

ARTIFICIAL/SYNTHETIC TURF

A Health, Environmental & Economic Hazard

May 2026 – Switzerland

THE CASE AT A GLANCE

The following bullet points summarise the complete evidence. The full scientific detail follows in Parts I and II.

● **HEALTH – every layer of synthetic turf is toxic**

- The plastic grass fibres themselves – not just the rubber infill – contain PFAS 'forever chemicals' added during manufacturing. PFAS are neurotoxic, disrupt hormones, cause cancer, and never break down. They leach into groundwater. (Murphy & Warner 2022; Fidra 2024)
- Up to 300 million plastic fibres per pitch per year enter rivers and seas – regardless of what infill is used. When PFAS and microplastics combine in water, they are more toxic together than separately. (de Haan et al. 2023; Soltanighias et al. 2024)
- Rubber crumb infill adds ~120 tonnes of ground tyres per field containing styrene (neurotoxic carcinogen), butadiene (proven carcinogen: leukaemia, lymphoma), lead, cadmium, PAHs. Yale University found ~100 chemicals, 20% probable carcinogens. (Yale 2015; Mount Sinai 2016)
- Children are the most exposed group: they breathe hard during play, absorbing microplastics and chemical dust directly. Their developing organs are far more susceptible. 80% of chemicals in synthetic turf have no childhood toxicity data at all. (Dr Joel Forman, Mount Sinai)
- ACL knee injuries are 88% more frequent on synthetic turf; ankle sprains 32% more frequent. (NFL Injury Safety Panel 2002-2008)
- Surface temperatures reach 49-82°C - three times ambient air – causing heat exhaustion, burns, and dehydration risk. (Brigham Young University 2002; Fraunhofer 2021).

● **ENVIRONMENT – irreversible damage**

- Artificial turf is nearly impossible to recycle – its multiple plastic layers cannot be separated. It ends in landfill or illegal stockpiling. Toxic fires have occurred at disposal sites. Only 7.8% of UK artificial turf waste is even downcycled. (Truth About Plastic 2025; Fidra 2024)
- In Switzerland, rubber granulate was found >10 metres from virtually all examined pitches. ~10% of Swiss pitches have bodies of water within that radius. PFAS from a single US turf field contaminated local groundwater at 3× the state limit. (Fraunhofer UMSICHT 2021; Fidra 2024)
- Carbon footprint: 9.4-29.8 kg CO₂e per hour of use. Natural grass is a carbon sink. (Fraunhofer 2021)
- Destroys the living soil beneath it permanently and negatively affects biodiversity loss. Increases urban heat island effect. Synthetic turf is made from fossil fuels.
- Artificial turf is flammable. Natural grass is a fire retardant. (Turf Australia 2014)

● **ECONOMICS – more expensive at every level**

- City of Basel study (Swiss market, 45 years, 7,500 m² pitch): synthetic turf costs CHF 2,311,500 total investment vs CHF 549,000 for natural grass – 4.2× more expensive. Plus CHF 240,000 disposal costs. (Basel City / Playground@Landscape)
- Cost per m² per year: natural turf CHF 15.66 vs synthetic CHF 22.45 (+43%). (Basel City study)



- Hidden external costs not in commercial quotes: PFAS groundwater remediation; future regulatory compliance; public health costs; civil liability as cancer links strengthen. (Fraunhofer 2021)
- Natural grass adds up to 18% to property values. Synthetic grass has no proven equivalent benefit. (Turf Australia 2014, 114 Australian real estate agents)

● **REGULATION – the direction of travel is ban, not compromise**

- EU banned rubber crumb in synthetic pitches October 2023. Further restrictions from 2031. Switzerland aligning ORRChem with EU standards – adopted late 2025. National PFAS action plan adopted late 2025.
- The Netherlands' Eredivisie has banned all artificial turf (not just infill) from professional football from 2025. The direction of regulation is clear.
- Installing synthetic turf today creates stranded asset risk: mandatory replacement and remediation costs within years as regulations tighten.
- PFAS contamination is already a live crisis in Switzerland: PFAS found in ~50% of Swiss groundwater pipes; canton St. Gallen banned beef with PFAS levels 40× the legal limit in 2024.

