includes the North Melbourne cricket Ground at the North Melbourne Recreation Reserve, which is zoned for Public Park and Recreation Use. Mixed Use zoned land is present to the east of the site.

Currently, land uses within the Precinct are mostly of an industrial nature. Infrastructure includes transport, warehouses, flour mills, concrete and asphalt batching, automobile garages and laboratories. A few residences exist in the outer boundaries of the Precinct and on Stawell and Dryburgh Streets. Three parks exist in the Precinct; namely North Melbourne Recreation Reserve, Clayton Reserve and Railway Place and Miller Street Park.

The Precinct site boundary and 2 km radius is shown in Figure 2-1.

LEGEND

Precinct boundary 2 km radius

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0 400 800 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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Arden Adverse Amenity Impact Assessment

Site overview

Project No. 3137400
Revision No. -
Date. 06/09/2021

FIGURE 2-1

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Google Earth Imagery 2019. Created by: MT

2.2 Surrounding land use

The Precinct is surrounded by Kensington to the northwest, West Melbourne to the southwest and the balance of North Melbourne to the northeast and southeast. Kensington includes mostly general residential zones and parks, with some industry to the southeast. West Melbourne includes mostly industrial and public use zones for transport and 'other' use. The remainder of North Melbourne consists of residential zones and mixed use zones.

2.3 Sensitive land use

The definition of a sensitive receptor or sensitive land use is defined by the EPA[1] as:

> *'any land uses which require a particular focus on protecting the beneficial uses of the air environment relating to human health and well-being, local amenity and aesthetic enjoyment, for example residential premises, child care centres, pre-schools, primary schools, education centres or informal outdoor recreation sites'.*

Environment Protection Regulations 2021 defines a noise sensitive area as:

a) That part of the land within the boundary of a parcel of land that is:

- *within 10 metres of the outside of the external walls of any of the following buildings*
  - *a dwelling (including a residential care facility but not including a caretaker's house)*
  - *a residential building*
  - *a noise sensitive residential use; or*
- *within 10 metres of the outside of the external walls of any dormitory, ward, bedroom or living room of one or more of the following buildings*
  - *a caretaker's house*
  - *a hospital*
  - *a hotel*
  - *a residential hotel*
  - *a motel*
  - *a specialist disability accommodation*
  - *a corrective institution*
  - *a tourist establishment*
  - *a retirement village*
  - *a residential village; or*
- *within 10 metres of the outside of the external walls of a classroom or any room in which learning occurs in the following buildings (during their operating hours):*
  - *a child care centre*
  - *a kindergarten*
  - *a primary school*
  - *a secondary school; or*

b) subject to paragraph (c), in the case of a rural area only, that part of the land within the boundary of

- *a tourist establishment; or*
- *a campground; or*

[1] EPAV 2013 "Recommended separation distances for industrial residual air emissions" Publication. 1518, March 2013

- *a caravan park; or*

  c) *despite paragraph (b), in the case of a rural area only, where an outdoor entertainment event or outdoor entertainment venue is being operated, that part of the land within the boundary of the following are not noise sensitive areas for the purposes of that event or venue*

- *a tourist establishment*
- *a campground*
- *a caravan park*

Thus, the definition of sensitive receptor or sensitive land use is considered to be that identified by EPA for the purposes of this assessment.

Current sensitive land uses within the Precinct include the residences within the Mixed Use Zone located on the eastern edge of the site.

3. Existing planning and land use context

3.1 Planning policy framework

The Planning Policy Framework (PPF) includes a number of references to planning for the location of potentially conflicting land uses and their relationship to each other. The following clauses are relevant to this study for the Arden Urban Renewal Precinct.

3.1.1 Clause 11 Settlement

Clause 11 seeks to anticipate and respond to the needs of existing and future communities through appropriately zoned and serviced land for housing, employment, recreation and open space, commercial and community facilities and infrastructure.

Clause 11.01-1S identifies the need to focus investment and growth in places of state significance such as the Arden Urban Renewal Precinct, and to capitalise on development opportunities around planned transport infrastructure such as the new North Melbourne Station. This Clause also highlights the opportunity for urban renewal and infill redevelopment to provide for the needs of a growing Victoria.

Clause 11.02-2S encourages the orderly development of urban areas through the preparation of relevant plans, including structure plans. These plans should support land use and development which considers the strategic and physical context of a location, and facilitate both the provision of new infrastructure and continued use of established infrastructure and services as required within a given area.

Clause 11.03-1S and Clause 11.03-1R relate to activity centres and are relevant given the proposed Arden Central sub-regional activity centre and Macaulay neighbourhood activity centre within Precinct. These policies direct a concentration of compatible infrastructure, land uses and services to designated accessible centres to provide for high-quality development, activity and living.

3.1.2 Clause 12 Environmental and Landscape Values

Clause 12 relates to the protection and conservation of environmental and landscape values and highlights the need for planning to implement principles for ecologically sustainable development.

Clause 12.03-1 considers the protection of waterways in Victoria and is relevant given the presence of the Moonee Ponds Creek Corridor bordering the Precinct to the west. It supports development that is sensitively designed and sited to maintain and enhance the biodiversity, landscape and cultural values of waterways and waterbodies.

3.1.3 Clause 13 Environmental Risks and Amenity

Clause 13 considers environmental risks including reference to land use separation and protection of sensitive uses from adverse impacts caused by other land uses. Policies under this Clause which are of particular relevance to the assessment of adverse amenity impacts are underlined below.

Clause 13.03-1S relates to floodplain management and is relevant given the Arden Precinct is prone to flooding from both the Moonee Ponds Creek and from overland stormwater. Land use and development should consider flood risk and impacts, and be designed and sited to minimise flood hazard.

Clause 13.04-1S seeks to ensure that potentially contaminated land is suitable for its intended future use and development, and that contaminated land is used safely.

Clause 13.05-1S Noise Guidelines seeks to ensure that development is not prejudiced and community amenity is not reduced by noise emissions, using a range of building designs, urban designs and land use separation techniques as appropriate to the land use functions and character of the area. The policy considers the following policy guidelines (considered relevant to this study).

– The noise requirements in accordance with the Environment Protection Regulations under the Environment Protection Act 2017.

– Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues (Publication 1826.2, Environment Protection Authority, March 2021) (the Noise Protocol)

Clause 13.06-1S Air Emissions Guidelines relates to air quality management and aims to assist in the protection and improvement of air quality. This clause seeks to ensure, wherever possible, that there is suitable separation between land uses that reduce amenity and sensitive land uses. The policy considers the following policy guidelines (as considered relevant to this study).

– Recommended Separation distances for industrial residual air emissions (Publication 1518, Environment Protection Authority, March 2013)

Clause 13.07-1S Land Use Compatibility seeks to safeguard community amenity while facilitating appropriate commercial, industrial or other uses with potential off-site effects.

This can be achieved by ensuring the compatibility of a use or development as appropriate to the land use functions and character of the area by:

– Directing land uses to appropriate locations.
– Using a range of building design, urban design, operational and land use separation measures.

Clause 13.07-2S seeks to minimise the potential for human and property exposure to risk from incidents that may occur at major hazard facilities.

3.1.4 Clause 15 Built Environment and Heritage

Clause 15 seeks to promote excellence in the built environment and create places where urban design, built form and heritage values positively contribute to liveable and sustainable cities.

Clause 15.01-1S highlights the importance of urban design in creating urban environments that are safe, healthy, functional and enjoyable. This includes strategies to ensure development minimises detrimental impacts on local amenity or the natural environment, and supports safety and attractiveness in the public realm.

3.1.5 Clause 17 Economic Development

Clause 17 aims to provide for a strong and innovative economy by supporting economic growth and development. This is to be achieved by providing land, facilitating decision-making and resolving land use conflicts, so that each district may build on its strengths and economic potential.

Clause 17.03-1S seeks to ensure the adequate supply of land for industry in appropriate locations. This can be achieved by protecting existing industrial areas to, where possible, facilitate further industrial development; and to avoid locating non-industrial land uses in locations identified for future industrial use. The policy considers the following guidelines:

– *Recommended Buffer Distances for Industrial Residual Air Emissions (Environmental Protection Authority, 1990) in assessing the separation between land uses that reduce amenity and sensitive land uses.*

Note: A new EPA document entitled ‘Recommended separation distances for industrial residual air emissions – Publication Number 1518 March 2013 has since replaced EPA Publication AQ 2/86, ‘Recommended Buffer Distances for Industrial Residual Air Emissions 1990’.

Clause 17.03-2S refers to the siting of industrial development. It encourages the sustainable development and operation of industry by protecting industrial activity in industrial zones from encroachment of commercial, residential and other sensitive uses that would adversely affect industry viability. This can be achieved by the provision of adequate separation and buffer areas between sensitive uses and offensive and dangerous industries to ensure existing or future residents are not affected by adverse environmental effects, nuisance or exposure to hazards.

3.1.6 Clause 18 Transport

Clause 18 seeks to achieve an integrated and sustainable transport system which facilitates economic prosperity, contributes to environmental sustainability, and is accessible and safe.

Clause 18.01-2S is relevant given the proposed new North Melbourne railway station located within the Arden Precinct. It seeks to locate and design new transport routes and adjoining land uses to minimise disruption of residential communities and their amenity, and to enhance the service, safety and amenity desirable for that transport route.

3.1.7 Clause 19 Infrastructure

Clause 19 considers the efficient and adequate provision of infrastructure to support the growth and redevelopment of settlements.

Clause 19.03-5S seeks to reduce waste and maximise resource recovery so as to reduce reliance on landfills and minimise environmental, community amenity and public health impacts. In relation to planning for urban renewal Precincts, the policy encourages future waste and resource recovery infrastructure needs to be identified and planned for, to safely and sustainably manage all waste and maximise opportunities for resource recovery.

Buffers should be implemented to protect any existing or planned waste and resource recovery infrastructure from encroachment from incompatible land uses, and waste and resource recovery facilities should be sited, designed and operated to minimise impacts on surrounding communities.

3.2 Local planning policy framework

Under the transitional provisions included in Amendment VC148 to the Victorian Planning Provisions, the Municipal Strategic Statement (Clause 21) and Local Planning Policy Framework (Clause 22) within the Melbourne Planning Scheme must be considered in the absence of a Municipal Planning Strategy.

Relevant provisions of the Municipal Strategic Statement (MSS) and Local Planning Policy Framework (LPPF) to this study are summarised below:

3.2.1 Municipal Strategic Statement

The MSS describes the City of Melbourne's vision for 'Future Melbourne' as set out in *Future Melbourne 2008*. It seeks to grow Melbourne as a global city and as one of the top ten most liveable and sustainable cities in the world.

The MSS anticipates continued intensive growth within the municipality, with a residential population that could reach 177,000 people by 2030. To accommodate the municipality's growth over the coming decades, the footprint of intensive growth areas will need to expand beyond the Central City and into designated new urban renewal areas – such as the Arden Urban Renewal Precinct.

The MSS also recognises the original manufacturing and industry base of the City which has transitioned as these uses have been gradually relocated to outer areas. It highlights the ongoing need for continued industrial uses within the municipality that service other activities in the City, including the construction sector.

Clause 21.07 relates to the provision of housing within the City of Melbourne. It states that residential growth must be managed to ensure a good quality of life and amenity for existing and future residents. New residential development also needs to consider the amenity impacts of established and potential adjoining uses, including noise and light spill, and take protective steps to minimise these impacts.

Clause 21.08 relates to economic development within the City of Melbourne. It notes that areas around the Central City zoned Mixed Use and Commercial which have traditionally provided locations for business activities supporting Capital City functions, have become increasingly under pressure for housing. The Clause supports the careful management of the tension between amenity protection and the operational viability and on-going function of business and industry in an area.

Clause 21.14-2 relates to the Arden and Macaulay. This local policy refers to 'Arden-Macaulay' as a proposed urban renewal area which has been primarily an industrial area supporting the city's economy through manufacturing and production. It references the Arden-Macaulay Structure Plan 2012 and the need to manage the interface between on-going industrial and residential areas, in addition to the interface between new development and existing residential areas.

This Clause also recognises large manufacturing industry present in the western part of the Macaulay Precinct – corner of Bellair Street and Arden Street, and requires a 'commercial and industrial buffer' around this area to protect existing industry from encroachment by sensitive uses.

3.2.2 Local Planning Policies

Clause 22.17 considers urban design outside of the Capital City Zone and therefore applies to all land within the Arden Precinct. It seeks to ensure the scale, siting, massing and bulk of new development complements that of adjoining and nearby built form and minimises adverse impacts resulting from settlement pattern and design. The policy seeks to ensure new development provides a contextual response to existing and preferred settlement in the area.

Clause 22.19 provides guidelines to ensure that the design, construction and operation of buildings and urban renewal areas consider energy, water and waste efficiency. A relevant objective of this clause is to minimise the impacts of waste on the community.

Clause 22.22 relates to licensed premises in the City of Melbourne and seeks to identify appropriate locations and trading hours for their operation, and to minimise adverse amenity impacts such as noise emissions to the surrounding area.

4. Identified industries

A site inspection of the Precinct and surrounding area was conducted by GHD on 9 July 2019. This was supplemented by research using aerial photography from Google Earth and Google Street View and research of the National Pollutant Inventory database and the EPA website for licenced facilities.

GHD also conducted the following searches:

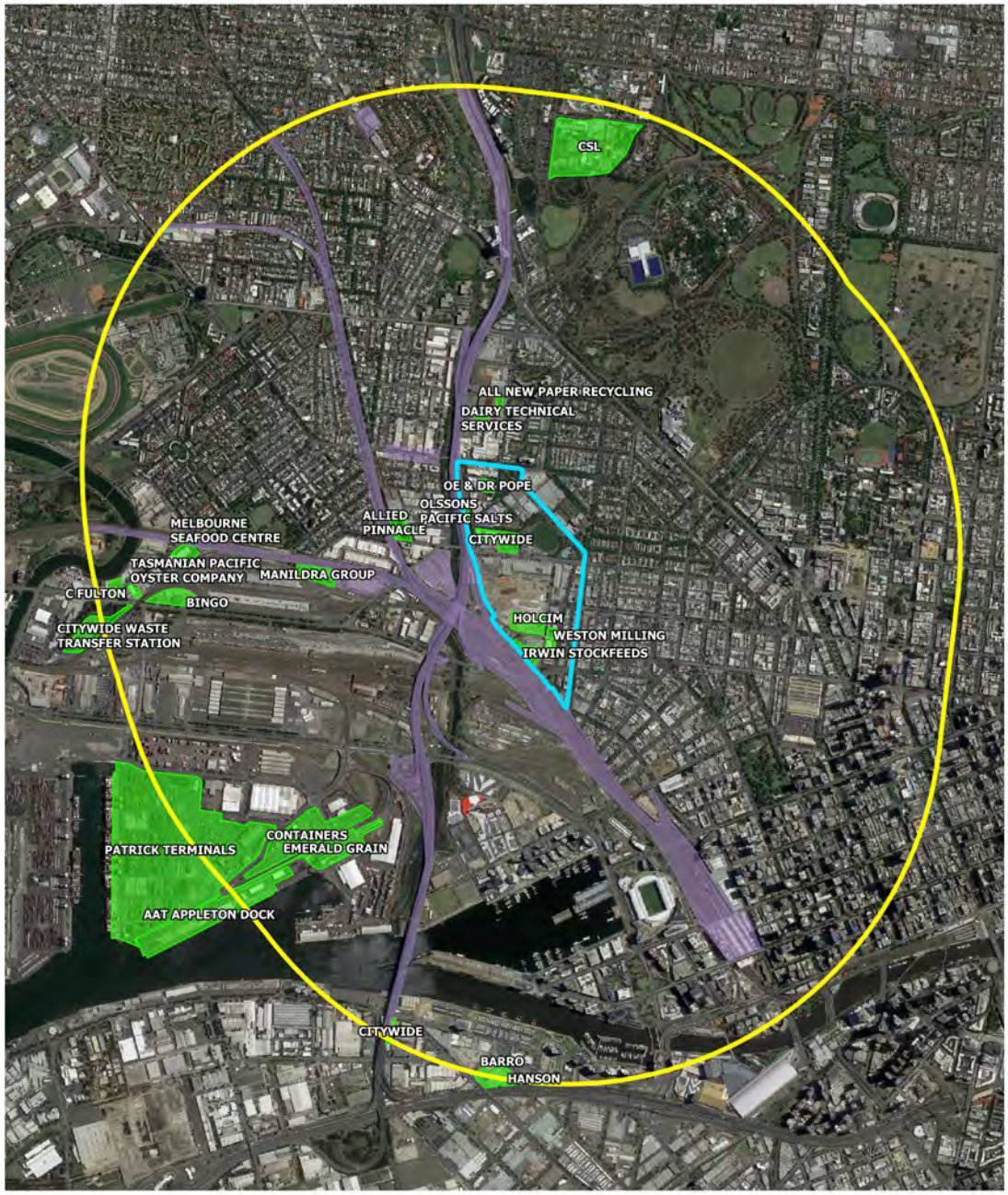
– National Pollutant Inventory (NPI) database – The following industries (in the Precinct and surrounding 2 km catchment area) report emissions to the NPI database. Hospitals, tertiary education, and electricity generation NPI categories have not be considered in line with Publication 1518:
    - Citywide North Melbourne Asphalt plant
    - Marathon Food Industries Pty Ltd
    - Melbourne Freight Terminal
    - Patrick Terminals, East Swanson Dock
    - SOUTH DYNON (Rail Passenger Transport)
    - Southern Cross (DMU) (Rail Passenger Transport)
    - SOUTHERN CROSS TANK (XPT) (Rail Passenger Transport)
    - Seqirus (CSL)
– EPA Licenced facilities – The closest EPA Licenced facility is located 2.8 km from the Precinct. The industry is located outside of the 2 km catchment area from the Precinct and is unlikely to result in air, noise and/or vibration amenity impacts at the Precinct. Therefore, this industry has not be considered in this assessment.

From GHD's site visit, the following identified industries listed in Table 1 were identified to have the potential to emit odour, dust, noise or vibration, within a 2 km radius of the Precinct. A 2 km radius was chosen as the amount of existing sensitive uses nearby would limit any new heavy industry that requires a larger buffer (which are normally reserved for IN2 zoned areas) from operating in the vicinity. Further, only two categories in Publication 1518 require a buffer distance of greater than 2 km, namely "paper and paper pulp manufacture by other methods" and a dairy stock feedlot, both of which require a separation distance of 5 km. As no industries which fall under these categories are located in inner-Melbourne, a 2 km radius will identify all relevant industries.

For each identified industry, Table 1 shows the company, type of operation, street address, potential sources, primary concern (dust, odour, noise and/or vibration), and location of the industry with respect to the Precinct. Refer to Figure 4-1 for locations of the industries that have been identified. These industries will then be assessed to determine whether they require buffer distances for air in Section 5, or noise mitigation in Section 6.

Auto facilities, service stations, general factories and warehouses have not been included, as they do not attract an odour/dust buffer under the EPA separation distance guidelines, hence likely to be a low risk to air quality and not considered further in the air quality assessment.

It should be noted that depending on the type of activities and distance to the subject site, these could result in potential low to medium noise impact on the subject site. Any noise impact from surrounding industries is addressed through the noise control provisions of Melbourne Planning Scheme and Victorian Planning Provisions (VPP), which is discussed in Section 6.4.



2 km radius

Zoomed into Precinct

Legend

- Precinct boundary
- 2 km radius
- Identiied industry
- Identified noise source

Left 0 200 400 m | Right 0 50 100 m

Paper Size ISO A4
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 55

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Arden Adverse Amenity Impact Assessment

Identified Industries

Project No. 3137400
Revision No. -
Date. 06/09/2021

FIGURE 4-1

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Print Date: 06/09/2021

Data Source:Google Earth Imagery 2021.
Created By: smateria

Table 1 Identified industry details

Company	Address	Operations	Operating hours	Potential sources of amenity impact	Primary concern
Within Precinct					
Citywide	208- 292 Arden Street, North Melbourne	Asphalt manufacturing	Typical operations between 6:00 am to 3:30 pm, however if required can operate 24 hours per day	Asphalt manufacture and truck delivery/ collection	Odour, Dust, Noise
Holcim	Part of 77- 199 Laurens Street, North Melbourne	Concrete Batching	Typical operations between 5:00 am to 7:00 pm, however if required can operate 24 hours per day	Concrete batching	Dust, Noise
Irwin Stockfeeds	1 & 29 Laurens Street, West Melbourne	Stockfeed storage, handling	Typical operations being from 4:00 am until 11:00 pm / 12:00 am during the peak season	Stockfeed handling	Dust, Odour, Noise
Lost Dogs Home	2- 52 Gracie Street, North Melbourne	Stray dog care	24 hours/ 7 days per week	Noise from dogs	Noise
OE & DR Pope	5 Boundary Road, North Melbourne	Packaging services	Weekdays 8 am – 3 pm	Plastic packaging manufacturing (resins)	Air emissions
Olssons Pacific Salts	5-15 Langford Street, North Melbourne	Edible salt producer	Weekdays 8 am – 4:30 pm	Manufacturing	Odour, Noise, Air emissions
Weston Milling	1 Munster Terrace, North Melbourne	Flour milling, processing, delivery	24 hours/ 7 days per week	Flour milling	Dust, Odour, Noise
Outside Precinct					
All New Paper Recycling	67 Sutton Street, North Melbourne	Paper recycling	Unknown	Recycling activities	Odour, Noise
AAT Appleton Dock	75 Appleton Dock Road, West Melbourne	Cargo facility	24 hours/ 7 days per week	Storage and handling of cargo	Noise
Allied Pinnacle	52- 112 Elizabeth Street, Kensington	Flour milling, manufacture of bakery goods	Unknown	Milling activities	Odour, Dust, Noise
Barro	310 Ingles Street and 223 Boundary Street, Port Melbourne	Concrete Batching	Unknown	Concrete batching	Dust, Noise

Company	Address	Operations	Operating hours	Potential sources of amenity impact	Primary concern
BINGO materials recycling facility	330-374 Dynon Road, West Melbourne	Construction and demolition (C&D) waste sorting facility	6:00 am to 6:00 pm	Waste sorting	Dust, Noise
C FULTON: Garden and Building Supplies, Firewood	240 Kensington Road, West Melbourne	Provision of garden, building supplies and firewood	6:30 am to 3:30 pm	Garden, building supplies and firewood	Dust
Citywide – Waste transfer Station & Resource Recovery Centre	437 Dynon Road, West Melbourne	Waste transfer station and resource recovery	9:00 am to 3:00 pm	Transfer and recovery activities	Dust, Noise
Citywide	824 Lorimer Street, Port Melbourne	Concrete Batching	Unknown	Concrete batching	Dust
Containers	4/10 Mullaly Close, West Melbourne	Container storage and handling	Unknown	Trucks, cranes, containers	Noise
CSL	45 Poplar Road, Parkville	Biotechnology development	Unknown	Discharges to air	Air emissions
Dairy Technical Services	63- 71 Boundary Road, North Melbourne	Food safety testing laboratory	Unknown	Discharges to air	Odour, Air emissions
Emerald Grain	20 Enterprize Road, West Melbourne	Grain storage and handling facility	24 hours/ 7 days per week	Grain activities	Dust
Hanson	577 Plummer Street and 299 Bridge Street, Port Melbourne	Concrete Batching	Unknown	Concrete batching	Dust, Noise
Manildra Group	1 Lennon Street, West Melbourne	Flour Milling and bakery goods production	Unknown	Milling activities	Dust, Odour, Noise
Marathon Foods	51-53 Hobsons Road, Kensington	Food products supplier	7:30 am to 5:00 pm	Food odour, machinery noise	Odour, Noise
Melbourne Seafood Centre	133 Kensington Road, West Melbourne	Wholesale seafood market	5:00 am to 11:00 am	Seafood odour	Odour
Patrick Terminals	Coode Island and 3-5 Dockside Road, Port Melbourne	Container terminals	Unknown	Containers, ships, cranes, trucks	Noise
Tasmanian Pacific Oyster Company	209 Kensington Road, West Melbourne	Preparation of seafood	3:00 am to 3:00 pm	Seafood odour	Odour

4.1 Identified industry operations

A brief company overview and description of the manufacturing process for the above identified industries is provided below.

