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"Somerville can thrive if we make the right choices now and help spark change in our region and the world." -Mayor Joe Curtatone (http://www.somervillema.gov/sustainaville/)

Green and Open Somerville

An Approach to Natural Grass Fields and Why They are Necessary

Somerville is at a crossroads: we can continue to maximize development and short-term financial gain at the expense of our environment and health, or we can consider our and our children's future and commit to making our environment as healthy as possible. While we may have to make some sacrifices, financial or otherwise, clean air, water, and soil, as well as the reduction of carbon emissions, will pay for themselves immeasurably in the future.

There is no denying that Somerville is an urban city, but that doesn't mean we have to eliminate all natural space. On the contrary, we need to improve and increase our green space and environmental health to the greatest extent possible. This is a massive undertaking, requiring creative and holistic solutions, including but not limited to: green zoning, the acquisition of land for green space, maintaining our current green space properly, changing the norms for development to go beyond LEED-certification standards, grey water management, solar (passive and active), green roofs, acknowledging street trees as part of our ecosystem, addressing stormwater management, the development of a citywide depaving program, eliminating chemicals we use to treat our trees and grass by switching to organic maintenance, and a carbon neutral plan. These practices will not only make our city a nicer, healthier place to live, it will help to reduce our contribution to climate change.

To responsibly and effectively become a truly green city, we need to look at all possible factors and their options. Green & Open Somerville would like to see Somerville take the lead regionally, if not nationally, on environmental practices and is prepared to help in any way possible. In this document, we focus on perhaps the most pressing of Somerville's environmental concerns: **the planned reduction of our precious green space and damage to our environment by the installation of artificial turf on our grass fields.** We will explain why this is a step in the wrong direction and what we can do instead.

Green Space: an area of grass, trees, or other vegetation set apart for recreational or aesthetic purposes in an otherwise urban environment.

> *"Today, more than 80% of the U.S. population lives in urban areas, and this number continues to rise. As cities grow, urban green space declines, leading to negative impacts on environmental quality and human well-being." Earthwatch.org*

Somerville is a lot of things: the hippest city, the most artistic, the happiest. We believe Somerville can become the **Greenest City** in New England.

Somerville Mayor Joe Curtatone set out to make Somerville Carbon Neutral by 2050 and joined the Mayors National Climate Action Agenda. We would like to see him remain on the national edge of these issues by including a commitment to maintaining existing green space as well as expanding green space in Somerville.

We would like Somerville to continue to lead by:

- committing to installing and maintaining high quality natural grass playing surfaces on all current grass fields, as well as increasing our green space by finding more places for high quality green space (trees, grass fields, pocket parks, green roofs, community gardens, etc.).
- creating more natural grass playing fields for public and team sport use. Add more grass playing fields around the city, for instance next to the Arthur D. Healey School and the Winter Hill Community Innovation Schools where sports teams and students could benefit.
- approaching green space in Somerville holistically. Let's ensure every neighborhood in Somerville has access to green space and that field use is spread fairly across many playing fields.
- Practicing organic grass care on all City-used fields.
- seriously considering a green sports complex in Assembly Square. Let's build a state of the art indoor sports complex with a green roof. The green roof adds to our green space and the indoor facility takes pressure off of our grass fields and offers year-round use. It would still have artificial turf indoors but the turf won't heat up if it's under cover. It would need organic infill to minimize health risks to people using it. These folks have several locations in Mass. Why not have them expand to Sville?
  http://www.forekicks.com/marlboro/shared/content/index.cfm?fuseaction=aboutus
  Potential locations: Assembly Square, Powderhouse School, Star Market (closed) on Broadway, Union Square/Boynton Yards redevelopment area.

Green Space vs. Open Space

The National Recreation and Park Association recommends a minimum of 6.25 acres of open space per 1,000 people in an urban area; Somerville has 2.1 acres per 1,000 people, which includes paved school yards and cemeteries. Somerville has the least amount of open space in New England. We must correct this. We believe a Green City provides access to urban green spaces.