● **THE SOLUTION – natural grass with modern management**

- There is no safe synthetic turf. Changing the infill does not fix the PFAS in fibres. Cork/sand/PFAS-free labels do not eliminate plastic fibre loss. Hybrid turf still contains plastic fibres. The only responsible choice is natural grass.
- Modern natural turf management dramatically reduces chemical inputs: drought-resistant varieties, precision irrigation (-30-50% water), integrated pest management, organic fertilisers. (Agroscope; BASPO)
- For high-intensity use: enhanced drainage, reinforced root zones, managed pitch rotation, and rest-period scheduling can significantly extend the usable hours of natural grass. An independent agronomic assessment should be commissioned before any decision

Bottom Line / Conclusion

Every form of artificial turf, with or without rubber crumb, with cork, sand, or any other infill, is a plastic product that contaminates water with PFAS, sheds hundreds of millions of plastic fibres into the environment, exposes children to carcinogens, costs substantially more over its lifecycle, and cannot be recycled. Natural grass is the only evidence-based answer.



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FULL EVIDENCE BASE

This section presents the complete evidence drawn from: Turf Australia (2014); Environmental Health News (2024); Safe Healthy Playing Fields; Sierra Club New Jersey (March 2026); Truth About Plastic - Artificial Grass briefing (2025) and Defra Response (June 2025); Fraunhofer UMSICHT - System Analysis for Switzerland and Germany (2021), commissioned by Zurich, Bern, Aarau, Chur, St. Gallen, and Winterthur; Murphy & Warner, Environmental Pollution (2022), NJIT; Fidra - PFAS in Artificial Turf (2024); and the City of Basel cost-benefit study.

1. HEALTH HAZARDS

1.1 The Problem Is the Plastic Itself - Every Layer, Not Just the Infill

The most important corrective to industry messaging is this: the hazards of artificial turf are not confined to rubber crumb infill and cannot be solved by switching infill materials. A peer-reviewed study in Environmental Pollution (Murphy & Warner, NJIT, 2022) - a systematic review of all available toxicology, ecotoxicology, and epidemiology research - establishes that hazardous chemicals arise from every synthetic layer: the plastic shock-absorbing sub-layer; the synthetic weed-prevention fabric; the polyurethane latex carpet backing; and critically the plastic grass fibres themselves. The study explicitly calls for research into 'components other than crumb rubber' and warns that many of these chemicals may have non-monotonic dose-response curves - meaning there may be no safe level of exposure.

[!\[\]\(e474458956c9a37fbf9586ddb60a7fa1_img.jpg\) Murphy & Warner, Environmental Pollution 310:119841 \(2022\)](#)

Peer-Reviewed Science (NJIT 2022)

Murphy & Warner reviewed all available studies on artificial turf health impacts. They found that chemicals including PAHs, phthalates, and PFAS are known carcinogens, neurotoxins, mutagens, and endocrine disruptors. The paper notes the financial incentives of manufacturers make artificial turf 'a prime target for manufactured doubt and scientific obfuscation', and recommends that studies with a financial conflict of interest be excluded from evidence review.

1.2 PFAS 'Forever Chemicals' in the Plastic Fibres - Not Only in the Infill

Research by Fidra (2024), citing multiple peer-reviewed studies, establishes that PFAS are added directly to the PE and PP plastic grass fibres during manufacturing - to help shape the blades and prevent molten plastic from clogging machinery, and to provide UV protection. These PFAS are present regardless of infill type. They leach into local water supplies. In Stockholm, PFAS was found in 76% of backing samples from 103 football fields. In the USA, PFAS from a single synthetic turf field contaminated local groundwater to 60 ng/L - three times the Rhode Island state limit of 20 ng/L. Children who play on artificial turf have measurably higher levels of PFOS on their hands after play.

