

Health considerations - Environmental Impact Statement

Guidelines for Proponents

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An electronic version of this document is available at

<http://www.health.qld.gov.au/public-health/industry-environment/environment-land-water/default.asp>

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Background

Land use decisions have the potential to adversely affect community health and wellbeing. In Queensland, an environmental impact statement (EIS) is the primary assessment tool used to determine the cumulative impact of major projects. It is important that EISs appropriately consider and develop strategies to minimise any adverse impacts that a project may have on community health. It should be recognised that an impact can be positive or negative or both and would be considered a change in consequence that results from the proposed project (either directly or indirectly).

The World Health Organisation has estimated that avoidable environmental exposures cause up to 24 per cent of diseases. Consequently, the minimisation and appropriate management of impacts that cause adverse health effects is a more effective way to protect the health and wellbeing of Queenslanders.

Objectives of this document

The Department of Health has developed *Health Consideration - Environmental Impact Statement Guidelines for Proponents* to:

- ensure that a proponent identifies relevant environmental hazards that impact on human health and wellbeing
- provide guidance to proponents on how to demonstrate that risks to human health have been minimised.

Scope

This guideline should be used by proponents to ensure that a project's EIS appropriately identifies and considers human health risks and commits to appropriate actions to minimise these risks.

These guidelines apply to assessments by EIS conducted under the following Acts:

- *State Development and Public Works Organisation Act 1971*
- *Environmental Protection Act 1994*
- *Sustainable Planning Act 2009*.

State Development and Public Works Organisation Act 1971

Projects that are declared to be coordinated projects by the Coordinator General are required to submit an EIS or an Impact Assessment Report (IAR) under the *State Development and Public Works Organisation Act 1971*. The projects assessed within the Act framework include major infrastructure projects, mines, ports, large scale resorts and industrial developments such as power stations and refineries.

Criteria used for a coordinated project declaration includes:

- complex approval requirements, including local, state and federal government
- significant environmental effects

- strategic significance to the locality, region or state, including for the infrastructure, economic and social benefits, capital investment or employment opportunities it may provide
- strategic infrastructure requirements.

This Act is administered by the Department of State Development, Manufacturing, Infrastructure and Planning. Further information is available at <http://www.statedevelopment.qld.gov.au/coordinator-general/>

Environmental Protection Act 1994

The EIS process under the *Environmental Protection Act 1994* is only used for mining or petroleum/gas and other resource projects. A proponent can voluntarily undergo the EIS process for a project or be required to be assessed by EIS when applying for an environmental authority. The criteria by which to assess whether an EIS is required are set by the Department of Environment and Science (DES) and are dependent on the size and nature of the project, as well as its distance from sensitive receivers/townships and other environmental matters. The details of the criteria used by the DES to determine whether an EIS is required can be found at www.ehp.qld.gov.au/management/impact-assessment/pdf/eis-guideline-trigger-criteria.pdf

Sustainable Planning Act 2009

The EIS process is initiated by requirements of the *Sustainable Planning Act 2009* and is used primarily for developments that are:

- proposed to be the subject of a development application
- for community infrastructure intended to be carried out on land proposed to be designated for the infrastructure
- proposed to be the subject of a master plan application.

The role of Queensland Health in the EIS process

Regardless of the legislative instrument requiring an EIS, the interests of Queensland Health do not vary significantly. Public health considerations that proponents should incorporate into an EIS include:

- air quality
- noise emissions
- water quality
- radiation safety
- land management
- community health and social aspects.

Note: Queensland Health may not have specific legislative responsibilities for the control of all specific hazards that may directly or indirectly cause a risk to human health. However, it is important that the proponent adequately demonstrates and communicates to the community how risks to human health will be appropriately minimised.

Proponents should also be aware that the above considerations are not totally exhaustive and other aspects may be required depending upon the nature of the project.

In projects where a hazard—for example an air emission—is likely to have a significant impact on human health, discussions should be undertaken with the Public Health Unit within the local Hospital and Health Service (HHS) to determine whether a health risk assessment is required. If it is determined that a health risk assessment is required, the assessment should be conducted in accordance with the EnHealth *Environmental Health Risk Assessment—Guidelines for assessing human health risks from environmental hazards*.

This guideline can be found on the Australian Department of Health website www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-publicat-environ.htm

Air quality

Within an EIS, proponents are required to demonstrate that the project will be constructed and operated in a way that protects the qualities of the air environment related to human health and wellbeing. The emissions from the project are required to be modelled/predicted and compared to the goals contained within the *Environmental Protection (Air) Policy 2008 (EPP Air)* and the *National Environmental Protection (Ambient Air Quality) Measure 2003 (Cwth) (NEPM AAQ)*. However, it should be noted that these goals are not fully protective of human health, especially in sensitive individuals.

