

May 10, 2024

Subject: Terra Linda High School Environmental Impact Report (EIR) Supplemental Attachment

To: San Rafael City Schools Board of Trustees

The attached Comments regarding the Draft EIR for the “Terra Linda High School Capital Improvements Project” were not included, and are hereby attached here as a Supplemental Document.

The email that included these comments, arrived minutes before the April 15, 2024 5:00 PM deadline. However, this email went to the Spam folder and the oversight was brought to our attention by the author May 9, 2024 3:12 PM.

These comments should be included and addressed, and are hereby attached to the Final EIR in this Supplemental Attachment.

San Rafael City Schools
Terra Linda High School
Capital Improvements Project

Supplementary Attachment to the
Final Environmental Impact Report
SCH No. 2023080737

P.4 Response to Comments – Letter G

The District received a comment letter on the Terra Linda High School Capital Improvements Project Draft Environmental Impact Report (EIR) immediately before the close of the public review period on April 15, 2024. This letter was inadvertently left out of Final EIR Section P.2 and has been included as Letter G. The full list of Draft EIR commenters is provided below.

Letter	Commenting Person/Agency	Date of Letter	Page Number
A	Shirley Fischer, Neighbor	March 18, 2024	P-4
B	Henri and Jeanne Lese, Neighbor	March 23, 2024	P-20
C	Scott Mills and Diane Sanfilippo, Neighbor	March 28, 2024	P-23
D	Andrea Wald, Neighbor	April 5, 2024	P-28
E	Heather Patrick, Neighbor	April 8, 2024	P-68
F	Stephanie Lovette, Neighbor	April 15, 2024	P-70
G	Cynthia Fan, Concerned Citizen	April 15, 2024	P-84

Letter G
Heyman, Barbara

Attachments: Comments on San Rafael Terra Linda HS DEIR - Apr 15 2024.pdf

From: **Cynthia Fan**
Date: Mon, Apr 15, 2024 at 4:58 PM
Subject: Re: Comments on the Draft EIR for the "Terra Linda High School Capital Improvements Project"
To: <tryan@srcs.org>, <lmarteldow@srcs.org>, <cmartin@srcs.org>, <mkoerner@srcs.org>, <mdenieva@srcs.org>, <mpalma@srcs.org>, <superintendent@srcs.org>

I am attempting to include the PDF as an attachment to this message, but because it's a large file, I first provided you with the URL from which you can directly download it.

thank you,
Cynthia Fan

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On Apr 15, 2024, at 4:56 PM, Cynthia Fan wrote:

Dear San Rafael City Schools Senior Director of Strategic Facility Planning, Trustees, and Superintendent,

Please find my comments on the Draft EIR for the "Terra Linda High School Capital Improvements Project" at <https://bit.ly/srcs-terra-linda-hs-turf-deir-comments-apr15-2024>

Thank you,
Cynthia Fan

April 15, 2024

San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903
tryan@srcs.org, lmarteldow@srcs.org, cmartin@srcs.org, mkoerner@srcs.org,
mdenieva@srcs.org, mpalma@srcs.org, superintendent@srcs.org

Re: Comments on the [Draft EIR](#) for the "[Terra Linda High School Capital Improvements Project](#)" which includes replacing natural turf fields with artificial turf

Dear San Rafael City Schools Senior Director of Strategic Facility Planning, Trustees, and Superintendent,

As part of compliance with California Environmental Quality Act (CEQA), a project's Environmental Impact Report must inform government decision-makers and the public about the potential environmental effects of proposed activities and an alternative to prevent significant, avoidable environmental damage. The Draft Environmental Impact Report (DEIR) for the "Terra Linda High School Capital Improvements Project (SCH No. 2023080737)" indicates that Phase 3 of the project includes replacement, in 2029, of approximately 200,000 square feet of natural turf with crumb-rubber-free artificial turf for the creation of baseball and multiuse (softball and soccer) fields. As detailed in this letter, artificial turf systems, even those that do not use crumb rubber, result in significant adverse environmental impacts. These impacts have not been disclosed in the DEIR and can not be reduced to less-than-significant-levels with mitigation measures or best management practices. A project alternative exists that can completely avoid this significant environmental damage while still achieving all of the Project objectives. That alternative is well-designed, well-constructed, well-managed natural turf.

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Please add to the EIR the undocumented environmental impacts I detail in this letter and add the following project alternative... Remove the artificial turf from the project and achieve the project objectives while avoiding significant environmental damage by (a) directly collaborating on the Project plans with a sports field management consultant that has a track record of keeping a high-use athletic field of

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natural turf in safe condition for 15+ years for a public agency, (b) revising the Project to include reconstruction of the existing natural turf fields with (b1) modern irrigation, (b2) soil high in both organic matter and microbial activity, and (b3) a modern, drought-tolerant natural turf cultivar, and (c) placing the fields under the management of a professional with the above track record or under the management of an in-house or outsourced individual that will be provided with training and coaching from such a professional.

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(Cont'd)

I. PFAS pollution

The Lead Agency must consider “direct physical changes in the environment which may be caused by the Project and reasonably foreseeable indirect physical changes in the environment which may be caused by the project.” CEQA Guidelines § 15064(d). The significance determination must be based on “substantial evidence in the record of the lead agency.” *Id.* § 15064(f). “Argument, speculation, unsubstantiated opinion or narrative, or evidence that is clearly inaccurate or erroneous, or evidence that is not credible, shall not constitute substantial evidence.” *Consolidated Irrigation Dist. v. City of Selma*, 204 Cal. App. 4th 187 (2012).

One of the significant adverse environmental impacts of artificial turf is PFAS pollution. It wasn't until 2019 that toxic PFAS chemicals were first found in artificial turf.¹ That was in fact the first time that PFAS chemistry used in plastic production had been found in finished consumer products.² Testing of numerous artificial turf samples detected elemental fluorine, and specific PFAS chemicals. Turf patents and industry literature were found discussing the widespread use of PFAS as a plastic processing aid (PPA) to enhance smoothness and reduce friction.³ PFAS are used in the base material for artificial turf as a slip agent that is intentionally added to the molten hydrocarbons in order to make the plastic grass blades free of defects. PFAS are also

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¹ Sharon Lerner, *Toxic PFAS Chemicals Found in Artificial Turf — The presence of the PFAS chemicals in turf adds to growing concerns about the grass replacement that covers more than 1,000 acres around the country* The Intercept (Oct. 8, 2019), available at <https://theintercept.com/2019/10/08/pfas-chemicals-artificial-turf-soccer/>

² David Abel, *Toxic chemicals are found in blades of artificial turf* Boston Globe (Oct. 9, 2019), available at <https://www.bostonglobe.com/metro/2019/10/09/toxic-chemicals-found-blades-artificial-turf/1mlVxXjzCAqRahwgXtly6K/story.html>

³ The Ecology Center *Toxic "Forever Chemicals" Infest Artificial Turf* (Oct. 10, 2019), available at <https://www.ecocenter.org/toxic-forever-chemicals-infest-artificial-turf>

used during the extrusion process for artificial turf's plastic fibers in order to avoid clogging of the extruding machines.

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(Cont'd)

Meanwhile, in 2022, the U.S. Environmental Protection Agency (EPA) drastically reduced the lifetime health advisory levels for several PFAS, bringing PFOA down to 4 parts per quadrillion (ppq) and PFOS down to 20 ppq.⁴ Parts per quadrillion levels are so tiny that this federal advisory means there are virtually no safe levels of these chemicals.

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On April 5, 2024, the California Office of Environmental Health Hazard Assessment (OEHHA) set the [Protective Health Goal](#) for PFOA at 0.0078 ppt for PFOA and 1.0 ppt for PFOS.

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The EPA in its 2021-2024 PFAS Strategic Roadmap⁵ also issued a directive to local governments, which includes school district boards and city/town/county councils/boards, to exercise increased and sustained leadership to prevent further PFAS contamination of the environment.

Conclusion

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Every level of government—federal, Tribal, state, and local—needs to exercise increased and sustained leadership to accelerate progress to clean up PFAS contamination, prevent new contamination, and make game-changing breakthroughs in the scientific understanding of PFAS. This strategic roadmap represents the Agency's commitment to the American people on what EPA seeks to deliver from 2021 to 2024.

A CEQA analysis of this Project needs to discuss the impacts associated with PFAS in the artificial turf, their ability to leach into the groundwater, surface water, San Francisco Bay, and drinking water, as well as potential impacts on the athletes using the fields and spectators.

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Regulatory bodies and state and federal governments have, over the past several years, increasingly prioritized rules related to PFAS reduction and safety for

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⁴ United States Environmental Protection Agency *Questions and Answers: Drinking Water Health Advisories for PFOA, PFOS, GenX Chemicals and PFBS*, (June 2022), available at <https://www.epa.gov/sdwa/questions-and-answers-drinking-water-health-advisories-pfoa-pfos-genx-chemicals-and-pfbs#g5>

⁵ United States Environmental Protection Agency *PFAS Strategic Roadmap: EPA's Commitment to Action 2021-2024*, accessible at https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf

good reason. PFAS is a very serious threat to the environment with irreversible consequences. PFAS are a class of human-made chemicals comprised of thousands that provide heat, stain, and water resistance. Due to the strong carbon-fluorine bonds that occur in these molecules, PFAS do not easily break down in the environment and are called “forever chemicals.” Well-studied PFAS are toxic to humans in concentrations as small as parts per quadrillion (ppq).

Even minute amounts of PFAS are dangerous. Even if artificial turf has “minimal” PFAS or *less* PFAS than some other consumer products, that does *not* mean it’s safe. As an example, consider PFOS. PFOS is a type of PFAS. *Any* amount of PFOS should be viewed as a risk given that the U.S. Environmental Protection Agency (EPA) has proposed a health-based value, the Maximum Contaminant Level Goal (MCLG), for PFOS, of zero,⁶ which is the same as the MCLG for lead⁷. In other words, there is no safe level of exposure to PFOS. California’s Office of Environmental Health Hazard Assessment recommends, as health protective limits, 7 ppq of PFOA and 1 ppt of PFOS⁸. Tests show that PFAS compounds leach off artificial turf at levels much higher than this. “Every sample of artificial turf tested by academic institutions and NGOs have resulted in positive results for PFAS,” writes Dr. Kyla Bennett of Public Employees for Environmental Responsibility. For evidence, refer to the testing from (a) Oak Bluffs⁹, MA, (b) Franklin¹⁰, MA, and (c) Woodbridge¹¹, CT. Also find evidence in that every

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⁶ United State Environmental Protection Agency *Proposed Rule - PFAS National Primary Drinking Water Regulation Rulemaking* (Mar. 29, 2023), available at <https://www.federalregister.gov/documents/2023/03/29/2023-05471/pfas-national-primary-drinking-water-regulation-rulemaking>

⁷ United States Environmental Protection Agency, *Basic Information about Lead in Drinking Water* (Jan. 25, 2024), available at <https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water>

⁸ Pesticide and Environmental Toxicology Branch - Office of Environmental Health Hazard Assessment - California Environmental Protection Agency *Second Public Review Draft — Perfluorooctanoic Acid and Perfluorooctane Sulfonic Acid in Drinking Water* (July 2023), available at <https://oehha.ca.gov/media/downloads/water/public-health-goal/pfoapfosseconddraft071423.pdf>

⁹ Horsley Witten Group *Synthetic Turf Laboratory Testing and Analysis Summary Report Martha’s Vineyard Regional High School* (Mar. 1, 2021), available at [https://www.mvcommission.org/sites/default/files/docs/210301_Turf%20Laboratory%20Testing%20Report%20Review_HWSIGNED\(1\).pdf](https://www.mvcommission.org/sites/default/files/docs/210301_Turf%20Laboratory%20Testing%20Report%20Review_HWSIGNED(1).pdf)

¹⁰ Kristen Mello, *PFAS in Artificial Turf - NEWMOA Conference presentation links and slide deck* (Apr. 6, 2022), available at <https://www.oakbluffsma.gov/DocumentCenter/View/8437/Kristen-Mello-WRAFT---May-4-2022>

¹¹ Id.

sample of dozens of artificial turfs tested by university researchers, regardless of the manufacturer, have shown PFAS¹² in the grass blades, the backing, and sometimes the shock pad and the infill. Moreover, Synthetic Precipitation Leaching Procedures (SPLPs) show that these PFAS leach off the fields into surrounding waters.^{13 14}

The results of testing performed on a sample of a FieldTurf product proposed for use by a southern California school show that 4 distinct PFAS and a number of metals and semi-volatile organic compounds will readily leach off the artificial turf into surrounding soil and waters and expose field users to these carcinogenic chemicals.¹⁵ Among the PFAS detected were perfluorooctanesulfonic acid (PFOS), perfluorooctanesulfonamide (PFOSA), and 6:2 fluorotelomer sulfonic acid (6:2 FTSA). A recent study shows that PFOSA can lead to cardiac diseases in fish.¹⁶ PFOSA is a precursor to PFOS. Studies conducted on the PFAS 6:2 FTSA show adverse impacts on animals and humans.¹⁷

Researchers are concerned about the possible impact of artificial turf additives on aquatic life in the San Francisco Estuary.¹⁸ Risking the addition of more

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¹² Kristen Mello, *PFAS in Artificial Turf - NEWMOA Conference presentation links and slide deck* (Apr. 6, 2022), available at <https://www.oakbluffsma.gov/DocumentCenter/View/8437/Kristen-Mello-WRAFT---May-4-2022>

¹³ Kristen Mello, *PFAS in Artificial Turf - NEWMOA Conference presentation links and slide deck* (Apr. 6, 2022), available at <https://www.oakbluffsma.gov/DocumentCenter/View/8437/Kristen-Mello-WRAFT---May-4-2022>

¹⁴ Horsley Witten Group *Synthetic Turf Laboratory Testing and Analysis Summary Report Martha's Vineyard Regional High School*, (Mar. 1, 2021), available at https://www.mvcommission.org/sites/default/files/docs/210301_Turf%20Laboratory%20Testing%20Report%20Review_HWSIGNED%281%29.pdf

¹⁵ Public Employees for Environmental Responsibility *Summary of PFAS and Other Chemicals of Concern in Harvard-Westlake's Proposed Field Turf Vertex Core 2.5* https://docs.google.com/file/d/1S-edneZWm-bfoxL9GZVDnNaqYPaVewNg/edit?usp=doclist_api&filetype=microsoftword

¹⁶ HongHong Chen et al. *Perfluorooctane Sulfonamide (PFOSA) Induces Cardiotoxicity via Aryl Hydrocarbon Receptor Activation in Zebrafish* (Jun. 2, 2022), available at <https://pubs.acs.org/doi/full/10.1021/acs.est.1c08875>

¹⁷ *PFAS-Tox Database - Easy Access to Health and Toxicology Data on PFAS*, available at <https://pfastoxdatabase.org>

¹⁸ Elena Galkina, *Potential Impact of Additives in Artificial Turf Microplastics on Aquatic Life in the San Francisco Estuary*, May 18, 2023, available at <https://repository.usfca.edu/cgi/viewcontent.cgi?article=2876&context=capstone#page3>

bioaccumulative PFAS to the San Francisco Bay via PFAS-laced microplastics and nanoplastics and PFAS-contaminated stormwater is of grave concern for Bay biota. PFAS are already ubiquitous in Bay bird eggs, harbor seals,¹⁹ and fish, including sport fish, particularly sport fish in the South Bay, which in the most recent study²⁰ showed concentrations of PFAS exceeded thresholds established by other states for the development of consumption advisories. In addition, recent research highlights that cocktails of PFAS compounds can be additively toxic to wildlife, jeopardizing their reproductive success.²¹

There is potential for artificial turf fields to contribute to PFAS exposure for field users. Routes of exposure for PFAS include ingestion, inhalation, and dermal absorption. EPA states that routes of PFAS exposure include, “Breathing air containing PFAS [and] [u]sing products made with PFAS.”²² Recent studies have shown that some PFAS can migrate from car seat fabric to sweat, showing a potential dermal exposure route.²³

Dr. Jamie DeWitt, current director of the Environmental Health Sciences Center at Oregon State University and former Professor of Pharmacology and Toxicology of the Brody School of Medicine at East Carolina University researching the toxicity of PFAS and how they affect the immune system, explains: “All PFAS, regardless of their specific chemistries present, have at least one ‘characteristic of concern’ associated with them. The vast majority of PFAS are persistent, which means that they will remain in the environment for years, to decades, to centuries, serving as continual sources of

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¹⁹ San Francisco Estuary Institute & The Aquatic Science Center *Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*, available at <https://www.sfei.org/projects/pfas>

²⁰ Nina Buzby et al. *Contaminant Concentrations in Sport Fish from San Francisco Bay: 2019* (Apr. 30, 2021), available at https://www.sfei.org/sites/default/files/biblio_files/2019%20Sport%20Fish%20Report%20-%20FINAL.pdf

