



Residential estates, precincts and urban developments

Scoping Tool: Public Health Considerations

This information sheet has been designed for State and Local Governments, and developers, who intend to develop land for residential estates and precincts.

Prior to development of land, public health needs to be considered in the early planning stages to ensure developments do not impact negatively on the health and wellbeing of future populations living in or around the area, as well as enhance the human health benefits of these developments.

This is a cost effective way of minimising future health implications and associated health related costs that may be imparted onto State and Local Governments, developers and local businesses, due to poorly planned or located developments.

To assist with understanding the potential health impacts associated with a proposed development, written evidence should be provided to health authorities on how identified public health factors and their potential impacts on public health and well being will be appropriately eliminated, mitigated or managed.

Public health factors to be considered include (but not limited to):

Air quality

- Spray drift, dust, smoke, ash, odour
- Buffers
- Noise (including traffic)
- Light

Water quality

- Wastewater disposal
- Drinking water
- Non-drinking water (recycled water or alternate water supplies)
- Environmental waters (for recreational use)

Land and hazard management

- Vector borne disease (mosquito management)
- Nuisance insects (stable fly)

- Pest management
- Pesticide use
- Contaminated sites

Radiation safety

- Powerlines, electromagnetic fields and health

Communities

- Climate change
- Provision of health services (hospitals, GPs)
- Healthy built environment
 - Physical activity
 - Sensitive uses (e.g. schools)
- Consulting with the community



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Air quality

It is essential to minimise incompatible land uses located adjacent to agricultural and industrial operations in a manner that inhibits normal farming and business practices, or impacts on the health of future residents.

Agriculture and chemical spray drift

The off-target movement of chemicals can be a major cause for concern to residents in proximity to farming and industrial areas. These concerns are largely based on fear of exposure to hazardous pesticides and other chemicals via spray drift, but also due to the detection of odours associated with their use.



Pesticides can drift hundreds of metres and further, depending on the method of application. The effective use of some herbicides often relies on them being applied in the presence of low wind. This also helps in avoiding chemical inversions which can travel some kilometres.

Spray drift can also cause significant damage to neighbouring crops and impact on aquaculture. Pesticide drift or direct spraying could also impact on water quality in residential rainwater tanks. This could cause possible adverse health affects, where rainwater is the sole source of potable water. Roofs can act to channel dust or chemical residues into rainwater tanks, with the end result being a concentrating affect.

Developers need to demonstrate how the risk to human health from spray drift would be managed, taking into consideration the type of agricultural activity currently undertaken on adjoining properties.

Where there is significant risk of chemical and spray drift occurring, it is necessary to implement an air quality monitoring plan to assess the level of contaminates likely to be associated with the proposed development, and reflect the locations where humans have the potential to be affected, either now or in the future. The monitoring plan should contain adaptive mitigation and management practices sufficiently flexible to respond proactively to conditions likely to generate emissions.

Early consideration of health and wellbeing also provides an opportunity to enhance the health benefits of a development for future residents.



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Emissions

People who move into residential estates do not expect industrial emissions to impact their health. They also expect a high standard of amenity.

A primary responsibility of state planning authorities is the preservation of air quality over residential areas both for purposes of health and amenity. The National Environmental Protection Measure (NEPM) for Ambient Air Quality prescribes an ambient air quality standard for six key pollutants (PM₁₀, O₃, CO, NO₂, SO₂ and lead) in areas where people live. These standards include dust levels that protect against the adverse health effects from dust while separate guidelines also exist for dust levels that preserve amenity.

The Department of Health recommends the application of the “*Planning Guidelines: Separating agricultural and residential land uses*”, produced by the Queensland Department of Natural Resources. These Guidelines provide technical advice and guidance on reducing the potential for conflict between farming activities and residential developments.

Developers interested in developing land close to industry may have their developments compromised by lack of appropriate planning. Land uses around which a buffer distance for residential air emissions is required varies from no buffer required to buffer distances of 1 – 3 km or more.