[!\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\) Fidra - PFAS in Artificial Turf: The Grass Isn't Greener on the Artificial Side \(2024\)](#)

The Fraunhofer UMSICHT study (commissioned by Swiss cities) confirmed PFAS in PE/PP fibres as processing aids, accumulating in bodies of water and impairing drinking water quality. Switzerland's Federal Office for the Environment (FOEN) has found PFAS in approximately half of all underground water pipes analysed nationally. The canton of St. Gallen banned PFAS-contaminated beef in 2024 after finding levels 40× the legal threshold, traced to historic water use. Any synthetic turf pitch near proximity to a river or rivulet leading to Lac Léman would add directly to this contamination load.



[Fraunhofer UMSICHT \(2021\) Ch. 11](#) ; [SWI Swissinfo \(February 2025\)](#)

'PFAS-free' claims by manufacturers have been challenged by independent scientists. A former EPA official has noted that industry testing uses detection limits deliberately set too high to find PFAS. Pre-PFAS precursor substances (which convert to PFAS during degradation) may be present without appearing on ingredient declarations.

[Environmental Health News / Philadelphia Inquirer \(2024\)](#)

1.3 Microplastic Fibres: 300 Million Per Pitch Per Year Into Waterways

Banning rubber crumb infill (as the EU did in October 2023) does not resolve the microplastics problem **because the fibres themselves are the dominant source**. Research published in Environmental Pollution (de Haan et al., 2023) found that up to 300 million plastic fibres per pitch per year end up in rivers and seas. This occurs through UV degradation, mechanical wear, and freeze-thaw cycling of the carpet itself - and happens regardless of infill type. The Fraunhofer study confirmed fibre losses of 50 kg to over 1 tonne per year in Swiss-examined pitches, with discharge via players identified as especially significant.

[de Haan et al., Environmental Pollution 334 \(2023\)](#) ; [Fraunhofer UMSICHT \(2021\) Ch. 9](#)

A 2024 study (Soltanighias et al.) demonstrated that when PFAS and microplastics combine in aquatic environments, they produce more toxic effects in invertebrates than either substance alone - causing developmental failures, delayed sexual maturity, and stunted growth in *Daphnia magna*, a standard freshwater ecosystem indicator species.

[Soltanighias et al., Environmental Pollution 363 \(2024\)](#), cited in [Fidra \(2024\)](#)

1.4 Rubber Crumb Infill: Additional Carcinogen Burden

In addition to the fibre hazards that apply to all plastic turf systems, rubber crumb infill adds a further toxic layer. Yale University analysis identified nearly 100 chemicals in crumb rubber samples, of which ~20% are probable carcinogens and ~40% are irritants. The principal components - styrene (neurotoxic, suspected human carcinogen) and butadiene (proven human carcinogen linked to leukaemia and lymphoma) - are released as dust during play. A single conventional pitch contains approximately 120 tonnes of pulverised tyre material. Dr Joel Forman, Professor of Paediatric Medicine at Mount Sinai, warns that approximately 80% of the chemicals in synthetic turf carpets have no childhood toxicity data at all.

[Safe Healthy Playing Fields - Toxicity/Carcinogens](#) ; [Yale School of Engineering & Applied Science \(2015\)](#)

[Mount Sinai Children's Environmental Health Center \(2016\)](#)

Critical Finding

Workers who install synthetic turf are often required to wear protective breathing masks due to toxic fumes from the rubber crumb. **The children of Crans would play on this same surface without any protection, often for hours at a time at key developmental periods in their lives.**

1.5 Children: The Most Vulnerable and the Most Exposed

Children are the primary intended users of the proposed pitch, and they face the greatest risk. Their developing organs are far more susceptible to endocrine disruption, neurotoxic chemicals, and carcinogens. Foetuses can be affected by chemical exposures experienced by their mothers years before conception, because synthetic chemicals mimic the hormones that regulate development. Murphy & Warner (2022) identify 'sensitive windows of development' as a critical gap in current evidence - meaning the true harm to children may be substantially worse than current studies suggest. The Children's Environmental Health Center at Mount Sinai has formally recommended against the use of artificial turf. The UK Defra report acknowledged on-pitch exposure risks for children but declined to assess them - a failure criticised by Truth About Plastic.

