



## Artificial Turf vs. Natural Grass at Radnor Middle School – Letter to School Board

October 16, 2007

Radnor Township School Board

135 S. Wayne Avenue  
Wayne, PA 19087

Dear School Board Members,

Using only natural grass at the Radnor Middle School site is the best and most responsible choice you can make. The arguments being used to support an artificial turf option are ill-informed.

### **Artificial Turf Costs Excessively More than Natural Grass Under Every Cost Scenario.**

It has been said that artificial turf is the best economic decision for the school yet the school board has failed to prepare, review or consider any comprehensive cost analysis that compares the option of natural grass with the combination alternative of artificial turf and softball field. Failing to require, provide or rely upon such a detailed comparative analysis is irresponsible governance. It is imperative that you prepare and release such a cost analysis prior to making an informed decision.

I have taken the liberty of doing up such an analysis. I have taken all of the figures that have been thrown out at the various school board meetings and the fact of the matter is, under no set of circumstances does artificial turf ever come out as being cost beneficial. My alternative cost scenarios have included the net \$54,000 maintenance cost the schools pay to the township for field maintenance as well as the gross \$400,000 figure that no one seems able to fully articulate or document but that has nonetheless been thrown out as a potentially viable maintenance figure. I have used only the average replacement figure provided at the October 9, 2007 meeting of \$250,000 - I carefully did not rely on the high or the low, but the average figure that was provided by school administration staffing. I have analyzed figures based on the cheapest soils and seed mix, the median and the high. I have included costs to the school district for installation of natural grass that might exceed what the township was planning to spend. I have used the district's artificial turf figure, unchallenged. I have looked at 8 years, 10 years, 13 years and 20 years - only including a charge for replacement of the turf in the 20 year analysis, not in any of the shorter terms. In every instance - every instance - artificial turf is significantly higher, with plenty of financial room to install an irrigation system at the price already quoted to the district if deemed beneficial from a maintenance perspective.

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When using the highest cost for natural grass installation (the best soils and seed option) and the most expensive maintenance cost scenario provided at the 10/9/07 meeting (the \$400,000 gross figure which is never actually paid, only \$54,000 of this is ever actually paid by the district to the township) artificial turf after 10 years (NOT including cost of replacement at the end of the 10 years) is \$392,000 more expensive; after 13 years with no replacement yet it is \$407,000 more expensive, after 20 years with one replacement during that 20 year period it is \$692,000 more expensive.

Under the more realistic maintenance cost option (an option based on the actual \$54,000 payment the district makes to the township for field and grounds maintenance) the artificial turf and softball scenario exceeds the natural grass scenario by: \$320,000 after 10 years with no replacement, \$313,000 after 13 years with no replacement, and \$548,000 after 20 years with one replacement.

Even if the district were to put in the irrigation system at the \$88,600 price tag provided at the 10/9/07 meeting, the natural grass option makes the most sense in the short term and the long term financially.

My analysis is available for review and discussion upon request. It considers many varied options and scenarios including varying year cycles, varying maintenance costs, varying installation costs, and the addition of sod. It clearly documents and demonstrates that for you to include artificial turf at the middle school site unjustifiably increases the costs of the project dramatically.

It is important to note, as I understand this is a claim that is now being made -- it is not a valid argument to say that if the School Board holds off on installing artificial turf today that it will end up costing more in the future. Today it is the Township that would be paying for and installing natural grass, that is a cost savings to the School Board that could be set aside for future use as needed and appropriate.

### **The District Would Violate Radnor's Code if it Reverses Its Decision to Use Natural Turf**

As has been discussed by the community with the School Board, when the Township Commissioners gave their approval in 2005 it was with the proviso that "[t]he plan will be **subject to review and recommendation** by the Design Review Board." (*emphasis added*) The resolution was unanimously passed by the Commissioners containing this requirement.

In accordance with the directions of the Board of Commissioners, on July 19, 2005, the Design Review Board met and considered the plan for the middle school facility. The Design Review Board approved the project under four (4) conditions including, "The landscaping plan approved as submitted with the recommendation the playing fields be **natural grass**."

It is inarguable that the July 18, 2005 approval of the Commissioners was strictly contingent upon the approval of the Design Review Board, which is evidenced by the phrase "subject to". Moreover, at the time of their approval, the Board of Commissioners provided no qualifiers or mitigating language that could be read to reasonably disregard or overrule any of the conditions the Design Review Board imposed. Rather, the Commissioners deliberately constrained themselves to the determination and recommendation of the Design Review Board on July 18, 2005 by using the language "[s]ubject to review and recommendation" in the body of their approval. The decision of the Design Review board was natural grass.