Developers should be aware that buffers can be implemented by State Government long after developers have purchased land for residential estates wherever developments encroach onto heavy industry or land zoned and reserved for mixed industrial development.

Where there is a risk for industrial air borne emissions to impact proposed developments, planners and developers need to be aware of the potential for air-emissions to adversely impact the health and amenity of future residents.

Dust, smoke and ash

Agricultural and industrial activities can generate dust, smoke and ash through a variety of activities and processes that include farming, transport and shipping, fires, light and heavy industry and others. These activities can cause extensive nuisances to surrounding populations particularly when enhanced by local conditions, including wind strength and direction, rainfall, humidity and ambient temperatures, soil type, and vegetative cover.

Dust, smoke and ash can have significant adverse health effects on individuals and communities. Even perceived health effects can contribute to significant community unrest when land use compatibility has been overlooked.

The reasons for land use incompatibility are highly individual and may need to be addressed on a case-by-case basis.



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Odour

Odours can arise from use of agricultural chemical sprays, fertilisers (inorganic and organic), effluent disposal, intensive livestock activities (e.g. feedlots, piggeries and poultry farms), decomposing plant material (e.g. swamps and composting facilities), as well as plants as well as heavy industry.

Odours can impact on a resident's quality of life, and may have the potential to cause significant nuisance complaints for industry and local authorities. Odours also have the potential to have direct health effects and should be treated seriously by developers.

Buffers

Buffer areas are legitimate planning tools and are used to separate land uses to ensure long term protection of both areas impacted upon and minimise potential health impacts and any future conflicts. Examples of activities that require buffers include sewage treatment works, abattoirs, tanneries, composting plants and rendering works, intensive animal and plant production facilities (such as feedlots, piggeries and poultry sheds), and any industry or agricultural practice emitting emissions into the environment.

Information on buffer distances related to different industry activities can be obtained from the Environmental Protection Agency and the Department of Planning websites at www.epa.wa.gov.au and www.planning.wa.gov.au.

Noise

Noise pollution is a potential problem with closer encroachment of residential living on rural and industrial areas. Potential noise impacts to incoming residents could occur from such sources as intensive animal industries (poultry farms, feedlots), abattoirs, dairies or irrigated horticulture, constant or long-term noise, (e.g. pumps or refrigeration plants), and intermittent noise from tractors, other machinery and transport.

Noise can lead to significant health and public nuisance concerns to future residents. It is essential to undertake noise level monitoring to establish current background levels at the proposed boundaries of the development to ensure appropriate mitigation strategies are implemented.

Traffic

Increased traffic movements of trucks and machinery offsite through residential areas and local towns (including transient aboriginal communities) can cause concerns. It is important that where there is an increase in transit traffic appropriate planning and discussion with potentially affected communities is undertaken.



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Light

Consideration is needed for the potential for light pollution, characterised as excessive or obtrusive artificial light, which may affect nearby communities.

Light pollution can be divided into two main types: (1) annoying light that intrudes on an otherwise natural or low-light setting and (2) excessive light that leads to discomfort and adverse health effects. Its sources include advertising lights, commercial properties, offices, factories, streetlights, other buildings and illuminated sporting venues.

It is important to consider any light obtrusive activities surrounding the proposed development to ensure they do not impact on new communities.

Water quality

Wastewater disposal

All residential developments require access to wastewater systems to dispose wastewater generated safely.

Large scale residential developments require the provision of reticulated sewerage delivered by a licensed supplier in accordance with the *(draft) Country Sewerage Policy* and the *Perth Metropolitan Regional Government Sewage Policy*.

However, in some instances existing reticulated sewerage systems, particularly in regional and remote areas, is not available or planned. Moreover, existing sewerage systems may not have the capacity to accommodate increases in connection rates without significant investment. Therefore, it should be noted that it can take several years from planning stage discussions before an upgrade is operational.