The following descriptions are based on GHD's understanding of the process at each industry from a typical industry of the type identified, planning permits, an examination of the facilities' website where available, a roadside site inspection and not through direct contact with local industry or industry bodies except with the following businesses:

– Dairy Technical Services (DTS)
– Irwin Stockfeeds
– OE & DR Pope
– Olsson's Pacific Salts

4.1.1 Inside Precinct

Citywide

Citywide produces a range of asphalt products (warm mix, cold mix, dense graded, open graded, polymer modified, recycled asphalt product, low emission asphalt) which are delivered to construction sites throughout Melbourne. The site includes a NATA accredited laboratory.

Holcim

Holcim has constructed a concrete batching plant at the location of the Melbourne Metro Tunnel project site, presumably to assist with the Metro Tunnel project. VPA has advised that the facility will be decommissioned when no longer required for metro tunnel.

Irwin Stockfeeds

Irwin Stockfeeds has stockfeed mills and distribution warehouses throughout Victoria. The North Melbourne site includes milling and grain handling, with a throughput of 150,000 tpa[2].

Lost Dogs Home

In the year ending 2018, the lost Dogs Home sheltered 17,627 animals[3]. As well as providing an animals shelter and adoption services, the organisation also provides training programs and mobile veterinary services.

OE & DR Pope

OE & DR Pope is a packaging company providing textiles, plastics, paper sacks and agri products. The site does not include production activities4.

Olsson's Pacific Salts

Olssons produces specialty salt products for kitchen use, skin care and livestock feed. The facility in North Melbourne is a distribution warehouse, and does not include processing or production activities[5].

Weston Milling

The Laurens Street Weston Mills facility is a flour milling and warehouse facility. Site features include wheat silos, a mill, chlorination plant, laboratory, warehouse storage area, LPG tank, compressed air, workshop and a paint store. The facility services 170 truck movements per week.

[2] Email correspondence, 03/09/2019.
[3] The Lost Dogs Home. 2019. Retrieved from https://dogshome.com/
[4] Email correspondence, 06/09/2019
[5] Email correspondence, 10/09/2019

4.1.2 Outside Precinct

All New Paper Recycling

Self- described as a 'large factory' on the company website, All New Paper Recycling is a materials recovery facility for waste paper recycling. The facility processes more than 13,000 tonnes per annum (tpa) of waste paper which the facility sends to local paper mills.

AAT Appleton Dock

The AAT Appleton Dock is operated as a multi-purpose general cargo facility catering for general, bulk, project cargos and containers.

Allied Pinnacle Mills

Allied Pinnacle manufacture flour, cereal-based premixes and bakery products. The company own seven flour mills, four mixing sites and several bakeries. The Kensington site contains a flour mill, wooden silos, concrete silos, bulk loading bays and administration buildings[6].

Barro

A typical concrete batching plant contains silos, storage bins, a conveyor system with a fabric filter connected to hopper, concrete truck parking area and raw feed stockpiles. Typical operations for a concrete batching plant will not vary substantially, with cement delivered by road tanker and pneumatically transferred to silos. Sand and aggregate are transferred by truck from the on-site stockpiles in a damp condition to in-ground bins. Transfer from the bins is metered onto a bin conveyor and transferred to the loading tower via a covered conveyor and then into an agitator. Cement and water are mixed with the aggregate in the agitator and batches are checked before loading into delivery trucks through a rubber loading sock.

BINGO materials recycling facility

The BINGO site is a construction and demolition (C&D) waste sorting facility. The facility receives inert, dry materials from the construction sector and sorts them to constituent materials for resource recovery.

C FULTON Garden and Building Supplies, Firewood

C FULTON Garden and Building Supplies, Firewood has operated out of West Melbourne since January 2020. The operations at the site involve the provision of garden and building supplies in bulk across Melbourne.

Citywide – Waste transfer Station & Resource Recovery Centre

Citywide operates a waste transfer station and resource recovery centre at 437 Dynon Road. The facility serves Melbourne CBD and surrounding municipalities and has an annual throughput of 200,000 tpa.

Citywide

As above for Barro, Citywide operates a concrete batching plant in Port Melbourne.

Containers

Operations include handling, sorting, storing and examine containers which are imported and exported to and from the port.

CSL

Operations involve the manufacture of biotechnology equipment. The following operates out of the site:

– Seqirus (owned by CSL): Influenza, antivenom and Nervoderm manufacturing operations
– Zoetis Australia Research & Manufacturing (formally owned by CSL/Pfizer): animal health company which develop medicines and vaccines

[6] According to Allied Mills- Kensington Flour Mill Emergency Management Plan. 2015. Retrieved from https://alliedpinnacle.com/wp-content/uploads/2017/09/Kensington-Emergency-Response-Plan.pdf

Seqirus reports to the NPI under the “manufacture, development and marketing of pharmaceutical products of biological origin” category.

Dairy Technical Services (DTS)

DTS is a food safety analytical laboratory group offering microbiology and chemistry testing of a range of food products. The North Melbourne location conducts non-destructive chemical analysis of food and associated products[7]. This involves chemical reaction and extraction processes performed in vitro or using specialised equipment, and does not involve the burning of any compounds.

Emerald Grain

The Emerald Grain Melbourne Port Terminal is a bulk grain storage and handling terminal located in the Port of Melbourne. The site is capable of loading vessels at up to 20,000 mt per day. The site includes:

– Multiple gas tight, steel bins with 48,000 tonne capacity
– Full fumigation and aeration facilities
– Multiple grain segregations
– Container packing facilities

Hanson

As above for Barro, Hanson operates a concrete batching plant in Port Melbourne.

Manildra Group

The Manildra Group provides flour milling, sugar, canola and meat products to businesses across Australia. The West Melbourne location is a warehouse facility but may include processing and handling activities.

Marathon Foods

Marathon Foods manufacture quality frozen snack foods and shelf stable protein based meal solutions. Products include Spring Rolls and Dim Sims. Marathon Foods reports to the NPI under the “frozen food manufacture” category.

Melbourne Seafood Centre

Melbourne Seafood Centre comprises of a sales hall at the northern end and a cold storage facility to the south. The site operates as a wholesale seafood market and sub-leases seafood wholesalers. GHD understands that no processing of seafood (including preparation) is permitted at Melbourne Seafood Centre.

Patrick Terminals

Patrick Terminals operate four terminals in key locations around the Australian seaboard in the ports of Brisbane, Sydney, Melbourne and Fremantle. Operations involve the loading and offloading cargo to and/or from a ship. The Melbourne site reports to the NPI under the “stevedoring- Container Ships” category.

Tasmanian Pacific Oyster Company

The Tasmanian Pacific Oyster Company prepare seafood for high end restaurants. The operations include:

– Fillets and portions (salmon, ocean trout, kingfish, barramundi, snapper, blue eye etc.)
– Preparing sashimi from tuna, kingfish, salmon, ocean trout, sword fish etc.
– Preparing crustaceans and shellfish (crayfish, crabs, mussels, oysters, clams, pipis etc.)

4.2 Transport and civil infrastructure related sources

Additional sources of noise and vibration may be produced from the following transport associated (mobile) activities and civil infrastructure features within and surrounding the Precinct, as shown in Table 2.

[7] Email correspondence, 26/09/19

Table 2 Identified civil infrastructure details

Source	Address	Operations	Operating hours	Potential sources of amenity impact	Primary concern	Location
Citylink tollway	Western boundary of the Precinct	Freeway	Constant	Vehicle noise	Noise	Outside Precinct
Essendon tram depot	318-372 Mt Alexander Road, Travancore	Tram Deport	Constant	Tram noise	Noise	Outside Precinct
Upfield Rail Corridor – **Melbourne Freight Terminal** – **SOUTH DYNON (Rail Passenger Transport)** – **Southern Cross (DMU) (Rail Passenger Transport)** – **SOUTHERN CROSS TANK (XPT) (Rail Passenger Transport)**	Western boundary of the Precinct	Railway	Constant	Passing trains	Noise	Within Precinct
West Melbourne Terminal Substation	297- 307 Arden St Kensington	Electricity handling	Constant	Power surge	Noise	Outside Precinct
Drainage pump station 1	Langford St North Melbourne	Drainage pump station	Constant	Pumps	Noise	Within Precinct
Drainage pump station 2	Corner of Macaulay Rd and Langford St North Melbourne	Drainage pump station	Constant	Pumps	Noise	Within Precinct
Drainage pump station 3	Corner of Macaulay Rd and Stubbs St North Melbourne	Drainage pump station	Constant	Pumps	Noise	Within Precinct
Drainage pump station 4	Corner of Macaulay Rd and Bent St North Melbourne	Drainage pump station	Constant	Pumps	Noise	Within Precinct

A brief overview and description of the above identified noise and vibration sources is provided below.

The following descriptions are based on GHD's understanding of the process at each source from a typical source of the type identified, planning permits, an examination of the facilities' website where available, and a roadside site inspection.

Citylink

Citylink is a toll roadway connecting Melbourne city with Tullamarine, Monash and West Gate freeways. Most of the road contains four inbound and four outbound lanes. The road adjacent to the western boundary of the Arden Precinct is raised above ground and contains three inbound and three outbound lanes plus a service lane for each direction.

Essendon tram depot

The Essendon tram depot is operated by Yarra Trams and is one of eight tram depots on the Melbourne tram network. Essendon depot has 24 roads, 18 of which are covered in three sheds, the remaining six are in the open to the north of the sheds.

Upfield Rail Corridor

The Upfield line is an electrified railway line which forms part of the suburban rail service. The line is double-tracked between North Melbourne and Gowrie. The line services three trains per hour at peak periods[8].

West Melbourne Terminal Substation

The substation site is 3.075 ha large. The facility was upgraded in 2013 and 2014, with further amendments made in 2015 and 2016.

Drainage Pump stations

The proposed flow rates for the four drainage pump stations are presented in Table 3.

Table 3 Drainage pump flow rates[1]

Pump station	Current flow rate (m^3/s)	Proposed flow rate (m^3/s)
1	0.7	7.0
2	0.7	2.4
3	1.2	1.8
4	0.7	1.3
[1]Data provided by VPA		

4.3 Site visit

At the site visit conducted on the 09 July 2019, the following observations were made:

– Dust or odour emissions were observed and attributed to the following industries:
  - Holcim (dust)
  - Allied Mills (dust)
  - Citywide (odour)
  - DTS (odour)
– The ambient noise environment within the Precinct area at the time was observed to be predominantly influenced by traffic, which included a mix of domestic vehicles and vehicles servicing industrial facilities.

[8] Public Transport Victoria, 2012. https://static.ptv.vic.gov.au/siteassets/PTV/PTV%20docs/Metro-rail-network-development-plan/PTV_Network-Development-Plan_Metropolitan-Rail_2016update.pdf

– In addition to the typical urban ambient noise environment, noise was observed to be prominent from the following sources:
  - West Melbourne Terminal Substation
  - Citylink roadway
  - Macaulay and North Melbourne train station (train horns, signal alarms and level crossing)
  - Citywide (operational noise)
– A number of motor vehicle mechanic workshops exist within the assessment area and were observed to contribute to an increase in the ambient noise environment on some roads, particularly on and north of Canning St.

4.4 Complaint history

EPA has provided complaint records for odour, dust, smoke and noise within the area captured by the Arden Precinct for the period between 2013 to 2018. The number of records for each complaint type for each year are shown in Figure 4-2.

As can be seen by Figure 4-2, for most years the majority of complaints were made in regard to noise and odour. Smoke complaints increased in the most recent years of the complaint period, while dust complaints were highest in 2013. In 2018, a total of 35 complaints were made, over half (18) of which were noise related.

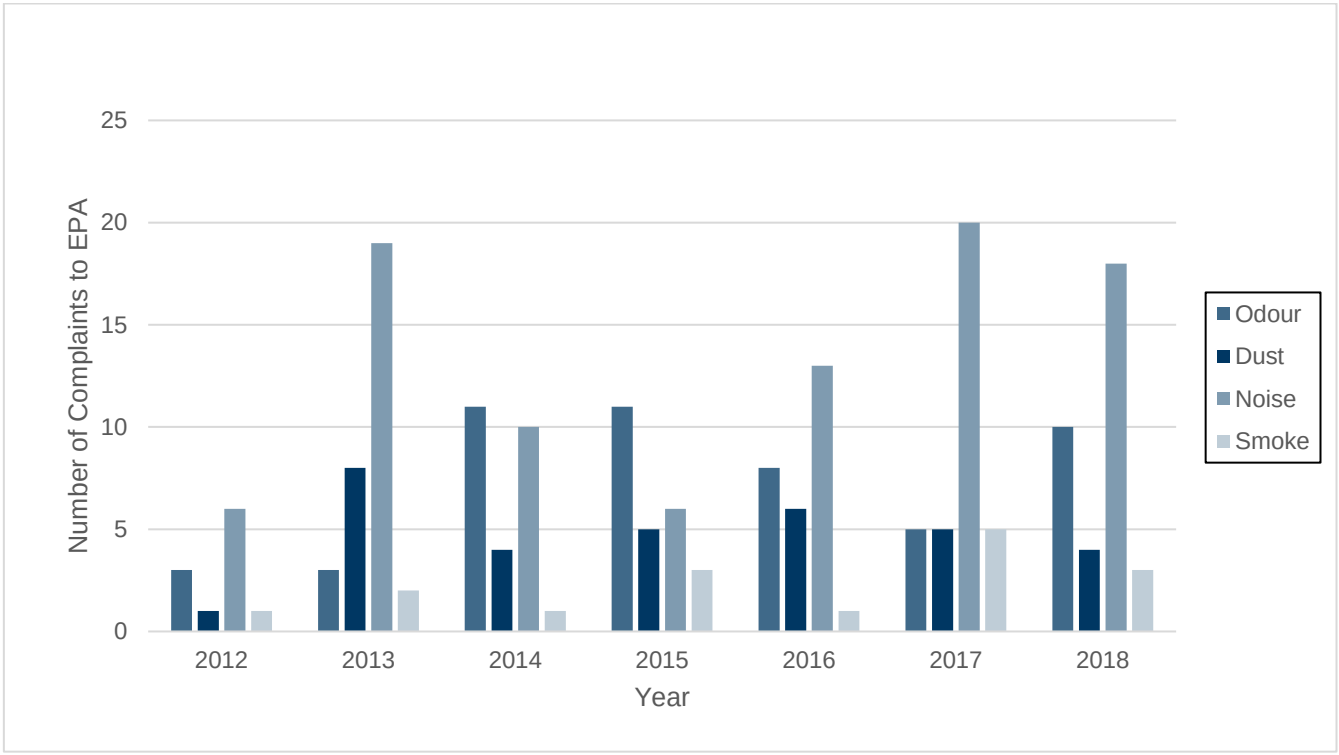


Figure 4-2 Complaint history within Arden Precinct and within 1 km of Precinct perimeter

In 2021 GHD requested EPA to provide an updated complaint history for the last two years (not pictured in Figure 4-2). EPA sent through an updated complaint history from 2013 until April 2021[9]. A total of fifteen odour complaints alleging odour from Citywide were provided. With regards to dust there were three complaints attributed to Weston Milling, two for Melbourne Metro Tunnel and one for Irwin Stockfeeds.

There has also been an increase in sensitive uses in the Precinct with the introduction of the Woolworths development (Corner of Macaulay Road and Vaughan Terrace in North Melbourne) which has not resulted in an increase in complaints. This suggests that the industries are not generating odour or dust reports in nearby residential areas within the recommended separation distances.

[9] Email from EPA dated 15 April 2021

5. Air quality amenity assessment

5.1 Relevant buffer guidelines

Two classes of buffer/separation distance guidelines are relevant in the context of planning in Victoria, namely threshold distances and buffer (or separation) distances.

5.1.1 Clause 53.10 – Threshold distances

Victorian Planning Schemes seek to ensure that planning resolves and does not create land use conflicts. This is typically acheived by providing separation distances between potentially conflicting land use zones that may result in incompatable uses.

Clause 53.10 of the VPPs seeks to define those types of industries and warehouses which if not appropriately designed and located may cause offence or unacceptable risk to the neighbourhood.

The clause sets out the threshold distance that is the minimum distance from any part of the land of the proposed use of or buildings and works for specified uses that have adverse amenity potential.

The table to the Clause 53.10 includes three columns that refer to the type of production or use or storage (purpose) which may result in adverse amenity potential and includes the threshold distance in metres and notes:

– **Note 1** is where the threshold distance is variable, dependent on the process to be used and the materials to be processed or stored.
– **Note 2** is where an assessment of risk to the safety of people located off the land may be required.

Clause 53.10 does not itself trigger the need to obtain a permit, however Clause 66.02 – 7 (use and development referrals) requires that an application is referred to the EPA as the determining referral authority if the proposal is to use land for an industry or warehouse for a purpose listed in the table to Clause 53.10 shown with a Note 1 or if the threshold distance is not met.

Over the years there have been a number of VCAT, Planning Panel and Advisory Committee reports and recommendations in relation to the use and operation of the threshold distances (separation distances) included in under clause 53.10 – Uses with adverse amenity potential.

The following Planning Panel commentary provides a snapshot as to the recent application of the threshold distances listed under Clause 53.10 and the separation distances included in the EPA Guidelines 1518 – *Recommended Separation Distances for Industrial Residual Air Emissions – Guidelines (IRAE)*.

Melbourne Planning Scheme Amendment C221 – West Melbourne Waterfront (26 January 2017)

The purpose of the Panel Hearing was to consider submissions in response to a rezoning application to facilitate a mixed use development of approximately 2.8 hecatres comprising substantial residential, retail, commercial and open space land uses. The subject land is proximate to both the Footscray Major Activty Centre and the Melbourne's Central Business District.

The Panel considered odour and dust impacts from surrounding industry and considered whether the site could achieve adequate separation distances. The following commentary in relation to the application of Clause 53.10 and EPA 1518 Guidelines are as follows:

– *The Panel reiterates that it is satisfied that the most relevant consideration in the establishment of appropriate separation distances between existing industries and proposed new sensitive land uses are the EPAV 1518 Guidelines.*
– *The Panel agrees with the views of the Advisory Committee, which notes that Clause 52.10 (now 53.10) does not act as a 'reverse buffer' (the concept of 'reverse buffer' is where an impact generating use is protected from encroachment by sensitive uses, rather than the sensitive use being protected from encroachment by a use with adverse impacts). It does not provide a statutory buffer for the location of residential uses that is a suitable distance from existing industries. Industries are not therefore completely protected from encroachment of residential uses.*

In considering the evidence, the Panel made the following conclusion:

– *The Panel considers that the EPAV 1518 Guideline is the relevant guideline to inform separation distances between existing commercial/industrial uses and proposed sensitive uses. Informed by these Guidelines and the testing of the evidence, the Panel is satisfied that, subject to further assessment and detailed site planning, the introduction of sensitive uses on [sic] subject site can be accommodated in a manner that will afford adequate separation distances from existing commercial and industrial operations in the Dynon Precinct*

Summary

The use of the *EPA Guideline - Recommended Separation Distances for industrial residual air emissions 1518 (March 2013)* is the preferred approach to determining suitable separation distances between existing industrial and proposed new sensitive uses.

5.1.2 EPA separation distances (buffer distances)

In the case of an existing industrial use, the EPA recommends buffer distances should be considered when preparing a planning scheme, planning scheme amendment or planning permit application. A buffer distance is a planning instrument used to provide separation of sensitive land uses (i.e. residential, schools, hospitals) from existing premises with the potential for off-site emissions (odour or dust) that can cause dis-amenity in the event of an upset or malfunction. Under routine operations, any adverse impact is to be confined on-site so that an external buffer should not be required.

