Environmentally Sustainable Design Strategy

220081 28-32 BOURKE RD

Client:

Alexandria Property Development Pty Ltd

Revision:
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REPORT INFORMATION

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1 Executive Summary

This report has been prepared by LCI consultants for the proposed 32-42 Bourke Road, Alexandria (Alexandria Health Centre) project. This Report provides an overview of the Ecological Sustainable Design (ESD) initiatives considered for the new Alexandria Health Centre, and to address the ESD requirements of the Secretary's Environmental Assessment Requirements (SEARs). This report will be included within the Environmental Impact Statement (EIS) that will accompany a State Significant Development Application (SSDA).

2 Overview of Proposed Development

Development consent is sought for a concept proposal for the 'Alexandria Health Centre' comprising medical centre uses and anchored by a mental health hospital. Specifically, the application seeks concept approval for:

- In principle arrangements for the demolition of existing structures on the site and excavation to accommodate a single level of basement car parking (partially below ground level).
- A building envelope to a maximum height of 45 m (RL 53.41) (including architectural roof features and building plant). The podium will have a maximum height of RL 28.41.
- A maximum gross floor area of 11,442.20 sqm, which equates to a maximum FSR of 3.85:1. The total FSR will comprise a base FSR of 2:1, a community infrastructure bonus FSR of 1.5:1 and a 10% design excellence bonus FSR (subject to a competitive design alternatives process).
- Indicative use of the building as follows:
  - Mental health hospital at levels 5-7.
  - Medical centre uses at levels 1-4; and
  - Ground level reception/lobby and pharmacy.
- Principles for future vehicular ingress and egress from Bourke Road along the site's western frontage.
- Subject to agreement on a public benefit offer submitted with this application, the proposal includes the indicative dedication of the following land to Council as envisaged by the Draft Sydney Development Control Plan 2012 – Southern Enterprise Area Amendment (Draft DCP):
  - A 2.4m wide strip of land along the site's frontage to Bourke Road for the purpose of footpath widening
  - A 3m wide lane along the site's western boundary contributing towards a 6m wide lane (it is noted that the concept proposal will allocate an additional 3 m strip of land within the site along the western boundary to enable two-way vehicle movement into and out of the site).
  - A 3m wide lane along the site's southern boundary, contributing towards a 9m wide lane.

3 Site Description

The site is located within the City of Sydney Local Government Area (LGA). The site is situated approximately 4km to south of the Sydney CBD and approximately 2km north-east of the Sydney International Airport within the suburb of Alexandria.

The site comprises approximately 3,000 sqm and currently contains a one storey warehouse building used for the purpose of vehicle repairs. The surrounding context consists of similar structures utilised for light industrial purposes.

The street address for the property is 28-32 Bourke Road, Alexandria, NSW, 2015 and is known as is Lots 1,2 and 3 in Deposited Plan 324707.

Figure 1: Site plan.

4 Assessment Requirements

4.1 SEARs

The Department of Planning and Environment have issued Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as follows:

Ecologically Sustainable Development (ESD) and climate change	Report Reference
Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the concept design and ongoing operation of the development.	Refer to **Section 5.0** in response to clause 7(4) of Schedule 2 of the EP&A Regulation
Demonstrate how the concept development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	See **Section 5.2** for how the project has incorporated ESD in the design, construction, and operation of the development. See **Section 6.0 and 7.0** for details regarding the proposed ESD initiatives
Demonstrate how the concept development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	See **Section 6.0** for details regarding: • The proposed Energy and GHG emissions reduction strategies. These strategies will contribute to the Government's goal of net zero emissions by 2050 by reducing the demand side consumption (building energy demand) and supporting transition to full electrification and elimination of fossil fuel (except for minor use i.e. backup diesel generator). • For initiatives relating to water conservation and site treatments. Refer to the Integrated Water Management Plan for details relating to water sensitive urban design.

5 SEAR 8 | Ecologically Sustainable Development (ESD) and Climate Change

5.1 Clause 7(4) of Schedule 2

The ESD principles that are to be incorporated into the proposed development must be aligned with Clause 7(4) – Schedule 2 – Environmental Planning & Assessment Regulation (2000).