In situations where onsite wastewater systems are proposed, such as septic tanks or aerobic treatment units, it is essential to conduct a Land Capability Assessment or a geotechnical report as per AS 1547 (2000) at the lot and subdivision level. In all cases lot sizes shall be able to accommodate the wastewater generated on-site.

Written evidence should be provided on:

- The predicted population size to reside within the development
- Whether the development will be connected to the reticulated sewerage system. If so:
 - The capacity of the local reticulated mains to handle the increase in generated wastewater volumes, and/or details of future proposals to upgrade the reticulated sewerage system or the wastewater treatment plant
 - Whether the development will require lots to be connected to onsite wastewater systems. If so provide a Land Capability Assessment at the lot and development levels, or a Geotechnical report as per AS 1547 (2000) at the lot and development level.



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Drinking water

A safe and potable supply of drinking water is essential for all. In situations where connection to drinking water supply through a licensed provider is not available, consideration must be given to alternative household drinking water systems quality, how many people will need access to drinking water and how drinking water will be supplied to the estate.

Written evidence should be provided on:

- Drinking water volumes required
- How drinking water will be provided to households
- The commitment to comply with the Australian Drinking Water Guidelines 2011 (2011 ADWG), as published by the National Health & Medical Research Council
- The establishment of a Drinking Water Quality Plan including a drinking water quality monitoring program for chemical and microbiological analysis)
- Routine evaluation of the 12 elements of the Drinking Water Quality Plan.

Where rainwater is proposed as the main source of potable water, consideration must be given to WA's decreasing rainfall patterns. In addition, depending on the proximity of the estate to agricultural and industrial sites, there is the potential for roofs to act as a funnel and capture dust, chemicals and spray drift residues that may concentrate in the rainwater tank. Rainwater monitoring and other mitigation strategies will be required to ensure the health of future residents is not compromised.

Non-drinking water (recycled water or alternative water supplies)

The Department of Health supports non-drinking water schemes as a sustainable and beneficial option to manage water resources. However, serious health implications may result if non-drinking water (in particular recycled water) is not appropriately installed and managed.

Written evidence should be provided on:

- The intention for all recycled water schemes to be approved by the Executive Director of Public Health prior to implementation.
- The volumes of non-drinking water produced/required
- The treatment of the non-drinking water to a level that is fit for purpose
- The commitment to implementation of the relevant Australia Water Recycling Guidelines: Australian Guidelines for Water Recycling - Phase 1 (2006); Australian Guidelines for Water Recycling - Phase 2: Stormwater Harvesting and Reuse (2009); and the Australian Guidelines for Water Recycling - Phase 2: Managed Aquifer Recharge (2009).
- The establishment of a Recycled/Alternate Water Quality Plan including the water quality monitoring program
- Routine evaluation of the 12 elements of the Recycled/Alternate Water Quality Plan.

Note: The Department of Health cannot support mandatory recycled water re-use for a development. Rigid sustainability targets may not recognise that some areas may not be



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suitable for garden grey-water re-use, due to potential issues such as the height of the groundwater table, proximity to wetlands, small lots sizes etc.

Environmental waters (for recreational use)

Communities place great importance on the need to keep waterways commonly used for recreational activities such as swimming, surfing and fishing, free from disease and other health related problems.

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.

It is essential to protect recreational water environments against direct contamination from faecal and chemical contaminants from the estates and associated infrastructure.

