

# MANAGING CONFLICT BETWEEN LAND USE AND DISCHARGES INTO AIR IN AUCKLAND

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## Summary

Auckland is the largest city in New Zealand and the Auckland region is continuing to grow. It is estimated that by 2050 2 million people will live and work within Auckland (ARGF 1999). Unfortunately with growth comes an increased pressure for land. This, combined with a public desire for fresh, clean air can create conflicts with activities that discharge contaminants into air, particularly dust and odour. Managing this conflict falls to the local councils and the Auckland Regional Council and generally requires a multi-faceted approach including land use planning controls, buffers or notional boundaries, and defining acceptable levels of air quality and types of activities within an area. Auckland's approach to managing conflict between activities that discharge contaminants into air and parties sensitive to those discharges, through the Proposed Auckland Regional Plan: Air, Land and Water (ARC 2001) and resource consents is presented and discussed. Case studies where the approach has been used are also given.

*Keywords:* Reverse sensitivity conflict, growth, regional plan, buffers, land use management

## 1. Introduction

Conflict between activities that discharge contaminants into air and parties sensitive to those discharges, including reverse sensitivity, occur within Auckland on a regular basis. The New Zealand Environment Court defined reverse sensitivity in *Auckland Regional Council v Auckland City Council* (RMA 10/97), where Judge Sheppard stated 'the term "reverse sensitivity" is used to refer to the effects of the existence of sensitive activities on other activities in their vicinity, particularly by leading to restraints in the carrying on of those other activities' (Environment Court 1997). Reverse sensitivity is associated with sensitive activities forcing changes on an industrial or commercial activity however the converse land use conflict is also possible: where an industrial activity locates in an area where sensitive uses can be present. The effects of land use conflict place a large drain on ARC resources trying to resolve specific issues. Land use conflict can cause frustration to residents and other affected parties, and can place unnecessary costs and restriction on industrial and commercial premises that discharge contaminants into air.

The Auckland Region is growing at an average rate of 20,000 people per year and it is predicted that by 2050 there will be approximately 2 million people living in the Region requiring an additional 300,000 dwellings (ARGF 1999). This is considerably more people than the 1.2 million currently in Auckland (Statistics New Zealand 2001).

In Auckland there is already a shift from the traditional New Zealand 'quarter acre block' housing to more intensive forms of housing such as apartments and terraced housing. These forms of housing require less land per house and many are being built in less traditional housing areas, particularly near or within industrial areas and close to the central city. Also in the traditional rural farming areas many farms are being subdivided into rural residential 'lifestyle' blocks' as more Aucklanders are now seeking a 'rural lifestyle'. Furthermore, as the population of Auckland increases, more land for services, commercial areas, shopping malls and industry will be required.

The consequence of these shifts in urban living and the necessity for more land, is that the potential for conflict between activities that discharge contaminants into air and activities sensitive to those discharges will continue to increase unless local and regional planning methods and policies are adequate to keep pace with Auckland's changes.

Auckland Regional Council (ARC) uses several techniques for managing reverse sensitivity including:

- Buffers;
- Notional boundaries; and
- A proposed new planning approach of establishing Air Quality Management Areas (ARC 2001).

## 2. The New Zealand Air Management Framework

The New Zealand statutory framework for managing air quality and any associated effects is the Resource Management Act 1991 (RMA). The RMA is primarily administered and implemented by regional councils and local councils (City and District Councils). Regional councils are responsible for managing the natural resources such as air, land, water and the coastal environment whereas local councils are responsible for managing the effects of land use.

Air, a natural resource, is therefore the responsibility of regional councils. However, local councils have an important role to play by managing land use and the associated impacts land use can have on air quality or air quality can have on land use.

The Auckland Region spans from just above Wellsford in the north to the Bombay Hills in the south and is administered at a regional level by the Auckland Regional Council and at a local level by seven local councils.

### 2.1 Resource Management Act 1991

The RMA is an 'effects based' legislation with the primary goal of 'promoting the sustainable management of natural and physical resources' (Salmon 2002). The RMA manages the air resource by a series of interrelated policy documents (Regional Policy Statements, Regional Plans and District Plans) that comprehensively define the management of a region's environmental resources; and through the issuing of resource consents (permits) for activities that cause, or have the potential to cause, significant adverse effects on the environment.

The RMA has provisions relating to air quality under section 15, which states that no person shall discharge any contaminant into air unless certain criteria are met and a regional council permits the discharge (Salmon 2002).