The purpose of the EPA separation distance guidelines is to provide recommended minimum separation distances between odour or dust emitting industrial land uses and sensitive land uses. Accordingly, the relevant sections of the guideline for this assessment are to:

– Provide clear direction on which land uses require separation
– Inform and support strategic land use planning decisions
– Prevent new sensitive land uses from impacting on existing industrial uses
– Prevent new or expanded industrial land uses from impacting on existing sensitive land uses
– Identify compatible land uses that can be established within a separation distance area

In the case of the Arden Precinct, the EPA recommended separation distance guideline[10] (Publication 1518) will apply to existing industries in and surrounding the Precinct.

Note that noise, vibration, ambient and hazardous air pollutants and light spill are not considered in the separation guideline.

EPA default buffers from surrounding industries

The industrial premises identified in Section 4 which attract buffers under EPA publication 1518 are listed in Table 4. A description is given below of the evaluation of each industrial premise.

Table 4 Default buffers for identified industries

Company	Industry type and activity/ definition	EPA default buffer (m)	Default buffer impacts Precinct (Y/N)
All New Paper Recycling	Materials recovery and recycling facility. Collecting, dismantling, treating, processing, storing, recycling, or selling used or surplus materials.	Case by case	-
Allied Pinnacle	Flour mill. Production of flour.	250	N

[10] EPA Recommended Separation Distances for Industrial Residual Air Emissions, Publication 1518, March 2013

Company	Industry type and activity/ definition	EPA default buffer (m)	Default buffer impacts Precinct (Y/N)
Barro	Concrete plant Production of concrete	100	N
BINGO materials recycling facility	Materials recovery and recycling facility. Collecting, dismantling, treating, processing, storing, recycling, or selling used or surplus materials.	Case by case	-
Citywide	Asphalt plant. Production of asphalt.	500	Y
Citywide	Concrete plant Production of concrete	100	N
Citywide – Waste transfer Station & Resource Recovery Centre	Transfer station Collecting, consolidating, temporarily storing, sorting or recovering refuse or used materials before transfer for disposal or use elsewhere	250	N
CSL	Pharmaceutical and veterinary product production Production of pharmaceutical or veterinary products	500	N
Emerald Grain	Grain and stockfeed mill and handling facility Receiving, storing, fumigating, bagging, transporting and loading grain or stock feed	250	
Hanson	Concrete plant Production of concrete	100	N
Holcim	Concrete plant. Production of concrete.	100	Y
Irwin Stockfeeds	Grain and stockfeed mill and handling facility. Receiving, storing, fumigating, bagging, transporting and loading grain or stockfeed.	250	Y
Manildra Group	Flour mill. Production of flour.	250	N
OE & DR Pope	Packaging company, not including the production of rubber, polyester or synthetic resins	-	-
Olssons Pacific Salts	Warehouse and distribution facility	-	-
Weston Mills	Flour mill. Production of flour.	250	Y

AAT Appleton Dock (no default buffer, no impact on Precinct)

EPA Publication 1518 does not include an industry class that represents cargo/container storage and handling. Therefore, no buffer distance has been applied.

All New Paper Recycling (no default buffer, no impact on Precinct)

All New Paper Recycling is best described in EPA Publication 1518 as a materials recovery and recycling facility. Buffers are determined for these facilities on a case-by-case basis depending on the activities at the site. The North Melbourne site is likely not to require a buffer, as the business website describes the collection of waste paper for supply to local paper mills, indicating there is no processing or manufacturing on site. Further, it is expected that waste paper will not generate odour or dust emissions.

Allied Pinnacle Mills (default buffer 250 m, no impact on Precinct)

EPA Publication 1518 specifies a 250 m buffer for flour mills producing >200 tpa of flour. GHD has assumed, based on a visual inspection of the size of the site, that the Kensington Allied Pinnacle Mill produces more than 200 tpa of flour products. The potential amenity impact relates to dust.

Barro (default buffer 100 m, no impact on Precinct)

EPA Publication 1518 specifies a 100 m buffer for production of concrete with a throughput of >5,000 tonnes per year. GHD does not know the throughput of Barro and has therefore conservatively applied the 100 m buffer distance to the site.

BINGO materials recycling facility (case by case, no impact on Precinct)

BINGO materials recycling facility is best described in EPA Publication 1518 as a materials recovery and recycling facility. Buffers are determined for these facilities on a case-by-case basis depending on the activities at the site. It is noted that the largest buffer specified in EPA Publication 1518 under the Waste Management category is 500 m, however BINGO is located approximately 1,500 m from the Precinct. Therefore, if an assessment was undertaken which determined a buffer distance was applicable to BINGO, it would likely not exceed 500 m and therefore would not impact the Precinct.

C FULTON: Garden and Building Supplies, Firewood (no default buffer, no impact on Precinct)

EPA Publication 1518 does not include an industry class that represents the storage and distribution of garden and building supplies and firewood. Therefore, no buffer distance has been applied.

Citywide (default buffer 500 m, impacts on Precinct)

EPA Publication 1518 specifies a 500 m buffer for asphalt plants producing over 100 tonnes of asphalt per week. GHD has assumed, based on a visual inspection of the site and indications on the business website, that the North Melbourne site produces more than 100 tonnes per week. The potential amenity impact relates to odour and dust.

Citywide – Waste transfer Station & Resource Recovery Centre

Citywide – Waste transfer Station & Resource Recovery Centre is best described in EPA Publication 1518 as a transfer station (i.e. collecting, consolidating, temporarily storing, sorting or recovering refuse or used materials before transfer for disposal or use elsewhere materials recovery and recycling facility), which requires a buffer distance of 250 m. Therefore a 250 m buffer distance has been applied.

Citywide (default buffer 100 m, no impact on Precinct)

EPA Publication 1518 specifies a 100 m buffer for production of concrete with a throughput of >5,000 tonnes per year. GHD does not know the throughput of Citywide and has therefore conservatively applied the 100 m buffer distance to the site.

Containers (no default buffer, no impact on Precinct)

EPA Publication 1518 does not include an industry class that represents cargo/container storage and handling. Therefore, no buffer distance has been applied.

CSL (default buffer 500 m, no impact on Precinct)

EPA Publication 1518 specifies a 500 m buffer distance for the production of pharmaceutical or veterinary products with a throughput of >2,000 tpa. This buffer distance is appliable to both Seqirus and Zoetis Australia Research & Manufacturing who operate out of the 45 Poplar Road, Parkville site.

Dairy Technical Services (no default buffer, no impact on Precinct)

EPA Publication 1518 does not include an industry class that represents chemistry laboratories such as the DTS site.

Emerald Grain (default buffer 250 m, no impact on Precinct)

EPA Publication 1518 specifies a 250 m buffer for grain and stockfeed mill and handling facilities with a throughput of >20,000 tonnes per year. GHD does not know the throughput of Emerald Grain and has therefore conservatively applied the 250 m buffer distance to the site.

Hanson (default buffer 100 m, no impact on Precinct)

EPA Publication 1518 specifies a 100 m buffer for production of concrete with a throughput of >5,000 tonnes per year. GHD does not know the throughput of Hanson and has therefore conservatively applied the 100 m buffer distance to the site.

Holcim (default buffer 100 m, impacts on Precinct)

The Holcim site in North Melbourne appears to be a large facility capable of processing >5,000 tpa, a capacity for which EPA Publication specifies a 100 m buffer. The potential amenity impact relates to dust.

Irwin Stockfeeds (default buffer 250 m, impacts on Precinct)

The Irwin Stockfeeds site can best be described in EPA Publication 1518 as a grain and stockfeed mill and handling facility. For a throughput of >20,000 tpa, a 250 m buffer applies to this facility type. The North Melbourne Irwin Stockfeeds site has a throughput of 150,000 tpa and is therefore subject to the 250 m buffer distance. The potential amenity impact relates to dust.

Lost Dogs Home (no default buffer, no impact on Precinct)

There is no industry class in EPA Publication 1518 that describes an animal shelter. Therefore, there is no requirement for a buffer at this facility.

Manildra Group (default buffer 250 m, no impact on Precinct)

Although the business website indicates that the North Melbourne site is a Warehouse facility only, GHD has applied the 250 m buffer for flour milling due to observations made during GHD's site visit. The potential amenity impact relates to dust.

Marathon Food Industries

EPA Publication 1518 does not include an industry class that represents the manufacture of frozen food (such as spring rolls and dim sims). Therefore, no buffer distance has been applied.

Melbourne Seafood Centre (no default buffer, no impact on Precinct)

GHD understands that the Melbourne Seafood Centre is a wholesale fish market only (warehouse use) with no fish processing undertaken on site. Therefore, no buffer distance is applicable to the site.

OE & DR Pope (no default buffer, no impact on Precinct)

The OE & DR Pope facility in North Melbourne does not manufacture any of the materials specified as requiring a buffer distance in the EPA buffer guideline (rubber, polyester or synthetic resins). As such, a buffer has not been prescribed for the site.

Olsson's Pacific Salts (no default buffer, no impact on Precinct)

The North Melbourne facility undertakes the storage and distribution of goods. Given the absence of any production activities, a buffer distance is not required.

Patrick Terminals (no default buffer, no impact on Precinct)

EPA Publication 1518 does not include an industry class that represents cargo/container storage and handling. Therefore, no buffer distance has been applied.

Tasmanian Pacific Oyster Company (no default buffer, no impact on Precinct)

GHD understands that the operations of Tasmanian Pacific Oyster Company can be described as 'preparation' of seafood. Preparation of seafood is the front end of seafood processing, with the subsequent components of cooking, smoking and curing forming the components where most odour is generated. No guidance is given by way of definition in EPA Publication 1518 as to whether the preparation components alone attract a buffer. On the basis of the planning experience with suburban fish markets, it was deemed unlikely that the operations would require a buffer.

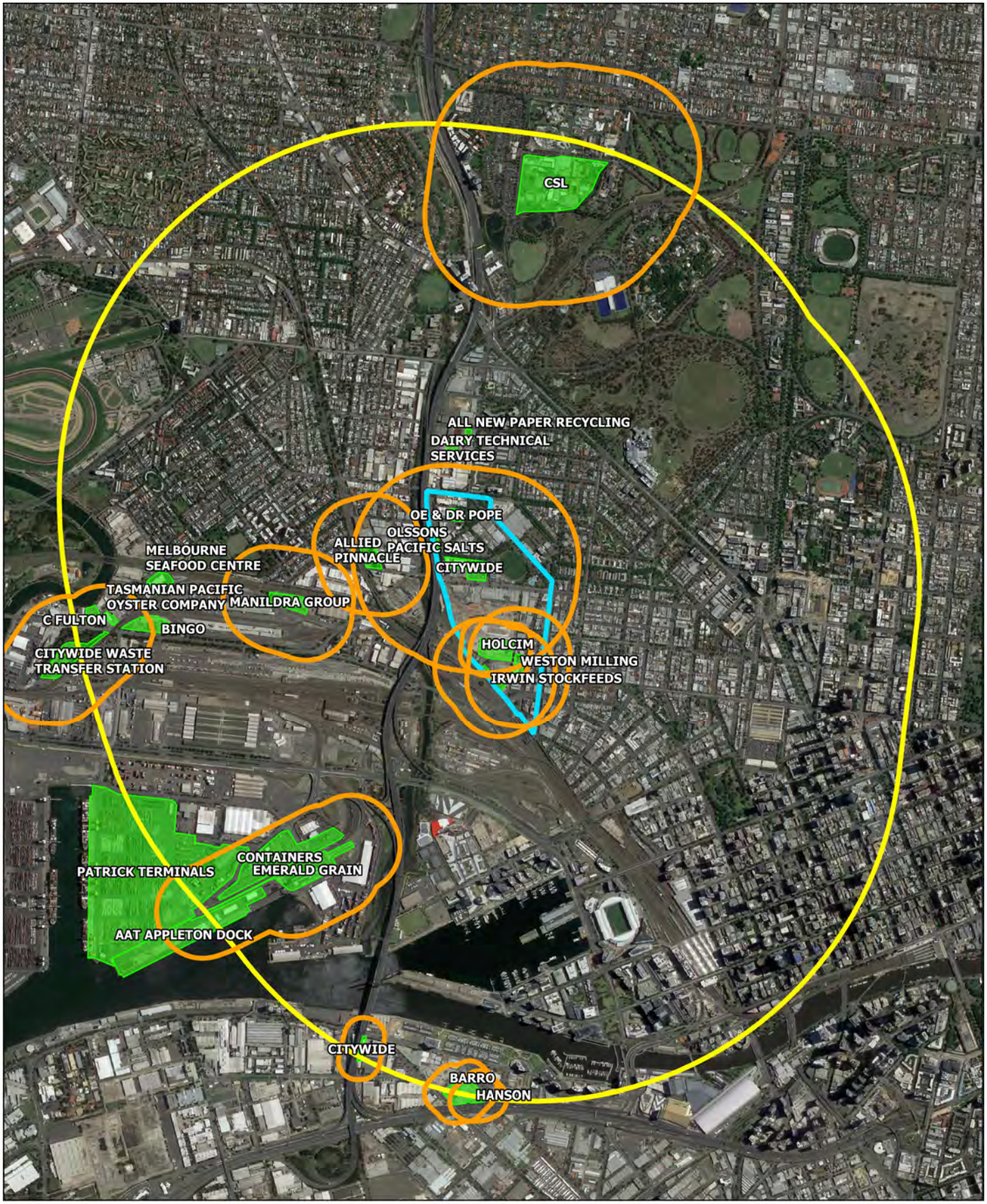
Weston Mills (default buffer 250 m, impacts on Precinct)

GHD has assumed, based on a visual inspection of the size of the site, that the Weston Mills North Melbourne facility produces over 200 tpa of flour. Therefore, the default buffer for large flour mills of 250 m has been applied. The potential amenity impact relates to dust.

5.1.3 Application to the Precinct

The buffer distances should be scribed from the envelope of potential sources within the premises as per the EPA separation guidelines (Method 1 – Urban method), however, given the uncertainty regarding the individual sources within some of the identified facilities, the property boundary has been used to define the envelope of the sources (this is a conservative approach).

The impact of each of the identified default buffers can be seen in Figure 5-1 (2 km radius extent) and Figure 5-2 (zoomed into the Precinct). The figure shows that the 500 m buffer from Citywide has the largest impact, covering the majority (88%) of the Precinct. Citywide is the only industry constraining the north of the Precinct. Holcim, Irwin Stockfeeds and Weston Mills all cover a large portion of the Precinct to the south. The 100 m buffer for Holcim is contained by the 250 m buffer for Irwin Stockfeeds. The 250 m buffer from Weston Mills covers approximately 35% of the Precinct. Irwin Stockfeeds covers a further 4% of the Precinct to the west of the Weston Mills buffer. Allied Pinnacle and Manildra flour mills do not impact the Precinct. In total, majority of the Precinct is impacted by industry buffers.



LEGEND

Precinct boundary
Identified industry
2 km radius
EPA default buffer

Paper Size A4

0 200 400 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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EPA default buffers (2 km)

Project No. 3137400
Revision No. -
Date. 06/09/2021

FIGURE 5-1

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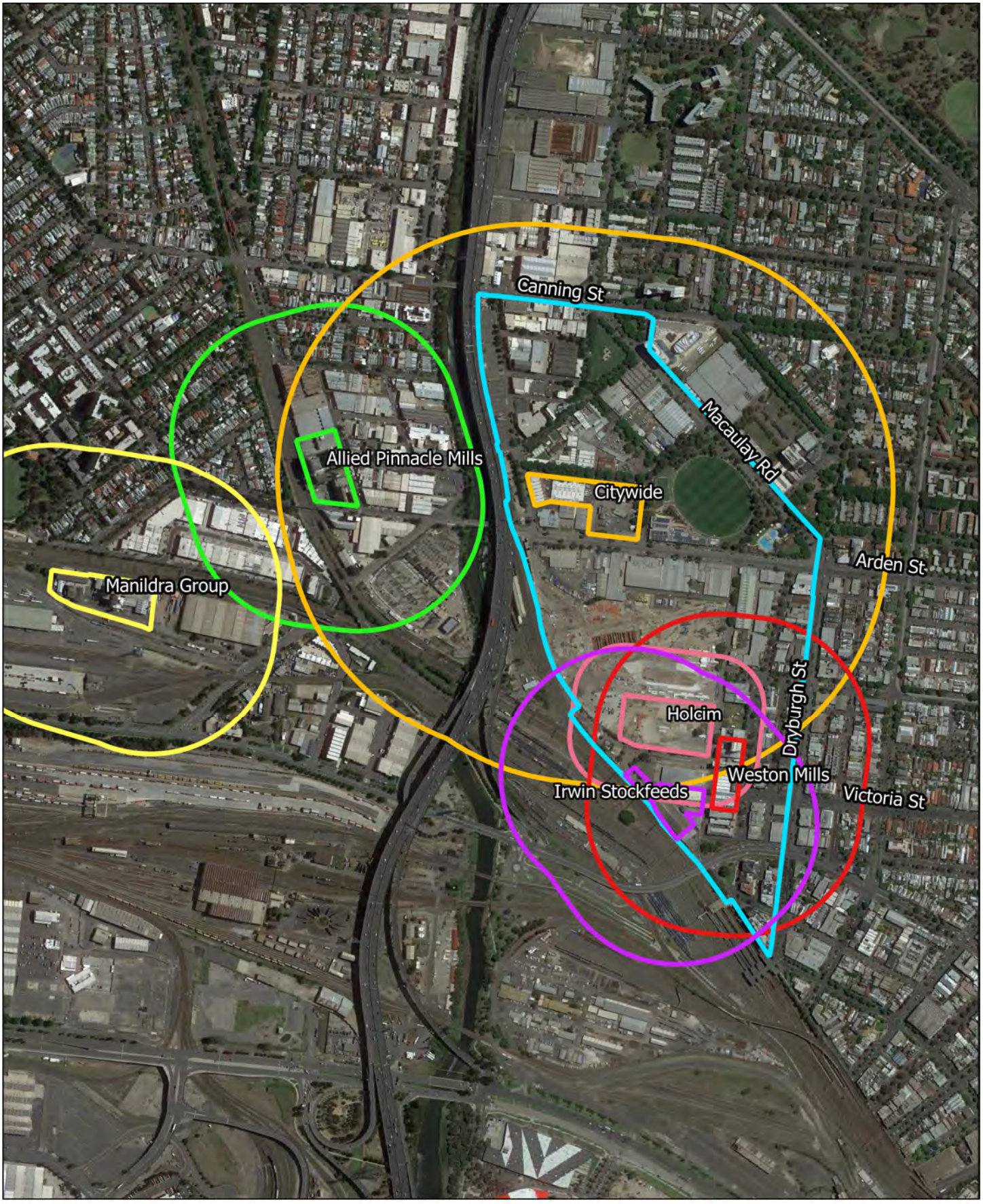
Google Earth Imagery 2019. Created by: MT



LEGEND

Precinct boundary
Citywide
Irwin Stockfeeds
Weston Mills
Allied Pinnacle Mills
Holcim
Manildra Group

Paper Size A4

0 150 300 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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GHD

Victorian Planning Authority

Arden Adverse Amenity Impact Assessment

EPA default buffers

Project No. 3137400
Revision No. -
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FIGURE 5-2

5.1.4 Site specific variation to the default buffer

The EPA allows for a site-specific variation to the default buffer distance for a given industry and identifies six criteria to consider in Table 4 of the guideline (reproduced in Figure 5-3 below).

Table 4: Criteria for site-specific variation

Criteria	Explanation
Transitioning of the industry	Existing industry has formally indicated that it will transition out of an area and over a specified timeframe.
Plant equipment and operation	The industrial plant and equipment have an exceptionally high standard of emission control technology.
Environmental risk assessment	An environmental risk assessment of IRAEs has been completed that demonstrates a variation is justified.
Size of the plant	The plant is significantly smaller or larger than comparable industries.
Topography or meteorology	There are exceptional topographic or meteorological characteristics which will affect dispersion of IRAEs.
Likelihood of IRAEs	Particular IRAEs are either highly likely or highly unlikely to occur.

Figure 5-3 Table 4 of the EPA buffer guideline – criteria for site-specific variation to default buffers

The criteria as these apply to the identified industries are addressed below:

- Transitioning of the industry – This criteria allows for a variation (i.e. a reduction) to the default separation distance for site specific cases where industries have been identified or confirmed that they plan to transition out of the area. GHD understands that the industries identified within the Precinct are likely to move out of the area in the long term. However, no specific information was available pertaining to any of the individual industries, except Holcim. As such, no site-specific variation to default buffer distances has been made on this basis (except for Holcim), but instead some high level discussion is provided regarding transitioning as a means to vary a sites buffer in section 1.1.
- Plant equipment and operation – If the plant has a high standard of emission technology or has evidence of no upset or malfunctions occurring then a reduced buffer may be more appropriate. As the specific operational details of the identified industries is not known by GHD, no site-specific variation to default buffer distances has been made on this basis.
- Environmental risk assessment (ERA) – An ERA would need to be completed to assess this option, this would require specific knowledge of process operations and emission rates. An ERA may also consist of onsite odour surveillance.
- Size of the plant – If the throughput is small compared to large examples within the same industry then it may be possible to de-rate the buffers based on throughput. Based on the information provided to GHD, site visit and desktop searches, no site-specific variation to default buffers has been made on this basis as the throughputs identified in Publication 1518 are considered to be exceeded.
- Topography or meteorology – This has been assessed in section 5.2.3 to produce directional buffers, which consider the influence of topography or meteorology on the dispersion of IRAEs, for identified industries with a default buffer located nearby or impacting on the Precinct. With regards to the word ‘exceptional’, Publication 1518 does not provide a definition, however GHD is of the opinion that the local meteorological effects should always be taken into account when assessing potential air quality impacts including in the form of buffers as the local wind conditions across Victoria are vastly different. This approach is supported by Planning Practice 92 *Managing buffers for land use compatibility* which requires prevailing weather conditions and topography to be considered as part of any site-specific assessment to assess the extent of a buffer area. In addition, Draft EPA Publication 1961 *Guideline for assessing and minimising air pollution in Victoria (May 2021)* requires meteorology to be characterised as part of the hazard identification process. Specifically, Publication 1961 states; “*Meteorology plays a key role in the dispersion of airborne pollutants. In some cases, meteorology can also play a role in the generation of pollutants. While meteorology is explicitly and quantitatively considered in air dispersion modelling reports, it is important that it is understood and described in all air quality reports.”*

– Likelihood of industrial residual air emissions (IRAEs) – The likelihood of residual emissions from the identified industries would need to be assessed once specific operational information was obtained regarding their operations including how frequently upset conditions occur and the assessment would rely on a detailed complaint history from the residential area (section 4.4) encompassed within the default buffer. As specific operational details such as how frequently upset conditions occur is not known for the identified industries, no buffer distances were able to be reduced on this basis.