To minimise the risk of recreational water illnesses, written evidence should be provided:

- Stating that no recreational water body in close proximity to the development site will be impacted by faecal or chemical contamination
- (Where appropriate) Of the intention to develop and implement a recreational water monitoring and management program in accordance with the National Health Medical Research Council, *2008 Guidelines for Managing Risks in Recreational Water* to monitor microbial, algal species and numbers and chemical contaminants in recreational waterways that may experience contamination from the site. This should include background monitoring prior to construction, during construction and following operation.
- There may also be a need to undertake similar types of monitoring in relation to fish/shellfish health for recreational collection and consumption.
- Depending on the nature of development, construction activities e.g. where dredging or similar activities may be required, then other parameters e.g. pH, water clarity (Secchi disc measurements), dissolved oxygen levels, total suspended solids in relation to aesthetics and physical water quality suitability for recreation may also be required.

Recreational waterways must be kept free from contaminants to prevent recreational water illnesses.

Land and hazard management

Vector borne diseases (mosquito management)

Mosquito populations and the types of mosquito-borne diseases vary across WA. Existing habitats such as wetlands can support extensive mosquito populations and can cause serious nuisances to humans who may reside within these areas, as well as increase the chance of people contracting debilitating or potentially life threatening mosquito-borne diseases.



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New estates may be proposed in areas that are not suitable for humans to live. Re-contouring the land and installing infrastructure can create new habitats for mosquitoes to breed.

Developers tend to ignore concerns raised about the need to minimise mosquito breeding and can put the health of future populations at risk of contracting diseases such as Ross River virus disease and Barmah Forest virus disease, as well as making life unbearable for the people who end up living in these mosquito infested areas.

Developing in mosquito prone areas can be a long term financial burden to State and Local Governments.

Some developments are simply proposed in areas that are not suitable for humans to live.

The long term investment needed by State and Local Governments to control mosquito populations to a level that minimises the risk of disease, and the number of nuisance complaints, can be a significant financial burden. Therefore, it is essential that developers and State and Local Governments consider these health implications (including long term financial costs) associated with developing in mosquito prone areas.

To minimise the risk of mosquito-borne disease and breeding sites, a proponent needs to provide written evidence of the following:

- The identification of existing breeding locations within close proximity to the proposed development, and the extent of known mosquito-borne disease risk and nuisance levels from biting insects.
- Commitment to develop and implement a mosquito management plan that provides strategies for managing mosquito breeding sites during construction and ongoing operational phases of the development and minimising the exposure of future residents to adult mosquitoes.
- Commitment to locate, design and maintain any proposed man-made water bodies (e.g. constructed wetlands, vegetated swales and other stormwater infiltration infrastructure) in accordance with the *Chironomid midge and mosquito risk assessment guide for constructed water bodies* (Midge Research Group, 2007).

Nuisance insects (stable fly)

Consideration needs to be given to other nuisance insects such as stable fly that may cause health concerns to future residents.

Stable fly can be a significant public health concern and is generally a problem surrounding rural activities such as agriculture, irrigated horticulture, animal industries, dairies, piggeries and the like.



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Consequently, incoming urban residents may be exposed to nuisance fly breeding and infestation that can be associated with surrounding activities.

Stable flies are an aggressive, biting, blood sucking fly that attack livestock, domestic pets and humans in search of a blood meal. The primary host animals are cattle and horses which are normally 'accessible' to stable flies in a rural environment. The repeated biting attacks can cause considerable suffering and distress to animals and in some cases, cause death. Whilst this is not strictly a public health issue it can be a significant nuisance to residents and cause suffering and annoyance to livestock and domestic pets.



Stable fly breeding has been known to be a problem in the Shires of Harvey, Gingin, Serpentine/Jarrahdale and Murray that have mixed agriculture and horticultural activities.

One of the main sources of breeding has been the use of poultry manure for vegetable production on the Swan Coastal Plain. It is also known that stable flies also breed prolifically in rotting vegetable material, other manures, animal bedding and feed (if left exposed to the elements).

It is known that flies can travel some distance to find a food source, breeding site or host animal. In WA, significant resources have been invested by industry and governments where stable fly has caused public health problems in residential developments surrounding agricultural sites.

