

NSW Chief Scientists Report

Key quotes

"A conservative estimate indicates there are currently approximately 181 synthetic turf sports fields in NSW, an increase from approximately 24 in 2014 and 30 in 2018. Replacement of existing natural fields in residential areas with a synthetic field appears associated with the highest level of concern and dissatisfaction for nearby residents."

"Many synthetic sports fields in NSW feature long synthetic blades supported by infill, the most commonly used infill is styrene butadiene rubber (SBR) crumb sourced from recycled tyres. SBR crumb is the material most associated with community concerns about contamination. Currently, there is insufficient information and a lack of standards about the materials and chemical composition of synthetic turf."

"To aid decision-making, more accessible data regarding the installation, volumes, and composition of synthetic turf in public and private settings across NSW is required."

"The Review identified policy, as well as scientific and technical initiatives in other jurisdictions to address key knowledge gaps and potential risks."

"Heat-related impacts were identified as a priority area for focus."

"Areas of concern regarding environmental and ecological impacts identified by the Review include water contamination and soil health."

"Given the use of synthetic turf in public and private settings is increasing across NSW, a staged plan across government and non-government settings and sectors is required to develop appropriate standards and end of life solutions."

"Given the observed risk of deteriorating fields, synthetic turf installation should be subject to a set of requirements to ensure best practice use during the product lifespan and appropriate end of life planning and disposal to avoid stranded assets."

"This Review identified significant knowledge gaps in key areas of concern, which hinders effective decision-making."

"The surface of unshaded synthetic turf can become significantly hotter than that of natural turf under the same ambient temperature on hot days, which may worsen thermal discomfort within its proximity."

"Environmental conditions, especially solar radiation and ambient temperature, as well as the material composition, design, and age of synthetic turf all influence surface temperature."

"On hot summer days with air temperatures reaching mid-30°C or higher, synthetic turf surface temperature can be up to 38°C higher than that of natural turf."

"The UHI effect occurs when surfaces and air in the cities are hotter than nearby vegetated reference sites. Contributing factors include heat-retaining urban materials such as synthetic

turf as well as roofs and pavement, and tight urban geometry that traps radiation and blocks its reflection back to the sky."

"Contribution of synthetic turf fields to the UHI effect is likely to be small, contained within the spatial footprint of the surface, but the cumulative depletion of grass surfaces over time may exacerbate heat exposure risk in the population, particularly vulnerable populations (e.g., children)."

"Synthetic turf has been found to generate greater stress on the players' feet, with some studies suggesting players experience greater rotational torque from the shoe-surface interaction, and the material can heat to very high temperatures."

"An area of environmental concern raised was the potential water pollution impacts associated with the use of different materials in the construction and installation of synthetic turf and from water runoff."

"Similar concerns about toxicant and plastic pollution were raised regarding soil health."

"There are a range of potential impacts to biodiversity caused by replacing natural grass with synthetic surfaces. "These impacts extend beyond the footprint of the field in question."

"The impact of Artificial light at night [ALAN] is not specific to turf type and would apply to both natural and synthetic turf surfaces that have artificial overhead lighting."

"There is limited literature examining the specific impact of ALAN on fauna in the context of sporting fields."

"There is global agreement on the need to limit ALAN to support biodiversity health."

"There is incontrovertible evidence demonstrating the impacts of increased heat on biota."

Key recommendations

1. NSW councils and other bodies approving the installation of new synthetic turf fields or replacement of existing fields should adopt standard conditions of approval. As relevant, additional actions may be required for specific developments. A range of mitigation strategies should be implemented to manage pollutant 'runoff' and 'walk-off' risks.
2. The DPE should work with relevant agencies such as NSW Environment Protection Authority (EPA) and the Office of Local Government to provide specific advice regarding preparation of a Review of Environmental Factors (REF) for synthetic turf installations.
3. The NSW Government should establish a requirement that grants or funding for synthetic or hybrid turf sporting fields comply with standard conditions of approval for receipt of NSW Government funds, being compliance with minimum data approval standards and implementation of outcomes of the whole of life cycle management project.

4. Risk assessments should be undertaken, and synthetic turf fields are not approved in areas of high environmental risk. This includes bushfire prone areas and areas with a higher likelihood of flooding. Assessments and testing should be informed by relevant NSW Government emergency response agencies as well as independent expert advice, including advice contained in this report.
5. Standards Australia, together with relevant state fire agencies (including Fire and Rescue NSW, the NSW Rural Fire Service) and research experts (including the NSW Bushfire Risk Management Research Hub, ARC Research Hub for Fire Resilience Infrastructure, Assets and Safety Advancements, Natural Hazards Research Australia and the CSIRO) should review ignition and fire testing standards for synthetic turf sports fields in bushfire prone areas and provide advice to the NSW Department of Planning and Environment and the NSW Office of Sport on standards that should be used for approvals.
6. The NSW Government should commission an independent review and provide advice on the types, strengths and weaknesses of leasing and management models, and financial and governance arrangements between local government and other entities in relation to synthetic turf fields. The term 'other entities' includes sporting codes and bodies, schools and universities and other public, private and not for profit bodies. Findings should inform good practice guidance and future funding requirements.
7. There should be a requirement of approval for the use of synthetic turf is an end of life (EOL) management plan that is consistent with the intent and provisions of the NSW Waste and Sustainable Materials Strategy and the NSW Plastic Reduction and Circular Economy Act 2021. If the preferred EOL option is unconfirmed, a contingency plan should be developed.
8. The DPE and the NSW Office of Sport work with Hunter Water, Sydney Water, local councils and sporting codes to support adoption and take up of best practice guidelines and benchmarks for natural turf in open spaces. An expert technical advisory group should be established to support development of priorities and a staged implementation plan. This includes advice on the nature and extent of the 'gap' between best and current practices and condition assessment of fields.
9. The EPA and the Office of Energy and Climate Change (OECC) coordinate a cross government and cross-sector review on the use of synthetic turf in both public and private spaces in NSW and make recommendations on the whole of life cycle management of synthetic turf materials