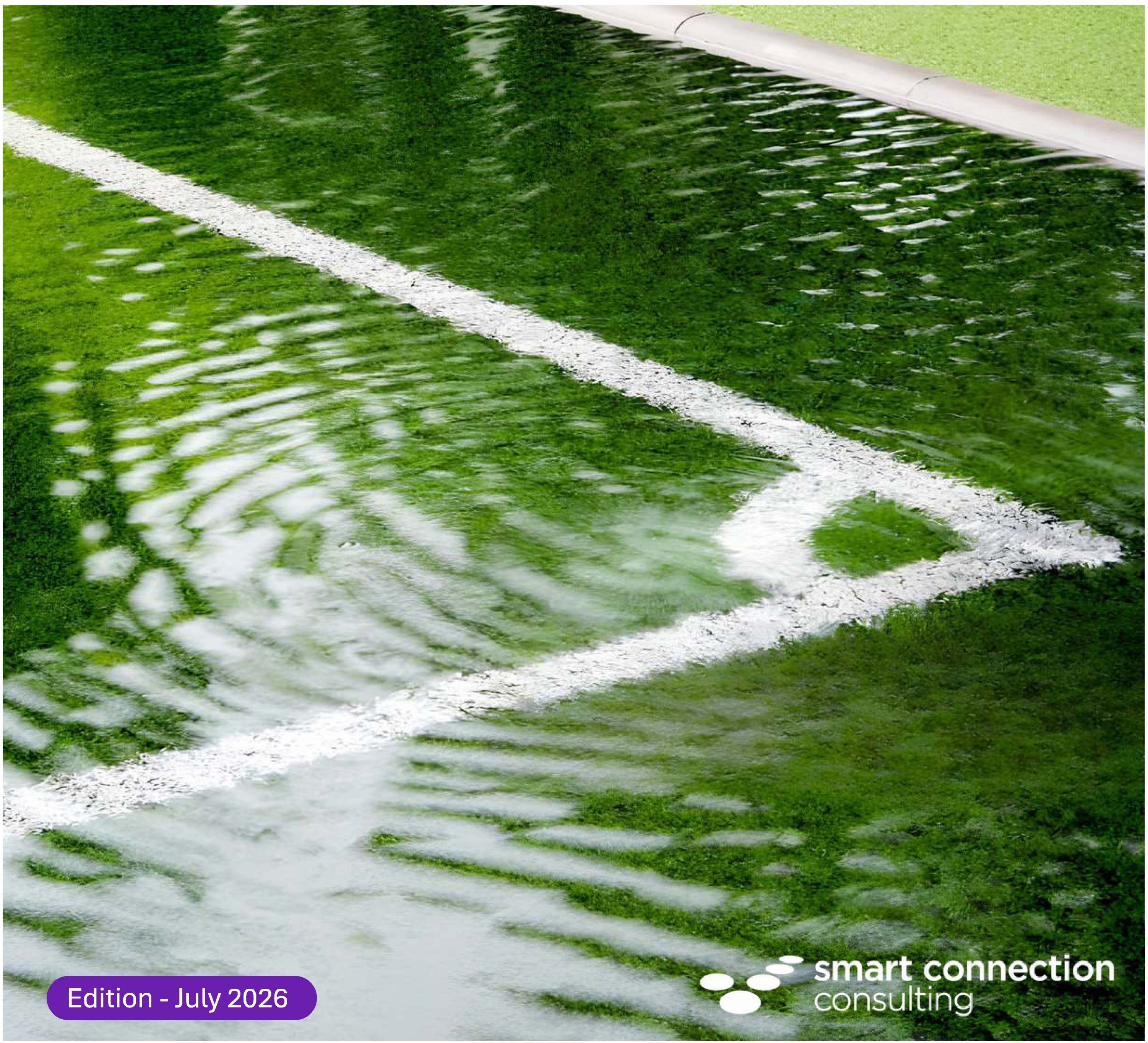
SPORTS&PLAY
INDUSTRY ASSOCIATION LIMITED

PFAS AND SPORTS SURFACES

Understanding PFAS risks, emerging standards, risk mitigation and the future of sports infrastructure in Australia



PFAS Standards

Purpose and Context

The increasing global focus on PFAS has transformed environmental risk assessment across many industries, including sports infrastructure.

Per- and polyfluoroalkyl substances (PFAS) comprise a large group of fluorinated chemicals developed since the 1940s and widely used because of their resistance to heat, water, oils and chemical degradation. These characteristics make PFAS valuable in manufacturing but also highly persistent once released into the environment.

Within the sports infrastructure sector, PFAS has become a growing topic of discussion, particularly in relation to synthetic turf systems. However, recent research demonstrates that PFAS is not solely a synthetic turf issue. PFAS has been found just as strongly in natural grass systems, soils, irrigation water, biosolids, composts, stormwater and a range of construction materials.

As community expectations increase and regulatory frameworks evolve, councils, sporting organisations and asset owners require a more sophisticated understanding of PFAS. The challenge is no longer determining whether PFAS exists; it is understanding where it originates, how it should be assessed and how procurement decisions can be informed by evidence rather than assumptions.