The proponent should provide the following information in the EIS:

- A list of the air contaminants that would be generated and the predicted concentration likely to be emitted by the proposal.
- A management plan that would successfully mitigate any potential adverse emission that may be generated by the project. This plan should identify how the risk to human health will not be increased by the project. The plan should be sufficiently flexible to respond proactively to conditions/circumstances that are likely to generate elevated emissions.
- This management plan should include a commitment to implementing an ongoing air quality monitoring strategy, incorporating air monitoring equipment and weather stations or alternatively justification of why a monitoring plan is not required. Prominent mitigation measures of the plan should be highlighted within the air quality chapter of the EIS. Practical strategies that would proactively deal with community concerns when/if they arise should also be highlighted.

The above information is not exhaustive and proponents should seek the advice of a suitably qualified consultant to prepare a concise but detailed report and management plan.

Typical contaminants of concern

The contaminants identified below are not fully inclusive of all air emissions that Queensland Health believes cause adverse health effects. If a contaminant is not identified in the EPP Air or NEPM AAQ, the proponent should identify any risk the contaminant may have to human health. This should include the use and justification of an appropriate health-based criteria/standard for the contaminant. The following contaminants are relatively common among most projects and should be addressed.

Particulate matter/dust

Dust is a general term used to describe particles that are suspended in the air we breathe. The EPP Air uses the term particulate matter (PM) to describe airborne dust. Particulate matter is categorised as either PM₁₀ or PM_{2.5}. PM₁₀ refers to particles that are less than 10 micrometres in diameter. PM_{2.5} denotes smaller particles up to 2.5 micrometres in diameter.

A wide range of project-related activities generate dust and particulates, including the removal of vegetation, transport and loading activities, and wind action on stockpiles and exposed areas. The combustion of fuels (i.e. petroleum, diesel) also contributes significantly to the level of particulate matter in the air.

A number of studies have linked particulate matter to a range of health outcomes. The potential to cause health problems is generally related to the size of particles. PM₁₀ particles can enter the airways to the lungs and PM_{2.5} particles can reach the air sacs deep inside the lungs.

The results of many population-based epidemiological studies indicate that the potential impacts of particulate matter include:

- irritation of the airways, coughing, or difficulty in breathing
- decreased lung function and the development of chronic bronchitis from long-term exposure
- aggravated asthma
- increased incidence of non-fatal heart attacks
- people with heart or lung disease/injuries may die prematurely.

The likelihood of adverse effects is dependent on factors such as level of exposure and frequency of exposure and the nature of the particulates.

Additionally, dust on roofs can be washed into rainwater tanks and contaminate the water. This is of particular concern if rainwater is the main source of drinking water for residents or workers.

Oxides of nitrogen

Oxides of nitrogen (NO_x) are gases composed of nitrogen and oxygen. NO_x are produced, for example, during explosions and the combustion of wood, fossil fuels, petrol and diesel.

Depending on exposure levels, NO_x can irritate the eyes and respiratory tract. Nitrogen dioxide—one of the most common NO_x—can exacerbate pre-existing chronic obstructive pulmonary disease and asthma, especially in children. Large population-based studies comparing health outcomes with continuously monitored gaseous pollutants indicate a probable contribution of increases in NO_x with increases in daily mortality, and increases in hospital admission and emergency room attendance for both respiratory and cardiovascular disease. Nitrogen dioxide may sensitise individuals to the effects of other pollutants and allergens and may increase susceptibility to respiratory infections.

Sulfur dioxide

Sulfur dioxide (SO₂) is a colourless irritant gas with a strong, suffocating odour. The majority of the SO₂ in air comes from human sources. The main source of SO₂ in the air is industrial activity that processes materials that contain sulfur—for example, the generation of electricity from coal, oil or gas that contains sulfur. Some mineral ores also contain sulfur, and SO₂ is released when they are processed. In addition, industrial activities that burn fossil fuels containing sulfur can be important sources of sulfur dioxide.

SO₂ causes irritation of the eyes and respiratory tract at elevated concentrations. Prolonged exposure may cause inflammation of the respiratory tract and lung damage. SO₂ also causes muscular constriction of the large airways. This is most noticeable in asthmatics when they exercise.

