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From: Cnty Board of County Councilors General Delivery
Sent: Tuesday, April 05, 2016 7:34 AM
To: Mielke, Tom, Madore, David, Stewart, Jeanne, Olson, Julie (Councilor); Boldt, Marc
Cc: McCauley, Mark, Tilton, Rebecca; Schroader, Kathy
Subject: FW: Comments for County Council RILB public hearing April 5
Attachments: RILB Vicinity Google Earth 2015 Images for Emailing pdf, 1840_GS3 pdf

for the record

From: Tim Trohimovich [<mailto:Tim@futurewise.org>]
Sent: Monday, April 04, 2016 3:50 PM
To: Cnty Board of County Councilors General Delivery; Cnty 2016 Comp Plan
Subject: RE: Comments for County Council RILB public hearing April 5

Dear Sirs and Madams:

Here are the maps and last documents referenced in our letter

Tim Trohimovich, AICP
Director of Planning & Law

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Subject: RE: Comments for County Council RILB public hearing April 5

Dear Sirs and Madams:

Here is two of the enclosures referenced in our letter.

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Subject: Comments for County Council RILB public hearing April 5

Dear Sirs and Madams.

Enclosed please find our comment letter for the April 5, Rural Industrial Land Bank public hearing. It also includes two of the enclosures. We are sending other enclosures in two separate emails. Thank you for considering our comments.

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Director of Planning & Law



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Planning Guidelines

Separating Agricultural and Residential Land Uses

Department of Natural Resources, Queensland
Department of Local Government and Planning, Queensland
DNRQ 97088

These planning guidelines are to be read in association
with State Planning Policy 1/92 Development and the
Conservation of Agricultural Land

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Preface

State Planning Policy 1/92 Development and the Conservation of Agricultural Land was approved by the Queensland Government in December 1992, under the *Local Government (Planning and Environment) Act 1990-1992*

State Planning Policy 1/92 addresses key principles for the protection of agricultural land. The policy is supported by planning guidelines which provide detailed advice on implementing the policy.

Planning Guidelines: The Identification of Good Quality Agricultural Land was released in 1993 and addressed the definition and identification of good quality agricultural land and appropriate planning approaches to achieve the protection of such land.

Planning Guidelines: Separating Agricultural and Residential Land Uses provides technical advice and guidance to local government, developers, consultants and landholders on minimising conflicts between farming activities and residential uses (Policy Principle No. 8 of State Planning Policy 1/92). The planning guidelines are a product of extensive public consultation: two drafts were published (1993 and 1995), and the document has been substantially amended in response to comments received. In particular, the document advocates a flexible approach that is responsive to specific circumstances.

Planning Guidelines: Separating Agricultural and Residential Land Uses has been prepared by the Department of Natural Resources and the Department of Local Government and Planning in consultation with a reference group formed from representatives of the following bodies:

Local Government Association of Queensland

Queensland Farmers' Federation

CANEGROWERS

Australian Cotton Foundation

Queensland Pork Producers' Organisation

Queensland Dairy Farmers' Organisation

Queensland Fruit and Vegetable Growers

Queensland Grain Growers' Council

Queensland Conservation Council

Australian Sugar Milling Council

Urban Development Institute of Australia

Royal Australian Planning Institute

Land Resource Consultants

Department of Environment

Department of Primary Industries

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1. Introduction

1.1 *The Queensland Government considers that good quality agricultural land is a finite national and state resource that must be conserved and managed for the longer term*

State Planning Policy 1/92 Development and the Conservation of Agricultural Land (SPP1/92) was introduced in December 1992 as an instrument to protect good quality agricultural land through local government planning. SPP1/92 Principle No 8 states

Local Authority planning provisions should aim to minimise instances of incompatible uses locating adjacent to agricultural operations in a manner that inhibits normal farming practice. Where such instances do arise, measures to ameliorate potential conflicts should be devised wherever possible

Purpose

1.2 The purpose of the planning guidelines is to provide technical advice and guidance on reducing the potential for conflict between farming activities and residential development in accordance with Principle No 8 of State Planning Policy 1/92. The planning guidelines are intended to assist local governments, developers, landholders and consultants. In particular, the planning guidelines contain provisions which local governments should consider including in their planning schemes or adopting as local planning policies.

1.3 Although intended to support the protection of good quality agricultural land in accordance with State Planning Policy 1/92, the principles in the planning guidelines could be used to assist decision-making on other land where agricultural/residential conflicts could arise. Also, the principles can be applied to situations where conflicts are likely to arise between industrial, tourist, commercial or other urban uses and nearby agricultural uses.

1.4 It should be noted that conflict due to intensive animal industries is not specifically covered in these planning guidelines. Detailed guidance on dealing with the impact from these activities is provided in industry-specific codes of practice and guidelines which are listed in the reference section of this document.

Background

1.5 Conflict between residential development and agricultural land uses is likely to occur where residential land uses directly abut, or are sufficiently close to, farmland such that they are likely to be affected by agricultural activities.

1.6 Such conflict can arise from the use of agricultural chemicals, and noise, dust and odour generating activities. Adverse impacts of residential development on farmland include sediment and stormwater run-off. These planning guidelines outline planning measures to reduce such land use conflict.

The Environmental Protection Act

1.7 The *Environmental Protection Act 1994* (EP Act) was introduced by the Queensland Government primarily to protect the environmental values of air, noise and water. Under the EP Act and associated Environmental Protection Policies (EPPs), everyone has a general environmental duty of care to the environment and their neighbours.

1.8 Advice in the planning guidelines is based on certain assumptions:

- (a) All agricultural activities incorporate reasonable and practicable measures to protect the environment in accord with the Environmental Code of Practice for Agriculture (prepared under the provisions of the EP Act) and associated industry specific guidelines.
- (b) All agricultural activities are legally conducted as required by other legislation covering workplace health and safety, and the use and handling of agricultural chemicals.
- (c) Nevertheless, certain activities practised by even the most careful and responsible farmer may result in a nuisance to adjacent residential areas through, for example, unavoidable odour drift and noise impacts.

1.9 The separation distances recommended in this document are drawn from relevant State and Commonwealth legislation and guidelines, notably the EP Act, relevant research and the sources cited.

The Use of Buffer Areas

1.10 Buffer areas are legitimate planning tools. They are used to separate land uses to ensure long-term protection of both areas impacted upon and areas used for the conflict generating activity. Examples of such activities include sewage treatment works, abattoirs, tanneries, composting plants and rendering works; and intensive animal and plant production facilities (such as feedlots, piggeries and poultry sheds). The principle of separating conflicting uses is also applied to the protection of natural resource areas (such as nature conservation reserves, streams, water supply storage areas and forest reserves).

1.11 By separating agricultural uses from residential and other urban uses, buffer areas can reduce conflict and the resulting complaints. Complaints about agricultural practices are often based as much on perception as reality, particularly in relation to chemical spray drift. Seeing or smelling the source of nuisance may heighten the perception of that nuisance. Buffer

areas can contribute to the screening of agricultural activities from the view of residential areas. Thus a suitable visual barrier between the development and agricultural land in the form of a vegetation screen can significantly reduce the level of complaint by minimising both the cause and the perception of a nuisance.

1.12 Nevertheless, buffer areas designed in accordance with these planning guidelines will not totally eliminate all impacts of activities. Also, the planning guidelines do not limit the rights of individuals to take action under the common law or such legislation as the *Health Act 1937*, *EP Act 1994*, *Work Place Health and Safety Act 1995* or the *Agricultural Chemicals Distribution Control Act 1966*, if they believe their rights to enjoy a safe environment and the use of their land are restricted. Appendix 1 outlines existing controls and administering agencies for a range of issues.

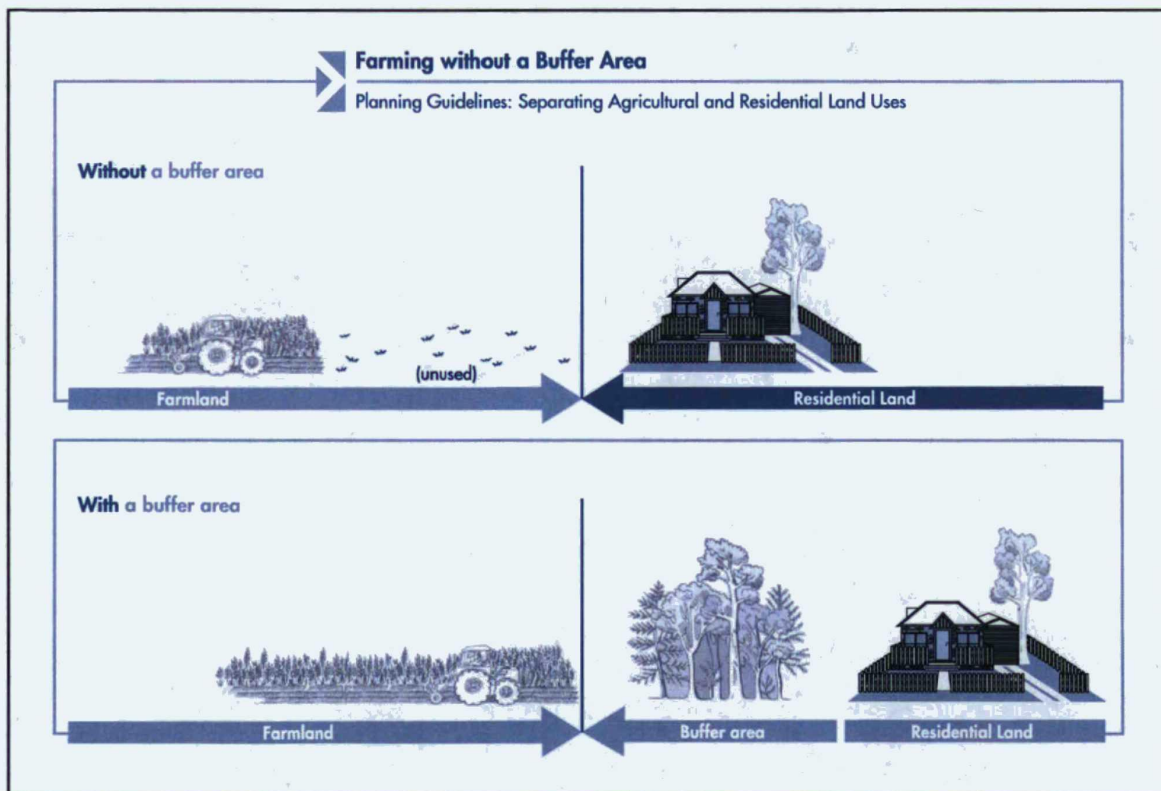


Figure 1. Farming without a buffer area

Principles

1.13 The planning guidelines should be applied with consideration to the following principles:

1. Provided agricultural practices are legally practised according to existing codes of practice, it is unreasonable for new adjacent uses to demand a modification of these practices to an extent which threatens efficient agricultural operations.
2. When preparing planning schemes, local governments should avoid, as far as practicable, locating residential development in close proximity to agricultural land. Where this is not possible, mechanisms such as buffer areas should be used to minimise conflicts.
3. Buffer areas should be determined on the basis of the sustainable agricultural land use with the potential to have the most impact on adjacent land uses and which is reasonably likely to be practised, regardless of current use.
4. Buffer areas should be located within the site being developed for residential purposes, and be provided/funded by the proponent of that development. This principle protects the prior rights of agricultural producers to practice agriculture on rural land.
5. Where conflicts already exist between agricultural and residential land uses, mechanisms including mediation, source controls and public education should be encouraged.

Objectives

1.14 The planning guidelines seek to achieve the following objectives:

1. To protect the use of reasonable and practicable farming measures that are practised in accordance with the Environmental Code of Practice for Agriculture and associated industry-specific guidelines.
2. To minimise scope for conflict by developing, where possible, a well-defined boundary between agricultural and residential areas and not interspersing agricultural and residential areas.
3. To minimise the impacts of residential development on agricultural production activities and land resources.
4. To minimise the potential for complaints about agricultural activities from residential areas.

5. To provide residents with acceptable environmental conditions in residential areas that are located adjacent to agricultural production areas.

Structure of the Planning Guidelines

1.15 The contents of these planning guidelines are as follows:

- **Section 2** provides advice on forward planning to prevent and/or minimise conflicts.
- **Section 3** details how to assess the need for buffer areas as part of development assessment and provides a performance based approach to planning scheme provisions.¹
- **Section 4** deals with issues of use, ownership and maintenance of buffer areas.
- **Section 5** provides advice on situations where conflict may already exist.
- **Section 6** identifies roles and responsibilities.
- **Appendixes** provide information on existing controls and technical data to assist in the design of effective buffer areas.

Definitions and Abbreviations

1.16 For the purpose of these planning guidelines, the following abbreviations are used:

DLGP	- Department of Local Government and Planning
DNR	- Department of Natural Resources
DPI	- Department of Primary Industries
ESD	- Ecologically Sustainable Development
EP Act	- <i>Environmental Protection Act 1994</i>
EPP	- Environmental Protection Policy
L _{Amax,T}	- The average maximum A-weighted sound pressure level in a specified time interval (T) or event
LG(P&E) Act	- <i>Local Government (Planning and Environment) Act 1990</i>
SPP1/92	- State Planning Policy 1/92: Development and the Conservation of Agricultural Land

¹ The performance based approach is explained in paragraph 2.27

1.17 The following definitions have been adopted in the planning guidelines:

Agricultural land use—the use of land for the production of food, fibre and timber; including grazing, cropping, horticulture and forestry². Agricultural land use is subject to constraints imposed by:

- climate
- slope, soil and water limitations
- processing requirements
- economic conditions.

Buffer area—an area of land separating adjacent land uses that is managed for the purpose of mitigating impacts of one use on another. A buffer area consists of a separation distance and one or more buffer elements.

Buffer element—a natural or artificial feature within a buffer area that mitigates an adverse impact. A buffer element may include open ground, a vegetation buffer and/or an acoustic barrier.

Building envelope—A diagram drawn on a subdivision plan, or other plan that forms part of a development application, defining the limits for the siting of buildings (and associated services and facilities e.g swimming pools).

² Guidelines for the separation of residential uses from intensive agricultural production establishments including cattle feedlots, piggeries and poultry farms are available in separate publications listed in the references.

Drift—airborne movement of agricultural chemicals onto a non-target area with the potential for risk of injury or damage to humans, plants, animals, environment or property³.

Residential development—urban subdivision, low density residential subdivision (including rural residential) and rural allotments created primarily for residential purposes (residential excisions, concessional allotments, retirement blocks etc.), and other places used as human accommodation excluding dwellings associated with bonafide agricultural holdings.

Sensitive receptor

- a dwelling, mobile home or caravan park, residential marina or other residential place in a residential development;
- a motel, hotel, or hostel;
- a childcare centre, kindergarten, school, university or other educational institution; or
- a medical centre or hospital.

Separation distance—the total linear distance between a source and a sensitive receptor.

³ The detection of odour does not necessarily correspond to the presence of an active chemical ingredient.

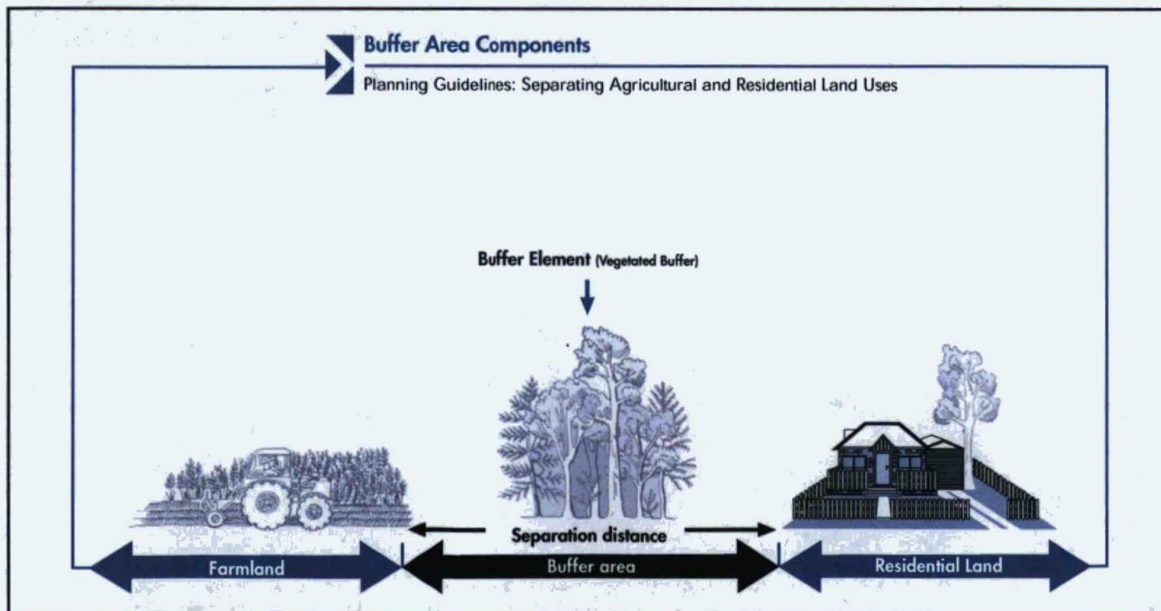


Figure 2. Buffer area components

2. PLANNING SCHEMES

2.1 Planning schemes provide local governments with the opportunity to minimise the potential for conflict between agricultural and residential land uses by separating those uses, thereby providing more certainty for land holders

Methods of Achieving Separation

2.2 The main ways of achieving separation through planning decisions and the use of planning controls are as follows

- As far as possible, isolate good quality agricultural land from uses likely to conflict with nearby farming activities
- On the edges of urban areas, retain natural features (e.g. watercourses and ridge lines) free from development to act as buffer areas between newly developing areas and farmland
- Ensure that, as far as practicable, newly developing areas are designed so that features such as public open spaces, road reserves or purpose-designed buffer areas provide the required separation
- Require individual developments to be designed in ways that incorporate buffer areas

2.3 Some or all of these methods will be appropriate, depending on the local circumstances. The rest of Section 2 describes how these various methods can be used when preparing planning schemes and assessing development applications

Overview

2.4 Planning schemes comprise a forward-looking land use/development strategy complemented by development assessment provisions. These have been known respectively as the Strategic Plan and the Planning Scheme Provisions in the *Local Government (Planning & Environment) Act 1990*

2.5 Preventing and/or minimising conflict between agricultural land uses and residential development will involve

- determining the potential for conflict through investigations conducted as part of the preparation or review of planning schemes,
- reducing the opportunity for land use conflict by adopting appropriate planning strategies in the Planning Scheme,

- adopting provisions that are consistent with these planning guidelines and appropriate to local circumstances

Strategic Planning

2.6 Strategic planning, supplemented as necessary by local area planning, establishes the broad framework to guide future land use and development. Therefore, when preparing or reviewing strategic plans, areas of good quality agricultural land should be identified and protected through appropriate land use designations⁴

2.7 These designations should include additional areas considered essential for the protection of good quality agricultural land and its productive potential. Additional areas may need to include buffer areas or areas containing essential agricultural infrastructure (e.g. sugar mill tramways, irrigation pump stations, farm packing sheds and cool rooms)

2.8 Any analysis of future development options and settlement patterns should include an assessment of the potential for conflict between agricultural and other land uses. Areas designated for residential and other urban uses should be clearly delineated thereby providing some certainty about the intended boundaries between urban and rural areas. Designations should be based upon an assessment of future development needs for a reasonable time scale (approximately 15 years). This approach avoids blighting agricultural land long before it may be required for development.

Isolating Good Quality Agricultural Land from Incompatible Uses

2.9 Land use strategies in strategic plans and any supporting local area plans should, as far as practicable, aim to isolate good quality agricultural land from uses likely to conflict with certain farming activities

2.10 Areas of poorer quality agricultural land, when used for purposes that will not cause land use conflicts, may serve to isolate more intensively farmed land from encroaching incompatible uses. Farm forestry and grazing are examples of rural land uses that are compatible with either adjoining areas of intensive agriculture or adjacent residential uses.

2.11 Where achieving isolation is not possible through forward planning, separation should be achieved in other ways

⁴ Advice on this is contained in *Planning Guidelines: The Identification of Good Quality Agricultural Land*

Using Retained Natural Features as Buffer Areas

2.12 Boundaries of urban designations should, where practicable, take opportunities to follow natural features that will be retained undeveloped, such as watercourses, ridge lines, steeply sloping ground and areas for nature conservation (see 4.9). All these features can act as natural buffer areas between farmland and urban areas.

Designing Urban Areas to Provide Buffer Areas

2.13 Certain facilities and uses, such as public open spaces, road reserves and golf courses, can also be located and designed to act as buffer areas.

2.14 Public open spaces and recreational uses should only be located at the edge of development and used as buffer areas if:

- the location is appropriate for satisfying the open space needs of the community;
- the use of the buffer area as public open space is compatible with adjoining uses,
- the impacts from the adjoining agricultural use do not preclude recreational use of the open space.

2.15 In many of the smaller towns in Queensland, a strip or a tract of Crown land is set aside as a town reserve or common that can act as a buffer area between agricultural and residential land. As well as a buffer area, such town reserves provide a 'land store' dedicated for various public purposes, including parks.

Designing Developments to Provide Buffer Areas

2.16 Despite designing land use strategies to minimise potential for conflict, there will be areas where residential and other urban uses have to locate adjacent to good quality agricultural land. Policies and measures to reduce the potential for conflict should therefore be set out in strategic plans or elsewhere in planning schemes.

2.17 Broad criteria should be included for determining the need for buffer areas and for the design of features such as vegetated buffers. In areas where potential for conflict is identified, each development application should be required to include an assessment of the need for buffer areas and design measures to ensure their effectiveness. Appropriate design requirements are described in Section 3.