It is important to distinguish between "Green Space" and "Open Space". While green space is open space, the opposite is not necessarily true. Currently, the paved Union Square plaza and Lincoln Park's grass field are in the same category. Both are important parts of a vibrant community but they clearly serve different roles and should therefore be categorized separately.

We feel it is critical that Somerville maintain its green space by committing to natural grass and vegetative surfaces. Particularly, Somerville should commit to using natural grass surfaces for its playing fields because they abut residences and schools and are areas that attract consistent mixed and casual recreational uses. Grass fields reduce the effects of heat and the exposure to toxins among residents.

aerial view of Somerville

green spaces in Somerville

Why Natural Grass Playing Fields are the Right Choice for Somerville and the Environment

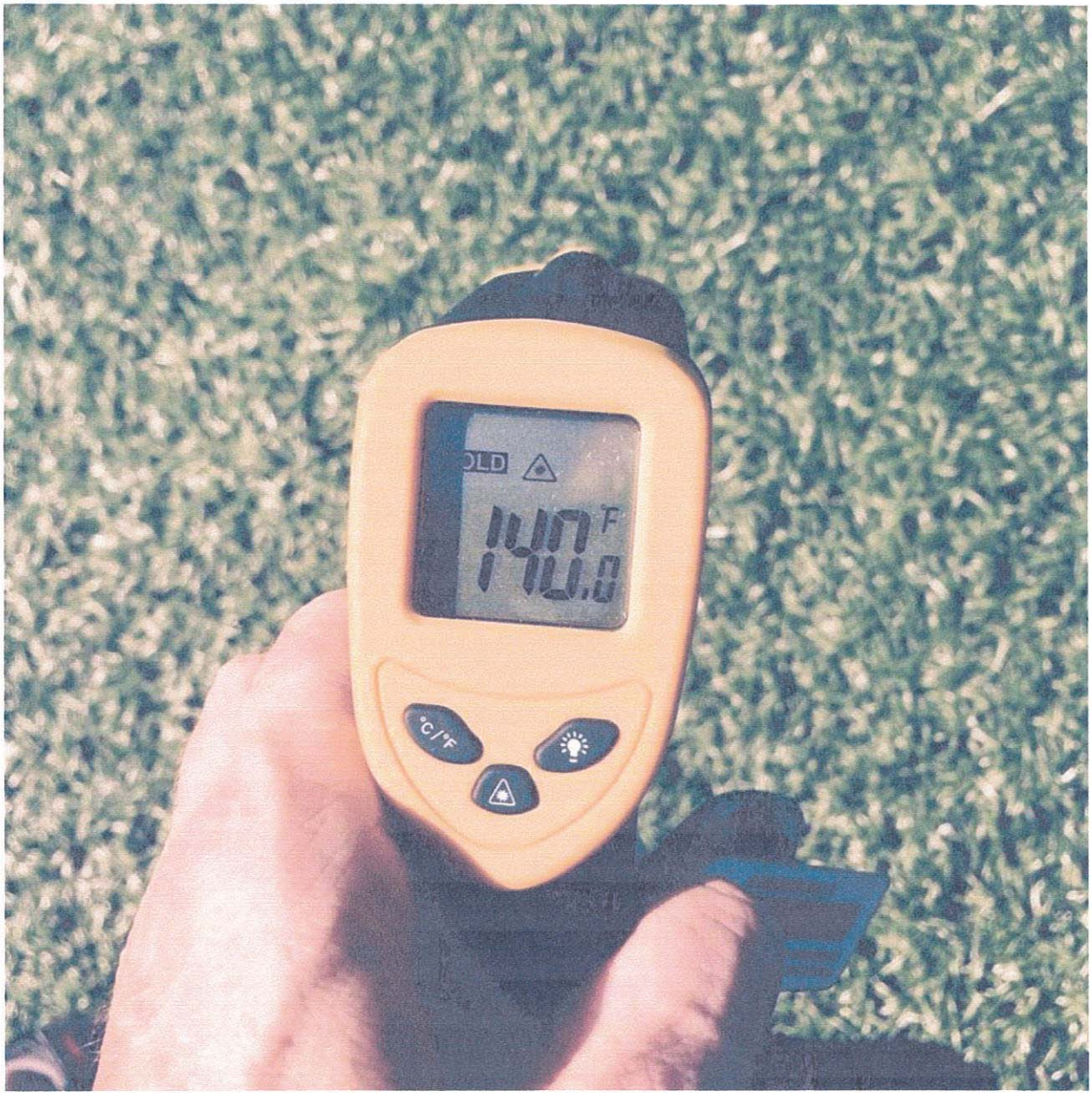
- Somerville has the least amount of open space in the Commonwealth. Because so little of our open space is green, we need all of the green we can get for human and environmental health and wellbeing.
- Many of our residents' only opportunity to experience nature is to go to their local park. Artificial turf is not nature.
- Removal and proper upkeep of artificial turf is prohibitively expensive; every day there is more evidence that artificial turf is making people sick, so installing something that raises so many concerns may be throwing money away.