[Murphy & Warner \(2022\)](#) ; [Mount Sinai CEHC \(2016\)](#) ; [Truth About Plastic – Defra Response \(2025\)](#)



1.6 Physical Injury Risk

A study by the NFL Injury and Safety Panel (2002-2008) across nine artificial turf stadiums found anterior cruciate ligament (ACL) injuries were 88% more frequent on artificial turf than on natural grass, and ankle sprains were 32% more common. The NFL Players Association formally states that players suffer fewer injuries on natural grass. A US baseball team officially banned artificial turf after six players died from rare brain tumours following decades of play on synthetic surfaces. The EU's own evidence-gathering ahead of its 2023 ban confirmed elevated injury risk as a contributing factor.

[!\[\]\(2e897e890e69d81eae4503a8342c36b0_img.jpg\) Turf Australia \(2014\)](#) ; [!\[\]\(ce4e2504c7100a62a9a9496b2e01b6e4_img.jpg\) Sierra Club NJ \(2026\)](#)

1.7 Extreme Heat

Synthetic turf surfaces reach 49-82°C on hot days - roughly three times the ambient air temperature - creating serious risks of heat exhaustion, heat stroke, dehydration, and contact burns that can melt shoes. Natural turf stays up to 40°C cooler through evapotranspiration. The Fraunhofer study specifically flagged overheating as a key planning consideration for Swiss pitches. Some manufacturers recommend applying expensive cooling gels, or watering the surface, undermining the claim of zero water requirement.

[!\[\]\(74d4806277d7e73349d8e8c0897931e9_img.jpg\) Fraunhofer UMSICHT \(2021\) Ch. 11.2](#) ; [!\[\]\(5f42d2cd7ad901bc24e5d35a38c777fd_img.jpg\) Brigham Young University \(2002\)](#) ; [!\[\]\(628bc0b1ef2b63d1fc4442fb794e3e78_img.jpg\) Sierra Club NJ \(2026\)](#)

2. ENVIRONMENTAL HAZARDS

2.1 Unrecyclable by Design

Artificial turf is composed of polyethylene fibres, polypropylene backing, polyurethane latex, and rubber or sand infill - multiple plastic types that cannot be mechanically separated at commercial scale. Fidra (2024) documents that end-of-life artificial turf results in stockpiling, illegal disposal, misleading 'recycling services', and toxic fires. The Fraunhofer study confirmed that a closed-loop recycling approach for any full artificial turf system cannot yet be identified. Truth About Plastic estimates that in the UK - where 44.8 km² of sports artificial turf exists - recycling capacity is just 7.8% of the waste stream, and that represents mere downcycling into inferior products.

[!\[\]\(8bba887393ca45b761e5cb49e755e762_img.jpg\) Fidra \(2024\)](#) ; [!\[\]\(b898b980f2d860cdb0237afbc3664529_img.jpg\) Fraunhofer UMSICHT \(2021\) Ch. 12](#) ; [!\[\]\(489b6f540446f926b6e5cda90c9ff8a8_img.jpg\) Truth About Plastic \(2025\)](#)

2.2 Toxic Runoff and Swiss Water Bodies

The Fraunhofer study found plastic material - rubber granulate and fibres - at over 10 metres from virtually all examined pitches in Switzerland. Bodies of water lie within this contamination radius for approximately 10% of pitches. Strong winds and heavy rain spread contamination well beyond the pitch perimeter. In Switzerland, 5.8 million m² of water bodies are within 100 metres of artificial turf sites nationally. The ECHA has classified microplastics as persistent, bioaccumulative, and toxic substances for which no safe environmental threshold can be established. The proximity of Crans to Lac Léman makes this risk particularly acute - the lake provides drinking water to the region.

