SPORTS&PLAY
INDUSTRY ASSOCIATION LIMITED

MICROPLASTICS AND SYNTHETIC SURFACES

Protecting our waterways and landscapes for future generations

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smart connection consulting

Microplastics and Synthetic Surfaces

Purpose and Context

Synthetic sports surfaces help communities meet demand for safe, reliable places to play, especially where natural turf is overused, weather-affected or constrained by population growth.

Intentionally added microplastics (eg. the rubber crumb performance infill) have become a valid concern to some groups in the community due to the migration of the black rubber into surrounding natural landscape and drainage into waterways.

Many of these migration challenges have been due to the historic and traditional design, with the key causes being:

- Using intentionally added microplastics (Eg. SBR rubber)
- Providing a monofilament yarn-based carpet that creates ball splash and allows migration of the infill across the field
- Drainage traditionally has been at surface level allowing migrated infill to migrate and disperse into the waterways.
- No containment strategies designed into the field of play to mitigate the migration of the microplastics .

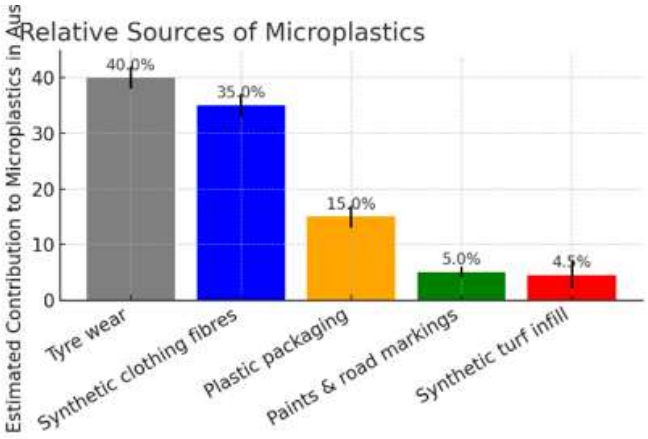
All of these causes can be rectified with new, smarter, contemporary designs that will reduce both the amounts of microplastics and their movement outside of the field of play to almost zero over the life of the surface.

What are Microplastics?

Microplastics are extremely small pieces of plastic - often less than 5mm in size. In synthetic sports fields, they can come from the plastic turf fibres, rubber infill, or other components that wear down over time.
As they're so small, they can be carried away by wind, rainwater, or even on players' shoes and clothing.
Microplastics come from many different sources in our daily lives. The largest contributors are vehicle tyre wear, which produces tiny rubber fragments, and synthetic clothing fibres that shed during washing.
Other common sources include plastic packaging breakdown, paints, and road markings.

While estimates vary depending on methodology and local context, the dominant sources of microplastics in Australia are consistent with global findings: tyre wear and synthetic clothing fibres are the largest contributors, followed by plastic packaging and paints/road markings, with smaller contributions from synthetic turf infill. Comparable studies include the IUCN (Boucher & Friot, 2017)[1] and European Commission JRC (2018)[2], which show tyre wear contributing ~28–46%, synthetic textiles ~34–35%, paints/road markings ~5–24%, and synthetic turf <5%.

While it ranks below tyres and clothing in total volume released into the environment, it is a highly visible source that communities can actively manage through targeted solutions.



In comparison, synthetic sports turf infill is a very small contribution, and so we should still aim to eliminate them and any ruminants getting into the water or landscape. This can be achieved by embracing modern practices and the Australian Standards.