²¹ Tyler D Hoskins et al. *Chronic Exposure to a PFAS Mixture Resembling AFFF-Impacted Surface Water Decreases Body Size in Northern Leopard Frogs (*Rana pipiens*)*, (Aug. 2023) available at https://pubs.acs.org/doi/10.1021/acs.est.3c01118?_ga=2.268456433.1617854846.1708957681-879159149.1708957681

²² U.S. Environmental Protection Agency *Our Current Understanding of the Human Health and Environmental Risks of PFAS* <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>

²³ Yan Wu et. al, *Side-chain fluorotelomer-based polymers in children car seats*, (Jan. 1, 2021) <https://www.sciencedirect.com/science/article/abs/pii/S0269749120361650>

exposure. Many PFAS are known to bioaccumulate, or move from the environment into the bodies of living organisms where they can potentially interact with biological molecules to produce toxicity.”²⁴

A compilation of PFAS toxicity studies shows that virtually every PFAS examined is correlated with adverse health outcomes.²⁵ PFAS are associated with cancer and have been linked to growth, learning, and behavioral problems in infants and children; fertility and pregnancy problems, including pre-eclampsia; interference with natural human hormones; increased cholesterol; and immune system problems.²⁶ Epidemiological studies have found decreased antibody response to vaccines, and associations between blood serum PFAS levels and both immune system hypersensitivity and autoimmune disorders like asthma and ulcerative colitis.^{27 28} The Centers for Disease Control and Prevention released a “Statement on Potential Intersection between PFAS Exposure and COVID-19,” which recognized the “evidence from human and animal studies that PFAS exposure may reduce antibody responses to vaccines... and may reduce infectious disease resistance.”²⁹

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For the time being, industry regulation of artificial turf remains sorely lacking. The term “PFAS-free” is not defined. The hype around “PFAS-Free” artificial turf amounts to greenwashing. Communities are repeatedly misled by manufacturer and vendor claims

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²⁴ Dr. Jamie DeWitt *Letter recommending Harvard Westlake River Project not use artificial turf* (Jul. 6, 2023), available at <https://drive.google.com/file/d/1DT-UQ5bEeD4kfFhtxLcSNDYTmhLn8D9L/view?usp=drivesdk>

²⁵ Northeastern University PFAS Project Lab, *PFAS Systematic Evidence Map*, available at <https://pfasproject.com/pfas-toxic-database/>

²⁶ U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry *Toxicological Profile for Perfluoroalkyls* (May 2021), available at <https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf>

²⁷ Sunderland, E. M. et. al., *A Review of the Pathways of Human Exposure to Poly- and Perfluoroalkyl Substances (PFASs) and Present Understanding of Health Effects*, 29 *Journal of Exposure Science and Environmental Epidemiology*, no. 2, (2018), available at <https://pubmed.ncbi.nlm.nih.gov/30470793>

²⁸ U.S. Environmental Protection Agency, *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*, 39 (May 2016), available at https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf

²⁹ Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry, *Statement on Potential Intersection between PFAS Exposure and COVID-19*, <https://www.atsdr.cdc.gov/pfas/health-effects/index.html> (last visited Feb. 26, 2024).

of “certified PFAS-free” synthetic turf. Learn from the cautionary tales of the public agencies that have become greenwashing victims. The City of Portsmouth, N.H. was promised a “certified PFAS-free” synthetic field by their engineering consultants and manufacturer FieldTurf. This promise was not delivered; The community was deceived. The full story is recounted in the first-person³⁰ and by a third-party news source.³¹ Experts had advised the City to have comprehensive PFAS testing of the artificial turf system components performed and completed prior to approving construction. The City opted not to heed the advice, so concerned residents arranged to have brand new, unused samples tested for PFAS by a certified lab. The results indicated that both the plastic carpet and shock pad had elevated fluorine levels, indicating the presence of PFAS chemicals.³² This motivated the City to have its own testing performed, and indeed it confirmed the same. Those PFAS-free promises made by the manufacturer and consultant turned out to be false. The promise had been based on a narrow risk assessment that did not evaluate leaching and contamination of PFAS into the surrounding area. South Philadelphia is home to another community that fell prey to the greenwashing. The community spent \$7.5 million to install an artificial turf system at the rec center for which the turf manufacturer, Sprinturf, had provided a lab report to support its claim the turf did not contain the so-called forever chemicals. Three independent experts who separately reviewed the test results concluded the lab test is flawed and inadequate and that the turf likely still contains the PFAS chemicals.³³ The test selected was both inappropriate and of incredibly narrow scope. The lab used a PFAS detection limit set about 20,000 times higher than what is typically used to determine presence of PFAS.

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Back in 2019, FieldTurf claimed their supplier confirmed their artificial turf filaments were free of PFAS.³⁴ However, there exist public records of test results for

³⁰ Diana Carpinone, email (July 5, 2023), available at <https://drive.google.com/file/d/15sCXsM6BTgHyBmECg-GwOdcSvCOjUcP5/view?usp=drivesdk>

³¹ E.A. Crunden and Ariel Wittenberg, “Our Community has been Deceived”: Turf Wars Mount over PFAS, E&E News (Aug. 3, 2022), available at <https://www.eenews.net/articles/our-community-has-been-deceived-turf-wars-mount-over-pfas/>

³² Non Toxic Dover New Hampshire Tests Detect Dangerous PFAS Chemicals in Portsmouth’s New Synthetic Turf Field (Sep. 15, 2021), available at <https://nontoxicdovernh.wordpress.com/2021/09/15/tests-detect-dangerous-pfas-chemicals-in-portsmouths-new-synthetic-turf-field/>

³³ David Gambacorta and Barbara Laker. *City officials believed a new South Philly turf field was PFAS-free. Not true, experts say.* The Philadelphia Inquirer. (Feb. 23, 2024), available at <https://drive.google.com/file/d/1xZUt9BzSfrvc8iiXzsRP4rETQ9Baqply/view?usp=drivesdk>

FieldTurf since that time, specifically the product FieldTurf Vertex Core. A 2021 lab report shows that FieldTurf Vertex Core samples from Portsmouth, NH were not PFAS free.³⁵ A separate set of lab test results from 2023 interpreted by credentialed experts from Public Employees for Environmental Responsibility also show the FieldTurf Vertex Core is not PFAS free and conclude PFAS will “readily leach off into surrounding soil and waters.”³⁶ Specifically FieldTurf Vertex Core contains two PFAS of critical concerns, PFOS and PFOA. The authors warn that if FieldTurf Vertex Core artificial turf is installed, these PFAS “will contaminate the soil and waters around the project site, and expose both the athletes and others using the fields to these carcinogenic chemicals.”

Citizens should not need a degree in analytical chemistry to debunk manufacturer claims and identify the ways in which interpretations of test reports have an inappropriately narrow focus, but thankfully they are stepping up. Kristen Mello, Masters in Analytical Chemistry from the University of Delaware and member of both the Analytical and Fluorine Divisions of the American Chemical Society, has interpreted for communities the PFAS Analytical Laboratory Reports from testing of artificial turf athletic field system components. In April 2022, she was invited, with Dr. Graham Peaslee from Notre Dame University, to give the presentation “PFAS in Artificial Turf” at the New England Waste Management Operators Association.

In July of 2022, on behalf of a group of concerned citizens, Mello reviewed for their local electeds a technical report that had been shared. She explained³⁷ some of the key takeaways they may have not otherwise fully digested, namely that PFAS was detected in the artificial turf carpet, shockpad, and infill. She also reminds the electeds that, with regards to determining how much PFAS is too much to risk, “On June 15,

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³⁴ FieldTurf, “To Whom It May Concern” letter (Oct. 25, 2019), available at https://drive.google.com/file/d/10X3LteVwIC8t_nMa9SRJUGcFuSRoqN1q/view?usp=drivesdk

³⁵ Galbraith lab report prepared for and sent via email to Ecology Center (Jul. 23, 2021), available at <https://nontoxicdovernh.files.wordpress.com/2021/09/pfas-testing-721-galbraith-cc-samples.pdf>

³⁶ Bennett, K, Public Employees for Environmental Responsibility (PEER.org) *Testing results for FieldTurf Vertex Core, proposed synthetic turf fields for Harvard-Westlake, Weddington Project, Studio City, CA* (Jul 2023), available at https://docs.google.com/file/d/1F7zgu3aPB3qe7O7Ozqzh-7iSDOUOu0Jd/edit?usp=doclist_api&filetype=microsoft

³⁷ Kristen Mello, letter to the mayor and councilors of City of Portsmouth, NH (Jul. 5, 2022) available at <https://nontoxicdovernh.files.wordpress.com/2022/07/wraft-pfas-portsmouthletter-5july2022.pdf>

2022 the EPA issued updated advisories reducing what they consider a 'safe amount' in drinking water to be 5 orders of magnitude smaller than they announced in 2016.”

Then in July of 2023, on behalf of separate group of concerned citizens, this time in a California community, Mello writes in her public testimony³⁸ regarding the CEQA EIR for the proposed artificial turf project, “Based on all of the testing I have seen to date, there is every reason to believe that until there is a manufacturing revolution, any artificial turf field will be made with PFAS and PFAS will leach into the environment in communities where the field is manufactured, installed, and eventually disposed of.” She then proceeds to provide explanatory comments regarding a FieldTurf Testing Report, dated November 22, 2022³⁹ that summarized lab tests of artificial turf carpet and included the laboratory reports themselves, concluding that artificial turf fields are not a risk to human health based on the PFAS toxicity from dermal exposure to the players. Mello breaks down in her letter the errors and omissions in that FieldTurf Testing Report and reveals how the author “makes carefully true statements that don’t tell the whole story.” She includes an insightful summary in the appendix of her letter explaining the lacking context and the many risks not examined and addressed.

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Based on the advice Mello shares in her letters to public agencies, it's clear an environmental analysis of artificial turf would be incomplete if it did not address at least all of the following with respect to the PFAS found in artificial turf system components:

- PFAS volatility
- exposures to users and spectators, especially for babies/toddlers
 - dermal
 - ingestion
 - inhalation
- human toxicity⁴⁰
- leaching protocol and calculations, with concentrations propagated out for installation mass and size, of how much PFAS has been and will be

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³⁸ Kristen Mello, letter to Department of City Planning for Los Angeles (Jul. 12, 2023) available at <https://drive.google.com/file/d/1qVPA1Clp7-UmTtas9hgDa6yWL9GFtKY1/view?usp=drivesdk>

³⁹ Final Environmental Impact Report Appendix E.3 *FieldTurf Testing Report* (Nov. 22, 2022), available at https://planning.lacity.gov/eir/Harvard-Westlake_River_Park_Project/feir/FEIR%20Appendices/Appendix%20E.3%20-%20FieldTurf%20Testing%20Report.pdf

⁴⁰ Published toxicity information regarding PFAS <https://pfastoxdatabase.org/>

leaching off the field materials and into the stormwater management system

- aquatic toxicity
- bioaccumulative effects of stormwater runoff
- groundwater contamination
- surface water contamination
- PFAS contamination incurred by environmental justice populations where these field components are manufactured and destroyed or disposed of
- environmental cleanup that may be later required
- cost to dispose of field components at end-of-life should the chemicals they leach be, at that time, designated as hazardous

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Objective voices like Mello's must be a priority in environmental analyses. Signed affidavits from manufacturers and associated industries have been proven false, are reportable, and are not acceptable in lieu of independent third party testing. Independent experts should be consulted when it comes to questions around appropriate PFAS test methods. Dr. Graham Peaslee⁴¹ at University of Notre Dame is a leading researcher on the topic and would make an excellent resource.

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When it comes to artificial turf, CEQA document authors and readers are urged to critically review any input provided by Gradient, described as "rented white coats",⁴² any input provided by Exponent, described as "science-for-hire",⁴³ any input provided by Laura Green,⁴⁴ and any input provided by David Teter.

David Teter has been brought by Verde Design Inc, a landscape architect that has a number of California public agencies as artificial turf project clients, into local government meetings here in California to downplay environmental concerns about

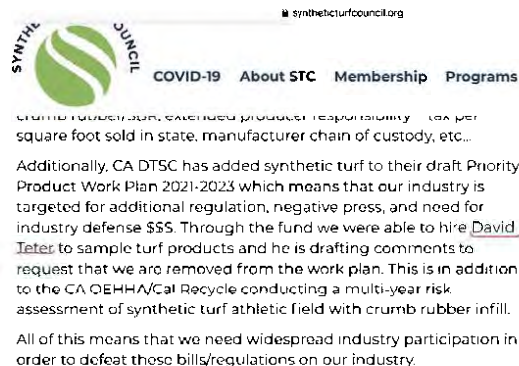
⁴¹ Graham Peaslee and Kristen Mello, *PFAS in Artificial Turf* (Apr. 6, 2022) available at <https://www.newmoa.org/wp-content/uploads/2023/02/PFAS-in-Artificial-Turf.pdf>

⁴² David Heath, *Meet the 'rented white coats' who defend toxic chemicals* (Feb.8, 2016), available at <https://publicintegrity.org/environment/meet-the-rented-white-coats-who-defend-toxic-chemicals/>

⁴³ Myron Levin and Paul Feldman, *Big Companies in Legal Scrapes Turn to Science-for-Hire Giant Exponent* (Dec. 13, 2016), available at <https://business-ethics.com/2016/12/13/1724-big-companies-in-legal-scrapes-turn-to-science-for-hire-giant-exponent/>

⁴⁴ E.A. Crunden and Ariel Wittenberg, *Toxicologist who belittled PFAS risks resigns from EPA role* (Dec. 12, 2021), available at <https://www.eenews.net/articles/toxicologist-who-belittled-pfas-risks-resigns-from-epa-role/>

artificial turf. Mr. Teter's input can not be considered unbiased given his work as a paid industry consultant for the synthetic turf trade association and artificial turf manufacturers. His work for this trade association was specifically aimed at keeping synthetic turf from being investigated by California's Department of Toxic Substances Control (DTSC), an agency which could potentially require artificial turf manufacturers to label the toxic chemicals in their products. The Synthetic Turf Council⁴⁵ website at one point included the following text:



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Mr. Teter ultimately failed in his mission to compel DTSC to drop artificial turf from the short list of products it is now prioritizing⁴⁶ and currently studying. The fact that our state's own Department of Toxic Substances Control has concerns over synthetic turf's hazards despite Teter's input suggests that his input may not represent a comprehensive and balanced professional opinion on synthetic turf hazards.

PFAS are manmade chemicals, not naturally occurring in the environment. Every bit found in the environment, soil, rainwater, tap water, dust is there because of human activity. The fact that our environment has already been polluted with PFAS is not a reasonable justification to pollute further, especially given that these chemicals are persistent and bioaccumulative.

⁴⁵ Synthetic Turf Council, <https://www.syntheticturfCouncil.org>

⁴⁶ California Department of Toxic Substances Control Safer Consumer Products Program *Three Year Priority Product Work Plan* (2021-2023), available at <https://dtsc.ca.gov/wp-content/uploads/sites/31/2021/04/Final-2021-2023-Priority-Product-Work-Plan.pdf>

Artificial turf promoters claiming a product contains no PFAS are routinely found guilty of citing the results of testing that uses very high detection limits designed to find no PFAS.

Often the referenced tests:

- fail to reflect real-world abuse the product takes during the years it is installed on the site, such as harsh weathering conditions, frequent mechanical abrasion, and extensive UV exposure
- fail to conduct Synthetic Precipitation Leaching Procedure (SPLP) tests, which shows what actually leaches off a field
- test for a mere fraction of the thousands of toxic PFAS (Absence of proof is not proof of absence when only a small percentage of PFAS are tested for.)

For example, the California Proposition 65 and US EPA Method 537 are not relevant standards⁴⁷ for asserting a product is PFAS-free. Although more appropriate EPA-approved testing exists, these two aforementioned standards continue to serve as the basis of PFAS-free confidence by many of the misled and under-informed electeds, school district and city/town/county staff, landscape architects, civil engineering firms, and construction firms across the country who are unaware of this critical detail or who are uninterested in it given determination to promote or defend the choice of artificial turf.

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There are artificial turf manufacturers claiming “PFAS-free” products while presumably hoping customers won’t notice they are self-defining “PFAS-free” to mean their product may contain no more than 100,000,000 ppt of fluorine (i.e. 100 ppm of fluorine).

100,000,000 ppt of fluorine can translate into a **very** significant amount of PFAS. Let’s put this in perspective... PFOS is one of the PFAS chemicals routinely found in artificial turf. The U.S. Environmental Protection Agency states that PFOS is likely to cause cancer. EPA states that, similar to lead, there is no dose below which PFOS is considered safe. EPA has proposed a goal of 0 ppt of PFOS in drinking water but due to the limitations of testing will tolerate up to 4 ppt.⁴⁸ With a goal of 0 ppt PFOS and a limit

⁴⁷ The Ecology Center *PFAS-free Turf Recommendations* (Dec. 19, 2021), available at <https://docs.google.com/document/d/1H7jCbrN9vhlfvXpOaOAAftGSvbPdCikbwZd4NpGa5kg/edit>

⁴⁸ United State Environmental Protection Agency *Proposed Rule - PFAS National Primary Drinking Water Regulation Rulemaking* (Mar. 29, 2023), available at

of only 4 ppt PFOS, how could an artificial turf's whopping 100,000,000 ppt of fluorine possibly be safe??