Volatile organic compounds

Volatile organic compounds (VOCs) include all organic compounds—substances made up of predominantly carbon and hydrogen—with boiling temperatures in the range of 50-260 °C, excluding pesticides. This means that they are likely to be present as a gas at ambient temperatures. Substances that are included in the VOC category include aliphatic hydrocarbons (e.g. hexane), aromatic hydrocarbons (e.g. benzene, toluene and the xylenes), and oxygenated compounds (e.g. acetone and similar ketones).

The health effects derived from VOCs depend on the specific composition of the VOCs present, as well as the concentration and the length of exposure. Some VOCs are suspected or known to cause cancer in humans. General effects of lower concentrations include eye, nose and throat irritation; headaches; loss of coordination; nausea; and damage to the liver, kidneys and central nervous system.

Odour

Odours can arise from a variety of projects and associated activities. Odour is likely to become an issue in situations where conflicting land uses result in sensitive receptors locating close to odour sources. If not managed appropriately, odours can impact adversely on an individual's quality of life and health.

Proponents should be aware that odours present a difficult management issue and have the potential to cause significant nuisance complaints. The DES provides a detailed assessment methodology for the assessment of odour impacts. This can be found at www.ehp.qld.gov.au/licences-permits/business-industry/pdf/guide-odour-impact-assess-developments.pdf

Noise emissions

Noise emissions have the potential to cause adverse impacts on human health and wellbeing. The proponents should describe the potential noise impacts and proposed mitigation measures—for example, this may include the attenuation of premises and/or the buying of nearby properties that are sensitive receivers. Publications relevant to the health impacts created by environmental noise includes the World Health Organisation's *Guidelines for Community Noise* (available at <https://infrastructure.planninginspectorate.gov.uk/document/2322958>) and the enHealth Council's *The health effects of environmental noise—other than hearing loss* (available at http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-publicat-document-metadata-env_noise.htm).

Queensland Health supports the proponent describing the existing audible noise and vibration environment that may be affected by all components of the project in the context of the environmental values defined by the *Environmental Protection (Noise) Policy 2008* (EPP Noise). Proponents also should refer, when necessary, to both the *Noise Measurement Manual* (Environmental Protection Agency 2000) and the *Guideline: Noise and vibration from blasting* (Environmental Protection Agency 2006) when preparing an assessment of the noise impact created by the project. If a noise characteristic, which has been determined to affect human health, is not addressed within the EPP Noise, then the emission should be discussed with reference to its risk, using an appropriate health-based guideline/standard.

In situations where the source noise cannot be adequately mitigated, the proponent should provide options for mitigation at the sensitive receivers to ensure a satisfactory internal noise level for the preservation of health and wellbeing.

A proponent needs to provide written evidence/commitment that a noise level monitoring program will be established at the proposed boundaries of the project or at a sensitive receptor. This program should ensure noise mitigation strategies, which are appropriate and adequate to achieve health and wellbeing goals/criteria, are implemented. Mitigation measures and monitoring programs should be highlighted within the noise chapter of the EIS.

Buffer areas/distances

One approach proponents can take to avoid or mitigate potential adverse health effects created by air and noise emissions from the proposal is the use of buffer areas. It is essential for appropriate buffers to be planned and maintained accordingly to ensure noise, emissions, dusts, other airborne particulates, and odours do not cause immediate or future health concerns for local communities.

Proponents should be aware that Queensland Health considers accommodation villages/camps to be sensitive receptors, meaning human health and wellbeing goals/criteria should apply in areas where accommodation villages/camps are located. For this reason, such accommodation should be strategically located to minimise and reduce health risks according to predominant wind direction, distance from the proposed project and likely level of exposure.

In principle, local or state governments may impose distances between planned zoned areas as specified within the State Planning Policy. A significant economic impost is placed on both government and industry in situations where public health is put at risk from industry's emissions. For this reason, it is recommended that industry assess the merits of implementing a voluntary buffer that will help to protect them from future land use conflicts. In undertaking this assessment, the proponent should consider the regional and local government planning schemes to gain a better understanding of the local council's long-term plan for the region.

Water resource/quality

EISs can provide several sections or chapters discussing the impact of the project on the various forms of water bodies/sources (i.e. both surface and ground waters) depending on the project type. The interests that Queensland Health has in these sections/chapters include:

- drinking water
- non-drinking water (recycled water or alternate non-drinking water supplies)
- wastewater disposal/sanitation
- environmental waters (release of contaminants to receiving waters).

Drinking water

Providing and maintaining a safe and potable supply of drinking water is essential and the EIS should describe how this would be achieved during construction activities and ongoing operational phases.