[!\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\) Fraunhofer UMSICHT \(2021\) Ch. 5 and 10](#) ; [!\[\]\(882be629d4a853dc90d60f084b0d185d_img.jpg\) ECHA Annex XV Restriction Report](#)

2.3 Fossil Fuels, Carbon, and Soil Destruction

Synthetic turf is a petroleum product. The Fraunhofer study measured carbon footprints of 9.4-29.8 kg CO₂ equivalent per hour of use depending on system type (SBR rubber infill generating the highest emissions). Natural turf absorbs CO₂ and stores it as organic carbon in the soil, acting as a carbon sink. **Synthetic turf is installed on a compacted hard base that permanently destroys the soil biome, earthworms, and the biological communities that sustain healthy soil. This soil does not regenerate after the plastic surface is removed. Natural turf also reduces noise, reflects less light, and moderates local temperatures.**

[!\[\]\(41aea2746216b27a6939d696d8e035da_img.jpg\) Fraunhofer UMSICHT \(2021\) Ch. 13](#) ; [!\[\]\(990e790e6efb89997a442ee76392bbf4_img.jpg\) Truth About Plastic \(2025\)](#) ; [!\[\]\(c06ed410b39a7d6adc0183dd719caa28_img.jpg\) Turf Australia \(2014\)](#)

2.4 Flammability

Synthetic turf is flammable. Natural grass acts as a genuine fire retardant. The South Australian Country Fire Service explicitly recommends natural mown grass as the most appropriate surface immediately



surrounding buildings. Fidra documents that stockpiled end-of-life synthetic turf has caused toxic fires at disposal sites.

[Turf Australia \(2014\)](#) ; [Fidra \(2024\)](#)

3. REGULATORY CONTEXT: EU, NETHERLANDS, AND SWITZERLAND

3.1 The EU Ban - And Why It Is Not Enough

The European Commission banned tyre crumb rubber in artificial grass pitches in October 2023, following the ECHA's classification of microplastics as persistent, bioaccumulative, and toxic with no safe emission threshold. From 2031, the EU extends this to further microplastics in artificial turf infill. However, the EU ban does not address PFAS in plastic fibres, fibre microplastic loss of up to 300 million particles per pitch per year, or the unrecyclability of the plastic carpet system. It is a step, but it does not make any form of synthetic turf safe.

[Fidra \(2024\)](#) ; [ECHA Annex XV Restriction Report](#) ; [Truth About Plastic – Defra Response \(2025\)](#)

3.2 The Netherlands: Total Ban

The Netherlands' professional football league - Eredivisie - has gone further than the EU infill ban and prohibited all artificial turf, requiring clubs to use only natural grass from 2025. This followed a 2016 Dutch study finding high levels of carcinogens in 58 of 60 artificial fields surveyed. This is the direction in which regulation is moving.

[Fidra \(2024\)](#) ; [Ministry of Sport, Netherlands](#)

3.3 Switzerland: Converging Regulation and an Active PFAS Crisis

Switzerland is aligning its chemical regulations (ORRChem) with EU standards, with a draft revision submitted to the WTO for comment in May 2025 and adoption expected in 2026. The Swiss Federal Council published a national PFAS action plan in late 2025. Switzerland already banned PFHxS and related PFAS compounds in November 2023. PFAS contamination is already a live national crisis: FOEN found PFAS in ~50% of Swiss groundwater pipes analysed; the canton of St. Gallen banned beef in 2024 with PFAS levels 40x the legal threshold; five other St. Gallen municipalities were subsequently found to be affected. Installing artificial turf today, against this regulatory trajectory, exposes the commune to significant future compliance costs and potential civil liability.

[SWI Swissinfo \(February 2025\)](#) ; [SGS Switzerland \(April 2024\)](#) ; [SGS Switzerland \(June 2025\)](#) ; [WTO Notification \(May 2025\)](#)

3.4 The UK Defra Report: Regulation Could Eliminate 100% of Microplastic Emissions

The UK's own government-commissioned Option Appraisal for Intentionally Added Microplastics (Defra/eftec, May 2025) found that artificial grass crumb rubber accounts for 33.7% of all intentionally added microplastics emissions - the single largest source. It found that regulation could eliminate 72-100% of such emissions over 2024-2043. Despite this, the report did not recommend direct regulation as its primary measure - a conclusion challenged by Truth About Plastic, who identified stakeholder bias (tyre industry and sports bodies dominated the consultation) and deliberate underweighting of effectiveness relative to cost.

