



Planning Policy No. 7.1

East Rockingham Industrial Park: Environmental Planning Policy

**Statement of Planning Policy No. 7.1 - East Rockingham Industrial Park
Environmental Planning Policy**

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PLANS

1. EAST ROCKINGHAM INDUSTRIAL PARK - IP14 STRUCTURE PLAN

Chapter 1

INTRODUCTION

In 1990 the City of Rockingham commissioned BSD Consultants and Mitchell McCotter & Associates to prepare a Statement of Planning Policy for Industrial Land in the East Rockingham (IP14) locality. The report was prepared and has guided Council's decision-making in the area since this time.

In 1999, the Policy was updated for inclusion in the review of the City of Rockingham Town Planning Scheme No. 1. The Policy was aimed to be a supporting document, giving guidance to Council and potential developers in the IP14 area.

This second review of the Statement of Planning Policy 7.1 (2002) brings the Policy in line with new environmental legislation, regulations and guidelines issued by the State Government.

1.1 BACKGROUND

The Kwinana industrial area (KIA) is located approximately 30 kilometres south of Perth, and is at present the major site for the location of heavy industry in Western Australia. As such, the region has been the focal point of public and media attention due to environmental, health and social issues.

Immediately south of the KIA there exists approximately 1,150 hectares of predominantly vacant land which is the subject of the East Rockingham Industrial Park Strategic Development Plan for the Improvement Plan 14 (IP14) area, prepared by Dames and Moore (1991) and the East Rockingham Industrial Park IP14 Structure Plan prepared by Taylor Burrell (April 1996). Proposed industrial uses for this land under IP14 include port-related industry (excluding heavy industry), environmentally acceptable heavy industry, an advanced materials park, general industry and light industry.

The IP14 area is adjacent to residential areas on both its south and south-west boundaries. The substantial buffer that currently exists between residential areas and heavy industry further north will be significantly reduced if heavy industry is permitted on the land.

In order to achieve optimum utilisation of industrial land in East Rockingham, the IP14 proposal has put forward a graduated land utilisation strategy. This strategy would permit light industry at the periphery of the area (both south and east),

general and specialised industry towards the core, and heavy and port related industry at the core in the north and west of the IP14 area.

The Kwinana Regional Strategy (State Planning Commission, 1988), acknowledged that the majority of undeveloped industrial land in the Kwinana region occurs in the East Rockingham area, as defined by Improvement Plan No 14 (IP14). The IP14 area was initiated under provisions of the Metropolitan Region Scheme (MRS) in 1988.

In June 1990, the City of Rockingham resolved to establish a Statement of Planning Policy for dealing with proposals to establish new industry within the East Rockingham area in an ecologically sustainable manner.

The East Rockingham Industrial IP14 Structure Plan prepared by Taylor Burrell has been adopted by Cabinet and the Western Australian Planning Commission (WAPC) and is included as *Plan 1*.

1.2 REPORT FORMAT

The Planning Policy No. 7.1 - Environmental Protection (Industrial Development) is presented in Chapter 2 of this document. It outlines the policy objectives, principles and specific policy statements relating to the IP14 area. These cover air quality, risks and hazards, noise, water quality and the social environment. Chapter 2 concludes with a summary of Industry Classification and State Buffer Policy.

Chapter 3 provides details of policy implementation by the City of Rockingham.

This Planning Policy is supported by an additional document that provides the necessary background to the Policy Statements. The Background Report outlines the Study Area, existing and potential environmental constraints, the social environment and local economy and the results of the original community survey conducted in 1990. The report concludes with the identification of a number of alternative development strategies. Where possible, the Planning Policy has been updated to include the most recent State legislative requirements.

PLANNING POLICY No. 7.1

2.1 POLICY OBJECTIVES

This Policy is to be known as Planning Policy No. 7.1 - Environmental Protection (Industrial Development).

Its primary objective is to establish guiding principles and policies for the environmental acceptability of industrial development on industrial zoned land within the City of Rockingham, predominantly within the IP14 area.

Supporting to the primary objective are a number of principles drawn from established policies and principles at the state, national and international levels. These principles relate to issues of major importance in global environmental management and protection, and are built upon a philosophical base of environmental responsibility and accountability. The ethical issues are succinctly put by Leopold (1949):

"Examine each question in terms of what is ethically and aesthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise".

2.2 POLICY APPLICATION

This Policy applies to land contained within the East Rockingham Industrial Park. The Policy is one of a number of planning policies that are referred to in Council's town planning scheme.

For the purposes of this Policy, an industrial zoning relates to land zoned Light Industry, General Industry and Special Industry as identified in the City of Rockingham Town Planning Scheme No. 1 and No. 2 (Scheme Review) (as amended).

2.3 PRINCIPLES

Throughout the formulation of this Policy, a number of guiding principles derived from the State Conservation Strategy and Environmental Charter, have been considered. Most of the principles are derived from the maxim of Leopold quoted earlier. They are:

- maintenance of essential ecological processes and life support systems;
- preservation of genetic diversity;
- ensuring the sustainable use of natural resources and ecosystems;
- maintenance and enhancement of environmental qualities;
- optimising the quality of life for all Western Australians, including residents of Rockingham;
- management of wetlands, lakes, estuaries and the atmosphere to ensure a clean and healthy condition;
- the polluter pays for monitoring and restoration; and
- development should not exceed the environment's capacity to assimilate, not jeopardise the well-being of present and future generations, and meet local community objectives and satisfy regional needs.

2.4 POLICIES

Specific policies have been developed under five headings:

- Background;
- Air Quality;
- Risks and Hazards;
- Noise;
- Water Quality; and
- Social Environment.

The policies should be seen as a minimum requirement for current proposals and should be subject to review after a five year period of application. Policies have been developed within the framework of principles articulated at 2.3.

2.4.1 *Background*

The East Rockingham Industrial Park IP14 Structure Plan (Taylor Burrell, 1996) proposed the establishment of Precinct 2: Environmentally Acceptable Heavy Industry to the north of the IP14 area. This Policy sets out criteria in terms of air quality, noise, risks and hazards, water quality and social environment, industrial development applications, including those for heavy industrial uses, that should comply with in order to be acceptable.

This Policy supports:

- ID1 All industry established in the IP14 area must comply with the following policies.

2.4.2 Air Quality

The Policy Statement 7.1 adopts the Environmental Protection (Kwinana)(Atmospheric Wastes) Policy (EPP) 1992 and the Environmental Protection (Kwinana)(Atmospheric Wastes) Regulations 1992 for the air pollutants SO₂ and particulates. The regulations consist of a three level system of land use designations (industrial, buffer and residential) and associated air quality standards. These industrial (Area A in the Policy), buffer (Area B) and residential areas (Area C) are identified in *Figure 2.1*. In residential areas the standards and limits for both SO₂ and particulates are considered reasonably stringent by world standards. It is important to note that all residential areas in Rockingham fall within the Area C designation.

Due to the lack of former standards for other air pollutants, this had Policy previously proposed NO₂ and O₃ standards and limits for residential areas based on safe levels proposed by the Institute for Environmental Science (1987). These have now been replaced by the NEPM (Ambient Air Quality) (1998).

The NEPM were developed by the National Environment Protection Council and prescribe ambient air quality standards for NO₂, O₃, Pb, PM₁₀, CO and SO₂, with a goal of achieving the standards within 10 years (2008). The NEPM requires that States must report on the extent to which the NEPM standards have been met. The standards are to be implemented in Western Australia through an EPP. The Air NEPM standards and limits will apply state-wide, except in designated industrial areas and buffer zones. As Rockingham falls within buffer area C of the Kwinana EPP, the NEPM do not necessarily apply. However, as the Kwinana EPP regulations do not cover these pollutants, it is proposed to adopt the NEPM standards until separate standards for buffer area C are developed.

The NEPM standards and allowed exceedences are listed in *Table 1*.

Table 1 NEPM Standards for Ambient Air Quality

Pollutant	Units	Max. Conc.	Measurement criteria
Carbon monoxide (CO)	ppm	9.0	8-hour average not to be exceeded more than once a year
Nitrogen dioxide (NO ₂)	ppm	0.125	1-hour level not to be exceeded more than once a year
	µg/m ³	230	
	ppm	0.03	Annual mean, no exceedences allowed
	µg/m ³	57	
Ozone	ppm	0.10	1-hour level not to be exceeded more than once a year
	µg/m ³	200	
	ppm	0.08	4-hour level, not to be exceeded more than once a year
	µg/m ³	160	
Sulphur dioxide (SO ₂)	ppm	0.20	1-hour average, not to be exceeded more than once a year
		0.08	24-hour average, not to be exceeded more than once a year
Particles (as PM ₁₀)		0.02	Annual mean, no exceedences allowed

With respect to odour management, the EPA has recently issued the Guidance for the Assessment of Environmental Factors: Assessment of Odour Impacts from New Proposals, No. 47 (March 2002). The Guidance Statement (No. 47) recommends criteria which will assist the Environmental Protection Authority (EPA) in determining whether odour impacts from a new proposal or expansion are likely to be acceptable in terms of their impact on amenity. The Guidance states the following:

"If generic buffer distances are met (as set out in EPA Guidance Statement No. 3 or in appropriate Codes of Practice or Statements of Planning Policy developed by the WAPC) and the proposed facility is designed for "best practice" emission control, then no further assessment of odour is required. Proposals for sensitive land use developments near existing odour sources will need to make some assessment of the level of management in place at the nearby source".