The nonprofit Ecology Center recommends⁴⁹ that an artificial turf manufacturer claiming PFAS-free turf fiber be expected to produce testing results evidencing no more than 1,000,000 ppt of total organic fluorine (TOF) or total fluorine. Stated more simply, the recommendation is no more than 1ppm TOF. "A company claiming PFAS-free turf fiber should thus be able to produce testing results showing less than 1 part per million of total organic fluorine or total fluorine. We recommend that companies be required to test products and provide these results."

Insist the manufacturer prove that there are *zero* amounts of these specific PFAS and their precursors:

- Perfluorooctanoic acid (PFOA)
- Perfluorooctanesulfonic acid (PFOS)
- Perfluorobutanesulfonic acid (PFBS)
- Hexafluoropropylene oxide-dimer acid (GenX)
- Perfluorononanoic acid (PFNA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluorodecanoic acid (PFDA)
- Perfluorohexanoic acid (PFHxA)
- Perfluorobutanoic acid (PFBA)

The reason to add this stipulation on top of meeting the 1ppm TOF limit advised by Ecology Center is that the above 9 PFAS encompass the PFAS that are to be regulated in drinking water plus the PFAS that the EPA proposed on Jan 31, 2024 to be listed as hazardous constituents under RCRA⁵⁰. EPA has evidence that each of those 9 PFAS has "toxic, carcinogenic, mutagenic or teratogenic effects on humans and other life forms."

<https://www.federalregister.gov/documents/2023/03/29/2023-05471/pfas-national-primary-drinking-water-regulation-rulemaking>

⁴⁹ Ecology Center *PFAS in Synthetic Turf Fiber* (Jun. 1, 2020), available at https://nontoxicdovern.files.wordpress.com/2020/06/june1_portsmouthpfas.pdf

⁵⁰ United States Environmental Protection Agency *Proposal to List Nine Per- and Polyfluoroalkyl Compounds as Resource Conservation and Recovery Act Hazardous Constituents* (Feb. 8, 2024), available at <https://www.epa.gov/hw/proposal-list-nine-and-polyfluoroalkyl-compounds-resource-conservation-and-recovery-act>

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To summarize, **before the Lead Agency accepts an artificial turf system, verify the results of independent SPLP testing.** SPLP is a test method that demonstrates what leaches off the test subject. (Be vigilant! Manufacturers are notorious for choosing tests that do not reflect the real-world conditions to which artificial turf is subjected, for not specifying detection limits, or for setting detection limits too high.⁵¹) **Verify that the results of SPLP testing indicate the system as a whole has (a) less than 1ppm TOF and (b) less than the lowest limits of detection available at commercial labs for each of these 9 PFAS:**

PFOA
 PFOS
 PFBS
 GenX
 PFNA
 PFHxS
 PFDA
 PFHxA
 PFBA

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This testing should not be limited to the synthetic turf carpet fibers. It should also include the turf carpet backing, infill, and shockpad.

Please direct staff to request these test results for the artificial turf carpet, as well as the other artificial turf system components, and have the lab test selections, PFAS detection limits, and test results reviewed by an independent expert unaffiliated with the industry. The Lead Agency's procurement and sharing of such test results and interpretive reports is essential to providing the decision-makers and public with transparent disclosure about the environmental risks of the artificial turf.

CEQA requires a Lead Agency to determine the significance of all environmental impacts (California Public Resources Code [PRC] § 21082.2; 14 CCR [State CEQA Guidelines] §150641). A threshold of significance for a given environmental impact defines the level of effect above which the Lead Agency will normally consider impacts to be significant, and below which it will normally consider impacts to be less than significant (See State CEQA Guidelines §15064.7(a)). A threshold of significance may be defined as a quantitative set of criteria. The threshold must be backed by substantial

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⁵¹ David Gambacorta and Barbara Laker. *City officials believed a new South Philly turf field was PFAS-free. Not true, experts say.* The Philadelphia Inquirer. (Feb. 23, 2024), available at <https://drive.google.com/file/d/1xZUt9BzSfrvc8iiXzsRP4rETQ9Baqply/view?usp=drivesdk>

evidence, which is defined in the CEQA statute to mean “facts, reasonable assumptions predicated on facts, and expert opinion supported by facts” (State CEQA Guidelines § 15064.7(b)).

“Lead Agencies are responsible for establishing the thresholds of significance for all documents they prepare... The development and use of thresholds of significance are not required by CEQA. However, it is good and accepted practice to do so in... EIRs because it allows readers to more easily understand the chain of facts and logic that led the Lead Agency to their significance conclusions... [B]ecause an EIR typically provides a more in-depth analysis of the project’s environmental impacts, it typically also includes more detail to support the selection of significance thresholds...; a discussion of the chosen thresholds is commonly included in the methodology section of each EIR chapter.”⁵²

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In the EIR, please define the maximum concentration of PFAS chemicals, or concentration of each PFAS chemical⁵³, that can leach off of an artificial turf system yet still be considered by the Lead Agency to represent a less-than-significant environmental impact. Please provide the chain of facts and logic that support the Lead Agency’s decision to choose this set of criteria as the significance threshold for the PFAS that can leach from an artificial turf system into the environment.

If the Lead Agency’s chosen threshold is informed by “expert opinion supported by facts,” it is relevant to disclose (a) that expert’s qualifications and (b) any current or former artificial turf industry affiliation of that individual in order to reveal potential conflicts of interest.

Sources who can not be assumed to be free of conflicts of interest:

- Manufacturers, providers, and installers of artificial turf products.
- Landscape architects that use artificial turf products in designs.
- Gradient, Exponent, David Teter, and Laura Green for the reasons detailed earlier.

⁵² Association of Environmental Professionals, *CEQA Portal Topic Paper - Thresholds of Significance*, 2020, available at <https://ceqaportal.org/tp/CEQA%20Portal%20Topic%20Paper%20Thresholds%20of%20Significance%202020Update.pdf>

⁵³ Safe Healthy Playing Fields Inc. *Letter to Los Gatos-Saratoga High School District*, March 2024, Top of page 4 lists PFAS found to date in synthetic turf components and plant based infill according to public records. <https://drive.google.com/file/d/1-25Q0EMQdlQEKaxuE7QPNvE-otItHHwi/view?usp=drivesdk>

Expert sources, referenced earlier, with no conflict of interest:

- Dr. Graham Peaslee
- Dr. Kyla Bennett
- Kristen Mello
- The Ecology Center, nonprofit

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Leading researcher and independent expert, Dr. Graham Peaslee, discussed his findings that PFAS leaches from artificial turf and detailed his concerns about drinking water contamination at a March 26, 2024 online meeting hosted by a commission in Washington D.C.⁵⁴

Dr. Peaslee explains, “The baseline level of PFAS is... zero, because they are all manmade. They shouldn’t be there... It’s very hard to think of the level part per trillion, but that is the level of concentration we are worried about. So when [the artificial turf] industry proudly announces that we don’t use PFAS or if we do use them, it’s the safe kind..., that’s true if you don’t think in terms of what the numbers actually are... The most important point that I’d like you to take away is that... the turfgrass field, even after it’s been played on and disposed of, continues to leach these chemicals for years to come. Forever. Similarly, even when they’re in play and you have an acre or two of turfgrass exposed to sun and these extreme heats that Dr. Evans talked about, and sunlight particularly, and rain, [PFAS will] run off. And that’s why we see these transient measurements of PFAS running off [artificial turf]... [Polymer processing aids] are added to all extruded polyethylene blades... They are fluoropolymers that are the safe kind, the industry tells us. However any industrial process is [only] about 80% pure... and this industrial process leads to the PFAS you DON’T want: the PFOA, the PFHxA, the PFHxS. All these other [PFAS] that could possibly occur come along with that in the industrial processes. There is no way for [the industry] to clean it up. They have never been able to. And they never will.”

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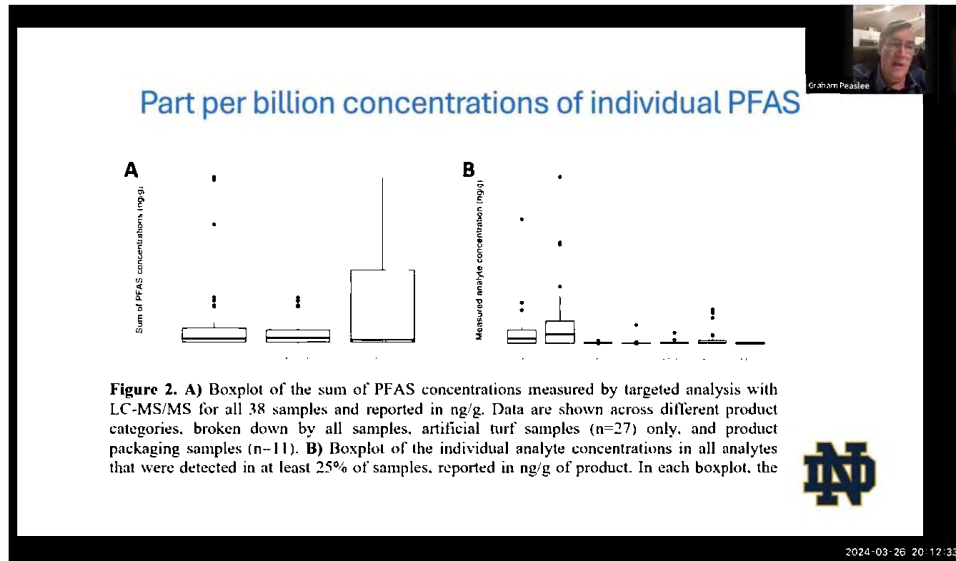
⁵⁴ Chevy Chase (DC) Advisory Neighborhood Commission online meeting: “*Is Artificial Turf Safe for Our Kids and Our Environment?*”, Mar. 26, 2024, available at <https://youtu.be/i8xICA9M8hl?si=NND3R2-h5BqsHy0l&t=3803>

Dr. Peaslee discusses a research paper for which they measured specific PFAS

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from artificial turf blades. They were measured in parts per billion levels.

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He explains that industry claims parts per billion of PFAS is a barely measureable amount. While that may be true, “parts per billion are what’s [already] in our blood from accumulation of years of [PFAS] exposure.”

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Dr. Peaslee walks through the logic behind his calculation that approximately 12mg of PFAS would leach off an artificial turf field each year.

Sample back-of-the-envelope calculation of PFAS contamination of turf grass runoff:

From this work, we assume the average concentration of identified non-polymeric PFAS extracted from turfgrass is about 5 ng/g.

From the internet, an average face weight for synthetic turf grass is around 50 ounces square yard (<https://artificialturfbyfenix.com/why-synthetic-turf-face-weight-matters/>). There are also approximately 7140 m² of turf grass per standard soccer field (<https://www.footballhistory.org/field.html>). Some unit conversions yield a typical mass of blades on a synthetic turf soccer field to be around 12000 kg.

This means that an extraction similar to the one in this work would yield about 60 mg of PFAS from an entire soccer field. Since rainwater, sunlight and oxygen from the environment would not extract as efficiently as a QuEChERS extraction in the laboratory, we can estimate that this extraction would be the equivalent of five years of environmental exposure. This would indicate that approximately 12 mg of PFAS would be released each year, while the bulk of the polymeric PFAS and the plastic turf itself would remain intact.

Given 12 mg field entering run-off water from each field and an EPA regulatory limit of around 4 ng/kg for PFOA and PFOS, this yields about 800,000 gallons of water contaminated by each artificial turf grass field annually. For reference, the United States currently has over 12,000 turf grass fields, and is installing new ones at a rate of more than 1,200 per year. (<https://www.nps.org/parks-recreation-magazine/2019/may/synthetic-sports-fields-and-the-heat-island-effect/>)

This is intended as only a rough approximation of PFAS load a community might face from a single field to point out the environmental impact of IPPAs in extruded plastic blades, and more thorough estimates can be calculated by the reader.

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Peaslee explains, “That sounds like a minute amount... but if you consider that’s from a single field and the EPA limit for drinking water is now about 4ppt for PFOA and PFOS, this would yield about 800,000 gallons of water contaminated by a single artificial turf field per year... I’m really worried about what’s in our... community’s drinking water based on the large use of plastics that involve just a little bit of PFAS added to them... There’s nothing safe about what they’re adding... These are toxic chemicals... They are coming off. They will get into your drinking water, and they’ll stay there for a very long time, until we drink them, where they’ll stay in your body for a very long time as well. Years... So this is the concern that I have that is environmental. It is not just for the players... I would argue very strongly there is a very strong sustainability [issue with this], as well as just the very low levels at which these [PFAS] are known to be toxic once they get in the drinking water. There is nothing safe about contaminating 800,000 gallons of water per field per year... It’s just adding to our exposure levels of something that shouldn’t be in the environment at all. It’s all manmade. And it will lead to higher levels [of PFAS] in all the community, not just the players.”

In February 2024, independent expert, the nonprofit The Ecology Center, published testing criteria that could be considered for use as the significance threshold for an artificial turf system’s leachable PFAS and “found a range of third-party labs capable of conducting this type of analysis.”⁵⁵ In the document, this independent expert source explains:

- their organization has had many samples of artificial turf tested and continues to test more and have not found any that are “PFAS-free,” highlighting “the need for companies to provide precise and meaningful test results if they claim PFAS-free”
- “targeted testing results provided by the turf industry are inadequate to support a ‘PFAS-free’ claim”; targeted tests “can detect only a portion (typically 24 – 70 compounds, depending on the lab) of the hundreds of possible PFAS chemicals that may be present”; this is why U.S. EPA Method 537.1 is not sufficient to demonstrate a carpet or turf fiber is PFAS-free
- California Proposition 65 compliance is inadequate to support a ‘PFAS-free’ claim, because it regulates few PFAS chemicals
- the industry standard for certifying other types of products as PFAS-free requires total fluorine testing and this “should be the standard for polymer-based products like turf as well”

⁵⁵ The Ecology Center *Letter to Hamilton, Massachusetts Planning Board regarding school district athletic field project*, Feb. 6, 2024, available at <https://drive.google.com/file/d/1PDCpIvVc-lpeYeBhDSEd9yL3aRLRtghx/view?usp=drivesdk>

Once the Lead Agency has defined its significance threshold criteria for an artificial turf system's leachable PFAS, it is imperative the EIR provide evidence that there exists at least one artificial turf system suitable for the Project that does not exceed this significance threshold. If the Lead Agency is unable to provide this evidence, it can not be reasonably concluded that it is feasible for the Project to have a less-than-significant impact on the environment. To qualify as adequate evidence, PFAS test detection methods and detection levels must be identified and test data must be provided for the identified artificial turf system (including the turf carpet, the turf carpet backing, the infill, and the shockpad.)

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II. Microplastic and nanoplastic pollution

A second significant adverse environmental impact from artificial turf is microplastic and nanoplastic pollution. As of 2020, research reports indicate that microplastics have become an "intense global concern. These particles are present in aquatic environments in high concentrations and may adversely affect aquatic organisms. An additional concern is the ability of microplastics to adsorb inorganic and organic pollutants and subsequently liberate them into marine and freshwater systems."⁵⁶ "Microplastic and now nanoplastic research [have] grown rapidly in the last 10 years" and it suggests they are "detrimental to ecosystems and species health, modifying mobility, fecundity and mortality."⁵⁷ Very recent research (in 2023) has identified artificial turf as "widespread pollutants of aquatic environments." The researchers found that "artificial turf fibers accounted for up to 15% of meso- and microplastic abundance" in rivers and sea surface waters.⁵⁸ Artificial turf systems therefore represent a significant source of plastic pollution to natural aquatic environments. Artificial turf fibers are found in Lake Tahoe.⁵⁹ They are found in the

G-19

⁵⁶ Xu, et al., *Microplastics in aquatic environments: Occurrence, accumulation, and biological effects*, *Science of the Total Environment*, Volume 703 (Feb. 10, 2020), available at <https://www.sciencedirect.com/science/article/abs/pii/S004896971934690X>.

⁵⁷ Steve Allen, Deonie Allen, Samaneh Karbalaeei, Vittorio Maselli, Tony R. Walker, *Micro(nano)plastics sources, fate, and effects: What we know after ten years of research*, *Journal of Hazardous Materials Advances*, Volume 6 (2022), available at <https://doi.org/10.1016/j.hazadv.2022.100057>

⁵⁸ Haan, et al., *The Dark Side of Artificial Greening: Plastic turfs as widespread pollutants of aquatic environment*, *Envtl. Pollution*, Volume 334 (Oct. 1, 2023), available at <https://www.sciencedirect.com/science/article/pii/S0269749123010965>.

ocean.⁶⁰ There is risk that microplastics from the Lead Agency artificial turf are, and will continue to be, flushed into San Francisco Bay and make their way into the Pacific Ocean.