How Microplastics Can Escape

Microplastics have in some cases been able to migrate from the traditionally designed synthetic sports fields into the environment in several ways:

- Rainwater washing particles off the field into surface drains and waterways
- Ball splash and wind carrying lighter particles outside the field of play
- Players and equipment transferring particles off-site after games or training
- Wear and tear of the surface over time, especially if not well maintained
- These can now be stopped or reduced significantly by adopting a triple mitigation strategy, namely:

- Reduce the amount of intentionally microplastics added to zero in a synthetic sports field initially
- Design the field with a containment strategy in place to reduce migration off the field of play in accordance with
- Enhance the quality of the surface to reduce the amount of microplastics caused through ageing and intensity of usage

1 Boucher, J. & Friot, D. (2017). Primary Microplastics in the Oceans: A Global Evaluation of Sources. IUCN, Gland, Switzerland.
2 European Commission (2018). Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitted by (but not Intentionally Added in) Products. JRC Technical Report, EUR 29610 EN.

Mitigation Strategies Towards Zero Microplastics

By understanding the causes of microplastics migration into the environment across the surface and infrastructure to be designed with a vision of zero microplastics in the environment.

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By following these key strategies, we should aim to reduce the risk significantly.

1. No intentionally added microplastics – Do not use rubber as the performance infill. Thus reducing 99% of all microplastics created at a synthetic surface sports field.
2. Only use a high-intensity dual yarn system (monofilament and tape combination) which has been proven to capture the infill and has significantly reduced ball splash & therefore reduced infill migration.
3. Require high intensity grass yarn that has been tested to 10 times the FIFA requirements (Lisport Test 2012, 200,000 cycles).
4. The synthetic sports surface must be designed in a manner that will reduce the impacts of micro-plastics from the yarn and any infill (even organic) impacting on the local environment. The Contractor must adhere to Australian Standard SA TR CEN 17519: 2021 Surfaces for sports areas - Synthetic turf sports facilities - Guidance on how to minimize infill dispersion into the environment.The Contractor is also encouraged to adopt Best Practice and of which many have been embraced within the specification
5. A quality shockpad is used to reduce the need for excessive infill that meets, EN 15330-1 "Surfaces for sports areas - Synthetic turf and needle-punch surfaces primarily designed for outdoor use, Part 1: Specification for synthetic turf surfaces for football, hockey, rugby training, tennis and multi-sport use.
6. All drainage is subsurface, ensuring all water is filtered through the sand infill and shockpad.
7. Containment design strategy around field to reduce any ageing grass yarn breakage, with 200mm hub around the fence and boot cleaning mats at pedestrian & vehicle entrances.
8. Adequate maintenance program to ensure that the surface life is achieved with minimal yarn breakage. Any loose threads should be picked up and disposed of responsibly

