

180813 PD Turf Presentation Draft

Issue: The RFPD is considering the removal of natural grass fields and replacing them with artificial turf in at least one location in RF. The PD Board has invited comments and input from the RF Sustainability Commission on this issue, as ecosystems and open spaces are one of our main areas of focus.

Known information about the PD Plans: The PD has publicly relayed few details about its plans, so our response is limited at this time. The RFPD has not shared the location(s) or the types of artificial turf infill with which they are considering replacing existing RF natural grass, the timing of their plans, or their research to date on their reason for replacing natural turf with artificial.

This is what we know:

- The PD has set aside \$1.5M for one or more artificial turf fields in RF, as an “unfunded” 2018-2019 budget item;
- There are 3 components to an artificial sports field: the synthetic carpet base, the artificial grass-shaped fibers, and the infill (usually pellet-shaped) material.
- The PD has discussed replacing one or more existing natural grass fields at Keystone and/or Centennial Park (next to the Library) with artificial turf;
- The PD has met with OPPD and FPPD personnel and conducted site visits of their artificial turf fields. The FP field was replaced 2 years ago, had a lifespan of @ 10 years. One of the OP fields started out as a tire grind infill, and was replaced with a rubber grind called “Nike Grind” in 2015; and
- The PD reports that it has received notice from the Water Reclamation District that it is possible for them to install artificial turf if it chooses.

RF Sustainability Commission Input: The RFSC believes that the most environmentally sustainable option is to maintain its current natural grass fields, and not replace these fields with artificial turf. Natural grass fields offer important environmental and health benefits, which would be lost if removed. In contrast, artificial turf poses numerous known environmental

risks and dangers, including chemical and micro plastic runoff into waterways, heat stress on humans and the environment, the loss of biodiversity, and more than 120 tons of chemical/petroleum-based plastic and rubber dumped into the landfill after the estimated 10- year life of an artificial turf field.

The RFSC suggests that instead, the PD explore measures for improving the Village's existing natural grass investment. If the PD's motivation for exploring artificial turf is more playability during the spring, fall, and on rainy days, it should avail itself of techniques to maintain natural grass fields at a higher level, for a fraction of the \$1.5M cost set aside for artificial turf. These techniques include advanced soil aeration, nutrient management, and use of grass breeds that are disease and cold weather-resistant. These techniques are successfully used worldwide, in climates harsher than Chicago, at a fraction of the cost of artificial turf.

If field playability is driving the PD's decision, we note that dangerously high artificial turf temperatures have caused field closures that are not necessary on natural grass. According to the Penn State Center for Sports Surface Research, artificial turf is generally 35° – 55° hotter than natural grass, which stays cooler than air temperatures. Studies have found artificial turf surface temperatures to reach 120° with a 79° air temperature, and 146° with an 85° air temperature. Artificial turf manufacturers recommend watering of fields for temporary turf cooling, and closing of fields to prevent heat stroke, skin blistering, turf burn, and melting of artificial turf materials. Further information below.

10 Environmental Advantages of Natural Grass Fields:

1. Purified air and improved air quality: Natural grass fields remove dust and dirt from the air, along with common impurities such as carbon dioxide. *Natural* grass blades capture air-borne impurities; dew and precipitation help move them into the root zone, where dust and dirt return to the soil and soil microbes help break pollutants down.
2. Carbon Sequestration and Reduction in Global Warming: Natural grass in the U.S. captures about 5% of the carbon dioxide from the atmosphere each year. Natural grass traps and converts carbon dioxide to a stable form of carbon that's locked into the soil layer

through a process known as carbon sequestration. Rather than being released into the atmosphere and adding to greenhouse gasses, carbon is held in the soil where it eventually becomes organic matter. An average-size natural grass soccer field (@64,000 sq. feet) collects and stores up to 18,000 lbs. of carbon per year.