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Microplastics escape from synthetic turf into the environment. These microplastics include both primary and secondary microplastics. Primary microplastics are intentionally engineered particles; secondary microplastics are the result of degradation of larger plastics. Primary microplastics include plastic-based artificial turf system infill pellets, such as tire crumbs, polymer-fused cork, and plastic-coated sand. Secondary microplastics include pieces of synthetic turf fibers that detach from the carpet backing or break off the plastic carpet pile, as well as smaller fragments that plastic carpet fibers and plastic-based infills break down into. Despite synthetic turf industry claims that the plastic carpet fibers do not break down, real-world evidence proves otherwise.⁶¹ This degradation into secondary microplastics can result from the aging and weakening of the carpet and infill as it is subjected to ultraviolet rays, heat, wind, rain, and the extensive mechanical abrasion that results from repetitive friction that the carpet and infill are subjected to under grooming equipment, heavy foot traffic, and cleats, as well as the grinding action against infill materials (such as sand, plasticized pellets, walnut shells, olive pits, Zeolite, etc.), some of which are more abrasive than others. The degradation of the plastic carpet fibers may be the reason some artificial turf manufacturers only warranty that their plastic carpet will retain 50% of its pile height (and tensile strength) after 8 years,⁶² and it may be the reason some manufacturers, like FieldTurf, as shown in the warranty for the system installed at Saratoga High School in 2023, do not warranty fiber pile height retention at all.⁶³

G-20

⁵⁹ Madison Schultz, *UC Davis Environmental Research Center fundamental at Lake Tahoe*, Sierra Sun (Dec. 25, 2022), available at <https://www.sierrasun.com/news/uc-davis-environmental-research-center-fundamental-at-lake-tahoe/>.

⁶⁰ Gerry Hadden, *Surfing scientists in Spain are hunting down microplastics*, The World (July 29, 2022), available at <https://theworld.org/stories/2022-07-29/surfing-scientists-spain-are-hunting-down-microplastics>.

⁶¹ Public Hearing Regarding Artificial Turf Proposal, Massachusetts (April 2021), available at <https://www.youtube.com/watch?v=A8OLBfWmt7g>

⁶² *SYNLawn Warranty* (2021), available at <https://drive.google.com/file/d/1kENxS7B4-gRillKBSR2e8h3x7ksF--kb/view?usp=drivesdk>

⁶³ *FieldTurf Warranty for Saratoga High School* (2023), available at https://drive.google.com/file/d/1d6cRVDBDOPWIA_cCNVV7HmmtG1T-RIE/view?usp=drivesdk

Because a single microplastic particle may break down into millions of nanoplastics⁶⁴, nanoplastics also escape from synthetic turf into the environment.

G-20

There is now evidence that microplastic pollution in the blood is related to a disease.⁶⁵ Preclinical studies show microplastics and nanoplastics are emerging as a potential risk factor for cardiovascular disease.⁶⁶

III. Greenhouse gas emissions

A third significant adverse environmental impact from artificial turf is its greenhouse gas emissions. In 2019, oceanographer and plastic degradation scientist Dr. Sarah-Jeanne Royer reported that the amount of GHGs emitted into the atmosphere in the form of ethylene, methane, and propylene by artificial turf carpet and shock pad represent a significant adverse environmental impact⁶⁷ and should be calculated as part of a public agency's CEQA analysis. The expert opinion of Dr. Royer, supported by recent research findings⁶⁸, is that "the environmental health impacts posed by plastic carpets and polypropylene shock pads are likely significant and should be at the forefront of any decision regarding these materials." Dr. Royer's research has revealed that the breakdown of plastic represents a significant source of greenhouse gas pollution. The amount of greenhouse gases (GHGs) emitted by artificial turf is especially significant due to the following:

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⁶⁴ Yee MS, Hii LW, Looi CK, Lim WM, Wong SF, Kok YY, et al. *Impact of microplastics and nanoplastics on human health*. *Nanomaterials* (Basel) 11(2):496. (2021), available at <https://doi.org/10.3390/nano11020496>.

⁶⁵ Jacobs, Andrew *Microplastics Are a Big Problem, a New Film Warns— At SXSW, a documentary traces the arc of plastics in our lives, and highlights evolving research of the potential harm of its presence in our bodies* (Mar. 9, 2024) available at <https://www.nytimes.com/2024/03/09/health/microplastics-sxsw-health-plastic-people.html>

⁶⁶ Marfella, R. et. al *Microplastics and Nanoplastics in Atheromas and Cardiovascular Events* (March 7, 2024), available at <https://www.nejm.org/doi/full/10.1056/NEJMoa2309822>

⁶⁷ Sarah-Jeanne Royer *Synthetic turf will contribute to greenhouse gas problems* (Feb. 20, 2019), available at <https://www.mvtimes.com/2019/02/20/synthetic-turf-will-contribute-greenhouse-gas-problems/>

⁶⁸ Sarah-Jeanne Royer *Production of methane and ethylene from plastic in the environment* (Aug 1., 2018), available at <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0200574>

- The type of plastic from which synthetic turf is typically made is polyethylene.
- Old news: GHGs are released during the manufacturing of synthetic turf. (Producing one ounce of polyethylene releases⁶⁹ one ounce of carbon dioxide.)
- Much more recent news: Plastics emit GHGs when exposed to UV light and air, and polyethylene is the plastic found to release GHGs at the highest rate. This means that significant GHGs continue to be released while the synthetic turf and shockpads are in use and as they degrade.
 - Methane and ethylene are among the significant GHGs emitted by polyethylene. Methane has been shown to be 21 times more potent than carbon dioxide. Ethylene is produced in even greater amounts.
 - Land based plastics produce 2 times more methane and 76 times more ethylene than those found in our waterways and oceans.
 - While methane and ethylene offgassing is triggered by solar radiation, the offgassing continues in the dark and likely over the lifetime of the plastic.
 - The amount of offgassing is based on the surface area of the plastic. Synthetic turf represents enormous surface area because:
 - Synthetic turf occupies vast acreage when all of the Lead Agency's synthetic turf systems are accounted for.
 - Each individual blade of plastic grass represents additional surface area.
 - The surface area of the plastic further increases due to degradation from weather, foot traffic, ultraviolet radiation, and resulting fragmentation. As a result, the amount of GHGs emitted accelerates *exponentially*.

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There is no evidence that attempts to mitigate environmental impacts are adequate. For example, there is no evidence that bioretention systems can adequately remove PFAS from the water that runs off an artificial turf system. PFAS in the dissolved form (i.e., less adherence to sediment) may leach through the mulch/biotreatment soil media and enter the underdrain of the bioretention systems and/or native soil. There is no evidence that even "state of the art" attempts to mitigate

G-22

⁶⁹ Samantha Staley *The Link Between Plastic Use and Climate Change: Nitty-gritty* (Dec. 2009), available at [https://stanfordmag.org/contents/the-link-between-plastic-use-and-climate-change-nitty-gritty#:~:text=Carbon%20Calculations,of%20polyethylene%20\(PET\)%20produced](https://stanfordmag.org/contents/the-link-between-plastic-use-and-climate-change-nitty-gritty#:~:text=Carbon%20Calculations,of%20polyethylene%20(PET)%20produced)

micro- and nano-plastic migration can adequately limit the escape of macro- and micro-particulate and chemically laced dust from the site of the synthetic turf system. While local filtration systems (drain filters installed beneath the field, along its perimeter, or in nearby drains on the property), catch basins, grates, barriers, netting, cleaning stations, walk-off mats, and regular grooming, can prevent some volume of plastic fragments from being washed by rain into a storm system, plastic fragments smaller than the pores of the filters would not be prevented from entering the storm system. These mitigation measures are unable to adequately capture the microplastics and nanoplastics carried much further from the field by wind, shoes, and clothing, where they would logically be rinsed into other storm drains, eventually flowing to the San Francisco Bay and carrying PFAS with it. Citizen scientists have provided plenty of photographic and video evidence of the small plastic fibers and infill blowing long distances from artificial turf fields where they can contaminate the local watershed and also be washed into storm drains. This microplastic migration phenomenon is evidenced by the fact that broken fragments of plastic grass fibers sometimes collect in areas with a physical barrier such as walls of nearby structures or, to provide you with a recent, local, visual example, a curb near one of the Sunnyvale Fremont High School artificial turf fields. See the brief video at <https://drive.google.com/file/d/1mNKjWoShiqUfin8CJeHwsx-dUEVw5WXs/view>. It shows some of the plastic turf fibers and black tire crumbs, which are also considered microplastics, that are initiating their journey out into the world far from the field. It is reasonable to assume plastic grass fibers that don't encounter a physical barrier migrate further as they are readily lofted into air and washed into soil. It is also reasonable to assume that there are smaller fragments of plastic grass fibers that aren't visible to the naked eye, known as nanoplastics, also being carried similar distances from the field. What pollutes the land eventually pollutes the water. During rain events, land pollution is swept into storm drains where it then flows into local creeks and the bay.

G-22

Greenhouse gas emissions are cumulative. As the Lead Agency eliminates/eliminated its grass, there are significantly fewer soil microbial communities and plants on Lead Agency land to draw down carbon. Successive iterations of artificial turf replacement projects, which will be necessary every 8-10 years ad infinitum, or until prohibited by law or regulation, therefore constitute significant cumulative adverse environmental impact. A narrow focus on a single field and failure to recognize the successive iterations of replacement projects would violate CEQA.

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IV. Cumulative effect of relatively frequent generation of non-recycled plastic waste: voluminous and emitting long-lasting pollutants (nanoplastics, PFAS, etc.)

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The cumulative impact of successive projects of the same type in the same place, over time is significant. Cumulative effects are the “change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.” CEQA Guidelines § 15355.

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Periodic disposal of the artificial turf carpets for all of the Lead Agency's artificial turf fields will be necessary each time these carpets reach the end of their useful lives. The collective volume and weight of all of this material needs to be considered cumulatively, as these plastic turf carpets require replacement approximately every 10 years, forever. This also means the Lead Agency will require hundreds of tons of virgin-plastic turf carpet to be manufactured for it approximately every 10 years. These “successive projects” must be considered together, and disposal and the inability to genuinely recycle the fields causes some of the greatest long-lasting and severe environmental effects.

Due to ultraviolet rays and heavy use, so much of the plastic carpet pile height of artificial turf has broken off and/or matted down after a mere 8-10 years (typical warranty period) of use, that the carpet fibers become unable to keep the infill material contained, rendering the whole carpet due for replacement. The issue of how to handle artificial turf waste once it wears out is a significant environmental concern given both the sheer volume of the waste and the hazardous nature of its content. Each regulation-sized plastic turf soccer field covers 80,000 square-feet and when disposed of would fill between fifteen and twenty 30-yard dumpsters.⁷⁰ For a visual of the volume of waste generated by just *one* artificial turf sports field replacement (Saratoga High School, summer 2023), see the brief video at the following link:

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<https://twitter.com/banplasticturf/status/1691640297812627701?s=61&t=aykVGXwuYJp rFxosgnti2Q>. Now, for agencies that own multiple artificial turf systems, imagine that many times that volume of waste. Now, imagine generating *that* volume of waste *every* eight years. “Where do the millions of square feet of synthetic turf go to die? ... to landfills, to rural and urban stockpiles and ‘scattered in ravines, deserts, woods, and empty lots,’ according to a FairWarning investigation.”⁷¹ It can cost tens of thousands of

⁷⁰ Public Employees for Environmental Responsibility *Artificial Turf's Big Lie: Old Fields Not Recycled* (Jan 30, 2020), available at <https://peer.org/artificial-turfs-big-lie-old-fields-not-recycled/>

⁷¹ Marjie Lundstrom *Artificial turf, touted as recycling fix for millions of scrap tires, becomes mounting disposal mess — Where do the millions of square feet of synthetic turf go to die?* https://www.salon.com/2019/12/21/artificial-turf-touted-as-recycling-fix-for-millions-of-scrap-tires-becomes-mounting-disposal-mess_partner/

dollars to dispose of a single field's worth of plastic carpet in a landfill. This is likely why there have been a number of cases where the artificial turf waste has been illegally dumped.⁷² The environmental impacts of illegal dumping are especially concerning given the accelerated pollution shedding from degraded, end-of-life plastic turf.

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How will the Lead Agency be adequately reassured that the artificial turf carpet from this Project is taken where the vendor claims and ultimately repurposed or ultimately recycled into other products? This concern is particularly pressing given that the Saratoga High School artificial turf Chain of Custody document was falsified.⁷³

While environmentally-conscious electeds are rightly uncomfortable with landfilling this much waste, the solution is well-managed natural grass. The Synthetic Turf Council (STC), the world's largest organization representing the synthetic turf industry (with over 200-member companies from over 10 countries) explains, "Synthetic turf systems have a limited lifespan that ranges between 8–10 years... As with any recycle, reuse and recovery effort, the diversity of component materials may represent economic or technical challenges."⁷⁴ "Artificial turf is extremely difficult and expensive to recycle since all the different plastics, rubber, and other materials used must be separated from each other" and "there are no turf recycling plants in the U.S.,"⁷⁵ explains a scientist and attorney formerly with the U.S. Environmental Protection Agency after Public Employees for Environmental Responsibility (PEER). However, this reality unfortunately hasn't dissuaded "artificial turf makers and vendors" from using "recycling claims as a promotional ploy to portray [artificial turf] as an environmentally responsible alternative to traditional grass fields." (PEER has "filed a complaint⁷⁶ with the Federal

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⁷² Public Employees for Environmental Responsibility *Artificial Turf's Big Lie: Old Fields Not Recycled* (Jan 30, 2020), available at <https://peer.org/artificial-turfs-big-lie-old-fields-not-recycled/>

⁷³ Bond, P, Letter to Los Gatos-Saratoga Union High School District Board "Letter regarding 3/12 Board Meeting agenda item 5F CMAS proposal for Helm Field" (Mar. 2024), available at https://drive.google.com/file/d/1ZEaj-4yp3oqarwyUkKAcMkaVMuH_WKTx/view?usp=drivesdk

⁷⁴ Synthetic Turf Council *A Guideline to Recycle, Reuse, Repurpose and Remove Synthetic Turf Systems* (Oct. 2017), available at https://cdn.ymaws.com/www.syntheticurfCouncil.org/resource/resmgr/guidelines/STC_Guideline_for_Recycle_Re.pdf

⁷⁵ Public Employees for Environmental Responsibility *False Artificial Turf Recycling Claims Ripped — FTC Enforcement Urged to End Deceptive Turf Industry Greenwashing* (Mar 7, 2022), available at <https://peer.org/false-artificial-turf-recycling-claims-ripped/>

Trade Commission (FTC), seeking FTC enforcement action to end misleading turf manufacturer and vendor claims.”)

For manufacturers and vendors to promote artificial turf as being “recyclable” is misleading. The synthetic turf industry, like the broader plastics industry, has been greenwashing consumers for years when it comes to the subject of recycling. “Underpinning the plastic waste crisis is a campaign of fraud and deception that fossil fuel and other petrochemical companies have created and perpetuated for decades... Big Oil and the plastics industry have deceptively promoted recycling as a solution to plastic waste management for more than 50 years, despite their long-standing knowledge that plastic recycling is not technically or economically viable at scale.”⁷⁷ As reported by Beyond Plastics Bennington College and The Last Beach Clean Up in “The Real Truth About the U.S. Plastics Recycling Rate,”⁷⁸ the recycling rate for post-consumer plastic waste in the U.S. in 2021 was less than 6%. The report explains that the other 94% was disposed of in landfills, burned in incinerators, or ended up polluting our oceans, waterways, and landscapes. Even when millions of tons of plastic waste per year were counted as recycled when exported to China, the post-consumer plastic waste recycling rate still never even reached 10%. It was also revealed that while plastics recycling is on the decline, the per capita generation of plastic waste has increased by 263% since 1980. It is neither a safe nor realistic solution to bank on promises that plastic recycling will in future become a scalable tool for achieving meaningful reductions in plastic waste and pollution.