2.18 Strategic plan maps can depict an 'area of investigation' where proposed residential uses adjoin existing agricultural areas (see Figure 3). The size of the area of investigation should be determined by:

- the potential agricultural activities in the area concerned (see paragraph 1.13, Principle 3);
- the minimum separation distances appropriate to the likely sources of conflict (see Table 2).

2.19 Planning schemes should provide scope for required separation to be achieved in different ways. A purpose-designed buffer area is one method. Alternatively, the buffer area could be incorporated into the design of the particular development.

2.20 For example, with residential development, large residential allotments incorporating the required buffer area could be located on the boundary between the residential subdivision and agricultural land. Planning schemes should allow for this approach by specifying minimum lot sizes sufficiently large to incorporate the desired buffer area into the allotment while allowing an adequate balance of the lot to be available for the house and normal residential use. To minimise any loss of development potential, a higher allotment yield could be offered over the balance of the development site to offset the use of the larger lots incorporating the buffer area.

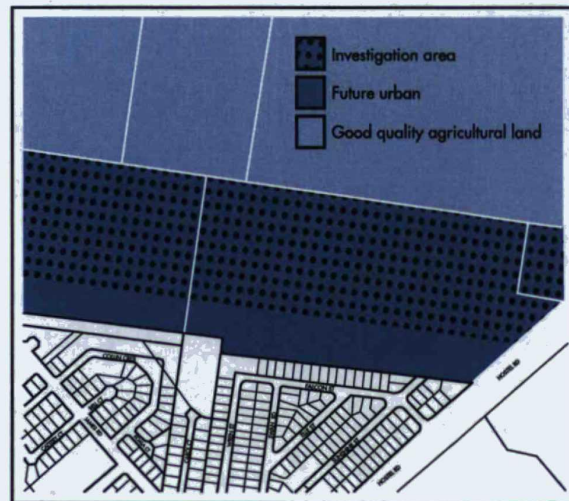


Figure 3. Strategic plan map

2.21 Designing and providing an adequate buffer as part of each residential allotment should enhance the prospect of the buffer areas being effective and well managed

Temporary Buffers

2.22 In areas experiencing high levels of urban growth, relatively large areas of land might need to be designated for urban development. Situations will arise where good quality agricultural land is necessarily designated for development, but that development may be some years away. In such cases, consideration should be given to the need for temporary buffers at particular development stages to protect continuing farm operations until that farmland is developed.

2.23 Strategic plans or another part of the planning scheme should identify where the need for such buffer areas should be considered. Normally, the temporary buffer area should be incorporated in the future subdivision design, and planning schemes should include such a requirement. However, as the need for a buffer area is only short term, it need not be designed as a permanent feature, unless that feature has a desired role in the urban area (e.g. public open space or large residential allotments as described in 2.20).

2.24 Alternatively, land in the next development stage could still be farmed until required for development, but a buffer area incorporated into the farm management. This approach can only be required when the development approval includes the farmland concerned.

2.25 Depending on the degree of conflict and the lifespan of the buffer area, such temporary buffer areas may be considered unnecessary by council. Temporary buffer areas should be subject to the same design criteria as permanent buffer areas to ensure effectiveness at reducing conflict.

Development Assessment Provisions

2.26 Planning schemes should contain development assessment provisions to support the land use strategy and policies. Such provisions should be designed to achieve the appropriate protection of good quality agricultural land and reduce the potential for conflict between agricultural and residential land uses.

2.27 Development assessment provisions should preferably be performance based⁵. Such provisions focus on achieving specific outcomes, but allow flexibility in the means of achieving these outcomes rather than relying only on prescriptive requirements. Performance-based provisions can therefore ensure that agricultural

impacts on adjoining residential and other urban uses are minimised, but allow for differing approaches and responsiveness to local circumstances. Examples of such provisions are provided in Section 3.

2.28 For local governments without a planning scheme, a policy⁶ should be prepared to detail the mechanisms required when land use and subdivision approvals are being assessed in close proximity to agricultural land.

Appropriate Development

2.29 Minimising the potential for land use conflict can be achieved by limiting those uses regarded as inappropriate in areas of good quality agricultural land and immediately adjoining areas. The planning scheme should therefore aim to limit development in such areas to agricultural uses and other uses required to support agricultural activities. Such uses may include saleyards, grain drying facilities, animal husbandry services, storage for fresh produce, custom machinery operators.

2.30 In buffer areas between farmland and urban development, the planning scheme should aim to limit development to uses that do not detract from the effective operation of the buffer area. Such uses should therefore be compatible with the adjoining agricultural areas and adjacent residential development.

2.31 Examples of compatible uses (depending on the agricultural uses) include farm forestry, plant nurseries, horse trails, walking/cycling tracks, sport fields or other recreational activities. However, if the buffer area is created primarily to reduce conflict from agricultural chemical spray drift, some of these uses may not be compatible. In certain cases of land use conflict, it may be appropriate that minor loss of amenity is tolerated if the intrusion occurs on an infrequent basis without associated health risks.

2.32 In urban areas, the close proximity of any agricultural land should be a major consideration when deciding upon the type and design of development, including the need for buffer areas.

⁵ Such an approach involves clearly stated objectives and offers a choice of following prescribed development standards (acceptable solutions), or varying those standards in accordance with the objectives and performance criteria. **Objectives** describe the preferred outcomes for development and provide the opportunity for a variety of innovative solutions.

Performance Criteria the means of achieving the objectives—what is to be achieved rather than how this should be done.

Acceptable solutions set out some ways that guarantee the objectives can be met to the desired standards.

⁶ Local planning policies under the *Local Government (Planning & Environment) Act 1990* or planning scheme policies under the *Integrated Planning Act*.

Subdivision of Land

2.33 SPP 1/92 requires local government to give due consideration to the protection of good quality agricultural land when assessing applications for subdivision

Residential or Rural Residential Areas

2.34 Where residential areas have to abut farmland, adequate separation can be achieved through subdivision design (see 2 20 and 2 21)

2.35 If the required buffer area is incorporated in large residential allotments, the buffer portion of the lot should be suitably designed and protected through conditions of development approval These include requiring the provision and maintenance of planted areas in the buffer area, defining building envelopes for the location of houses outside the buffer area, or applying vegetation protection controls The larger residential lots could be designed in such a manner as to allow redevelopment should the buffer area become redundant

2.36 If buffer areas are proposed as one component of the public open space contribution, the issues set out in 2 14 above should be considered

2.37 The ownership and maintenance of buffer areas are discussed in Section 4

Single Residential Allotments

2.38 The creation of residential allotments in productive rural areas often fragments farmland and may lead to land use conflict, particularly when the occupants of the new dwelling have no direct connection with the surrounding agricultural activities Where possible therefore, single residential allotments (such as 'concessional lots' or 'family excisions') should not be located on or adjacent to good quality agricultural land

2.39 Local governments are encouraged to review and amend any subdivision provisions that permit residential allotments in rural areas to ensure that appropriate buffer areas are required adjacent to good quality agricultural land

Conditions of Approval

2.40 Conditions should be set by local governments according to the relevant requirements of the planning legislation to ensure that on going maintenance and effectiveness of the buffer areas are binding upon successors in title

3. Conflict assessment and buffer area design

3.1 Adequate consideration of possible conflict is necessary during development assessment. Development proponents should be required to assess the potential for land use conflict in areas of investigation (*see 2.13*), or in proximity to good quality agricultural land. This should be done regardless of whether or not the good quality agricultural land is being utilised for agriculture at the time of an application.

3.2 Councils may require reports from suitably qualified consultants to address each element of conflict and accompany an application where:

- the proposed development is within the area of investigation; or
- the planning scheme has not resolved or is silent on the issue of land use conflict; or
- the proposed development is contrary to the planning scheme.

3.3 In investigating the need for appropriate buffer areas, the following steps should be taken:

- Determine the sustainable agricultural land use with the potential of causing most problems for adjacent residential uses and which is reasonably likely to occur on the subject land.
- Identify the elements that may cause conflict and the extent of the conflict. The elements should be quantified, where possible, in terms of frequency and duration of activities to determine the element's impacts.
- Explain how the proponent intends to address each element to achieve acceptable outcomes in terms of residential area design, size of lots, separation widths, tree planting, acoustic barriers etc.
- Propose the means by which the proposed measures will be monitored and maintained. This should include responsibility for implementing and maintaining specific features of the buffer areas to ensure continued effectiveness.

3.4 When assessing development applications, local governments will need to consider the information submitted, and ensure that the mechanisms proposed to ameliorate land use conflict address all elements. The mechanisms must be flexible enough to accommodate possible changes in agricultural practices on the adjacent

land and be able to be implemented through the planning approval process. DNR is available to assist local governments in determining likely agricultural land uses.

3.5 The following provisions are provided for guidance in development assessment and for adoption by local government. Solutions other than those described may be acceptable to councils to meet the performance criteria.

Element: Agricultural chemical spray drift

Overview

3.6 The off-target movement of agricultural chemicals can be a cause for concern to residents in proximity to farming areas. These concerns are largely based on fears of exposure to agricultural chemicals but also due to detection of odours associated with the chemical (*see Appendix 5*). It should be noted that the guidelines treat chemical spray drift and odour as separate elements for the design of buffer areas (*see section 3.15–3.20*).

3.7 A Federal Government working group has conducted a review of agricultural chemical spray drift (CSIRO 1993). It concluded that 'there is insufficient knowledge to settle on a single distance for a buffer zone and that evidence indicates that buffer zones need to be chemical/formulation specific, based on supporting data.'

Available information

3.8 Studies at Emerald in 1990–91 concluded that the estimated average seasonal exposure for an adult or child of the five aerially applied insecticides detected did not exceed 0.2% of the World Health Organisation Acceptable Daily Intake. These studies did not measure the distance of measurement points from agricultural areas, but generally were in excess of 300 m from areas of chemical applications. However the perception of risk in the community associated with chemical spray drift persists.

3.9 Research and subsequent modelling has indicated negligible chemical drift at a range 300 m downwind from the release point of a chemical spray application (Spillman 1988). This research suggests a 300 m separation distance downwind of agricultural spraying is an acceptable minimum distance for adoption. It should be noted that the perception of 'negligible drift' may be influenced by the toxicity of the chemicals involved and may pose an unacceptable risk to some members of the community.

Other research and field trials have shown vegetated buffers are effective in capturing up to 80% of pesticide spray drift from an application upwind of a single row of trees (Harden 1992). Several Queensland councils now require vegetated buffers as a condition of development approval at the interface between agricultural and residential land use. Specific design criteria for vegetated buffer elements are presented in Appendix 2. Revegetation or thinning of existing stands of vegetation to the specifications in Appendix 2 may also be appropriate.

Buffer Area Width

3.10 From a planning perspective, it is not considered practical to base buffer area dimensions on individual chemicals or formulations. Based on the available research on chemical spray drift, the planning guidelines have adopted a minimum width of 300 m where open ground conditions apply, and a minimum width of 40 m where a vegetated buffer element can be satisfactorily implemented and maintained. These dimensions may vary according to local topographical or climatic conditions or as further knowledge is obtained.

3.11 Farm management can influence the effectiveness of buffer areas. The advice provided in the planning guidelines in relation to agricultural chemical use assumes farmers and their employees and contractors carry out their activities in accordance with reasonable and practicable measures as set out in the Environmental Code of Practice for Agriculture, and the *Agricultural Chemicals Distribution and Control Act 1966*. The Advisory Standard For the Storage and Use of Chemicals at Rural Workplaces provides additional guidance to persons with obligations under the *Workplace Health and Safety Act 1995*. It should be noted that currently there is no acceptable ambient air standard for agricultural chemical spray drift.

3.12 It should be noted that the recommended vegetated buffer (which includes multiple rows of trees) will not capture 100% of the chemical spray drift, but may reduce spray drift to less than 1% at a sensitive receptor when managed in terms of porosity, litter build up and noxious weed control to ensure effectiveness.

3.13 Factors affecting buffer area requirements for reducing agricultural chemical spray drift include

- chemical composition/formulation e.g. toxicity, evaporation rates,
- method of application/release height e.g. aerial application, airblast mister etc ,
- spray technology e.g. nozzle type, droplet size,
- frequency of application,
- ability of the vegetation to capture spray droplets,
- target structure,
- weather conditions e.g. wind speed and direction, air turbulence, inversions,
- microclimate,
- geographical conditions and barriers e.g. topography

3.14 Further information and advice on the use and effects of agricultural chemicals is available from

Department of Primary Industries Agricultural Standards
Ph 07 3239 3936

Department of Training and Industrial Relations
Division of Workplace Health and Safety
(Rural Officers) Ph 1800 177 717

Queensland Farmers Federation (Workplace Health and Safety Officers) Ph 1800 818 006

Department of Environment district or regional offices

Element: Agricultural Chemical Spray Drift

Objective: To locate new residential areas so that the impact of agricultural chemical spray drift on amenity and health is avoided and complaints from residents regarding the use of agricultural chemicals is unlikely

Performance Criteria

Residential development to be located or incorporate measures such that chemical spray drift does not adversely affect community public health and safety

Acceptable Solutions

- (i) The separation distance between a sensitive receptor and agricultural land is a minimum of 300 m

or

- (ii) A vegetated buffer designed by a consultant acceptable to council and incorporating the criteria shown in Appendix 2 is located between the sensitive receptor and adjacent agricultural land. The vegetated buffer should
 - be provided with a suitable watering system,
 - include access strips on either side which are kept clear of vegetation and other flammable materials,
 - be of a height, density and width (40 m min) acceptable to council prior to the development of residential areas within 300 m of the agricultural land

or

- (iii) Other measures which meet the performance criteria and which are acceptable to council

Element: Odour

Overview

3.15 Odour in rural areas can arise from use of agricultural chemical sprays, fertilisers (inorganic and organic), effluent disposal and intensive livestock (e.g. feedlots, piggeries and poultry farms) and composting plants. Such detrimental odours can impact on residential amenity and have the potential to affect public health.

3.16 Odour is often a major factor in many complaints about off-site chemical spray drift where there is sometimes no objective evidence of toxic exposure. Some agricultural chemicals contain 'markers' (strong odours) to allow easy identification and these markers or mixing agents are sometimes detected at a distance from the target area and cause concern even though in some circumstances extremely low levels of the active ingredients may be present. Residents' association of the odour with the chemical is sufficient to raise fears of exposure (see Appendix 5).

3.17 Factors affecting complaints from odour are influenced by the frequency, intensity, duration and offensiveness of the odour. An objectionable odour may be tolerated if it occurs infrequently at a high intensity, however a similar odour may not be tolerated at lower levels if it persists for a longer duration.

Available information

3.18 Odour can be emitted from a variety of sources and dispersed by the atmosphere. Ground level concentrations of odour have been reported as being inversely related to wind speed and atmospheric conditions, i.e. the lower the wind speed and the more stable the conditions, the higher the concentration. The subjective nature of conflict resulting from exposure to odour makes the determination of design goals difficult (Holmes et al. 1996).

3.19 Industry-specific guidelines have been developed to determine suitable separation distances to deal with odour for feedlots, piggeries and poultry farms. Factors influencing the separation distance required include the number of livestock, site factors and levels of management. The siting of such industry and other development should be carefully considered in areas with poor dispersion conditions e.g. valleys. The buffer area between a proposed residential development and existing or approved intensive livestock facilities or composting facilities should

conform with standards specified in the relevant industry specific guidelines. The separation distance will be determined by consideration of the licence conditions applying to individual facilities set by DPI, DoE and/or local government.

3.20 While detection of odours may be instantaneous, often several hours are needed to confirm the presence and source of such odours. Odours from intermittent sources, such as chemical applications in rural areas, may only reach nuisance levels when exposure at a sensitive receptor exceeds a duration threshold. This is supported by research conducted by Holmes et al. (1996) who nominate 1% of time as an appropriate threshold.

Odour Duration Threshold

3.21 For the purpose of the planning guidelines and the design of effective buffer areas, the following odour duration threshold has been adopted:

- Odour from intermittent agricultural activities (e.g. fertiliser spreading, effluent disposal or chemical spraying) should not exceed nuisance levels outside any affected sensitive receptor for greater than 1% of the time (or 88 hrs/yr).

3.22 The duration threshold allows for some detectable odour levels provided they occur for less than 88 hrs/year. For the purposes of the planning guidelines, the following formula can be used to determine the potential time of odour impact upon a sensitive receptor:

$$t = n \times o$$

where:

t = potential hours of nuisance level odour per year

n = number of cropped hectares within 500 m of the receptor (40 ha max)

o = hours of operation per hectare per year of odour producing activity (a,...z) (see tables in Appendix 4)

If the time 't' is greater than 88 hrs/year then the design goal has been exceeded and a buffer area may be required.

Buffer Area Width

3.23 Information on odours from poultry farms (DoE, 1994) indicate that 500 m would be an acceptable separation distance for odour mitigation should the duration threshold be exceeded.

3.24 Applicants who wish to propose alternative odour reduction measures should consider the following factors that influence odour dispersion

- atmospheric stability wind speed and direction,
- terrain/topography and drainage flows,
- vegetation density,
- impact location,
- odour source, e.g. composting, chemical formulation, effluent disposal etc.

3.25 Information on odours associated with some agricultural chemicals is provided in Appendix 5. Additional advice should be sought from agricultural chemical suppliers, AVCARE and other sources to determine the nature and odours likely to be encountered in particular instances.

Element: Odour from agricultural activities	
Objective: To locate new residential areas so that the impact of odour generated by agricultural activities on residential areas is minimised	
Performance Criteria	Acceptable Solutions
Residential development to be located or incorporate measures to minimise the impact of odour in excess of the duration threshold generated by intermittent agricultural activities at dwellings within the development	<p>(i) The separation distance between a sensitive receptor and agricultural land is a minimum of 500 m or</p> <p>(ii) A buffer area design based on a report consistent with the draft EPP (Air) from a qualified consultant acceptable to council detailing relevant factors and verifying that odour design goals in the EPP (Air) will be met at sensitive receptors within the development or</p> <p>(iii) Other measures which meet the performance criteria and which are acceptable to council</p>

Element: Noise

Overview

3.26 There are four types of noise associated with agricultural activity which may lead to land use conflict. These are the noises associated with intensive livestock facilities, aircraft activities, constant or long-term noise, (e.g. pumps or refrigeration plants), and intermittent noise from tractors and other machinery.

3.27 The draft EPP (Noise) and associated guidelines allows agricultural practices to generate noise provided the activity is in accordance with reasonable and practicable industry measures as described in the Environmental Code of Practice for Agriculture and other industry specific guidelines. Under the code, it is not a breach of the general environmental duty of care if noise is generated in circumstances where it can be shown that the activity is not frequent or that there are no practicable alternatives.

3.28 The Code of Practice and other industry specific guidelines, further advises that rural industry practices should seek to avoid causing excessive noise at night-time (10 p.m.–6 a.m.) which may affect residential areas. Modification of farm machinery and management practices may reduce noise levels, but there will be instances when the generation of noise due to agricultural practices is unavoidable and may result in conflicts between land uses. Planning may also reduce conflict arising from noise by requiring appropriate buffer areas.

3.29 Many noisy activities associated with agriculture are intermittent and may only affect a particular adjacent residence for a few hours several times a year. For example, small cropping on a two crop per year basis for potatoes generally requires approximately 25 hours of machinery activity per hectare per year; sugar cane production requires less than 5 hours machinery activity per hectare per year.

Noise Level and Duration Thresholds

3.30 For the purpose of the planning guidelines the following noise levels and cumulative time thresholds have been adopted to determine whether noise is likely to be excessive outside a noise-sensitive receptor. The noise source is classed as intermittent if the specified noise level in the following table is exceeded for a cumulative total of 10 hours per year. If this cumulative time threshold is not exceeded, the noise source is considered not sufficient to require a buffer area. The noise source is classed as long term if the specified

noise level in the following table is exceeded for a cumulative total of 50 hours per year. Furthermore, stricter design goals are applied to night time operations between 10 p.m. and 6 a.m.

Table 1. Noise design goals

	Intermittent >10 hrs/yr	Long term >50 hrs/yr
Day-time 6 a.m.–10 p.m.	75 dB(A) ($L_{Amax,T}$)	60 dB(A) ($L_{Amax,T}$)
Night-time 10 p.m.–6 a.m.	55 dB(A) ($L_{Amax,T}$)	45 dB(A) ($L_{Amax,T}$)

3.31 The following formulae outline the steps for calculating cumulative hours of noise which exceed the design goals per year from agricultural activities. The formula for deriving hours per year of excessive noise from intermittent day-time activities is as follows:

$$x = \sum \{(c \times f \times h) \times (\pi \times d^2 / 2)\}$$

where:
 x = hours/year when noise exceeds 75 dB(A) ($L_{Amax,T}$)⁷
 c = crops per year
 f = frequency of activity (a...z) per crop
 h = hours of noise per hectare for activity (a...z)
 $d = 10^{(N-60.47)/16.6}$ where
 N = noise measured as $L_{Amax,T}$ at 7.5 m for activity (a...z)
NB: For long-term day-time activity, use
 $d = 10^{(N-45.47)/16.6}$

The formula for deriving hours per year of excessive noise from intermittent night-time activities is as follows:

$$y = \sum (c \times f \times n)$$

where:
 y = hours/yr when noise exceeds 55 dB (A) ($L_{Amax,T}$)⁷
 c = crops per year
 f = frequency of night-time activity (a...z) per crop
 n = hours of activity per night (prior to 6am) when noise levels exceed 55dB(A) ($L_{Amax,T}$)

⁷ $L_{Amax,T}$ is the average maximum A-weighted sound pressure level in a specified time interval or event.