5.1.1 The Precautionary Principle

The proposed Alexandria Health Centre will be constructed on a previously developed site, consisting of existing industrial facility and hardscaping. This will not have an adverse environmental impact and therefore alleviates concern of serious or irreversible environmental damage. Proactive measures to prevent environmental degradation have been included within the design, construction and operational phases of the proposed development. During the design and construction phases the main contractor will implement an Environmental Management System that follows NSW Environmental Management System Guidelines. The project will target sustainability initiatives that will drive efficient operation of the building, which ensures environmental risks are actively managed across the site.

5.1.2 Inter-Generational Equity

To uphold inter-generational equity, the proposed development minimises the consumption of energy and water resources while reducing waste.

The ESD principles incorporated into the proposed Alexandria Health Centre facilitates the conservation of energy and water resources through energy and water efficiency measures. Energy reduction has been considered in the design of the building, through passive and active measures. The reduction in water use has been considered through high WELS equivalent water fixtures and fittings, low water demand landscaping and use of non-potable water sources (harvested rainwater) where appropriate.

Waste generated during the construction and operational phases will be diverted from landfill to be recycled. An Environmental Management System (EMS) will be utilised to throughout construction. Operational waste streams will be separated to maximise recycled waste.

Reducing energy, water and waste ensures that the health, diversity and productivity of the environment is maintained for the benefit of future generations.

5.1.3 Conservation of Biological Diversity and Ecological Integrity

The project's ESD principles to reduce energy, water and waste consumption have an indirect impact to conserve biodiversity and ecological integrity to the surrounding area. By minimising demand on energy and water resources, the need for land-clearing and the pollution generated from new Alexandria Health Centre to support the surrounding area will be minimised.

5.1.4 Improved Valuation

The valuation of the project's assets and services consider environmental factors through the implementation of various ESD initiatives. An Environmental Management System will be adhered to during construction to ensure that

contractors are responsible for costs associated with generating excessive pollution and waste. The project team will bear the extra cost of providing recycling and landfill waste streams during construction and operational phases. This creates a system where the polluter pays and creates and incentive to reduce pollution and waste.

The design of the project will be designed to meet or exceed the NCC Section J 2019 (Energy Efficiency Provisions) and has committed to achieving a 5 Star certified rating under the Green Star Buildings v1 rating tool, which will provide environmental goals for the project. Project requirements stipulate design teams are contractually required to deliver targeted ESD initiatives for the project.

5.2 Framework to Reflect Best Practice Sustainable Design Principles

5.2.1 Green Star Buildings v1

The 32-42 Bourke Road, Alexandria (Alexandria Health Centre) project has committed to achieving a 5 Star Certified Green Star Buildings v1 rating. The Green star Buildings rating system provides a framework to assess how a building reduces its impact on the environment while meeting the economic and social needs for its occupants and surrounding communities. Green Star's goal is to "lead the sustainable transformation of the built environment", by encouraging practices that:

- Reduce the impact of climate change
- Enhance health & quality of life
- Restore and protect our planet's biodiversity and ecosystems
- Drive resilient outcomes for buildings, fit outs, communities, and homes
- Contribute to market transformation and a sustainable economy.

The Green Star Design Buildings v1 rating system assessing buildings through the following categories:

- Responsible
- Healthy
- Resilient
- Positive
- Places
- People
- Nature
- Leadership

Points are awarded for a building project's ability to secure as many credits as possible from each category. Each credit targets the environmental impact of a specific design feature. The total number of points awarded determines if the level of certification (star rating) as shown in figure 2.

Figure 2: Green Star Buildings v1 – Rating Scale

The project will achieve a set of minimum expectations to ensure that the building meets a basic definition of a green building established by the Green Building Council of Australia (GBCA). The table below summaries each minimum expectation by Green Star credit. Note, the project has committed to achieving a 5 Star rating, and will be required to achieve additional minimum expectations through the climate positive pathway. These climate positive minimum expectations will be addressed as part of the design.