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True recycling of artificial turf is a notoriously challenging task, not economically viable over the long-term, and constitutes a source of further microplastic and chemical pollution. Recycling of plastic is reported to pollute the air⁷⁹ around the facility. Like

⁷⁶ Public Employees for Environmental Responsibility *Complaint of Deceptive and Unfair Advertising of Artificial Turf* (Feb 28, 2022), available at https://peer.org/wp-content/uploads/2022/03/3_7_22-Filed-FTC-Complaint-2.28.22.pdf

⁷⁷ Center for Climate Integrity *The Fraud of Plastic Recycling — How Big Oil and the plastics industry deceived the public for decades and caused the plastic waste crisis*. (Feb. 2024), available at <https://climateintegrity.org/uploads/media/Fraud-of-Plastic-Recycling-2024.pdf>

⁷⁸ Bennington College Beyond Plastics and The Last Beach Cleanup *The Real Truth About the U.S. Plastics Recycling Rate* (May 2022) <https://static1.squarespace.com/static/5eda91260bbb7e7a4bf528d8/t/62b2238152acae761414d698/1655841666913/The-Real-Truth-about-the-US-Plastic-Recycling-Rate-2021-Facts-and-Figures-5-4-22.pdf>

⁷⁹ *Recycling can release huge quantities of microplastics, study finds — Scientists find high levels of microplastics in wastewater from unnamed UK plant – and in air surrounding facility* The Guardian, available at

PEER, I am not aware of any facility in the country successfully recycling artificial turf at scale. Claims that facilities capable of recycling at scale will be operational in time for the replacements necessary 10 years down the road are a tired sales tactic. Despite decades of repeated assurances from industry that scalable artificial turf recycling is just-around-the-corner, attempts to make this a reality have encountered one failure after another^{80 81}, like violating environmental laws, and may never come to fruition. Of course, from the industry's point of view, there's no incentive to let customers know that. If recycling of artificial turf were a long-term economically viable, environmentally safe, scalable solution, then massive stockpiles of unwanted, used turf wouldn't be a thing. Those stockpiles are a thing. Society can not afford to continue to rely on the future *potential* for scalable recycling to justify massive plastic purchases.

Being "recyclable" is not the same as being "recycled".

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Repurposing is not recycling. It is nothing more than a temporary pitstop in the product's relatively short journey to its final long-lived resting places. Transferring the product's end-of-life challenges to the responsibility of another entity does not absolve the Lead Agency from its part in the production of this volume of plastic and consequent waste. The Lead Agency is the product's *raison d'être*.

Incineration is not recycling.

"Mechanical recycling" is not recycling. It's just chopping materials into smaller pieces.

"Advanced recycling", a.k.a. "chemical recycling", is not recycling. It's greenwashed terminology for pyrolysis, a form of incineration.⁸² "What they are doing is

<https://www.theguardian.com/environment/2023/may/23/recycling-can-release-huge-quantities-of-microplastics-study-finds>

⁸⁰ Bethany Rodgers *Turf recycler hit with environmental violations as it works to open PA plant* (Apr. 2, 2023) <https://www.phillyburbs.com/story/news/environment/2023/03/20/pa-officials-say-turf-recycler-is-violating-environmental-laws/69995371007/>

⁸¹ Barbara Laker and David Gambacorta *'Forever Fields': How Pennsylvania became a dumping ground for discarded artificial turf — Danish company Re-Match secured state incentives to open a recycling plant in 2022. It hasn't happened yet. Meanwhile, thousands of rolls of the fake grass, containing PFAS, are piled up on farms.* (Dec. 13, 2023), available at <https://bit.ly/foreverfields>

⁸² Natural Resources Defense Council *"Chemical Recycling" is Not Recycling: The Plastic Industry Is Greenwashing Incineration* (Sep. 2022) <https://www.nrdc.org/sites/default/files/chemical-recycling-plastic-greenwashing-incineration-fs.pdf>

burning it. Burning it. It's incredibly environmentally harmful. It is probably the worst thing you could do with these fields, because it emits all sorts of chemicals to the fenceline communities... And it puts the PFAS that is in this field into the air where it then travels about 150km where it falls to the ground," explains Dr. Kyla Bennett, PhD in Ecology.⁸³

Downcycling is not recycling. Question the long-term viability of a waste management solution that depends on a high level of sustained demand for downcycled products, like plastic decking, plastic lumber and other construction materials incorporating plastic waste, especially given the materials would contain hazardous and undisclosed chemicals like PFAS that will continue to contribute to environmental and human health burdens.⁸⁴ Historically, industries have favored the low cost and high economic gain of virgin plastics so have not established high demand for recycled plastics.⁸⁵

As for downcycling artificial turf into plastic lumber, prolific use of plastic in the construction industry is likely a key contributor to plastic pollution and climate change and, in turn, global social injustice. Research shows that incorporating plastic waste into building materials and infrastructure:⁸⁶

- represents ongoing efforts at greenwashing
- delays and distracts from real solutions to the plastic pollution crisis
- exacerbates negative ecological impacts of plastic waste
- exacerbates negative health impacts of plastic waste
- increases demand for continued production of new (virgin) plastics by creating new markets for plastic wastes
- supports an unsustainable pattern of plastic production, use, and disposal

⁸³ Safe Healthy Playing Fields Inc. *Advanced Recycling is the Latest Greenwashing of the Synthetic Turf Industry* (Apr. 25, 2023) <https://www.youtube.com/watch?v=pzdi2cVWZdw>

⁸⁴ Svetlana Wagner Legacy additives in a circular economy of plastics: Current dilemma, policy analysis, and emerging countermeasures (Jul. 2020) <https://www.sciencedirect.com/science/article/pii/S092134492030121X>

⁸⁵ Merrington, A. *Recycling of plastics in Applied plastics engineering handbook: Processing, materials, and applications*. 2nd, 167–189. Elsevier, Amsterdam, Netherlands, (2017), available at <https://www.sciencedirect.com/science/article/abs/pii/B9780323390408000092>

⁸⁶ Erica Cirino et al. *Assessing benefits and risks of incorporating plastic waste in construction materials* *Front. Built Environ., Sec. Sustainable Design and Construction* (July 2023), available at <https://doi.org/10.3389/fbuil.2023.1206474>

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- contributes to the rapidly escalating increase in global plastic production
- is responsible for significantly harming human health and driving serious societal injustices⁸⁷
- is not circular and does not address the core problem of plastic pollution
- greenlights continued manufacturing of plastic material items, perpetuating the cycle of increased pollution and injustice⁸⁸

A significant adverse environmental impact of shredding or pelletizing plastic waste for incorporation into composites and lumbers is that it generates microplastics and nanoplastics. These particles, along with chemical additives and sorbed contaminants travel widely through air⁸⁹, the ocean⁹⁰, and soils⁹¹—and into living bodies including humans.⁹² The need to incorporate additive chemicals and/or new materials to plastic waste to maintain structural and performance integrity introduces additional environmental risk and diminishes a material's circularity and safety.⁹³

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Repurposing, chopping, landfilling, and incinerating waste do not constitute true recycling and are not sustainable. True recycling, if it generates microplastic pollution, is also not sustainable. True recycling of a relatively small number of fields is not the same as true recycling at scale.

⁸⁷ Landrigan, P. J., Raps, H., Cropper, M., Bald, C., Brunner, M., Canonizado, E. M., et al. *The minderoo-Monaco commission on plastics and human health*. *Ann. Glob. Health* 89 (1), 23. (2023) <https://annalsofglobalhealth.org/articles/10.5334/aogh.4056>

⁸⁸ Plastic Pollution Coalition joined by frontline activists from communities of color across America's industrial plastic and petrochemical corridors. *From the Frontline: Petrochemicals, Plastics, and Cancer Alley* (Feb. 15, 2024) <https://www.youtube.com/watch?v=GfsRFM3Vl4w>

⁸⁹ Amato-Lourenço et al. *An emerging class of air pollutants: Potential effects of microplastics to respiratory human health?* (Dec. 20, 2020), availability at <https://www.sciencedirect.com/science/article/pii/S0048969720352050>

⁹⁰ Erikson et al. A growing plastic smog, now estimated to be over 170 trillion plastic particles afloat in the world's oceans—Urgent solutions required (Mar. 8, 2023) <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0281596>

⁹¹ Cramer et al. *Microplastic induces soil water repellency and limits capillary flow*. (2023) <https://access.onlinelibrary.wiley.com/doi/10.1002/vzj2.20215>

⁹² Amobonye et al. *Environmental Impacts of Microplastics and Nanoplastics: A Current Overview* (Dec. 14, 2021) <https://www.frontiersin.org/journals/microbiology/articles/10.3389/fmicb.2021.768297/full>

⁹³ Sara Parece et al. *A Methodology to Qualitatively Select Upcycled Building Materials from Urban and Industrial Waste* (Mar. 15, 2022) <https://www.mdpi.com/2071-1050/14/6/3430>

If the Lead Agency contract is to include recycling, what makes the agency confident the taxpayer dollars being put toward recycling are indeed resulting in legitimate, sustainable, local, or at least domestic, recycling of 100% of the agency's artificial turf waste?

If you are told there's a facility doing *true* recycling of artificial turf *at scale*, please request and share the facility name, location, years in operation, evidence of the volume of artificial turf it recycles annually, and evidence that it is true recycling, as opposed to one of the situations listed above. Please also factor into the Project budget the cost of transporting the used turf to the facility, especially if it'd be sent to a facility across the country or overseas.

Another public agency was recently told FieldTurf would commit to recycling the agency's end-of-life artificial turf system carpets at a California facility, turning it into a PP/PE blend that will then be sent to third party consumer markets to be manufactured into products like plastic lumber, park benches, and trash receptacles. Who is the third party? Why aren't the third party and its customers concerned about the PFAS? Where is the third party? Is the third party even domestic? Is the third party facility sited in a sacrifice zone near disadvantaged communities? Are there social and environmental justice issues at play?⁹⁴

Is that California facility's acceptance of an agency's plastic carpets a small-scale performative operation crafted primarily as a strategy to increase artificial turf sales, i.e. to market to municipal and school district decision-makers, that have pre-purchase inquiries about the environmental sustainability of artificial turf? If recycled, how much waste would be generated by the recycling process for Lead Agency's artificial turf and will that waste be landfilled or incinerated?

Is the California facility Circular Polymers? Why doesn't Circular Polymers mention a purported ability to recycle artificial turf on its website, <https://circularpolymers.com>, especially given widespread demand for artificial turf recycling and plenty of online assertions that there's no facility in the U.S. that recycles artificial turf at scale?

Is the facility's artificial turf carpet "recycling" experimental? The process described by agency staff sounds similar to one of the recycling operations featured in a

⁹⁴ United Nations Environment Programme *Plastic pollution is an environmental injustice to vulnerable communities* (Mar. 30, 2021) <https://www.unep.org/news-and-stories/press-release/plastic-pollution-environmental-injustice-vulnerable-communities-new>

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December 2023 news report which also alluded to artificial turf being extruded for use in plastic lumber. However that news report describes that operation as a “trial” and, curiously, the “partners” were kept secret from the reporters.⁹⁵

The City of San Francisco had 3 fields removed as part of FieldTurf’s “take back” program to be recycled into products like park benches and trash receptacles. While FieldTurf’s slideshow advertising the program failed to mention where the waste would ultimately go, city records state it was shipped over 8,000 miles to Malaysia.⁹⁶ Will any of the Lead Agency’s plastic waste be shipped abroad?

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With regard to the never-ending repetition of disposal of massive quantities of artificial turf product component waste not yet safely recyclable at scale, the Lead Agency lacks substantial evidence to support a finding that no significant cumulative adverse environmental impact exists. The inability to safely and genuinely recycle artificial turf at scale causes great long-lasting and severe environmental effects.

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Plastic waste sent to a landfill will never decompose. The capacity of many landfills are reported to be rapidly depleting. Even if there’s room in a landfill, the PFAS and nanoplastics may contaminate local groundwater. PFAS leach from landfills⁹⁷ and are released into the air by incineration⁹⁸. Please confirm local landfills have remaining capacity to house the volume of never-ending, never-decomposing artificial turf waste the Lead Agency would be regularly disposing of every ~10 years. Recognize the possibility that, especially as chemical regulation increases, artificial turf disposal in landfills may eventually be prohibited; It may become a requirement to treat artificial turf

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⁹⁵ Barbara Laker and David Gambacorta ‘Forever Fields’: How Pennsylvania became a dumping ground for discarded artificial turf (Dec. 13, 2023) https://drive.google.com/file/d/1HMd-hqWeE0THBRcx_TWuB8hIM5uOtByT/view?usp=drivesdk

⁹⁶ Marjie Lundstrom *Artificial turf, touted as recycling fix for millions of scrap tires, becomes mounting disposal mess — Where do the millions of square feet of synthetic turf go to die?* https://www.salon.com/2019/12/21/artificial-turf-touted-as-recycling-fix-for-millions-of-scrap-tires-becomes-mounting-disposal-mess_partner/

⁹⁷ Tolaymat et al. *A Critical Review of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Landfill Disposal in the United States*. Science of the Total Environment, Elsevier BV, AMSTERDAM, Netherlands, 905:167185, (2023). https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=359168&Lab=CESER

⁹⁸ Earthjustice and Sierra Club *Incineration is not a safe disposal method for PFAS* (2022) <https://www.reginfo.gov/public/do/eoDownloadDocument?pubId=&eodoc=true&documentID=251195>

as hazardous waste, given known hazards, like PFAS, which may also increase the Lead Agency’s future disposal costs.

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Ongoing PFAS and microplastic pollution from plastic turf represent significant cumulative adverse environmental impacts. PFAS and microplastic pollution occur:

- from the facilities where PFAS, plastic, and plastic turf are manufactured
- during transport to the Lead Agency’s site
- from the Lead Agency’s sites where the plastic turf sits for 10ish years
- during transport from the Lead Agency sites to its next home
- from the sites where the plastic turf is taken after the Lead Agency is done with it (such as empty lots where they may be stored or sites on which they are repurposed, landfilled, or incinerated)
- from the PFAS-laced plastic products the plastic turf is downcycled into plastic lumber, park benches, and trash receptacles

Every 10 years, forever, literal tons of plastic carpet enters that pipeline. At some point, the market for plastic lumber, park benches, and trash receptacles will be saturated. Every batch of carpet will still exist in some form or another on this earth centuries from now, possibly spread between the post-consumer products it will theoretically be recycled into, stockpiles of crumbling plastic carpet rolls, and a “microlayer” of floating microplastics and nanoplastics in our oceans.

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Because the artificial turf carpet is not truly and safely recyclable into new artificial turf carpet, this system is linear, not circular. This system takes as its input fossil fuels to create more virgin plastic turf, and as its output, it continuously generates a stream of PFAS-laced plastic pollution and every 10 years hundreds of rolls of degraded PFAS-laced plastic carpets. A linear system of plastic production, pollution, and waste inevitably represents a significant cumulative impact. This plastic and this pollution never go away. PFAS are called “forever” chemicals because they last essentially forever. Plastics also last essentially forever. Every bit of plastic manufactured for the Lead Agency’s fields and every bit of PFAS and microplastic pollution that escape during the product’s journey detailed above are forever. The PFAS and microplastics loose in the environment will circulate through our air, water, and soil forever. The amount of PFAS and microplastics we are breathing in, swallowing in our drinking water, and consuming in our food will continue to increase if our societies do not begin making radical changes in our approach to plastics. This is the premise of much scientific input that has been laid out in the recent discussions about the Global Plastics Treaty being developed.⁹⁹

Successive iterations of artificial turf replacement projects, which will be necessary every 8-10 years ad infinitum, or until prohibited by law or regulation, constitute significant cumulative adverse environmental impact in terms of both the volume of waste being produced and the emissions from this waste of long-lasting pollutants like microplastics and PFAS. A narrow focus on a single field and failure to recognize the successive iterations of replacement projects would violate CEQA.

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V. The Environmental Injustice of Artificial Turf

Production, transport, use, and disposal of artificial turf all are guilty of contaminating water, soil, and air. As such, environmental justice issues span the lifecycle of artificial turf, a fossil-fuel-derived plastic product. This includes negative impacts on communities near fossil-fuel extraction sites. It includes negative impacts on communities near facilities manufacturing artificial turf, its plastics, and the hundreds of chemicals found in those plastics, many of which have been identified as toxic. For example, modern-day news abounds with stories of communities (like those in [northern Georgia](#) where carpet and artificial turf are manufactured) whose drinking water supplies have become contaminated with PFAS. PFAS are known as “Forever Chemicals”, because they accumulate in our bodies and the environment and last essentially forever. As artificial turfs reach their useful end-of-life, a massive amount of waste is being incinerated or landfilled. Incinerators and landfills are often sited in sacrifice zones, i.e. near disadvantaged communities. Both incineration and landfilling pollute soil, air, and water. Note that PFAS is not destroyed by incineration nor wholly contained by landfills.

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Does CEQA not require you to consider the upstream and downstream impacts of a project if they are out of the local area or out of state? Are California public agencies permitted to choose upstream sourcing and downstream disposal options out of the area or state to avoid having to acknowledge its responsibility for some of the significant adverse environmental impacts of its actions??

⁹⁹ United Nations Environment Programme *Historic day in the campaign to beat plastic pollution: Nations commit to develop a legally binding agreement* (Mar. 2, 2022) <https://www.unep.org/news-and-stories/press-release/historic-day-campaign-beat-plastic-pollution-nations-commit-develop>

The State of California’s Office of Attorney General, under the heading “Environment & Public Health,” has a lot to say about plastics:

Plastic manufacturing itself is highly hazardous, with the pollution burden being primarily borne by low-income communities and communities of color. Plastics manufacturing plants and materials recovery facilities, which are often sited in or near marginalized communities, generate hundreds of millions of tons of toxic air pollution each year. Ninety-nine percent of plastic is made from fossil fuels. The process of making plastic — from the extraction of oil and gas through the stages of manufacturing polymers — is a highly polluting process and a significant source of greenhouse gas emissions. The plastic industry’s greenhouse gas emissions are expected to surpass those of coal-fired power in the United States by 2030. While California has aggressive programs in place to reduce greenhouse gas emissions and transition to a clean economy, plastic production remains on the rise, threatening state climate goals and exacerbating the impacts of the climate crisis.