On-site drinking water

In situations where connection to a drinking water supply through a licensed provider is not available or practical, consideration should be given to alternative drinking water systems. The proponent needs to highlight within the EIS whether they will be regarded as a drinking water service provider as regulated by the *Water Supply (Safety and Reliability) Act 2008* and the *Public Health Act 2005*. If the proponent is not a drinking water service provider, then the proponent needs to develop a management system—a drinking water management plan—that will be used to ensure that all potable water consumed on site complies with the Australian Drinking Water Guideline 2011 (ADWG), as published by the National Health and Medical Research Council. This should include how potable water will be sourced, treated, transported, stored, reticulated and the water quality monitored (including microbiological analysis). Identification of how potable water will be protected from potential cross-contamination from other water sources and waste streams on-site needs to be highlighted, ensuring compliance with the relevant plumbing and drainage requirements.

Use of rainwater tanks for drinking water

Many areas in Queensland do not have access to reticulated or town water for drinking, personal hygiene and food preparation. If rainwater tanks are to be used, it is

recommended that there is an appropriately designed water treatment system that can achieve the microbiological treatment performance requirements of Australian/New Zealand Standard 4348:1995. It should be noted that these disinfection systems require regular maintenance to remain effective and it is important that the manufacturer's instructions are always followed.

A proponent should have considered the following aspects if they identified that they will use rainwater from tanks within their development/proposal:

1. tank maintenance
2. the tank design should ensure that every opening includes
 - a) mosquito-proof screens that
 - i. are made of brass, copper, aluminium or stainless steel gauze
 - ii. have a mesh size of not more than one millimetre
 - iii. are installed in a way that does not cause or accelerate corrosion
 - iv. stop mosquitoes passing through the openings
 - b) Flap valves that, when closed, stop mosquitoes passing through the openings.

Under the *Public Health Act 2005*, a person must not use or allow the use of lead—or any material containing lead—in a rainwater collection and storage system when used as a supply of potable water. For further information about rainwater tank regulatory roles and responsibilities, the proponent should refer, when applicable, to the following Queensland Health documents:

- Rainwater tanks—regulatory roles and responsibilities (https://www.health.qld.gov.au/data/assets/pdf_file/0020/444323/rainwatertanks.pdf)
- Rainwater tanks—a Guide to keeping your tank safe. (https://www.health.qld.gov.au/data/assets/pdf_file/0034/719773/rainwater-tank.pdf)

Non-drinking water

Queensland Health supports the appropriate management of water resources, ensuring that any adopted non-potable water management schemes are sustainable and beneficial to the surrounding community. However, health implications to workers at the project and the surrounding communities may result if non-drinking water management schemes—in particular recycled water—are not appropriately installed and managed.

Recycled water or alternate water supplies

A proponent should provide evidence in the EIS that:

- all recycled or alternate water schemes will not adversely affect human health
- when recycled water is to be used, the proponent commits to the implementation of the relevant Australia water recycling guidelines.

These documents can be found at <http://www.agriculture.gov.au/water/quality/nwqms>

The proponent should also identify whether they will be captured as a recycled water provider (for clarification go to <https://www.dews.qld.gov.au/water/regulation>). If they are a recycled water provider, then they are required to highlight within the EIS how they will comply with the requirements of the *Water Supply (Safety and Reliability) Act 2008* and the *Public Health Act 2005*.

Use of rainwater tanks for non-drinking water

Queensland Health supports the sustainable and responsible use of roof-harvested rainwater. The proponent should consider tank maintenance and design aspects, as described for drinking water.

For further information about rainwater tank regulatory roles and responsibilities, the proponent should refer, when applicable to the following Queensland Health documents:

- Rainwater tanks—regulatory roles and responsibilities (<http://www.health.qld.gov.au/publications/public-health/industry-environment/environment-land-water/Water/rainwatertanks.pdf>)
- Rainwater tanks—a Guide to keeping your tank safe (https://www.health.qld.gov.au/data/assets/pdf_file/0034/719773/rainwater-tank.pdf)

Wastewater disposal

In some instances, existing reticulated sewerage systems, particularly in regional and remote areas, may not have the capacity to accommodate increases in connection rates without significant investment. Any upgrades to an existing sewage treatment system, if connections are available, can require significant capital, and may not be scheduled by the local government (or wastewater treatment plant owner). This needs to be considered by a proponent when developing the EIS.

Where a reticulated sewerage system is not available, health and environmental concerns may arise if a site does not install and maintain an appropriate on-site wastewater system to service the workforce. The proponent should provide commitments that adequate certification and/or appropriate plumbing and drainage approvals will be obtained for all sanitation systems that are proposed to be installed and that such systems will meet the required capacity will not adversely affect human health.