"If a generic separation distance is not met, the proponent needs to undertake an odour impact study in accordance with one or both of the procedures in 2a) and 2b) below. By way of explanation, the procedure in 2a) is a conservative but relatively simple screening procedure, providing the proponent with a "green light" without the necessity to undertake further studies. The more detailed odour assessment required in procedure 2b) is less conservative and would be used by the EPA to decide if odour impacts are likely".

2a) Conduct computer modelling, using either a measurement or reliable estimate of odour emission rate (in odour units per second) in order to demonstrate that the ambient odour concentration does not exceed the following two-part criterion at existing or proposed sensitive premises:

- 2OU/m 3 minute average, 99.5th percentile; and
- 4 OU/m 3 minute average, 99.9th percentile.

If the above two-part criterion is met, no further assessment is required.

2b) For proposals which do not meet the screening criterion in 2a) above, proponents may undertake an odour intensity study to provide greater certainty about the odour impact of the proposal. This greater certainty allows a less conservative criterion to be used. As with 2a) above, the proponent should conduct computer modelling, using a measurement of odour emission rate (OU/s) and should compare the results to the following criterion at existing or proposed sensitive premises:

- odour concentration equivalent to an intensity levels of “distinct”, averaged over 3 minutes, 99.5th percentile.

If the above criteria is met, no further assessment of odour is needed.

With respect to air quality, this Policy supports:

- ID2 The use of the EPP for Air Quality in the Kwinana/Rockingham Region.
- ID3 The standards and limits for SO₂ and dust set in the EPP and the implementation of monitoring programmes to enforce these standards and limits.
- ID4 The adoption of NEPM Standards for Ambient Air Quality for CO, NO₂ ozone, SO₂ and PM 10.
- ID5 The progressive reassessment of air quality impacts in the buffer zone (Area B).
- ID6 The establishment of a new permanent air quality monitoring stations in Hillman, complementing the monitoring stations currently located on Governor Road.
- ID7 A clear demonstration of compliance with the EPP and NEPM air quality criteria prior to development approval of any industry with emissions of the listed pollutants.

- ID8 The installation of best practice technology available, and integrated monitoring programmes to ensure emission objectives.
- ID9 Management of odours by a combination of minimum separation distances and best practice emission control. In case of doubt, an odour impact study should be conducted in accordance with EPA Guidance Statement No. 47.

2.4.3 *Risks and Hazards*

In contrast to groundwater, marine and air quality matters, the history of hazard and risk management at Kwinana has been very good. There have been no incidents resulting in fatalities outside the industrial area. Existing buffering of industry from residential areas, and keen attention to safety management within industry are responsible for this clean record.

Recent re-establishment of industries in the downstream processing sector, with a generally higher risk profile, has been accompanied by quantitative risk assessment at the approvals stage, and operation risk management for established plants. This approach effectively guards against relaxation in risk standards.

At the same time, however, there has been a general increase in the extent and volume of hazardous and toxic materials transported and stored in the area.

Principles to be followed in the future development of industry in IP14 should therefore include:

- clear establishment of minimum separation distances for acceptable risk levels in residential areas;
- a close examination of the risk profile in buffer areas (both terrestrial and marine) in terms of individual fatality risks and societal risks;
- an evaluation of the local and regional implications of major impacts within buffer zones due to a single or multiple sequence of catastrophic events;
- close attention to disaster management schemes, especially in relation to transportation, cargo handling, and storage of hazardous materials; and
- a clear preference for industries with relatively low risk profiles and minimal need for large volume storages of pressurised, flammable or other hazardous materials.

At the State level there is the Western Australian Hazardous Materials Emergency Management Scheme (WAHMEMS) which enables co-ordinated response between

emergency services. As well as this there is the Kwinana Industries Mutual Assist (KIMA) which ensures joint response to emergencies by Kwinana industries. This is privately funded and managed by industry.

This Policy supports the definition of acceptable individual fatality risks within residential areas, and the level of risk set in the DEP¹'s Guidance Statement No. 2 on Guidance for Risk Assessment and Management: Offsite Individual Risk from Hazardous Industrial Plant (July 2000). For residential areas the individual risk criteria is 1×10^{-6} , which means that a facility, caused by industrial malpractice, of one person in a resident population of one million is acceptable per year.

New industries are required to demonstrate:

- ID10 Compliance with the individual fatality risk criterion of 1×10^{-6} per year;
- ID11 Compliance with the 50×10^{-6} per year individual fatality risk limit at the site boundary of an individual industrial plant;
- ID12 Compliance with the cumulative risk level of less than 1×10^{-6} per year;
- ID13 Compliance with $0.5-1.0 \times 10^{-6}$ per year risk level for sensitive developments and intermittently occupied areas (such as car parks); and
- ID14 Compliance with 10×10^{-6} per year risk level for non-industrial activity in the buffer zone.

This Policy also supports:

- ID15 Clear preference for industries with low risk profiles and minimal need for storage of pressurised, flammable or hazardous materials;
- ID16 A preference for rail transport of hazardous materials; and
- ID17 Bringing forward of, and Government commitment to, regional road planning to relieve Patterson Road from non-industrial traffic, thus reducing risk exposure to road users.

2.4.4 Noise

Noise emissions impacting on residents located near the IP14 Industrial Area must be managed effectively. This management must include noise emissions associated with new industrial development as well as from existing industries located in the

¹ The DEP is in the process of amalgamation with the Water and Rivers Commission to form the Department of Environment, Water and Catchment Protection. Environmental legislation is still currently issued by the DEP.

KIA. It is well documented that residences situated in North Rockingham are often exposed to high ambient noise levels resulting from industry and extensive noise monitoring has been conducted by the Department of Environmental Protection. The development of the IP14 Industrial Area has the potential to exacerbate the current noise issue, which is already considered to be unacceptable. As such, development in this area must be carefully planned with rigorous environmental assessment implemented to ensure that noise emissions are effectively managed.

i. Industrial Noise

Environmental noise impacts from industrial premises are addressed in the Environmental Protection (Noise) Regulations 1997 (the Regulations). These Regulations are in line with world-best-practice and are based on maximum allowable noise levels determined by the calculation of an influencing factor, which is then added to the base levels. The influencing factor is calculated by considering land use within two circles having a radius of 100 m and 450 m from the noise sensitive premises concerned. In respect to impacts resulting from the IP14 area, the most relevant noise sensitive premises, as described in *Part C* of the Regulations are “Premises occupied solely or mainly for residential or accommodation purposes” and “Premises used for the purpose of a caravan park or camping ground”.

The influencing factor for premises within 450 metres of the IP14 area will need to be calculated on an individual basis. However, residents situated just further than 450 metres from the IP14 Industrial Area zone, will attract a nil influencing factor and are likely to be the controlling factor when considering noise emissions from industry. For these residents, the levels listed in *Table 2* apply when the measurements are obtained at a location within 15 metres of the residence facade.

Table 2 Assigned Levels for $L_{A 10}$, $L_{A 1}$ and $L_{A Max}$ as Allocated to Different Times of the Day

TIME OF DAY	ASSIGNED LEVEL (dB)		
	$L_{A 10}$	$L_{A 1}$	$L_{A Max}$
0700 to 1900 hours Monday to Saturday	45 dB(A)	55 dB(A)	65 dB(A)
0900 to 1900 hours Sunday and public holidays	40 dB(A)	50 dB(A)	65 dB(A)
1900 to 2200 hours all days	40 dB(A)	50 dB(A)	55 dB(A)
2200 on any day to 0700 hrs Monday to Saturday and 0900 hours Sunday and public holidays	35 dB(A)	45 dB(A)	55 dB(A)

The above assigned noise levels are also conditional on there being no annoying characteristics, such as tonal components. If these characteristics cannot be reasonably and practicably removed, then a series of adjustments to the measured levels are set out, and the adjusted level must comply with the assigned level. The adjustments are set out in *Table 3* below.