Furthermore, if the Board of Commissioners had a change of heart, and decided that they no longer wanted their approval to be "**subject to**" their preexisting, self-restricting condition, then the Board was required to follow the appellate protocol set forth in the Township Code, specifically Section 150-8. This section sets forth strict timing requirements that must be followed if a decision by the Design Review Board aggrieves any party. As per Section 150-8, the time for filing an appeal on the Design Review Board's decision to go with natural grass lapsed over two (2) years ago.

Accordingly, because the Design Review Board and all associated conditions are clearly binding as per the self-imposed restrictions the Board of Commissioners imposed on themselves when they gave their approval on July 18, 2005, and because the window of opportunity to file an appeal has long since been shut, it would therefore be violative of Radnor's Code if the Board of Commissioners reverses its decision to use natural turf at the Middle School site at this time.

**Assertions that Natural Grass at this Site, Over Infiltration, Will Not Survive are Unsubstantiated and Incorrect.**

Claims that natural grass at this site would not survive as the result of inundation by stormwater are contradicted by the experts and by design of the site. The infiltration system is being specifically designed to ensure that the recess/sports field will not be inundated by water but that instead water will flow through to the infiltration system below. A number of safeguards have been designed into the project to prevent inundation of the site by stormwater. Claims that grass at the site has been harmed by inundation in the past have no application to this newly designed system or play field.

Claims that natural grass at this site will not survive due to lack of water are again, the baseless claims of laypeople intent on securing artificial turf at the site at all cost. The fact is that as long as a natural grass system is appropriately selected, installed and maintained there is no reason to believe that it cannot withstand the programmatic use of the middle school and its student body. In 2002 the Philadelphia School District has already successfully installed a subsurface stormwater storage and infiltration system below its playfield at its recently constructed Penn Alexander School. This is considered a model project boasted for its success by the Philadelphia Water Department. [\[1\]](#)

Attached find letters from two experts attesting to the viability of a grass playfield field over infiltration.

ü According to Meliora Environmental Design "the stormwater bed beneath the playfield does not preclude the use of natural turf." "Natural turf requires maintenance regardless of the underlying system. With 12 inches or more of soil over the stone stormwater bed, the stormwater bed will not dry out the shallow-rooted turf system."

ü According to Viridian Landscape Studio "We at Viridian Landscape Studio endorse the use of play fields as areas for stormwater infiltration." "Much research is being conducted on turf grass that minimizes water and fertilizer use and holds up to extensive play." "In closing, there is no reason that a real turf playing surface will not work on a stormwater infiltration bed and this approach is, in fact, an important one in promoting sustainable solutions to stormwater management." "When comparing turf grass to artificial playing surfaces people often forget that artificial surfaces require maintenance too. Some of these tasks include top dressing and watering on hot days to cool down the surface for play."

Natural grass at the middle school site will not result in erosion as claimed by some. The roots associated with the natural grass will prevent nonnatural erosion and sedimentation to the stream below.

Comparing the middle school site to other locations in the township do not support a claim that grass here is not viable. Conditions at these locations are totally different. Claims of what did and did not happen at these locations and the final resulting outcome are undocumented and have not been subject to any kind of objective review or scrutiny - they are simply the self-motivated claims of a sporting community intent on obtaining artificial turf at the middle school site.

One of the biggest arguments made for artificial turf is the increased playing time it provides. While artificial turf technology has progressed, so too has the science surrounding natural turf grass for sports. The right selection of soils, grass seed, maintenance and playing schedule can significantly enhance the usability of natural grass for sports playing.

While, according to Mr. McAdams, the site may be used by as many as 1100 students daily, he fails to emphasize the number of days annually the site will be used by students. Radnor Middle School is only in session in the range of 180 days a year, some of these half days and a number of the days students are already forced inside due to rain, cold and/or snow conditions. The use of Odorisio, North Wayne and South Devon fields should all be included in this use analysis. In addition, if there is a perception that use by the sporting community will result in overstress of the field from a school board perspective then such uses should be limited or prohibited. This is a field intended for school use, it is more than capable of withstanding school and extra-school use if installed and maintained properly. School Board members trying to justify an additional \$300,000 \$700,000 additional investment of taxpayer dollars in order to support a perception of need for nonschool functions are behaving irresponsibly.

### **Environmental, Educational and Social Affects of ArtificialTurf Cannot be Justified.**

Environmentally artificial turf is a concern - both in and of itself, but also in that the use of artificial turf denies us the benefits of natural grass.