Heat Island Effect from Artificial Surfaces

"The term "heat island" describes built up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F (1–3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality." (http://www2.epa.gov/heat-islands)

Artificial surfaces, whether asphalt, foam rubber playground surfaces, or artificial turf, have all proven to be extremely hot, much hotter than soil and grass. This not only can cause heat-related injuries, it heats up our already increasingly warm environment both locally (think air-conditioning costs) and globally.

"The first evidence of a "heat island" effect came a few years ago, when Columbia University climate researcher Stuart Gaffin analyzed thermal images generated from NASA satellite maps of New York City. He wanted to figure out how urban trees may help cool down neighborhoods. When Gaffin noticed a bunch of hot spots on the maps, he assumed they were rooftops. But he wanted to know for certain. "So we picked five or six really hot locations in the Bronx and went to visit them, and two turned out to be turf fields" says Gaffin. In retrospect, he says he should have realized that, because they're a perfect sunlight-absorbing system." (read full article: http://www.npr.org/templates/story/story.php?storyId=93364750)



East Somerville Community School artificial turf field, Sept. 9, 2015, 2:30 p.m., 93 deg. air temp

We have tracked temperatures on local Somerville playing surfaces and found that the artificial turf playing surfaces were as much as 47 degrees hotter than the air temperature and 28 degrees hotter than grass. When it's in the 90s, that's hot. (Incidentally, we believe that for human safety, fields and playgrounds should be closed when surface temps exceed 122 degrees, as FIFA does).

Green Space and Carbon Neutrality and Air Quality

From: **Impacts of urban greenspace on offsetting carbon emissions for middle Korea**

"Greenspace in urban ecosystems can reduce atmospheric C levels in three ways. Here, greenspace is defined as soil surface area capable of supporting vegetation and the vegetation being supported. First, urban trees and shrubs directly sequester and accumulate atmospheric C in the process of their growth through photosynthesis. Second, urban vegetation decreases building cooling demand by shading and evapotranspiration, and heating demand by windspeed reduction, thereby reducing C emissions associated with fossil fuel use. Third, urban soils store organic C from litterfall, until it is returned to the atmosphere by decomposition." (http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.155.7&rep=rep1&type=pdf)

From: **The impact of green space on heat and air pollution in urban communities**

"Urban green spaces — from trees and parkettes to green roofs and large natural spaces — generally provide significant health benefits for residents and the community. It also found that these ecological benefits are directly related to the size, quality and density of the green space." (http://www.davidsuzuki.org/publications/ImpactofGreenSpaceonHeatandAirPollutioninUrbanCommunities.pdf)

The Important Role of Soil in Relation to Climate Change

Soil worldwide holds more than three times as much carbon as is in the air. Plants growing in healthy soil transfer carbon from the air into soil in the form of organic matter. Scientific evidence suggests that, with improved land management, a significant amount of carbon can be removed from the atmosphere and stored longterm in soil.

Removing carbon from the air — essentially reversing climate change — takes place only when soil is healthy and teeming with earthworms and other soil life. To the extent possible, all land -- especially publicly-owned land -- should be maintained in a way that promotes good soil health and carbon sequestration.