Buffer Area Width

3.32 In cases where the duration thresholds are likely to be exceeded, the planning guidelines use the noise design goals in Table 1 for determining effective separation distances. Minimum separation distances have been determined on the basis of noise attenuation rates of 5 dB(A) for each doubling of distance from the noise source. This attenuation rate assumes open ground conditions. The existence of natural barriers, broken topography or other features would increase attenuation and affect the separation distance required. A standard noise source of 90 dB(A) ($L_{Amax,T}$), measured at 7.5 m from the source has been used. For example a day-time noise level attenuates to 75 dB(A) ($L_{Amax,T}$) by a distance of 60 m from the source. A night-time noise level attenuates to 55 dB(A) ($L_{Amax,T}$) by a distance of 1000 m from the source. These distances have been adopted in the planning guidelines as the minimum buffer width for intermittent day and night-time activities that occur more than 10 hrs/yr but less than 50 hrs/yr.

3.33 If a noise source operating at 90 dB(A) ($L_{Amax,T}$) were to exceed the noise design goals for >50 hrs/yr, a distance of 500 m to attenuate the noise level to 60 dB(A) ($L_{Amax,T}$) for day-time noise, would be required. Night-time noise at this level may exceed 45 dB(A) ($L_{Amax,T}$) up to 4 km away. Such noise occurrence between 10 p.m.–6 a.m. is likely to be considered intrusive and therefore unreasonable. In circumstances where there are existing long term noise sources close to a proposed residential development, the proponent may consider funding measures such as machinery enclosures, mufflers, noise barriers and/or house design elements such as double glazing to complement subdivision layout and design measures to meet the performance criteria.

3.34 Appendixes 3 and 4 provide technical data on noise issues and worked examples of using these formulae to determine whether noise duration thresholds have been exceeded.

3.35 Applicants who wish to propose alternative noise reduction measures should determine noise levels at specific representative sites and demonstrate that the noise design goals for residential areas as set out in the draft EPP (Noise) and associated guidelines are not exceeded.

3.36 Factors affecting noise from agricultural activities which should be considered in designing buffer areas include

- type of engine (diesel or petrol, 2- or 4-stroke),
- number of cylinders,
- cooling system (air or liquid),
- load,
- timing, frequency and duration of operations,
- geographical conditions and barriers e.g. topography and inversions,
- weather conditions e.g. wind speed and direction,
- typical industry machinery and practices.

3.37 It should be noted that while noise barriers can reduce noise by 10–16 dB(A) they may prove costly and have long term maintenance implications. Earth mounds to control noise must be carefully engineered to ensure minimum impacts on natural drainage patterns or the effectiveness of vegetated buffers. Noise attenuation devices may reduce the minimum separation distance for 90 dB(A) ($L_{Amax,T}$) intermittent day-time activities from 60 m to 15 m and for intermittent night-time activities from 1000 m to 250 m using a 10 dB(A) reduction as a guide.

Aircraft Noise

3.38 In areas of aerial spraying, the separation distance between the development and agricultural land must be a minimum of 100 m to comply with Air Navigation Order 2021. This distance is based on operational safety and noise considerations.

Element: Noise from agricultural activities

Objective: To locate new residential areas so that noise from agricultural activities is attenuated to safeguard amenity in noise sensitive places.

Performance Criteria

- a) Residential development to be located or incorporate designs to minimise the impact of noise in excess of the duration threshold from **day-time** agricultural activities at dwelling within the development

- b) Residential development to be located or incorporate designs to minimise the impact of noise in excess of the duration threshold from **night-time** agricultural activities at dwellings within the development

- c) In areas of **aerial** agricultural activity, development should be located to minimise noise from aircraft

Acceptable Solutions

- a) (i) The separation distance between the sensitive receptor and agricultural land is a minimum of 60 m for intermittent noise and 500 m for long-term noise

or

- (ii) A buffer width and design based on a report from a qualified acoustic consultant acceptable to council detailing relevant factors and verifying that noise design goals consistent with the draft EPP (Noise) will be met at sensitive receptors within the development

or

- (iii) Other measures which meet the performance criteria and which are acceptable to council

- b) (i) The separation distance between the sensitive receptor and agricultural land is a minimum of 1000 m

or

- (ii) A buffer width and design based on a report from a qualified acoustic consultant acceptable to council detailing relevant factors and verifying that noise design goals consistent with the draft EPP (Noise) will be met at sensitive receptors within the development

or

- (iii) Other measures which meet the performance criteria and which are acceptable to council

- c) The separation distance between the sensitive receptor and agricultural land to be a minimum of 100 m to comply with Air Navigation Order 20 21 which prohibits air craft flying closer than 100 m to a private dwelling

Element: Dust, Smoke and Ash

Overview

3.39 Some agricultural activities including cultivation prior to planting, tractor and transport movements, cane fires and harvesting can generate dust, smoke and ash

3.40 Contemporary farming practices incorporate measures to minimise loss of soil, but at times it is necessary to leave land unplanted for extended periods, which can lead to the movement of dust. Local conditions, including wind strength and direction, rainfall, humidity and ambient temperatures, soil type, vegetative cover and type of on site activity determine the extent of the nuisance

3.41 The Environmental Audit of the Queensland Cane Growing Industry identifies cane fires as a source of smoke and ash nuisance for residents adjacent to farms but the continuing adoption of green cane harvesting will help to reduce the impacts from cane fires

Buffer Area Design

3.42 In the absence of quantitative research data, the planning guidelines recommend a separation distance of 150 m where dust, smoke or ash from agricultural activities have been identified as a potential nuisance. In most cases, a vegetated buffer designed to capture chemical spray drift (see Appendix 2) will also be effective in reducing conflict resulting from dust, smoke and ash

Element: Dust, smoke and ash from agricultural activities

Objective: To locate new residential areas so that the impact of dust, smoke and ash generated by agricultural activities on residential areas is minimised

Performance Criteria

Residential development to be located or incorporate measures to minimise the impact of dust, smoke and ash generated by agricultural activities

Acceptable Solutions

- (i) The separation distance between the sensitive receptor and agricultural land is a minimum of 150 m

or

- (ii) A vegetated buffer designed by a consultant acceptable to council is located between the sensitive receptor and adjacent agricultural land. The vegetated buffer should
 - be provided with a suitable watering system,
 - include access strips on either side which are kept clear of vegetation and other flammable materials,
 - be of a height, density and width (40 metres min) acceptable to council prior to the development of residential areas within 150 m of the agricultural land

or

- (iii) • Other measures which meet the performance criteria and which are acceptable to council

Element: Sediment and stormwater run-off

Overview

3.43 Residential development affects land surface characteristics and the hydrological balance, with the impacts often occurring on farmland located lower in the landscape. The increase of impermeable surfaces and changes to drainage patterns can accelerate soil erosion, siltation and sedimentation, and increase the risk of flooding. Techniques to alleviate conflict due to downstream effects of residential development include suitable erosion, sediment and stormwater control during the construction and operational stages of a development.

3.44 Soil erosion can be a major problem due to the highly dispersive and unstable nature of many soils in

Queensland. Proper subdivision and infrastructure design to minimise soil movement and silt loads entering drainage lines should be implemented. Temporary sediment control works should be constructed on sloping ground or near drainage lines during construction.

Buffer Area Design

3.45 Options available for council can include provisions for an erosion control plan for the construction and operation phases of the development, and management of stormwater run-off. Buffer areas can also be designed to utilise techniques such as water spreading and water diversion to reduce conflicts from stormwater run-off between residential development and adjacent farmland. Ongoing maintenance and enforcement must be identified and incorporated into conditions of approval.

Element: Sediment and stormwater run-off from residential development

Objective To design new residential areas so that the impact of run-off and sediment from residential development areas on agricultural land is minimised

Performance Criteria

Residential development to be located or incorporate measures to minimise the impact of sediment and stormwater run-off on agricultural enterprises

Acceptable Solutions

- (i) Residential development proposals to include the following
 - an erosion control plan for the construction and operation phases of the development which meets the standards set out in the Guidelines for Soils Erosion and Sediment Control for Construction Sites (1996),
 - stormwater run-off from all hard surfaces (including roads, roofs, driveways etc) to be carried to stable waterways,
 - measures such as water spreading and water diversion implemented within the buffer area
- or
- (ii) Other measures which meet the performance criteria and which are acceptable to council

Summary of Buffer Area Design Criteria

3.47 The design and adoption of a buffer area for a particular development proposal will reflect an analysis of all the elements likely to cause conflict and the final buffer area and component elements should reflect the

most intrusive element. Table 2 gives an overall summary of each element's duration threshold and design criteria for acceptable solutions. See also Appendix 6 for examples of effective buffer areas.

Table 2. Summary of buffer area design criteria

	Duration threshold	Min. default distance (m)	Min. design distance with buffer element(m)
Chemical spray drift	None	300	40
Intermittent odour	>88 hrs/yr	500	500*
Intermittent noise**	>10 hrs/yr<50 hrs/yr	60 (d) 1000 (n)	15 (d) 250 (n)
Long term noise **	>50 hrs/yr	500 (d) 1000# (n)	120 (d) 1000# (n)
Dust, smoke and ash	None	150	40

* Minimum design distance for an odour buffer area may be reduced on consideration of site factors and nature of odour

** Based on source noise level of 90 dB(A) ($L_{Amax,T}$) at 7.5 m

d = Noise occurring in day-time (6 a.m.–10 p.m.)

n = Noise occurring in night-time (10 p.m.–6 a.m.)

= Long-term noise occurring between 10 p.m.–6 a.m. is likely to be considered intrusive and therefore unreasonable. Such noise sources may be ameliorated by a combination of enclosing or muffling the source of the noise, by provision of a buffer area and attention to residential design.

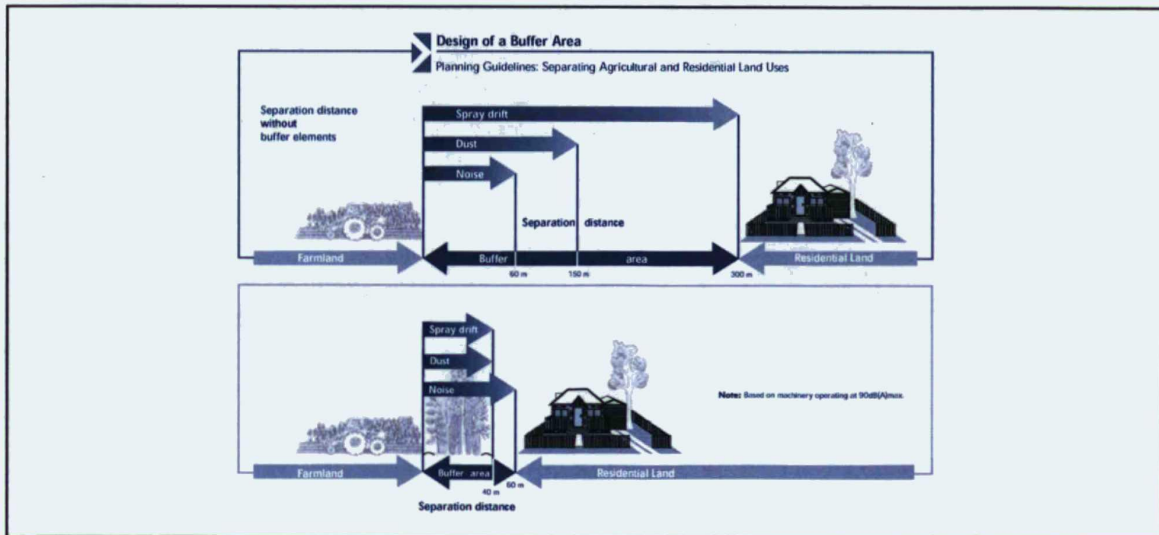


Figure 4. Design of a buffer area

4. Ownership and Maintenance of Buffer Areas

Ownership

4.1 Ownership and tenure may vary depending on the circumstances, and can be mixed over the area. For example, council parks, State land (e.g. roads), leasehold land, freehold land and easements may combine to form a continuous buffer area. An area designated as a 'buffer area' does not need to change tenure. However it should be managed in ways that reduce conflict between land uses.

Private land—single tenure

4.2 Private land refers to freehold and leasehold land. A buffer area on privately-owned land can be created through

- planning controls such as building envelopes and other reasonable and relevant conditions attached to a development approval,
- Vegetation Protection Orders or other tree clearing controls to protect vegetation where existing vegetation is contributing to an effective buffer area,
- voluntary provision of a buffer area by the rural landholder when initiating an intensification of rural land use.

4.3 The owner will retain the rights to use the land forming the buffer area, subject to the controls and agreements put in place at the time of creation of the buffer area. Vegetation protection orders may need to be revoked if the separation area becomes redundant.

4.4 Where the buffer area is provided voluntarily by the rural land holder on rural land, it should remain in private ownership and may support productive rural uses which will not affect residential amenity, for example grazed pasture or farm forestry. Where the buffer area consists of natural vegetation with conservation values, the landholder may enter a voluntary agreement under the *Nature Conservation Act 1992* to create a nature refuge.

Private land—joint tenure

4.5 Common property areas of land which are often included as part of a community title form of development, may be used as a buffer area where the location is suitable. The land use and management must be consistent with the reduction of land use conflict.

4.6 The common property to be incorporated as the buffer area would be owned by the members of the joint tenure arrangement, usually the body corporate.

Public land

4.7 Buffer areas in public ownership will usually be under the control of local governments but may also include land under the control of State instrumentalities such as the Main Roads Department, Transport Department or Department of Natural Resources. Depending on the circumstances, parks, public open space, road and drainage reserves may be used as buffer areas. The permitted uses of the area may need to be varied if it is to function as a buffer area.

Maintenance

4.8 As a general rule, buffer areas should be properly designed to avoid special maintenance requirements whilst achieving their maximum desired effect of separating conflicting land uses. However, it will be necessary to ensure ongoing maintenance of buffer areas, including replanting, thinning, management for fire protection, herbicide damage, noxious weeds, feral animals, litter build-up etc. so that the buffer areas continue to be effective in reducing conflict. Vegetated buffers may require ongoing attention to maintain a porosity of 0.5 with suitable lower and upper storey vegetation to ensure their effectiveness in capturing spray drift.

4.9 Vegetated buffers may serve as components of wildlife corridors and improve opportunities for conserving wildlife habitat. Expert advice on effective wildlife corridors should be obtained from the Department of Environment. Where natural vegetation is used as a buffer element, management should meet objectives of both nature conservation and buffer performance. Where nature conservation objectives preclude thinning to achieve porosity specifications, an increased buffer width may be necessary.

4.10 To achieve effective management, clear responsibilities for maintenance should be determined before the buffer areas are implemented

Responsibilities for maintenance will be largely determined by ownership. If in public ownership, local government and other agencies would be responsible for overseeing maintenance in conjunction with their usual town planning/health inspection and parks/gardens operations. In general, maintenance of buffer areas in private ownership will be the responsibility of the proprietor, as controlled by development conditions, local laws, or environmental protection agreements. The recommended mechanism is through planning conditions imposed on a development approval. These conditions attach to the land and are binding on successors in title. The necessary controls to ensure this maintenance is carried out must be in place at the time the buffer area is created.

4.11 Under joint tenure arrangements, the body corporate is responsible for the maintenance of the common area which would include the roads and any dams or buildings which exist on the common area. Control of fire, noxious weeds and feral animals should be the responsibility of the body corporate, as outlined in the body corporate management plan. This would need to be presented to the local government for approval at the time of the development application.

5. Dealing with Existing Conflicts

5.1 It should be noted that while this section does not deal with planning issues, it has been included for the benefit of councils and their local communities

5.2 Where the opportunity to implement buffer areas is limited due to existing patterns of development, other options to reduce conflict can be explored. Mechanisms should aim to minimise conflict while not restricting existing legitimate farming operations

Mediation and Negotiation

5.3 Many disputes arise as a result of a lack of information and understanding of why certain practices are carried out, or their effects on nearby residents. Councils should bring the conflicting parties together to discuss their concerns and focus on finding solutions. Often parties in dispute can reach agreement amongst themselves when given the opportunity

5.4 The Department of Justice provides an alternative dispute resolution mechanism for the resolution of community disputes. It is a free, confidential mediation service that can be accessed from anywhere within the State via a toll free number. The department handles a wide range of disputes and issues. Disputes handled to date have involved neighbours on issues such as trees, boundaries, children and noise, and public issues; disputes involving government departments, residents groups, conservation groups, industry representatives etc. The use of this mediation service does not limit an individual's right to use other legal avenues. This service can be reached by telephoning 1800 017 288

5.5 The National Disputes Centre also offers a mediation service for conflict resolution, and can be reached by telephoning 029 223 1044

Source Controls and Agricultural Practices

5.6 With the implementation of the EP Act, all persons now have a general duty of care to protect the environment. Rural producers are required to adopt reasonable and practicable measures to avoid environmental harm. These measures are set out in the Environmental Code of Practice for Agriculture. This may mean that some primary producers may need to modify some current practices to comply with the code

5.7 Local governments will be responsible for administering sections of the EP Act. In some situations, councils may have no alternative other than to impose appropriate source controls on offending activities. An example of this may be that a farmer needs to operate a stationary pump adjacent to residences, for extended periods. In this case a cover, mounding or muffler that reduces the noise emitted by the pump to EPP Noise Design Goals would be required. Farmers can modify their practices or voluntarily forego agricultural production adjacent to residential areas to reduce conflict. Residential land holders may also choose to voluntarily forego the use of land adjacent to agricultural land for a buffer area to reduce conflict

Education

5.8 Persons intending to live in or adjacent to an agricultural production area need to be fully informed of the likely agricultural practices that may impact on their residential amenity before they settle in such an area

5.9 Local governments and primary industry bodies can play a role in the education process. Councils can include a 'Notice to Intending Purchasers' (see Figure 5) when providing information to persons conducting conveyancing searches. Figure 5 provides an example of such a notice. This could be combined with media releases and other methods of disseminating information to inform people from non-agricultural backgrounds. Government departments can also assist. The Department of Primary Industries produces farmer publications (Farmnotes, Guidelines for producers etc.) that can aid in educating the public, and the Department of Natural Resources provides advice on sustainable land management practices

(EXAMPLE ONLY)

NOTICE

TO PURCHASERS OF LAND IN RURAL AREAS IN (...) SHIRE

() Shire Council supports the right of persons in rural areas to carry out agricultural production using reasonable and practicable measures to avoid environmental harm. An Environmental Code of Practice for Agriculture has been prepared under the *Environmental Protection Act 1995* and provides guidance on reasonable and practicable measures.

Intending purchasers are advised that agricultural production practised in accordance with the Code of Practice may include some of the following activities and some activities may have implications for occupiers of adjacent land.

- Logging and milling of timber
- Dams
- Intensive livestock production (feedlots, piggeries and poultry farms)
- Vegetation clearing
- Cultivation and harvesting
- Bushfire hazard reduction burning
- Construction of firebreaks
- Construction of dams, drains and contour banks
- Fencing
- Use of agricultural machinery (tractors, chainsaws, motor bikes etc.)
- Pumping and irrigation
- Pesticide spraying
- Aerial spraying
- Animal husbandry practices
- Droving livestock on roads
- Silage production
- Construction of access roads and tracks
- Slashing and mowing vegetation
- Planting of wood lots

Intending purchasers of land in rural areas may have difficulty with some of these activities or the impact of these activities when they are being carried out on land near their proposed purchase. If so, they should seek independent advice and consider their position.

This notice is not intended to affect the rights of individuals to take action under the common law or legislation (including the *Health Act 1937*, *Environmental Protection Act 1994*, *Agricultural Chemical Distribution Control Act 1966* or the *Work Place Health and Safety Act 1995*).

This notice is provided for information purposes only.