TYPICAL SECTION OF SYNTHETIC SPORTS TURF FOR FOOTBALL FIELD

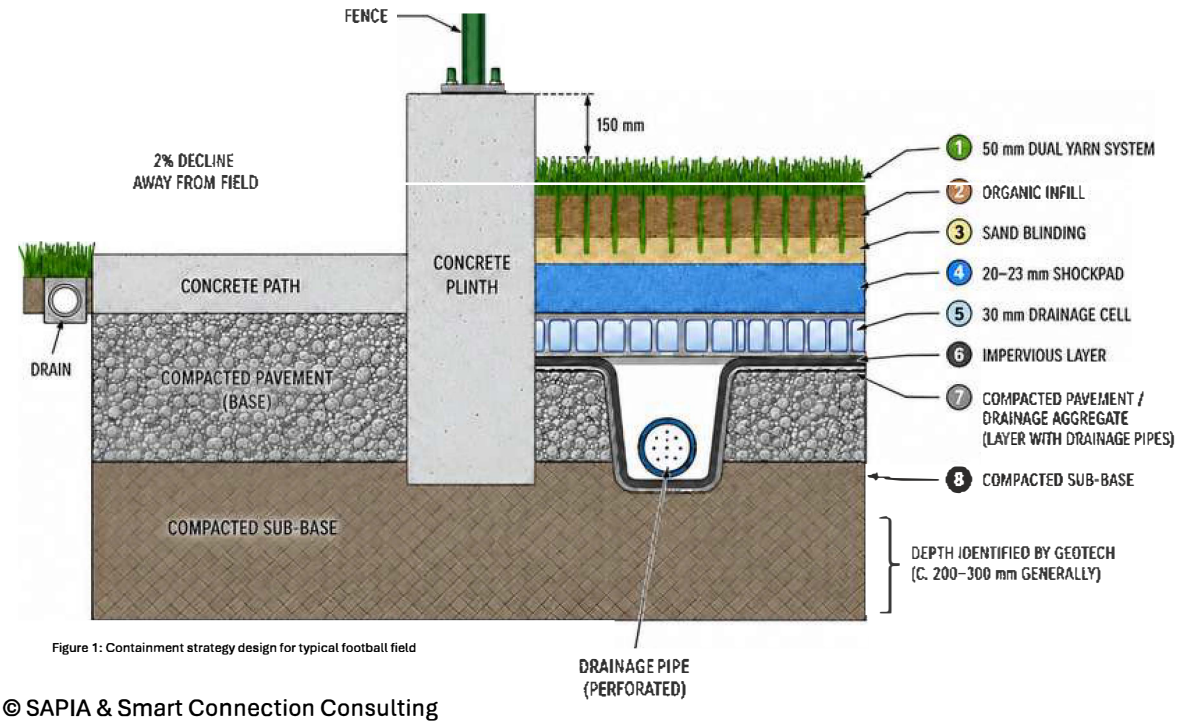
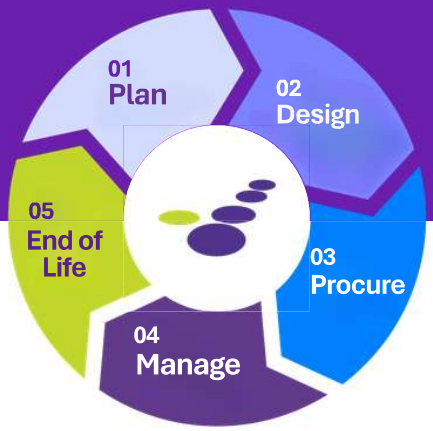


Figure 1: Containment strategy design for typical football field



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

- Start with a network needs assessment, not a surface preference, and confirm whether natural, hybrid or synthetic options best meet demand.
- Avoid sensitive waterways, bushland, flood pathways and sites where environmental controls cannot perform.
- Assess microplastic, stormwater, soil, heat, biodiversity, amenity and end-of-life risks early.
- Engage the community with clear information on benefits, impacts and mitigation obligations, and identify where synthetic surfaces are appropriate or not.
- Have no intentionally added Microplastics in the planning and design stages

Design

- Specify systems that minimise fibre wear, infill splash and material migration.
- Consider non-infill, reduced-infill or lower-risk organic infill options where suitable for the sport.
- Use solid kerbs, controlled gates and brush/clean-down points.
- Design subsurface or enclosed drainage with filterable discharge points.
- Add planting, shade and WSUD to manage runoff, heat and surrounding landscape value.

Procure

- Require material data sheets and evidence of durability, UV stability and performance testing.
- Ask tenderers to address microplastic capture, maintenance and end-of-life recovery.
- Use independent design advice and clear performance criteria rather than lowest capital cost only.
- Include maintenance manuals specific to the selected system and site.
- Set quality hold points for drainage, filters, seams, infill placement and clean-up.

Manage

- Regularly inspect drains, kerbs, gates and edges.
- Remove infill, fibres, leaves and litter promptly.
- Maintain infill levels, seams and fibre condition.
- Monitor runoff impacts and adjust procedures accordingly.

End of Life

- Prepare an end-of-life plan before construction, not at replacement time.
- Separate turf carpet, infill, shockpad and base materials during removal.
- Prevent fibres and infill from escaping during cutting, rolling, transport and storage.
- Use recycling or recovery pathways where suitable and available.
- Do not rely on cutting up old fields for reuse elsewhere as the primary plan.
- End-of-life planning protects both budgets and the environment.

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.