

Module 20. Wind farm development

20.1 Wind farm state code

20.1.1 Purpose

The purpose of the code is to:

- (1) regulate the development of a new wind farm, or the expansion of an existing wind farm, in an appropriate location
- (2) ensure potential adverse impacts on the community, environment and strategic airports and aviation facilities of interest to the state, are avoided or mitigated during the construction and operation of a wind farm.

Guidance on how to demonstrate compliance with the performance outcomes and acceptable solutions of this state code are available in the *Wind farm state code planning guideline*, Department of Infrastructure, Local Government and Planning, 2015.

20.1.2 Criteria for assessment

Development mentioned in column 1 below must be assessed against the assessment criteria in the table mentioned in column 2.

Column 1	Column 2
Material change of use	Table 20.1.1

Table 20.1.1: Material change of use

Performance outcomes	Acceptable outcomes
Aviation Safety, Integrity & Efficiency	
PO1 The safety, operational integrity and efficiency of air services are not adversely affected by the location or siting and design of the development.	<p>AO1.1 Wind turbines or wind monitoring towers are less than 150 metres in height and do not infringe on the obstacle limitation surfaces (OLS) of a certified or registered aerodrome.</p> <p>OR</p> <p>AO1.2 For development involving wind turbines or wind monitoring towers more than 150 metres in height and more than 30 kilometres away from a certified or registered aerodrome or a military aerodrome, an aviation risk assessment by a suitably qualified aerodrome consultant and specialist certifies the development will not adversely affect the safety, operational integrity and efficiency of air services.</p> <p>OR</p> <p>AO1.3 For development involving wind turbines or wind monitoring towers more than 150 metres in height and within 30 kilometres of a certified or registered aerodrome, written endorsement by the Civil Aviation Safety Authority (CASA) and Airservices Australia stating there are no risks to air services.</p> <p>OR</p> <p>AO1.4 For development involving wind turbines or wind monitoring towers more than 150 metres in height and within 30 kilometres of a military aerodrome, or a certified or registered aerodrome jointly used as a military aerodrome, written endorsement by the federal Department of Defence, Civil Aviation Safety Authority (CASA) and Airservices Australia stating there are no risks to air services.</p> <p>AND</p> <p>AO1.5 Marking and lighting of wind turbines or wind monitoring towers is provided in accordance with sections 30–42 of <i>National Airports Safeguarding Framework Guideline D – Managing the risk to aviation safety of wind turbine installations (wind farms)/wind monitoring towers</i>.</p>

Performance outcomes	Acceptable outcomes
Local Amenity	
PO2 Development is designed and sited to avoid or minimise electromagnetic interference to pre-existing television, radio reception or transmission.	No acceptable outcome is provided.
PO3 Development avoids shadow flicker impacts on existing adjoining sensitive land use(s).	AO3.1 The modelled blade shadow flicker impact on any existing adjoining sensitive land use(s) does not exceed 30 hours per annum and 30 minutes per day. AND AO3.2 Wind turbine blades have a low reflectivity finish.
Flora and fauna	
PO4 Development ensures the impacts on flora, fauna and habitat are avoided and minimised through siting, design and operation.	No acceptable outcome is provided.
Traffic and access	
PO5 Development provides suitable vehicular access, manoeuvring areas and parking for the ongoing operation and maintenance activities.	No acceptable outcome is provided.
Stormwater management	
PO6 Development avoids or minimises adverse impacts on environmental values and water quality objectives for receiving waters during the operation of the development.	AO6.1 Development is located more than 30 metres from a waterway (top of bank). AND AO6.2 All stormwater, wastewater, discharges and overland flows leaving the site are managed and treated to achieve the same quality and quantity of receiving waters prior to development.
Visual amenity	
PO7 Development minimises adverse impacts on identified visual amenity and or landscape values of the locality or region.	AO7.1 Development meets the appropriate criteria for landscape values and scenic amenity, established under the relevant regional plan or local government planning scheme. AND AO7.2 Electrical infrastructure connecting wind turbines and substation/s are located underground, and where possible within internal access roads and co-located with other services.
Acoustic amenity	
PO8 Development ensures all wind turbines are setback a minimum of 1,500m from all existing adjoining sensitive land use(s).	No acceptable outcome is provided.
PO9 Noise emissions resulting from the development achieve acceptable outdoor noise levels for existing adjoining sensitive land use(s).	AO9.1 The outdoor night-time (10pm to 6am) A-Weighted equivalent noise level (L_{Aeq}), assessed one metre from all noise affected façades of existing adjoining sensitive land use(s), does not exceed: (1) 35dB(A), or (2) the background noise (L_{A90}) by more than 5dB(A), whichever is the greater, for wind speed from cut-in to rated power of the wind turbine and each integer wind speed in between extrapolated to hub height. AND AO9.2 The outdoor day-time (6am to 10pm) A-Weighted equivalent noise level (L_{Aeq}), assessed one metre from all noise affected façades of existing adjoining sensitive land use(s) does not exceed:

Performance outcomes	Acceptable outcomes
	(1) 37dB(A), or (2) the background noise (L_{A90}) by more than 5dB(A), whichever is the greater, for wind speed from cut-in to rated power of the wind turbine and each integer wind speed in between extrapolated to hub height.
PO10 Low frequency noise emissions resulting from the development achieve acceptable outdoor noise levels for existing adjoining sensitive land use(s).	AO10.1 The outdoor night-time (10pm to 6am) C-Weighted equivalent noise level (L_{Ceq}), assessed one metre from all noise affected façades of existing adjoining sensitive land use(s), does not exceed 60dB(C). AND AO10.2 The outdoor day-time (6am to 10pm) C-Weighted equivalent noise level (L_{Ceq}), assessed one metre from all noise affected façades of existing adjoining sensitive land use(s), does not exceed 65dB(C).
Construction management	
PO11 Development avoids or minimises adverse impacts on environmental values and water quality objectives for receiving waters during construction.	AO11.1 Stormwater and erosion sediment control measures and practices are implemented throughout construction to ensure the quantity and quality of all stormwater, wastewater, discharges and overland flows leaving the site are managed and treated to achieve the same quality and quantity of receiving waters prior to development.
PO12 Construction traffic is managed to mitigate impacts on road networks, and is supported by any relevant road or intersection upgrades where identified.	No acceptable outcome is provided.

1.2 Glossary of terms

For the purposes of this code, the following terms apply:

Air services means the premises used for any of the following:

- the arrival and departure of aircraft
- the housing, servicing, refuelling, maintenance and repair of aircraft
- the assembly and dispersal of passengers or goods on or from an aircraft
- any ancillary activities directly serving the needs of passengers and visitors to the use
- associated training and education facilities
- aviation facilities.

Cut-in means the wind speed at which a wind turbine starts power production.

Electromagnetic interference means disturbance or degradation of telecommunications signals currently in operation over the land use area. Includes signals transmitted via microwave, very high frequency and ultra-high frequency systems.

Ground level means the level of the natural ground, or, where the level of the natural ground has been changed, the level as lawfully changed.

Height of a wind turbine means the maximum height reached by the tip of the turbine blades at their highest point above ground level.

Hub height of a wind turbine means the height of the hub measured from ground level (i.e. the height of the wind turbine without blades).

Landscape values means areas protected under a regional plan, such as biodiversity networks, natural economic resource areas (including rural production), scenic amenity areas and landscape heritage areas.

Low frequency noise means noise from 20Hz to 200Hz.

Low reflectivity means a surface treatment that minimises glint.

Military aerodrome means an aerodrome under the control of any part of the Defence Force.

Obstacle limitation surfaces (OLS) means a series of surfaces that set the height limits of objects around an aerodrome. Objects that project through the OLS become obstacles.

Sensitive land use means any of the following as defined in the standard planning scheme provisions:

- (1) caretakers accommodation
- (2) child care centre
- (3) community care centre
- (4) community residence
- (5) detention facility
- (6) dual occupancy
- (7) dwelling house
- (8) dwelling unit
- (9) educational establishment
- (10) health care services
- (11) hospital
- (12) hotel
- (13) multiple dwelling
- (14) non-resident workforce accommodation
- (15) office
- (16) relocatable home park
- (17) residential care facility
- (18) resort complex
- (19) retirement facility
- (20) rooming accommodation
- (21) rural workers' accommodation
- (22) short-term accommodation
- (23) tourist park

Scenic amenity means areas of high scenic amenity and significant view corridors as identified by a regional plan or a local government planning scheme.

Shadow flicker means a shadow that is cast under certain combinations of geographical position and time of day, when the sun passes behind the blades of a wind turbine and as the blades rotate, the shadow flicks on and off. The duration of this effect, which varies according to the time of the year, can be calculated from the machine geometry and the latitude of the site.

Wind farm means any, or a combination of, the following—

- (a) premises containing more than 1 wind turbine (including any existing wind turbines); or
- (b) premises containing 1 or more wind turbines of a height greater than 30m; or
- (c) premises containing 1 or more wind turbines (including any existing wind turbines) used to generate more than 500 kilowatts (collectively) of electricity by wind force; and
- (d) includes infrastructure and works such as site access, foundations, wind monitoring towers, landscaping, ancillary storage and maintenance facilities associated with the wind turbine(s).

Wind farm does not include a premises containing 1 wind turbine of a height less than 30m and with an overall generation capacity of less than 500 kilowatts. These proposals will be assessed by the local government authority.

Wind monitoring tower means a mast that incorporates wind speed and direction measuring and recording equipment.

Wind turbine means a machine or generator driven by wind, and includes turbine blades.

1.3 Abbreviations

dB(A) – decibels measured on the 'A' frequency weighting network.

dB(C) – is a measured sound pressure level. The 'C' frequency weighting adjustments are much reduced at low frequencies compared to 'A' weighting, giving greater 'prominence' to the low-frequency components in the overall measured dBC sound pressure level compared to the measured dBA sound pressure level.

LAeq – Energy Averaging.

RPEQ - Registered Professional Engineer of Queensland.

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