The proponent should provide evidence and commitments within the EIS that any other wastewater treatment facilities will be run in a manner that will not adversely affect human health.

Environmental waters for drinking and recreational use

Detailed consideration should also be given to how/if the project will impact on any surrounding waters that are used by other communities as a drinking water supply.

Proponents should consider the downstream effects of any waters released from the site and the potential for such releases to adversely affect human health, either directly (potable water source) or indirectly (used for irrigating crops and/or impacts on seafood). For example, proponents of coal seam gas projects must highlight how the project aligns with the requirements of the *Water Supply (Safety and Reliability) Act 2008*. This Act requires proponents to assess whether the project will impact on water sources off-site that are used as a potable water supply. This includes assessing whether a recycled water management plan is required. It is essential that the proponent provides a recycled water management plan, not only if waters are proposed to be provided on a commercial basis, but also if the waters released by the project are determined— Department of Energy and Water Supply —to have a *material impact* on a drinking water source. It should be noted that this includes activities such as groundwater-aquifer recharge and/or surface water releases. It should also be noted within the EIS that the proponent take the appropriate steps to obtain an exclusion decision by the — Department of Energy and Water Supply —if it is warranted.

Recreational activities such as swimming, surfing and fishing are extremely important to communities. Therefore, it is essential that waterways do not pose an unacceptable public health risk.

To minimise the risk of recreational water illnesses, a proponent should provide written evidence and/or commitments that:

- there will be no impact on recreational water bodies that are likely or may be affected by water discharge or runoff from the proposal
- where appropriate, 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
- monitoring of microbial, algal species and numbers and chemical contaminants will be undertaken when necessary—this should include background monitoring prior to construction, during construction and following operations
- depending on the nature of development and construction activities (e.g. where dredging or similar activities may be required), there may be a need to undertake monitoring in relation to fish/shellfish health for recreational collection and consumption.

Radiation safety

An aspect many proponents overlook when producing an EIS is the potential for radiation hazard, especially regarding projects involving mining or mineral processing. Examples of projects which may need to undertake an assessment for radiation hazard are oil and gas, bauxite/aluminum industries, phosphate industries (such as fertiliser manufacturer), metal extractive and processing industries, coal extraction and electricity generation. These activities can result in the workers and the public being exposed to radiation from naturally occurring radioactive material (NORM) and may produce radioactive waste.

Proponents need to identify in the EIS whether their project requires a:

- licence under the *Radiation Safety Act 1999* if prescribed radiation sources (such as radiation gauges, industrial radiography equipment) are proposed to be used for testing or measurement purposes
- radiation management plan and radioactive waste management plan for
 - mining (including exploration) and processing of ores containing NORM
 - industries where radiation protection issues may arise due to NORM.

Projects that may be impacted with the inadvertent presence of radioactive material should undertake a radiation risk assessment. This risk assessment should identify how the risk of radiation hazard, if significant, will be managed and/or mitigated.

The risk management strategy may include:

- an ongoing radiation monitoring program for the life of the project, if necessary
- identification and demonstration of compliance with the relevant codes of practice for handling, storage and disposal of radioactive material. Such codes may include:
 - Code of Practice for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005)
 - Safety Guide for the Management of Naturally Occurring Radioactive Material (NORM)—these codes are available from the Australian Radiation Protection and Nuclear Safety Agency www.arpansa.gov.au/publications/codes/rps.cfm
 - an assessment and management of radiological contaminants during the decommissioning / rehabilitation phase of the project.

An EIS produced for activities such as these should demonstrate compliance with the requirements in the *Radiation Safety Act 1999* or the above codes if it applies to any radiation sources in the proposed project.

Similarly, projects with sources of electromagnetic fields, such as major electricity infrastructure—transmission power lines—also need to undertake a hazard and risk assessment. A risk management strategy may include the following:

- an ongoing monitoring program for the life of the project, if necessary
- identification and demonstration of compliance with standards such as the Radiation Protection Standard—Maximum Exposure Levels to Radiofrequency Fields—3 kHz to 300 G Hz.

The Radiation Health Unit in the Health Protection Branch of the Department of Health handles the administration of the *Radiation Safety Act 1999*. However, radiation safety on mines and exploration sites is also subject to regulation under the *Mining and Quarrying Safety and Health Act 1999* and subordinate regulation. Please contact the Department of Natural Resources and Mines for further information with respect to this legislation.

Land management

Contaminated sites

Many activities requiring an EIS have the potential to contaminate ground and surface waters, as well as the soil, which may adversely affect human health and wellbeing.