Figure 5. Sample notice to intending purchasers

6. Roles

Proponents/Consultants

- Submit planning applications to local government
- Provide accurate information which addresses each element of conflict and submit, a residential design which minimises land use conflict
- Determine the sustainable agricultural land use with the potential for causing most problems for adjacent residential uses and which is reasonably likely to occur adjacent to the subject land
- Identify the elements that may cause conflict and the extent of the conflict. The elements should be quantified where possible in terms of frequency and duration of activities to determine the element's impacts
- Explain how the proponent intends to address each element to achieve acceptable outcomes in terms of residential area design, size of lots, separation distances, tree planting acoustic barriers etc
- Propose the means by which the proposed measures will be implemented, monitored and maintained to ensure continued effectiveness

Local Government

- Prepare strategic plans indicating areas of good quality agricultural land, investigation areas (areas of potential conflict), policies for the protection of such areas, and the avoidance of land use conflict
- Provide applicants with detailed information as set out in *Planning Guidelines Separating Agricultural and Residential Land Uses*
- Determine applications, based on independent advice if necessary, and set appropriate conditions
- Supply site data from planning applications to DNR and/or DoE (if advice from these agencies is required)

Department of Natural Resources

- Provide advice to local government and comment on available broad-scale land resource information for strategic planning
- Define what constitutes good quality agricultural land within a local government area

- Assist consultants and local government staff in the interpretation of the elements of land use conflict in rural areas
- Assist local governments in checking submitted information, if required, and ensure appropriate standards are met
- Provide advice to DLGP relevant to the implementation of State Planning Policy 1/92

Department of Local Government and Planning

- Review planning schemes and amendments (rezonings) submitted by local governments
- Provide policy guidance to local governments

Department of Environment

- Set standards and provide advice on noise and air quality under the *Environmental Protection Act 1994*
- Assist local governments in checking submitted information, if required, and ensure appropriate standards are met
- Provide advice to DLGP and/or DNR relevant to the implementation of State Planning Policy 1/92

Department of Primary Industries

- Assist local governments in checking submitted information, if required, and ensure appropriate standards are met
- Provide relevant information on licence conditions for approved intensive animal production facilities to local government
- Provide advice to DLGP and/or DNR relevant to the implementation of State Planning Policy 1/92
- Provide advice on the most suitable agricultural land use for an area

Agricultural Producers

- Carry out agricultural practices in accordance with the Environmental Code of Practice for Agriculture and relevant industry guidelines

Residents

- Understand agricultural workplace practices
- Maintain buffer areas and buffer elements located on private land

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APPENDIX 1: Existing controls

Issue	legislation/regulations	Guidelines/	Contact Codes of Practice
Agricultural Chemicals	<ul style="list-style-type: none"> • <i>Agricultural Chemicals Distribution and Control Act, 1966</i> • <i>Chemical Use (Agricultural and Veterinary) Act, 1988</i> 	<i>Environmental Code of Practice for Agriculture</i>	Department of Primary Industries*
Aircraft	Civil Aviation Order 20 21	Civil Aviation Authority	
Air Quality	<ul style="list-style-type: none"> • <i>Environmental Protection Act, 1994</i> • EPP (Air) 	<i>Environmental Code of Practice for Agriculture</i>	Department of Environment**
Environmental Health	<i>Health Act</i>		Department of Health
Feedlots	<i>Stock Act, 1989</i>	<i>Guidelines for the Establishment and Operation of Cattle Feedlots</i>	Department of Primary Industries*
Fire	<i>Qld Fire Services Act, 1990</i>	Qld Fire Service	
Noise	<ul style="list-style-type: none"> • <i>Environmental Protection Act, 1994</i> • EPP (Noise) 	<i>Environmental Code of Practice for Agriculture</i>	<ul style="list-style-type: none"> • Department of Environment** • Local governments
Piggeries		<i>Draft Environmental Code of Practice for Piggeries in Qld</i>	• QPPO, Department of Primary Industries*
Poultry Farms		<i>Guidelines for Poultry Farming in Queensland</i>	Department of Primary Industries*
Water Quality	<ul style="list-style-type: none"> • <i>Environmental Protection Act, 1994</i> • EPP (Water) 	<i>Environmental Code of Practice for Agriculture</i>	<ul style="list-style-type: none"> • Department of Environment** • Local governments
Waterways	<i>Water Resources Act, 1989</i>	<i>Water Quality Council of Queensland Guidelines</i>	<ul style="list-style-type: none"> • Department of Natural Resources*** • Local governments
Work Practices	<i>Workplace Health and Safety Act, 1995</i>	Advisory standards for <ul style="list-style-type: none"> • Storage and Use of Chemicals at Rural • Use of Rural Plant at a Rural Workplace 	Department of Training and Industrial Relations

* Contact local offices of the Department of Primary Industries listed in local telephone directories

** Contact district or regional offices of the Department of Environment listed in local telephone directories

*** Contact district offices of the Department of Natural Resources listed in local telephone directories

APPENDIX 2: Vegetated buffer element design

While buffer areas of 300 m width are recommended for forward planning between residential and agricultural areas, 'vegetated buffers' can offer an alternative to this separation requirement. Research into the behaviour of pesticide spray drift has shown that vegetation screens can prove effective barriers to spray drift where they meet the following criteria:

- are of a minimum total width of 40 m;
- contain random plantings of a variety of tree and shrub species of differing growth habits, at spacings of 4–5 m for a minimum width of 20 m;
- include species with long, thin and rough foliage which facilitates the more efficient capture of spray droplets;
- provide a permeable barrier which allows air to pass through the buffer. A porosity of 0.5 is acceptable (approximately 50% of the screen should be air space);
- foliage is from the base to the crown;
- include species which are fast growing and hardy;
- have a mature tree height 1.5 times the spray release height or target vegetation height, whichever is higher;

- have mature height and width dimensions which do not detrimentally impact upon adjacent cropped land;
- include an area of at least 10 m clear of vegetation or other flammable material to either side of the vegetated area;

Vegetated buffers have other advantages in that they:

- create habitat and corridors for wildlife;
- increase the biological diversity of an area, thus assisting in pest control;
- favourably influence the microclimate;
- are aesthetically pleasing;
- provide opportunities for recreational uses;
- contribute to the reduction of noise and dust impacts.

Applications for development, where vegetated buffers are proposed, should include a landscape plan indicating the extent of the buffer, the location and spacing of proposed and existing trees and shrubs and a list of tree and shrub species to be planted. The application should also contain details concerning proposed ownership of the vegetated buffer and the means by which the buffer is to be maintained. Information on appropriate vegetation species is available in the publication *Trees and Shrubs* or from DNR forestry extension officers.

Based on research by Centre of Pesticide Application and Safety, University of Queensland, Gatton College.

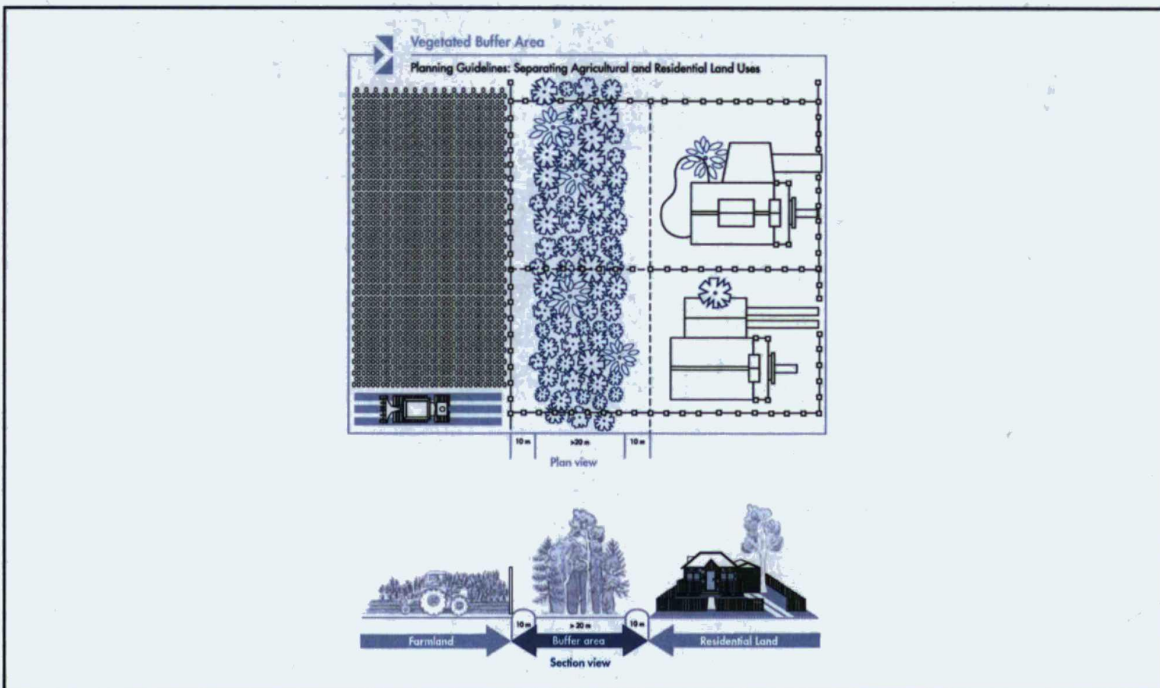
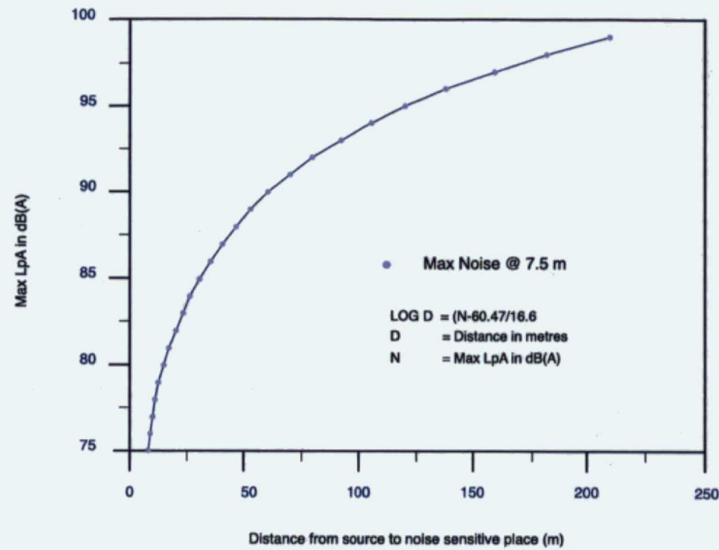


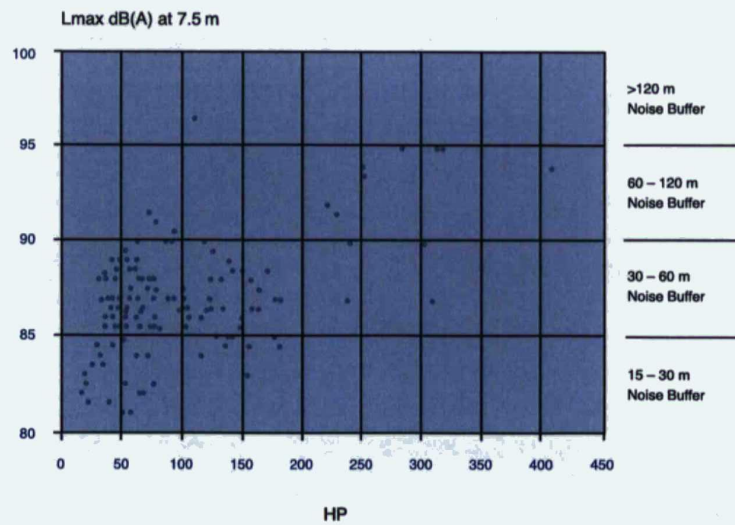
Figure 6. Vegetated buffer element

APPENDIX 3: Noise levels and separation distances

Noise levels and separation distance required to reduce noise levels to 75 dB(A)($L_{Amax,T}$)



Tractor HP and Noise Levels



Source: Leviticus and Morgan (1993)

APPENDIX 4: Examples and formulae for duration thresholds

The following formula and examples demonstrate the duration thresholds of intermittent noise generating activities by crop type. For day-time activities the formula for determining the number of hours of noise from agricultural activities per year is:

$$x = \sum \{(c \times f \times h) \times (\pi \times d^2 / 2)\}$$

where:

x = hours/year when noise exceeds 75 dB(A) ($L_{Amax,T}$)

c = crops per year

f = frequency of activity (a...z) per crop

h = hours of noise per hectare for activity (a...z)

$$d = 10^{[(N-60.47)/16.6]}$$

N = noise measured as ($L_{Amax,T}$) at 7.5 m for activity (a...z)

The results indicate that of all crops tested, tomatoes (25 hrs) and beetroot (15 hrs) have more than 10 hours of day-time activity per year when noise will exceed 75 dB(A) ($L_{Amax,T}$). The other crops conform with the duration threshold for noise which allows for up to 10 hours of day time activity per hectare per year. The separation distance required would be 69 m.

For night-time activities the formula is:

$$y = \sum (c \times f \times n)$$

where:

y = hours/yr when noise exceeds 55 dB(A) ($L_{Amax,T}$)

c = crops per year

f = frequency of night-time activity (a...z) per crop

n = hours of activity per night (prior to 6 a.m.) when noise levels exceed 55dB(A) ($L_{Amax,T}$)

The results indicate that while some crops do not require any night-time activities, beetroot (12 hrs), avocado (28 hrs), potatoes (32 hrs), tomatoes (96 hrs) and lucerne (48 hrs) require nighttime activities which exceed 10 hr/year when noise will exceed 55 dB(A) ($L_{Amax,T}$). The other crops conform with the duration threshold for noise which allow for up to 10 hours of night-time activity per year without the need for a buffer area.

The separation distance required without other amelioration measures would be 500 m for beetroot and lucerne and 1000 m for avocado, potatoes and tomato.

Crop	Crops/yr [c]	Activity	Day /Night	Freq/ crop [f]	Freq/ yr	Hrs/ ha [h]	Hrs/ ha/yr [o]	dB(A) @ 7.5 m [N]	Impact dist.(m) [d]	Impact area (ha) [$\pi \times d^2 / 2$]	Hrs/yr > 75 dB(A) [x]	Hrs/yr > 55 dB(A)
Beetroot	2	plough	D	3	6	1.67	10.00	91.00	69	0.75	7.49	12.00
	2	cultivate	D	3	6	0.50	3.00	87.00	40	0.25	0.74	
	2	plant	D	1	2	1.00	2.00	87.00	40	0.25	0.49	
	2	fertilise	D	2	4	1.00	4.00	87.00	40	0.25	0.99	
	2	spray	N	3	6	0.40	2.40 ^o	87.00	40/500	0.25	0.59	
	2	harvest	D	1	2	3.33	6.67	91.00	69	0.75	4.99	
Total				13	26	7.90	28.07				15.29	12.00

o = hours of operation per hectare per year of odour producing activity

Crop	Crops/yr {c}	Activity	Day /Night	Freq/ crop {f}	Freq/ yr	Hrs/ ha {h}	Hrs/ ha/yr {o}	dB(A) @ 7.5 m {N}	Impact dist.(m) {d}	Impact area (ha) { $\pi \cdot d^2/2$ }	Hrs/yr> 75 dB(A) {x}	Hrs/yr> 55 dB(A)
Sugar cane	0.25	plough	D	1	0.25	1.00	0.25	95.00	120	2.27	0.57	
	0.25	plant	D	1	0.25	1.00	0.25	91.00	69	0.75	0.19	
	1	cultivate	D	4	4	0.25	1.00	91.00	69	0.75	0.75	
	1	fertilise (N)	D	1	1	0.33	0.33	91.00	69	0.75	0.25	
	1	fertilise (P)	D	1	1	1.00	1.00	91.00	69	0.75	0.75	
	1	spray	D	2	2	0.17	0.33 ^o	91.00	69	0.75	0.25	
	1	harvest	D	1	1	1.00	1.00	96.00	138	3.00	3.00	
Total		aerial spray		11	9.5	4.75	4.16				5.76	0.00

Crop	Crops/yr {c}	Activity	Day /Night	Freq/ crop {f}	Freq/ yr	Hrs/ ha {h}	Hrs/ ha/yr {o}	dB(A) @ 7.5 m {N}	Impact dist.(m) {d}	Impact area (ha) { $\pi \cdot d^2/2$ }	Hrs/yr> 75 dB(A) {x}	Hrs/yr> 55 dB(A)
Avocado	1	slashing	D	10	10	0.33	3.33	90.00	60	0.57	1.89	
	1	weed spraying	D	4	4	0.40	1.60	90.00	60	0.57	0.91	
	1	pesticides	N	14	14	0.40	5.60 ^o	90.00	60/1000	0.57	3.18	28.00
	1	harvesting	D	3	3	1.00	3.00	85.00	30	0.14	0.43	
Total				31	31	2.13	13.53				6.41	28.00

Crop	Crops/yr {c}	Activity	Day /Night	Freq/ crop {f}	Freq/ yr	Hrs/ ha {h}	Hrs/ ha/yr {o}	dB(A) @ 7.5 m {N}	Impact dist.(m) {d}	Impact area (ha) { $\pi \cdot d^2/2$ }	Hrs/yr> 75 dB (A) {x}	Hrs/yr> 55 dB(A)
Irrigated	1	chisel plough	D	1	1	1.67	1.67	91.00	69	0.75	1.25	
Cotton	1	rip	D	1	1	1.67	1.67	91.00	69	0.75	1.25	
	1	bed preparation	D	3	3	1.00	3.00	91.00	69	0.75	2.25	
	1	fertiliser	D	1	1	0.42	0.42	87.00	40	0.25	0.10	
	1	plant	D	1	1	1.00	1.00	87.00	40	0.25	0.25	
	1	boom spray	D	7	7	0.40	2.80 ^o	87.00	40	0.25	0.69	
	1	aerial spray	D	8	8	0.10	0.80 ^o	100	1.57	1.26		
	1	picking	D	2	2	1.00	2.00	91.00	69	0.75	1.50	
1	stick pulling	D	1	1	1.00	1.00	91.00	69	0.75	0.75		
Total				25	25	8.26	14.36				9.30	0.00

Crop	Crops/yr (c)	Activity	Day /Night	Freq/ crop (f)	Freq/ yr	Hrs/ ha (h)	Hrs/ ha/yr (e)	dB(A) @ 7.5 m (N)	Impact dist.(m) (d)	Impact area (ha) ($\pi \cdot d^2/2$)	Hrs/yr> 75 dB(A) (x)	Hrs/yr> 55 dB(A)
Dryland	1	chisel plough	D	1	1	1.67	1.67	91.00	69	0.75	1.25	
Cotton	1	cultivation	D	2	2	1.67	3.33	91.00	69	0.75	2.50	
	1	bed preparation	D	2	2	1.00	2.00	91.00	69	0.75	1.50	
	1	fertiliser	D	1	1	0.42	0.42	87.00	40	0.25	0.10	
	1	plant	D	1	1	1.00	1.00	87.00	40	0.25	0.25	
	1	boom spray	D	3	3	0.40	1.20 ^o	87.00	40	0.25	0.30	
	1	aerial spray	D	4	4	0.10	0.40 ^o	100	1.57	0.63		
	1	picking	D	1	1	1.00	1.00	91.00	69	0.75	0.75	
	1	stick pulling	D	1	1	1.00	1.00	91.00	69	0.75	0.75	
Total				16	16	8.26	12.02				8.03	0.00

Crop	Crops/yr (c)	Activity	Day /Night	Freq/ crop (f)	Freq/ yr	Hrs/ ha (h)	Hrs/ ha/yr (e)	dB(A) @ 7.5 m (N)	Impact dist.(m) (d)	Impact area (ha) ($\pi \cdot d^2/2$)	Hrs/yr> 75 dB(A) (x)	Hrs/yr> 55 dB(A)
Wheat	1	chisel plough	D	1	1	1.67	1.67	91.00	69	0.75	1.25	
Sorghum	1	cultivate	D	2	2	0.33	0.67	87.00	40	0.25	0.16	
Maize	1	plant	D	1	1	1.00	1.00	87.00	40	0.25	0.25	
	1	spray	D	1	1	0.40	0.40 ^o	87.00	40	0.25	0.10	
	1	harvest	D	1	1	1.00	1.00	91	69	0.75	0.75	
Total				6	6	4.4	4.74				2.51	0.00

Crop	Crops/yr (c)	Activity	Day /Night	Freq/ crop (f)	Freq/ yr	Hrs/ ha (h)	Hrs/ ha/yr (e)	dB(A) @ 7.5 m (N)	Impact dist.(m) (d)	Impact area (ha) ($\pi \cdot d^2/2$)	Hrs/yr> 75 dB(A) (x)	Hrs/yr> 55 dB(A)
Potatoes	2	plough	D/N	1	2	1.67	3.33	91.00	69/1000	0.75	2.50	4.00
	2	cultivate	D/N	2	4	0.50	2.00	87.00	40/500	0.25	0.49	8.00
	2	plant	D	1	2	2.50	5.00	87.00	40	0.25	1.23	
	2	fertilise	D	2	4	0.50	2.00	87.00	40	0.25	0.49	
	2	spray	D/N	5	10	1.00	10.00 ^o	87.00	40/500	0.25	2.47	20.00
	2	harvest	D	1	2	1.67	3.33	91.00	69	0.75	1.50	
Total				12	24	7.84	25.66				8.68	32.00

Crop	Crops/yr (c)	Activity	Day /Night	Freq/ crop (f)	Freq/ yr	Hrs/ ha (h)	Hrs/ ha/yr (e)	dB(A) @ 7.5 m (N)	Impact dist.(m) (d)	Impact area (ha) ($\pi \cdot d^2/2$)	Hrs/yr> 75 dB(A) (x)	Hrs/yr> 55 dB(A)
Tomatoes	2	plough	D/N	1	2	1.67	3.33	91.00	69/1000	0.75	2.50	4.00
	2	disc/tyne	D	3	6	1.67	10.00	91.00	69	0.75	7.49	
	2	bed forming	D	1	2	2.50	5.00	91.00	69	0.75	3.74	
	2	lay plastic	D	1	2	2.50	5.00	91.00	69	0.75	3.74	
	2	plant	D	1	2	2.50	5.00	91.00	69	0.75		
	2	rip	D/N	1	2	1.67	3.33	91.00	69/1000	0.75	2.50	
	2	rotary hoe	D/N	1	2	0.33	0.67	87.00	40/500	0.25	0.16	
	2	fertilise	D	1	2	0.42	0.83	87.00	40	0.25	0.21	
	2	spray	N	21	42	0.40	16.80 ^o	87.00	40/500	0.25	4.15	
	2	harvest	D	2	4	1.00	4.00	87.00	40	0.25	0.99	
Total				33	66	14.66	53.96				25.48	96.00

Crop	Crops/yr (c)	Activity	Day /Night	Freq/ crop (f)	Freq/ yr	Hrs/ ha (h)	Hrs/ ha/yr (e)	dB(A) @ 7.5 m (N)	Impact dist.(m) (d)	Impact area (ha) ($\pi \cdot d^2/2$)	Hrs/yr> 75 dB(A) (x)	Hrs/yr> 55 dB(A)
Lucerne	0.6	chisel plough	D	1	0.6	1.67	1.00	91.00	69	0.75	0.75	
	0.6	cultivation	D	3	1.8	0.33	0.60	87.00	40	0.25	0.15	
	0.6	plant	D	1	0.6	1.00	0.60	87.00	40	0.25	0.15	
	0.6	fertilise	D	1	0.6	0.42	0.25	87.00	40	0.25	0.06	
	1	spray	D	10	10	0.40	4.00 ^o	87.00	40	0.25	0.99	
	1	cut	N	8	8	1.00	8.00	87.00	40/500	0.25	1.97	16.00
	1	raking	D/N	16	16	1.00	16.00	85.00	30/500	0.14	2.27	32.00
	1	bailing	D	8	8	1.00	8.00	85.00	30	0.14	1.13	
Total				48	45.6	6.82	38.45				7.47	48.00