To minimise health risks associated with nuisance insects it is recommended that the proponent undertakes land use surveys within a 5-10 kilometer radius of the proposed estate to ascertain activities that may pose a risk from nuisance fly breeding, particularly if there are known stable fly problems in the area.

If any such activities are identified then effective management plans should be developed in consultation with the landowners on which the activities occur.

Pest management

All developments are likely to attract pests such as mosquitoes, cockroaches, rats and feral animals, which need to be controlled to prevent health concerns for the surrounding community.



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Written evidence should be provided on the intention to develop and implement a pest management plan that appropriately controls pests and minimises any use of pesticides in the control of insect pests, weeds and where appropriate feral animals.

Pesticide use

There are general requirements for estates to control pests (weeds, weed pathogens, vermin, vectors, feral animals etc) on the site. However, appropriate training and licenses are required in accordance with the *Health (Pesticides) Regulations 2011*.

Written evidence should be provided on the intention to control pests by employing the use of contractors who are appropriately trained and hold a current Pest Management Technician Licence and be employed by a Registered Pest Management Business.

If a proponent wishes their own employees to apply pesticide(s) as part of their Pest Management Program, then the employees should be provided with sufficient knowledge, skills, training and the personal protective equipment to safely apply the pesticide(s).

Contaminated sites

Many estates may be proposed on land that is potentially contaminated from previous or existing land uses. Contamination may be of ground and surface waters and soil, and result from the release of hazardous substances associated with industrial and commercial activities, poor asbestos removal practices or dumping, or the disturbance of acid sulphate soils.



If a site is suspected of or known to be contaminated it will need to be reported to the Department of Environment and Conservation (DEC) in accordance with the *Contaminated Sites Act 2003*.

DEC will assess and classify the site if necessary, which may trigger a formal process of site investigation and/or cleanup. The aim of this work is to ensure that any contamination does not present an unacceptable risk to the environment or to people.

Acid sulfate soils

Acid sulfate soils (ASS) are naturally occurring soils and sediments containing iron sulfides, most commonly pyrite.

When ASS are exposed to air the iron sulfides in the soil react with oxygen and water to produce a variety of iron compounds and sulfuric acid. Initially a chemical reaction, the process is accelerated by soil bacteria. The resulting acid can release other substances, including heavy metals, from the soil and into the surrounding environment.



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The production of hydrogen sulphide gas from ASS is a source of concern for public health.

Further queries on contaminated sites and ASS should be directed to the Department of Environment and Conservation Contaminated Sites Branch. DEC will request Department of Health advice when appropriate on human health issues and public risk related to contaminated sites and ASS.

Radiation safety

Powerlines, electromagnetic fields and health

The magnetic field from a power line can vary widely because the current in the wires depends on the amount of power consumed. On the other hand, the electric field from a power line varies very little because the voltage essentially remains constant.

Electric and magnetic fields are also different in the way they interact with our bodies. Electric fields have very little penetration, while magnetic fields can penetrate to our inner organs.



The strongest electromagnetic fields (EMFs) are found around those major transmission lines that carry the highest voltages and currents. EMFs are also present around suburban distribution systems that, although at much lower voltages, still carry large currents.

Each power line runs along a corridor of land called an easement. The width of the easement is determined by a number of factors, including the electrical load on the line. The widest easements, naturally, are given to the lines with the highest loads e.g. an easement width of 60 metres is typical for 330kV lines.

Public access to an easement is permitted, but building and long-term occupation are not. At the edge of an easement, the EMFs are appreciably lower than they are in the centre. The World Health Organisation limits are not exceeded anywhere within easements; the EMFs outside easements are consequently well below these limits.

On this basis, there is no reason to discourage either residential development that borders power line easements, or short term recreational activity within easements.

The Radiation Safety Act and Regulations specify maximum exposure limits for non-ionising emissions from radiofrequency radiation, ultraviolet radiation and electromagnetic fields from powerlines and electronic equipment. Where a potential hazard in this area may arise, the Radiation Health Branch can provide advice on determining compliance to the relevant standards or guidelines.