Contaminated land refers to land contaminated by hazardous substances—such as arsenic, dichlorodiphenyltrichloroethane oil—that may pose a risk to human health and/or the environment. The EIS should identify the risk that the project will pose to the contamination of lands.

Proponents have responsibilities under the *Environmental Protection Act 1994* to notify the DES when they become aware that their land has been or is being used for a notifiable activity—activities that have been identified as likely to cause land contamination which are listed in Schedule 3 of the *Environmental Protection Act 1994*—or contaminated by a hazardous contaminant. The proponent should identify an ongoing plan—for example within the EMP—that sets out measures that will be undertaken to prevent and/or manage any potential contamination on an ongoing basis for the lifetime of the project. In projects where contaminated land has the potential to adversely affect human health, an assessment following the guidelines outlined by the National Environment Protection (Assessment of Site Contamination) Measure. These guidelines can be found at <http://www.nepc.gov.au/nepms/assessment-site-contamination>

Alternatively, a project may also propose to undertake works that involve the removal or demolition of structures that may contain hazardous material such as asbestos. It is essential that this work is done in a manner which will not adversely affect human health and the wellbeing of the surrounding community. In almost all situations, such removal/demolition work needs to be undertaken in accordance with the requirements of the *Work Health and Safety Act 2011* or similar legislation. This may require a management plan to be in place to ensure any hazards do not adversely affect the community. An example of this could be the establishment of an asbestos management plan that would set out appropriate safe work practices. This management plan should also identify any proposed disposal locations, highlighting any pertinent local government requirements (e.g. landfill capacity/requirements).

For further information regarding the management of asbestos at a work site, please refer to the Department of Education, Office of Industrial Relations website <http://www.deir.qld.gov.au/asbestos/>

Enquiries regarding the appropriate on-site management of contaminated sites should be directed to the DES.

Waste management

In the development of an EIS, proponents must consider waste streams and the appropriate disposal practices. The proponent should consider the capacity of local landfill sites and other waste facilities. Improper waste management practices have the potential to adversely affect human health and cause a public health risk (as defined in Section 11 of the *Public Health Act 2005*). Wastes that can cause a public health risk vary greatly depending upon the project. These wastes could range from material that is expected to contain naturally occurring radioactive material (as described above) on a site, to decaying animal carcasses or materials containing asbestos.

Vector and pest management

Pest management

Proponents should consider that all proposed projects are likely to attract a range of pest species, such as insects, rodents and feral animals. The requirement to control/mitigate the public health risks associated with designated pests, as defined within the *Public Health Act 2005* (e.g. mosquitoes, rats, mice and any other animal prescribed by regulation), protects the health and wellbeing of any surrounding community as well as the workers on-site.

A proponent needs to provide written evidence of their commitment to develop and implement a pest management plan.

Pesticide use

A site may require the application of pesticides to control a range of pest species (e.g. insects, weeds, feral animals). Where contractors are engaged, they should be appropriately licensed under the *Pest Management Act 2001*.

A proponent should provide written evidence of their commitment to control pests by ensuring any contractors employed hold a current pest management technician license.

Further information and guidance about pest management can be found at

<http://www.health.qld.gov.au/public-health/industry-environment/pest-management/default.asp>

Biting insect (mosquito, biting fly and biting midge) management

Biting insects can be divided into two distinct groups, pest species and species which are vectors of disease. Biting insects are able to disperse considerable distances from breeding sites. Proponents should be aware that biting insects could create nuisance and increase the risk of the spread of disease. The most common biting insects are mosquitoes, biting flies and biting midges.

Mosquitoes

There are approximately twenty mosquito species that cause adverse impacts in Queensland. Examples of problematic mosquitoes include:

- The mosquito species *Aedes vigilax* and *Culex annulirostris*, which are considered wetland species. These species are the vector for the most common endemic mosquito-borne diseases (Ross River virus and Barmah Forest virus) that produce non-fatal but debilitating ‘flu-like’ symptoms. These mosquitoes are often targeted in monitoring and pest control programs throughout the state.
- The dengue mosquito vector in Queensland is *Aedes aegypti*. In Queensland the prevention and control of the dengue vector is a major public health concern. North Queensland experiences regular outbreaks of dengue. *Aedes aegypti*, is also dispersing across Queensland. *Aedes aegypti* is a domestic species which is widespread throughout urban tropical north Queensland and has been detected in many towns in sub-tropical Queensland, but has yet to establish in south east Queensland.

- The mosquito species *Culex annulirostris*, which is widespread throughout Australia, and breeds in surface pools of water. This mosquito carries and spreads Murray Valley encephalitis, which can be fatal but is rare in Queensland.