#### 2.1.1. Regional Policy Statements

The Auckland Regional Policy Statement (ARPS) August 1999, sets the overarching principles, issues, objectives and policies for the region. The RPS then guides the generation of regional plans and district plans, which must not be inconsistent with the general provisions of an RPS. The RPS in Chapter 10 introduces the issue of reverse sensitivity and the management of any land use conflict through the use of separation distances (buffers) (ARC 1999).

#### 2.1.2. Regional Plans

Regional plans are the key tool for Regional Councils to implement the RMA and to provide more detailed issues, objectives, policies and methods than the RPS. In order to ensure integration between regional and local council functions for managing air related land use conflict any regional plan should be aligned with the relevant district plans. The regional plan managing Auckland's air is the

Proposed Auckland Regional Plan: Air, Land and Water (October 2001) (ALW Plan). Issue 4.2.4 and several policies of the ALW Plan are directed at minimising the adverse effects of reverse sensitivity and land use conflict (ARC 2001). Chapters 3 and 4 of the ALW Plan introduce the concept of Air Quality Management Areas as a co-ordinated regional management technique for minimising land use conflict.

#### 2.1.3. District Plans

Local council district plans have a role in air quality through their management of land use, primarily through land use zones and consenting processes. These zones can either enhance or mitigate the effects of air quality. There are seven local councils in the Auckland Region, made up of four City Councils and three District Councils. Each local council has different forms of zoning provisions and different requirements for land use which can lead to confusion and regional inconsistency.

## 3. Buffers and Notional Boundaries

Policy 10.4.7.4 of the ARPS discusses reverse sensitivity and land use conflict stating; 'Adequate separation distances shall be maintained between industrial or trade premises that discharge, or have the potential to discharge, noxious, dangerous, offensive or objectionable contaminants to air and adjacent land uses' (ARC 1999).

Section 10.4.9 Reasons, expands on Policy 10.4.7.4 advising; 'Where sensitive land uses are not sufficiently separated from industries, amenity and quality of life in the adjacent area may be reduced due to odour or dust emissions. Good pollution control technology and sound practice is not an adequate substitute for buffer distances to segregate noxious and offensive industry from other sensitive land uses. Equipment failure, accidents and unusual weather conditions can lead to emissions affecting properties beyond the boundaries of the source premises. Also, cost of control equipment can sometimes be prohibitive. Provision of an adequate separation or buffer distance allows uncontrolled episodic emissions (which occasionally occur despite consent conditions and pollution control technology) to dissipate without adverse effects on sensitive land uses. Such buffer distances must be preserved after industry has been built' (ARC 1999).

### 3.1 Buffers

Separation distances (buffers) can be used to minimise adverse effects on the surrounding environment particularly for mitigating amenity effects such as odour (odour buffer) or dust. The ARC has a strong policy of encouraging adequate separation distances to prevent nuisance situations. The appropriateness and size of the buffer chosen for an activity must be suitable to ensure any effects can be contained without crossing outside the buffer into adjacent sensitive areas. Any buffer should

be related to the prevailing wind direction and relevant source location (VICEPA 1990). Buffers to sensitive uses can be created by:

- Graduated land use zoning from non-sensitive uses (e.g. heavy industry), through to slightly sensitive uses and finally to highly sensitive uses (e.g. residential);
- The discharger owning the potentially affected area. This can be difficult for already established activities. However, ownership of the affected land provides the highest level of protection for the discharger; or
- Using notional boundaries (ARC 2002).

### 3.2 Notional Boundaries

Notional boundaries can be used for dealing with amenity issues such as odour and dust, but they are not generally relevant for hazardous air pollutants. Hazardous air pollutants can potentially cause health effects and the nature of notional boundaries is such that members of the public may be present within the notional boundary and therefore could be subjected to adverse health impacts.

Essentially a notional boundary allows the assessment of compliance with any criteria to be shifted from the immediate premise boundary to the boundary of the nominated area (notional boundary). A notional boundary is created by the discharger having some form of legal right or control over the air space of the potentially affected area. Thus, the discharger holds restrictions over the properties in question by agreements or covenants with the relevant property owners. In some instances designations can be placed on properties through the relevant district plan as an alternative technique. As a notional boundary is generally a negotiated agreement between a discharging activity and its neighbours, where the neighbouring properties are accepting a level of adverse effect, the creation of a notional boundary often involves complicated transactions between the parties which will not involve the regulatory authority.

Once a notional boundary has been created the notional boundary should be incorporated within the resource consent to provide certainty for the discharger. Otherwise, the regulatory authority can still legally require compliance with any amenity standard at the boundary of the premise (if this is what the consent states) rather than the notional boundary.