Based on the information available to GHD, the relevant site-specific criteria applicable to the industries at this level of assessment are meteorology and transitioning of the industry.

5.2 Meteorology

5.2.1 Long term pattern in wind

Local meteorology affects the pattern of offsite impact. The characterisation of local wind patterns requires accurate site-representative hourly recordings of wind speed and direction over a period of at least 12 months (one year).

High quality, meteorological data (five years (2013 – 2017) at hourly intervals from the Footscray automatic weather station (AWS), operated by the EPA, was used for this assessment. The Footscray AWS is located approximately 5.6 km from the Precinct. GHD has also accessed the Melbourne Airport AWS for cloud data, which is utilised during the determination of atmospheric stability. The Melbourne Airport AWS is situated approximately 17 km north- northeast from the Arden Precinct.

The effect of wind on dispersion patterns can be examined using the general wind climate and atmospheric stability class distributions. The general wind climate at a site is displayed by means of wind rose plots, giving the incidence of winds from different directions for various wind speed ranges.

The features of particular interest in this assessment are: (i) the prevailing wind directions and (ii) the relative incidence of more stable light wind conditions.

A distinction can be made for fugitive deposited dust entrained in strong winds (greater than 5 m/s), as opposed to dust emissions from process sources where the emission rate is independent of local wind conditions (light stable winds)

The average wind rose for the period 2013- 2017 is shown in Figure 5-4 and has the following features:

– The average wind speed for the monitoring period is 3 m/s
– The predominant wind directions are north and south, occurring for approximately 13% of the monitoring period each
– The direction with the lowest frequency of winds is east, from which incident winds occur 0.6% of the time
– Light winds (<2 m/s) occur approximately 27% of the time
– High wind speeds (>6 m/s) occur approximately 5% of the time

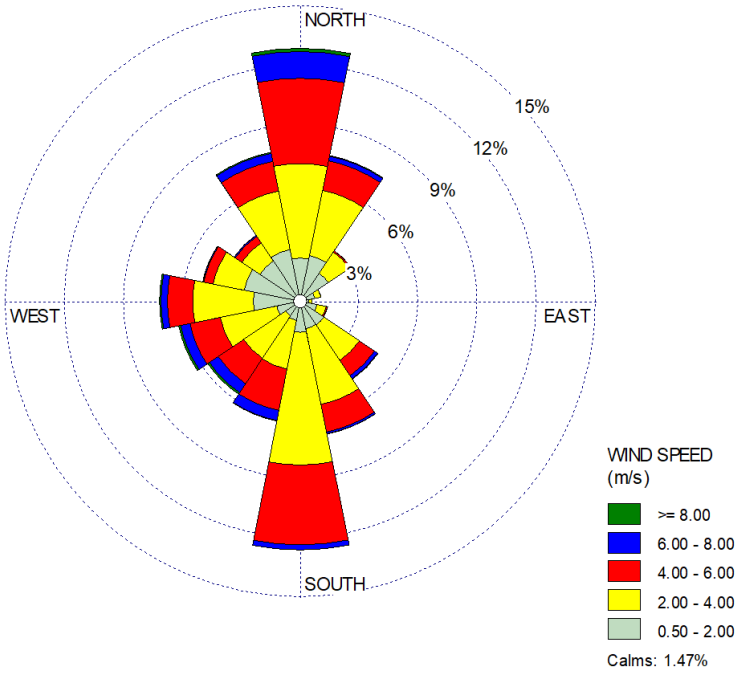


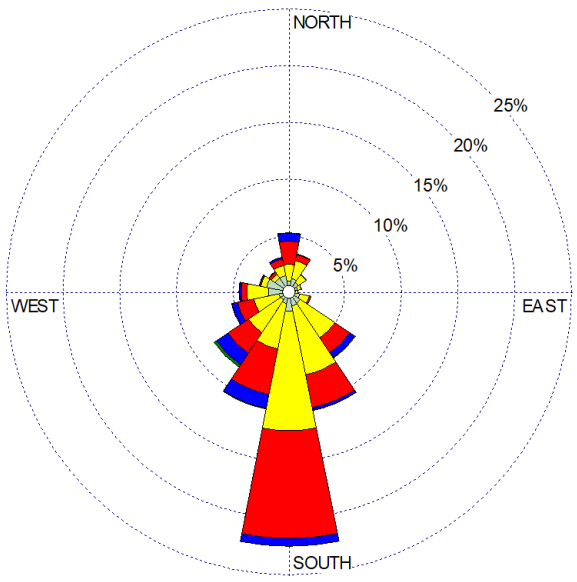
Figure 5-4 Annual wind rose for Footscray AWS

5.2.2 Seasonal pattern in wind

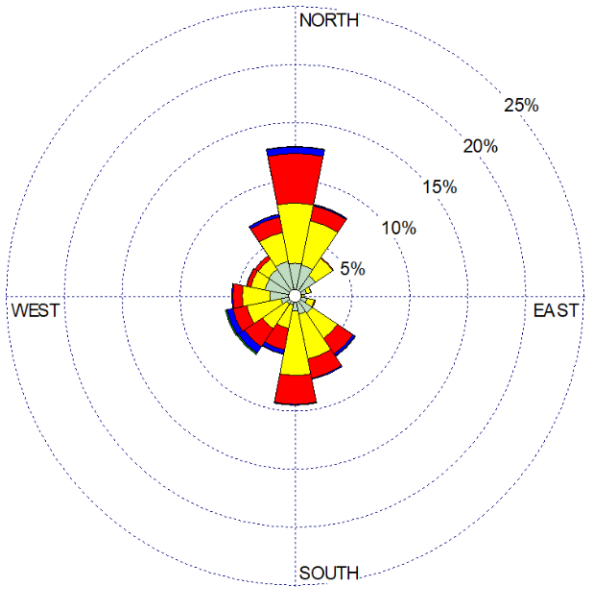
The wind roses for each season are given in Figure 5-5 and show that:

- The predominant wind direction in summer is south, occurring approximately 22% of the time. Northerly and easterly component winds occur approximately 5% of the time or less.
- Light winds (<2 m/s) occur approximately 20% of the time in summer.
- The predominant wind direction in winter is north, occurring approximately 21% of the time.
- Light winds occur approximately 32% of the time in winter.
- Autumn and spring contain characteristics of both summer and winter. The predominant wind direction in autumn is north, occurring for approximately 13% of the time. In spring, the predominant wind direction is south, occurring for approximately 14% of the time.
- Light winds occur approximate 31% of the time in autumn and 26% of the time in spring.

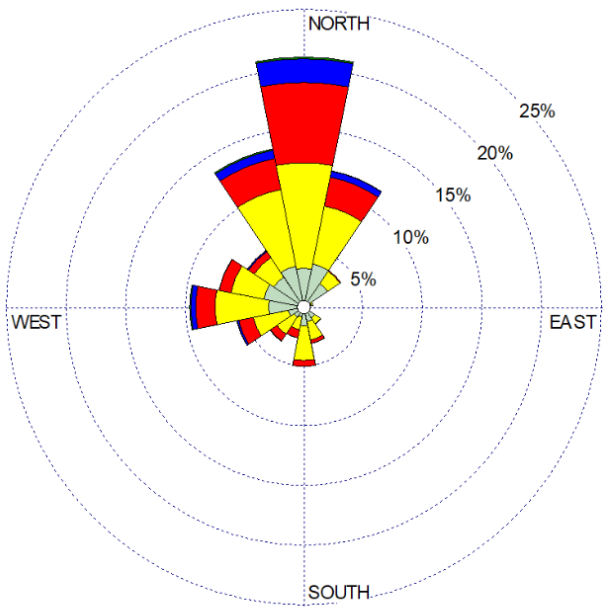
Summer – mean wind speed = 3.33 m/s



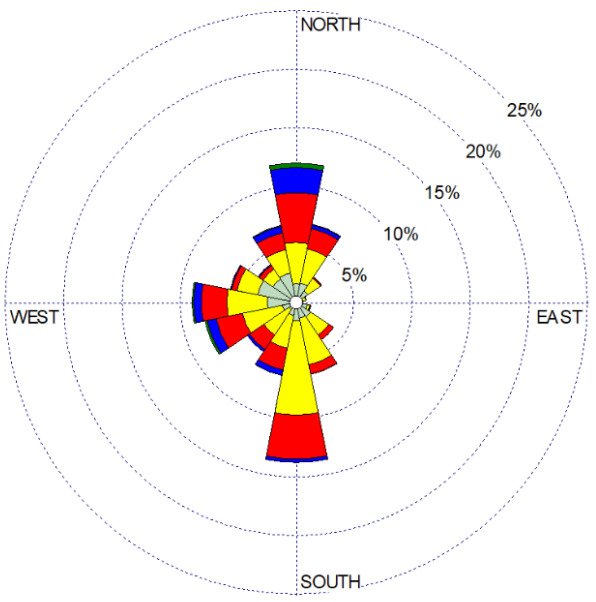
Autumn – mean wind speed = 2.87 m/s



Winter – mean wind speed = 2.85 m/s



Spring – mean wind speed = 3.15 m/s



Legend

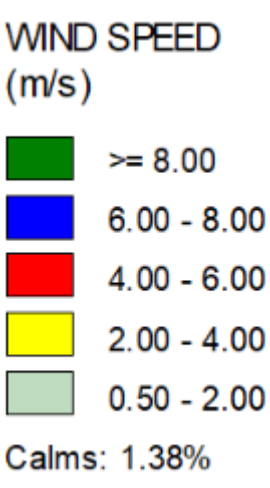


Figure 5-5 Seasonal wind rose for Footscray AWS

5.2.3 Directional buffer

Methodology

Section 9.2 of the EPA Publication 1518 allows for site-specific variation on the basis of topographical or meteorological features which will affect dispersion of industrial residual air emissions. GHD has developed an approach to provide directionally-dependent buffers on the basis of the dispersive ability of the atmosphere, as assessed using atmospheric dispersion modelling (Clarey & Pollock, 2004).

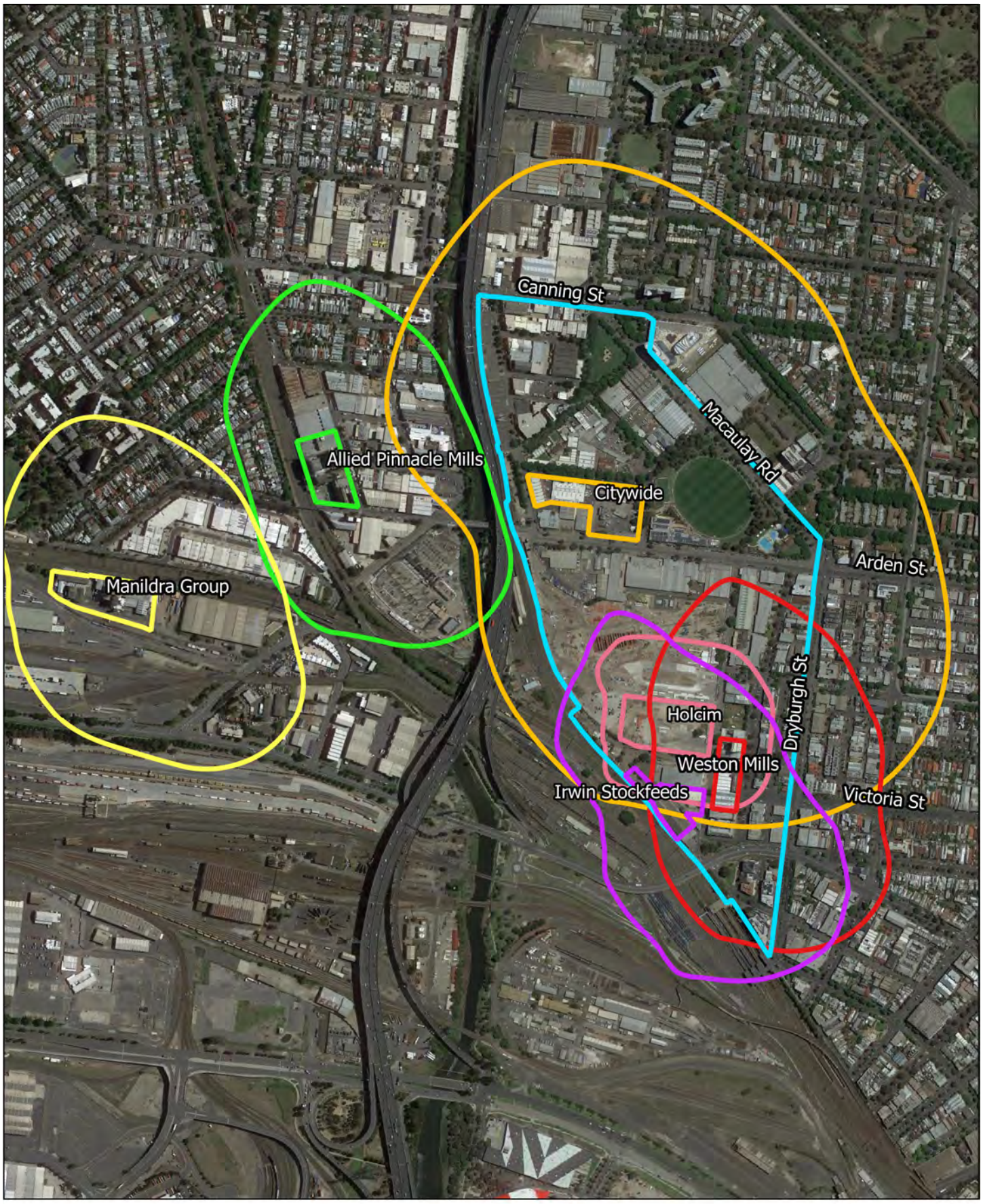
Where site-representative meteorological data is available, the direction of good and poor dispersion can be identified as shown above. Further, if the five year dataset is configured into the dispersion modelling format then dispersion modelling (using EPA regulatory model AERMOD) can be conducted using a nominal air source emission rate to assess the directional change in the buffer extent from a default radial buffer[11]. The directional buffer adapts the default radial buffer to take account of the directions of good and poor dispersion – found from the meteorological data representative of local conditions.

In the directions of poor dispersion, the buffer is extended and in the directions of good dispersion the buffer is retracted. The effect is to produce the same degree of protection from exposure to impact as the default buffer but shaped by the local meteorology to represent a more realistic site specific buffer in the event of a process upset.

Application to the Precinct

Directional buffers are plotted in Figure 5-6 for the industries identified in section 5.1.2, with buffers located nearby or impacting the Precinct. From the figure it can be seen that, as with the default buffers, Allied Pinnacle and Manildra Group buffers do not extend to the Precinct. The directional buffer for Citywide covers approximately the same area as the default buffer; covering approximately 93% of the Precinct compared with 88% from the default buffer. The Citywide directional buffer is slightly reduced toward the southwest compared with the default buffer. The directional buffers for Irwin Stockfeeds, Weston Mills and Holcim cover approximately the same area in the south of the Precinct as did the default buffers. The Irwin Stockfeeds buffer is slightly reduced toward the west compared with the default buffer. When taking all directional buffers into account, most of the Precinct remains impacted by industry buffers.

[11] Clarey P, Pollock T “Integrating Separation Distances with Dispersion Modelling” Enviro 04, 28 Mar – 1 April 2004, Darling Harbour, Sydney



LEGEND

Precinct boundary
Citywide
Irwin Stockfeeds
Weston Mills
Allied Pinnacle Mills
Holcim
Manildra Group

Paper Size A4

0 150 300 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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Victorian Planning Authority

Arden Adverse Amenity Impact Assessment

Directional buffers

Project No. 3137400
Revision No. -
Date. 06/09/2021

FIGURE 5-6

5.3 Air quality mitigation strategies

To reduce disamenity (odour and dust during an upset) to the proposed sensitive uses in the Precinct, the following potential mitigation measures are outlined for consideration where appropriate (i.e. in the event sensitive uses are located within a separation distance during the transition phase of an industry). Note that these are general in nature and a detailed assessment should be undertaken as required to quantify the nature of the impact and adequacy of any proposed mitigation measures.

Control of air quality emissions through built form

– The principal option is to limit the exposure of air emissions to residential openable windows/balconies. This can be dealt with in the design and orientation of buildings through urban design measures:
– Mechanical ventilation for rooms facing the potential source
– Locate air intakes away from the potential source i.e. on the lee wind side of the building
– Use of a filtration unit on heating, ventilating and air conditioning (HVAC) systems
– Non-openable windows facing the potential source

Control of odours at source

Odour emissions at source in an industrial premises can be reduced by odour treatment/control. This can be requested for new industries as part of best practice or required by EPA (via PANs (Pollution Abatement Notices) and PINs (Penalty Infringement Notices)). For those industries identified to cause a constraint, it is the EPA's responsibility to enforce compliance with Environmental Reference Standard (ERS) and the General Environmental Duty (GED)[12] so that these sites do not cause off-site adverse impacts or odour complaints under normal operations. EPA is also responsible for validating and investigating any odour complaints that they receive.

Control of dust emissions at source

Two available measures to control or reduce the dust emissions at source include:

– Use of BPEM (Best Practice Environmental Management) measures for each industry to mitigate dust on site
– Reduce the dust output of the source via dust mitigation measures (may require EPA enforcement via PANs and PINs)

EPA is also responsible for validating and investigating any dust complaints that they receive.

It is also recognised that where there are industrial air emissions from a premises, even with good pollution control technology and practice, there may still be unintended emissions which must be anticipated and allowed for. Therefore even if EPA enforce compliance with the ERS and GED, Publication 1518 acknowledges that these objectives might not always be met. The recommended separation distances are intended to account for these situations and do not provide an alternative to source control. Under the VPPs, industrial land uses have use rights which enable the industry to operate, provided they comply with relevant regulations.

5.4 Further work

As stated in Section 5.1.4 the EPA buffer guideline (Section 9) identifies six criteria to consider in Table 4 (Figure 5-3 in this report) of the guideline that allow for a site-specific variation to the default buffer distances outlined in Section 5.1.2. GHD assessed the 'topography or meteorology' criterion in section 5.2.3 to produce directional buffers which consider the influence of topography or meteorology on the dispersion of emissions, for the identified industries with a default buffer, located nearby or impacting on the Precinct. GHD has also provided discussion around transitioning of the industry criteria in Section 1.1.

[12] which requires Victorians to understand and minimise their risks of harm to human health and the environment, from pollution and waste

It is noted that further site specific variations to the default buffer distances outlined in Section 5.1.4 may be able to be made if further operational information of the industries requiring a buffer distance were to be obtained, such as:

– Transitioning of the industry
– Throughput amounts
– Plant equipment details
– Odour/dust controls implemented
– History, likelihood and likely off-site impact of plant upsets

In order to further vary an industry's buffer, a detailed assessment of the particular industry would need to be undertaken, requiring industry cooperation and operational information including but not limited to what emission controls and procedures are in place, past history of upsets and how frequently upset conditions occur. Variations using the above criteria may assist in reducing the default buffer for some of the constraining industries.

It is noted that further work in the form of an Amenity Risk Assessment was undertaken by GHD in 2021[13]. Site-specific variation to the default buffer distances for the following industries was assessed:

– Citywide (asphalt plant)
– Holcim
– Weston Milling
– Irwin Stockfeeds

[13] GHD 2021, Arden Transport Precinct, Arden Structure Plan – Amenity Risk Assessment

6. Noise and vibration assessment

6.1 What is noise

Noise is generally defined as unwanted sound, which may be hazardous to health, interfere with speech and could potentially be disturbing, irritating or annoying. Noise can be generated from various sources, such as industrial/commercial premises, musical instruments, and transport operations.

Noise sources may have certain characteristics, such as tonality, impulsiveness, intermittency, irregularity or dominant low-frequency content. There is evidence to suggest that noise with these characteristics can cause greater annoyance than noise without these characteristics at the same noise level.

6.2 Potential major noise sources

As discussed in section 4.3, the ambient noise environment was observed during the site visit undertaken on 9 July 2019. Local traffic and intermittent heavy vehicles servicing industrial facilities were observed to be the dominant sources of noise within the ambient noise environment. In addition to these, the following activities and industries were observed to contribute to increased noise levels during the site visit:

– Upfield rail corridor (Frequent noise from passing trains)
– North Melbourne station (Intermittent noise from boom gate alarm tones)
– Citylink (Constant hum from traffic, reaching varying sound levels)
– Citywide (Frequent industrial noise from machinery)

It was identified that these industries have the potential to impact sensitive receptors within the Arden Precinct. Table 5 lists these industries as well as other industries which have the potential to contribute to noise within the Precinct. The location of the major noise sources likely impacting the precinct are shown in Figure 4-1.

The Precinct consists of and is in close proximity to a mixture of commercial and industrial facilities. Generally, activities associated with such facilities are located indoors and anticipated to have low to medium noise impact risk on sensitive uses within the Precinct. However, there is potential for mechanical plant or machinery associated with these facilities to have medium impact risk on the sensitive uses within the Precinct. The medium impact risk can be interpreted as follows:

– Minor reduction in amenity would be either almost certain or likely
– Moderate reduction in amenity would be either possible or unlikely
– Major reduction in amenity would be rare

Reduction in amenity could be interpreted as exceedance above recommended noise amenity levels for sensitive land uses.