Crop	Crops/yr (c)	Activity	Day /Night	Freq/ crop (f)	Freq/ yr	Hrs/ ha (h)	Hrs/ ha/yr (e)	dB(A) @ 7.5 m (N)	Impact dist.(m) (d)	Impact area (ha) ($\pi \cdot d^2/2$)	Hrs/yr> 75 dB(A) (x)	Hrs/yr> 55 dB(A)
Peanuts	1	chisel plough	D		2	1.67	3.33	91.00	69	0.75	2.50	
	1	cultivation	D	2	2	0.33	0.67	87.00	40	0.25	0.16	
	1	plant	D	1	1	1.00	1.00	87.00	40	0.25	0.25	
	1	fertilise	D	1	1	0.42	0.42	87.00	40	0.25	0.10	
	1	spray	D	2	2	0.40	0.80 ^o	87.00	40	0.25	0.20	
	1	IR cultivation	D	2	2	0.33	0.67	87.00	40	0.25	0.16	
	1	digging	D	1	1	1.00	1.00	85.00	0	0.14	0.14	
	1	threshing	D	1	1	1.00	1.00	85.00	30	0.14	0.14	
Total				12	12	6.15	8.89				3.65	0.00

APPENDIX 5: Examples of agricultural pesticides and odours

	Chemical	Trade Names	Odour
Organophosphates	azinphos-methyl dichlorvos chlorpyrifos	Gusathion, Azithion, Benthion, Cotnion Mafu, Vapona, Insectigas-D, Chlorban Dursban, Argenstem, Lorsban, Grubkil Deter, Ankil, Chlorfos, Predator, Pyrinex Suscon Blue	sulphurous or garlic-like odour due to 'mercaptans' impurities
	chlorpyrifos-methyl diazinon	Nucidol, Reldan, diazinon, Gesapon Diacap, Pennside, Diazamin, Knox-out Neocid	
	dimethoate	Rogor, Gomite, Roxion, Saboteur Perfekthion, Danadim	
	fenitrothion	Folithion, Sumithion, Synergen F, Tugon Fenitrogard	
	methamidophos	Nitafol, Monitor	
	methidathion mevinphos	Supracide Phosdrin	
	maldison*	Malathion, Hy-Mal, Ulvomal	* low odour formulations marketed at various times
	monocrotophos	Azodrin, Cronofos, Nuvacron	
	parathion (parathion-ethyl) parathion-methyl	Novafos, E-605 Folidol M, Penncap M	
	profenofos**	Curacron, Sabre	** deodoriser added to prepared spray
	phorate	Thimet, Umet	
temephos	Abate, Lypor, Assassin, Tempor		
terbufos	Counter, Hunter		
Phenoxy type (/hormone) herbicides	2,4-D (dimethylamine salt)	Amicide 500, Aminoz, D-500, 500, Shirweed	ammoniacal/phenolic 'fishy'
	dichlorprop	AF-302, Lantana DP-600 Agritox, Thistle, MCPA 500, Killem	
	MCPA, 2,4-D (diethanolamine salt)	Amicide 10-500A, Baton, Zephyr,	'low odour' formulations
Miscellaneous	phosphine	various (e.g. Phostoxin)	rotting fish
	paraquat	Gramoxone, Shirquat	stench agent added to formulation
	endothal	Accelerate, Endothal	ammoniacal odour
	dithianon	Delan	musty
	dithiocarbamates (e.g. mancozeb)	Dithane, Manzate, Dek, Penncozeb	moderately sulfurous/musty
	methomyl	Lannate, Methomex, Marlin, Nudrin	sulfurous
	metribuzin	Lexone, Sencor	sulfurous mercaptan-like odour
	EDB	EDB	chloroform-like odour
chloropicrin	Larvacide	pungent odour	

Source: DPI

Note: This table is not a complete list of available agricultural pesticides

APPENDIX 6: Examples of minimum effective separation distances

This table provides examples of effective minimum separation distance for each of the elements described in Section 3. Design of individual buffer areas must take account of specific conditions and sources of conflict. In these examples it is assumed that a noise buffer will result in a reduction of noise level of 10 dB(A).

Sources of conflict	Minimum effective distance of open ground (metres)	Minimum effective distance with vegetated and noise buffer elements (metres)
1 Agricultural chemical spray Night-time tractor use with mister (90 dB(A) $L_{Amax,T}$) (>10 hrs) Odour (>88hrs/yr) Effective width	300 1000 * 500 1000	40 250 500 *# 500
2 Agricultural chemical spray Night-time tractor use (80 dB (A) $L_{Amax,T}$) (>10hrs) Odour (>88 hrs/yr) Effective width	300 250 500 * 500	40 60 500 *# 500
3 Aerial spray application Agricultural chemical spray Tractors (95 dB(A) $L_{Amax,T}$) (>10hrs) Dust generation Odour (<88 hrs/yr) Effective width	100 300 * 120 150 0 300	100 * 40 30 40 0 100
4 Agricultural chemical spray Tractors (85 dB(A) $L_{Amax,T}$) (>10 hrs) Day time irrigation pump (85 dB(A) $L_{Amax,T}$) (>50 hrs) Dust generation Odour (<88 hrs/yr) Effective width	300 * 30 250 150 0 300	40 10 60 * 40 0 60
5 Agricultural chemical spray Tractors (90 dB(A) $L_{Amax,T}$) (>10 hrs) Dust generation Odour (<88 hrs/yr) Effective width	300 * 60 150 0 300	40 * 50 40 * 0 40
6 Tractors (90 dB(A) $L_{Amax,T}$) (>10 hrs) Dust generation Odour (<88 hrs/yr) Effective width	60 150 * 0 150	15 40 * 0 40

Note * Most limiting factor to determine minimum separation distance
Minimum design distance for odour buffer area may be reduced on consideration of site factors and nature of odour

This table should be read in conjunction with the text of Section 3

- The separation distances in this table are not definitive distances for individual agricultural activities
- Long-term noise sources operating >50 hrs/yr particularly between 10 p.m. and 6 a.m., such as pumps and cooling units, may require acoustic muffling to reduce noise to acceptable levels.

APPENDIX 7: Sample report

NEED FOR AND DESIGN OF A BUFFER AREA BETWEEN RESIDENTIAL AND AGRICULTURAL LAND USES AT SMITHVILLE

INTRODUCTION

Property Description	Lot 111 on RP 23702, Parish of Tropicana Smith Street, Smithville
Site Description	The site consists of 40 ha, and is an undulating area with gentle northerly slopes ranging from 5–10%. The subject land comprises 24 ha of good quality agricultural land which are not to be developed, and 16 ha of rocky poor quality soils in the southern portion of the lot. The farming areas to the north and east of the site are used for mixed tree cropping enterprises of avocados, lychees and pineapples. There is a grazing property to the west of the site, and the Smithville township to the south.
Local Government	Black Stump Shire Council
Proposed development	The proposal involves a part urban expansion on 16 ha of unproductive rural land, with the remaining 24 ha of good quality agricultural land to remain in production.

SUSTAINABLE CROPPING USE OF THE LAND

The subject land has been mapped at a scale of 1:100 000 in the report *Black Stump Horticultural Land Suitability Study* (by Jones, M A), published by the Department of Primary Industries in 1987. The report classifies part of the land as being suitable for most tree and vine crops with minor limitations (Class 2), and part as unsuitable for agriculture (Class 5). Class 2 land has been identified by *Planning Guidelines: The Identification of Good Quality Agricultural Land* (DPI/DHLGP 1993) as Class A, Crop land. This classification is not disputed.

The property has been mapped into two land types. Land type 1 consisting of 24 ha has been classified as a red ferrosol (ASC) or krasnozem (GSG). Land type 2 consists of red and yellow kurosols and tenosols (ASC) or gravelly red and yellow podzolics and lithosols (GSG) (See attached map).

The most intrusive cropping use that the subject land is capable of sustaining consists of tree crops. In Black Stump Shire, the most common crops for this land type are avocados and lychees (the current land use). Table 1 outlines a range of farming activities associated with avocado and lychee production in Black Stump Shire.

The subject land utilises a piped irrigation system, allowing fertiliser application with the irrigation water. Therefore, foliar spraying of fertilisers is unlikely.

The majority of the activities on the subject farm are carried out during the period from October to April. The main activities throughout this period are inter row weed control and grass slashing, and insecticide and fungicide spraying. Machinery will be used in the orchard for approximately 31 events per year.

Stationary pumps on the property will operate for more than 50 hr/year (day and night).

Table 1. Typical farming activities for tree crops

Activity	Expected frequency	Machinery
Inter-row weed and grass slashing	2–10 times per annum depending on canopy size	60 hp tractor and slasher
Weed spraying around tree bases	up to 4 times per annum	60 hp tractor and spray pack
Insect and disease control	up to 14 times per annum depending on the season	60 hp tractor and air blast mister
Picking	1–3 times per annum	utility and/or cherry picker

POTENTIAL FOR CONFLICT

Land use conflict can occur in situations where agricultural activities impact on residential amenity. There is potential for conflict along the interface of the proposed northern and eastern residential boundaries, as the proposed residential land will abut agricultural land where the farming activities listed in Table 1 can be expected.

ELEMENTS LIKELY TO CAUSE CONFLICT

Agricultural chemical spray drift

- Avocado and lychee production entails regular spraying of pesticides (herbicides, insecticides and fungicides) which are recognised to release a moderate to strong odour. This is particularly an issue during summer when the majority of the activities on the subject farm are carried out.
- The off target movement of chemical sprays is unlikely to remain airborne greater than 300 m from the release area. However associated odour may be detectable at greater distances from the source.

Noise

- Noise from airblast misters and tractors utilised in pesticide spraying and general weed and grass control is anticipated to be in the vicinity of 85 dB(A) ($L_{Amax,T}$) when measured 7.5 m from the noise source.
- Day-time activity (between 6 a.m. and 10 p.m. the same day) is likely to occur up to 31 occasions per year. Using the formula as per *Planning Guidelines: Separating Agricultural and Residential Land Uses* (DNR/DLGP 1997), results in less than 7 hours of day-time activity per year for which noise will exceed 75 dB(A). This conforms with the design goals for noise which allows for up to 10 hours of day-time activity per year.
- Night-time activity (i.e. between 10 p.m. and 6 a.m. the next day (as defined by the EP Act)) is likely to occur on this farm up to 14 occasions per year for up to 2 hours at a time (given that spraying is likely to commence at 4 a.m., and that noise from such an activity is likely to exceed 55 dB(A) up to 500 m from the source). This will result in up to 28 hours of night-time activity per farm per year which will exceed 55 dB(A). This fails to conform with the Design Goals for Noise which allow up to 10 hours of night time activity per farm per year.

Dust

- It is considered that due to tree crop production, and the limited amount of bare earth exposed, dust generation will occur only on rare occasions, and should not be considered as a factor contributing to conflict in this situation.

Odour

- It is considered that due to the nature of tree crop production and the regular spraying of agricultural chemicals, that the generation of odour will occur up to 5 6hr/ha/yr Using the formula as per *Planning Guidelines Separating Agricultural and Residential Land Uses* (DNR/DLGP), the time of potential odour impact is 134 hrs/yr This level exceeds the duration threshold for odour and therefore odour is likely to impact upon the proposed residential area
- Prevailing wind direction will carry odour away from the residential area for approximately 50% of time This will reduce the time of odour impact to 67 hrs/yr and below the duration threshold

Sediment and stormwater run-off

- The proposed residential area is of higher elevation than the agricultural land.
- There is also potential for the residential area to impact on the agricultural land through increased runoff and sedimentation, particularly during the construction phase of the development

RECOMMENDED MEASURES TO ADDRESS EACH ELEMENT

Chemical spray drift

- The south easterly prevailing winds on the subject land will assist in directing residual chemical spray away from the residential areas
- The minimum vegetated buffer (40m width) designed to the criteria set out in Appendix 2 of *Planning Guidelines Separating Agricultural and Residential Land Uses* (DNR/DLGP 1997) to reduce conflict in this situation is recommended (See attached plan)
- DNR Forestry Extension Officers have recommended the following species as being suitable to capture spray droplets for this particular site

Casuarina cunninghamiana, river she-oak (outer rows)

Syzygium luehmannii, small-leaved lillipilly (inner rows)

Acmena smithii, lillipilly satinash (inner rows)

Melaleuca bracteata, river tea-tree (inner /outer rows)

Melaleuca leucadendra, white paperbark (inner/outer rows)

Melaleuca quinquenervia, broad-leaved tea-tree (inner/outer rows)

Waterhousia floribunda, weeping satinash (inner rows)

Grevillea baileyana, Findlay's silky oak (inner/outer rows)

Callitris columellaris, coastal cyprus pine (outer rows)

Araucaria cunninghamii, hoop pine (inner/outer rows)

Noise

- The south easterly prevailing winds on the subject land will not be a factor affecting noise levels
- A maximum distance of 500 m of open ground will reduce the night time noise level from tractors and farm machinery to 55 dB(A) which is recognised in *Planning Guidelines. Separating Agricultural and Residential Land Uses* (DNRI/DLGP 1997) as an acceptable design goal for intermittent night-time agricultural activities An appropriately designed noise mound put in place at 50 m from the resource boundary will reduce the overall separation distance required to meet the noise design goals to 120 m It is recommended that the developer provide a pump enclosure to eliminate night-time noise from stationary pumps

Odour

While odour impacts are within the duration threshold, the following will further assist in the reduction of odour impacts

- The south-easterly prevailing winds on the subject land will assist in directing odour from chemical spray away from the residential areas
- Not all the chemicals used or likely to be used on activities possible on this farm contain a strong odour
- The presence of a vegetated buffer element may also assist in reducing the impacts from odour associated with chemical spray

Sediment and Stormwater run-off

- Erosion control measures will be necessary during the construction phase of the residential development, and, should meet the standards set out in *Guidelines for Soil Erosion and Sediment Control for Construction Sites* (IEA/AIAS, 1996)
- Stormwater runoff from all hard surfaces should be designed to ensure that all runoff is drained or piped to Black Stump Township's existing storm water drainage system
- Water spreading devices should be utilised within the buffer area to minimise impacts on the adjacent farmland

IMPLEMENTATION

W Anonymous Consultants recommend the establishment of a 120 m wide buffer area incorporating the buffer elements of a 40 m vegetated buffer and noise mound along the northern and eastern boundaries of the subdivision. In this situation, the buffer area will be provided on private land of single tenure, utilising a series of larger lots along the agricultural land boundary. See attached map.

The proponent has agreed to provide an acoustic enclosure for stationary pumps on the adjacent agricultural property to reduce noise from these sources to acceptable levels. Additionally, it is recommended that council set the following conditions if the proposed development is approved, to take account of the agricultural conflict issues. These conditions must be continuous with all subsequent owners of the affected lots until such time as the buffer area is no longer required.

Conditions on development

1. Building envelopes to be specified on the affected lots to ensure that residences do not encroach into the required buffer area.
2. The buffer area will consist of a 120 m area along the northern and eastern boundaries of the development.
3. A vegetative buffer element of 40 m width within the buffer area, designed according to Appendix 2 of the *Planning Guidelines Separating Agricultural and Residential Land Uses* (DPI/DHLGP, 1997) is to be established by the applicant to the satisfaction of council prior to any building approval within 300 m of the good quality agricultural land, i.e. land type 1.
4. The land owner is to be responsible for on-going maintenance of the vegetative buffer element to ensure that the buffer area complies with the criteria of Appendix 2 of *Planning Guidelines Separating Agricultural and Residential Land Uses* (DNR/DLGP, 1997). This includes
 - replacement of dead or dying vegetation,
 - management for fire protection, including reduction in litter build-up,
 - ensuring access to the 10m maintenance strips either side of vegetation,
 - ensuring that the buffer element does not shade adjacent cropping land for a significant period in the afternoon,
 - control of noxious weeds

5. The vegetated buffer is to be protected by the tree clearing controls applicable to a 'Vegetation Protection Area' which are identified in the Planning Scheme of Black Stump Shire Council.
6. Prior to the sealing of the plan, a noise barrier acceptable to the engineering department of Black Stump Shire Council to be constructed by the applicant within 120 m of the good quality agricultural land ie Land Type 1. The noise mound must be of a height which is at least equal to the direct line of site of the noise source.
7. The land owner is to be responsible for on going maintenance of the noise barrier.
8. An erosion control plan which meets the standards of the Guidelines for Erosion and Sediment Control for Construction Sites is to be submitted by the applicant and complied with throughout the construction phase of the development.
9. Stormwater run-off from all hard surfaces is to be designed to ensure that all runoff is drained or piped to Black Stump township's existing stormwater drainage system.
10. Water spreading devices to be installed within the buffer areas by the applicant. Maintenance of these devices will be the land owner's responsibility.