Understanding PFAS

PFAS (Per- and Polyfluoroalkyl Substances) represent a family of more than 10,000 fluorinated compounds characterised by extremely strong carbon-fluorine bonds.

These chemicals have been used extensively in products requiring water repellence, oil resistance, heat resistance, chemical stability; and surface protection. Common applications include, non-stick cookware, firefighting foams, food packaging, outdoor clothing, carpets, industrial coatings, electronics; and various plastic manufacturing processes.

The environmental concern arises because many PFAS compounds degrade extremely slowly and can persist in soils, groundwater, rivers and ecosystems for decades.
Research has linked some PFAS compounds to:

- Reduced immune system function;
- Elevated cholesterol levels;
- Liver effects;
- Developmental impacts;
- Reproductive effects; and
- Increased risk of certain cancers.

Importantly, not all PFAS compounds exhibit the same toxicity, and risk depends upon the specific compound, concentration and exposure pathway.

PFAS in Sports Field Systems

PFAS may potentially be associated with both natural and synthetic sports fields through three primary pathways:

- **Intentionally Added PFAS** - Historically, some fluorinated compounds have been used during manufacturing to improve, surface durability, water resistance, processing efficiency; and product performance. Regulators are increasingly focused on eliminating intentionally added PFAS from consumer and industrial products.
- **Residual Manufacturing Contaminants -** PFAS may also occur as trace residues arising from, manufacturing aids, processing agents, raw material contamination; or recycled feedstocks. These concentrations are generally much lower than intentionally added PFAS but remain relevant for environmental assessments.
- **Environmental Deposition** - PFAS contamination may occur regardless of field type through, atmospheric deposition, rainfall, irrigation water, dust transport, flooding, biosolids, compost applications; and historical land uses.

Consequently, PFAS detection in a field does not automatically identify the field surface itself as the source.

Emerging Research on PFAS in Synthetic Turf

One of the most significant recent studies was undertaken by environmental consulting firm Gradient (July 2025)

The study evaluated forty PFAS compounds using US EPA Method 1633 across two Northern California high schools before and after replacement of existing sports fields. One site previously contained natural grass while the second contained an older synthetic turf system with styrene-butadiene rubber (SBR) infill.

Both sites were reconstructed using modern synthetic turf systems incorporating natural infill materials including cork, sand and olive pits.
Key findings included:

- One replacement synthetic field recorded no detectable PFAS compounds.
- The second replacement field recorded only trace concentrations below EPA and state screening criteria.
- PFAS concentrations in the replacement synthetic systems were lower than those measured in the original natural grass field.

- All measured concentrations remained below applicable screening levels.

The study concluded that modern synthetic turf systems can be manufactured with extremely low PFAS concentrations within EPA Guidelines and that naturally occurring environmental contamination may contribute more significantly to measured soil PFAS concentrations than the synthetic turf system itself.

PFAS in Natural Grass Systems

Natural grass surfaces are often perceived as environmentally neutral. However, recent research indicates that PFAS can be widespread in natural soils.
A 2024 study by environmental consultancy Woodard & Curran examined background PFAS occurrence in undeveloped soils throughout Massachusetts. The study found measurable PFAS concentrations in 88 percent of soil samples, with multiple compounds detected even in locations without obvious industrial contamination. Potential sources include:

- **Atmospheric Deposition** - Scientific research has demonstrated that PFAS can travel long distances through the atmosphere before settling onto soils and water bodies.
- **Irrigation Water** - PFAS has been detected globally in surface water, groundwater, recycled water; and stormwater systems.
- **Biosolids and Compost** - Organic soil amendments can introduce PFAS into sports turf systems.
- **Historical Land Uses** - Previous industrial activities, firefighting training, airports and waste disposal sites can leave residual PFAS contamination in soils for decades.

These findings suggest that PFAS assessments should focus on site-specific conditions rather than assumptions about surface type alone.

Australian Regulatory Context

Australia's PFAS management framework continues to evolve. Key initiatives include:

- National PFAS Environmental Management Plan (NEMP) - The NEMP provides nationally consistent guidance for site investigations, environmental assessments, waste management, remediation; and risk management.

- Industrial Chemicals Environmental Management Standard (IChEMS) - Australia has introduced restrictions on, PFOS, PFOA; and PFHxS. These compounds are among the most widely studied PFAS chemicals globally.

- Local Government Procurement - Increasingly, councils and government agencies are requiring, PFAS declarations, Environmental Product Declarations (EPDs), independent testing reports; and lifecycle sustainability information. This trend is expected to accelerate as regulations continue to develop.