[Truth About Plastic – Defra Response \(2025\)](#)

4. COST-BENEFIT ANALYSIS (SWITZERLAND)

4.1 The City of Basel Study: Swiss CHF Data

The City of Basel conducted a detailed cost-benefit comparison using its own natural and synthetic pitches as baseline data. All figures are in Swiss Francs at actual Swiss market prices, for a 7,500 m² football field over a 45-year horizon.

[City of Basel / Playground@Landscape Cost-Benefit Comparison](#)



Cost Category	Natural	Synthetic	Observation
Investment/pitch (45 yrs)	CHF 549,000	CHF 2,311,500	Synthetic: 4.2× more expensive
Investment/m² (45 yrs)	CHF 73.20	CHF 308.20	Synthetic: 4.2× higher per m²
Amortisation/pitch/year	CHF 12,200	CHF 51,366	Synthetic: 4.2× higher annually
Maintenance/pitch/year	CHF 105,250	CHF 116,950	Broadly similar direct costs
TOTAL cost/m²/year	CHF 15.66	CHF 22.45	Natural: 30% cheaper overall
Disposal costs (Switzerland)	Minimal	CHF 240,000	Major hidden cost for synthetic
Replacement costs (45 yrs)	Periodic upkeep	CHF 825,000	Full replacement required

4.2 The Full Picture: Hidden External Costs of Synthetic Turf

Commercial cost comparisons for synthetic turf systematically exclude the following costs, which the Fraunhofer study explicitly recommends should be internalised: future environmental remediation of PFAS and microplastic contamination of Swiss groundwater and surface water; compliance costs as Swiss ORRChem aligns with EU PFAS restrictions; public health costs from chemical exposure, particularly in children; mandatory cooling water in summer (making the 'no water required' claim false); civil liability exposure as scientific consensus on carcinogenicity grows; and end-of-life removal and landfill disposal. The Fraunhofer study also warned that the cost advantage of synthetic turf at high usage rates may not survive future regulatory tightening.

[Fraunhofer UMSICHT \(2021\) Ch. 6](#)

4.3 Natural Turf Maintenance: A Balanced Account

We acknowledge that maintaining natural grass involves real costs. For a 7,500 m² Swiss sports pitch, annual direct costs include: mowing (CHF 28,000-40,000); fertilisation (CHF 3,000-8,000); weed control (CHF 1,500-4,000); aeration/scarification (CHF 7,500-8,250); overseeding (CHF 2,000-6,000); irrigation (CHF 4,000-12,000); and pitch management labour (CHF 20,000-40,000). Total: approximately CHF 66,000-118,000/year, consistent with the Basel study's CHF 105,250/year figure. These costs are real. However: they are manageable and can be significantly **reduced through modern integrated pest management and organic approaches; they are biodegradable and do not persist in the environment; and they are counterbalanced by genuine ecosystem services - carbon sequestration, biodiversity, water filtration, urban cooling - that have their own measurable economic value.**

[Basel City Study / Playground@Landscape](#) ; [Fraunhofer UMSICHT \(2021\)](#) ; [Agroscope](#) ; Swiss groundskeeper rate data: [Buildigo.ch](#) (CHF 60–100/h for specialised work) ; [Ofri.ch](#) (CHF 70–90/h including call-out fee)

5. THE ONLY RESPONSIBLE RECOMMENDATION: NATURAL GRASS

5.1 Why There Is No Safe Plastic Alternative

The synthetic turf industry responds to each wave of regulation by promoting a new 'safer' alternative. These successive claims - first that rubber crumb was safe, then that EPDM was safer, then that cork or sand was safe, then that 'PFAS-free' certification resolved the issue - have all failed scrutiny. The structural reasons are permanent: PFAS are in the fibres, not only the infill; fibre microplastic loss of hundreds of millions of particles per year is a property of the plastic carpet, not the infill; and unrecyclability is a consequence of the multi-layer construction, not the infill choice. No infill substitution addresses any of these three fundamental problems.