Other mosquito species also have the potential to spread exotic diseases (e.g. chikungunya (CHIKV), Japanese encephalitis, malaria, and West Nile) which have caused major public health impacts (outbreaks) in other countries. Increased international travel makes it easier for the introduction of these diseases into locations either from which they have been eradicated or in which they have never occurred. Australia and Queensland in particular provide a suitable environment for incursions of these exotic diseases. The risk of these diseases impacting Queensland communities are significant as in many cases the mosquito vectors are already present. For example, the potential for CHIKV virus outbreaks in Queensland has increased with an epidemic declared in 2013 in Papua New Guinea. This virus can be carried and transmitted by *Ae. aegypti*, which is abundant in North Queensland and *Ae. Albopictus*, which is already established in the Torres Strait Islands.

Biting flies and biting midge

These insects do not transmit disease in Australia. However, the pain and allergic reaction caused by bites can have significant adverse impacts to workers or nearby residents / visitors. Control measures may be required to mitigate the impact of these insects such as routine spraying programs (e.g. biting midge control in canal developments of the Gold Coast), or as an emergency response to sporadic events (e.g. blackfly control in western Queensland following flooding rains).

Management plans

Project sites located near waterways, salt marshes/wetlands or in cyclone or flood prone areas will be particularly susceptible to mosquito and other biting insect populations. Proponents and/or developers tend to ignore concerns raised about the need to minimise mosquito breeding and can put their employees and local communities at risk of contracting debilitating or life-threatening mosquito-borne diseases, as well as impacting on lifestyle due to the pressure of nuisance mosquitoes and biting insects around work and living areas.

Project sites, exploration camps and mines, as well as construction villages can also create new habitats for mosquitoes to breed and can be located in remote areas where serious mosquito-borne disease can occur and where mosquito management may be difficult.

The infrastructure installed on-site may also create new mosquito breeding sites if not appropriately located, designed and maintained. The proponent must assess the site's potential to create breeding sites and harbourages for biting insects and describe strategies (including monitoring) to prevent the spread of mosquito-borne diseases. Mosquito control on-site needs to be managed in accordance with the *Public Health Act 2005* and Division 2 of the *Public Health Regulation 2005*.

To minimise the health risk caused by mosquitoes, the proponent should provide written evidence on their commitment to develop and implement a mosquito (and other biting insect) management plan. The plan needs to provide strategies for the management of risks on-site, including breeding sites and harbourages during construction and ongoing operational phases of the project. The may be incorporated into the projects Pest Management Plan.

For further guidance in relation to managing mosquitoes and biting midges on sites, please refer to the *Mosquito Management Code of Practice* and the *Guidelines to minimise mosquito and biting midge problems in new development areas*.

http://www.lgaq.asn.au/c/document_library/get_file?uuid=5f9164dea975633311e59614b40102d8&groupId=10136

<http://www.health.qld.gov.au/ph/documents/cdb/14804.pdf>

Community health and social aspects

Many projects involve the introduction of hundreds of people directly into the community over a short period. For many rural or regional townships, this can increase the local population considerably and place undue stress on existing health services. It is essential for the proponent to consider the direct and indirect health impacts that significantly increasing the population may have, particularly in remote or regional areas.

Communicable diseases

To minimise the risks of communicable diseases arising from interactions of the workforce and local communities, the proponent should commit to developing and implementing an ongoing health management (including prevention) plan. This plan should incorporate communicable disease education for their workforce that includes associated contractors. The plan should safeguard workers and local residents from the spread of communicable diseases (such as dengue, measles, hepatitis A and chlamydia). This plan should incorporate but not be limited to:

- prevention programs (e.g. vaccination programs, safe sex awareness)
- monitoring and surveillance activities
- response protocols

This plan in particular should be developed for worksites with large workforces (particularly large transient workforces) that are located within close proximity of small local communities.

Public buildings/accommodation camp facilities

Where on-site accommodation is provided, a range of mandatory appropriate health-related building regulations need to be addressed. The proponent should ensure consultation with the local government to gain appropriate approvals and advice regarding these matters. Standard building requirements should be used to negate aspects such as overcrowding and ensuring sufficient toilet and shower facilities are available so as not to generate conditions harmful to human health.