Table 3 Levels Added to the Recorded Values When the Noise is Found to Have Any of These Components Present

Where tonality is present	Where modulation is present	Where impulse is present
+5 dB	+5 dB	+10 dB

Notes: 1. A cumulative maximum reduction of 15 dB is permitted.

New industries that emit noise to an already high noise environment also require special consideration under the Regulations. *Regulation 7*, requires new industries to manage their noise emissions to ensure that noise levels received at noise sensitive premises are, at least, 5 dB(A) below the assigned level where assigned levels are already exceeded resulting from other noise sources. It is, therefore, likely that for development in the IP14 Industrial Area, only quiet industries would meet these criteria.

ii. *Transportation Noise*

Noise impacts resulting from transportation noise, in particular, freight rail activity is not covered under the Regulations. Impacts can be addressed through *Section 49* of the Environmental Protection Act 1986, as “unreasonable emissions”, however, this is assessed on a case by case basis. The management of freight rail noise is the responsibility of the individual freight train operator leasing the railway corridor from WestNet.

Transportation noise from freight train activities is currently an issue for residents located in North Rockingham, particularly at night, with impacts resulting from locomotive noise, wheel squeal and warning horns.

It is generally considered that the current transportation noise policies do not adequately assess the impacts on society and in particular, the impacts of sleep disturbance resulting from nighttime train and truck movements. As a result, transportation noise policy is currently under review in Western Australia. A working group has been formed with an expectation that a government policy, including noise level limits that are in line with world-best-practice, will be adopted in the near future.

The most current publication in this respect is the EPA’s Draft Statement for EIA Policy 14: Road and Rail Transportation Noise (May 2000). The paper presents preliminary noise criteria for transportation noise which can be used as the basis for planning decisions and environmental impact assessments. The statement considers three contexts:

- Proposed noise-sensitive developments (residences, hospitals, etc.) near existing road or railway transportation routes;

- New transportation infrastructure (road or railway) near existing noise-sensitive premises; and
- Traffic expansion on existing road or railway infrastructure.

Even though the EPA's Statement is still in draft form, it is normal procedure for the DEP to use the statement as a guide for noise assessments of new freight rail developments.

The City of Rockingham:

- ID18 supports the use of the Environmental Protection (Noise) Regulations 1997, in the assessment of noise from proposed industrial developments;
- ID19 supports the use of the Environmental Protection (Noise) Regulations 1997, in the continuing assessment and control of noise from current industrial operations;
- ID20 notes that new industry will have to comply with the 5 dB(A) below assigned level criterion;
- ID21 supports the adoption of a transportation noise policy that addresses the impacts of railway noise, in particular the impacts on sleep;
- ID22 Support the application of the draft EPA Statement for EIA Policy No. 14 (2000) in relation to railway movements;
- ID23 supports rigorous environmental assessment of any new proposal to ensure effective management of noise;
- ID24 supports the requirement for existing industry and freight rail operators to manage noise emissions to ensure compliance with the Regulations or transportation noise policies once adopted;
- ID25 supports a review of freight rail nearby residential areas to ensure that better use is made of the facility during the day with fewer train movements at nighttime; and
- ID26 supports the implementation of a complaints management program to be jointly managed by DEP and the City of Rockingham.

iii. Noise Monitoring

Ambient noise levels at residential premises located in North Rockingham will vary considerably depending on the prevailing wind direction and industrial activity.

During unfavourable conditions, it is not uncommon for the DEP to receive a number of complaints from residents in North Rockingham relating to high noise levels. These complaints are recorded, however, there is currently no method of correlating these complaints with actual noise levels at the time of the noise event.

The installation of a permanent noise monitoring station would provide valuable data regarding ambient noise levels in the area. The data could be effectively linked to a complaints management program and could possibly provide identification of specific noise producing industries and data on noise level trends in the area. In particular, the monitoring of overall reductions in noise levels resulting from the implementation of noise monitoring programs by current industrial developments in the KIA would be extremely useful. Data would be available to government bodies, industrial organisations and the public.

The City of Rockingham supports:

- ID27 the installation of a permanent noise monitoring station to be located adjacent the IP14 industrial area.

2.4.5 *Water Quality*

i. Surface and Ground Water

Previous effluent disposal practices in the Kwinana industrial area have created a legacy of groundwater contamination problems. Clearly, a repetition of such events is undesirable. Recognition, investigation and full description of the current state of groundwater management has occurred since 1985 (Institute for Environmental Science 1987, KICC 1987, Hirschberg 1989).

Better understanding of the interaction between surface discharges and groundwater is the foundation upon which good management can occur. In the context of industrial development in Rockingham, future management of groundwater contamination and water budget rests with the regulatory authorities (DEP and the Water & Rivers Commission (WRC)).

At the local government level, the opportunity to manage lies principally in the regime of development approvals and controls. The WRC's primary role is to allocate groundwater supply to various users.

The WRC reviewed the current status of groundwater extraction in the Kwinana area. Some of the findings and recommendations included:

- The superficial aquifer is fully allocated in the coastal Kwinana strip;

- Industry, including new industry, is encouraged to sign up to the wastewater reuse scheme for access to process water; and
- The Leederville and Yarragadee aquifers have been reserved for public water supply.

With respect to disposal of liquid effluent on site by infiltration, this Policy adopts the approach the DEP is taking in the absence of specific quality criteria. Each application is assessed individually, and decisions are based on the DEP Assessment Levels for Soil, Sediment and Water (Draft, 2001). The decision on whether or not to allow liquid effluent infiltration is driven by the requirement to maintain soil and groundwater quality levels well below the prescribed contaminated sites levels.

This effectively means that:

- no industry requiring large groundwater draw shall be permitted to establish;
- industries proposing liquid effluent infiltration should be assessed on their merits and be permitted only if their cumulative effect retains soil and ground water quality levels below prescribed contamination levels (Assessment Levels for Soil, Sediment and Water);
- preference should be expressed, in zoning schemes and instruments, for industries with low groundwater demand, and low effluent discharge requirements; and
- industries planning to establish adjacent to ephemeral or permanent wetlands should be required to demonstrate secure management practices and negligible impacts upon those wetlands.

ii Marine Environment

Marine pollution and consequent ecosystem damage is arguably the most visible adverse impact experienced from existing and previous Kwinana industry. Accordingly, the highest priority is being placed on avoiding further degradation of a finely balanced ecosystem.

Following the release of the Southern Metropolitan Coastal Waters Study (SMCWS) Report in 1996, the Cockburn Sound Management Council was invoked by the EPA with a mandate to protect the water quality in Cockburn Sound. One of the Council's responses was the preparation of an Environmental Management Plan (EMP), which was issued in draft form late 2001. The SMCWS Report found that nutrient-related water quality was only slightly better than in the late 1970s. Contaminated groundwater had replaced direct industrial pipeline discharge as the main nitrogen input to the Sound. Industrial discharge of metals and organic contaminants had

decreased substantially, as had contamination of sediments and biota. There was, however, widespread contamination of sediments and mussels with tributyltin.

The SMCWS report (DEP, 1996) recommended that the DEP should not issue works approvals or licenses to increase nutrient loads, mainly nitrogen, to Cockburn Sound until the draft Environmental Quality Objective 2 (ie. the maintenance of ecosystem integrity) is achieved and maintained for at least two years at levels that would permit consideration of further loadings. The Environmental Quality Objectives have not been finalised as yet.

The current quality of the Sound was addressed in the recent State of Cockburn Sound Study (DAL, 2001). It found that overall nutrient-related water quality had improved slightly since the early 1990s and that nitrogen contributions to the Sound from groundwater were declining. As a result of reductions by industry and the overall decline in nitrogen loads, the relative role of catchment land uses, including market gardens, is starting to become significant.

Although the impacts on groundwater quality from existing rural and urban land uses will be reduced further in the future, there may be additional cumulative impacts from new industry developing on groundwater quality unless comprehensive groundwater controls are put in place.

With respect to the management of Cockburn Sound's water quality, the following recommendations relating to new industry proposals in Rockingham can be adopted from the Cockburn Sound Environmental Management Plan (2001):

- Support the proposal by the Water Corporation and local Kwinana industries to recycle waste water and remove industrial discharges (other than cooling water) that flow into Cockburn Sound;
- Ensure comprehensive groundwater management plans are incorporated into new industrial projects proposed; and
- Ensure proponents of future development proposals are guided by the principle of no net loss of ecological or social function in Cockburn Sound.

The EMP also proposes to initiate a Catchment Partnership between industry, urban and rural land uses, local and State Government, schools and the local community, to identify those activities that presently have the greatest impact on groundwater and marine water quality, and to develop and implement best management practices to minimise future impacts.