How important is soil in combatting climate change? The Intergovernmental Panel on Climate Change says, "A large fraction of anthropogenic climate change resulting from CO2 emissions is irreversible on a multi-century to millennial time scale, except in the case of a large net removal of CO2 from the atmosphere over a sustained period." According to the United Nations Convention to Combat Desertification, *"The potential for land to hold carbon and act as a sink for greenhouse gases is unparalleled."* And, in July, Bloomberg News reported soil would be on the agenda for the first time at the Paris climate negotiations in December 2015, thanks to a proposal by France's Minister of Agriculture ("France Backs Soil Carbon Plan Ahead of Climate Summit" 7/28/15).

Even the White House is taking steps to increase the amount of soil carbon in the White House Kitchen Garden - *"In recognition of the importance of sustainable practice, the White House is announcing that it will plant cover crops in the White House Kitchen Garden this week to improve soil quality, reduce erosion and increase soil carbon."*
https://www.whitehouse.gov/the-press-office/2015/10/26/fact-sheet-obama-administration-announces-new-efforts-promote

A short video explaining how soil can trap carbon: **Kiss the Ground Video**:
http://thesoilstory.com

Green Space Affects our Students

Giving Somerville children access to green space can improve their cognitive development, improve test scores, and even reduce violence.

- In a study of over 905 schools, after controlling for factors such as race and parental income, Massachusetts third-graders with greater exposure to greenness show better academic performance in both English and Math in MCAS. *--Linking Student Performance in Massachusetts Elementary Schools with the "Greenness" of School Surroundings Using Remote Sensing.*
  http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0108548

- "The positive effects of nature exposure include improved cognitive functioning (including increased concentration, greater attention capacities, and higher academic performance), better motor coordination, reduced stress levels, increased social interaction with adults and other children and improved social skills." *--Childhood Development and Access to Nature: A New Direction for Environmental Inequality Research* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3162362/

- Green space around residences are "a significant negative predictor of property crime, violent crime, and total crime" *---Childhood Development and Access to Nature: A New Direction for Environmental Inequality Research*
  http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3162362/

The Products Used to Manufacture and Maintain Artificial Turf are Not Safe for Our Residents

Studies have shown the following problems with artificial turf:

- carcinogens from the rubber and plastic
- higher rates of concussions, sprains, strains, burns, and scrapes
- off-gassing

The Turf Industry MSDS warns waste tire installers to wash exposed areas frequently, wear a respirator, wear safety goggles, and remove and wash clothes.

18-month old with burns from AT playground surface (http://theforumnewsgroup.com/2015/08/13/avoid-artifical-turf-during-heat-waves-park-advocate/?utm_source=dlvr.it&utm_medium=twitter)

Women's world cup played on artificial turf
(http://www.nbcnews.com/news/sports/us-soccer-star-abby-wambach-playing-turf-nightmare-n371906)

Artificial Turf Fact Sheet

Natural Grass is a living ecosystem. It provides stormwater retention, erosion control, pollutant removal, microbial activity, carbon sequestration, heat island mitigation, air and water filtration, wildlife habitat, noise reduction, psychological benefits, and oxygen generation.

Can Somerville become carbon neutral by 2050 and install more artificial turf? To offset the carbon from an average artificial turf field we would need to plant over 1,800 10-year-old trees.

What happens when it rains? Artificial turf stormwater runoff contains the algaecides, sanitizers, pesticides, antistatic agents, and chemical solvents used to care for the field; these go into the storm drains. **Modern conventional grass care** has significantly reduced the amount of pesticides and fertilizers used. **Organic grass care** uses no synthetic chemicals.

What does it cost? A 2-acre artificial turf installation can cost up to **$1,000,000** and will last an average of 8-10 years with active maintenance by a grounds crew. Replacement costs for an artificial turf field average $500,000 and involves disposing of **several tons of plastic**. After

installation, many communities discover they must **restrict public access** to an artificial turf field in order to protect their million dollar investment. Fencing, increased police patrols, night illumination, and security cameras create additional costs. **A high-quality grass field costs up to $350,000.** See full comparison at end of this document.

What are "artificial turf" fields made of? Plastic. Let's be clear: the only thing green about artificial turf is the color; this product is made of plastic and known carcinogens.