Areas that are used for food preparation must also comply with health and hygiene requirements. The provision of food on-site must comply with the requirements of the *Food Act 2006*. This includes the design of food preparation areas that are administered by the local government. Further information regarding food safety and associated requirements can be found at www.health.qld.gov.au/foodsafety/default.asp

If a swimming pool (or aquatic facility/spa) is to be provided for employee use, additional approvals are required to ensure the pool is installed and operated appropriately. Further information about pool safety and water quality can be found at <http://www.health.qld.gov.au/public-health/industry-environment/environment-land-water/water/quality/pool-spa-recreation/default.asp> and www.hpw.qld.gov.au/construction/BuildingPlumbing/PoolSafety/Pages/default.aspx

The proponent should provide commitments that such approvals will be obtained from the local government and other relevant statutory bodies.

Emergency management

Many major project proposals requiring an EIS are located in remote areas that are prone to natural disasters such as cyclones and floods, as well as on-site activities such as fires, blasting/explosions. A proponent proposing a project in these remote areas should commit to the development of an emergency medical response plan (EMRP) and consult appropriately with relevant regional HHSs.

The EMRP should be developed for the project to plan for the health impacts of applicable incidents. Examples of such incidents are identified in the *Critical Infrastructure Emergency Risk Management and Assurance Handbook* (Emergency Management Australia, 2nd Ed May 2004). The plan should consider:

- an evacuation plan, including aerial transportation requirements
- arrangements for mass casualty incidents
- family member support of injured employees
- planning for extreme temperature and flood events
- the limited availability of health infrastructure and health specialists in a remote region
- communications plan
- disaster equipment that will be required
- the training of staff
- business continuity, with particular attention to reliance on resources that may also be relied upon by other industries/major projects that are active in the area.

The EMRP should be developed in collaboration with appropriate authorities and services—for example Queensland Ambulance Service.

Provision of health services

In addition to proponents putting in place appropriate systems to deal with emergency management, the capacity of the local health providers should be considered. The influx of new or unexpected populations requiring treatment for unexpected illness or accidents or routine health maintenance and prevention, may cause a strain on the local health services (such as the local hospital, dentists, general practitioner) within a region, particularly where a shortage in the health workforce may already be present. The proponent needs to assess the impact that both the predicted construction and operational workforce will place on these services. It is essential that the regional HHSs are consulted during the early planning stages to identify and assess whether the

capacity of the regional health services will meet the needs of the increased population. It is essential that the proponent provide an adequate commitment that on-going consultation with the HHS will take place. Further information about HHSs is located at www.health.qld.gov.au/services/default.asp

In certain circumstances, proponents may wish to provide an on-site medical facility to cope with minor medical emergencies. It is important in these circumstances that appropriate approvals are gained for the storage of drugs and poisons on site as required by the Health (Drugs and Poisons) Regulation 1996. Further guidance regarding these approvals is available from <http://www.health.qld.gov.au/system-governance/licences/medicines-poisons/approvals-authorities/default.asp>

Other aspects affecting health—social considerations

Common health needs that have been identified for those working in resources projects (e.g. mining and energy sectors) include physical injury, respiratory illness, mental health, and chronic conditions such as heart disease and cancer. Workers are also prone to health risk behaviours because of increased alcohol intake, drug and tobacco use, obesity/overweight and chronic fatigue, particularly among those working shifts. The health service needs of those working on projects in remote areas need to be considered in addition to the needs already existing in the region. Social aspects can also have considerable effect on the overall health of a community. Proponents should properly consult and engage with the local community and identify key performance indicators that adequately measure the ongoing community satisfaction with health and wellbeing impacts of the project implementation. Further guidance regarding social impact is available from

<https://www.statedevelopment.qld.gov.au/coordinator-general/social-impact-assessment.html>

Abbreviations

Acronym	
ADWG	Australian Drinking Water Guideline 2011
CHIKV	chikungunya
DES	Department of Environment and Science
DoH	Department of Health
DSDMIP	Department of State Development, Manufacturing, Infrastructure and Planning
EIS	environmental impact statement
EMP	environmental management plan
EMRP	emergency medical response
EPA	<i>Environmental Protection Act 1994</i>
EPP Air	<i>Environmental Protection Policy (Air) 2008</i>
EPP Noise	<i>Environmental Protection (Noise) Policy 2008</i>
HHS	Hospital and Health Service
NEPM AAQ	National Environmental Protection (Ambient Air Quality) Measure 2003 (Cwlth)
NO _x	oxides of nitrogen
NORM	naturally occurring radioactive material
PHU	Public Health Units
SO ₂	sulfur dioxide
SPA	<i>Sustainable Planning Act 2009</i>
SDPWO	<i>State Development and Public Works Organisation Act 1971</i>
USA	United States of America
VOCs	volatile organic compounds
WVN	West Nile virus