Green Star Credit	Minimum Expectation Criteria
Responsible Construction	• The site must have an environmental management plan. • The builder/head contractor must have an environmental management system; large builders will need to be ISO 14001 accredited. • 80% of construction and demolition waste must be diverted from landfill. • The head contractor must provide sustainability training to construction workers.
Certification and Handover	• Appropriate metering must be present to enable ongoing management and monitoring. • The building has set environmental performance targets. • The building must be commissioned and tuned. • Air tightness testing must be undertaken. • The project team create and deliver operations and maintenance information for facilities management. Information is available to building users on how to best use the building.
Responsible Resource Management	• The building must have appropriate spaces for waste management and an appropriately sized loading dock.
Clean Air	• The ventilation system must have appropriate filtration. • Point source pollutants, such as printers and kitchens, must be exhausted directly outside. • The building must be provided with an adequate amount of outside air.
Light Quality	• Lighting fittings must be of good quality. • Glare from light sources and daylight must be managed. • Lighting levels must be appropriate for typical tasks in each space. • A daylight strategy must be developed to provide adequate levels of daylight.
Acoustic Comfort	• Internal noise levels from services and the outside are limited through an acoustic comfort strategy.
Exposure to Toxins	• All paints, adhesives, sealants and carpets must have low levels of Volatile Organic Compounds. • Engineered wood must be low formaldehyde. • There must be no lead, asbestos, and PCBs in the building.
Climate Change Resilience	• The project team must complete a pre-screening assessment checklist to identify climate related risks facing the building.
Upfront Carbon Emissions	• The building has 10% less upfront carbon emissions compared to a standard building from materials.
Energy Use	• The building has at least a 10% lower energy consumption than one built to the National Construction Code 2019.
Energy Source	• The building provides a Zero Carbon Action Plan which must include a target date by when the building is expected to operate as fossil fuel free (fully electric).

Green Star Credit	Minimum Expectation Criteria
Water Use	• The building has at least a 15% reduction in potable water usage when compared to a reference building or has installed water efficient fixtures and appliances.
Movement and Place	• There are showers, lockers and change room facilities for building occupants. • The facilities are accessible, inclusive and located in a safe and protected space.
Inclusive Construction Practices	• During construction, the head contractor provides gender appropriate facilities and personal protective equipment. • The head contractor also installs policies on-site to increase awareness and reduces instances of discrimination, racism and bullying.
Impact to Nature	• Ecologically sensitive sites are protected. • The building's light pollution has been minimised.

6 Key Ecological Sustainable Design Strategies

The key ESD strategies for the project have been described below. The key ESD strategies are highly relevant to the nature of the project and will be explored further in achieving the ESD goals and within the project constraints:

- Incorporate onsite solar photovoltaics (Solar PV)
- Use of low embodied carbon materials throughout the development in reducing upfront carbon emissions
- Incorporate high performance heating, ventilation and air conditioning (HVAC) systems, including: heat recovery chillers for simultaneous chilled water and heating hot water production during shoulder seasons, high performance water-cooled chillers, high performance air handling equipment to minimise fan energy consumption (equivalent to Class A Eurovent efficiency), demand controlled ventilation to maintain high quality indoor environment while minimising energy consumption, efficient thermal zoning to maintain thermal comfort and reduce over-cooling and over-heating.
- Indoor air quality, e.g. low indoor CO2 and PM2.5 levels, via increased outside air supply (over and above minimum code requirements) and enhanced filtration. Reduction of pollutant sources through use of low VOC and formaldehyde materials.
- Low energy flicker free LED lighting, with high Colour Rendering Index and glare reduction. Consideration of circadian lighting for staff and patients.
- Electrification/No fossil fuel use to support the transition to Net Zero Emissions. For example electric heat pumps to be used in lieu of gas boilers for heating hot water and domestic hot water, no gas appliances in commercial kitchens.
- Consider Zero Ozone Depletion Potential and Lower Global Warming Potential of refrigerants
- Consider the recent impacts of COVID 19 and how the development will target and improve occupant health and operate during a pandemic or similar health crisis.
- Consider the use of mixed mode operation to appropriate areas of the buildings to allow occupants to connect to the outdoor when ambient conditions are favourable.
- Consideration of Chilled water and heating hot water thermal storage subject to space to house a large thermal storage tank. Thermal storage offers opportunities to reduce operational energy cost and resilience against peak conditions.
- Consider passive ESD measures such as external shading or high-performance facades to reduce peak summer solar gain, maximise annual building energy, and create occupant comfort through effective daylighting.
- Consideration of better air tightness, similar to Passive House standard
- Consider implementing Water Sensitive Urban Design features such as water efficient fittings and appliances, rainwater tanks to reduce potable water consumption and costs, proprietary devices and other approved site-specific measures to reduce pollution from stormwater entering local waterways.