## 4. Air Quality Management Areas

### 4.1 The Concept

Land use planning in the past has been the province of local councils. Local councils have determined what activities should locate in certain areas and what the level of amenity should be for those areas. Local councils have also determined whether a graduated

zoning approach should be taken: from heavy industrial zones, through commercial zones, and into residential zones; or whether a more 'mixed use' form of zoning should occur. To date in Auckland, local council land use planning has tended towards conventional land use planning considerations, such as building heights and noise levels, rather than the compatibility of adjacent properties or zones from an air discharge point of view.

Auckland Regional Council has made submissions on district plans to have the issues between air dischargers and sensitive activities considered. This has been an *ad hoc* approach, which has been successful in part, particularly in Auckland City. However, this approach has generally not been successful, as any changes have taken a long time to implement, used large amounts of ARC (and local council) resources and have required the relitigation of the issue for each different district plan. Finally, the process has not provided certainty for any party or a comprehensive air quality management strategy for combating the effects of land use conflict and reverse sensitivity across the Auckland region. Consequently, Auckland Regional Council has promulgated the concept of establishing regional 'Air Quality Management Areas' through the ALW Plan with an aim of comprehensively reducing the potential for land use conflict (ARC 2001).

The Air Quality Management Areas are designed to provide clarity to activities of the level of amenity that will be accepted within an area and what types of activities are generally appropriate (or inappropriate) for that area. The Air Quality Management Areas have been created using the underlying local council land use zones and then applying a 'broad brush' air quality management approach over the top. The Air Quality Management Areas are intended to complement the land use zones and within an Air Quality Management Area there may be several underlying land use zones, which may have their own differing amenity provisions.

There are four types of Air Quality Management Areas: Industrial; Urban; Rural and Coastal. Each area can have different Policies and Rules relating to how air discharges will be assessed and managed within the area. A series of maps of the entire Auckland Region showing the different Air Quality Management Areas is provided as part of the ALW Plan. An example of the mapped Air Quality Management Areas is given in Figure 1.

These maps provide information down to individual land parcel sizes so that any property owner or occupier can identify what Air Quality Management Area applies to their property.

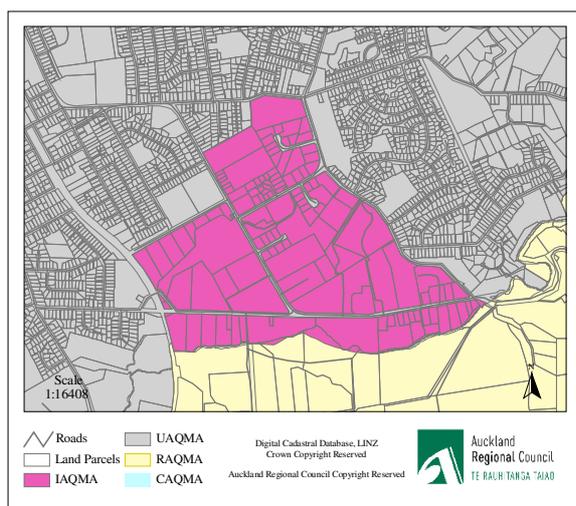


Figure 1. Air Quality Management Areas.

## 4.2 Industrial Air Quality Management Areas

The Industrial Air Quality Management Areas (IAQMAs) are areas that ARC considers are appropriate to ‘promote and encourage’ industrial intensification and apply to specific industrial areas within the Auckland Region. These IAQMAs overlay specific industrial zones within some district plans and are generally the larger industrial areas that cater for ‘heavy’ industrial activities.

Several factors were considered when determining whether an area should be classified as an IAQMA. These included:

- Size of the area, i.e. was the area large enough to provide adequate buffers for the type of activities that could be locating within the IAQMA;
- Whether there were adequate provisions within the relevant district plan that would support reduced amenity;
- What level of land use consent was required by the relevant local council for heavy industrial activities;
- Whether the area historically had, or in future could have, sensitive activities located within it (this is generally determined by the relevant district plan); and
- Proposed plans for the area over the longer term, i.e. whether the area was changing from a heavy industrial area to a more commercial area.

Once these criteria had been evaluated, the ARC considered that only Auckland City, Manukau City and Papakura District had areas that could be classified as IAQMAs. These areas are Otahuhu, Penrose, Onehunga, Avondale, Otahuhu, Favona, Wiri and East Tamaki, Auckland International Airport and parts of Papakura and Takanini.