The drainage pump stations are considered public utility servicing the wider community which when activated can generate likely noise impact at close proximity to the stations. These are however located indoors within brick enclosures which is expected to have been designed for noise control and hence likely to have low to medium noise impact on the precinct. Noise impact from drainage pump stations is further discussed in Section 6.5.2.

Small industrial and commercial establishments such as auto facilities, service stations and the like depending on the type of activities and distance to the subject site, could result in potential low to medium noise impact on the subject site.

These facilities generally operate during normal commercial hours (some exceptions may apply due to deliveries, service stations and the like), and hence their likely noise impact is expected to be during day and evening hours with minor impact during night time hours.

Table 5 Industries with potential for noise impacts to Arden Precinct

Industry/ activity	Noise sources
Upfield rail corridor	Passing trains, train horns
Macaulay and North Melbourne stations	Level crossing alarm tone, stopping and passing trains, and train horn
Citylink	Passing vehicles on elevated roadway
Citywide asphalt plant	Industrial noise
Drainage pump station	Drainage pump when activated
West Melbourne Terminal substation	Hum from transformers
Allied Pinnacle mill	Industrial noise
Weston Milling mill	Industrial noise
Lost Dogs Home	Dog barking
Holcim concrete batching plant	Industrial noise
Small industrial and commercial establishments	Commercial and industrial, deliveries

6.3 Existing potential primary vibration sources

Primary vibration sources within and adjacent to the Precinct may result from the following features:

– Upfield rail corridor and associated infrastructure
– Electrical substation

It should be noted that vibration impact may be noticeable in close proximity to a rail corridor or electrical substation. It is not expected to be significant at larger separation distances.

6.4 Legislation, guidelines and standards

The Precinct is located within the City of Melbourne for which the provisions of the Melbourne Planning Scheme are applicable. The following outlines the applicable requirements of the Melbourne Planning Scheme in relation to noise and vibration.

6.4.1 Melbourne Planning Scheme

Clause 13.05-1S Noise abatement

Objective: To assist the control of noise effects on sensitive land uses.

Strategy: Ensure that development is not prejudiced and community amenity is not reduced by noise emissions, using a range of building design, urban design and land use separation techniques as appropriate to the land use functions and character of the area.

Policy Guidelines

Consider as relevant:

– The noise requirements in accordance with the Environment Protection Regulations under the Environment Protection Act 2017.

Policy Documents

Consider as relevant:

– Environment Protection Regulations under the Environment Protection Act 2017
– Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues (Publication 1826.2, Environment Protection Authority, March 2021) (the Noise Protocol)

Clause 18.04-1S Planning for airports and airfields

Strategies

Plan for areas around all airfields such that:

– Any new use or development that could prejudice the safety or efficiency of an airfield is precluded.
– The detrimental effects of aircraft operations (such as noise) are taken into account in regulating and restricting the use and development of affected land.
– Any new use or development that could prejudice future extensions to an existing airfield or aeronautical operations in accordance with an approved strategy or master plan for that airfield is precluded.

Policy documents

National Airports Safeguarding Framework (as agreed by Commonwealth, State and Territory Ministers at the meeting of the Standing Council on Transport and Infrastructure on 18 May 2012).

Clause 21.08-3 Industry

Objective 2: To encourage industries to adopt the highest standards of environmental management practice.

Strategy 2.1: Encourage industries to adopt Environmental Management Plans and ensure new industrial uses incorporate measures to minimise noise and environmental impacts

Clause 32.04 Mixed use zone

32.04-12 Application requirements

Use for industry and warehouse:

Unless the circumstances do not require, an application to use land for an industry or warehouse must be accompanied by the following information:

The likely effects, if any, on the neighbourhood, including noise levels, traffic, air-borne emissions, emissions to land and water, light spill, glare, solar access and hours of operation (including the hours of delivery and dispatch of materials and goods).

Clause 33.01 Industrial 1 Zone

33.01-1 (For industry and warehouse) Must not adversely affect the amenity of the neighbourhood, including through the:

– Emission of noise, artificial light, vibration, odour, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil.

33.01-2 Application requirements:

An application to use land for an industry or warehouse must be accompanied by the following information, as appropriate:

– The likely effects, if any, on the neighbourhood, including noise levels, air-borne emissions, emissions to land or water, traffic (including hours of delivery and despatch), light spill or glare.

Clause 33.03 Industrial 3 Zone

33.03-1 (For warehouse) Must not adversely affect the amenity of the neighbourhood, including through the:

– Emission of noise, artificial light, vibration, odour, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil.

33.03-2 Use of land

A use must not adversely affect the amenity of the neighbourhood, including through the:

– Emission of noise, artificial light, vibration, odour, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil.

Schedule 26 to Clause 42.02 Design and Development Overlay

North Melbourne, West Melbourne and Arden-Macaulay Noise Attenuation Area

Design Objectives

– To ensure that new, refurbished or converted developments for new residential and other noise sensitive uses constructed in the vicinity of the Laurens Street, North Melbourne Industrial Area and in the vicinity of industrial operations in Arden-Macaulay include appropriate acoustical measures to attenuate noise levels within the building.
– To ensure that land use and development in the vicinity of the Laurens Street, North Melbourne Industrial Area and in the vicinity of industrial operations in Arden-Macaulay does not adversely affect the viability of industry within these areas.

Requirements

Any new or refurbished development or any conversion of part or all of an existing building that will accommodate new residential or other noise-sensitive uses must:

– Be designed and constructed to include noise attenuation measures. These noise attenuation measures must achieve a maximum noise level of 35dB(A)Leq in unfurnished and uncarpeted habitable rooms, with all windows and doors closed, unless there is no suitable air conditioning and/or mechanical ventilation, in which case the maximum noise level of 35dB(A)Leq in unfurnished and uncarpeted habitable rooms must be achieved with all the windows half open and the doors closed.
– Be fitted with suitable air conditioning and/or mechanical ventilation system to the satisfaction of the responsible authority unless the maximum noise level of 35dB(A)Leq in unfurnished and uncarpeted habitable rooms can be achieved with all the windows half open and the doors closed.
– Have walls, roof, windows, doors and external glazing and the air conditioning or ventilation system designed by a qualified acoustical consultant who must certify that the incorporation of the design features recommended by the consultant will achieve a maximum noise level in unfurnished and uncarpeted habitable rooms of 35dB(A)Leq, based on the external noise levels measured by the consultant as part of a noise level assessment conducted to the satisfaction of the responsible authority.

The pre-construction noise measurement will be conducted as follows:

– Be sufficient in detail and duration to be representative of the noise from the industrial operations which occur in the vicinity of the Laurens Street North Melbourne Industrial Area and the noise from industrial operations in Arden-Macaulay. This monitoring shall include sampling during the day, evening and night periods on weekdays and weekends.

Verification Testing

Prior to the commencement of a residential or other noise-sensitive use, acoustic testing must be conducted by a qualified acoustical consultant. The testing must verify that the maximum noise level of 35dB(A)Leq in the two most likely to be affected unfurnished and uncarpeted habitable rooms is achieved to the satisfaction of the responsible authority.

For further details in relation to the Verification Testing and general requirements refer to Schedule 26 to Clause 42.02 Design and Development Overlay of the Melbourne Planning Schemes (Pages 792 – 794).

Clause 53.06 Live Music Entertainment Venues

53.06–3 Requirements to be met

A live music entertainment venue must be designed, constructed and managed to minimise noise emissions from the premises and provide acoustic attenuation measures that would protect a noise sensitive residential use within 50 metres of the venue.

A noise sensitive residential use must be designed and constructed to include acoustic attenuation measures that will reduce noise levels from any:

– Indoor live music entertainment venue to below the noise limits specified in the Environment Protection Regulations under the Environment Protection Act 2017 and the incorporated Noise Protocol (Publication 1826.2, Environment Protection Authority, November 2020)
– Outdoor live music entertainment venue to below 45dB(A), assessed as an Leq over 15 minutes.

For the purpose of assessing whether the above noise standards are met, the noise measurement point may be located inside a habitable room of a noise sensitive residential use with windows and doors closed (consistent with EPA Publication 1826.2).

A permit may be granted to reduce or waive these requirements if the responsible authority is satisfied that an alternative measure meets the purpose of this clause.

Clause 55.07 Apartment developments

Purpose:

Clause 55.07 sets out requirements for an apartment development

55.07–6 Noise impacts objectives

– To contain noise sources in developments that may affect existing dwellings
– To protect residents from external and internal noise sources

Standard B40

– New dwellings should be designed and constructed to include acoustic attenuation measures to reduce noise levels from off-site noise sources.
– Buildings within a noise influence area specified in Table B6 (shown in Figure 6-1) should be designed and constructed to achieve the following noise levels:
    a) Not greater than 35 dB(A) for bedrooms, assessed as an $L_{Aeq,8h}$ from 10 pm to 6 am
    b) Not greater than 40 dB(A) for living areas, assessed $L_{Aeq,16h}$ from 6 am to 10 pm
– Buildings, or part of a building screened from a noise source by an existing solid structure, or the natural topography of the land, do not need to meet the specified noise level requirements.

Clause 58.04 Amenity Impacts

58.04–3 Noise impacts objectives

– To contain noise sources in developments that may affect existing dwellings
– To protect residents from external and internal noise sources

Standard D16

– New dwellings should be designed and constructed to include acoustic attenuation measures to reduce noise levels from off-site noise sources.
– Buildings within a noise influence area specified in Table D3 (shown in Figure 6-1) should be designed and constructed to achieve the following noise levels:
    a) Not greater than 35 dB(A) for bedrooms, assessed as an $L_{Aeq,8h}$ from 10 pm to 6 am
    b) Not greater than 40 dB(A) for living areas, assessed $L_{Aeq,16h}$ from 6 am to 10 pm
– Buildings, or part of a building screened from a noise source by an existing solid structure, or the natural topography of the land, do not need to meet the specified noise level requirements.

Noise source	Noise influence area
Zone interface	
Industry	300 metres from the Industrial 1, 2 and 3 zone boundary
Roads	
Freeways, tollways and other roads carrying 40,000 Annual Average Daily Traffic Volume	300 metres from the nearest trafficable lane
Railways	
Railway servicing passengers in Victoria	80 metres from the centre of the nearest track
Railway servicing freight outside Metropolitan Melbourne	80 metres from the centre of the nearest track
Railway servicing freight in Metropolitan Melbourne	135 metres from the centre of the nearest track

Note: The noise influence area should be measured from the closest part of the building to the noise source.

Figure 6-1 Noise influence area – Table B6 and D3 of the Melbourne Planning Scheme

6.4.2 The Noise Protocol

Noise associated with commercial, industrial and entertainment premises is managed under the EPA Victoria Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (the Noise Protocol).

The Noise Protocol provisions have been incorporated into the Environment Protection Regulations 2021 (EP Regulations 2021). The Noise Protocol provides a procedure for the purpose of determining noise limits for new and existing commercial, industrial and trade premises and entertainment venues as defined by the EP Regulations 2021. It sets the methodology for assessing the effective noise level to determine unreasonable noise under the provisions of EP Regulations 2021.

The Noise Protocol sets the maximum effective noise level allowed in a noise-sensitive area from commercial/industrial premises depending on the time of day, land use zoning and existing background noise levels Potential environmental noise emissions from individual developments on the Precinct should be assessed in accordance with the requirements of the Noise Protocol during development approval stages and where relevant planning conditions incorporated to require individual developments to demonstrate compliance with the Noise Protocol noise limits at the surrounding noise sensitive areas.

6.4.3 Victoria Planning Provisions (VPP)– Clause 58.04-3

Clause 58.04-3 of the planning scheme specifies indoor noise levels that should be met for residential dwellings within industrial areas or in a road or rail *noise influence area*.

In 2017, DELWP released a practice note for *Assessing External Noise Impacts for Apartments – Planning Practice Note 83* (August 2017) (PPN 83) to provide guidance about the operation of the VPP Clause 58.04-3.

Table 6 VPP Clause 58.04-3 Noise influence area and indoor design noise criteira

Noise source	Noise influence area	Indoor noise criteria
Zone interface		Not greater than 35 dB(A) for bedrooms, assessed as a $L_{Aeq,8hr}$ from 10 pm to 6 am. Not greater than 40 dB(A) for living areas, assessed $L_{Aeq,16hr}$ from 6 am to 10 pm.
Industry	300 metres from the industrial 1, 2 and 3 zone boundary	
Roads		
Freeways, tollways and other roads carrying 40,000 Annual Average Daily Traffic (AADT) Volume	300 metres from the nearest trafficable lane	
Railways		
Railway servicing passengers in Victoria	80 metres from the centre of the nearest track	
Railway servicing freight outside Metropolitan Melbourne	80 metres from the centre of the nearest track	
Railway servicing freight in Metropolitan Melbourne	135 metres from the centre of the nearest track	

Note that the *noise influence area* should be measured from the closest part of the building to the noise source.

6.4.4 Indoor sound levels – AS/NZS 2107

It is recommended the indoor sound levels of any building comply with the Australian Standard AS/NZS 2107:2016 "*Acoustics – Recommended design sound levels and reverberation times for building interiors*" (AS/NZS 2107: 2016) in addition to the VPP Clause 58.04-3 requirements.

Table 1 of AS/NZS 2107: 2016 outlines recommended design sound levels and reverberation times for residential buildings, as reporoduced in Table 7.

Table 7 Table 1 of AS/NZS 2107: 2016 Design sound levels for residential buildings

Type of occupancy/activity	Design sound level ($LA_{eq,t}$) range
Houses and apartments in suburban areas or near minor roads	
Apartment common areas (e.g. foyer, lift lobby)	45 to 50
Living areas	30 to 40
Sleeping areas (night time)	30 to 35
Work areas	35 to 40

6.4.5 Victorian Passenger Rail Infrastructure Noise Policy

The Victoria *Passenger Rail Infrastructure Noise Policy* (PRINP 2013) provides guidance to the transport bodies and planning authorities in their consideration of the impact of rail noise from improved, new passenger rail infrastructure and from changes to land use near existing or planned rail corridors. The guidelines provide a set of investigation threshold to guide relevant authorities when assessing rail noise if further mitigation is required.

If an assessment shows the investigation threshold is not exceeded, noise impacts can be considered a secondary matter and no further actions are needed under the PRINP 2013.

The investigation threshold for the change in land use near an existing rail corridor is presented in Table 8. The noise levels shown in Table 8 are external noise levels.

Table 8 PRINP investigation threshold for land use change near existing rail

Time	Type of receiver	Investigation threshold(s)
Day (6 am – 10 pm)	Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks. Noise sensitive community buildings including schools, kindergartens, libraries.	L_{Aeq} 65 dB or L_{Amax} 85 dB
Night (10 pm – 6 am)	Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks	L_{Aeq} 60 dB or L_{Amax} 85 dB

6.4.6 Sleep Disturbance

Impact of noise on sleep quality is greatly studied from long term effects perspective and sleep disturbance due to intermittent events is better correlated with maximum noise levels. Long term effects are typically addressed via design of average noise levels (such as $L_{Aeq,8hr}$), where as sleep disturbance is better correlated to the maximum noise levels per event (i.e. L_{Amax}). Sleep disturbance can occur via changes in sleep state and awakening is more related to subjective assessments of sleep quality [NSW Road Noise Policy 2011 (NSW RNP)].

The World Health Organisation (WHO) *Guidelines for Community Noise* recommend a maximum internal noise level of L_{Amax} 45 dB(A) for sleeping areas and can be considered as equivalent to 60 dB(A) external noise level on a 15 dB outside and inside conversion for partially open windows. It is noted that a level of L_{Amax} 45 dB(A) is based on the noise level at which effects of noise induced awakenings are observed.

Studies by the enHealth Council documented report titled *The health effects of environmental noise – other than hearing loss* dated May 2004 and also referenced in NSW RNP states that for short term events for good sleep over eight hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately L_{Amax} 45 dB(A) more than 10 or 15 times per night.

The NSW RNP also provides a summary of research in relation to noise induced sleep disturbance to date including the WHO and enHealth concluding the following:

– Maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep
– One or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly

A summary of the discussed sleep disturbance criteria is presented in Table 9. The NSW RNP approach has been previously accepted by Victorian Civil and Administrative Tribunal (VCAT) in relation to sleep disturbance.

Table 9 Summary of L_{max} Criteria for Sleep Disturbance

Source	Recommended internal L_{Amax}	Equivalent recommended external level(1)	Comment
WHO	45 dB(A)	60 dB(A)	Level at which the effects of noise induced sleep disturbance are observed.
enHealth Council	45 dB(A)	60 dB(A)	Recommended maximum noise level not exceed more than 10 – 15 times per night for a good sleep over 8 hours.
NSW RNP	50 – 55 dB(A)	65 – 70 dB(A)	Level below unlikely to awaken people from sleep
	65 – 70 dB(A)	80 – 85 dB(A)	Level that not likely to affect health and wellbeing significantly if only occur one or two events per night.
Equivalent external level based on a typical outdoor to indoor conversion of 15 dB for partially open windows. This is adopted by WHO and other guidelines.			

6.4.7 Aircraft noise – AS 2021

Aircraft noise impact is assessed against the requirements of the Australian Standard AS 2021 – *Acoustics – Aircraft Noise Intrusion – Building Siting and Construction*.

In accordance with the AS 2021, the acceptability of the location of building is dependent on the applicable ANEF (Australian Noise Exposure Forecast) from aircraft noise to the site as outlined in Table 10.

Table 10 AS2021 Building Acceptability based on Aircraft noise exposure

Building type	Site ANEF		
	Acceptable	Conditionally Acceptable	Unacceptable
House, home unit, flat, caravan park	< 20 ANEF	20 – 25 ANEF	>25 ANEF
Hotel, motel, hostel	< 25 ANEF	25 – 30 ANEF	>30 ANEF
School, university	< 20 ANEF	20 – 25 ANEF	>25 ANEF
Hospital, nursing home	< 20 ANEF	20 – 25 ANEF	>25 ANEF
Public building	< 20 ANEF	20 – 30 ANEF	>30 ANEF
Commercial building	< 25 ANEF	25 – 35 ANEF	>35 ANEF
Light industrial	< 30 ANEF	30 – 40 ANEF	>40 ANEF
Other industrial	Acceptable in all ANEF Zones		

Acceptable sites

For a building site that is classified as ‘acceptable’, there is usually no need for the building design and construction to provide protection specifically against aircraft noise. However, it should not be inferred that aircraft noise will be unnoticeable in areas with ANEF 20 contour or lower.

Conditionally acceptable sites

For a building site that is classified as ‘conditionally acceptable’, the maximum aircraft noise levels for the relevant aircraft within the proposed development should achieve the recommended AS 2021 indoor design aircraft noise levels.

Unacceptable sites

For a building site that is classified as ‘unacceptable’, construction of the proposed building should not normally be considered. Where in the community interest redevelopment is to occur in such areas where the relevant planning authority determines that a development may be necessary within existing built-up areas designated as unacceptable, then constructions should consider attenuation measures to achieve the recommended AS 2021 indoor design aircraft noise levels.

6.4.8 National Airport Safeguarding Framework

The *National Airports Safeguarding Framework* (NASF) developed by the Department of Infrastructure, Regional Development and Cities provides guidance on planning requirements for development that affects aviation operations. This includes building activities around the airport that might impact airport operations.

Guideline A of the NASF provides advice on the use of a supplementary suite of noise metrics, including the Australian Noise Exposure Forecast (ANEF) system and frequency-based noise metrics (N-contours), to inform strategic planning and provide communities with comprehensive and understandable information about aircraft noise.

The Precinct is located outside of the ANEF 20 contour for Melbourne Tullamarine Airport and therefore buildings developed in this Precinct are acceptable for noise sensitive uses in accordance with AS2021.

Based on noise exposure contours within the Melbourne and Essendon Airport Masterplan, the Precinct will likely be exposed to more frequent but less noisy aircraft noise events. Although aircraft noise may be audible at the Precinct, it is not expected to have adverse impact on the amenity of sensitive land uses or pose any restrictions on current or future operation of the Melbourne and Essendon airports with respect to aircraft noise.

6.5 Discussion of potential noise impacts from existing sources

6.5.1 Industrial and commercial

A number of industrial, commercial and transport sources which could have potential noise impacts on the amenity of noise sensitive uses within the Precinct were identified. These uses have been grouped into those within the Precinct and those adjacent to the Precinct, as outlined in Table 11.

Table 11 Potential noise impacts from existing sources

Group	Industries	Main Noise source	Part of the Precinct impacted
Adjacent to the western boundary of the Precinct	Citylink, upfield rail corridor, substation, drainage pump stations (1 to 4), Allied Pinnacle Mills	Road traffic, trains, level crossing bells, operating pumps, milling operations (mechanical equipment, loading/ delivery)	Western side of the Precinct
Within the northern portion of the Precinct	Citywide, Lost Dogs Home,	Mechanical equipment, loading and delivery activities, dogs barking	Northern side of the Precinct
Within the southern portion of the Precinct	Holcim, Weston Milling	Mechanical equipment, loading and delivery activities.	Southern side of the Precinct

Attended noise measurements

Attended noise measurements were made for selected sources during the site visit on 09/07/19. The results are summarised in Table 12 below.