3. Oxygen Generation: Natural grass generates significant amounts of life-supporting oxygen; One natural grass soccer field produces enough oxygen to meet the daily oxygen needs of 5,120 people – nearly 50% of RF's entire population.
4. Ambient Cooling and Offsetting of Solar Heat: Natural grasses cool themselves and their surroundings, offsetting 50% of solar heat through cooling evaporation. On sunny days surface air temperatures above natural grass stay 10°-14° cooler than asphalt. In contrast, surface temps of artificial turf can measure 37°F *higher* than asphalt, and more than 86°F higher than natural grass under the same conditions. Eight average-size natural grass front lawns have an estimated cooling impact equal to 70 tons of air conditioning.
5. Rainwater Purification and Improvement of Groundwater Quality: Natural grasses and the soil microbes that exist within them reduce environmental contamination by purifying water and breaking down pollutants as they move through the root zone. Pollutants in the atmosphere can make rainfall so acidic that it damages the environment. However, filtering rainwater through a healthy lawn can reduce its acidity to one-tenth its original, unfiltered state. This improves the quality of groundwater and reduces contamination of bodies of water, such as rivers and lakes.
6. Pollinator, Pet, Bird, and Biodiversity Support: Healthy, natural grass encourages earthworms, microorganisms, butterflies, ladybugs, and other insects and birds that support biodiversity. Natural grass fields are also safe for pets to play and roll around on. Natural grass absorbs pet urine and waste residue into the soil and does not leave a bad smell. Natural grass is also cool and comfortable for pets to walk on.
7. Reduction and Filtration of Runoff and Diversion of Water from Storm Sewers: Natural grass slows the flow of storm water, allowing it to be absorbed into the ground, filtered and returned to aquifers instead of flowing into storm sewers.

8. Erosion Reduction: Extensive natural grass root systems lock soil in place and protect it from loss by wind and water. Natural grass rootlets condition and aerate soil, build hummus, and help with dust stabilization and soil erosion control. By comparison, artificial turf infills are carried into the community by wind, water, shoes, etc. Many of us have experience with “turf bugs” in our kids’ sports bags, shoes, socks, clinging to water bottles, in our cars, laundry room floors, and in our washing machines, then flowing into our municipal water system.
9. Sound Absorption and Glare reduction: Natural grass absorbs sound and reduces noise pollution. It also reduces glare that can cause vision discomfort.
10. Low impact on Environment: Natural grass renews itself and can last indefinitely. It does not need to be removed, replaced, or landfilled. And in RF, our parks are largely chemical free – under the Integrated Pest Management program they are not treated with chemicals or pesticides except as a last resort.

13 Environmental/Health Impacts of Artificial Turf:

1. Leaching of Micro plastics, Chemicals, and Toxins: All components of artificial turf – the plastic carpet, synthetic “grass blades,” and infill materials – contain chemicals that leach into the water system and groundwater through runoff. Artificial Turf is comprised of a plastic, petroleum, and silica-based **carpet**; chemically treated **plastic** “grass blades”; and **pellet infill** made of a choice of recycled tire rubber, recycled manufacturing waste, recycled footwear, silica sand, thermoplastic elastomers (TPEs), Ethylene Propylene Diene Monomer (EPDM) Rubber, acrylic/polymer coated natural sand, treated organic materials such as coconut fiber, husks, peat, cork rice husks, and walnut shells. Some studies show significant zinc and lead leaching in groundwater from crumb rubber fields. The chemicals used to color artificial turf “blades” can include lead, titanium, and other metals. Some of the chemicals in tire crumb, such as dibenzopyrenes, are known carcinogens. A December 2016 EPA Report identified nearly 30 articles and reports relevant to chemical leaching from crumb rubber and/or ecological toxicity and risk. However, examination of these risks was deemed to be beyond

the scope of the EPA's research. Manufacturers of artificial turf materials are reticent to share the chemical make-up of their products (for example, Nike Grind), making it difficult to scientific study.

2. Heat Stress: Artificial turf fields absorb and retain heat, resulting in surface temperatures that are much higher than the surrounding air. For example, a BYU study reported average artificial turf field temp of 117°, as compared to 78° for natural grass, and 110° for asphalt. A maximum surface temp of 200° F is reported on BYU fields. The University of Missouri reports artificial turf field temp of 178° F (138° F at "head-level height" on a 98° day; and Penn State reports artificial field turf temps of 120°, 130°, and 146° F for air temps of 78°, 79°, and 85° F.
3. Silica Inhalation: The crystalline silica sand that is generally used in artificial turf infill contains silica dust, which can cause silicosis and cancer when inhaled. Crystalline silica is known by the state of California to cause cancer, and the IARC has classified silica as a carcinogen. One artificial turf manufacturer advises that its sand infill should not be breathed and can cause moderate to severe eye and respiratory irritation. However, there are currently no standards for non-occupational exposure on artificial turf fields.
4. Injury: Professional athletes consistently indicate preference to play on real grass, based on increased injuries, soreness and fatigue from artificial turf. For example, the NFL Players Association reports that artificial turf causes more strains, abrasions and concussions than natural grass, shortening their careers and adversely affecting their post-career quality of life. FIFA and the U.S. Soccer Federation report that artificial turf is not a preferred playing surface, and the U.S. Women's Soccer Team has filed discrimination lawsuits over matches required to be played on artificial turf. The U.S. Men's National Soccer team has contracted to play all games on natural grass since 2014. When natural grass stadiums are not available, natural grass is required to be installed over artificial turf to address the players' concerns.
5. Infection Risk: The abrasiveness of synthetic turf fibers contributes to abrasions or "turf burns," and a higher risk of exposure to staph infections.