Sustainable Design Principles

The following sustainable design principles have been proposed for the Alexandria Health Centre and can be addressed through the categories outlined within the Green Star Buildings v1 rating system.

6.1.1 Responsible

The Responsible category recognises activities that ensure the building is designed, procured, built, and handed over in a responsible manner.

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• Alexandria Health Centre is required to appoint a Green Star Accredited Professional. • Required to prepare a financial transparency to disclose the cost of sustainable building practices to the GBCA.	1. Industry Development
• The builder or head contractor has an environmental management system (EMS) certified to a registered standard such as AS/NZS ISO 14001 , BS 7750 or the European Community's EMAS. • The builder or head contractor has an environmental management plan (EMP) to cover the scope of construction activities. • The head contractor provides training on the sustainability targets of the building. • 90% of construction and demolition waste is diverted from landfill, and waste contractors and facilities comply with the Green Star Construction and Demolition Waste Reporting Criteria.	2.Responsible Construction
• The building is set up for optimum ongoing management due to its appropriate metering and monitoring systems. • The building has set environmental performance targets, designed, and tested for airtightness, been commissioned, and will be tuned. • The project team create and deliver operations and maintenance information to the facilities management team at the time of handover. Information is available to building users on how to best use the building. • Engaging An independent commissioning agent (ICA) to provide independent level of verification through provided to the design, planning, commissioning, and tuning activities	3.Verification and Handover
• The building is designed for the collection of separate waste and resource streams. • The building provides a dedicated and adequately sized waste and resource storage area. • The building ensures safe and efficient access to waste and resource storage areas for both occupants and waste and resource collection contractors.	4.Responsible Resource Management
• The building's design and construction procurement processes follow ISO 20400 Sustainable Procurement – Guidance by undertaking a risk and opportunities assessment. • A responsible procurement plan is developed to mitigate risks and implement opportunities identified in the assessment	5.Responsible Procurement

6.1.2 Healthy

Green Star Buildings Healthy category focuses on improving the indoor environment quality of rates building. Healthy category emphasises the important role the built environment has in enhancing the health and wellbeing of occupants.

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• The ventilation systems must comply with ASHRAE 62.1:2013 or AS 1668:2012 for separation distances between pollution sources and outdoor air intake. • Pollutants from printing and photocopying equipment, cooking processes and equipment are removed or exhausted directly to the outside. • All new and existing ductwork must be cleaned prior to occupation. • Outdoor air to achieve 50% improvement over AS 1668.2:2012 or CO2 levels must be maintained at maximum 800 ppm.	10.Clean Air
• Lighting within the building meets minimum comfort requirements. • Good lighting levels suitable for the typical tasks in each space are available. • The building provides adequate levels of daylight.	11.Light Quality
• An Acoustic Comfort Strategy is prepared to describe how the building and acoustic design aims to deliver acoustic comfort to the building occupants.	12.Acoustic Comfort
• The building's paints adhesives, sealants, and carpets are low in TVOC or non-toxic. • The building's engineered wood products are low in TVOC or non-toxic. • Occupants are not exposed to banned or highly toxic materials in the building.	13. Exposure to Toxins

6.1.3 Resilient

The Resilient category requires that various resilience aspects are considered, understood, and addressed. These include Climate Change, Operational and Community Resilience, as well as Heat Island Effect Mitigation and Grid Resilience.