Source: <https://oag.ca.gov/plastics>

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VI. Feasibility of Natural Grass

A proper evaluation of the feasibility of well-managed natural grass has not yet been documented and publicly shared by the Lead Agency. The infeasibility of well-managed natural grass fields is often implied by CBOs, elected officials, and bond/construction manager. The infeasibility of well-managed natural grass fields has been implied, in other settings in our area, by field design firm Verde Design, Inc, field construction firm Robert A. Bothman Construction, athletic directors, league directors, coaches, athletes, etc. However, to my knowledge, none of them have the professional credentials to conclude natural grass is infeasible. They also do not have the professional credentials to conclude artificial turf has no significant adverse environmental consequences. And since Lead Agency has failed to inform these well-meaning individuals of these consequences or of the option to have well-managed natural grass, it would not be surprising if many of them lobby for artificial turf. For the most part, those lobbying for artificial turf have been misled into believing the only realistic options are either natural grass that is poorly managed, unavailable during and after rain, offline for long stretches of time during the playing season, etc. or artificial turf.

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The Lead Agency and the public need to be educated about the environmental consequences of artificial turf and the alternatives to using artificial turf prior to a final decision to approve the Project. This is the purpose of undertaking the CEQA review process. The Lead Agency's failure to engage in this public process prior to its decision demands that it return to the drawing board. Once educated on the environmental and health risks of artificial turf, public opinion appears to strongly favor natural grass.

Before rushing into another ill-advised decision to approve artificial turf, consult with professional sports field managers who have had long-term success keeping natural grass sports fields, fields that have high-volume heavy-usage and all-weather, year-round availability needs comparable to the Lead Agency's, in safe condition on a public agency budget. They are the only experts qualified to conclude whether natural grass is infeasible for the Lead Agency's needs. Design firms and construction firms typically do not have sufficient first-hand successful experience with long-term management of natural grass sports fields to adequately advise the Lead Agency regarding their potential use, and the Lead Agency should not settle for their opinions on the issue. The Lead Agency is urged to consult professional sports field managers that have a record of long-term success (10+ years) with year-round, high-volume natural grass sports fields for public agencies. These experts exist and the Lead Agency should be talking to them.

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Experts recommended for consideration:

- Professional sports field managers made available to public agencies by the nonprofit Beyond Pesticides through their "[Parks for a Sustainable Future](#)" program. Reach out to this organization's team at sustainableparks@beyondpesticides.org to learn more. Through this program, the Lead Agency's staff can be trained to economically keep natural grass in safe condition. This program is teaching public schools and Parks & Rec departments how to prevent worn/bare spots, mud, and pests on high-use natural grass playing fields in order to give the kids a consistent, level playing surface. The program would serve as an ideal vehicle for demonstrating to the community that real grass sports fields can be affordably kept in safe condition for the Lead Agency's year-round high-volume usage needs. The program's emphasis would be on training the managers of the Lead Agency's natural grass fields and supporting their success. With the professional development gained via this training program, the Lead Agency's grounds team would learn to keep soil rich with microbial life, enabling resilient, thriving natural grass. (Both a bonus and a key to success of this program is that the field management methods are organic

and create more resilient turf that retains moisture and requires less watering. Organic management is safer for the grounds crew, field users, and the environment.)

- [Certified Sports Field Managers](#) (“CSFMs”) that have demonstrated years of success managing real grass fields on a public school budget for communities with usage and availability needs similar to the Lead Agency’s. Most field design firms and most field construction firms do not have a CSFM, especially not one that fits this description. Note also that many public agency field manager(s) are not yet certified as CSFMs. CSFMs are certified by the professional association called [Sports Field Management Association](#) (“SFMA”). The SFMA board president, [Sun Roesslain](#), may be particularly helpful in helping the Lead Agency assess the feasibility of natural grass. She is a CSFM that is part of a [2-person crew](#) managing national-award winning natural grass fields for a set of 6 public high schools. She is also networked with a number of the 250ish CSFMs across the country and may therefore be able to recommend other CSFMs for the Lead Agency to talk to regarding strategies for successful management with natural grass under the Lead Agency’s year-round high-volume usage needs. She should also be able to refer you to professional development opportunities for the Lead Agency’s field manager(s) to supplement information and training from the Beyond Pesticides training program. Consider supporting the Lead Agency’s field manager(s) in earning CSFM certification.
- National field management expert, [Jerad Minnick](#), and his consulting business, National Grass Advisory Group, are dedicated to proving how grass can take more use by focusing “on the most important elements of natural grass field maintenance to deliver stronger, safer, and more affordable playing fields.” His unique approach involves data-driven, targeted maintenance to offer economical field management . For example, rather than aerating the field once a year, his method involves performing more frequent mechanical aeration of areas that his tools detect to be more compacted. As you can imagine, the goal mouths would be targeted, but so would other areas of the field where compaction is inhibiting drainage and at risk of causing the grass not to thrive. Direct the Lead Agency staff to do a consultation with him to learn more about his firm’s [education and advisory services](#).

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Provided below is evidence to address the common conviction that natural grass can’t meet the Lead Agency’s usage demands, starting with the fallacy that natural grass, managed on a budget, can’t sustain high use 7 days per week, and that it can’t

possibly support high-volume use by football, soccer, marching band, lacrosse, other sports, summer usage, winter usage, and constant rentals.

For starters, please watch this [4-minute video](#) describing how using soil science in the approach to managing the field enables this community athletic field to sustain 49 hours per week of play. You will see this theme of emphasizing management of the soil, as opposed to exclusively focusing on management of the grass, repeated below where the Beyond Pesticides field management approach is detailed.



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The above adequately debunks the myth often amplified by the underinformed that safe condition natural grass requires infrequent use. Below, further evidence will be provided to debunk the myth that well-managed natural grass requires inaccessibly high levels of maintenance.

It's important to recognize that while there are countless examples of poorly-managed grass fields, that alone is insufficient evidence that it is infeasible for the Lead Agency to achieve well-managed grass fields. Even if there are no directly comparable fields to copy (i.e. no high school football fields in the area that have well-managed grass fields with comparable use), there exist well-managed high-use grass fields in different settings that can be learned from. It behooves us to approach this with an open-mind and progressive attitude. Wouldn't it be wonderful for the Lead Agency to be trendsetters responsible for a widespread movement to safe, healthy natural grass playing fields throughout bay area public agencies? Consider the acreage of plastic turf out there. (Bothman Construction boasts they've already Saran Wrapped over [27 million square feet of Northern California](#)). Imagine the positive impacts that could be achieved by challenging the status quo and being role models when it comes to environmental responsibility and children's health.

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In regards to poor condition natural grass fields often cited, these are simply not examples of what is feasible with well-managed natural grass. Many are poorly managed. In many cases, modern field management methods that include soil aeration have not yet been adopted. In many cases, public agencies deliberately opt to not dedicate resources to adequately maintain fields so that it can prioritize other things.

It is a myth that compacted goal mouths are inevitable and that using grass in wet winter weather will inevitably tear up natural grass. These myths will be debunked below.

To address concerns for overuse by competitive marching band, well-managed natural grass can handle this type of heavy use. Here is a [social media post](#) showing a beautiful example of a natural grass field after 32 marching band performances and 3 football games in one week. This field is managed by Sun Roeslein. Above, it was suggested she be contacted to learn more about the approach her 2-person team employs to manage fields for 6 high schools on a public school budget.

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To all convinced natural grass will be destroyed if used during or after rain, that is a valid fear with poorly managed fields. But there are field management methods that can be employed to keep soil decompacted so that water infiltrates easily and does not result in a squishy or muddy field. When water infiltrates easily, compaction while the soil is wet is less of a concern. [Click here to play a video](#) of an example from [Field Fund Inc.](#), a 501c3 community-based organization launched by three working moms "eager to

prove that healthy, organically maintained grass playing fields are the safest, most environmentally and financially responsible choice.” If they can do it, why can’t the Lead Agency? They got educated on field management methods from Jerad Minnick, suggested above.



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Above are a few stills from the Field Fund Inc. video, captioned “Rainy day following a rainy night but these healthy grass fields were draining beautifully and totally playable.”



That’s Jerad Minnick in the middle of their team photo.

There appears to be some level of conviction that, despite the revelatory information now before us regarding the climate crisis, plastics crisis, and PFAS crisis, we must resign ourselves to a decision made a decade ago when we were less

informed. If we open ourselves to seeking out the truth about our options, the outlook needn't be quite so bleak.

Synthetic turf industry talking points, like downtime estimates needed for natural grass repairs and renovations, tend to be biased. They need to be countered with natural grass industry talking points. Please be aware that field design firms (like Verde Design) and field construction firms (like Bothman Construction) that offer to design and/or build clients their choice of either natural turf fields or artificial turf fields, even if they claim to be agnostic about the client's decision, are not motivated to reveal to you that with modern, affordable field management methods, a natural grass field can be kept in such good condition that it does not require redesign or reconstruction for 25+ years¹⁰⁰, and at that time, the field may merely be due for irrigation system updates. These firms would lose repeat business on fields for clients successful with well-managed natural grass. In contrast, once these firms hook a client on artificial turf, that client will become due for costly reconstruction services every 8-10 years forever. Over the short-term, a client's choice of natural versus artificial turf may not make much difference to the firm's bottom line, but when it comes to long-term profit, artificial turf fields are an infinite profit center. Be skeptical of the bias in the input field design and field construction firms provide you.

G-34

To assure you this is not a conspiracy theory of mine, review the 2023 letter in which Bothman Construction [lobbies against](#) California [bill SB499](#), a bill designed to protect students from extreme heat on school campuses. As living landscapes have been replaced on school campuses with plastic turf, rubberized surfaces, blacktop, and other hardscape materials, campuses have lost the benefit of cooling that comes with evapotranspiration. This bill, perhaps if Bothman and the lobbyists at CASH hadn't objected to it, would have required schools to, among other things, replace artificial turf with natural grass at the next renovation. Since Bothman Construction emphasizes they are capable of constructing a client's choice of artificial or natural turf fields, as a for-profit business, it's hard to imagine Bothman Construction would have bothered to lobby against SB499's artificial turf regulations if Bothman Construction didn't benefit financially over-the-long-term from a widespread preference for artificial turf. If Bothman Construction stands to make just as much or more money over the long-term when clients opt for natural turf, you have to admit this lobbying effort of theirs calls into question their insistence that they are "agnostic" on the subject of whether clients

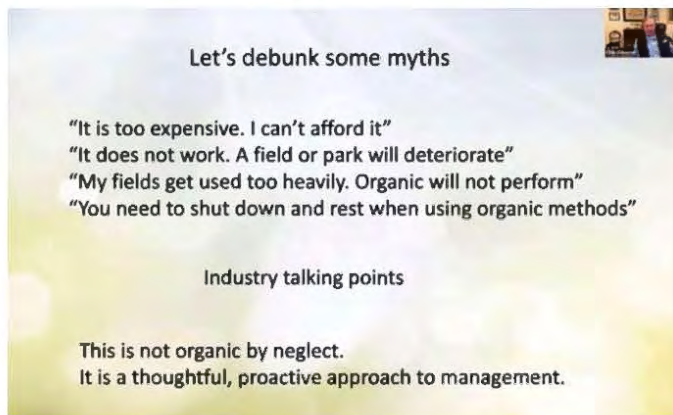
¹⁰⁰ Minnick, Jerad "The infrastructure of a natural grass field will last for 25 years at minimum," page 27 of Letter to School Committee regarding Martha's Vineyard Regional High School Athletic Field Master Plan & Phase 1 (Feb 4, 2019) <https://www.oakbluffsma.gov/DocumentCenter/View/5234/Review-of-Athletic-Field-Master-Plan-and-Phase-1---Jerad-Minnick-Oct-16-2020>

choose natural or artificial turf. By now, surely you realize that once Bothman persuades a client to install artificial turf, costly reconstruction services from Bothman (or a competitor) are needed every 8-10 years. Couple that with the fact that switching back to natural turf can be, if viewed only on the short-term, prohibitively costly. As you can see, clients with plastic turf fields essentially represent an infinite profit center for construction firms, whereas clients with *well-managed* natural grass, as I explained above, do not.

To address a potential concern that upgrading fields to natural grass would mean band and girls' flag football would lose access to the field during winter while the field recovers from football season, the points above offer reassurance this is not the case. There are multiple management methods that enable grass to sustain heavy use and enable play during and after rains. As explained in the 11/29/23 [Beyond Pesticides webinar](#), organic management of sports fields is an option for enabling high use fields to be used year-round.

[This 90-second clip](#) (extracted from this [full webinar recording](#)) in which organic sports field management expert, Chip Osborne, with his decades of experience managing natural grass athletic fields for public agencies, explains that it is a myth that natural grass can't be economically managed to sustain heavy use or that the field needs to be shut down and rested. "I have never worked yet, in 25 years, on a field that does not get heavy use... I have never worked on a property where the field has been closed and rested so that organic had a chance to work... It's not too expensive. Costs decrease over time. Parks and fields do not deteriorate... We are not talking about organic by neglect. We're talking about a thoughtful, proactive approach to management, a management practice/protocol that is founded in science."

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Slide from the webinar clip where sports field management expert debunks myths about organically managed natural grass fields.

To address concerns regarding water availability during drought, community athletic fields can be watered. While there may have been watering prohibitions for non-functional turf, there are no such prohibitions for watering community athletic fields. As an example, even at the highest stage of water conservation, San Jose Water considers watering community athletic fields a [well-justified use of water](#). When it comes to water conservation, [the bigger picture](#) needs to be considered.

Artificial turf advocates often fault natural turf for requiring gas-powered mowing equipment and many manhours for mowing. This is a tired claim. The natural turf industry has advanced significantly. You can now find auto-mowers and auto-painters for athletic fields. They look like Roomba vacuums. A CSFM working for a municipality on the east coast that we talked to was developing a plan to run the mowers overnight and have them return to a small shed. If he can do that, why can't the Lead Agency? This brings up another tired claim of artificial turf advocates... pesticides.

Concerns over exposure to pesticides and childrens' long-term exposure to chemicals are valid. Organically-managed natural turf should be explored as an alternative to both artificial turf and conventionally-managed natural turf (i.e. grass managed with synthetic pesticides and/or synthetic fertilizers). Keep in mind that pesticides are regulated by the federal government whereas artificial turf is *not* regulated by the federal government. Because of this, if the Lead Agency will not consider an organic field management approach, it is still preferable to carefully use regulated pesticides as part of natural grass rather than risk childrens' exposure to plastic turf's unregulated and undisclosed chemical cocktails, which are, by the way, protected from public scrutiny under Confidential Business Information laws. Please direct Lead Agency staff to consult directly with the nonprofit Beyond Pesticides about their Parks for a Sustainable Future program. Surely, you must be intrigued by the potential for organic management of natural grass sports fields to be a feasible option after watching that 90-second clip. You owe it to the youth to have the Lead Agency legitimately dig into the feasibility question with Beyond Pesticides before concluding that organically managed natural turf fields are not an option. Parroting the comebacks of those that get any benefit from choosing artificial turf, financial or otherwise, is inadequate without making the due diligence to source the story of natural grass promoters and critically evaluate the merits of the debate, and motives of the debaters, for yourselves.

G-34

Speaking of motives, I can't emphasize strongly enough that the Beyond Pesticides' Parks for a Sustainable Future program is not for-profit. Allow me to explain in more detail my understanding of this program, based on conversations I've had with Rika Gopinath, one of the program contacts...

The Parks for a Sustainable Future program, offered by the nonprofit Beyond Pesticides, offers 3 years of consultant services to help public agencies (i.e. school districts and municipalities) keep natural grass sports fields in safe condition while enabling year-round, high-volume, heavy use.

Their outreach is directed at school superintendents, city managers, and the electeds that oversee them.

It is a fallacy that plastic turf is the only practical solution to, on a tight public budget, conserve water and keep athletic fields in safe condition under year-round, high-volume, heavy use.

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These are well-recognized pain points when it comes to managing natural grass:

- short-staffing and/or short-funding
- athletic fields that get heavy usage, meaning desired to be available 12 months/year, 12 hours/day for:
 - practices and competitions of high-school-level band, football, soccer, etc.
 - gathering events like track meets
 - P.E. classes
 - and more
- community frustration with poor natural grass field conditions, including:
 - uneven surfaces
 - divots
 - mud
 - bare spots
 - goose feces
- community unwilling to tolerate frequent field closures intended to reduce field damage during/after rain
- high prioritization of water conservation

This program is designed to serve as a solution for all of the above. It is a 3-year program that starts by teaching your in-house or outsourced staff how to economically employ science-based methods to enable actively-organically-managed natural grass to

serve as a feasible and affordable solution to all of the above concerns. After teaching the methods and getting the agency launched on the right foot, the consultant remains available for troubleshooting and as-needed guidance for the remaining years of the program.