What makes these fields act like grass? All synthetic turf requires an infill which attempts to simulate the behavior of a grass field. Crumb rubber infill in artificial turf fields gets into eyes and mouths. That means people can ingest the cancer-causing chemicals including arsenic, benzene, cadmium, and nickel that have been found in crumb rubber. The EPA found 30 chemicals in artificial turf and **advises further study**. Is this an experiment we want to run on our children and residents? **Organic infill** (Geo Plus, GreenPlay, Corkonut, etc.) requires frequent watering and more frequent replacement than crumb rubber, and is prone to mold so trees should not grow within 100 ft. of the field. Some towns have discovered that the organic infill freezes in the cold and cannot be used.

Is it hot? Artificial turf can be **37℉ hotter than asphalt** and **86℉ hotter than grass**. The maximum observed surface temperature on artificial turf was **200℉**. At a temp of 122℉ it takes less than 10 minutes to cause injury to skin. NASA satellite maps of New York City showed that some of the **hottest surfaces were artificial turf fields**.

Why do professional athletes prefer grass? In 2015, Abby Wambach led 40 top female soccer players in filing a lawsuit against FIFA for using artificial turf, calling it "dangerous". 89% of NFL players surveyed said that playing on artificial turf shortens their playing careers and 82% said it increases injury.

Maintaining Natural Grass Surfaces on Fields That See a LOT of Play

We have done a lot of research and spoken with many turf experts. Here is what we have learned: If we commit to properly installing high-quality grass fields and then properly maintaining them, it is possible to have high use on grass fields. We need to educate ourselves on how to do this. There are people who can help:
http://www.naturalgrass.org/#!whatwedo/cd64

Organic Field Maintenance

Organic field maintenance is becoming more common and there are local people to help! Osborne Organics in Marblehead, MA says: *"Municipalities across the country are beginning to deal with the issue of pesticide use to maintain lawns, landscapes, public parks, and sports*

fields. Questions are posed from diverse groups concerned about water quality, storm water run-off, and public and children's health issues. The discussions focus on the use of synthetic fertilizers and chemical pesticides. In fact, some cities and towns either have enacted local restrictions or are in the process of doing so on their municipal properties. ***Sports fields, public parks, and municipal green spaces are all turf areas that historically have been under varying degrees of conventional management programs. Osborne Organics, LLC has developed a municipal turf management protocol that defines a natural, organic program and presents a creative approach to working within tight municipal budgets.*** *There is a transition period that involves a period of time to move from one program to another. By addressing soil health, cultural practices, and natural, organic product we can move successfully to our goal of chemical-free turf."*

We encourage you to visit Osborne Organics' website for more information:
http://www.osborneorganics.com/municipalities/

There is help out there:
Advisors to help communities become more green - http://plangreen.net/

Please see our complete, emailed version of this document for more information on the Importance of Green Space and Nature to the Happiness of Urban Dwellers as well as addendums with supporting information. This paper version minimizes links for easier reading.

Green and Open Somerville is a group of concerned residents who advocate for maintaining, improving, and expanding Green Space in Somerville to improve quality of life, reduce carbon emissions, and provide safe and healthy public spaces for all of our residents to enjoy and recreate on.

Read our blog: http://greenopensomerville.blogspot.com/
Get updated on Facebook: www.facebook.com/greenandopensomerville
Contact us directly via email: greenopensomerville@gmail.com
Twitter: @greensomerville
Join our listserv: green-and-open-somerville@googlegroups.com

Artificial Turf is More Expensive Than Natural Grass

(from http://safesportsfields.cals.cornell.edu/synthetic-turf)

Field size: approximately 2 acres

Estimates	Natural Turfgrass on Native Soil	Natural Turfgrass on Sand-based Field	Sand-Capped Field	Synthetic field
Construction Costs				
Source A	$50,000 - $150,000	$250,000 - $350,000		$850,000 – $1,000,000 (8-10 years of use before replacement)
Source B		$400,000 – $600,000	$200,000 - $300,000 $60,000 - $100,000 Spartan Cap System	$600,000 - $1,000,000
Annual Maintenance Costs				
Source A	$4,000 250 hours of labor			$6,000 375 hours of labor** (not including equipment)
Source B				$5,000 – $22,000

- *Source A: Estimates are derived from 2008 average costs cited: A Guide to Synthetic and Natural Turfgrass for Sports Fields, STMA, and included annual inflation of 3%.
- Source B: Information provided by David Minner, Extension Specialist, Iowa State University
- ** The cost can even be higher if field markings must be painted and cleaned often, or if frequent repairs are necessary.