Testing For and Measuring PFAS

As the range of PFAS materials are in excess of 10,000 it's exceptionally difficult to test for each of those options. It is therefore important to appreciate which tests can be used to provide a specific answer to a specific question. For instance:

Question	Recommended Test
Are there any fluorinated compounds present?	Total Fluorine (TF)
Is PFAS chemistry likely present?	Total Organic Fluorine (TOF)
Are environmentally mobile PFAS present?	EOF
Which PFAS compounds are present?	EPA Method 1633
Could unknown PFAS be present?	Non-targeted analysis
Are precursor compounds present?	TOP Assay

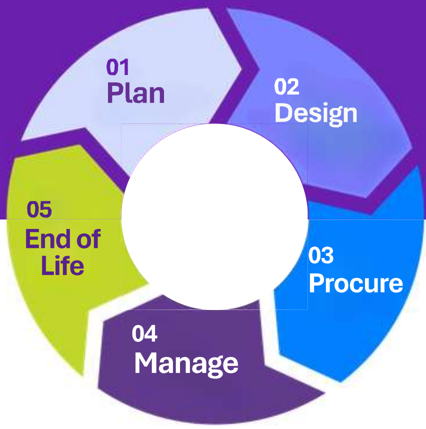
For sports surfaces (natural and synthetic) the strongest approach is a tiered strategy to provide the most complete understanding of PFAS presence and risk.

- Step 1 -Total Organic Fluorine (TOF)
- Step 2 - Extractable Organic Fluorine (EOF)
- Step 3 EPA Method 1633 Targeted PFAS Analysis
- Step 4 (if required) TOP Assay

A PFAS-Free Sports Surface System is one where no intentionally added PFAS compounds are used in the manufacture of the turf fibre, backing, infill, shockpad, adhesives or associated surface components, and where independent laboratory testing demonstrates:

Secure a manufacturers commitment and validation test that demonstrates levels of Total Fluorine/Total Fluorine in the carpet manufactured in the past 12 months, in accordance with the Californian EPA Method 1633. The collection method shall be aligned with the quality standard ASTN E3511-26 Standard guide for PFAS substances Environmental Sample Collection program; Ensure that the Total Organic Fluorine concentrate is below the established reporting threshold of 100ppi.

Additional tests for field could be conducted at the manufacturers plant, (Costing approximately $500-$1000 per roll) with an estimate of 40 roles per field, this could be costly.



Recommendations

The Sports & Play Industry Association (SAPIA) brings together the organisations that create the places where people of all ages and abilities can play, move and participate. Through professional standards, industry leadership and innovation, we are building and maintaining better places for a more active world.

To provide these SAPIA Insight Notes, we have partnered with Smart Connection Consulting to provide the latest technical knowledge on the issues that the community are keen to understand better. These notes are based around the NSW & SA Governments Frameworks for Decision Making for Synthetic Sports Fields.

Plan

Set the PFAS position early. Determine whether testing is required by regulation, funding conditions, internal policy, risk appetite or community expectation. Confirm which materials are in scope and whether results will be used for pass/fail compliance or as part of a wider product assessment. Avoid asking for unrealistic drinking-water reporting levels for solid turf products; the ASTM appendix notes that targeted PFAS reporting for synthetic turf is typically in ppb, not ppt. Consider whether the project also needs PAH, heavy metal, microplastic and leachate evidence so PFAS is handled within a broader chemical assurance framework.

Design

Design should reduce uncertainty and exposure pathways rather than rely only on a laboratory result. Select systems with transparent material declarations, minimise unnecessary fluorinated additives, and consider drainage, containment and maintenance approaches that limit migration of material from the field. Where a surface is near sensitive waterways or has heightened community concern, the design brief should describe how product evidence, stormwater treatment, infill control, maintenance and end-of-life recovery work together. PFAS testing should sit alongside practical design controls, not replace them.

Procure

Tender documents should require suppliers to nominate the test method and provide batch-specific evidence for the relevant system components. Require sampling procedures consistent with ASTM for fibre and finished fabric, including PFAS-aware contamination prevention. Ask for laboratory reports that state TF, EOF or targeted PFAS results as applicable, and require targeted PFAS reports to list compounds, CAS numbers, reporting limits and detection limits. Do not accept broad 'PFAS-free' wording unless the claim defines the analytes, method, reporting limit and product batch.

Manage

Keep PFAS records in the asset file for the life of the surface. Store supplier declarations, laboratory reports, sample IDs, chain of custody records, warranties, safety data sheets, environmental product declarations and end-of-life information. Re-testing should be risk-based: it may be appropriate after product change, supplier change, significant maintenance intervention, contamination incident or before recycling/disposal decisions. Communicate results carefully: a non-detect result means the analyte was not reported above the method limit; it does not necessarily prove the absolute absence of all PFAS.

End of Life

PFAS expectations are evolving rapidly, so procurement should anticipate future scrutiny. Keep a sample library or retained product sample where practical, and require suppliers to disclose any known fluorinated processing aids, coatings or additives in the product system. Before renewal or recycling, review whether additional testing is needed for the carpet, backing, infill and shockpad. A circular economy pathway is strongest when material composition is known before installation and documented through to removal. Councils should review PFAS requirements periodically as methods, reporting limits and regulatory settings mature.

To understand how SAPIA can assist you in making a difference to your projects and the community understanding of this technical subject please contact the SAPIA office at office@sapia.org.au or on our website www.sapia.org.au.