A very common reason natural grass athletic fields get compacted, patchy, muddy (i.e. fall into poor condition) is a lack of healthy soil microbial activity, a condition that results from (a) failure to add organic matter to the soil and/or (b) application of synthetic pesticides. Without soil microbes tunneling through the soil, the soil becomes compacted through heavy field usage. Compacted soil hinders extension of the grass's roots and reduces infiltration of water and air, leaving the grass to struggle. The economical solution is to feed the soil microbes organic matter and refrain from synthetic pesticide usage. A high population of healthy soil microbes provide free natural aeration of the soil, reducing soil compaction, enabling natural grass to thrive, fill in bare spots and crowd out weeds. Aerated soil helps water percolate through the soil, reducing mud and enabling field usage during/after rain. This free natural aeration also reduces irrigation needs and labor needs. Work with nature, not against it.

The mission of the nonprofit, Beyond Pesticides, is to reduce pesticide usage. They want cities and schools to succeed with pesticide-free athletic fields. Towards that goal, the nonprofit has raised funds to enable operation of a Parks for a Sustainable Future Program, a program in which the nonprofit pays seasoned experts (like Chip Osborne from that 90-second webinar clip I shared earlier) to consult for and train staff of public agencies, or their outsourced landscape maintenance contractors, on active, organic management of heavily-used natural grass athletic fields.

The only cost incurred by the agency would be approximately \$1000 for annual soil testing of 2 fields and that would need to be paid directly to a third-party testing facility of the agency's choosing. Beyond Pesticides has no financial motives. The organization, the consultants, and the Parks for a Sustainable Future Program do NOT require, sell or promote specific products or service contracts. The program does NOT compete with or replace any of an agency's staff or any of an agency's contracts outsourcing design, construction, or landscape maintenance. The program is intended exclusively to COMPLEMENT the work of the agency's staff and the work of any firms the agency contracts with. The program's consultant works as a peer, ALONGSIDE those the agency has already selected to design, build, and manage the field. The intent is that at the conclusion of an agency's 3 year participation in the program, the field management team has the knowledge and skill to successfully continue keeping all the

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agency's athletic fields in safe condition without any further assistance from the consultant.

Beyond Pesticides welcomes a chance to share more with you. Beyond Pesticides can be reached at info@beyondpesticides.org or 202-543-5450. Should the Lead Agency decide to apply for the Parks for a Sustainable Future Program, the school superintendent or city manager or their representative can get the process started. If accepted to the program, a consultant will be assigned to provide the agency with training and troubleshooting for TWO (no more, no less) of the agency's most heavily used fields. Selection of applicants is based on intent to follow through with prescribed methods of active field management. Selection is not based on sociodemographics. While donations are NOT required for participation in the program, the organization greatly appreciates donations by agencies that can afford to make donations so that the nonprofit can broaden its reach, stretching its budget so it can offer this program to as many public agencies as possible.

In the case where a new natural grass field is being designed, it is beneficial to enroll in the program at the very beginning of the project design phase. This enables the program consultant to provide input to best support the agency in both saving money and best preparing field conditions to support year-round high-volume heavy use from the start. The consultant can offer invaluable input on RFP language, construction specifications, and construction contract language on topics that help the agency succeed with natural grass, such as testing specifications for native and imported loads of soil for proper pH, contaminants, and minimum levels of organic content and healthy soil microbe activity prior to seeding or sodding the field.

What are you waiting for? But seriously, this option needs to at least be considered. If choosing between artificial and natural turf still feels difficult, then direct staff to develop a feasibility study, a more formal comparison between the two, factoring in the many issues. Such a study would be an asset to well-informed, transparent decision-making.

The critical caveat is to ensure the data sourced for this formal comparison regarding costs, labor manhours, field availability, etc. do not reflect a bias toward artificial turf as seems to be common when such comparisons are prepared with the exclusive input of civil engineering firms, field designers, and field installers. It is critical to include the voice of professional sports field managers that have a record of long-term success (10+ years) with year-round, high-volume natural grass sports fields for public agencies, as opposed to settling for the input of groundskeeping staff that have

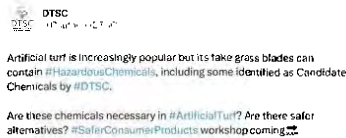
G-34

struggled to keep grass in safe condition, clearly not having had the training or been given the resources to be successful with it.

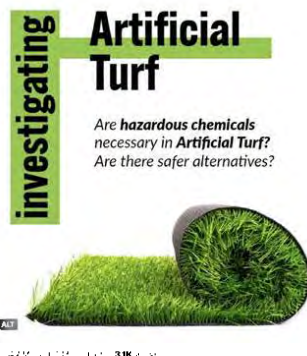
G-34

VII. If you reject artificial turf, you'd be in great company.

- [Santa Clara County Medical Association](#) has previously cautioned against the use of artificial turf, providing many citations evidencing its harms.
- The California government itself, specifically its Department of Toxic Substances Control, now acknowledges there are [hazardous chemicals](#) in the blades of plastic grass. (In the past, concerns around artificial turf had been focused primarily on the hazardous chemicals in the tire crumbs that were used as infill, but this new concern for the chemicals in the plastic grass itself means that even Organically-infilled artificial turf systems are hazardous.)



G-35



- In 2023, a state bill was signed into law after passing through both houses of the California legislature by wide margin, allowing cities and counties to [ban artificial turf](#). This new state law redefines “drought-tolerant landscaping” to explicitly *exclude* the installation of artificial turf.
- In 2023, a bill to [ban PFAS-laced artificial turf](#) also passed through both houses of the California legislature by wide margin. Among AB1423 supporters were Santa Clara Valley Water District, [Environmental Working Group](#), and the state legislators representing many of the same constituents you were elected to

represent. [Governor Newsom](#) “strongly” supported the intent of the legislation but didn’t ultimately sign it, concerned about the state’s ability to determine and enforce compliance. He suggested the issue could return. He also directed the state Department of Toxic Substances Control to explore “approaches to regulating the use of these harmful chemicals in consumer products”.

- [Millbrae](#) just recently banned artificial turf by unanimous vote of the city council.
- In December of 2023, a state agency (the California Coastal Commission) denied a school ([University of California - Santa Barbara](#)) the option to install artificial turf based on its obligations under CEQA.
- [Los Gatos Union School District](#) board recently unanimously rejected the proposal to artificial turf its elementary school playing fields, after receiving broad support for natural grass from the community and considering input from [experts, government agencies, and organizations](#), including 12 that weighed in directly on the LGUSD project. Community support for natural grass was clear from both a [petition](#) that netted nearly 500 signatures as well a [district-designed, district-administered survey](#) with record-setting participation that showed nearly 80% of respondents wanted natural grass. **LGSUHSD board members, recognize these are your constituents.**
- [Sunnyvale's City Council](#) just recently voted unanimously to keep artificial turf out of Lakewood Park.
- [Santa Clara County](#) discourages the installation of artificial turf.
- [Santa Clara Valley Water District](#) promotes water conservation but, even in severe drought emergency, NOT by installing plastic grass. It has produced an excellent information sheet to explain why artificial turf is discouraged.
- Santa Clara Valley Water District [will not issue a water conservation rebate](#) to customers that install artificial turf: “Artificial grass lawn turf does not meet goals set forth by Valley Water’s Landscape Rebate Program.”

G-35

VIII. Requests if you ultimately choose artificial turf

Once the CEQA analysis is complete, if artificial turf is ultimately chosen for the Project, please direct staff to do the following:

- Reduce artificial turf users' exposure to PFAS and watershed contamination. As recommended by independent experts, before signing a purchase contract, confirm via test results that each of the artificial turf components meets the PFAS standards detailed earlier. For assistance defining the details, reach out to the independent experts at PEER.org or EcoCenter.org.

G-36

- Reduce artificial turf users' risk of heat-related illness and bacterial infection. If not already installed, install irrigation for cooling and cleaning the field.
- Reduce pollution caused by end-of-life artificial turf waste. Require recycling of all artificial carpet and infill being removed from the site. Require covered transport. Require Chain of Custody documentation, including the addresses where the waste is taken as well as photographic proof that all of the waste makes it there and is housed indoors.
- Reduce pollution caused by the field. Because infill will degrade over time and spread into the environment despite best management practices, choose a 100% plant-sourced infill, rather than an infill product that contains plastic. For example, do not choose a product like TrueBlend, a 50/50 polymer/cork infill, which means it has plastic in it and can release microplastics as it grinds down. It's bad enough that the plastic grass sheds microplastics, but to dump literal tons of loose plastic pellets into the environment is an egregiously poor choice.
- Amend the standard artificial turf purchase contract to include GMAX testing after install and one test per year for the length of the warranty.

G-36

IX. Conclusion

Either remove artificial turf from the proposed Project in favor of natural grass, or halt all actions in furtherance of the Project. As discussed, natural grass is a feasible and environmentally preferable alternative.

The CEQA analysis must transparently explore:

1. the breadth and gravity of the environmental consequences that come with continually covering and re-covering acres of land with artificial turf and
2. the true feasibility and practicality of well-managed, drought-tolerant natural grass.

G-37

At the conclusion of the CEQA review, it is expected that the Lead Agency and the community will recognize that, over the long-term, modern, well-managed drought-tolerant natural grass reduces significant adverse environmental impacts and therefore deserves fair and thorough consideration.

Please acknowledge receipt of this letter and promptly provide notice of any actions taken in response.

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Sincerely,
Cynthia Fan

G-37

Response to Letter G – Cynthia Fan, April 15, 2024.

G-1 The comment includes two emails from the commenter. The first email includes a weblink to the comment letter, and the second email includes an attachment of the entire comment letter. The District compared both letters, and they appear to be the same. No additional response is needed.

G-2 The comment states that Phase 3 of the Project includes the replacement of natural turf with crumb-rubber-free artificial turf. It states that artificial turf systems even those that do not use crumb-rubber cause significant environmental impacts and that the effects have not been disclosed in the Draft EIR and cannot be reduced to levels below significance with mitigation or best management practices.

The comment is correct that Phase 3 of the Project proposes the use of crumb-rubber-free artificial turf. However, neither the comment nor Letter G provides factual basis on how the Project would cause significant environmental impacts on how chemicals in artificial turf will cause significant environmental effects.

G-3 The comment requests that “undocumented environmental impacts” provided in Letter G be incorporated in the EIR. Neither the comment nor Letter G substantiate what undocumented environmental impacts have not been addressed in the EIR or evidence on how chemicals in artificial turf will cause significant environmental effects. As documented in this response letter, the Final EIR adequately analyzes the environmental effects of the proposed Project pursuant to CEQA and CEQA Guidelines, as amended.

G-4 The comment further states that a project alternative exists that can avoid the significant environmental damage [of the artificial turf field component of the Project] while still achieving all Project objectives. The comment suggests the District work with a sports field management consultant that has a track record of keeping natural turf in safe conditions; revise the Project to include reconstruction of the existing natural turf fields with modern irrigation, soil that is high in organic matter and microbial activity, and to use modern drought-tolerant natural turf cultivar; and hire the sports field management professional to either maintain the turf or coach District staff to maintain the turf.

CEQA Guidelines Section 15126.6(a) provides that alternatives should be selected based on their ability to “avoid or substantially lessen any of the significant environmental effects of the project.” As provided in the EIR, the Project would not result in any significant environmental impacts after implementation of mitigation measures. Nevertheless, the Draft EIR includes three project alternatives, including the “No Artificial Turf at Southeast Fields Alternative” that is evaluated under Section 6.3.3, Page 6-12.

As the EIR has not identified impacts caused by the artificial turf component of the Project, the suggested project alternative is not required to be evaluated as a part of the EIR. Nevertheless, the District Board of Education will review the request in its decision-making process.

G-5 The comment cites Section Guidelines Sections 15064(d) and 15064(f), which respectively requires the Lead Agency to consider direct physical environmental changes caused by the Project and that the significance determination be based on substantial evidence. The comment presents data on PFAS (per- and polyfluorinated substances and per-and polyfluoroalkyl substances), PFOA (perfluorooctanoic acid), and PFOS

(perfluorooctane sulfonic acid) from news publications and a website indicating that these chemicals are toxic and found in artificial turf. This comment does not address the adequacy of the EIR analysis.

- G-6 The comment states that in 2022, the US Environmental Protection Agency (EPA) reduced the lifetime health advisory levels for PFAS. Specifically, PFOA to 4 parts per quadrillion (ppq) and PFOS to 20 ppq. The citation concerns “Drinking Water Advisories.” Presumably the comment is referring to the health advisory level for PFAS in drinking water. Using different search engines, the link either did not exist or brought up a generic US EPA webpage concerning Drinking Water Health Advisories, and the statistics provided in this comment were not available.

A quick search on the US EPA website shows that as of March 2023, the Biden-Harris Administration announced it is proposing the first-ever national drinking water standard for six PFAS; however, subsequent searches indicate that standards have not been adopted.¹ Accordingly, there are no federal thresholds that address the acceptable level of exposure to PFOA, PFOS, or PFAS.

- G-7 The comment includes a link that provides that on April 5, 2024, the California Office of Environmental Health Hazard Assessment (Cal OEHHA) adopted public health goals for PFOA and PFOS in drinking water. The adopted public health goals are not for exposure from artificial turf. This comment does not address the adequacy of the EIR analysis.

- G-8 The comment provides an excerpt from the US EPA 2021-2024 PFAS Strategic Roadmap that encourages governments of all levels to exercise increased leadership to prevent new contamination of PFAs. It should be noted that the same excerpt also encourages government agencies to make breakthroughs in the scientific understanding of PFAs. This excerpt exemplifies how additional research is needed to understand the effects of PFAs. This comment does not address the adequacy of the EIR analysis.

- G-9 The comment states the CEQA analysis must discuss the environmental effects associated with artificial turf; their ability to leach into the groundwater, surface water, San Francisco Bay, and drinking water; and impacts on athletes using the fields and spectators.

While it is understood that artificial turf contains PAH and PFAs, the magnitude of their effects on humans and the environment are inconclusive. The National Institute of Health (NIH) provides that the United States recognizes microplastics and the PAH and PFAS chemicals contained in artificial turf fibers and crumb rubber infill are harmful to the environment. However, the NIH also provides that no federal policies have been developed and implemented that directly regulate the installation or chemical composition of artificial turf fields, and that this likely stems from the absence of conclusive studies

¹ United States Environmental Protection Agency. *Biden-Harris Administration Proposes First-Ever National Standard to Protect Communities from PFAS in Drinking Water*. March 14, 2023. <https://www.epa.gov/newsreleases/biden-harris-administration-proposes-first-ever-national-standard-protect-communities>

demonstrating that average use of the artificial turf fields leads to adverse human health effects.²

It would be speculative for the District to analyze the environmental effects of artificial turf and its effects on humans in the EIR, as the science of artificial turf is not fully understood. As cited in Comment G-8, the US EPA 2021-2024 PFAS Strategic Roadmap encourages a better understanding of the science of PFAs.

CEQA Guidelines Section 15204(a) provides that “reviewers should be aware that the adequacy of an EIR is determined in terms of what is reasonably feasible, in light of factors such as the magnitude of the project at issue, the severity of its likely environmental impacts... CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commentors.”

The request to analyze the effects associated with artificial turf is unreasonable, as there is limited science on the effects of PAH and PFAs, as provided by the NIH. It would be speculative for the District to assume their effects on the environment and humans. The comment is noted and will be reviewed by District decisionmakers, along with the recommendation included in Comment G-36.

- G-10 The comment provides that regulatory bodies and state and federal governments have increasingly prioritized rules related to PFAS reduction and safety, because PFAS is a threat to the environment and irreversible consequence. The comment further describes how PFAS do not easily break down in the environment and provides references that artificial turf tested by academic institutions have resulted in positive results for PFAS. Research shows that PFAS leach from fields to surrounding waters and have been found in fish, bird eggs, and harbor seals. The comment speculates that there is potential for artificial turf to contribute to PFAS exposure for field users, as exposure include ingestion, inhalation, and dermal absorption. Cited studies show that PFAS correlate with various adverse health outcomes.
- G-11 The comment states that industry regulation on artificial turf is lacking. This comment is noted, and further stresses why the requested made under Comment G-9 is unreasonable. The burden to evaluate the environmental consequences and human effects caused by the exposure of artificial turf is not the District’s responsibility or under the Draft EIR. Rather, it should be regulating government bodies, such as, but not limited to the NIH, US EPA, and OEEHA that provides these guidelines. The evaluation of the Project’s impacts on the environment under the Draft EIR must be based on adopted thresholds of significance, and as provided in Response G-9, the NIH opines that the federal government has not established thresholds likely due to the absence of conclusive studies.
- G-12 The comment further provides that the term “PFAS-free” is not defined and misleads the public, that various synthetic turf that were advertised as PFAS-free actually contained PFAS chemicals. The comment provides cited information on results of tests and studies. It also cites experts warning that PFAS will contaminate the soil and waters around the

² National Institute of Health. *Artificial turf and crumb rubber infill: An international policy review concerning the current state of regulations*. December 9, 2022. [Artificial turf and crumb rubber infill: An international policy review concerning the current state of regulations - PMC \(nih.gov\)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7000000/)

project site and expose users to the carcinogenic chemicals, and that these and many risks have not been examined and addressed.