[Murphy & Warner \(2022\)](#) ; [Fidra \(2024\)](#)

5.2 Natural Grass with Modern Management

For Swiss sports pitches, sustainable management approaches include: drought-resistant, high-wear grass varieties (fine fescues, reinforced ryegrass blends); precision subsurface irrigation reducing water use by 30-50%; integrated pest management replacing herbicide and pesticide programmes with mechanical and biological approaches; slow-release organic fertilisers; and managed pitch rotation and



recovery periods. BASPO (Swiss Federal Office of Sport) and Agroscope (Swiss federal agricultural research centre) provide specific guidance for Swiss conditions. A well-managed natural pitch can sustain substantially more use hours than the traditional figure of 900 hours per year suggests, particularly with improved drainage infrastructure.

[BASPO](#) ; [Agroscope](#) ; [Fraunhofer UMSICHT \(2021\) Ch. 15](#)

5.3 The Fraunhofer Recommendation

The Fraunhofer UMSICHT study - the most authoritative Switzerland-specific research available, commissioned by the cities of Zurich, Bern, Aarau, Chur, St. Gallen, and Winterthur - explicitly recommended that operators assess whether the actual, evidenced need for playing hours is sufficient to justify artificial turf before any decision is made. It warned that the cost advantage of artificial turf may not survive future regulatory tightening. It found approximately 800 artificial turf pitches in Switzerland outside private use, many close to protected water bodies - and concluded that the full environmental and health cost of these installations has not been adequately internalised.

[Fraunhofer UMSICHT \(2021\) Ch. 1, 6, and 15](#)

Aspect	Natural Turf	ANY Synthetic Turf
Temperature	Up to 40°C cooler; evapotranspiration	49-82°C surface; 3× ambient air temp
Fire safety	Natural fire retardant	Flammable; toxic fires at disposal sites
PFAS	None	In PE/PP fibres regardless of infill type
Plastic fibres to water	None	Up to 300 million/pitch/year (all systems)
Rubber crumb toxics	None	Styrene, butadiene, lead, cadmium, PAHs
Recyclability	Biodegrades; tilled back into soil	Near-zero recyclability; landfill or illegal stockpile
Carbon	Carbon sink	9.4-29.8 kg CO ₂ e/hr of use (Fraunhofer)
Biodiversity & soil	Full living soil ecosystem	Permanently destroys soil biome
Injury risk	Lower ACL & ankle sprain rates	88% more ACL injuries (NFL data 2002-2008)
Investment cost (CH)	CHF 549,000/pitch over 45 yrs	CHF 2,311,500/pitch + CHF 240k disposal
Cost/m ² /year (CH)	CHF 15.66	CHF 22.45 (+43%)
Property values	+up to 18% (114 Australian estate agents 2012)	No proven benefit
EU regulatory status	Fully compliant; recommended by fire services	Crumb rubber banned Oct 2023; fibres under review
Netherlands	Now required in Eredivisie from 2025	All synthetic turf banned in professional football
Swiss regulation	Fully compliant; no regulatory risk	ORRChem aligning with EU; PFAS action plan 2025



Conclusion

Every form of artificial turf - with any infill or none - is a plastic product that sheds PFAS and microplastic fibres into water, exposes children to carcinogens, costs substantially more over its lifecycle, destroys soil biodiversity, and ends as unrecyclable waste. The EU ban on rubber crumb is a floor, not a ceiling - it does not make plastic turf safe. The Netherlands has recognised this and banned plastic turf entirely. The only evidence-based recommendation for Crans, for the children who will use this pitch, and for the protection of Lac Léman, is natural grass managed with modern sustainable methods.

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