Table 12 Attended noise measurement notes

Location	Sources	Time	Average dB(A)	Peaks observed dB (A) and notes
Macaulay Station Carpark, Langford St	Citylink Upfield railway line	13:45	60 - 62	65- Truck pass-by 83- Horn 71- Train horn at station 73- Train pass-by
Arden St, opposite Citywide	Citywide asphalt plant	14:07	65	76- Car pass-by 83- Horse and cart 78- Truck pass-by Tonal and impulsive mechanical noises
Laurens St, opposite Holcim	Holcim concrete batching plant	14:28	66 - 68	77- Car pass 75- Car pass

Industrial noise influence area

A great portion of the Precinct is currently zoned as Industrial 1 and 3 zones (IN1Z and IN3Z) from which a 300 m noise influence area is applicable in accordance with provisions of the Clause 55.07 and 58.04 of the Melbourne Planning Scheme. The Industrial zones and applicable 300 m noise influence area are shown in Figure 6-2. Based on the current Industrial zoning within the Precinct, the 300 m noise influence area covers the full area of the Precinct.

Accordingly, any proposed noise sensitive development within the Precinct should be required to undertake a detailed noise intrusion assessment by a qualified acoustic engineer or other suitably skilled person to the satisfaction of the responsible authority, to demonstrate that the proposed design meets the following internal noise limits from external noise sources:

– Recommended indoor noise limits outlined in VPP Clause 58.04-3 (PPN 83) as follows:
    a. Not greater than 35 dB(A) for bedrooms, assessed as an LAeq,8h from 10 pm to 6 am
    b. Not greater than 40 dB(A) for living areas, assessed LAeq,16h from 6 am to 10 pm
– Satisfaction of the sleep disturbance criteria in the bedrooms or sleeping areas in accordance with World Health Organisation (WHO) recommendations as follow:
    c. Maximum internal noise levels (L_{Amax}) not exceeding 45 dB(A).

Due to the industrial/commercial nature of the area within and surrounding the Precinct, it is recommended that the above indoor noise limits are met, regardless of whether the proposed dwelling is located within a noise influence area or not. This includes consideration of small industrial and commercial establishments such as auto facilities and the like.

The requirements of the PPN 83 are enforced by Clause 55.07 and 58.04 (Apartment Developments and Amenity Impacts) of the Melbourne Planning Scheme for residential dwellings. Since ambient noise in the Precinct is generally high, it is important that amenity of residents inside dwellings is protected. It is recommended that the detailed acoustic assessment to be accompanied by a design response that addresses the recommendations of the acoustic assessment.

LEGEND

Precinct boundary

Industrial Zones

IN1Z

IN3Z

Noise Influence Area (300 m)

IN1Z Noise Influence Area

IN3Z Noise Influence Area

Paper Size A4

0 50 100 150 200 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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GHD

Victorian Planning Authority

Arden Adverse Amenity Impact Assessment

Noise Influence Area - Industrial Noise

Project No. **3137400**
Revision No. **-**
Date. **02/12/2019**

FIGURE 6-2

6.5.2 Drainage pump stations

The drainage pump stations when activated can generate likely noise impact at close proximity to the stations. These are however located indoors within brick enclosures and with intermittent operation.

The noise emission from existing facilities are expected to have been designed and controlled to meet the relevant Noise Protocol noise limits at the nearest noise sensitive receivers. However notable increase in future capacity (i.e. drainage flow rate) is proposed at each station which may increase noise emissions from each station. Hence, it is expected that further noise investigations have been or will be undertaken by the relevant authority maintaining the pump stations to ensure that the upgraded capacity achieves the relevant Noise Protocol noise limits at the nearest and approved future developments. Future new noise sensitive land uses as part of the Precinct are generally recommended to be avoided in close proximity of the pump stations where possible. However, further to the recommendations in Section 6.5.1, any noise sensitive land use encroaching on the pump stations should undertake a detailed noise intrusion assessment by a qualified acoustic engineer to demonstrate that the internal noise amenity proposed design achieves the internal amenity with consideration to the drainage pump stations as well as any other industrial or commercial noise sources within the area.

6.5.3 Design and Development Overlay

A portion of the Precinct falls within the Schedule 26 to Clause 42.02 Design and Development Overlay (DDO26) of the Melbourne Planning Scheme within which noise sensitive uses are required to include noise attenuation measures achieving relevant internal noise amenity. Areas within the Precinct where DD026 Overlay requirements apply are shown in Figure 6-4. Any new or refurbished development or any conversion of part or all of an existing building that will accommodate new residential or other noise-sensitive uses within the DD026 Overlay (as shown in Figure 6-4) must:

– Be designed and constructed to include noise attenuation measures. These noise attenuation measures must achieve a maximum noise level of 35dB(A)Leq in unfurnished and uncarpeted habitable rooms, with all windows and doors closed, unless there is no suitable air conditioning and/or mechanical ventilation, in which case the maximum noise level of 35dB(A)Leq in unfurnished and uncarpeted habitable rooms must be achieved with all the windows half open and the doors closed.
– Be fitted with suitable air conditioning and /or mechanical ventilation system to the satisfaction of the responsible authority unless the maximum noise level of 35dB(A)Leq in unfurnished and uncarpeted habitable rooms can be achieved with all the windows half open and the doors closed.
– Have walls, roof, windows, doors and external glazing and the air conditioning or ventilation system designed by a qualified acoustical consultant who must certify that the incorporation of the design features recommended by the consultant will achieve a maximum noise level in unfurnished and uncarpeted habitable rooms of 35dB(A)Leq, based on the external noise levels measured by the consultant as part of a noise level assessment conducted to the satisfaction of the responsible authority.

6.5.4 Music noise

As discussed in section 1.1, a desktop search was made for licenced premises in the Precinct area and surrounding 200 m. One business was identified as having the potential for music impact within this zone. The business, named The Third Day, is located on 290 Macaulay Road and is a converted warehouse which serves beverages and hosts DJs and food trucks. The venue also hosts party functions. Details on the license conditions for The Third Day are listed in Table 13. They outline applicable music noise limits and basic noise control measures.

Table 13 Licence conditions for The Third Day

License type	License description	Trading hours on license	Special conditions (noise- related)
On- premises License	This license is an on-premises license and authorizes the licensee to supply liquor on the licensed premises for consumption on the licensed premises during the trading hours specified.	**Mon- Thurs**: 5 pm- Midnight **Fri**: 5 pm to 1 am **Sat**: 12 pm to 1 am **Sun**: 9 am to 11 pm	That an octave band noise limiter be installed to the Premises sound system. This limiter shall be fitted with a feedback loop microphone that monitors music noise levels within the Premises and facilitates automatic reduction in music noise levels should any exceedance occur. The limiter shall be of a type that retains records of music noise levels played within the premises and associated Noise Protocol compliance for a period of not less than three months and produces a record of when the limiter is disconnected from the system. That the limiter records should be made available to the appropriate Authorities upon request, as necessary to demonstrate compliance or otherwise with the Noise Protocol. That prior to commencement of operation under an amended Liquor Licence, the music noise limiter be calibrated and commissioned by a suitability qualified acoustic engineer such that music noise levels within the premises do not exceed the Compliant Music Noise Levels set out in table 6 of the Strategic Assessment of Venue Noise Emissions report dated 13 November 2018. When music is played above background level within the premises, the roller door on Macaulay Road should be kept closed, with patrons accessing the premises from the door on the eastern side of the building. That all music at the venue only be played on the house sound system incorporating the stated music noise limiter. It is the Licensee responsibility to ensure that the calibration of the noise limiter is working and accurate at all times.

6.5.5 Traffic noise

The main traffic noise sources likely to affect future sensitive uses within the Precinct are the Citylink tollway road on the western boundary of the Precinct as well as the eastern section of the West Gate Tunnel Project.

City Link

According to VicRoads Open Traffic Volume Data[14], the portion of road passing the Precinct receives an Annual Average Daily Traffic (AADT) volume of 61,000 vehicles north of the Dynon Rd off-ramp and 58,000 vehicles south of the ramp. A total two way traffic volume of up to 121,000 AADT is expected along the portion of the CityLink in close proximity to the Precinct's western boundary. This exceeds the threshold of 40,000 AADT for consideration of traffic noise in accordance with the requirements of the VPP. As such, part of the Precinct is subject to the noise influence area of 300 m from the nearest trafficable lane shown in Figure 6-4.

Any new noise sensitive land use within the established Noise Influence Area should be required to undertake a detailed noise intrusion assessment by a qualified acoustic engineer or other suitably skilled person to the satisfaction of the responsible authority, to demonstrate that the proposed design meets the following internal noise limits from external noise sources:

– Recommended indoor noise limits outlined in VPP Clause 58.04-3 (PPN 83) as follows:
  a. Not greater than 35 dB(A) for bedrooms, assessed as an LAeq,8h from 10 pm to 6 am
  b. Not greater than 40 dB(A) for living areas, assessed LAeq,16h from 6 am to 10 pm
– Satisfaction of the sleep disturbance criteria in the bedrooms or sleeping areas in accordance with World Health Organisation (WHO) recommendations as follow:
  c. Maximum internal noise levels (L_{Amax}) not exceeding 45 dB(A)

West Gate Tunnel Project

The eastern section of the West Gate Tunnel Project (Port to City Works) will include future elevated road and structures and new cycling and walking bridges in close proximity to the south west of the Precinct. The works include:

– Elevated roadway connecting to CityLink, Dynon Road and Footscray Road, running above the centre of Footscray Road
– Walking and cycling paths for quicker and safer cycling to the city with a new veloway and bridges over Footscray Road and Moonee Ponds Creek
– Wurundjeri Way extension and widening – an extra lane in each direction and extending Wurundjeri Way north to Dynon Road to create a city bypass

The proposed elevated structures and road corridors as part of Port to City works of the West Gate Tunnel Project are shown in Figure 6-3 along with the Precinct boundary to the north east of the works.

[14] https://vicroadsopendata-vicroadsmaps.opendata.arcgis.com/datasets/traffic-volume/data?geometry=144.906%2C-37.806%2C144.989%2C-37.794&page=6

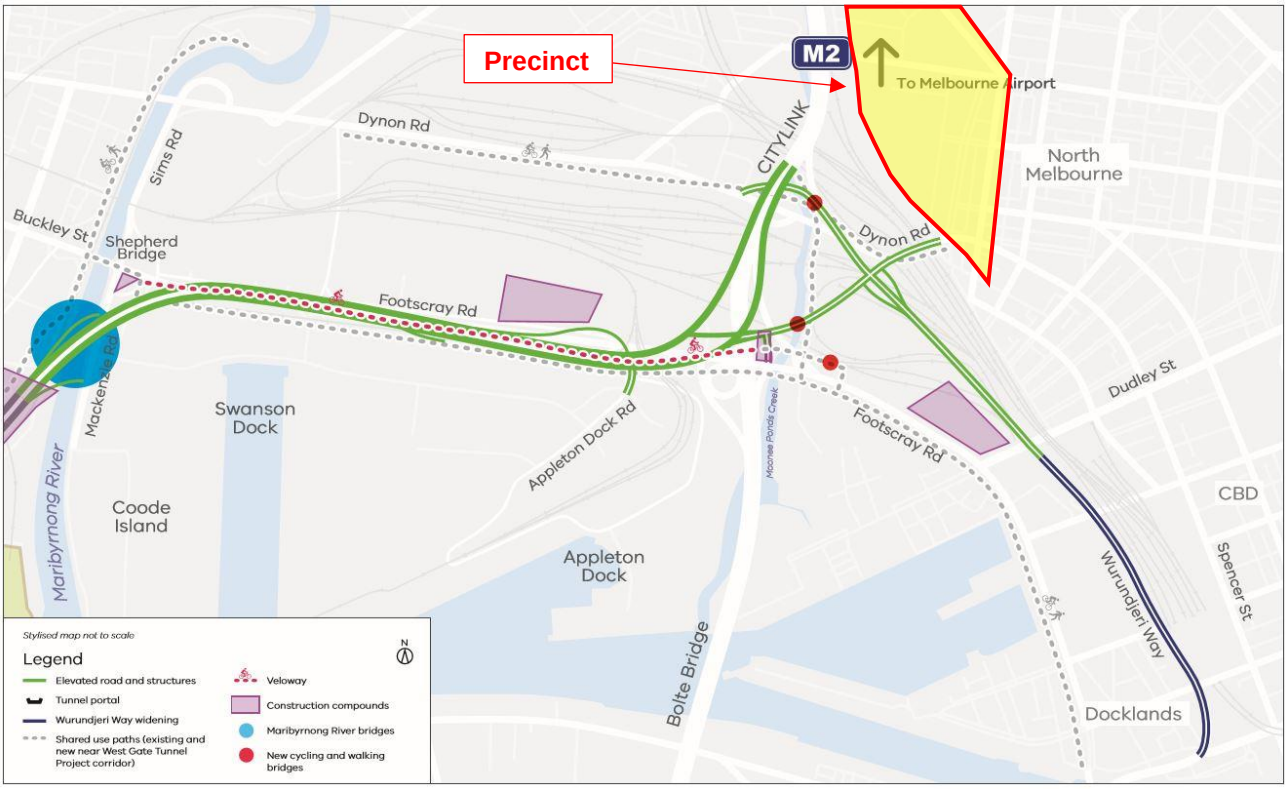


Figure 6-3 West Gate Tunnel – Port to City Works (image courtesy of West Gate Tunnel Project[15])

Construction works

This portion of the West Gate Tunnel project is understood to be scheduled for completion at year 2022[16]. The likely noise impacts from the West Gate Tunnel works will include noise and vibration emissions associated with the construction works and likely noise impact due to operation of the new elevated roads and structures as well as likely traffic noise increase due to increased traffic volume on existing connecting roads such as Dynon Road, Footscray, CityLink and Wurundjeri Way.

As part of the West Gate Tunnel works noise and vibration studies would have been conducted to address likely impact during construction works at the existing and approved future noise sensitive receivers within the existing boundaries of the Precinct. However, it is not expected that the West Gate Tunnel project would have had consideration with regards to the proposed Arden Precinct. The West Gate Tunnel project construction noise and vibration studies could however be used to inform likely impact on the Precinct.

The construction works are however understood to be scheduled for completion in 2022 and expected to be finished prior to the Precinct's transformation.

Although, based on current information, the West Gate Tunnel's City to Port works are expected to be completed by 2022, it is recommended that further consultation is undertaken with West Gate Tunnel Authority in relation to the project timing and noise and vibration studies undertaken to assess likely impact on the Precinct during construction works. Where this was relevant, then further investigations may be required to establish relevant noise mitigation strategies such as appropriate Precinct planning and staging to accommodate West Gate Tunnel construction works.

[15] http://westgatetunnelproject.vic.gov.au/construction/port-to-city
[16] http://westgatetunnelproject.vic.gov.au/construction/port-to-city

Operation

Noise from the operation of the West Gate Tunnel project's Port to City extensions on the Precinct is expected due to the following:

– Likely increase in traffic noise from CityLink due to increase in traffic volumes
– Traffic noise at Wurundjeri Way extension (new elevated road)
– New Dynon Road extension and likely increase in traffic noise on Dynon Road due to increased traffic volumes

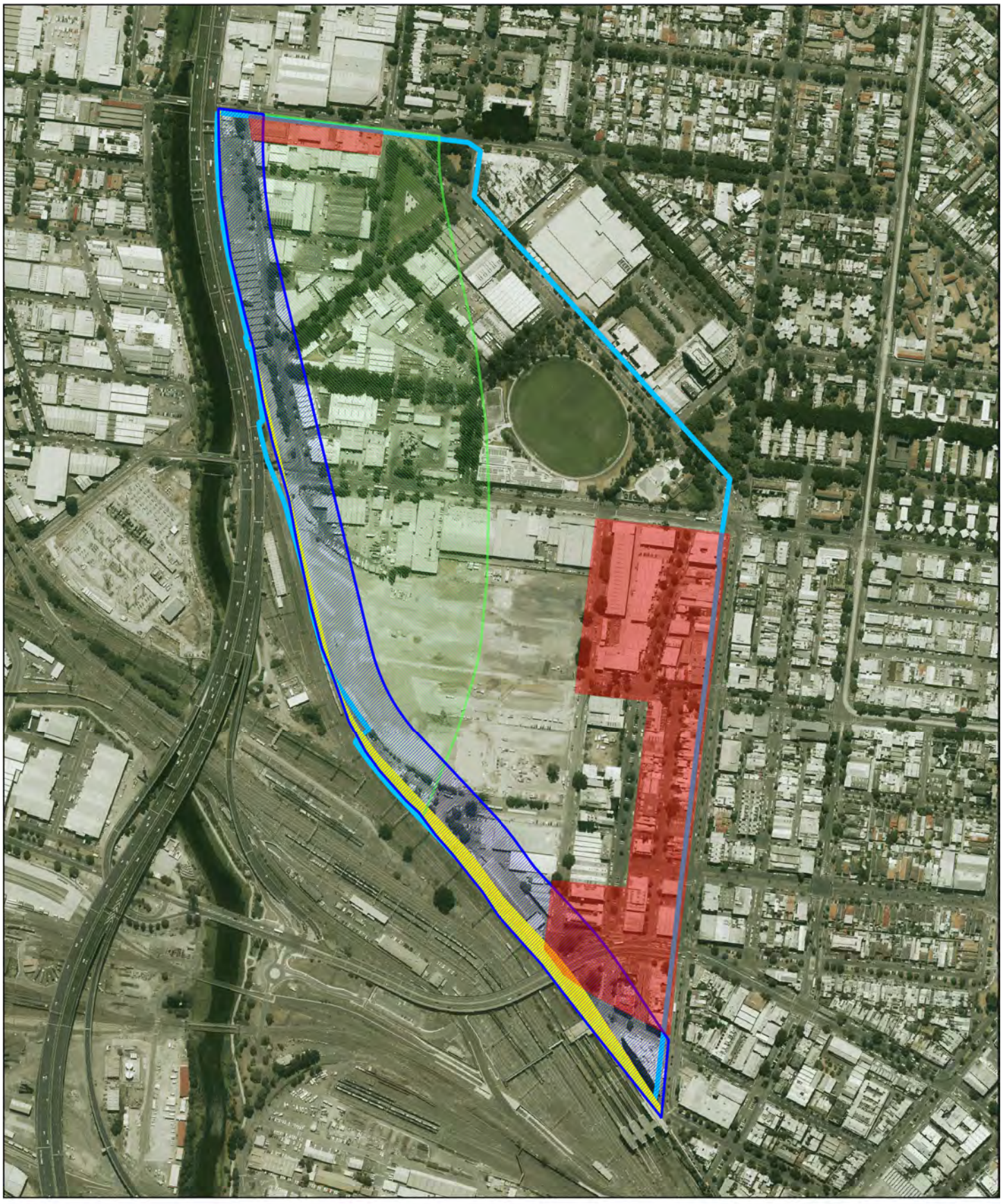
The expected traffic volumes at different sections of the West Gate Tunnel project following the project opening are not available publicly (this information however may be available from West Gate Tunnel Authority). Likely increase on CityLink is not expected to result in significant traffic noise increase and any potential future impact will be addressed within the provisions of Clause 55.07 and 58.04 of the Melbourne Planning Scheme and the established Noise Influence Area for City Link as shown in Figure 6-4.

According to VicRoads Open Traffic Volume Data[17], the Dynon Road and Wurundjeri Way have an existing traffic volume of 35,000 AADT which is below the 40,000 threshold for consideration of traffic noise in accordance with the requirements of the VPP. Given the connection of these roads ultimately to the West Gate Freeway and/or other arterial roads, there is likelihood of increase of traffic volumes beyond the 40,000 AADT for which provisions of the VPP noise influence area will be applicable. Therefore, it is recommended that further investigations to be undertaken to obtain further information on expected traffic volumes on the associated City to Port extensions to ascertain if consideration of VPP requirements is required.

The expected noise influence areas associated with the Port to City extensions assuming the new Wurundjeri Way and Dynon Road extension will have an ultimate traffic volumes above 40,000 are shown in Figure 6-5. As noted above, further investigations will however be required to confirm if this noise influence area is applicable.

Other elevated structure such as the new cycling and walking bridges will not have any noise impact on the Precinct.