W. Smith

ANONYMOUS CONSULTANTS LIMITED

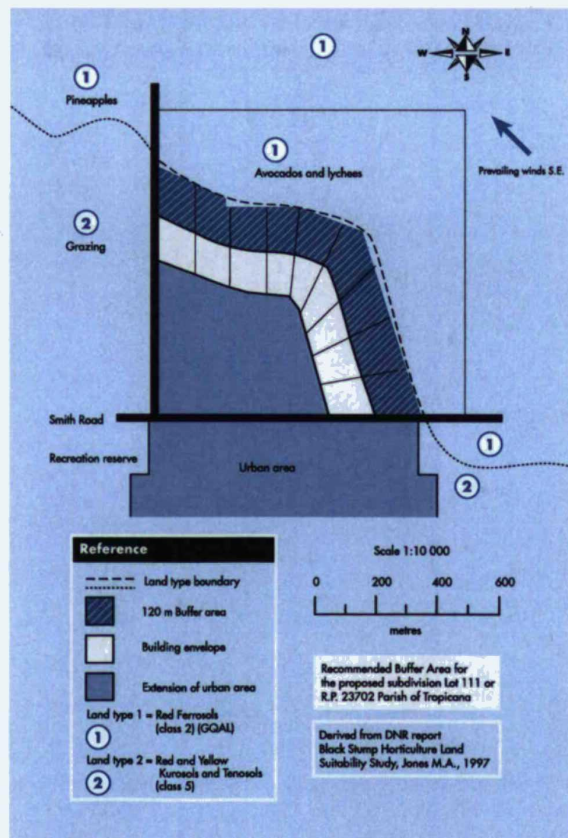
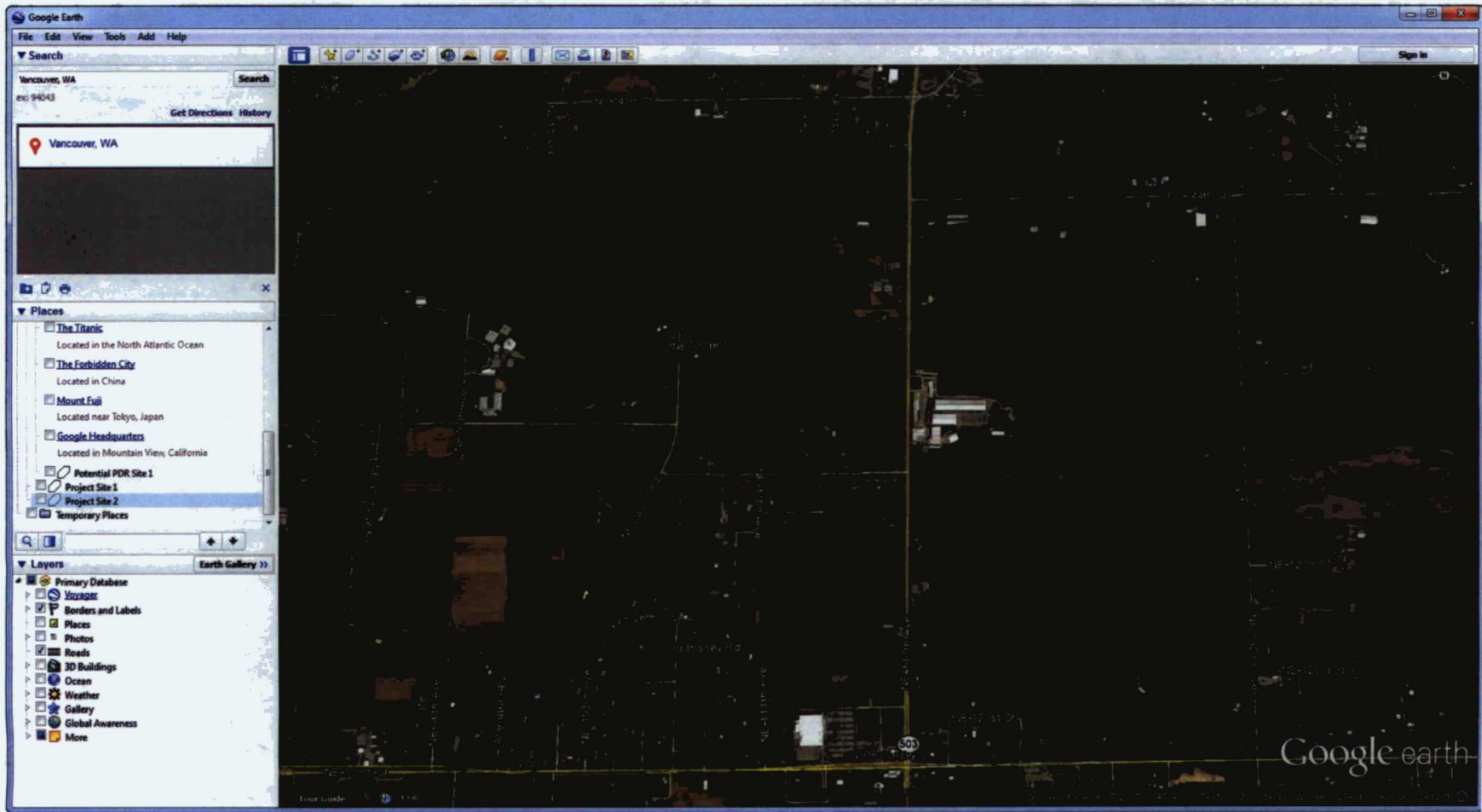
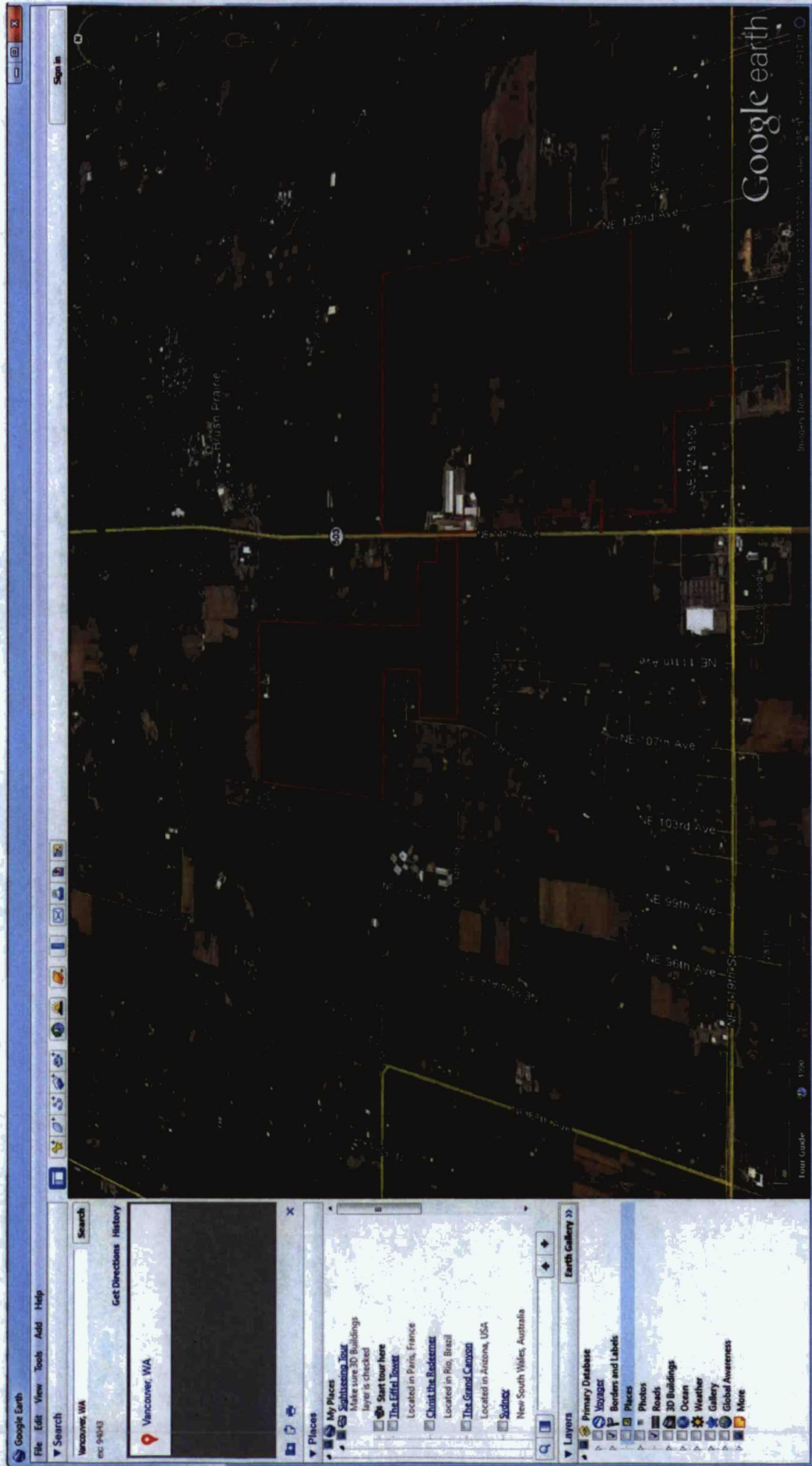
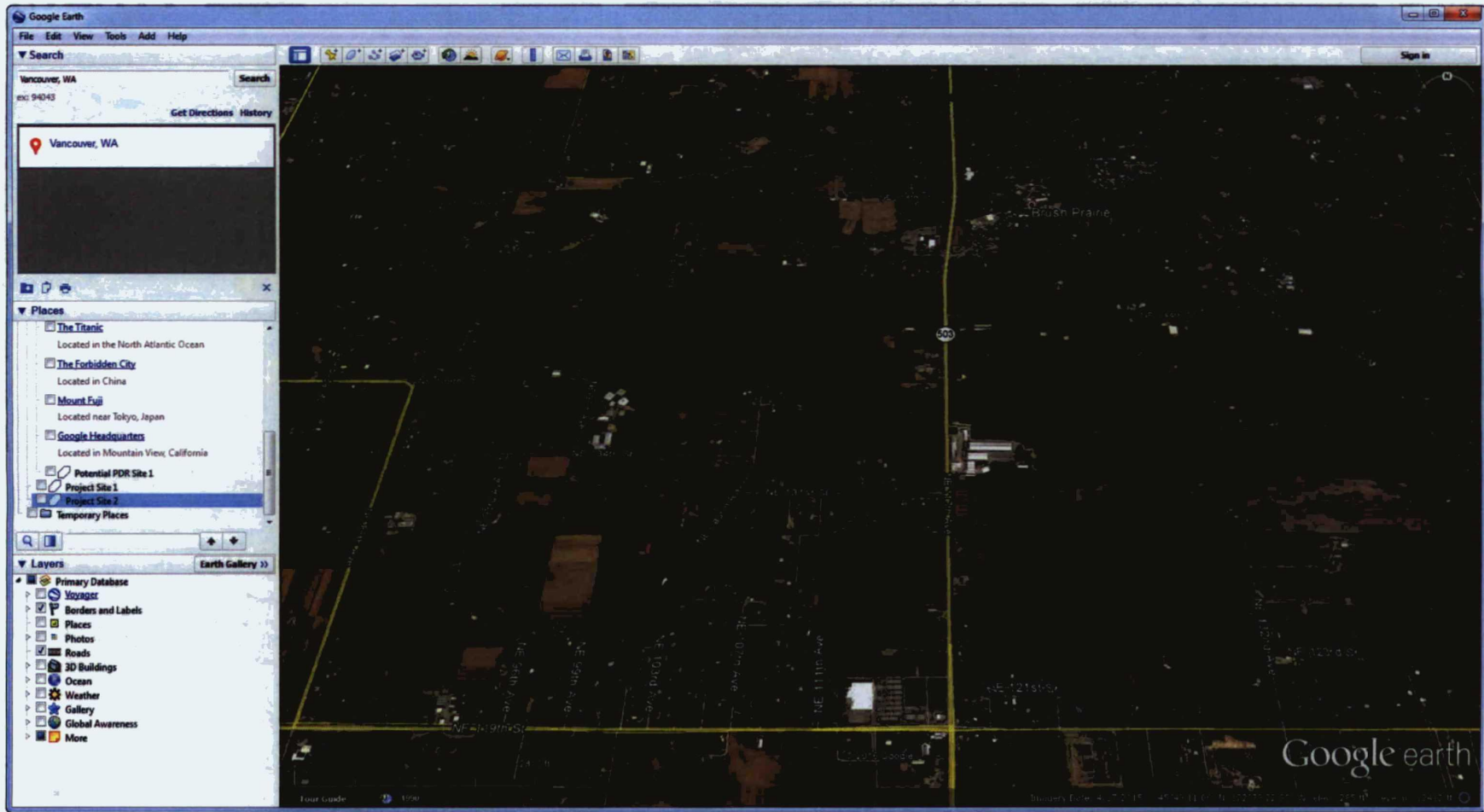


Figure1. Site Plan











Environmental Protection Authority

Guidance for the Assessment of Environmental Factors

(in accordance with the
Environmental Protection
Act 1986)

Separation Distances between Industrial and Sensitive Land Uses

No. 3

June 2005

Western Australia

FOREWORD

The Environmental Protection Authority (EPA) is an independent statutory authority and is the key provider of independent environmental advice to Government.

The EPA's objectives are to protect the environment and to prevent, control and abate pollution and environmental harm. The EPA aims to achieve some of this through the development of environmental protection Guidance Statements for the environmental impact assessment (EIA) of proposals and schemes.

This document is one in a series being issued by the EPA to assist proponents, consultants, responsible authorities and the public generally to gain additional information about the EPA's thinking in relation to aspects of the EIA process. The series provides the basis for the EPA's evaluation of, and advice on, development proposals and schemes subject to the EIA process. The Guidance Statements are one part of assisting proponents and responsible authorities in achieving an environmentally acceptable outcome. Consistent with the notion of continuous environmental improvement and adaptive environmental management, the EPA expects proponents and responsible authorities to take all reasonable and practicable measures to protect the environment and to view the requirements of this guidance as representing the **minimum** necessary process to achieve an appropriate level of environmental protection.

This document provides advice on the use of generic separation distances (buffers) between industrial and sensitive land uses to avoid conflicts between incompatible land uses

This Guidance Statement has the status of "**Final**" which means it has been reviewed by stakeholders and the public. The EPA has signed off the Guidance Statement and published it although it will be updated regularly as new information come to hand.

I am pleased to release this document which now supersedes the draft version.



Walter Cox
CHAIRMAN
ENVIRONMENTAL PROTECTION AUTHORITY

June 2005

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Guidance Statement No. 3

SEPARATION DISTANCES BETWEEN INDUSTRIAL AND SENSITIVE LAND USES

Key Words: buffer, industrial land use, sensitive land use, separation distance

1 PURPOSE

Guidance Statements generally are developed by the EPA to provide advice to proponents, responsible authorities¹, stakeholders and the public, about the minimum requirements for environmental management which the EPA would expect to be met when the Authority considers a proposal or scheme¹ during the EIA process. The generic process for Guidance Statements is set out in Appendix 2.

This Guidance Statement is termed “Final”, and thus the EPA expects that proponents will give full attention to the information provided when they submit proposals for assessment.

This Guidance Statement replaces the draft Guidance Statements “Industrial-Residential Buffer Areas (Separation Distances)” released in July 1997, and “Separation Distances between Industrial and Sensitive Land Uses” released in June 2004. It specifically addresses generic separation distances between industrial and sensitive land uses to avoid conflicts between these land uses. It takes into account protection of the environment as defined by the *Environmental Protection Act 1986* (EP Act) with a focus on protecting sensitive land uses from unacceptable impacts on amenity that may result from industrial activities, emissions and infrastructure.

During the EIA process the EPA principally considers impacts to the physical and/or biological environment. In association with the Department of Health, it also considers health risk assessment from predicted emissions under normal operations. Industrial activities may also lead to increased levels of individual risk of fatality. The EPA currently considers off-site individual risk, as outlined in the EPA Guidance Statement No. 2 *Risk Assessment and Management Off-site*

¹ This term is used in this Guidance Statement in the same way as it is defined in the *Environment Protection Act 1986* (see Section 7 Definitions)

individual risk from Hazardous Industrial Plant, when assessing new hazardous plant. The EPA seeks technical advice regarding off-site individual risk from the Department of Industry and Resources (DoIR), where the proposal relates to petroleum or major hazard facilities under DoIR's statutory regulation. Public risk assessment and management in Western Australia is undergoing review to ensure public safety issues are appropriately addressed by Government. It is expected that this Guidance Statement will need to be updated once the risk review and the legislative amendments to empower the responsible authority(s) has been completed.

Proponents and responsible authorities are encouraged to consider their proposals and schemes in the light of the guidance given. A proponent or responsible authority wishing to deviate from the advice in this Guidance Statement would be expected to put a well-researched, robust and clear justification arguing the need for that deviation

This document provides the generic buffer (separation) distances referred to in the State Industrial Buffer Policy (Government of Western Australia 1997).

2 THE ISSUE

A number of emissions are generated by industrial, commercial and rural activities and infrastructure. These include noise and air emissions (gases, dust and odours). The levels of emissions may at times exceed amenity levels considered acceptable in residential areas and at other sensitive land uses.

In line with the requirements of the EP Act, it is necessary for individual industrial developers to take all reasonable and practicable measures to prevent or minimise emissions from their premises. It is generally expected that, through appropriate site layout, design of facilities, and the implementation of engineering and process controls, emissions from an individual industrial land use can be prevented from causing an adverse environmental impact beyond the boundaries of the particular site or beyond the boundaries of an industrial estate.

Generally, but not always, impacts on the environment decrease with increasing distance from the source of the emission. If the impacts from a particular industry or industrial estate are considered to be unacceptable at the boundary of the site or estate, then there is usually a need for a buffer area to separate industrial land use and sensitive land use.

The determination of the buffer area is necessary in many situations to avoid or minimise the potential for land use conflict. While not replacing the need for best practice approaches to emission management, the use of buffers is a useful tool in achieving an acceptable environmental outcome.

The EPA's preferred hierarchy for the management of industrial emissions is:

- avoidance of impacts;
- minimise the creation and discharge of waste by implementing best practice (see EPA Guidance Statement 55, *Implementing Best Practice in proposals submitted to the Environmental Impact Assessment process*); or
- ensure environmental impacts from industrial emissions are acceptable and meet the relevant regulations and health criteria beyond the boundary of the site, industrial estate or buffer area.

The area that may be adversely affected by industrial emissions will depend on site- and process-specific factors such as the scale of the operation, plant processes and emission controls, storage of raw material and waste, local wind patterns and topography. The possibility of future expansion will also be relevant in the consideration of an appropriate separation distance.

A sound site-specific technical analysis is generally found to provide the most appropriate guide to the separation distance that should be maintained between an industry or industrial estate and sensitive land use.

However, in recognition that a site-specific study may not be necessary in all situations, generic separation distances have been developed. The generic separation distances in Appendix 1 are based on the experience of the Department of Environment (DoE) and other regulatory authorities (e.g. Environmental Protection Authority, Victoria) and limited site-specific quantitative scientific assessment. The table in Appendix 1 includes industries that historically have been associated with amenity impacts from gaseous, dust, noise and odorous emissions, as well as with elevated levels of off-site risk to the public. For some industries, separation distance ranges are specified. For others, generic distances are not applicable and separation distances need to be determined case by case.

This Guidance Statement provides advice on the use of the generic separation distances that have been developed by the DoE for a range of industrial land uses. The use and application of the generic separation distances is explained in more detail in Section 4 of this Guidance Statement.

2.1 Types of industrial land uses

For the purposes of this Guidance Statement, "industrial land use" is used in a general way to encompass a range of industrial, commercial and rural activities, and infrastructure, associated with off-site emissions that may affect adversely the amenity of sensitive land uses.

The term includes:

- general industry;
- light industry;
- service industry;
- some commercial activities, e.g. service stations;
- rural industry and some forms of agriculture;
- rural intensive land use;
- resource processing industry;
- hazardous industry;
- noxious industry;
- extractive industry;
- technology parks;
- freight terminals;
- waste water treatment plants;
- power generation facilities;
- power distribution terminals and substations;
- solid waste disposal sites;
- resource recovery plants; and
- gas and petroleum pipelines.

The table in Appendix 1 includes a variety of land uses that may require consideration of buffers to manage off-site impacts on the environment. However, the list is not definitive. Other land uses where buffers need to be considered include airports and major sporting facilities, e.g. speedway racing, football and soccer. The principles in Section 4.1 apply to these land uses as well as to those listed in Appendix 1.

2.2 Types of industrial emissions

The generic separation distances are based on the consideration of typical emissions that may affect the amenity of nearby sensitive land uses. These include:

- gaseous and particulate emissions;
- noise;
- dust; and
- odour.

The generic separation distances table also identifies a range of industrial land uses associated with higher levels of risk of injury or death from accidents.

2.3 Types of sensitive land uses

Land uses considered to be potentially sensitive to emissions from industry and infrastructure include residential developments², hospitals, hotels, motels, hostels, caravan parks, schools, nursing homes, child care facilities, shopping centres, playgrounds, and some public buildings. Some commercial, institutional and industrial land uses which require high levels of amenity or are sensitive to particular emissions may also be considered “sensitive land uses”. Examples include some retail outlets, offices and training centres, and some types of storage and manufacturing facilities.

3 SCOPE OF THE GUIDANCE

This Guidance Statement is intended to provide advice on generic separation distances between specific industry and sensitive land uses to avoid or minimise the potential for land use conflict. The distances outlined in Appendix 1 are not intended to be absolute separation distances, rather they are a default distance for the purposes of:

- identifying the need for specific separation distance or buffer definition studies; and
- providing general guidance on separation distances in the absence of site-specific technical studies.

The separation distances are intended to be used as a tool, supplemented by other appropriate techniques, to assist in the assessment of:

- new individual industries, infrastructure and estates, in the vicinity of existing/proposed sensitive land uses; and
- new individual sensitive land uses or estates, in the vicinity of existing/proposed industry and infrastructure.

The separation distances are also intended to provide assistance to strategic planning studies and processes.

The separation distances outlined are not intended to replace the need for proponents and relevant authorities to take all reasonable and practicable measures to minimise emissions and off-site impacts.

To ensure an appropriate environmental outcome, the generic separation distances will need to be complemented by other assessment tools and the consideration of the full range of environmental factors.

The reader should be aware that the generic distances do not take into account:

² Residential development in a planning sense can also mean subdivision

- cumulative impacts;
- non-typical emissions;
- the protection of natural resources and significant elements of the natural environment; and
- potential health impacts from emissions.

As part of comprehensive environmental impact management, the EPA expects that these will also be considered and managed as appropriate.

3.1 Relationship of the separation distances to codes of practice and management guidelines

A number of environmental codes of practice and management guidelines issued by State Government agencies provide advice on separation distances between specific industries, other land uses and natural resources. The DoE for example has issued codes of practice on turf farms, piggeries, cattle feedlots, the poultry industry, vineyards and dairies. This Guidance Statement has attempted to incorporate advice relating to separation distances from the various codes and guidelines to provide a comprehensive overview.

Some codes and guidelines may contain more detailed information on buffers that may be relevant to the achievement of an acceptable environmental outcome.

3.2 Relationship of the separation distances to the State Industrial Buffer Policy

The Western Australia Planning Commission has prepared a Statement of Planning Policy entitled *State Industrial Buffer Policy* (Government of Western Australia 1997). This is a statutory policy prepared pursuant to the *Town Planning and Development Act 1928*. The Policy is intended to provide a consistent Statewide approach to the definition and securing of buffers for industry and infrastructure, protect industry and infrastructure from the encroachment of incompatible landuses, provide for the safety and amenity of land uses surrounding industry and infrastructure, and provide for the protection of the interests of both landowners affected by buffers, and industry and infrastructure encroached upon by sensitive land uses.

A role of this Guidance Statement is to complement and assist the implementation of the Western Australian Planning Commission's *State Industrial Buffer Policy*. The Policy makes specific reference to the generic buffer (or separation) distances developed by the DoE. At the time of publication of this Guidance Statement, the table in Appendix 1 lists the Department's and the EPA's generic separation distances.

4 THE GUIDANCE

4.1 The EPA approach to protecting the amenity of sensitive land uses from emissions from industrial land uses

As stated in Section 2, the EPA's preferred hierarchy for the management of industrial emissions is:

- avoidance of impacts;
- minimise the creation and discharge of waste by implementing best practice (see EPA Guidance Statement 55, *Implementing Best Practice in proposals submitted to the Environmental Impact Assessment process*); or
- ensure environmental impacts from industrial emissions are acceptable and meet the relevant regulations and health criteria beyond the boundary of the site, industrial estate or buffer area.

To ensure an appropriate level of environmental protection, the EPA expects that individual industrial developers will take all reasonable and practicable measures to prevent or minimise emissions from their premises. This entails not only compliance with all recognised environmental protection criteria but also the adoption of best practicable measures for prevention or minimisation of adverse environmental impacts.

Wherever practicable, it is expected that adverse environmental impacts should not extend beyond the boundary of a particular industrial site. Where this is not possible, adverse environmental impacts should not extend beyond the boundaries of a buffer area, which should contain only compatible land uses. New sensitive land uses are not appropriate in the buffer.

Where a buffer has been agreed to by the relevant authorities, the EPA expects that effective measures will be applied, generally through the land use planning process, to ensure that only compatible land uses are allowed in the buffer area. The EPA also expects that appropriate management and monitoring of industries and the buffer area will be implemented to ensure that emissions do not exceed acceptable levels at the outer boundary of the buffer.

Generally, protection of sensitive land uses from industrial emissions is assisted by the identification of suitable buffers at the strategic and structure planning stages of the land use planning process, and in the early project formulation stages in the case of individual projects.

A sound site-specific technical analysis will provide the most appropriate guide to the separation distance that should be maintained between a particular industry and sensitive land uses, or between industrial precincts and sensitive land uses, to avoid or minimise land use conflicts.

Where a site-specific study is carried out, it should generally include a technical analysis and report on the nature and level of the possible emissions from the

industry, the site context, predicted impacts, acceptable criteria, and proposed management. Guidance on appropriate technical studies for particular circumstances is available from a range of sources including the DoE, other government agencies and the EPA, in the case of proposals and schemes subject to the EIA process.

A site-specific technical study to determine separation distances is generally expected in the case of a major heavy industrial estate, or a general industrial estate where emissions may result in cumulative impacts.

Where a proposal or scheme subject to the EIA process involves industrial development near sensitive development, the EPA will take into account the likelihood of industrial emissions that may affect the amenity of the sensitive land use, the management measures (including monitoring), and the separation proposed. Where separation is proposed, the EPA will consider the ability to apply effective mechanisms for establishing and enforcing the separation distance or buffer area.

Generally, the EPA expects the potential for land use conflicts to be resolved through the land use planning process, following consideration of adequate technical information and advice from the relevant agencies.