This Policy supports the following Policy Statements relating to surface, ground and marine water quality (specifically in Cockburn Sound):

- ID28 The quality of marine and estuarine waters in Cockburn Sound, Warnbro Sound and other coastal waters in Rockingham should conform to those in the *“Western Australian Water Quality Guidelines for Fresh and Marine Waters”* released by the EPA in October 1993;
- ID29 the Cockburn Sound EPP and Environmental Management Plan, released in draft form in 2001;
- ID30 A target of very low (as determined by relevant Authorities namely DEP and the Cockburn Sound Management Council) or nil discharge to Cockburn Sound to be set for proposed industries in respect of all wastes; and
- ID 31 A local industrial effluent reuse scheme if it does not result in addition of further pollutants.

In regard to groundwater and its relationship to wetlands, this Policy supports the overall intent and objectives of the EPP (Swan Coastal Plain Wetlands) 2000. In particular, this Policy Statement calls for:

- ID32 A target of very low (as determined by relevant Authorities) to nil discharge of waste to groundwater aquifers by infiltration;
- ID33 A clear preference for industries not requiring dedicated containment of waste with potential for aquifer pollution;
- ID34 Protection of groundwater upstream and around important wetlands (as listed in the Swan Coastal Plain Lakes Policy, 1992) for beneficial uses of ecosystem maintenance and flora and fauna habitat;
- ID35 Maintenance of water table levels by a management policy of sustainable yield as determined by the WRC and avoidance of over-clearing of significant vegetation stands; and
- ID36 A water sensitive design approach to subdivision layouts and landscaping.

2.4.6 Social Environment

A review of the population and economic structure of the City of Rockingham indicates that it operates essentially as a residential area. Its local economy and tourism and leisure functions are important but to a lesser extent than its qualities as a residential area. This conclusion is reflected in the fact that many who work outside the area choose to live in Rockingham. It has gained a reputation as an area

which provides attractive residential amenity in an accessible and affordable manner.

The community survey carried out in 1989 and reported in the Background Report reinforces this concept. Some 47 percent of respondents worked outside Rockingham. However, 69 percent chose to live or buy in Rockingham because of its coastal location, low cost housing or recreational opportunities. These therefore represent residential qualities which people value and which are deciding factors when they are faced with locational decisions. Consequently the Policy should have as its primary objective the maintenance or improvement of Rockingham as a residential area. A secondary objective is to maintain or improve its role as a tourist and recreation resource.

Other objectives should relate to the broader economic base of the City, including the improvement of local job opportunities and the strengthening of the local economic base through the stimulation of industries which meet the other objectives.

The aim of the Policy should therefore be to protect those attributes which contribute to Rockingham's attraction to residents and tourists. Many of the potential impacts on the physical amenity of the area, such as air and water pollution, have been dealt with in other sections. Therefore this section will confine itself to the social environment. The following issues are those where action by Council may assist in meeting the above mentioned objectives:

- image;
- tourist locations; and
- job creation and local economic development.

The image of Rockingham is tied to the coast and its residential function. Some 88 percent of respondents to the survey saw Rockingham as either a tourism and recreation area, a residential and retirement area, a modern regional centre or a youthful family area. Only seven percent described it as a busy industrial area.

To achieve the objectives, the image of Rockingham should be strengthened around the residential and coastal images. In order to do this it is considered that industry should be kept separate from residential and recreational uses, either physically or in a conceptual way. Wherever possible the visibility of industrial establishments from residential and recreational areas and major thoroughfares should be minimal. Any external impact on these areas such as odours, transport operations, or visible gaseous emissions, should be minimised.

Those areas which are known as major tourist and recreational attractions should be given special consideration in planning for industry. In cases where developments may impinge on these areas, potential impacts on tourism and recreation should be specifically considered in the development approval process.

In considering industrial development, Council should look at the potential impacts on the local economy. Key issues include labour needs, and specifically whether the skill requirements of the industry match those of the unemployed in Rockingham. While high-tech operations are very much in vogue, they often require a small and highly trained workforce, providing only limited benefits to the local area. In addition, consideration should be given to the local multiplier effects. If a new development purchases inputs from local suppliers this will stimulate the local economy and may cause increased employment and household expenditure in the area.

This Policy supports the primary functions of the City of Rockingham as being for residential and recreational purposes and seeks to maintain and improve those values which contribute to these functions. In assessing development applications for industry, impacts on the following should be specifically considered:

- ID37 Visibility of industry from residential areas, recreation areas and major thoroughfares;
- ID38 Any other impacts on residential areas, recreation areas and major thoroughfares;
- ID39 The skill requirements of the industry and the potential for local employment; and
- ID40 The potential for multiplier impacts benefiting the local economy.

2.4.7 Other Issues

Light spill from industrial areas illuminated at night is a phenomenon with a potential to cause nuisance to surrounding residential dwellers. Although there is no widely recognised methodology to rigorously predict or model the impacts of night-time illumination, there are clearly defined areas of managing and ameliorating impacts. They are broadly:

- management at source - by elevation, orientation and intensity of lighting, and by sensitivity and adaptability of operators to public comments;
- management at the planning level by ensuring proper separation between industry and residential areas within buffer zones of public space and non-illuminated land uses; and
- landscape amelioration of light intrusion, both at the plant level (screen planting at the perimeter and in lines of sight) and especially in the buffer or separation zones between industry and residences. To this end, the "green belt" buffer zone

concept with areas of natural or purpose planted bushland is often a means of both screening views during daytime, and interrupting and filtering light at night.

2.5 INDUSTRY CLASSIFICATION

In past studies and documentation of the KIA, use of "industry" and "heavy industry" have been at times interchangeable, and at other times mutually exclusive. Certainly there is a community perception of the area as "heavy industrial" with the term "heavy" having the following meanings or connotations:

- a risk profile due to products used, materials stored and processed, and transportation of such materials;
- emission of gaseous and particulate wastes to the atmosphere through high stacks;
- emission of liquid wastes to Cockburn Sound through outfalls, or indirectly via the unconfined groundwater aquifer;
- dedication of large areas of land based disposal ponds for solid and slurry wastes;
- presentation of an "industrial landscape" to the passer by;
- emission of noticeable and often offensive odours;
- night time lighting accentuating the continuous operation of the various industrial processes; and
- fugitive dust emissions from the storage, transport and impoundment of dry products and residues.

Other connotations are possible. In contrast, general and light industry have very few (if any) of the listed meanings associated.

In some senses, the community perception is one which has not generally kept abreast of technological developments in processing industries. For instance, the chlor-alkali plant comprises an advanced chemical process with some associated risk, an "industrial landscape" appearance, yet relatively minor emissions of wastes. It is a product of the 1980's wave of heavy industry development. In contrast the oil refinery has just about all of the listed connotations, albeit lately with a comprehensive environmental management program, and perhaps embodies the most negative community views toward heavy industry. It is a product of the

processing technology of the 1950's and 60's. Many of the petroleum industry sites in the IP14 area have been upgraded in recent times.

In order to achieve optimum utilisation of industrial land in East Rockingham, the IP14 proposal has put forward a graduated land utilisation strategy. This strategy would see light industry at the southern periphery of the area, general and specialised industry towards the core and heavy and port related industry at the core in the north and west of the IP14 area.

Such an approach would see future heavy industry locating close to similar industry at Kwinana, light industry locating close to similar at Dixon and Mandurah Roads, port related industry close to the shoreline and advanced materials industry building upon the trend begun by the advanced ceramics and zirconia plant. It is a rational and logical approach, albeit with particular problems.

Sections of the Background Report highlight the potential difficulties in the establishment of new heavy industry in Rockingham. It does not say that "it can't be done", simply because of the existence of these constraints. The stimulus to seek and obtain solutions to the often comprehensive and overlapping constraints applicable in the area may well yield innovative proposals for new industrial development.

The objective of this Policy 7.1 however, is to provide a framework for protection of the environment for the local and regional community, and to support Council's stance on the unacceptability of further noxious, hazardous or polluting industry in the IP14 area.

In response to State Government standards and regulations, the onus is on the proponent to illustrate that, through the use of best practice emission control technology, compliance with all relevant standards and guidelines can be achieved at the nearest sensitive receptor, ie. residents, schools, hospitals, or at site boundary, depending on the regulations' requirements.

In contrast, the IP14 Strategic Development Plan, by Dames and Moore, 1991, used a different procedure to gauge the effects of elevated releases on potential location of industries. A contour plan indicating a gradation from heavy to light industry was produced (refer Figure 10 of the Draft Strategic Development Plan, Dames and Moore, 1990). This showed minor differences to what is known as the Index approach, but generally concurred in that some heavy industry was technically feasible in the north of East Rockingham.