[17] https://vicroadsopendata-vicroadsmaps.opendata.arcgis.com/datasets/traffic-volume/data?geometry=144.906%2C-37.806%2C144.989%2C-37.794&page=6



LEGEND

Precinct boundary

DDO26

Noise Influence Area - CityLink Traffic (300 m)

Noise Influence Area - Rail Noise (80 m)

Rail vibration buffer (20 m)

Paper Size A4

0 50 100 150 200 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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Arden Adverse Amenity Impact Assessment

Noise and Vibration Overlay & Buffers

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FIGURE 6-4

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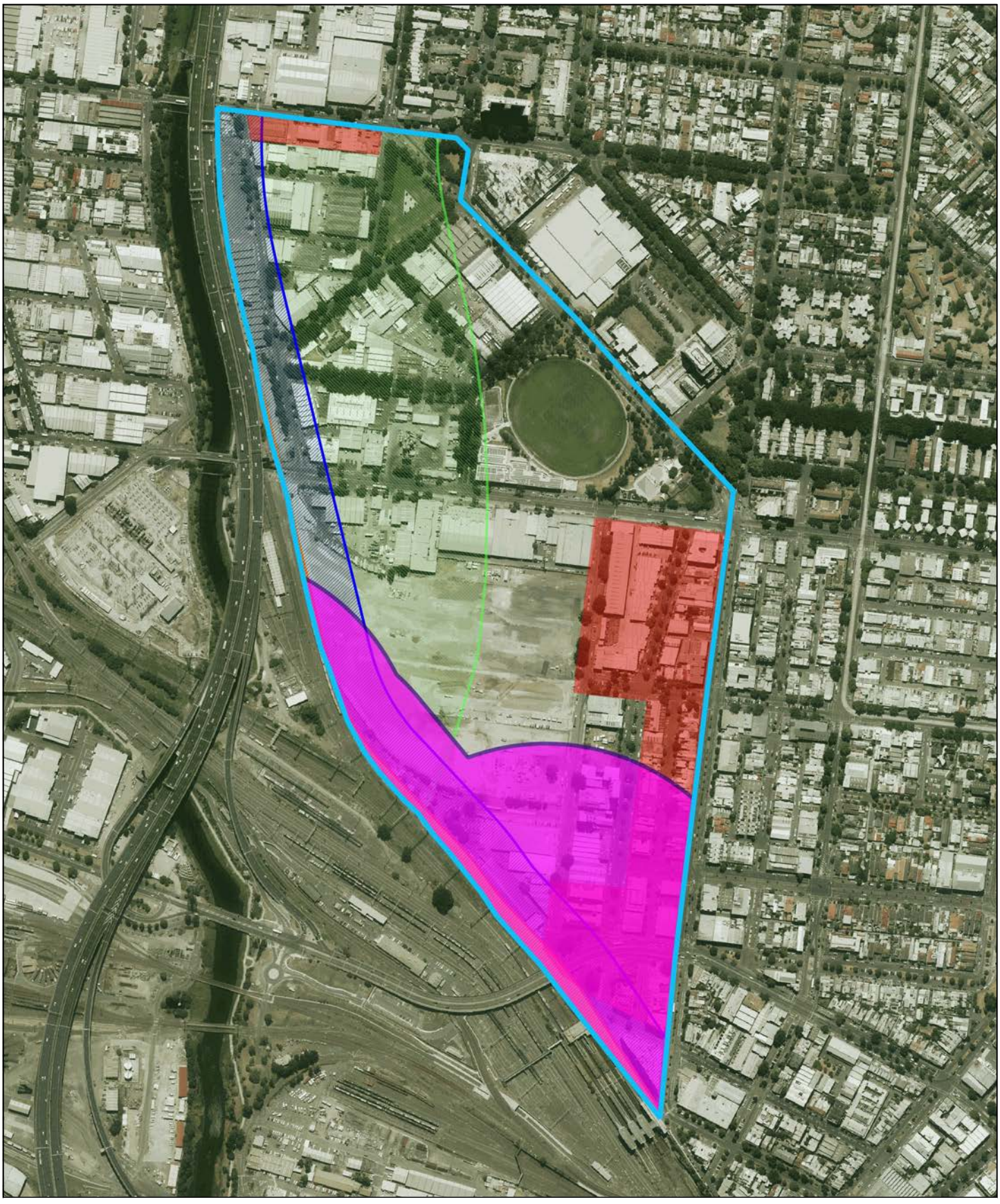
Data Source: Government of Victoria, DELWP VicMap. Created by: VA



LEGEND

Precinct boundary

Noise Influence Area - CityLink Traffic (300 m)

Rail Noise Buffer 80 m

DDO26

Potential Noise Influence Area - West Gate Tunnel

Paper Size A4

0 50 100 150 200 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

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GHD

Victorian Planning Authority

Arden Adverse Amenity Impact Assessment

Potential West Gate Tunnel's Port to City Extension Noise Influence Area

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Date. **02/12/2019**

FIGURE 6-5

Document Path: C:\Users\salamshah\Desktop\Projects Ongoing\Arden Amenity\Shape files\DD Zones.qgz

Data Source: Government of Victoria, DELWP VicMap. Created by: VA

6.5.6 Rail noise

The Upfield railway line is immediately adjacent to the western boundary of the Precinct. Based on a review of publicly available data, GHD understands that this railway line services Metropolitan trains only. GHD understands, based on a review of the train line timetable, that the line services at most three trains per hour one-way during peak periods, with the exception of 8 am – 9 am (four trains).

Based on a review of the Network Development Plan- Metropolitan Rail (Public Transport Victoria, 2012), GHD understands that the Upfield line will continue to run metropolitan services exclusively, with the aim of increasing services to six trains per hour during peak hours within a 15 year horizon[18].

In accordance with the requirements of the VPP enforced by Clause 55.07 and 58.04 of the Melbourne Planning Scheme, any noise sensitive use closer than 80 m of the track line, should be designed and constructed to achieve the following indoor noise limits:

– Not greater than 35 dB(A) for bedrooms, assessed as an $L_{Aeq,8h}$ from 10 pm to 6 am
– Not greater than 40 dB(A) for living areas, assessed $L_{Aeq,16h}$ from 6 am to 10 pm

In addition to above, consideration of World Health Organisation (WHO) sleep disturbance criteria is also recommended as follow:

– Maximum internal noise levels (L_{Amax}) not exceeding 45 dB(A)

The noise influence area associated with the Upfield rail line running along the western boundary of the Precinct is shown in Figure 6-4.

6.5.7 Aircraft noise

The Precinct is located approximately 14 km to the south east of the Melbourne Tullamarine International Airport and about 7.5 km to the south-southeast of the Essendon Fields Airport.

Melbourne Planning Scheme Clause 45.08 Melbourne Airport Environs Overlay

The Precinct is located outside of the Melbourne Airport Environs Overlay and therefore no restrictions in the use and development is required in relation to potential aircraft noise exposure.

AS 2021 Site Acceptability

In accordance with the AS 2021, the acceptability of the location of building is dependent on the applicable ANEF

The ANEFs for Melbourne Tullamarine Airport have been sourced from the Melbourne Airport 2018 Master Plan[19]. The ANEFs are composites of four Australian Noise Exposure Concepts (ANECs) prepared for the major operational stages of the airport's development, forecasted to 2048. The Precinct is located outside of the ANEF 20 contour for Melbourne Tullamarine Airport and therefore buildings developed within the Precinct are considered acceptable for noise sensitive uses such as residential, accommodation, educational and health uses in accordance with the AS 2021.

The ANEFs for Essendon Fields Airport have been sourced from the Essendon Fields Airport Master Plan 2013[20].The Master Plan presents the 2033 ANEFs. The Precinct is located outside the 2033 ANEF 20 contours for the Essendon Fields Airport and therefore buildings developed within the Precinct are considered acceptable for noise sensitive uses such as residential, accommodation, educational and health uses in accordance with the AS 2021.

[18] Public Transport Victoria, 2012. https://static.ptv.vic.gov.au/siteassets/PTV/PTV%20docs/Metro-rail-network-development-plan/PTV_Network-Development-Plan_Metropolitan-Rail_2016update.pdf
[19] Melbourne Airport 2018 Master Plan, Figure 9-11 (https://www.melbourneairport.com.au/getmedia/672d0a02-c629-4391-9f6d-23d2ac623b81/Melbourne_Airport_Masterplan.pdf.aspx?ext=.pdf)
[20] Essendon Fields Airport Master Plan 2013 (https://ef.com.au/community/master-plan/)

6.6 Discussion of potential noise emissions

Proposed industrial/commercial and residential dwellings have the potential to emit noise which may impact the existing uses within the Precinct.

As required by Clause 13.05-1S Noise abatement of the Melbourne Planning Scheme, the following policy documents should be considered as relevant:

– The noise requirements in accordance with the Environment Protection Regulations under the Environment Protection Act 2017.
– Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues (Publication 1826.2, Environment Protection Authority, March 2021) (the Noise Protocol)

Any proposed development within the Precinct should be designed and constructed such that the environmental noise emissions comply with the requirements of the Noise Protocol at the relevant surrounding noise sensitive receivers. This also includes new small commercial and industrial establishments such as auto facilities, workshops and the like.

Where relevant, the planning authority should ensure that appropriate planning conditions are imposed to require prospective developments to demonstrate compliance with the Noise Protocol at surrounding noise sensitive areas. This involves requiring an acoustic assessment by a qualified acoustic engineer or other suitably skilled person to the satisfaction of the responsible authority, to demonstrate that the proposed development comply with the requirements of the Noise Protocol.

6.7 Discussion of potential vibration impacts

6.7.1 Rail movements

Train pass-bys will induce ground borne vibration transmitted through the subsoil which may cause intermittent vibration nuisance to the surrounding sensitive receivers. Vibration impacts at sensitive receivers would depend on various factors such as source type, distance to receivers and ground soil properties. It should be noted that Victoria's Passenger Rail Infrastructure Noise Policy 2013 does not contain ground borne vibration and noise criteria.

NSW Rail Infrastructure Noise Guideline 2013 suggest criteria for ground- borne noise (measured inside buildings):

Table 14 Summary of ground- borne trigger levels $L_{Amax,Slow}$ for rail projects

Sensitive use	Time of day	Internal noise limit
Residential	Day (7 am- 10 pm)	40 dB(A)
	Night (10 pm- 7 am)	35 dB(A)
School, educational institutions, places of worship	When in use	40 – 45 dB(A)

The Guideline references NSW DEC Assessing Vibration: A Technical Guideline (2006) for vibration limits that should be applicable to rail projects.

Part of the Precinct is located approximately 5 m from the rail corridor servicing Melbourne Metro passenger trains, however nearest receivers are situated at a greater separation distance.

Rail vibration impact depends on many factors such types of the trains and track, track conditions, speed and frequency of movements. Based on a review of publicly available information, the following daily train pass-by events are estimated on a typical weekday under current conditions:

– About 108 Metro passenger train services[21]

[21] Public Transport Victoria, 2019. Upfield line (https://www.ptv.vic.gov.au/route/timetable/15/upfield/)

It is understood that the maximum train speed between the North Melbourne and Upfield Station is 80 km/hr[22]. Based on above and typical train vibration levels, a minimum buffer distance of 20 m is recommended between the rail track and any sensitive use within the Precinct. It is recommended that noise sensitive land uses within above 20 m buffer be avoided where practical. The established rail vibration buffer is shown in Figure 6-4.

6.8 General noise and vibration mitigation strategies

This section provides general guidance on potential mitigation strategies that could be implemented to control noise within prospective noise sensitive developments within the Precinct and could be considered for control of external noise sources such as industrial noise, traffic and aircraft applicable to the proposed development.

Relevant in-principal noise mitigation strategies include:

– *Land use controls* (separating the location of noise-producing activities from sensitive areas)
– *Control in transmission* (reduce noise level at the receiver but not necessarily the environment surrounding the source, e.g. noise barrier, etc.)
– *Receiver control* (localised acoustic treatment at sensitive receptor)

6.8.1 Land use controls

There are several strategies involved in using the land use control measures, as follows:

– *Setback strategy* (e.g. open space design adjacent to noisy industries, busy roads and/or railway corridors to provide noise reduction through setback distances to residential uses).
– *Setback distances* between the noise source and the noise sensitive receptor may assist reducing the noise exposure level at the proposed Precinct development. A setback strategy would also be effective in mitigating ground-borne vibration impacts from nearby vibration sources.
– *Building locations and height controls*, could be adopted to provide noise shielding from noise sources to residential uses and the overall Precinct.
– *Expansion of cycle and pedestrian facilities* to discourage the use of motor vehicles and encourage the use of bicycles, scooters or walking, which would result in less noise emission within the area.
– *Impose acoustic control planning conditions on new developments* such as planning permit conditions for specific acoustic treatments to noise sensitive developments.

6.8.2 Control in transmission

The noise reduction strategy used to control in noise transmission generally involves the installation of noise barriers. Noise barriers may include an existing feature, such as:

– An elevated road or a natural slope (e.g. earth mound)
– A purpose designed feature such as a solid boundary fence
– A purpose designed feature of the building, such as a partially enclosed carport
– A purpose designed building which acts as a barrier block

Figure 6-6 and Figure 6-7 illustrate different noise barrier configurations, sourced from the NSW Department of Planning "*Development near Rail Corridors and Busy Roads – Interim Guideline*" (NSW DoP, 2008).

The barrier should be installed in a manner such that it covers the noise sources from direct line-of-sight to the sensitive receptors. In general, the barrier should provide sufficient screening to avoid direct line-of-sight between the shielded noise sources and the protected sensitive receptors.

Noise barriers would not be effective in reducing noise impacts if the line of sight from the noise source to the residence is not reduced. Hence, it may not be practical to install a noise barrier for elevated sensitive receptors.

[22] https://vicsig.net/infrastructure/line/upfield

Figure 3.18a: Noise barrier using an earth mound

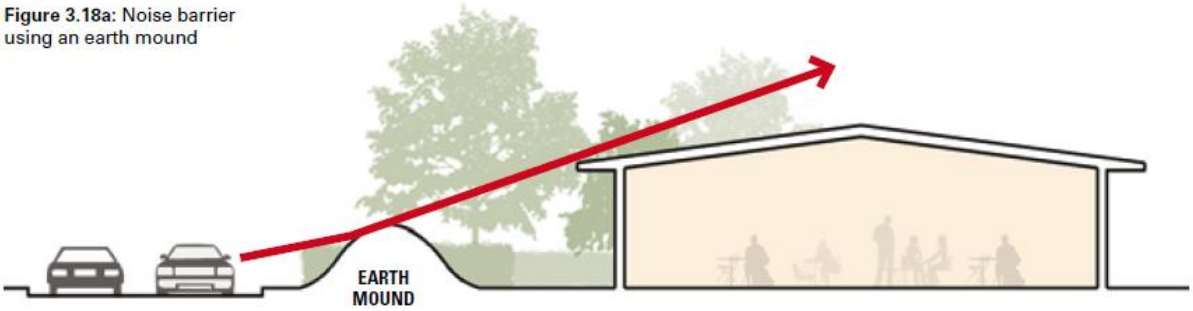

Figure 3.18b: Noise barrier using an earth fence/wall

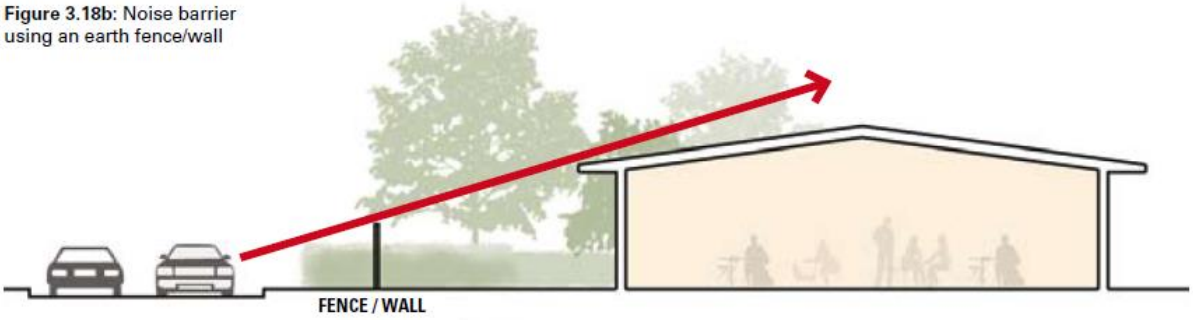

Figure 3.19: Noise barrier using a fence/wall

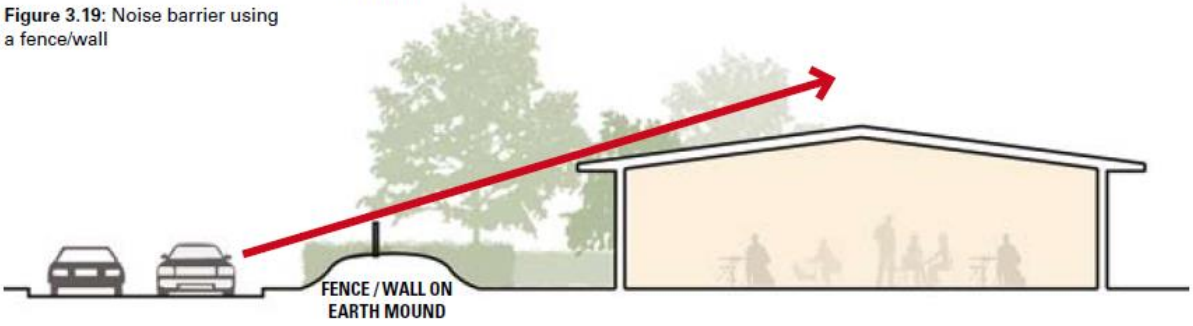

Figure 6-6 Noise barrier features (NSW DoP, 2008)

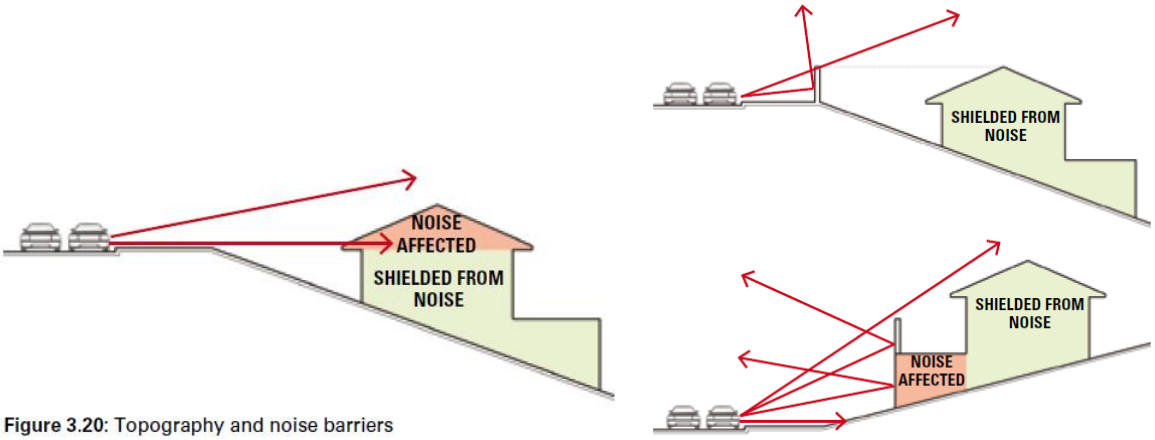

Figure 3.20: Topography and noise barriers

Figure 6-7 Noise barrier topography and features (NSW DoP, 2008)

6.8.3 Receiver control

There are several strategies that could be used to control noise at the receiver including:

– Building orientation
– Balustrade/balcony design/configuration
– Building façade acoustic treatment

Building orientation

The building orientation layout involves configuring the development's floor plan to have sleeping areas/habitable areas facing away from the noise sources. Figure 6-8 and Figure 6-9 illustrate samples of building orientation layout strategies to minimise local noise intrusion, which is sourced from NSW Department of Planning "*Development near rail corridors and busy roads – Interim guideline*" (NSW DoP, 2008).

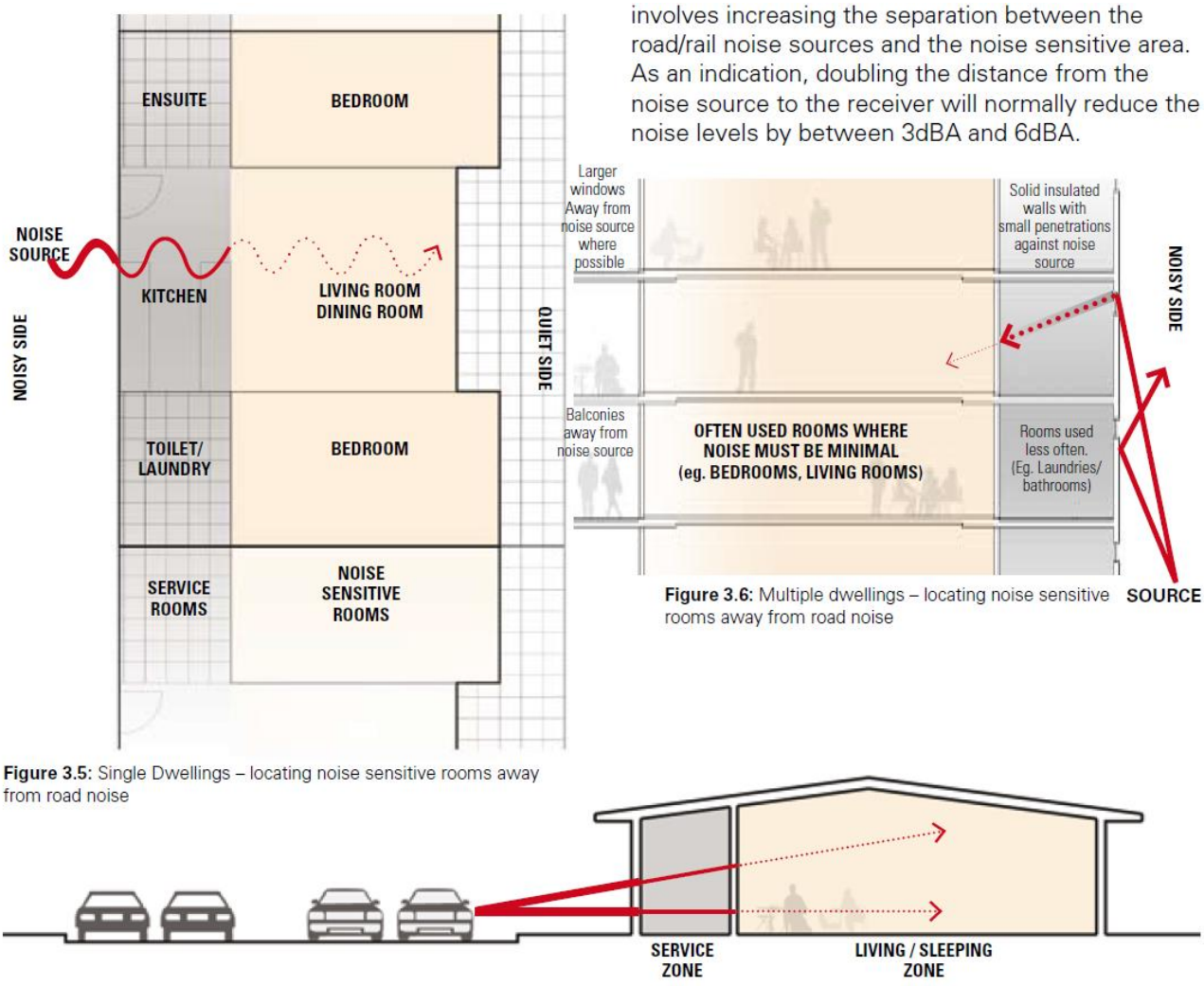

Figure 3.5: Single Dwellings – locating noise sensitive rooms away from road noise

Figure 3.6: Multiple dwellings – locating noise sensitive rooms away from road noise

Figure 6-8 Sample of building layout strategies 1(NSW DoP, 2008)