The policy provisions within the ALW Plan for the IAQMAs advise that when ARC is assessing a resource consent application, or the extent of the level of an adverse effect for an activity within an IAQMA

‘recognition shall be given to the nature of activities usually associated with industrial processes and intrinsic character of industrial areas’. The intention of the policies for the IAQMAs is to provide a clear indication that ARC considers that IAQMAs are primarily for heavy industrial activities and that provided these industries are operating in accordance with the Best Practicable Option (section 2 RMA 1991) less stringent criteria will be applied in assessing the appropriate level of amenity.

## 4.3 Urban Air Quality Management Areas

The Urban Air Quality Management Areas (UAQMAs) cover most of the urbanised areas of the Auckland region including townships, residential, central city, commercial and light industrial areas. These are areas that ARC considers should generally have good air quality and therefore activities that could make air quality levels worse, particularly heavy industry, should be discouraged from operating in these areas. When the UAQMAs are considered in conjunction with the relevant district plan a graded level of amenity may occur. This may allow some activities that discharge significant quantities of contaminants into air to locate within an UAQMA but these would be at the lower end of the range. However ARC generally considers that in order to minimise conflict heavy industrial activities should as a general principle not locate within an UAQMA.

## 4.4. Rural Air Quality Management Areas

The Rural Air Quality Management Areas (RAQMAs) cover all of the land in Auckland Region not otherwise classified as an IAQMA or an UAQMA. The RAQMAs are designed to maintain current levels of amenity while allowing the continued operation of rural activities.

## 5. Case Studies

ARC has used buffers and notional boundaries for quite some time and has had varying degrees of success. Two case studies of where buffers have been used for mitigating the effects of land use conflict, are Waste Management NZ Ltd – Redvale Landfill and Watercare Services Ltd – Mangere Wastewater Treatment Plant. In these case studies the conflict has been due to the discharger being located in an area that does not have provisions for reduced amenity, rather than the more obvious reverse sensitivity conflict of a sensitive activity locating near a discharger and placing pressure on the discharger’s activity.

### 5.1. Waste Management NZ Ltd - Redvale Landfill

#### 5.1.1 The Situation

Redvale Landfill is situated in Dairy Flat, north of Auckland and can take up to 400,000 tonnes of refuse

per annum. The landfill is within a rural/rural lifestyle area and has neighbours immediately adjacent to the landfill boundary. The landfill applied for an air discharge consent from ARC in 1994.

ARC officers expressed concern during the application process that the small buffer of land around the landfill footprint owned by Waste Management NZ Ltd would be insufficient to mitigate any odour effects. This would then compromise the landfill's ability to meet ARC's standard odour condition of 'that beyond the boundary of the site there shall be no odour caused by discharges from the site which...is noxious, offensive or objectionable' (ARC 1998a). However, through the consent hearing process Waste Management NZ Ltd advised that they were confident that their state of the art landfill could comply with the odour condition. Subsequent to this, consent for operation of the landfill was granted in 1998 with the inclusion of the standard odour condition (ARC 1998b).

Since the consent was granted in 1998 ARC have received approximately 106 complaints relating to odours from the landfill's activities. In many instances the landfill has been meeting best practice (e.g. daily cover, odour suppression systems, waste acceptance criteria, and landfill gas extraction system). However, odours have still occurred at neighbouring properties for up to a distance of approximately 800 metres on some occasions. Therefore, the buffer (generally between 30 to 150 metres) has been found to be inadequate to mitigate residual odour emissions from the landfill that are occurring despite the landfill generally complying with best practice.

### 5.1.2 The Solution

Waste Management NZ Ltd, with encouragement from ARC, has initiated a process of extending the buffer around the landfill. When considering the tools for creating a buffer a designation cannot be created by Waste Management NZ Ltd as it is not a designating authority and graduated zoning is not applicable for the area. Waste Management NZ Ltd has therefore determined that creating a notional boundary is the most appropriate technique. At this time Waste Management NZ Ltd is in negotiations with the relatively few neighbours to include the relevant properties within a notional odour boundary. Provided negotiations are successful, this will change the test for compliance with the landfill's air discharge consent from the current site boundary to the new notional boundary and should enable Waste Management NZ Ltd to comply with the conditions of their consent.

## 5.2. Watercare Services Ltd – Mangere Wastewater Treatment Plant

Watercare Services Ltd owns and operates the Mangere Wastewater Treatment Plant. This treatment plant services most of the Auckland region and once upgraded will treat a mean daily flow of approximately 390,000

m<sup>3</sup> and a maximum daily flow of approximately 1.2 million m<sup>3</sup> (ARC 1997). The treatment plant was built several decades ago and at that time was surrounded by rural activities. Since then residential areas have been built around the plant. The treatment plant has had a history of significant odour impact on surrounding areas for several kilometres and in 1997 was granted a suite of consents to upgrade the plant.