The comment does not substantiate the environmental effects associated with the Project's artificial turf; rather, it confirms the science on the effects of artificial turf has not been confirmed. The comment does not address the adequacy of the EIR analysis.

- G-13 The comment states that the data and research presented in Letter G confirm PFAS are in artificial turf systems and that the environmental analysis on artificial turf would be incomplete if it did not address its potential effects related to a list of topics included in the comment, including PFAS volatility, exposure to humans, leaching into storm systems, groundwater, aquatic effects, effects incurred by disadvantaged populations, environmental cleanup, and disposal of the artificial turf.

As provided in Responses G-9 and G-11, CEQA does not require the lead agency to conduct every test or perform all research, study, and experimentation demanded by commentors. Moreover, the data and research presented in Letter G do not indicate that PFAs in artificial turf would harm the environment or humans. In fact, the commenter even states in Comment G-11 that industry regulation on artificial turf is lacking, alluding additional studies are required. It is not within the District's responsibility to evaluate and determine whether the effects of artificial turf and/or how much harm there would be to the environment or humans.

- G-14 The comment provides that experts should be consulted, CEQA document authors and readers must be unbiased. The comment mentions a consultant who was allegedly paid to keep artificial turf from being investigated by government entities. It further provides that PFAs are manmade, not naturally occurring in the environment and that artificial turf promoters make claims that use very high thresholds to find no PFAs. The comment does not address the adequacy of the EIR analysis.

- G-15 The comment requests that the Lead Agency verify whether the proposed turf system, including the carpet fibers, carpet backing, infill, and shockpad contains any of 9 PFAs, based on an independent "SPLP" testing method. The comment states that the test will provide the decision-makers and public with disclosure about the environmental risk of the proposed artificial turf.

The comment is noted and will be considered by the Board of Education.

- G-16 The comment mentions Public Resources Code Section 21082.2, CEQA Guidelines Section 15064.7(a), and a citation concerning thresholds of significance, including the responsibility of the lead agency to establish a threshold of significance. The comment further requests that the EIR define the maximum concentration of PFAS chemicals that would be allowed to leach off an artificial turf system that is considered by the Lead Agency to represent an impact that is below significance and document how the Lead Agency chose the criteria as the significance threshold for the PFAs. The comment further expands that if the Lead Agency chooses to be informed by expert opinion, a list of entities who are qualified and not qualified is provided.

CEQA Guidelines Section 15204(a) states that the lead agency is not required to conduct every test or perform all research, study, and experiment demanded by commenters. While it is understood that PFAs may be harmful to the environment and humans, as

provided in Response G-11, the science on environmental and human effects caused by PFAs in artificial turf is inconclusive. It would be speculative for the District to determine what amount of PFAs is acceptable to be allowed to leach offsite. As indicated by the commenter in Response G-11, industry regulation on artificial turf is lacking, and there are other regulating bodies that have more authorities on this matter, and it is not the District's responsibility to speculate what is an acceptable level of PFAs that can leach offsite. Accordingly, per CEQA Guidelines Section 15204(a), the Draft EIR is not required to evaluate the environmental and human effects of PFAs in the proposed artificial turf system (See Response G-9).

- G-17 The comment includes excerpts from experts addressing PFAs leaching from artificial turf and their concern about contamination of the environment during their processing, the amount of PFAS that can leach off an artificial turf field and eventually affect drinking water, and testing criteria to determine if a produce is PFAS-free. The comment does not address the adequacy of the EIR analysis.
- G-18 The comment provides that once the Lead Agency defines its significance threshold for leachable PFAS found in artificial turf, the EIR must provide evidence that there is an artificial turf system suitable for the Project that would not exceed the threshold. If the Lead Agency is unable to provide this evidence, it cannot reasonably conclude that it is feasible for the Project to have a less than significant impact on the environment. The comment further requests that the PFAS test detection methods and detection levels be disclosed, and test data be provided for the entire artificial turf system.

As provided in G-9, while it is understood that artificial turf contains PAH and PFAs, the magnitude of their effects on humans and the environment are inconclusive. The NIH also provides that no federal policies have been developed and implemented that directly regulate the installation or chemical composition of artificial turf fields, and that this likely stems from the absence of conclusive studies. It is unreasonable for the comment to request that the District to determine an acceptable amount of PFAs that can leach into the environment and/or that is acceptable for exposure to humans when regulating government bodies are not able to. The EIR is required to evaluate effects based on adopted federal, state, and local laws and regulations and must not be speculative. Pursuant to CEQA Guidelines Section 15145, the District is not required to evaluate an impact that is too speculative for evaluation, and no further response is necessary.

The EIR has been prepared with a sufficient degree of analysis to provide the Board of Education with information that will enable them to make a decision on the environmental consequences of the Project. Pursuant to CEQA Guidelines Section 15151, the evaluation of the environmental effects of a project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Moreover, the EIR includes the "No Artificial Turf at Southeast Fields Alternative" that is evaluated under Section 6.3.3, Page 6-12. The Board of Education will consider the comments received on the Draft EIR, including Comment G-36, and will have the ability to either approve the proposed Project as presented in the EIR, approve any of the Project Alternative presented, or a modified alternative of the Project, such as that presented in Comment G-4.

- G-19 The comment concerns microplastic and nanoplastic pollution and their prevalence in aquatic environments and potential adverse effect on aquatic life. The comment asserts that the microplastics from the proposed artificial turf will be flushed into San Francisco Bay and the Pacific Ocean. The comment is unsubstantiated. The San Francisco Bay and

Pacific Ocean are over 3 miles from the Project Site. As discussed in EIR Section 4.8, Hydrology and Water Quality, the Project would comply with all applicable federal, state, and local requirements governing water quality, and Project impacts to water quality during construction and operation would be less than significant. The EIR has adequately addressed water quality impacts, and no additional analysis is required.

G-20 The comment provides information on primary and secondary microplastics and asserts that plastic carpet fibers do break down, despite synthetic turf industry claims. The comment explains how microplastics degrade into millions of nanoplastics that escape from synthetic turf into the environment. The comment further cites studies that microplastic pollution has been found in the bloodstream. The comment does not address the adequacy of the EIR analysis.

G-21 The comment states that the breakdown of plastic in artificial turf represents a significant source of greenhouse gas pollution and provides information related to polyethylene, which the comment asserts is the type of plastic from which synthetic turf is typically made. The comment further provides information on methane and ethylene that is emitted by polyethylene and asserts that their contribution to greenhouse gas emissions are more potent than carbon dioxide.

The EIR analyzes greenhouse gas emissions in Section 4.7. The analysis and modeling conducted conforms with industry standards. Moreover, the analysis is conservative. The modeling conducted does not credit emissions currently generated by the existing operations of the proposed improvements or that related to new utility systems that would replace existing inefficient systems on the campus that currently generate more emissions. Notwithstanding the conservative analysis, the construction and operational emissions generated by the Project would not exceed the significance threshold established by the California Air Pollution Control Officers Association. The Project's impacts to greenhouse gas emissions are less than significant. The analysis conducted is sufficient, and additional analysis is not required.

G-22 The comment provides that there is no evidence that mitigation to limit PFAs into the environment is adequate. The comment further provides that bioretention systems do not adequately remove micro and nanoplastics from runoff of artificial turf systems and includes a video showing green debris possibly from artificial turf blades from a high school football field blown to an area outside the field and asserts that the debris would be swept into storm drains.

Stormwater management features have been designed and installed for the proposed Project that would reduce and filter materials as part of the best management practices for stormwater runoff. The synthetic field turf included as part of the proposed project includes permeable layers. Stormwater runoff would be directed from the artificial turf to a stormwater system specifically designed to serve the proposed Project. Additionally, the District will consider using infill materials that substantially reduce plastics, microplastics, and nano plastics. No mitigation measures or changes to the text of EIR are required as a result of the comment.

G-23 The comment provides that greenhouse gas emissions are cumulatively considerable, the elimination of natural grass to draw down carbon dioxide, and the replacement of the turf every 8-10 years, or until prohibited by law or regulation constitutes a significant cumulative environment impact.

Section 15065 of the CEQA Guidelines defines “cumulatively considerable” as the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. The fact that a cumulative impact is on the whole significant does not necessarily mean that the project-related contribution to that impact is also significant. Instead, under CEQA, a project-related contribution to a significant cumulative impact is only significant if the contribution is cumulatively considerable. The comments also appears to address cumulative concerns on a national and global nature related to GHG emissions. The comment claims there could be cumulatively considerable significant impacts due to an increase in GHG emissions but provides no support for that claim for this project. While the comments raise concerns regarding the use of artificial turf in general, the commenter does not provide the factual basis on how the proposed Project would result in a significant impact based upon the use of artificial turf in this location and proposed project, and the discussion of GHG in this air basin or project area.

EIR Section 4.7.5 adequately discusses the Project’s cumulative impacts related to greenhouse gas emissions. It provides that greenhouse gas emissions are recognized exclusively as cumulative impacts and that there are no non-cumulative greenhouse gas emission impacts from a climate change perspective. As the Project’s contribution to global climate change is less than significant, as discussed in Response G-21, the Project’s contribution to cumulative effects would also be less than significant. Therefore, the Project would not cause a significant cumulative environmental impact related to greenhouse gas emissions. No changes to the EIR is required.

- G-24 The comment alleges that the narrow focus on a single field and failure to recognize the successive iterations of turf replacement projects would violate CEQA. It is speculative to assume the District would replace the artificial turf. As stated by the commenter in Comment G-23, it is possible that the installation and replacement of turf will be prohibited by law. Or it is possible that new research and development will result in new materials that do not contain PFAS. According to CEQA Guidelines Section 15145, further response and evaluation of speculative impacts need not be further addressed.
- G-25 The comment provides that the continued replacement of artificial turf approximately every 10 years is a “successive project” and over time is significant, as the old turf would need to be disposed and currently cannot be recycled and new turf would be manufactured. As provided in Response G-24, it is speculative to assume that the proposed artificial turf, if approved by the Board and installed, would be replaced in 10 years. No additional response is required.
- G-26 The comment elaborates on the need to replace artificial turf after 8-10 years of use, provides that one field will generate a substantial amount of waste, includes a video of old turf from one sports field, requests that the reader imagine the amount of waste of multiple artificial turf fields, and provides that artificial turf waste has been illegally dumped, which accelerates pollution. The comment questions how the Lead Agency will be assured that the artificial turf from the proposed Project would be recycled into other products?

The comment does not address the adequacy of the EIR analysis. No response is necessary.

- G-27 The comment concerns the lifespan of artificial turf, states that it is difficult and expensive to recycle, and that vendors advertising turf as recyclable is misleading, as it is not

economically viable and results in indirect environmental pollution. Different types of recycling and downcycling techniques are discussed, and information is provided on their negative effects.

The comment does not address the adequacy of the EIR analysis. No response is necessary.

- G-28 The comment questions if the Lead Agency contract includes recycling, what makes the agency confident that taxpayer dollars are being put towards legitimate recycling of the artificial turf waste? The comment requests information on a true recycling facility of artificial turf waste and suggests including the cost of transporting the used turf to the facility, especially if it is across the country or overseas. The comment further addresses the potential reuse of recycled turf by third party markets and questions why they are not concerned about PFAS and whether there are social and environmental justice issues that should be considered. The comment continues with a list of questions.

The comment does not address the adequacy of the EIR analysis. No response is necessary.

- G-29 The comment states that the Lead Agency lacks substantial evidence to support a finding that no significant cumulative adverse environmental impact exists as the repeating of the disposal of used artificial turf cannot safely be recycled, and the artificial turf would cause long-lasting environmental effects.

As discussed in Response G-24, it is speculative to assume the District would repeatedly replace the artificial turf, which would require in the disposal of large quantities of used artificial turf. According to CEQA Guidelines Section 15145, further response and evaluation of speculative impacts need not be further addressed.

- G-30 The comment states that plastic waste sent to a landfill will never decompose and the capacity of landfills are depleting rapidly. The comment rhetorically requests that the District confirm if local landfills have remaining capacity to accommodate the used artificial turf every 10 years. The comment further states it is possible that the disposal of artificial turfs in landfills may eventually be prohibited or there may be a requirement to treat the artificial turf as hazardous waste, which would increase the Lead Agency's disposal cost.

The comment does not address the adequacy of the EIR analysis. No response is necessary.

- G-31 The comment provides that ongoing PFAS and microplastic pollution represents a significant cumulative environmental impact and lists how their pollution can occur. The comment states that the inability to properly recycle the artificial turf will result in increased pollution in the air, water, and soil.

The comment does not address the adequacy of the EIR analysis. No response is necessary.

- G-32 The comment summarizes the section that artificial turf replacement every 8-10 years constitutes a significant cumulative environment impact to both the volume of waste produced and emissions from the waste and that a narrow focus on a single field fails to account for the successive cumulative impacts and is a violation of CEQA.

As provided in Section 3.19(d) of the Initial Study (Draft EIR Appendix A-1), The Redwood Landfill and Potrero Hills Landfill accept most of the solid waste from Marin County. The Redwood Landfill has a remaining capacity of 26 million tons, with an estimated closure date of July 1, 2036, and the Potrero Hills Landfill has a remaining capacity of 13,872,000 tons, with an estimated closure date of February 14, 2048. The discussed in the Initial Study, the landfills would be able to accommodate proposed Project.

The comment claims there could be potentially significant impacts due to an increase in waste generation but provides no support for that claim for this Project. While the comments raise concerns regarding the use of artificial turf in general, the commenter does not provide the factual basis how the proposed artificial turf would result in a significant impact based upon the use of artificial turf in this location and proposed project, and the available landfill capacity presented above. The comment does not raise a new significant environmental impact related to the proposed project's waste generation or provide evidence to support a significant contribution to cumulative impact related to waste generation. As a result, impacts would be less than significant. No mitigation measures or changes to the text of the Draft EIR are required as a result of the comments.

Moreover, it is speculative to assume the District would replace the artificial turf every 8 to 10 years. According to CEQA Guidelines Section 15145, further response and evaluation of speculative impacts need not be further addressed.

G-33 The comment states the Project would result in impacts related to Environmental Justice, questions whether CEQA requires this evaluation, and includes an excerpt from the California Office of Attorney General. Unlike the National Environmental Policy Act (NEPA), CEQA does not require a standalone evaluation of Environmental Justice as part of the preparation of the EIR. There are no federal sources of funding related to the proposed project that would require environmental evaluation of the proposed project under NEPA. Therefore, the comment related to Environmental Justice is not relevant to the adequacy of the EIR under CEQA. No further response is required.

G-34 The comment opines on the lobbying for artificial turf; provides that the Lead Agency and public need to be educated about the environmental effects of artificial turf, and alternatives to using artificial turf; requests that the Lead Agency consider a natural grass alternative; and provides a list of experts who can assist with managing natural turf. The comment further provides information on how natural grass can be adequately maintained for sustained use, similar to artificial turf, including for marching band. The comment further states that synthetic turf industry points need to be countered with the natural-grass industry's talking points and provides this information. The comment includes information on water availability during drought and organically-managed fields with no pesticides and offers information on a company that can provide the service.

The comment does not address the adequacy of the EIR analysis. No response is necessary.

G-35 The comment lists agencies that caution against the use of artificial turf, identifies bills that allows cities and counties to ban artificial turf and ban artificial turf with PFAS, and lists agencies that discourages and rejected the use of artificial turf.

The comment does not address the adequacy of the EIR analysis. No response is necessary.

- G-36 The comment provides recommendations in the event the District ultimately chooses artificial turf over natural turf, including test of the artificial turf to ensure it meets the PFAS standards provided in the Letter G, include irrigation or cooling and cleaning the field, require recycling of all artificial carpet and infill removed from the site, require covered transport of the turf, chain-of-custody documentation showing proof that waste is housed indoors, select plant-sourced infill, rather than plastic-containing products, and a “GMAX testing” after installation and one test per year for the length of the warranty.

The Board of Education will consider the recommendations as conditions for Project approval. The comment does not address the adequacy of the EIR analysis. No additional response is necessary.

- G-37 The comment requests that the Project be updated to remove artificial grass or halt actions in furtherance of the Project, and that the CEQA analysis must disclose the environmental effects related to covering and re-covering acres of land with artificial turf, and the feasibility and practicality of well-managed, drought-tolerant natural grass.

The Board of Education will review the comments and consider the request herein. The Final EIR, herein, complies with the requirements of Public Resources Code Section 21000 et seq and CEQA Guidelines Section 15000 et seq.