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• Complete Climate Change Pre-screening Checklist included in the Green Star Buildings v1 Technical Manual. • Both historic and future data must be used when completing the checklist. • It must be signed off by the client/ building owner.	16.Climate Change Resilience
• The project team is required to hire a qualified professional develop an Operations Resilience Assessment including shocks and stresses likely to influence future building operations as outlined in the Technical Manual. • Extreme and high risks are addressed through specific design responses (minimum 2 risks). • Project team must address the building survivability in the case of a blackout.	17.Operational Resilience
• The project team is required to qualified professionals develop Community Resilience Plan - needs analysis of the community, identifies shocks and stresses that impact the building's ability to service the community. • Two most significant impacts are dressed through building's design. • Undertake at least one community capacity building activity prior to or during construction.	18.Community Resilience

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• At least 75% of the whole site comprises of one or a combination of the following strategies that reduce heat island effect: vegetation, roofing material including shading structures, unshaded hard-scaping elements with a 3 year SRI of minimum 34 OR initial SRI of minimum 39, hardscaping elements shaded by overhanging vegetation	19.Heat Resilience
• The building provides active generation and storage systems. If possible, PV on rooftop may be used to reduce Peak Demand.	20.Grid Resilience

6.1.4 Positive

The purpose of the Energy Use and Energy Source credits is to reduce the operating costs due to energy efficient design and lessen the building's dependency on the grid, as well as to support the transition of the electricity grid by procuring renewable energy.

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• Undertake LCA analysis. • 40% reduction of upfront carbon emissions through design and material selection when compared to a reference building.	21.Upfront Carbon Emissions
• Section J - Building energy use is 10% less than a reference building, not including PV Systems	22.Energy Use
• Green Star Accredited Professional to develop and provide Net Zero Carbon Action Plan Develop a Zero Carbon Action Plan (including refrigerants) with target date by when the building is expected to operate as net zero carbon. • 100% of the building's electricity under the control of the building owner/ operator comes from renewable electricity (both on-site and off-site renewables are acceptable).	23.Energy Source
• The building owner eliminates or offsets emissions from refrigerants.	24.Other Carbon Emissions
• Efficient water fixtures: 5-star WELS = Taps/ Urinals/ Dishwashers, 4-star WELS = Toilets/ Clothes Washing Machine, 3-star WELS = Showers • The building uses 45% less potable water compared to a reference building and provide infrastructure for recycled water connection.	25.Water Use
• 30% reduction in life cycle impacts when compared to standard practice (Life Cycle Assessment)	26.Life Cycle Impacts

6.1.5 Places

The Places category has an increased focus on putting people at the forefront of design. It focuses on the integration of the building into the urban fabric and delivers places that increase social cohesion.

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• Changing facilities • Provide showers and lockers based on the regular occupancy of the building. • Access must be safe, well-lit and easily located.	27.Movement and Place
• Urban Context Report (analysis of the local setting and wider urban context) and resultant design responses, or	29.Contribution to Place

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• conduct an Independent Design Review.	
• Culture, Heritage, and Identity Report (detailing the community engagement activities) and resultant design responses or • Conduct an Independent Design Review.	30.Culture, Heritage, and Identity

6.1.6 People

The People category encourages solutions that address the social health of the community by bringing a new dimension to the design and construction of buildings.

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• During the building's construction, the head contractor provides gender inclusive facilities and protective equipment. The head contractor also installs policies on-site to increase awareness and reduces instances of discrimination, racism, and bullying. • Policies and programs implemented are relevant to construction workers on site. The head contractor provides high quality staff support on-site to reduce at least five key physical and mental health impacts. The effectiveness of the interventions is evaluated.	31.Inclusive Construction Practices
• Inclusion of Indigenous Design - demonstrate that the Australian Indigenous Design Charter guiding principles are incorporated in the design of the building.	32.Indigenous Inclusion
• Buildings design and construction can be navigated and enjoyed by all stakeholders through: - equal access to the building - diverse wayfinding - inclusive spaces • Needs analysis report - consult with distinct community types to develop a needs analysis that will influence the project during design phase.	34.Design for Inclusion

6.1.7 Nature

The "Nature" category: Limits the development's impacts on the natural world and focus on creating biodiversity in Australian cities and regions that is indigenous and resilient to climate change. Provide natural corridors for animals to migrate and allow buildings to claim reward for taking initiatives that restore biodiversity offsite.