With the rescision of the DoE's Industrial Residential Buffer Areas Guidance Statement No.3, the Statement of Planning Policy No.4 (State Industrial Buffer Policy) applies. The WAPC established a State Industrial Buffers Policy Steering Committee in 1994. The commission's major objective has been to investigate ways of protecting appropriate industrial buffers through the planning process. The

Commission developed its Statement of Planning Policy No. 4: which is currently being revised. It states that the size of buffer areas should be determined by:

- Risk (individual and societal);
- Air quality (dust and sulphur dioxide);
- Noise; and
- Odour.

The buffer policy does not actually prescribe recommended buffer zone distances. As a guide, Annex A shows the Environmental Protection Authority of Victoria's recommended buffer zones for Industrial Residential Air Emissions. However, this is only a guide providing a tool to for proponents to use in the creation of development proposals. Adequate buffer zones will actually be determined for each individual industrial plant in response to State Government standards and regulations. Policy 7.1 supports the adoption of the State Industrial Buffer Policy (1997) being Western Australian Planning Commission SPP No.4.1.

POLICY IMPLEMENTATION

The City of Rockingham will support industrial utilisation of land in the East Rockingham Industrial Area which accords with the Policy Statement set out at 2.4. Zoning of land under the MRS is the responsibility of the WAPC while the City is the determining authority for zoning under the City of Rockingham Town Planning Scheme. Development applications will be determined by the City of Rockingham subject to appropriate consultation where necessary, with appropriate government departments and agencies.

The social climate is highly unfavourable to heavy industrial development in the IP14 area, especially in East Rockingham. The perception of such industries as polluters is based on historical record, and although it may not accurately reflect current technology and its capacity to address the problems of the past, this perception would appear to be firmly entrenched.

Consequently, it is recommended that heavy industries not be permitted to locate within IP14 unless they can demonstrate:

- a) clear compliance with all policies herein;
- b) clear compliance with the Environmental Protection Act and other statutory obligations;
- c) potential economic and social benefits to the Rockingham community; and
- d) commitment to an open dialogue with concerned community members aimed at dispelling misconceptions and allaying apprehensions.

There will be occasions when a proponent can demonstrate that an industry is capable of achieving acceptable environmental standards (that is, buffer distances less than those used in the former DoE Policy, Guidance Statement No. 3). Careful assessment of the submission and confirmation by the DoE or EPA should allow the industry to establish with Council approval. When relevant State Government standards and regulations are adequately addressed to the satisfaction of Council, then such a proposal is permissible.

In summary, development applications for industries in Rockingham should respond to the requirements of this Policy 7.1 and to State Government standards and regulations.

APPENDICES

Appendix A

RECOMMENDED BUFFER ZONES

FOR

INDUSTRIAL RESIDUAL AIR EMISSIONS

**Environmental Protection Authority
of Victoria**

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INTRODUCTION

The recommended buffer zones were adopted by the Authority on 9 March 1977 and amended on 24 July 1979 and again on 24 July 1984. The first amendment included buffer zones for sewage treatment installations. The second amendment included a 2,000 metre category for Oil Refineries and Aluminium Smelters and a 5,000 metre category for Wood Pulp Mills using the kraft or neutral sulphite semi-chemical process.

The purpose of buffer zones in environmental management is to separate areas allowed to be lived in or frequented by the public from a source of environmental nuisance or effect. Buffer zones should be integral components of environmental management programmes and are not substitutes for source controls.

The buffer zones recommended in this document are based on local and overseas experience. They are intended to be used for the dispersion of residual air emissions arising from diffuse sources and adventitious losses in industrial plant. They assume that good control practice is employed by the industry in accordance with the requirements of the State Environment Protection Policies for Victoria. Hazards and noise emissions should also be considered, where appropriate, in setting buffer zones.

THE CHEMICAL INDUSTRY

Class I : Buffer zone 5,000m wide.

1. Production of paper pulp and hemi-cellulose by the sulfite, bisulphite, and monosulfite processes involving the combustion of sulfur and sulfur-containing materials; also production of paper pulp by the sulfate process.

Class II : Buffer Zone 2,000m wide.

1. Oil Refineries.

Class III : Buffer Zone 1,000m wide.

1. Production of nitrogen compounds (ammonia, nitric acid, and fertilisers).
2. Production of intermediate products of the aniline dye industry in the benzene and ether series (aniline derivatives, nitrobenzene, alkyl amines, phenol, etc) where total output is over 1,000 tonnes per year.
3. Production of intermediate products in the naphthalene and anthracene series (1-naphthol, anthraquinone, phthalic anhydride, etc) in amounts exceeding 2,000 tonnes per year.
4. Production of iron (III) bromide.
5. Production of illuminating gas, water gas, or producer gas in amounts exceeding 50,000m³ per hour.
6. Plants for the underground gasification of coal.
7. Production of caustic soda and chlorine by electrolysis.
8. Production of rare metals by the chlorination process (titanomagnetite, etc).
9. Production of artificial viscose fibre and cellophane.
10. Production of concentrated mineral fertilisers.
11. Production of organic solvents and oils (benzene, toluene, xylene, naphthol, phenol, cresol, anthracene, phenanthrene, acridine, carbazole).
12. Production of arsenic and its inorganic compounds.
13. Production of petroleum gas in amounts exceeding 5,000m³ per hour.
14. Production of picric acid.
15. Production of hydrofluoric acid, calcium fluoride, hydrogen fluoride, and other fluorides.
16. Coal processing plants.
17. Plants for the chemical processing of peat.
18. Plants processing fuel shales.
19. Production of mercury.
20. Production of carbon black.
21. Production of sulfuric acid, fuming sulfuric acid, and sulfur dioxide.
22. Production of carbon disulfide.
23. Production of hydrochloric acid.
24. Production of superphosphate.
25. Production of phosphorus (yellow or red) and organophosphorus compounds (parathion, malathion, etc).
26. Production of chlorinated and hydrochlorinated hydrocarbons.
27. Production of calcium carbide, acetylene from calcium carbide, and acetylene derivatives.

28. Production of dimethyl, terephthalate.
29. Production of caprolactam.
30. Production of cellulose nitrate fibre.
31. Synthesis of ethanol by the sulfuric acid process or by direct hydration, in plants with departments for concentrating sulfuric acid or carrying out desulphurisation.
32. Production of artificial rubber.
33. Production of blowing agents for the rubber industry.
34. Production of amines (methylamine, dimethylamine, diethylamine, triethylamine, etc).
35. Production of cyanides (calcium, sodium, copper, etc) dicyandiamide, calcium cyanamide.
36. Production of aminoheptanoic aminoundecanoic, aminononanoic, thiopentanoic, and isophthalic acids.
37. Production of sodium nitrite, hydrazine sulfate, hydrazine hydrate, ammonium sulfate, thionyl chloride, and ammonium carbonate.
38. Production of acetylene from hydrocarbon gases.
39. Production of dimethyl formamide.
40. Production of ethyl fluid.
41. Production of catalysts.
42. Production of products and intermediate products used in the synthesis of polymers.
43. Production of organosulfur dyes (sulphur black, etc).
44. Production of hydrocyanic acid and its derivatives (acrylates, diisocyanates, etc).
45. Production of beryllium.
46. Production of synthetic pharmaceutical's.
47. Synthesis of fatty acids and production of higher fatty alcohols by direct oxidation.
48. Mercaptan production and central plants for odorizing gas with mercaptans including facilities for odorant storage.
49. Potassium works.

Class IV : Buffer zone 500m wide.

1. Production of urea and thiourea.
2. Natural-gas processing plants.
3. Production of niobium.
4. Production of tantalum.
5. Production of producer gas from coal and peat at a rate of 25,000-50,000m³ per hour.
6. Production and processing of natural tars and their residues (pitch, etc).
7. Production of soda ash by the Solvay process in amounts exceeding 400,000 tons per year.
8. Synthesis of ethanol by the sulfuric acid process or by the direct hydration process in plants lacking a department for concentrating sulfuric acid or, in the case of the second process, a desulphurisation installation.
9. Production of ammonium, potassium, sodium, and calcium nitrates.
10. Production of organic chemical reagents.
11. Production of plastics from cellulose esters.
12. Production of corundum.
13. Production of barium chloride with the use of hydrogen sulfide.
14. Industrial hydrogenation of fats (non-electrical electrical process using hydrogen).
15. Production of synthetic fibres (eg, acetate, polycaprolactum, polyesters, polyvinyl chloride, and polyamides).
16. Production of ultramarine.
17. Production of chromium trioxide and chromates.