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Communities

Climate change – health considerations

It is now known that our changing climate presents a significant and emerging threat to public health. Public health impacts have been identified that should be considered in any future developments. Some of the health concerns that may warrant consideration by developers include:

Heat effects

Increases in temperature are predicted. Design requirements may include retaining natural vegetation and trees that help to cool urban and rural environments, consideration of the albedo level of surface materials, as well as using passive solar designs for buildings.

Extreme weather related health effects

Increases in floods, cyclones and bushfires are predicted. Developments should not be located in flood plains and should be designed to withstand extreme weather conditions. In bushfire prone areas, adequate precautions should be taken to minimise the risk to human life in the event of a fire.

Water consumption

A reduction in rainfall is predicted. Consideration should be given to the supply and use of water, particularly in regional areas, and approved methods to reduce and reuse water.

Healthy built environments

The way in which neighbourhoods are designed can have a profound affect on how people get around, whether people can easily walk or cycle for transportation and recreation and whether people can access healthy food. It can also have a big impact on community wellbeing and physical and mental health

The Department of Health supports strategies that create an urban environment that supports physical activity and healthy eating. A good neighborhood should be designed to encourage people to walk, cycle, use public transport, use public open spaces and other recreational facilities and enable easy access to healthy food.

Key principles in designing the built environment can contribute to the health and wellbeing of the community. There are a number of key principles:

- Mixed land use integrated with transport.
- Accessible, convenient and safe active transport



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(walking, cycling and public transport).

- Well connected streets, pathways and walking/cycling routes.
- Dwellings within 400m walkable catchments of activity centres, schools, shops, parks and public transit stops.
- Mixed housing types and density.
- An attractive and welcoming urban form.
- Safe and accessible places for all users.
- Parks and open space with a mix of formal and informal physical activity uses and community gardens.
- Supporting infrastructure that encourages physical activity e.g. lighting, bike lockers and shade.
- Limiting density of fast food outlets.

When these design principles are integrated and applied correctly a range of health, social, economic and environmental benefits will follow. It can improve the wellbeing of the community and help to foster a prosperous economic future. Further information is available from the Healthy Spaces and Places website www.healthyplaces.org.au and Active by Design www.heartfoundation.org.au.

Sensitive uses e.g. schools, hospitals and child care centres

Where facilities for the more vulnerable in our communities are planned for an estate, special consideration should be given to the location of these types of facilities. For example:

- Primary schools and child care centres should not be located on major roads.
- Premises selling junk food, tobacco and alcohol should not be located around schools and childcare centres.
- Schools should be located and designed to facilitate shared use of ovals and other facilities.
- Schools and hospitals should not be located near industrial areas or high disaster potential industries such as petrol stations.

Consulting with the community

The Department of Health regards community consultation as an important part of the planning stages for new residential estates that may impact both positively and negatively on the local community. It is essential for any community to be given opportunities to participate in decisions that have the potential to improve the health and wellbeing.

It is important that proponents and communities are aware of issues that may be perceived as health risks. This provides developers with an opportunity to minimise or eliminate issues that may be seen to cause public health concerns during the early planning stages of developments.

Addressing health concerns early can save significant amounts of money that may be needed in the future to minimise or eliminate public health concerns. Proponents are encouraged to demonstrate that they are working effectively with communities.



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Further information

The Public Health Division of the Department of Health of Western Australia has a range of health resources and experts who can provide advice on improving the health outcomes of residential estates, precincts and developments. For further information visit www.public.health.wa.gov.au

This document was produced by the Health Impact Assessment team of the Environmental Health Directorate on behalf of the Public Health Division. This document will be regularly reviewed and updated. Feedback can be provided by emailing ehinfo@health.wa.gov.au with "Health Impact Assessment" in the subject heading.

May 2011