Maintaining Artificial Turf vs. Natural Grass - not significantly less labor when done correctly: http://read.dmtmag.com/i/86038-october-2012/8 (pages 8 through 16 discuss the maintenance of both grass and artificial turf).

Some examples of artificial turf field restrictions from around the country.

Bunnell High School (Stratford, CT) Synthetic Turf Field and All-Weather Track: Rules and Regulations

Use of the Bunnell High School synthetic turf field and rubber track is limited to Stratford Public School students and programs, faculty, staff, public walkers and joggers, teams and opponents or groups with a permit issued by the Stratford Recreation Department. The following rules and regulation have been developed in order to preserve the quality of the field and rubber track.

1. Coaches and/or adult supervisors shall be present at all times when field or track is being used by authorized groups or teams.
2. Youth or high school teams must have adult or coach supervision when using the field.
3. Teams and individuals using the field must pick up and remove all litter from the field and track areas. All areas around the track and turf field must be cleaned after use.
4. Food, chewing gum, sunflower seeds and flavored drinks are **NOT** allowed on the track or turf field. Smoking and chewing tobacco are **NOT** allowed on school grounds. Water is allowed on the track or turf field.
5. If something spills on the field and needs to be cleaned....do **NOT** attempt to do so. Contact school or Recreation Department officials in such cases. Do **NOT** use heat, wire brushes, high pressure water sprays or other cleaners on the turf field.
6. Any device that will puncture the turf field base may **NOT** be used. Corner flags, pylons, goal anchors, team banners, and tents must be weighted or secured with weights (**NOT** spikes).
7. Soccer and lacrosse goals are **NOT** to be left on the turf playing field. Soccer and lacrosse goals will be placed in a designated area after practices and games. Soccer and lacrosse goals must be carried. Do **NOT** drag goals or benches on the turf or track.
8. Precautions (see FieldTurf maintenance manual) must be used when using risers, tables or chairs on the turf field. High heels should **NOT** be worn on the turf field.
9. Dogs or pets are **NOT** allowed on the turf field or track.
10. Rubber tipped javelins may be used on the turf field. Shots and disci may **NOT** be used.
11. Only light maintenance or service vehicles with pneumatic rubber tires are allowed on the field or on the track.
12. Scooters, roller blades, skateboards, or other such devices with hard/non-rubber wheels are **NOT** allowed on the turf field or track. Bicycles are **NOT** allowed on the track or turf field.
13. Golf playing is **NOT** allowed on the turf field.
14. Spectators are **NOT** allowed on the playing field or track. Spectators at

sporting or other events must remain outside the fence around the track.

15. Hanging or climbing on the football or soccer goal posts is prohibited.
16. Cleats may be worn on the turf field. Long spikes or long cleats are **NOT** allowed. Metal cleats are prohibited.
17. Soccer, football, lacrosse, baseball or softball cleats are **NOT** allowed on the track. Athletes wearing cleats must enter and exit the field using the runners and mats located at the gated entrances. Do **NOT** jump the fence. All cleats must be cleaned of dirt, grass and debris before crossing the track to go on the turf field.
18. Only ¼" track spikes or shorter may be used on the rubber track.
19. Walkers and joggers may **NOT** use the track when athletic contests are taking place. Walkers and joggers may not use the track while the high school track teams are practicing (Spring).

In San Luis Obispo, California: http://www.asi.calpoly.edu/admin/img/upFormsPolicies/1402591561_SYNTHETIC%20TURF%20FIELD%20RULES.pdf

In Wellesley, MA: http://www.wellesleyma.gov/Pages/FOV1-0001FDB3/Synthetic%20Turf%20Field%20Rules.pdf