18. Production of artificial leather with the use of volatile organic solvents.
19. Production of esters.
20. Production of the products of organic synthesis (ethanol, enyl ether, etc) and petroleum gases at a rate of over 5,000m³ per hour.
21. Production of intermediate products of the aniline dye industry in the benzene and ether series (aniline derivatives, nitrobenzene, alkyl amines, phenol, etc) where total output is under 1,000 tonnes per year.
22. Production of intermediate products in the naphthalene and anthracene series (1-naphthol, anthraquinone, phthalic anhydride, etc) for a total output of up to 2,000 tonnes per year.
23. Production of vat dyes from all types of azotols and azoamines.
24. Experimental plants in the aniline dye industry with a total capacity of 2,000 tonnes per year and an output of under 1,000 tonnes per year.
25. Plants for the production of asbestos goods.
26. Production of acetic acid.
27. Production of polyethylene and polypropylene from petroleum by-product gas.
28. Production of food and fodder yeasts and furfural by hydrolysis of wood pulp and agricultural wastes.
29. Production from petroleum by-product gases of ethylene and propylene copolymers and higher polyolefin polymers.
30. Production of tar, liquid and volatile distillates of wood pulp, methanol, acetic acid, turpentine, acetone, and creosote.
31. Production of nicotine.
32. Production of phenolic, polyester, epoxy, and other synthetic resins in amounts exceeding 300 tonnes per year.
33. Production of synthetic camphor by the isomerisation process.
34. Production of melamine and cyanuric acid.
35. Production of polycarbonates.

Class V : Buffer Zone 300m wide.

1. Production of bitumen and other products from the distillation residues of coal-tar, crude oil, pine tar (asphalt, polyasphalt, etc).
2. Production of soda ash by the Solvay process in amounts under 400,000 tons per year.
3. Production of caustic soda by the Lowig and soda-lime processes.
4. Production of mineral salts, with the exception of the salts of arsenic, phosphorus, chromium, lead, and mercury.
5. Production of petroleum gas at a rate of 1,000-5,000m³ per hour and of producer gas at a rate of 5,000-25,000m³ per hour.
6. Production of plastics.
7. Production of phenolic moulding materials and of moulded or rolled goods from paper and textiles impregnated with phenolic resins, in amounts exceeding 100 tonnes per year.
8. Production of artificial mineral dyes.
9. Rubber-reclaiming plants.
10. Production of tyres, industrial rubber goods, ebonite and bonded footwear, and the rubberstock used in their manufacture.
11. Chemical processing of rare ores for the extraction of salts and antimony, bismuth, lithium, etc.
12. Production of fertiliser mixtures.
13. Production of carbon goods for the electrical industry.

14. Vulcanisation of rubber goods using carbon disulfide.
15. Production of acetaldehyde by the vapour-phase process without the use of metallic mercury.
16. Production and bulk storage of ammonia water.
17. Production of polystyrene and copolymers of styrene.
18. Production of organosilicon varnishes, liquids, and resins.
19. Plant for distributing gas to the mains network, including installations for odorising the gas with mercaptans.
20. Production of sebacic acid.
21. Production of vinyl acetate, polyvinyl acetate, polyvinyl alcohol, polyvinyl emulsions, and acetals.
22. Production of polyfluorethylene resins.
23. Production of plasticisers.
24. Production of food and fodder yeasts by the hydrolysis of wood pulp and agricultural wastes (sunflower husks, maize stalks, straw, etc).
25. Production of iso-octyl alcohol, butyric anhydride, butyric acid, foam plastic, vinyltoluene, polyvinyltoluene, polyurethane for casting, polyformaldehyde, reclaimed organic acids (acetic, butyric, etc) formaldehyde, urotropin, penta-erythritol, methylpyrrolidone, polyvinylpyrrolidone, and of derivatives of petroleum gas, where production is less than 5,000m³ per hour.
26. Production of lacquer, spirit varnishes, printer's varnish, varnishes for the rubber industry, insulating varnishes, etc.
27. Production of drying oils.
28. Production of phenolic, polyester, polyamide, epoxy, and other synthetic resins in amounts of up to 300 tonnes per year.
29. Production of metal carbonyls.
30. Production of methionine.
31. Production of antibiotics by biological methods.
32. Storage tanks (petroleum products and crude oil) greater than 2,000 tonnes capacity - not equipped with floating roofs.

Class VI : Buffer Zone 100m wide.

1. Production of paper from prepared cellulose and rags.
2. Production of casein plastic and other protein plastics (amino plastics, etc).
3. Production of glycerol.
4. Production of enamels from condensation resins.
5. Soap production.
6. Processing of animal organs.
7. Production of producer gas from coal and peat in amounts of up to 5,000m³ per hour.
8. Chemical processing of rare metal ores to extract the salts of molybdenum, tungsten and cobalt.
9. Production of phenolic moulding materials and of moulded or rolled goods from paper or textiles impregnated with phenolic resins, where production does not exceed 100 tonnes per year.
10. Industrial hydrogenation of fats (using hydrogen produced electrolytically).
11. Salt making (evaporation and rolling).
12. Production of potassium salts for pharmaceutical purposes.
13. Production of rubberised footwear without the use of organic solvents and of rubber stock without the use of carbon black.
14. Production of liquid fertilisers.

15. Production of vanillin and saccharin.
16. Production of petroleum gas at a rate of up to 1,000m³ per hour.
17. Production of moulding materials (phenol-formaldehyde, urea-formaldehyde, melamine-formaldehyde, organosilicon, etc).
18. Production of artificial leather from polyvinyl and other resins without the use of organic solvents.
19. Production of polyvinyl plasticisers, vinyl plastics, plastic separators for polyurethane foam, aerated plastics, glass-fibre-reinforced plastics and expanded polystyrene.
20. Production of alkaloids and galenicals.
21. Production of natural mineral dyes (chalk, ochre, Prussian red, etc).
22. Production of perfumes.
23. Production of tanning extracts.
24. Production of goods from synthetic resins, polymers, and plastics by various methods (moulding, extrusion, injection moulding, vacuum-forming, etc).
25. Production of synthetic detergent powders.
26. Storage tanks (petroleum products and crude oil) greater than 2,000 tonnes capacity - equipped with floating roofs.

Class VII : Buffer Zone 50m wide.

1. Production of inorganic reagents in plants without a chlorine shop.
2. Vulcanisation of rubber without the use of carbon disulfide.
3. Production of carbon dioxide and 'dry ice'.
4. Production of artificial pearls.
5. Production of goods from plastics and synthetic resins (mechanical operations only).
6. Production of photochemicals (photographic plates, cine-film, and photographic paper).
7. Production of fertilisers using carbon dioxide.
8. Depots for cleaning, washing, and steaming-out tanks used for the transport of crude oil and petroleum products.
9. Production of various types of paper and cardboard from imported semi-processed materials; production of wood pulp and hemi-cellulose with the use of sola or monosulfite in plants where prepared monosulfite is used, spent lyes and other compounds are not burnt, and liquid sulfur dioxide is not used.
10. Production of printing inks.
11. Compounding of pharmaceutical preparations.
12. Production of condensed and liquefied products from the separation of air.

THE METALLURGICAL, MACHINE-TOOL, AND METAL-WORKING INDUSTRIES

Class I : Buffer Zone 2,000m wide.

1. Production of aluminium by electrolysis of fused aluminium salts (alumina).

Class II : Buffer Zone 1,000m wide.

1. Plant for secondary processing of non-ferrous metals (copper, lead, zinc at a rate of over 3,000 tonnes per year).
2. Coking.
3. Iron-smelting where the total volume of the blast furnaces is over 15,000m³.
4. Plants carrying out all processes of iron and steel production, with an output of over a million tonnes of iron and steel per year.
5. Steel-smelting by the open earth and converter techniques in works equipped to process wastes (milling of Thomas slag, etc) where output of the basis product exceeds one million tonnes per year.
6. Smelting of non-ferrous metals (including lead, tin, copper and nickel direct from ores and concentrate).
7. Smelting of special types of pig iron; production of ferroalloys.
8. Plants for the sintering of ferrous and non-ferrous metal ores and pyrites cinders.
9. Production of alumina.
10. Production of cast-iron sections in amounts exceeding 100,000 tonnes per year.

Class III : Buffer Zone 500m wide.

1. Magnesium production by any technique except the chloride process.
2. Production of non-ferrous metals in amounts exceeding 2,000 tonnes per year.
3. Plants for secondary processing of non-ferrous metals (copper, lead, zinc, etc) in amounts from 2,000-3,000 tonnes per year.
4. Iron-smelting where the total volume of the blast furnaces is between 500 and 1,500m³.
5. Plants carrying out all processes of iron and steel production, with an output of up to one million tonnes per year of iron and steel.
6. Steel-smelting by the open hearth, converter, and process wastes (milling of Thomas slag, etc) where output of the basic product is less than one million tonnes per year.
7. Production of lead accumulators.
8. Milling of Thomas slag.
9. Production of antimony by pyrometallurgical methods.
10. Production of cast-iron sections in amounts from 20,000-100,000 tonnes per year.
11. Production of zinc, copper, nickel and cobalt by electrolysis of their aqueous solutions.