One of the key requirements of the plant upgrade was to ensure that the treatment plant would be able to comply with ARC's standard 'no odour' condition, given above in section 5.1.1, once the upgrade is completed in October 2003. Through the consent process it was determined that the predictive numerical standard relating to this narrative 'no odour' standard of 'there shall be no offensive or objectionable odours' should be 'one hour average concentrations of odour, as predicted by the ISC atmospheric dispersion model, shall not exceed 2 OU/m<sup>3</sup> for more than a small percentage of the real-time meteorological conditions (such as 0.1% or 0.5%)' (Freeman *et al.*, 1999).

Once the numerical standard had been set atmospheric dispersion modelling predicted that after the upgrade the treatment plant's site boundary would not be sufficiently large to ensure that the narrative standard could be complied with (i.e. the 2 OU/m<sup>3</sup> extended beyond the site boundary). In order to combat this, Watercare Services Ltd applied for a designation through the Manukau City Council District Plan process to allow for a designated odour buffer (Odour Boundary) to be created outside the site boundary to move the point of compliance with the odour standard. Watercare Services Ltd could apply for a designation as it is a requiring authority under the RMA (Salmon 2002). The designation application for the Odour Boundary was granted and covered land owned by many parties, some of which was privately owned, and also included publicly owned regional parkland and roads.

The Odour Boundary does not come into effect until the plant upgrade is completed in October 2003. Until this time ARC and Watercare Services Ltd will not be able to determine whether the calculated and then designated Odour Boundary is of a sufficient size to ensure compliance with the odour standard. A review clause on the air consent conversely also allows for the Odour Boundary to be reduced if it is found to be larger than necessary.

Finally, as a follow on from the designation process Watercare Services Ltd has made a decision to negotiate with the affected private landowners to purchase the relevant properties covered by the Odour Boundary. Ownership of the private properties within the Odour Boundary will potentially provide Watercare Services Ltd with a better degree of control over those properties than the designation, particularly if the ARC were to review the air discharge consent to reduce the Odour Boundary.

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## References

- ARC (Auckland Regional Council) 1997, '*Auckland Regional Council Resource Consent: 9610853*', ARC, Auckland, New Zealand.
- ARC 1998a, '*Report to Commissioners Hearing: Application Number 10002 by Waste Management NZ Ltd to Discharge Contaminants to air at the Redvale Landfill, Limeworks Access Rd, Dairy Flat*' ARC, Auckland, New Zealand.
- ARC 1998b, '*Commissioners Determination on Consent Application: Application Number AIR 10002 by Waste Management NZ Ltd for consent to continue to discharge contaminants to air at the Redvale Landfill, Limeworks Access Road, Dairy Flat*', ARC, Auckland, New Zealand.
- ARC 1999, '*Auckland Regional Policy Statement*', ARC, Auckland, New Zealand.
- ARC October 2001, '*Proposed Auckland Regional Plan: Air, Land and Water*', ARC, Auckland, New Zealand.
- ARC April 2002, '*Technical Publication 152: Assessing Discharges of Contaminants into Air – Draft*', ARC, Auckland, New Zealand.
- ARGF (Auckland Regional Growth Forum) 1999, '*A Vision for Managing Growth in the Auckland Region*', *Auckland Regional Growth Strategy: 2050*. ARGF, Auckland, New Zealand.
- Freeman T., Needham C. and Shulz T. 1999, '*Analysis of Options for Odour Evaluation for Industrial or Trade Premises – Draft 3: Prepared for the Auckland Regional Council*', CH2M Beca Ltd, Auckland, New Zealand.
- Salmon P. 2002, '*Salmon Resource Management Act 1991*', (DSL Publishing Ltd), Auckland, New Zealand.
- Sheppard D. 1997, '*Auckland Regional Council v Auckland City Council (RMA Decision No. 10/97)*', Environment Court New Zealand, Auckland, New Zealand.
- Statistics New Zealand 2001, '*Standard Tables*', *2001 Census of Population and Dwellings: Final Counts*. [www.stats.govt.nz/census](http://www.stats.govt.nz/census), Wellington, New Zealand.
- VICEPA (Victoria Environmental Protection Agency) July 1990, '*Recommended Buffer Distances for Industrial Residual Air Emissions AQ 2/86*', VICEPA, VIC, Australia.