Generic separation distances have been developed by the EPA in recognition that a site-specific study to determine a buffer may not always be necessary, and that generic guidelines are a useful tool at the design and planning stages. The generic separation distances are included in this Guidance Statement in Appendix 1.

4.2 When to use the generic separation distances

The generic separation distances are a tool to assist in the determination of suitable distances between industry and sensitive land uses where industry may have the potential to affect the amenity of a sensitive land use.

The data is helpful in the following instances:

- to identify the need for specific buffer definition studies where:
 - a new industrial land use is proposed near an existing or proposed sensitive land use; or
 - a new sensitive land use is proposed near an existing or proposed industrial land use; and
- to provide general guidance on separation distances in the absence of site-specific technical studies, or, where only an estimation of the area that could be subject to land use conflicts is required.

It is not appropriate to use the generic separation distances where the industry involved is very large, utilises non-typical technology, or in some other way the circumstances are not typical.

Further, the separation distances should be used with caution in strategic and structure planning exercises, and in situations where cumulative impacts may result from the co-location of many industries.

4.3 Risk and the generic separation distances table

For some industries, the table indicates the possibility of risk, in the sense of risk of an accident or incident causing injury or death to the public. This is provided for general information only. The EPA's current approach to risk is to identify whether a proposal for a new hazardous plant meets the EPA's off-site individual risk criteria (EPA 2000). The EPA seeks technical advice from DoIR for proposals under DoIR's statutory responsibility.

4.4 How to use the generic separation distances in Appendix 1

The generic separation distances for a range of industrial land uses are listed in Appendix 1. This section addresses the use of the table in the following instances.

4.4.1 A new industrial land use is proposed near existing or proposed sensitive development, OR sensitive development is proposed near an existing/proposed industry

Where the separation between the industrial and sensitive land uses is **greater** than the generic distance, there will not usually be a need to carry out site-specific technical analyses to determine the likely area of amenity impacts due to emissions from the industry. The need for technical analyses is likely to be limited to such instances as major industrial developments, industries using new or non-typical processing techniques, or areas subject to cumulative impacts.

Where the separation distance is **less** than the generic distance, a scientific study based on site- and industry-specific information must be presented to demonstrate that a lesser distance will not result in unacceptable impacts.

If the distance from the industrial land use to the sensitive land use is less than the recommended separation distance, and it cannot be demonstrated that unacceptable environmental impacts are likely to be avoided, then other options should generally be pursued.

These may include:

- modifying the project to reduce emissions via engineering controls such as process design, process enclosure or other means; and
- pursuing land use planning and management controls (e.g. land acquisition, rezoning) to reduce environmental impacts to acceptable levels.

For proposals and schemes subject to the EIA process, where it cannot be demonstrated that there will be acceptable emission levels at present and future residences and other sensitive premises, the EPA is likely to recommend that the proposal or scheme is not environmentally acceptable.

If a referral is made to the EPA, information that will assist the EPA to set an appropriate level of assessment includes information on the location of existing industrial and sensitive premises, land zoning and scheme provisions, the results of any site-specific studies and consultation, and the proposed planning and environmental management measures.

4.4.2 General guidance is required on separation distances in the absence of site-specific technical studies, OR an estimation of the area that could be subject to land use conflicts is required

In most cases, land use conflicts resulting from industrial emissions are not expected where the generic separation distances are maintained. Further investigations should be carried out, however, in non-typical situations, and where cumulative impacts may occur.

Where a separation under consideration is less than in the table, it is recommended that a new project does not proceed in the absence of site-specific investigations and a report demonstrating that the separation distance will meet acceptability criteria and that enforceable management techniques will be applied to ensure an appropriate environmental outcome.

5 APPLICATION

5.1 Area

This Guidance Statement applies to all proposals and schemes subject to the EIA process throughout the State of Western Australia.

5.2 Duration and Review

The duration of this Guidance Statement is for five years unless some unforeseen circumstances require it to be revised earlier.

6 RESPONSIBILITIES

6.1 EPA responsibilities

The EPA will apply this Guidance Statement to proposals and schemes that are subject to the EIA process under Part IV of the EP Act.

6.2 DoE responsibilities

The DoE will assist the EPA in applying this Guidance Statement to the EIA of proposals and schemes, and in conducting its functions under Part V of the EP Act.

6.3 Proponent and responsible authority responsibilities

Where proponents and responsible authorities demonstrate to the EPA that the requirements of this Guidance Statement are incorporated into proposals and schemes in a manner which ensures that they are enforced and audited, the assessment of such proposals and schemes is likely to be assisted.

7 DEFINITIONS

In this Guidance, the terms listed have the following definitions.

Amenity – factors which combine to form the character of an area and include the present and likely future amenity. For the purpose of this Guidance Statement, consideration of loss of amenity is limited to unreasonable impact on a person from gaseous, dust, noise and odorous emissions and risk.

Buffer – all the land between the boundary of the area that may potentially be used by an industrial land use, and the boundary of the area within which unacceptable adverse impacts due to industrial emissions on the amenity of sensitive land use are possible. This may be represented by the separation distance.

Emission – discharge of waste, emission of noise, odour or electromagnetic radiation or transmission of electromagnetic radiation.

Industrial land use, industry – a general term used in this Guidance Statement to encompass a range of industrial, commercial and rural land uses and infrastructure associated with emissions that may affect the amenity of sensitive land uses

Residential development – any permanent structure whose primary use is as a dwelling place.

Responsible authority – as defined in the *Environmental Protection Act 1986*, and

generally, the authority responsible for:

- a town planning scheme, a regional planning scheme, a redevelopment scheme, or an amendment to any of the above;
- a statement of planning policy, or amendment to such a statement; or
- a subdivision or strata plan.

Scheme – as defined in the *Environmental Protection Act 1986*, and generally:

- a town planning scheme, a regional planning scheme, a redevelopment scheme, or an amendment to any of the above; or
- a statement of planning policy or an amendment to such a statement.

Sensitive land use – land use sensitive to emissions from industry and infrastructure. Sensitive land uses include residential development, hospitals, hotels, motels, hostels, caravan parks, schools, nursing homes, child care facilities, shopping centres, playgrounds and some public buildings. Some commercial, institutional and industrial land uses which require high levels of amenity or are sensitive to particular emissions may also be considered “sensitive land uses”. Examples include some retail outlets, offices and training centres, and some types of storage and manufacturing.

Separation distance – the shortest distance between the boundary of the area that may potentially be used by an industrial land use, and the boundary of the area that may be used by a sensitive land use.

8 REFERENCES

Environmental Protection Authority 1997 *Industrial-Residential Buffer Areas (Separation Distances)* Draft Guidance No. 3, Environmental Protection Authority, Perth Western Australia

Environmental Protection Authority 2000 *Guidance for Risk Assessment and Management. Offsite individual risk from Hazardous Industrial Plant* Guidance No. 2, Environmental Protection Authority, Perth Western Australia

Environmental Protection Authority 2004 *Separation Distances between Industrial and Sensitive Land Uses* Draft Guidance No. 3, Environmental Protection Authority, Perth Western Australia

Western Australian Planning Commission 1997 *State Industrial Buffer Policy Statement of Planning Policy No 4* Government of Western Australia, Perth Western Australia

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Appendix 1: Separation Distances between Industrial and Sensitive Land Uses

Note:

These generic guidelines do not take into account

- cumulative impacts,
- non-typical emissions,
- the protection of natural resources and significant elements of the natural environment, and
- potential health impacts from emissions

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Abattoir	killing of animals for human consumption or pet food – no rendering	√ (15) (Reg 1)	DAWA, WRC, local gov't	CoP - Aug 1996 Regs in Sept 1996		√	√	√		500-1000, depending on size
Abrasive blasting operations	metal or other material is cleaned or abraded by blasting with any abrasive material	√ (Reg 5)	local gov't	CoP - 1993 Regs in Sept 1996		√	√			case by case
Aluminium production	using electrolytic fusion technique	√ (44)	DoIR		√	√	√		√	1500-2000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Ammonia importation	unloading ammonia from ships and storage		DoIR, DPI		√ NH ₃				√	case by case
Ammonium nitrate import/export	transfer of chemical from ship to land-based transport and vice versa	√ (58, 86)	DoIR, DPI						√	case by case
Ammunition production	includes explosives and fireworks		DoIR						√	1000
Animal feed manufacturing	manufacture of animal feed from grain and other food products	√ (23)	DAWA, local gov't			√	√	√		500
Animal feedlot	intensive rearing of cattle (in rural zone, away from towns)	√ (1, 68)	DAWA, WRC, local gov't	Cattle Feedlots Guidelines - 2002		√	√	√		1000-2000, depending on size
Animal feedlot	other intensive rearing, e.g. sheep (in rural zone, away from towns)	√	DAWA, WRC, local gov't			√	√	√		1000-2000, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Aquaculture – ponds or tanks & natural waters included	propagation or rearing of aquatic fauna, with supplementary feeding	√ (3, 4)	Fisheries, WRC, local gov't	Fisheries, & WRC guidelines		√		√		100-300, depending on size
Asphalt works	asphalt is mixed and prepared	√ (35)	local gov't	CoP - 1991		√	√	√		1000
Automotive spray painting	liquid paint is directed onto automotive surfaces by airless, compression, electrostatic or other methods		local gov't	CoP - Oct 1997		√	√	√		200
Bakeries	day-time operations		local gov't			√		√		100-200, depending on size
	large night-time operations		local gov't			√		√		500
Bauxite refining	premises on which alumina is produced	√ (46)	DoIR			√	√	√		case by case

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Beverage manufacturing – alcoholic	alcoholic beverages are manufactured – brewery, distillery or winery	√ (25)	WRC		√	√	√	√		200-500, depending on size & type of product
– non-alcoholic	non-alcoholic beverages are manufactured, processed or packaged	√ (24)	WRC			√	√	√		200-500, depending on size
Boat building and maintenance – vessels are built,	organotin compounds are not used or removed from vessels	√ (82)	DPI, local gov't		√	√	√	√		200-500, depending on size
maintained or refurbished	organotin compounds are used or removed from vessels	√ (49)	DPI, local gov't		√	√	√	√		500-1000, depending on size
Briquettes manufacture	compressed coal-dust or wood-dust production		local gov't			√	√	√		300-500, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Bulk material loading or unloading	clinker, coal, ore, ore concentrate or any other bulk granular material is loaded/unloaded from vessels	√ (58, 86)	DoIR, DPI			√	√		√	1000-2000
Calcium-based compounds production, other than lime	calcium compounds are produced, mixed, blended or packaged (see cement works for lime manufacture)	√ (31, 33, 72, 74, 75)	DoIR, WRC		√	√	√	√	√	500-1000, depending on size & type of product
Carbon stripping	reprocessing of carbon granules (gold extraction)	√ (79)	local gov't		√ acid fume			√		200-300
Carpet backing	process using latex		local gov't		√	√		√		500
Cattery zones	in urban areas		local gov't			√		√		200
Cement product manufacturing works	concrete or cement is mixed, prepared or treated – up to 5000 tonnes per year	√ (77)	DoIR, WRC, local gov't	√		√	√			300-500, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
	concrete or cement is mixed, prepared or treated – from 5000 to 150 000 tonnes per year	√ (77)	DoIR, WRC, local gov't	√		√	√			500-1000, depending on size
	concrete or cement is mixed, prepared or treated – greater than 150 000 tonnes per year	√ (77)	DoIR, WRC	√		√	√			1000-1500, depending on size
Cement or lime manufacturing works – use of furnace or kiln	Production of cement clinker or lime or cement or similar is ground or milled	√ (43)	DoIR, WRC, local gov't		√	√	√	√		1000-2000, depending on size
Ceramic goods manufacturing	premises on which ceramic kitchen or table ware or other non-refractory ceramic products are made	√ (76)	DoIR, WRC, local gov't		√	√	√	√		300-500, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Charcoal production	wood, carbon material or coal is charred to produce a fuel or material of enriched carbon content	√ (37)	DoIR, local gov't		√	√	√		√	1000
Chemical blending or mixing	chemicals or chemical products are blended, mixed or packaged	√ (33, 74, 75)	DoIR, WRC, local gov't	draft - on hold	√	√	√	√	√	300-500, depending on size & type of chemicals involved
Chemical fertilizers	manufacture of artificial fertilizers	√ (31, 72)	DoIR, WRC, Water Corp		√ HF, NH ₃ , SO ₂	√	√	√	√	1000-2000, depending on size
Chemical manufacturing	chemical products are manufactured by a chemical process	√ (31, 72)	DoIR, WRC, Water Corp		√	√	√	√	√	300-1000, depending on size & type of chemicals involved
	inorganic industrial chemical manufacture (other than listed elsewhere)	√ (31, 72)	DoIR, WRC, local gov't		√	√	√	√		300-1000, depending on size & type of chemicals involved

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
	organic industrial chemical manufacture (other than listed elsewhere)	√ (31, 72)	DoIR, WRC, local gov't		√	√	√	√	√	500-1500, depending on size & type of chemicals involved
Chemicals – non-industrial	production – other than listed elsewhere		WRC, Water Corp			√	√			300-1000, depending on size & type of chemicals involved
Chemical or oil recycling	waste liquid hydrocarbons or chemicals are refined, purified, reformed, separated or processed	√ (39)	DoIR, WRC, Water Corp		√ VOCs			√	√	500-1000, depending on size
Chemicals storage – minor	non-bulk storage of chemicals	√	WRC, Water Corp	draft in preparation	√			√	√	200-300
– bulk/major	bulk storage of acids, alkalis or chemicals	√ (73)	DoIR, WRC, Water Corp		√				√	500-1000, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Chlor-alkali works	manufacture of caustic soda and chlorine	√ (31, 72)	DoIR, WRC		√ Cl ₂	√		√	√	2000-3000
Clay bricks or ceramic/refractory products works	premises on which fired-clay bricks, tiles, pipes or pottery are manufactured	√ (41)	DoIR, DAWA, WRC		√ HF, HCl, SO ₂	√	√	√		300-1000, depending on size
Clay extraction or processing	Mining, extraction or processing of clay	√ (80)	DoIR, WRC			√	√			500-1000, depending on size & processing
Coal mine	extraction of coal – open cut method	√ (9)	DoIR, WRC			√	√			1000-2000
Coke production	coke is produced, quenched, cut, crushed and graded	√ (38)	DoIR, WRC		√	√	√	√	√	1000-2000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Composting facility	outdoor uncovered, regularly turned windrows	√ (67A)	WRC, local gov't	draft Organic Wastes Guidelines - Dec 1997		√	√	√		1000 for manures, mixed food/putrescible & vegetative food waste, 500 for biosolids & 150 for green waste
	outdoor covered, turned windrows	√ (67A)	WRC, local gov't	draft Organic Wastes Guidelines - Dec 1997		√	√	√		750 for manures, mixed food/putrescible & vegetative food waste, 250 for biosolids & 150 for green waste
	outdoor covered windrows with continuous aeration	√ (67A)	WRC, local gov't	draft Organic Wastes Guidelines - Dec 1997		√	√	√		500 for manures, mixed food/putrescible & vegetative food waste, 250 for biosolids & 150 for green waste

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
	enclosed windrows with odour control	√ (67A)	WRC, local gov't	draft Organic Wastes Guidelines - Dec 1997		√	√	√		250 for manures, mixed food/putrescible & vegetative food waste, 150 for biosolids
	in-vessel composting with odour control	√ (67A)	WRC, local gov't	draft Organic Wastes Guidelines - Dec 1997		√	√	√		150 for manures, mixed food/putrescible & vegetative food waste, 150 for biosolids
Concrete batching plant or cement products (bricks) manufacture	concrete is made (batched) and loaded for transport or cement products are made	√ (77)	local gov't	CoP - 1991 Regs 1998		√	√			300-500, depending on size
Cosmetics production	manufacture of cosmetics and toiletries		local gov't			√		√		100
Crematoria			local gov't		√	√			√	200-300

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Crude oil extraction	oil or gas production from wells	√ (10)	DoIR		√	√		√	√	case by case
Crushing of building material	crushing or cleaning of waste building or demolition material	√ (13)	local gov't			√	√			1000
Dairies	milking shed operations		DAWA, WRC, local gov't	CoP - March 1998		√	√	√		500
Dog kennels	in rural zones		local gov't			√		√		500
	in or near urban areas		local gov't			√		√		1000
Dry-cleaners	dry-cleaning operations		local gov't			√		√		100
Edible oil or fat processing (vegetable oil production)	vegetable oil, oil seed or animal fat is processed – includes seed crushing and use of solvents to refine oils	√ (19)	WRC, Water Corp, local gov't			√	√	√		500

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Electric power generation	generating electricity – 20 megawatts or more (total) for natural gas & 10 megawatts or more (total) for other fuels	√ (52)	DoIR, WRC		√ NO _x , SO _x	√	√			3000-5000, depending on location & size
	natural gas-fuelled electricity production – more than 10, but less than 20, megawatts total	√ (84)	DoIR, WRC		√ NO _x	√				2000-3000
Extractive industries – hard rock, Darling Scarp	quarrying (including blasting), crushing and screening	√ (5, 12, 70)	DoIR, WRC	CoP - 1990, revised in 1995		√	√		√	1000
– not hard rock	blasting, grinding and milling works – material processed by grinding, milling or separated by sieving, aeration etc	√ (5, 12, 70)	DoIR, WRC	CoP - 1990, revised in 1995		√	√		√	case by case

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
- no blasting conducted	grinding and milling works – material processed by grinding, milling or separated by sieving, aeration etc	√ (5, 12, 70)	DoIR, WRC	CoP - 1990, revised in 1995		√	√			case by case
- sand and limestone extraction	no grinding or milling works		WRC, local gov't			√	√			300-500, depending on size
Fellmongering	animal skins or hides are dried, cured or stored	√ (83)	WRC, Water Corp, local gov't			√		√		500
Fibreglass reinforced plastic manufacturing	using Low Styrene Emission (LSE) resins	√ (Reg 3)	DoIR, local gov't	CoP - 1993 Regs in Sept 1996			√	√		200
	using non-LSE resins	√ (Reg 3)	DoIR, local gov't	CoP - 1993 Regs in Sept 1996			√	√		500
Flour mill	grain or seed milling premises		local gov't			√	√			300-500, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Fly ash disposal	premises on which fly ash is disposed	√ (53)	WRC, local gov't				√			case by case
Foam products manufacturing	resin is used to prepare or manufacture plastic foam or foam products using MDI or TDI	√ (51)	DoIR, local gov't		√			√	√	500
Food processing	fruit, vegetables or meat is cooked, dried, preserved, bottled, canned or processed	√ (18)	WRC, Water Corp, local gov't			√	√	√		200-500 for fruit & vegetables, 500 for meat
Food or beverage products	manufacture of food and beverage products not categorised	√ (18, 24, 25)	WRC, local gov't			√		√		100-300, depending on size & type of product
Formaldehyde	Formaldehyde production	√ (31)	DoIR, local gov't		√	√		√	√	500
Foundries – metal melting or casting	ferrous metals (alloys)	√ (45)	DoIR, local gov't	CoP - 1992		√	√	√		300-500, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
	non-ferrous, aluminium	√ (45)	DoIR, local gov't	CoP - 1992		√	√	√		300-500, depending on size
	non-ferrous, other than aluminium	√ (45)	DoIR, local gov't	CoP - 1992	√ fume	√	√	√	√	500-1000, depending on metal & size
Fuel burning	any boiler(s) capable of consuming 500 kg or more per hour of combustible material, either alone or aggregate, for the supply of steam or in power generation equipment	√ (67, 87)	DoIR, WRC		√ NO _x , SO _x	√	√	√	√	200-500, depending on type of fuel used & size
Fuel importation	fuel unloading from ships, storage and despatching		DoIR, DPI						√	1000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Fuel storage – crude oil and petroleum products in tanks or vessels exceeding 2000 tonnes capacity	Fixed Rooves	√ (73)	DoIR	draft in house				√	√	300-500, depending on type of fuel stored & size
	Floating Rooves	√ (73)	DoIR	draft in house				√	√	200-1000, depending on fuel stored & size
Gas distribution	works to supply mains		AInta Gas					√	√	300
Gasworks	premises on which coal, coke and oil (mixtures or derivatives of) are processed to produce combustible gas	√ (11, 34)	DoIR		√	√	√	√	√	1000-2000, depending on raw materials used, odourising process used & size
Glass or glass fibre works	premises on which glass or glass fibre is produced	√ (40)	DoIR, local gov't		√	√	√			500

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Gold ore	grinding and milling works – rocks ore etc processed by grinding, milling or separated by sieving, aeration etc	√ (5, 12, 70)	DoIR, WRC			√	√			1000-2000, depending on location, process used & size
Gold roaster	gold extraction from sulphide ores	√ (44)	DoIR		√ SO ₂	√	√	√		5000
Grain cleaning (no milling)	premises on which grain or seed is cleaned, graded, sorted or processed		local gov't			√	√	√		300-500, depending on size
Grain elevator	grain transfer using conveyor belts etc		local gov't			√	√		√	500
Greenhouse/ hothouse	using manure		local gov't			√		√		200-300
	using compost		local gov't			√		√		200-300
Hay processing plant	hay processing, handling or storage premises		local gov't			√	√	√	√	500-1000, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Heavy industrial site	proposals for "greenfield" sites	√ various	√ various		√	√	√	√	√	case by case
Horse stables	keeping horses		local gov't	draft in preparation		√	√	√		100-500, depending on size
Incineration	for biomedical, chemical or organic waste	√ (59, 60)	local gov't		√	√	√	√	√	500-1000, depending on size
	for plastic or rubber waste	√ (60)	local gov't		√	√	√	√		1000
	for waste wood	√ (60)	local gov't			√	√	√		300
Industrial gases	production, processing, refining or storage of industrial gases	√ (31, 72)	DoIR, local gov't		√	√		√	√	500-1000, depending on size & type of gases
	commercial/retail outlets		local gov't		√	√			√	50
Iron ore smelting	production of iron from iron ore	√ (44)	DoIR		√	√	√	√		1000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Joinery & wood working premises	production of wooden furniture & household items such as doors, kitchen fittings, flooring & mouldings		local gov't	CoP - 1995, being revised		√	√	√		100-300, depending on size
Liquid Petroleum (LP) gas retailing – above ground tanks	LP gas storage & handling at automotive retail outlets – up to 8000L tank – 8000L to 16 000L tank		DoIR, local gov't	AS 1596 Supplement No 1 - 1994				√	√	55 for sensitive uses & up to 8000L tank, 85 for sensitive uses & from 8000L to 16 000L 15 for residential uses
– underground tanks	LP gas storage & handling at automotive retail outlets – up to 65 000L tank		DoIR, local gov't	AS 1596 Supplement No 1 - 1994				√	√	55 for sensitive uses & 15 for residential uses
Livestock saleyard or holding pen	holding of live animals pending sale, shipment or slaughter	√ (55)	DAWA, WRC, local gov't			√	√	√		at least 1000, depending on size
Malt-works	malt production from grain		local gov't			√	√	√		500