Class IV : Buffer zone 300m wide.

1. Concentration of metals without hot processing.
2. Production of lead-covered or rubber-insulated cable.
3. Production of cast-iron sections in amounts from 10,000-20,000 tonnes per year.
4. Plants for secondary processing of non-ferrous metals (copper, lead, zinc, etc) in amounts up to 1,000 tonnes per year.
5. Production of non-ferrous metals in amounts from 100-2,000 tonnes per year.
6. Production of mercury and apparatus containing mercury (mercury rectifiers, thermometers, valves, etc).

7. Iron-smelting, where the total volume of the blast furnace is less than 500m³.
8. Casting of non-ferrous metal sections under pressure with an output of 10,000 tonnes of castings per year (9,500 tonnes of aluminium pressure castings and 500 tonnes of zinc castings).
9. Production of metal electrodes with the use of manganese.

Class V Buffer zone 100m wide.

1. Manufacture of electrical engineering machines and apparatus (dynamamos, condensers, transformers, projectors, etc) where foundries and similar installations are small.
2. Production of bare cable.
3. Manufacture of boilers.
4. Production of metallic electrodes.
5. Metal-working factories for cast-iron, steel (in amounts up to 10,000 per year), and non-ferrous (in amounts up to 100 tonnes per year) castings.
6. Production of antimony by electrolysis.
7. Type foundries where lead may be emitted into the air.

Class VI : Buffer zone 50m wide.

1. Metal-working industries using heat treatment, but with no foundries.
2. Production of alkali accumulators.
3. Type foundries.
4. Production of instruments for the electrical engineering industry (lamps, headlights, etc) in factories without foundries and not using mercury.
5. Production of hard alloys and refractory metals in plants containing no departments for chemical ore processing.
6. Printing works.

MINING OF ORE MINERALS AND NON-METALLIC MINERALS

Class I : Buffer zone 1,000m wide.

1. Plant for the extraction of crude oil, where 0.5-1 tonne of hydrogen sulfide is discharged per day and the oil has a high proportion of volatile hydro-carbons.
2. Mining of lead ores, mercury, arsenic, and manganese.
3. Plants for the extraction of natural gas.

Class II : Buffer zone 500m wide.

1. Plants for the extraction of phosphorite, apatite, or pyrites without chemical processing.
2. Plants for the extraction of fuel shales.
3. Mining of hard coal, brown coal, and other coals.
4. Open-cast mining of iron and complex metallic ores (with the exception of lead ores, mercury, arsenic, and manganese), and the quarrying of rock of grades VIII-XI.

Class III : Buffer zone 300m wide.

1. Plants for the extraction of crude oil, where the amount of hydrogen sulfide discharged is less than 0.5 tonne per day and the volatile hydrocarbon content of the oil is low.
2. Quarrying of rock of grades VI-VII: dolomites, magnesites, asbestos, tars and asphalts.
3. Open-cast mining of metalloid compounds.
4. Production of briquettes from powdered peat and coal.
5. Hydraulic mines and wet-dressing plant.

Class IV : Buffer zone 100m wide.

1. Mining of rock salt.
2. Peat-cutting.
3. Mining of metal and metalloid ores in pits, except for lead ores, mercury, arsenic, and manganese.

THE BUILDING INDUSTRY

Class I : Buffer zone 1,000m wide.

1. Production of Portland, Portland-slag, and other cements in amounts exceeding 150,000 tonnes per year.
2. Kilning of magnesite, dolomite, and fire-clay in shaft or rotary kilns.

Class II : Buffer zone 500m wide.

1. Production of gypsum (alabaster).
2. Production of asbestos.
3. Production of lime in factories with shaft or rotary kilns.
4. Production of Portland, Portland-slag, and other cements in amounts up to 150,000 tonnes per year.
5. Production of asphalt concrete in mobile plants.

Class III : Buffer zone 300m wide.

1. Production of artificial fillers (clay and other fillers).
2. Production of glass wool and slag wool.
3. Production of local cements (calcined-clay cement, Roman cement), slag-gypsum cement, etc) in amounts up to 5,000 tonnes per year.
4. Production of tar paper and rubberoid roof-sheeting material.
5. Production of asphalt concrete in permanent plants.

Class IV : Buffer zone 100m wide.

1. Production of artificial stone and concrete articles.
2. Hoists for lifting cement and other dust-producing building materials.
3. Production of building materials from heat-and-power station wastes.
4. Production of articles from asbestos cement.
5. Production of polymerised building materials.
6. Production of porcelain ware and earthenware.
7. Production of red brick and silica brick.
8. Production of ceramic and refractory ware.
9. Production of stoneware.
10. Glass manufacture.

Class V : Buffer zone 50m wide.

1. Quarrying of rock without blasting and plants for working natural stone.
2. Production of plaster goods.
3. Production of reedboard, strawboard, etc.
4. Pottery production.

THE WOOD INDUSTRY

Class I : Buffer zone 1,000m wide.

1. Chemical processing of wood and the production of charcoal.

Class II : Buffer zone 500m wide.

1. Production of charcoal by the retort process.

Class III : Buffer zone 300m wide.

1. Plants for impregnating wood in order to preserve it.
2. Production of articles from wood fibre using artificial resins as binders (chipboard, fibreboard).

Class IV : Buffer zone 100m wide.

1. Production of wood fibre.
2. Saw mills and factories producing plywood and wood parts for buildings of standard design.
3. Shipyards for the construction of wooden craft.
4. Production of wallpaper.
5. Production of vitamin-enriched pine-needle flour, chlorophyll-carotene pastes and pine extracts.

Class V : Buffer zone 50m wide.

1. Wood-working, manufacture of furniture, parquet, and boxes.
2. Plants for the protective treatment of wood by impregnation with aqueous solutions (other than arsenic salts).
3. Production of articles from wood fibre (chipboard, fireboard, cement-fibrolite board, etc).
4. Production of barrels using prepared staves.
5. Production of bast matting.
6. Boatyards for the construction of launches and small craft.

THE TEXTILE INDUSTRY AND LIGHT INDUSTRY

Class I : Buffer zone 1,000m wide.

1. Plants for the primary processing of cotton which have departments for treating seed with organomercury compounds.

Class II : Buffer zone 500m wide.

1. Plants for the chemical treatment and processing of textiles with carbon disulfide.
2. Production of artificial leather, sheeting, oilcloth, and plastic for shoe soles where volatile organic solvents are used at the rate of up to 2 tonnes per day.

Class III : Buffer zone 300m wide.

1. Plants for continuous impregnation of textiles and paper with oil-varnish, oil-asphaltum, bakelites, and other varnishes, where the rate of production of impregnated material exceeds 300 tonnes per year.
2. Plants for the primary processing of vegetable fibres (flax, hemp, cotton, etc).
3. Plants for the treatment and processing of textiles without the use of carbon disulfide (leatherette, leather substitute, etc).
4. Bleaching, dyeing and finishing plants.
5. Production of polyvinylchloride sheeting reinforced on one side, blended polymer sheeting, rubber for shoe soles, and reclaimed rubber, where solvents are used at the rate of 1 tonne per day.

Class IV : Buffer zone 100m wide.

1. Plants for the continuous impregnation of textiles and paper with oil-varnish, oil-asphaltum, bakelite, and other varnishes, where the rate of production of impregnated material is less than 300 tonnes per year.
2. Manufacture of cottonin.
3. Silk filatures.
4. Manufacture of hemp cordage, rope and twine.
5. Manufacture of yarn and textiles from wool, cotton, and linen in mills with dyeing and bleaching departments.
6. Production of fancy leather board with polymer finishes where organic solvents are used at a rate of 0.5 tonne per day; and rubber for shoe soles without the use of volatile organic solvents.

Class V : Buffer zone 50m wide.

1. Manufacture of cotton, linen, and woollen yarns and textiles in mills without dyeing and bleaching departments.
2. Manufacture of knitwear and lace.
3. Silk weaving.
4. Clothing factories.
5. Manufacture of carpets and artificial astrakhan.
6. Production of insole board from leather and leather-cellulose fibre without the use of solvents.

7. Footwear manufacture.

PROCESSING OF ANIMAL PRODUCTS

Class I : Buffer zone 1,000m wide.

1. Factories manufacturing glue from hide remnants, bone refuse, and other animal wastes and residues.
2. Production of industrial gelatine from bone refuse, scrapings, hide remnants, and other animal wastes and residues in plants where such material is stored under cover or in the open air.
3. Salvaging plants for processing animal or fish wastes and residues into fats, animal feed, fertilisers, etc.