6. Latex Allergy: Latex allergens are found in natural rubber and cause an allergic response in 6% of the general population. Reports of allergic responses to crumb rubber (from tires, shoes, manufacturing waste, or otherwise) are anecdotal, because scientific studies have not been conducted.
7. Increased Storm Water Runoff and Polluted Water: Artificial turf does not absorb rainwater – it drains through the surface or along the ground into storm sewers. Prior to installation of artificial turf, the soil below is compacted. Then a layer of sand, concrete, or decomposed granite is put on top of the soil and compacted so the turf lays flat. Next, a layer of plastic may be applied, followed by the artificial turf being stapled down. While rain may permeate the plastic grass shaped fibers and synthetic infill pellets, it is not absorbed into the ground below the plastic carpet backing. Some studies show that zinc and other metals, are found in synthetic turf runoff, affecting water quality and aquatic organisms.
8. Undercutting of Municipal Efforts to Manage Increased Storm Water: Statistics show that Chicago has been receiving heavier rainfall and snow, and scientists predict higher and stronger frequency, putting stress on all infrastructures. The village of RF, city of Chicago, and other metropolitan areas have launched efforts to manage storm water, implement green urban design, and preserve plants and trees to manage the effects of heat and heavy storms. For example, the Village's 2016 install of permeable pavers in its commuter parking lot was designed to divert 46,000 gallons annually from RF's sewer system. Artificial turf subverts these efforts by decreasing the square footage of water-absorbing soil in RF. If the PD replaces the Centennial Park natural grass field with artificial turf, the entire *annual benefit* of the Village's permeable paver lot would be eliminated with just a 1.16" rainfall. RF receives an annual rainfall of at least 37", so the Village would need to install 32 more permeable paver lots to compensate for the added stormwater runoff caused by one artificial turf field.
9. Increased Water Usage: Artificial Turf needs to be watered to help cool (at least temporarily) the high temperatures of artificial turf. Watering also improves playability by settling infill particles, decreases static cling, and washes away bacteria and fluids on fields.

Water irrigation not only uses water resources, but also requires energy for transport.

10. Increased Carbon Footprint: The production, transport, maintenance and disposal of artificial turf contributes to a large carbon footprint. Artificial turf is a petro-chemical product that requires the use of virgin materials and high levels of processing and production. A 2007 Canadian study found that a 9,000 sq. meter artificial turf field emitted 55.6 tons of CO₂ over a 10-year period, plus additional greenhouse gasses. The study found that 1,861 trees would need to be planted to offset these emissions from one field. **Taking this to a RF level,** the carbon effect of installing one artificial turf field would negate nearly half (45%) of the green house gasses saved by our D90 schoolchildren through their food scrap compost program. The impact of installing a 10-year artificial turf field is equivalent to gutting 1 ½ years of the 3-year food compost program at our Willard, Lincoln, and Roosevelt schools.
11. Synthetic Turf Does Not Support Biodiversity: Though most artificial turf fields have drainage systems, they do not contain microorganisms that can break down pollutants. Artificial turf does not offer habitats for insects, butterflies, or provide food for birds.
12. Urban Heat Island Effect: Urban heat islands are created when natural grass and trees are replaced by impervious surfaces that absorb heat. Urban heat islands increase demand for energy (particularly air conditioning), intensify air pollution, and increase heat-related health problems.
13. Noise and Glare: Synthetic turf tends to produce glare from natural sunlight and overhead lights and does not have the ability of natural grass to absorb sound.

Conclusion: The RFSC believes that the Village's natural grass fields offer important environmental and health benefits, which would be lost if removed. We are concerned about artificial turf's numerous known environmental and health risks, and those not yet studies. We encourage the PD to provide information to the Commission and Village residents about their research and ongoing artificial turf plans, so that relevant research can be conducted, and the most helpful input may be provided.

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