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Market gardens	broad-scale operations		WRC, local gov't	draft in house	√	√	√	√		300-500, depending on size
Metal coating	metal products are powder-coated or enamelled	√ (81)	local gov't	Powder coating - July 1994 Regs 1998		√	√	√		200
Metal coating – industrial spray-painting	site on which spray-painting is conducted inside a spray booth	√ (81)	local gov't	CoP - Sept 1995 Regs 1998		√	√	√		200
	work is conducted in the open (no spray booth)	√ (81)	local gov't	CoP - Sept 1995 Regs 1998		√	√	√		500
Metal fabrication	sheet metal, structural metal and iron and steel products – up to 50 000 tonnes per year		DoIR, local gov't			√	√			500-1000, depending on size
Metal finishing	galvanizing	√ (48A)	DoIR, WRC, local gov't		√ acid fume	√	√	√		500

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
	other than galvanizing	√ (48)	DoIR, WRC, local gov't		√ acid fume	√	√	√		200
Metal leaching – vat or <i>in situ</i>	metal extraction from ore with a chemical solution	√ (7)	DoIR, WRC			√	√	√		500
Metal smelting, refining, melting, casting, fusing, roasting or processing works	where metal, metal ores, concentrates or wastes are treated to produce metal (other than iron & aluminium) <ul style="list-style-type: none"> • up to 100 tonnes per year • between 100 & 1000 tonnes per year • greater than 1000 tonnes per year 	√ (45) √ (44)	DoIR, local gov't		√	√	√	√		100-200 300-500 case by case, depending on process

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Milk processing	milk is separated, evaporated or a dairy product is manufactured	√ (17)	WRC, local gov't			√		√		200-500, depending on size, wastewater treatment & disposal system
Mine dewatering, tailings or residue disposal	water extracted and discharged to allow mining of ore, or mining or processing of ore occurs and tailings or residue are discharged into a dam	√ (6)	DoIR, WRC			√	√			case by case
Mineral sands – dry processing only	grinding and milling works – material processed by grinding, milling or separated by sieving, aeration etc	√ (8)	DoIR		√ H ₂ S	√	√	√		1000-2000
– secondary treatment plant	treatment of primary concentrate from mine – zircon, rutile/leucoxene and ilmenite	√ (8)	DoIR, WRC			√	√	√		1000-2000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
- synthetic rutile plant	mining of mineral sands and processing to produce concentrate	√ (8)	DoIR, WRC		√ H2S SO2	√	√	√		3000-5000
Mineral wool or ceramic fibre	manufacture of mineral wool or ceramic fibre	√ (42)	DoIR, WRC		√	√	√	√		500
Motor body works	including panel beaters		local gov't	CoP - Oct 1997		√	√	√		200
Mushroom farm	using on-site blended soils or compost	√ (67A)	WRC, local gov't			√		√		500-1000, depending on size
Nurseries	no composting		local gov't			√				100
Oil or gas extraction from land or offshore	production from wells involving primary separation or treatment	√ (10)	DoIR, DPI		√	√		√	√	2000
Oil or gas production (other)	production of oil or gas, including gas reforming	√ (11)	DoIR		√	√		√	√	2000
Oil or gas refineries	crude oil or condensate is refined or processed	√ (34)	DoIR		√	√		√	√	2000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Open cut mining (large operations)	other than coal	√ (5, 6, 12, 70)	√ various	√		√	√		√	1500-3000
Orchards	broad-scale operations		DAWA, local gov't		√	√				500
Paints and inks	blending and mixing	√ (33, 74)	WRC, Water Corp		√ VOCs	√		√		200 for water-based, 300 for solvent-based
	manufacturing	√ (31, 72)	DoIR, WRC, Water Corp		√ VOCs	√		√	√	500 for water-based, 1000 for solvent-based
Pesticides manufacturing	herbicide, insecticide or pesticide manufacture by a chemical process	√ (32)	DoIR, WRC, Water Corp		√	√	√	√	√	300-1000, depending on size
Pharmaceuticals	Production – including veterinary products	√ (31, 72)	WRC, Water Corp			√		√	√	300-1000, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Piggery – intensive, – 5000 pigs or more – 500 to 5000 pigs – 50 to 500 pigs – less than 50 pigs	premises on which pigs are fed, watered and housed in indoor pens	√ (2, 69)	DAWA, WRC, local gov't	DAWA Guidelines for New & Existing Piggeries - May 2000		√		√		5000 for piggeries with more than 5000 pigs, 3500 for piggeries with 500 to 5000 pigs, 2000 for piggeries with 50 to 500 pigs, and 500 for piggeries with less than 50 pigs
Piggery – extensive (all premises)	premises on which pigs are fed, watered and housed in outside paddocks or enclosures		DAWA, WRC, local gov't	DAWA Guidelines May 2000			√	√		1000 for all extensive piggeries
Plaster manufacturing	plaster, plasterboard, gyprock or other products comprised wholly or mostly of gypsum are made	√ (78)	local gov't			√	√		√	200

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Ports	bulk material that is loaded or unloaded onto a vessel		local gov't			√	√		√	case by case
Poultry industry	intensive farming		DAWA, WRC, local gov't	CoP - 1999		√	√	√		300-1000, depending on size
Pulp, paper or paperboard manufacturing	manufacture of paper pulp, wood pulp, kraft paper, kraft paperboard, cardboard paper or paperboard	√ (30)	DoIR, WRC, Water Corp		√ H ₂ S, SO ₂	√	√	√		1000-1500, depending on process used, wastewater treatment system & size
Quicklime plant	clay, limesand or limestone material fired in a furnace or kiln to produce quicklime	√ (43)	DoIR, local gov't		√	√	√			500 for no quarrying on the premises, 1000 if quarrying is conducted
Rabbitries	intensive husbandry		local gov't	1995 flyer			√	√		500
Raceways for motor vehicles	Speedways and drag strips	√	local gov't	draft in preparation		√	√			case by case

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Rendering works	animal matter is processed or extracted for use as fertilizer, stock food or other purposes	√ (16)	WRC, Water Corp, local gov't	CoP - 1991, revised in Oct 1995		√		√		1000-1500, depending on wastewater treatment/disposal system, location & size
Resins manufacturing	polyester resins manufacture	√ (31, 72)	DoIR		√	√	√	√	√	500-1000
Resins manufacturing	rubber & synthetic resins manufacture	√ (31, 72)	DoIR		√	√	√	√	√	1000
Rockwool manufacturing	mineral wool or ceramic fibre manufacture	√ (42)	DoIR, WRC			√	√	√		500
Rubber products manufacturing	using either organic solvents or carbon black		DoIR, local gov't		√ VOCs	√	√	√		300-500
Sawmill	timber (tree) milling		local gov't			√	√			500-1000, depending on location & size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Scrap metal recycling works	scrap metal is fragmented or melted to recover metal (including lead battery reprocessing)	√ (45, 47)	DoIR, WRC, local gov't	CoP - 1992		√	√	√		300-500
Screening works	screening or sieving of sand, rocks, chemicals and minerals	√ (12, 70)	DoIR, local gov't			√	√			500
Seafood processing	fish or other seafood is processed or packaged	√ (22)	WRC, Water Corp, local gov't					√		500
Service stations, involving vehicle cleaning/detailing facilities & the retailing of spare parts & foodstuffs	for premises operating during normal hours, i.e Monday - Saturday from 0700-1900 hours		DoIR, local gov't	draft in house	√	√		√	√	50
	freeway service centre (24 hour operations)		DoIR, local gov't		√	√		√	√	100

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
	all other 24 hour operations		DoIR, local gov't	draft in house	√	√		√	√	200
Silicon refining	silicon smelter operations	√ (44)	DoIR		√	√	√		√	1500-2000
Smallgoods	not including abattoir facilities or rendering works		Water Corp, local gov't			√		√		100
Smoking, drying or curing operations	meat or other edible products are smoked, dried or cured	√ (Reg 2)	Water Corp, local gov't	Regs in Sept 1996	√	√		√		200-300, depending on size
Sodium cyanide manufacturing	production of sodium cyanide	√ (31, 72)	DoIR		√ HCN, NO _x	√	√		√	1000-2000
Sodium silicate manufacturing	production of sodium silicate	√ (31, 72)	DoIR			√	√	√	√	1000
Solar salt manufacturing	salt is produced by solar evaporation	√ (14)	DoIR			√	√			1000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Starch manufacturing	starch or gluten is manufactured	√ (20)	WRC, local gov't			√	√	√		300-500, depending on size
Straw pulp and paper mill	processing cereal straw and mixing with waste paper to produce container board	√ (30)	WRC, local gov't		√ H ₂ S, SO ₂	√		√		1000-1500, depending on process used, wastewater disposal system & size
Sugar milling or refining	sugar cane is crushed or sugar is refined	√ (21)	DoIR, WRC			√	√	√		1000-1500, depending on wastewater disposal system & size
Sulphuric acid plant	production of sulphuric acid	√ (31, 72)	DoIR, WRC		√ SO ₂ , SO ₃	√	√	√		2000-3000
Tailings disposal	containing cyanide	√ (5)	DoIR, WRC				√	√	√	case by case
	not containing cyanide – (fly ash, red mud)	√ (5)	DoIR, WRC				√	√		case by case

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Tannery	treatment and drying of animal skins, leather and artificial leather – using sulphide process	√ (50)	WRC, Water Corp, local gov't		√ H ₂ S	√		√		1000-2000, depending on process used, wastewater treatment system & location
Tannery	treatment and drying of animal skins, leather and artificial leather – small premises, non-sulphide	√ (50)	WRC, Water Corp, local gov't			√		√		200-300, depending on size & wastewater treatment & disposal system
Textile production – artificial & synthetic fibre manufacturing or treatment	cellulose nitrate, viscose fibre, cellophane, artificial rubber or other man-made textiles manufacture	√ (26, 31, 72)	DoIR, local gov't			√	√	√		500

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
– carpet making & other forms of manufacturing, ginning, milling or production of natural fibres	manufacture, bleaching, dyeing or finishing of cotton, linen, woollen yarns & other natural textiles	√ (26)	DoIR, WRC, Water Corp			√		√		200-300, depending on type of fibre & wastewater treatment & disposal system
Textile operations – chemical or physical processes	using carbon disulphide (CS ₂) as a solvent	√ (26, 31, 72)	WRC, Water Corp, local gov't		√ CS ₂	√		√		500-1000, depending on wastewater treatment & disposal system
– chemical or physical processes	using other substances	√ (26, 31, 72)	WRC, Water Corp, local gov't			√		√		200-500, depending on process used & wastewater treatment & disposal system
Timber preserving premises	timber preservation by chemical means, including chromated copper arsenate (CCA)	√ (29)	WRC, local gov't			√	√	√		300-500, depending on size

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Titanium dioxide pigment plant	production of titanium dioxide (Cl ₂ process)	√ (31, 72)	DoIR, WRC		√ Cl ₂ , TiCl ₄	√	√	√	√	2000-3000
Transport vehicles depot	buses, trucks and other heavy vehicles depot		DoIR, local gov't		√	√	√	√		200
Turf farms and lawns	broad-scale turf production		WRC, local gov't	Guidelines - Dec 2001		√	√	√		500
Used tyre storage - general - tyre fitting	premises on which used tyres are stored	√ (56, 57)	WRC, local gov't				√		√	100-200, depending on size
- recycling	premises on which used tyres are crumbed, granulated or shredded	√ (56, 57)	WRC, local gov't		√	√	√	√	√	500-1000

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Vanadium mine	extraction and processing of vanadium	√ (5, 12, 70)	DoIR		√	√	√	√	√	1500-3000
Vineyards (viticulture)	broad-scale operations (including winery)	√ (25)	DAWA, WRC, local gov't	CoP - 2002	√	√	√	√		500
Waste disposal industrial liquid waste	site on which liquid waste from other premises is stored, reprocessed, treated or irrigated/discharged	√ (61)	DoH, WRC, local gov't			√		√		case by case
inert landfill site (Class 1)	site only accepting inert waste, contaminated solid waste (meeting criteria for Class 1), special wastes (type 1), as specified, for burial	√ (63)	WRC, local gov't	Draft CoP - May 1997 Guidelines for Acceptance of Solid Waste to Landfill - Jan 2001		√	√			150 for residential uses & an internal buffer of 25 from boundary

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
putrescible landfill site (Class 2 & 3)	site accepting inert, putrescible, contaminated solid waste (meeting criteria for Class 2 & 3), special wastes (type 1 & 2), as specified, for burial	√ (64, 89)	WRC, local gov't	Guidelines for Acceptance of Solid Waste to Landfill - Jan 2001 Regs (Rural Landfill) 2002 Draft Rural Landfill Management CoP	√	√	√	√		500 for sensitive uses (subdivisions), 150 for single residences & an internal buffer of 35 from boundary
secure landfill site (Class 4)	site accepting inert waste, contaminated solid waste (meeting criteria for Class 2, 3 & 4) and special wastes (type 1 & 2), as specified, for burial	√ (65)	DoH, WRC, local gov't	Guidelines for Acceptance of Solid Waste to Landfill - Jan 2001	√	√	√	√	√	case by case

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
intractable waste landfill site (Class 5)	site only accepting intractable waste, as specified, for burial	√ (66)	DoH, WRC, local gov't	Guidelines for Acceptance of Solid Waste to Landfill - Jan 2001		√	√	√	√	case by case
waste depot	premises on which waste is stored or sorted, pending final disposal or re-use	√ (62)	DoH, WRC, local gov't	Guidelines for Acceptance of Solid Waste to Landfill - Jan 2001		√	√	√		200
waste – resource recovery plant	premises on which solid waste is stored, reprocessed, treated or discharged	√ (60, 61A, 67)	DoH, WRC, local gov't		√	√		√	√	case by case

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Wastewater treatment plant	sewage treatment facility (including Mechanical/Biological and Pond Systems and Facultative Pond Systems) 20-100 m ³ per day >100 m ³ per day	√ (85) (54)	Water Corp , Fisheries, WRC, local gov't		√	√		√	√	buffer studies in progress to determine appropriate separation distances
Wastewater disposal site (treated sewage)	site from which treated sewage is discharged (including by Spray irrigation and Flood/Channel Irrigation) 20-100 m ³ per day >100 m ³ per day	√ (85) (54)	Water Corp , Fisheries, WRC, local gov't DoH					√	√	case by case
Wastewater pumping stations	vacuum pumping station		local gov't	√	√	√		√	√	20
	wastewater pumping station (<= 40L/s)		local gov't	√	√	√		√	√	10

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
	wastewater pumping station (<= 90L/s)		local gov't	√	√	√		√	√	20
	wastewater pumping station (<= 180L/s)		local gov't	√	√	√		√	√	30
	wastewater pumping station (<= 350L/s)		local gov't	√	√	√		√	√	50
	wastewater pumping station – major		Water Corp , WRC		√	√		√	√	150
Wastewater tanking manhole	used as a temporary measure – buffer primarily for visual amenity		Water Corp , local gov't	√	√			√	√	100
oxygen injection site	with a storage tank		DoIR			√			√	10 (under review)
oxygen injection site	with an on-site generator		DoIR			√				20 (under review)

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
odour control facility	varying process		DoIR			√				30 (under review)
Water treatment plants	including chemical dosing facilities for potable water	√ (Reg 4)	DoIR, WRC	Regs in Sept 1996	√	√		√	√	case by case – (under review)
Water pumping stations	minor		local gov't	√		√				20 (under review)
	major		local gov't	√		√				25 (under review)
Water supply regulating valves	>= 300mm diameter		local gov't	√		√				16 (under review)
Cathodic protection ground beds	induced electrical current to protect pipes from corrosive soils		local gov't	√					√	case by case – (under review)
Wood-board manufacturing – (including MDF plants)	premises on which particleboard or chipboard is fabricated or manufactured	√ (28)	DoIR, WRC			√	√	√		1000-2000, depending on size and location

Industry	Description of industry	DoE Licence or Registration category (*)	Key Government agencies for advice or approvals	Code of Practice (CoP) / environmental requirements	Impacts					Buffer distance in metres and qualifying notes
					Gaseous	Noise	Dust	Odour	Risk	
Woolscouring	scouring and primary treatment of wool	√ (27)	DoIR, WRC			√	√	√		500-1000, depending on wastewater treatment & disposal system & size
Wreckers (automotive)	vehicle parts recycling		local gov't	CoP - Oct 1997		√	√			300

Notes on table

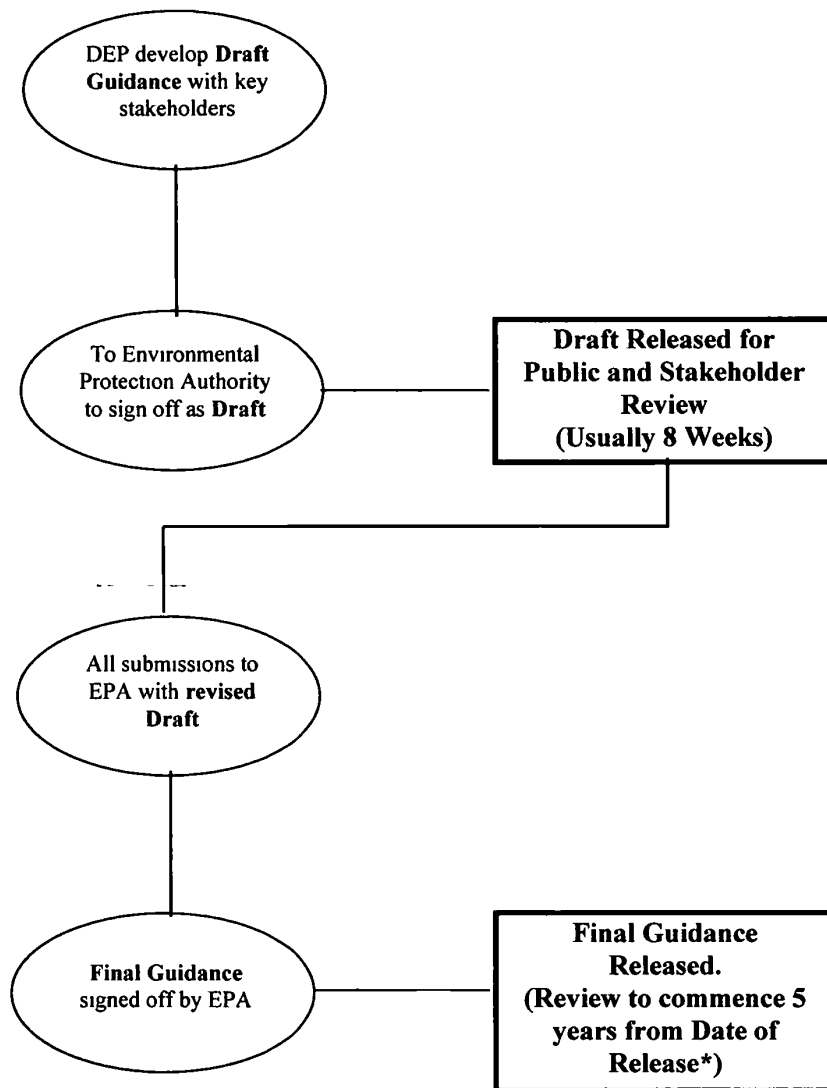
DAWA	Department of Agriculture Western Australia
DoE	Department of Environment
DoH	Department of Health
DoIR	Department of Industry and Resources
DPI	Department for Planning and Infrastructure
Fisheries	Department of Fisheries
WRC	Water and Rivers Commission (to become the Department of Environment)

- * Certain industries with the potential to pollute the environment (prescribed premises) must hold a Works Approval (for construction) and a Licence or Registration (for operation) under the *Environmental Protection Act 1986*. The *Environmental Protection Regulations 1987* set out the categories for prescribed premises.

Prescribed premises must hold a Works Approval prior to commencing any work or construction on a premises that would cause the premises to become prescribed. Prior to operating these premises a Licence must be obtained for some categories of prescribed premises (covered under Schedule 1, Part 1 of the Regulations). The remainder of the categories of prescribed premises may be registered instead of holding a Licence but still require a Works Approval to construct (Schedule 1, Part 2). A further five categories of premises require a registration only and do not require a Works Approval (Schedule 2).

The Department of Environment can refer any proposal that needs a Works Approval, Licence or Registration to the EPA. Usually the Department refers a proposal to the EPA if it has the potential to cause significant environmental impacts. This is generally the case if the siting is inappropriate, i.e. too close to residential areas, coastal areas, wetlands or areas protected by Environmental Protection Policies.

Appendix 2: Generic Flow Diagram for the Guidance Statement Process



* Guidance may be reviewed earlier if circumstances require it