Sustainable Building Design and Construction Management Practices	Green Star Buildings v.1
• The building was not built on, or significantly impacted, a site with a high ecological value. • The building's light pollution has been minimised. • There is ongoing monitoring, reporting, and management of the site's wetland ecosystem. • Ecological assessment report prepared by an ecologist - on the sites ecological value, the project must have a design response to protect sites ecological value. Where the area has been deemed an area of high biodiversity value the project must retain at least 50% of this area contiguously.	35.Impacts to Nature

7 Design for Climate Change Resilience

The proposed 32-42 Bourke Road, Alexandria (Alexandria Health Centre) project will be designed to future-proof itself from the potential impacts of climate change. This section provides an overview of how the design of the development is responsive to the NARCliM projected impacts of climate change.

The project will undertake a Climate Change Risk and Adaptation (CCRA) workshop to identify climate change risks for the project and mitigation strategies to reduce the environmental, social and economic consequence on the project.

NARCLiM Climate Change Projections

The NSW Office of Heritage and Environment, now part of the NSW Department of Planning, Industry and Environment, has developed the NSW and ACT Government Regional Climate Modelling (NARCLiM) climate change projections to provide a dataset for detailed near future (2020-2039) and far future (2060-2079) projections. Generally, it determines that there will be:

1. more hot days and fewer cold nights;
2. an increase the number of heatwave events;
3. more hot days above 35°C; particularly in Spring and Summer;
4. Rainfall is projected to remain similar, projected to increase across the region during autumn
5. a change in rainfall patterns that will affect drought and flooding events.

PROJECT RESPONSE

These projections will have an impact on operational costs and occupancy comfort and safety. Hotter days with more heatwaves will particularly affect patients and the operation of building services equipment. This will also require higher capacity and operational costs for mechanical services to maintain occupancy comfort. Increased drought events will require provisions to supplement shortages in potable water. Stronger and reinforced façade components will be required to withstand increased rainfall and wind gust events.

The following Climate Change design initiatives will be considered as part of the Climate Change Risk and Adaptation workshop to mitigate the effect of future climate change while maximising efficiency in energy, water and material use. These measures should allow the project to meet the difficulties predicted by the climate change projections while maintaining occupancy comfort and operational efficiency.

Climate Change Projections	Climate Change Design Considerations
 Hotter days and more frequent heatwave events	Design Considerations - Minimise unwanted solar heat gain into spaces through shading and/or glazing performance. - Improve efficiency of mechanical services. - Additional Cooling Plant Capacity to assist with peak cooling events - Façade Systems to consider exposure to high temperatures (superficial peeling, cracking, corrosion, etc.)
 Extreme Heat	Design Considerations - Improved thermal performance building fabric to mitigate heat discomfort and heat stress.

Climate Change Projections		Climate Change Design Considerations
		- Mechanical system is designed to provide adequate thermal comfort to occupants and to ensure safe operation of equipment during extreme heat events. - Backup power generation and load shedding during peak cooling events
	Extended drought periods	Design Considerations - Landscaping with native low-water plant species. - Drought tolerant species - Capture and reuse of rainwater for landscape irrigation and/or toilet flushing
	More extreme rainfall events	Design Considerations - Rainwater tank to consider impacts from more extreme rainwater events - Increase peak stormwater discharge capability. - Increase over-flow drainage from site.
	Storms and Flooding	Design Considerations - Increase peak stormwater discharge capability. - Increase over-flow drainage from site. - Location of critical plant so not be affected by potential flooding - Water sensors in lift pits to send lifts to the highest level in a flood event.
	Gustier wind conditions	Design Considerations - Design of façade elements/systems to minimise strain or loss of building fixtures, fittings and fastenings.
	Bushfire	Design Considerations - Outdoor air filter grades and ongoing operational measures to manage smoke ingress from bushfires.

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