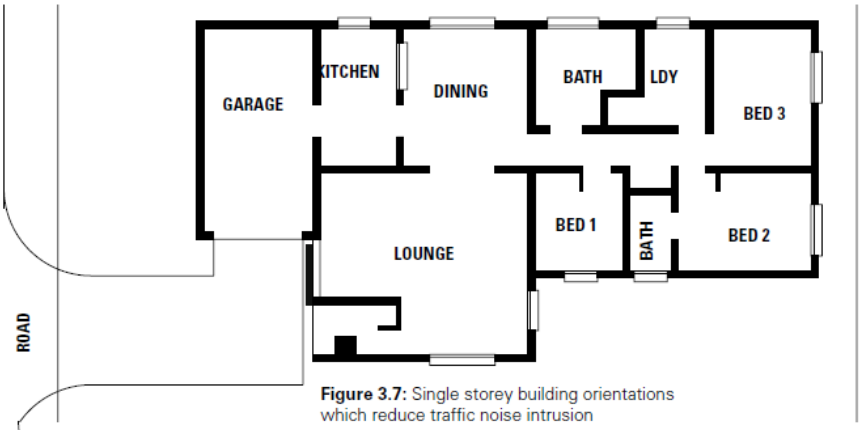

Figure 3.7: Single storey building orientations which reduce traffic noise intrusion

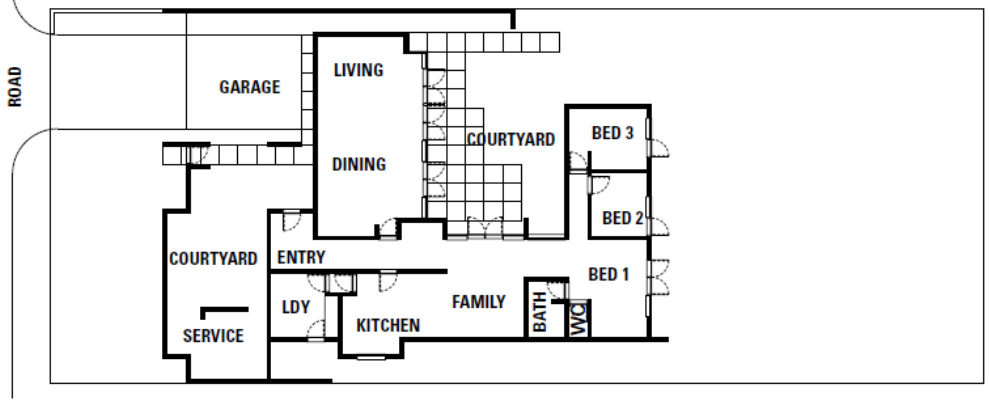

Figure 3.8: Double storey building orientation which reduces traffic noise intrusion

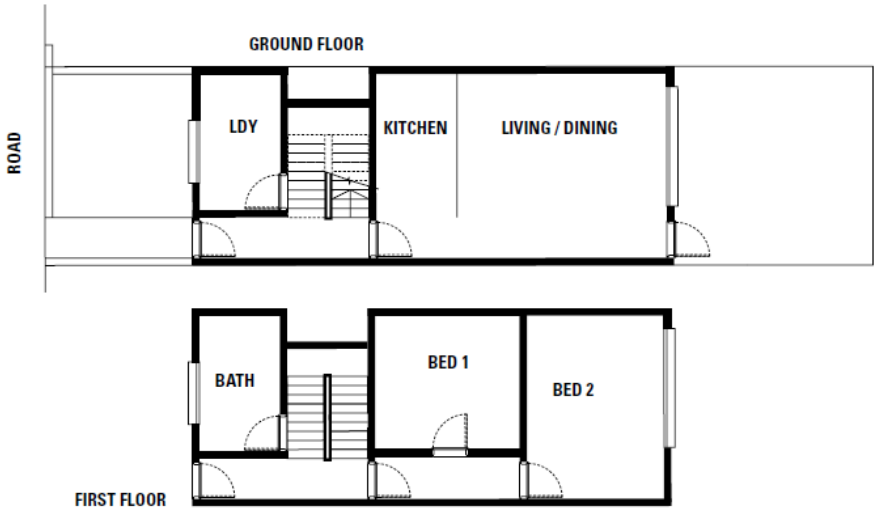

Figure 6-9 Sample of building orientation layout strategies 2 (NSW DoP, 2008)

Building façade acoustic treatment

External noise intrusion due to different sources such as traffic, rail, aircraft, music or industrial noise is typically transmitted into the building via lightweight façade elements such as glass, doors, lightweight walls, lightweight roofs, as well as any grille openings. Subject to more detailed noise assessment of external noise intrusion, these light weight façade elements may need to be acoustically treated to preserve indoor amenity of the building occupants, such as:

– Minimise lightweight external wall construction facing the dominating noise sources
– Thicken glazing construction for the window façade
– Minimise window size and maximise masonry on the external wall construction
– Minimise the use of openable window construction
– Configure any discharge/intake duct grill layout (above ceiling level) facing away from the noise sources

The purpose of treating the building envelope is to reduce the internal noise. In principle, noise inside a building can be reduced if the building envelope has a high sound reduction. Heavy, dense materials such as masonry or brick walls are better for low frequency sound reduction. However, lightweight solutions can also be effective in reducing noise. These include double-stud, staggered-stud or resilient-stud systems that have external layers of cement sheet or similar and internal layers of plasterboard with acoustic insulation in the cavity.

Noise from external noise sources may enter a room through the roof, external walls, windows and external doors. Windows and doors are often the weakest point in sound insulation. Measures such as thicker glass, laminated glass or double glazing and acoustically sealed windows (permanent or openable) are techniques for noise reduction. Louvre windows are less effective in noise reduction when compared to solid single and double glazed acoustically sealing windows. Depending on the noise reduction required, window size and effectiveness of acoustic seals, louvre windows can be considered as a construction component.

The internal noise design objectives in some cases can only be achieved when the windows remain closed. In such cases, to maintain internal design objectives at all times would require ventilation to rooms by means other than through openable windows. Alternative ventilation may include "borrowed" natural ventilation from other rooms with less exposure to external noise sources or a mechanically ventilated system.

6.9 Summary

A summary of the noise assessment and recommendations for proposed uses to be located within the Precinct are presented in Table 15.

Table 15 Noise assessment summary

Item	Assessment Item	Report Section	Summary	Recommendation for proposed uses to be located within the Precinct
1	**Melbourne Planning Scheme**			
1.1	Clause 13.05-1S Noise Abatement	6.6	Noise emissions from external plants associated with proposed developments within the Precinct (prospective industrial, commercial, residential, etc.) should comply with the requirements of the Noise Protocol	Appropriate planning permit conditions are imposed to require prospective developments to demonstrate compliance with the Noise Protocol at surrounding noise sensitive areas. Consideration of an acoustic assessment required by planning authority as part of the development approval process.
1.2	Clause 18.04-1S Planning for airport and airfields	6.5.7	The Precinct is located within an area with ANEF of less than 20 for both Melbourne and Essendon airports where sensitive uses are considered acceptable.	Although aircraft noise may be audible at the Precinct, it is not expected to have adverse impact on the amenity of sensitive land uses or pose any restrictions on current or future operation of the Melbourne and Essendon airports with respect to aircraft noise.
1.3	Clause 21.08-3 Industry	6.5 6.6 6.7	Industrial uses within the Precinct relate to clause 21.08-3	Encourage industries to adopt Environmental Management Plans and ensure new industrial uses incorporate measures to minimise noise and environmental impacts.
1.4	Clause 32.04 Mixed use zone	6.5	A portion of the Precinct is classified as Mixed use Zone.	Any proposed noise sensitive development within the Precinct to be required to undertake a detailed noise intrusion assessment to demonstrate that the proposed design meets the internal noise limits from external noise sources outlined in VPP Clause 58.04-3 (PPN 83). As for 1.4
1.5	Clause 33.01 Industrial 1 Zone	6.5	A portion of the Precinct is classified as Industrial 1 Zone (Figure 6-4)	
1.6	Clause 33.03 Industrial 3 Zone	6.5	A portion of the Precinct is classified as Industrial 3 Zone (see Figure 6-4)	As for 1.4
1.7	Schedule 26 to Clause 42.02 Design and Development Overlay (DDO26)		A portion of the Precinct shown in Figure 6-4 falls within the DD026.	Any new or refurbished development or any conversion of part or all of an existing building that will accommodate new residential or other noise-sensitive uses must incorporate noise attenuation measures and meet the requirements as outlined in Schedule 26 to Clause 42.02 of the Melbourne Planning Scheme.

Item	Assessment Item	Report Section	Summary	Recommendation for proposed uses to be located within the Precinct
1.7	Clause 45.08 Melbourne Airport Environs Overlay	6.5.5	The Precinct is not located within the Melbourne Airport Environs Overlay.	*Nil*
1.8	Clause 56.06 Live Music Entertainment Venues	6.5.2	One premises exists within and surrounding the Precinct which is likely to emit music noise.	Any noise sensitive residential development within the Precinct should be designed and constructed to mitigate music noise levels from any entertainment venues to the noise limits specified in the Noise Protocol
1.9	Clause 55.07 and 58.04 Apartment developments and Amenity impacts	6.5	Entire Precinct falls within Noise influence area for industrial noise (refer to Figure 6-2) A number of potential noise sources within and surrounding the Precinct have been identified. Due to the industrial/commercial nature of the area within and surrounding the Precinct, it was recommended that the VPP indoor noise limits are met, regardless of whether the proposed dwelling is located within a noise influence area or not. Part of the site is considered within noise influence area in regards to road traffic noise (refer to Figure 6-4) Part of the Precinct considered within a noise influence area with regards to rail noise (refer to Figure 6-4). West Gate Tunnel extension (City to Port) may result in additional traffic noise buffer/influence area.	Any proposed noise sensitive development within the Precinct to be required to undertake a detailed noise intrusion assessment to demonstrate that the proposed design meets the internal noise limits from external noise sources outlined in VPP Clause 58.04-3 (PPN 83) (enforced by Clause 55.07 and 58.04 of the Melbourne Planning Scheme). Any noise sensitive use within the Precinct close to major roads and within the traffic noise bugger shown in Figure 6-4, should be designed and constructed to achieve the VPP indoor noise limits. Satisfaction of the sleep disturbance criteria in the bedrooms or sleeping areas of the noise sensitive development as defined by the limits recommended by the World Health Organisation. Any noise sensitive use within the established rail noise buffer shown in Figure 6-4, should be designed and constructed to achieve the VPP indoor noise limits. Potential West Gate Tunnel's Port to City noise influence area within the Precinct is shown in Figure 6-4 assuming extension works will result in traffic volumes above 40,000 at Wurundjeri Way extension and Dynon Road. Further investigation is recommended to ascertain if this is applicable.
2	**The Noise Protocol**	6.6 6.5.4	Refer to Item 1.1 above In the area within and surrounding the Precinct, one premises was identified which is likely to emit music noise.	Refer to Item 1.1 above. As for 1.8
3	**AS/NZS 2107 Indoor Sound Levels**	6.4.5	Recommended as supplementary design internal noise level for residential dwellings in addition to provisions of Clause 58.04-3.	
4	**Sleep disturbance**	6.4.6	External sources such as traffic, rail passbys and industrial noise can high levels of generate short term noise events that could result in sleep disturbance at night.	Satisfaction of the sleep disturbance criteria in the bedrooms or sleeping areas of the noise sensitive development as defined by the limits recommended by the World Health Organisation.

Item	Assessment Item	Report Section	Summary	Recommendation for proposed uses to be located within the Precinct
5	**AS 2021 Aircraft noise**	6.5.7	The Precinct is located outside of the ANEF 20 contour for Melbourne Tullamarine Airport and Essendon Fields Airport. Buildings developed within the Precinct are considered acceptable for noise sensitive uses such as residential, accommodation, educational and health uses in accordance with the AS 2021.	*Nil*
6	**NASF**	6.5.7	Refer to Item 1.2 above	Refer to Item 1.2 in above.
7	**Vibration impact**	6.7	Vibration from train movements potentially impact a small part of the Precinct (refer to Figure 6-4)	Sensitive land uses should be avoided within 20 m rail vibration buffer from the track line shown in refer to Figure 6-4)

7. Future land use planning considerations

7.1 Key findings and development constraints

The key findings from each of the assessments are detailed below.

7.1.1 Amenity assessment (dust/odour/air)

EPA complaint history indicates that odour has been the predominant adverse amenity impact to air quality within the Precinct. In 2018, 10 odour, four dust and three smoke complaints were reported to EPA. Specific industries cited by complainants include Citywide, Allied Pinnacle and Weston Mills. During a site visit to the Precinct, dust and odour emissions were observed from the following industries:

– Holcim (dust)
– Allied Mills (dust)
– Citywide (odour)
– DTS (odour)

Nine industries within the assessment area (2 km radius from the Precinct boundary) were identified as requiring a separation distance based on the EPA buffer guideline.

The application of separation distances from the EPA buffer guideline showed that the majority of the Precinct is affected by buffer constraints. This is the case for both default buffers and directional buffers. The industry with the largest constraint on the Precinct is the Citywide asphalt plant, with its separation distance covering greater than 80% of the Precinct area. Citywide is the only industry placing a buffer constraint on the northern portion of the Precinct. Three industries (Irwin Stockfeeds, Weston Mills and Holcim) place buffer constraints on the southern portion of the Precinct.

It is noted that further site specific variations to the default buffer distances may be able to be made if further information of the industries requiring a buffer distance were to be obtained, such as:

– Transitioning of the industry
– Throughput amounts
– Plant equipment details
– Odour/dust controls implemented
– History, likelihood and likely off-site impact of plant upsets

However, GHD cautions the likelihood of this as it is unlikely that a large variation would be achieved from any of the above except the transitioning of the industry criteria. This is due in part to the size of the industries and the existing complaint history which indicates that Citywide and Western Mills have resulted in potential amenity impacts in the past.

Given the Precinct is planned to transition from industrial to mixed land use the relevant separation distance for a particular industry may be reduced with agreement of the industries and EPA, as the industries transition out of the area over a designated timeframe. During any transitional phase when significant industrial activities leave the area, opportunities will be created to expand the amount of sensitive uses within the Precinct.

Once an industry's plans are known, the transition provisions can be used to sequence any proposed sensitive land use development within the existing separation distance. For example Holcim is likely to transition out of the area by the end of 2023.

Further, given the basis of large current and future constraints from Citywide and Western Mills, consideration should be given to the future role of these businesses within the Precinct.

7.1.2 Noise and vibration assessment

EPA complaint history indicates that noise impacts are typically experienced in the Precinct area, with 18 noise complaints in 2018 and a total of 92 between the years 2012 and 2018. Of these, it is possible that not all are attributed to industrial processes. During a site visit to the Precinct it was observed that the ambient noise environment is predominantly affected by transport activity.

The key identified noise sources with potential to impact on the amenity of the Precinct included:

– Industrial and commercial premises on site and surround, in particular:
  - Citywide asphalt plant
  - Drainage pump stations
  - West Melbourne Terminal substation
  - Allied Pinnacle mill
  - Weston Milling mill
  - Lost Dogs Home
  - Holcim concrete batching plant
– Traffic noise from the existing road network including Citylink and occasional noise from heavy vehicles servicing industrial facilities (i.e. warehouses and general factories).
– Rail noise due to passenger services passbys (Upfield rail line).

Rail movements were also identified as potential vibration source impacting a small portion of the Precinct.

The existing industrial sites within the Precinct such would have been required to comply with the Noise Protocol at the existing noise sensitive receivers and are not required to mitigate further if new sensitive land encroach on their site.

7.1.3 Air and noise constraining industries

The following industries identified as constraining the Precinct with respect to both air and noise were:

– Citywide (odour, dust and noise)
– Holcim (dust and noise)
– Western Milling (dust and noise)

7.2 Mitigation measures

It is assumed that the development of the site will occur incrementally over time, and therefore it is important that the management of the transition from existing to proposed uses minimises short term impacts of non-compatible uses.

Land use planning considerations

Separating odour and/ or dust producing activities from sensitive areas using a setback strategy (e.g. open space design adjacent to odour and/or dust sources to provide a reduction through setback distances to sensitive uses) is commonly adopted and recommended as part of this study locating sensitive uses outside the identified directional buffer areas of existing industries.

The identified directional buffers, as a minimum, indicate where the establishment of sensitive uses should be avoided to reduce potential adverse amenity issues.

Based on the directional buffer distances, this report has highlighted a number of locations where existing industries may have a detrimental impact on the amenity of proposed new sensitive uses.

It is considered that the location of sensitive uses within prescribed separation distances of existing industries could raise the following two problems:

1. A risk to future sensitive uses being subjected to unacceptable odour, noise and dust during either routine or upset events or in certain other circumstances (amenity impacts).
2. The encroachment of sensitive uses on the buffer areas of existing industries may result in unachievable or unreasonable requirements on the industries to mitigate the impacts at the source (reverse amenity impacts).

In order to manage the conflicts between existing and proposed land uses, there must be a balance between selecting measures that sufficiently mitigate amenity impacts, and avoiding over regulation and therefore impacting on the ability to achieve other objectives such as urban growth and environmental sustainability.

Staged development

Undertake a staged development approach to the extent possible as the area is predominantly in private ownership – so that sensitive uses are not developed within buffer areas until the industry adequately reduces the off-site impacts or provides information pertaining to transitioning out of the area. Planning policy may be introduced to support this approach and put the onus on ensuring appropriate separation rests with the encroaching sensitive land use.

GHD recommends that VPA contact those industries placing significant buffer constraints on the Precinct in order to implement a staged implementation plan. This should allow for a smooth transition of land use from industrial to sensitive land use over an appropriate period of time. Any plans should also consider the impact that removing the industry may have on other areas or infrastructure projects.

Control of air quality emissions through built form

To minimise air quality impacts on proposed sensitive uses within the Precinct a number of air quality mitigation measures can be dealt with at the design phase including:

– Limiting the exposure of emissions to bedroom openable windows/balconies
– Mechanical ventilation
– Location of air intakes
– Use of a filtration unit
– Non-openable windows

Control of odours at source

Odour emissions at source in an industrial premises can be reduced by odour treatment/control. This can be required for new industries as part of best practice or by EPA (via PANs (Pollution Abatement Notices) and PINs (Penalty Infringement Notices)). For those industries identified to cause a constraint, it is the EPA's responsibility to enforce compliance with the ERS and GED so that these sites do not cause off-site impacts or odour complaints under normal operations. EPA is also responsible for validating and investigating any odour complaints that they receive.

Control of dust emissions at source

Two available measures to control or reduce the dust emissions at source include:

– Use of BPEM (Best Practice Environmental Management) measures for each industry to mitigate dust on site
– Reduce the dust output of the source via dust mitigation measures (may require EPA enforcement via PANs and PINs)

EPA is also responsible for validating and investigating any dust complaints that they receive.

The ERS objectives might not always be met, and therefore the recommended separation distances are intended to account for these situations and do not provide an alternative to source control.

Control of noise emissions

Some possible noise mitigation strategies that are available include:

– Land use control
– Control at source
– Control in transmission
– Receiver control

Each of above strategies are further discussed in Section 6.8 of this report.

It is also noted that the higher density nature of the future development may assist in alleviating adverse amenity impacts from existing industries, subject to a detailed assessment.

7.3 Recommended actions

There are a number of different types of planning controls that could be implemented to assist in mitigating the potential for adverse amenity impacts resulting from a transitioning of land uses within the Precinct.

Based on the above investigations, the following recommendations should be considered in the development of the Precinct:

– Undertake a detailed analysis of the constraining industries, which may result in a variation of the default buffer.
– Contact existing industries that pose a constraint to organise a transition strategy for the Precinct (utilising the transitioning of the industry criteria within EPA Publication 1518).
– Careful strategic planning of land uses, to:
  - Plan where different types of land uses can be located using a setback strategy (directional buffers).
  - Manage and minimise noise impact from sensitive and non-sensitive land use interfaces including but not limited to consideration of in-principle noise mitigation strategies outlined in this report.
– The implementation of design controls within the Melbourne Planning Scheme (the planning scheme) and where appropriate development approval process to:
  - Where appropriate place specific planning requirements as part of planning scheme amendments or planning permit conditions (i.e. control of air quality and noise emission) on proposed sensitive land use and developments in particular areas and implementing buffer areas.
  - Require any proposed sensitive land uses to undertake external noise intrusion assessment to demonstrate that the development is designed and constructed to achieve recommended noise amenity targets outlined in VPP Clause 58.04-3 and sleep disturbance criteria as defined by World Health Organisation from external noise sources.
  - Require any noise sensitive land use located close to the rail track line, to undertake external noise intrusion assessment to demonstrate that the development is designed and constructed to achieve recommended noise amenity targets outlined in VPP Clause 58.04-3 and sleep disturbance criteria as defined by World Health Organisation from rail noise.
  - Require developments with potential to generate noise to undertake further acoustic assessment to demonstrate that the development is designed and constructed to comply with the Noise Protocol requirements at surrounding sensitive uses (including within the Precinct).
– Consider staging the development of the land to provide the opportunity to consider the changing (transitioning) industrial context for the surrounding Precincts.
– Locate complimentary commercial and other business uses within the specified buffer distances to industrial developments and adjacent to arterial roads. This could apply spatially at a horizontal level as well as a vertical level. The commercial and business land uses would act as a physical buffer between industrial activities and more sensitive land uses.
  - Implementation of recommended buffer distances for control of rail noise and vibration as outlined in Sections 6.5.6 and 6.7.1.

- Consider staging the development of the land to provide the opportunity to consider the changing industrial context for the surrounding Precincts.
- Locate complimentary commercial and business uses within the specified buffer distances to industrial developments and adjacent to arterial roads. This could apply spatially at a horizontal level as well as a vertical level. The commercial and business land uses would act as a physical buffer between industrial activities and more sensitive land uses.
- Manage and minimise existing odour and dust emissions at source.

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