Class II : Buffer zone 500m wide.

1. Plants for roasting and grinding bones.
2. Fat rendering plants producing industrial fats and greases in amounts exceeding 30 tonnes per year.

Class III : Buffer zone 300m wide.

1. Plants for preparing belts for dyeing (sheepskin, tanned sheepskin, furs and the production of suede, morocco leather, kid, etc, with facilities for preparing wastes.
2. Plants for processing raw cattle hides; raw-hide dressing and tanning with facilities for processing wastes.
3. Production of industrial fats and greases in amounts up to 30 tonnes per year.
4. Wool-washing plants.
5. Storehouses for wet-salted and unprocessed hides (storage capacity for over 200 hides).

Class IV : Buffer zone 100m wide.

1. Production of skeletons and visual teaching aids from animal carcasses.
2. Feed concentrate plants using animal and food wastes.
3. Felt manufacture.
4. Production of high grade gelatine from fresh bones kept for as short a time as possible under refrigeration in special stores.
5. Plants for processing hair, bristle, down, feathers, horns, and hooves.
6. Production of gut and catgut.

Class V : Buffer zone 50m wide.

1. Manufacture of patent leather.
2. Manufacture of leather goods.
3. Manufacture of brushes from bristle and hair.
4. Depots for the temporary storage of wet-salted hides (up to 200), where no processing is carried out.
5. Felting shops.

FOOD PROCESSING AND THE PRODUCTION OF FLAVOURINGS

Class II : Buffer zone 500m wide.

1. Stockyards to hold over 1,000 head of livestock after shipment.
2. Abattoirs for cattle and sheep, meat-packing plants, and meat-packing houses, with stockyards for holding animals before slaughter that, at maximum capacity, represent three days' supply of meat.
3. Plants for melting down blubber from marine animals.
4. Plants for washing intestines.
5. Disinfection and cleaning stations for washing down trucks in which livestock have been shipped.

Class III : Buffer zone 300m wide.

1. Beet-sugar refineries.
2. Factories producing feed antibiotics.
3. Fisheries.
4. Stockyards holding up to 1,000 head of livestock after shipment.
5. Plants for the production of enzymes by the surface culture technique.
6. Slaughterhouses for small animals and poultry - 360m wide.¹

Class IV : Buffer zone 100m wide.

1. Flour mills, hulling mills, grain shellers, and feed concentrate mills.
2. Grain elevators.
3. Coffee-roasting plants.
4. Cheese-making factories.
5. Production of oleomargarine and margarine.
6. Meat-curing plants.
7. Production of alcohol for the food industry.
8. Fish canneries and fish filleting plants with departments for processing wastes; fish-packing plants.
9. Plants for the production of enzymes by submerged fermentation.
10. Beet-sugar refineries without facilities for storing beet pulp.
11. Cornflour and corn syrup factories.
12. Production of albumin.
13. Vegetable processing (drying, salting, or pickling) plants.
14. Production of dextrin, glucose, and molasses.
15. Starch production.

Note: ¹ Recommendation from the Report on 'Guidelines for the Conduct of Intensive Animal Industries' prepared by EPA - Agricultural Department Liaison Committee.

Class V : Buffer zone 50m wide.

1. Confectionery factories.
2. Production of table vinegar.
3. Tobacco-curing plants and cigarette factories.

4. Tea-blending plants.
5. Distilleries.
6. Oil mills (vegetable oils).
7. Canneries.
8. Vegetable storehouses.
9. Sugar refineries.
10. Brandy distilleries.
11. Breweries (without malthouses).
12. Pasta factories.
13. Milk and dairy product factories.
14. Sausage factories with an output of over 3 tonnes per shift.
15. Factory-type bakeries.
16. Factories preparing foodstuffs.
17. Refrigerating plants with a capacity of over 600 tonnes.
18. Plants for the initial stages of wine-making.
19. Wine-making establishments.
20. Production of grape juice.
21. Production of fruit and vegetable juices and non-alcoholic beverages.
22. Plants for the production of commercial malt and yeast.
23. Fish-curing plants.

SANITARY ENGINEERING INSTALLATIONS AND MUNICIPAL UNDERTAKINGS

Buffer zones for sanitary engineering installations and municipal undertakings shall be established on the basis of the sanitary classification and production capacity of such installations and undertakings.

Class I : Buffer zone 1,000m wide.

1. Controlled unimproved tips for liquid and solid domestic wastes of organic origin.
2. Fields where night soil and septic-tank contents are ploughed or in spread.

Class II : Buffer zone 500m wide.

1. Burial-places for cattle.
2. Salvaging plants for the disposal of animal carcasses and condemned meat.
3. Principal centres for salvage and incineration of refuse.
4. Improved tips for solid wastes.
5. Centralised composting areas for solid wastes and refuse from population centres.

Class III : Buffer zone 300m wide.

1. Cemeteries.
2. District centres for salvage and incineration of refuse.
3. Principal collection centres for utilisable wastes.
4. Cattle burial-places with carcass destruction chambers.
5. Outfall works.
6. Greenhouses and hothouses making use of refuse.
7. Composting of refuse containing neither manure nor faecal matter.

Class IV : Buffer zone 100m wide.

1. District collection centres for utilisable wastes.
2. Depots for vehicles used for refuse collection in towns.
3. Places for the temporary storage of scrap material without processing.
4. Servicing stations for heavy goods vehicles and for buses belonging to the urban transport system.

Class V : Buffer zone 50m wide.

1. Servicing stations for motor vehicles (cars, except for privately owned cars, and buses outside the urban transport network).

SEWAGE TREATMENT INSTALLATION

Types of Installation	Width of zone (in metres) for ¹ installations with treatment capacity of:			
	(m³ day)			
	Less than 200	200- 5,000	5,000- 50,000	50,000- 280,000
Installations for mechanical and biological treatment of sewage with sludge beds for digested sludge, and installations with sludge beds along.	150	200	400	500
Installations for mechanical and biological treatment of sewage and thermomechanical processing of sludge in closed premises.	100	150	300	400
Trickling Filters ³	200	300	500	1,000
Anaerobic Ponds ⁴	400	600	800	1,000
Facultative Ponds ⁵	300	450	600	750
Aerobic Waste Stabilisation Ponds ⁶	200	300	400	500
Spray Irrigation with effluent ⁷	500	500	500	500
Sewage Pumping Stations ⁸	15	15	20	30

Notes:

1. Where houses are located to the lee of installations from major wind directions, the buffer zones should be enlarged to twice the width shown in the table.
2. Buffer zones for installations with a capacity exceeding 280,000m³/day and for installations not using approved sewage-treatment and sludge-processing techniques shall be established in conjunction with the EPA.
3. Buffer zones for covered filter beds - refer Health Commission of Victoria.
4. Anaerobic ponds are anaerobic throughout their depth except for an extremely shallow surface zone. Depth not less than 1.5m, usually 2.5m.
5. Facultative, or aerobic-anaerobic, ponds consist of a surface aerobic zones, an intermediate zone and an anaerobic zone.
6. Aerobic Waste Stabilisation Ponds are usually designed to a depth not greater than 1.2m.
7. Effluent treated to secondary standard.
8. Subject to the installation of adequate vent pipes.

BUFFER ZONES FOR AGRICULTURAL UNDERTAKINGS AND PREMISES

TYPES OF UNDERTAKINGS OR PREMISES	WIDTH OF BUFFER ZONE (METRES)
Farms:	
stud farms and rabbit farms	100
cattle farms (all types), sheep farms, and fur farms	300
poultry farms	360
pig farms	500
Veterinary surgeries:	200
Hothouses and greenhouses:	
heated biologically (using manure)	100
heated biologically (using refuse)	300
using electrical, steam, or water heating systems	no standard
Premises for preparing food:	
without the use of food wastes	no standard
with the use of food wastes	100
Undertakings and premises for the initial treatment and processing of milk, fruit, or vegetables:	no standard
Garages and yards for the repair, servicing, and parking of cars and agricultural machinery, with a capacity of over 200 machine units:	100
Storehouses for fruit, vegetables, potatoes, grain, other agricultural produce, and other stores:	50
Buildings for housing animals and poultry kept for private use in residential areas:	50
Storehouses:	
for mineral fertilisers	200
for mineral fertilisers and up to 20 tonnes of pesticide:	200
for pesticides:	
up to 20 tonnes	200
20-50 tonnes	300
50-100 tonnes	400
100-200 tonnes	500
300-500 tonnes	700
over 500 tonnes	1,000
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Beef Feedlots:	
to residentially zoned areas	5,000
to any residential dwelling on adjacent property	400
to any road boundary	50
to any property boundary	50
to water storage, other than domestic, or offtake	800