Artificial turf can be a source of toxins; it provides no pollution filtering, it provides no habitat, and it will not help the infiltration system better handle its water.

Scientific study into the environmental, health and safety affects of artificial turf are in the early stages. That being said, independent scientific studies have identified that the use of artificial turf is a threat to local streams and aquatic communities. Study has concluded that the use of tires in artificial turf has the potential to pollute our environment with PAHs, phenols and zinc<sup>[2]</sup> and that runoff from an artificial turf field draining to a local creek can pose "a positive risk of toxic effects on biota in the water phase and in the sediment."<sup>[3]</sup> Zinc has also been shown to leach from the artificial turf fibers.<sup>[4]</sup> It is believed that chemicals leaching from synthetic turf materials occurs slowly, and as a result the environmental harms may take place over many years.<sup>[5]</sup> While the supporters of artificial turf point to studies minimizing its environmental threat, the fact is, there is enough science, and enough concern about the environmental harms of artificial turf that a number of European countries have held conferences dedicated to the issue and have passed or are working on regulations, policies and/or monitoring requirements for artificial turf systems. It is incumbent on the School Board to make the decision that is most protective of our community, our environment and our children - it is incumbent on the School Board to make the risk averse decision - and to endorse its selection of natural grass at the Middle School site, not change it to artificial turf.

By comparison, natural grass and soil can filter pollution that would otherwise enter the infiltration and stream system, including pollution washed from the neighboring softball field; they can help the infiltration system soak up and remove water; and they can provide habitat for birds and insects which enrich our lives and the education of our children.

There is little debate over the excessive heat created by the presence of artificial turf. On October 8, 2007, when it was 86 degrees in the afternoon, the temperature on the artificial turf at the High School measured 111 degrees. These measures in Radnor Township equate to the findings of a number of studies on the matter.

Studies document that the surface temperature on artificial turf is dramatically increased as compared to surrounding land uses, particularly natural grass. Studies have found temperatures on artificial turf exceeding temperatures on nearby natural grass by 86.5° F, by 95 to 140° F, and by 39 to 68.5° F. While irrigation provided significant cooling for the synthetic turf, after only 5 minutes the temperature quickly rose again, with a nearly doubling of temperature (85° F to 164° F) after only 20 minutes. <sup>[6]</sup> Assertions by others that artificial turf does not get much hotter than pavement nearby are silly - we are not talking about a choice between pavement and artificial turf, this is a choice between natural grass and artificial turf.

The heat island affect of artificial turf is also a concern for the neighboring community. Wayne is already well developed, much more so than many of the outer lying areas of the Township. The high levels of pavement and rooftops contributes to increased temperatures in the community. Installing artificial turf with its excessive temperature regimes is bound to contribute temperature-wise to the community and kids seeking to enjoy the out of doors.

The School Board has apparently totally ignored this community impact of genuine concern.

Concerns regarding the excessive temperatures range from the implications for players already exerting themselves playing in such excessively high temperatures, to the implications for burns when players or pedestrians come into contact with the hot surfaces, to the implications for small children trying to enjoy casual play on a hot day during recess or school activities. At the last school board meeting it was acknowledged that the temperatures can get so extreme that it prohibits children from walking on the surface, particularly small children, in bare feet - this should tell us something.

Natural grass, by comparison, provides a natural cooling affect. "The temperature of natural grass rarely rises above 85 degrees Fahrenheit, regardless of air temperature." [7] The cooling contribution of natural grass can be felt on any hot day.

### **Teaching by Example**

The Radnor Middle School project has been portrayed to our students, the community and the media (most recently the Philadelphia Inquirer) as an ecologically sensitive development project. Using artificial turf contradicts this commitment. Artificial turf is an environmental threat. In addition, artificial turf is not natural, and as such is certainly not the best environmental choice for our environmentally friendly school.

As a community we have invested heavily in building an environmentally friendly school -- it is an absolute contradiction to place living vegetation on our rooftops and plastic grass on the ground.

If the concern is getting the kids out to play sooner then we should be planning on sod which only adds an additional \$40,000 to \$95,000 to the cost of the project (depending on the figures used) - not over \$630,000 like artificial turf.

It does seem apparent, from the public record being built, that the primary driver for an artificial turf field is its future use by the nonschool sporting community. The Radnor Middle School is for the entire community, the field behind is for all of our kids and families. It is not okay to confiscate the field from the community and to turn it over to the sporting community. It is not okay to force our children to spend their recreational time at school on fake grass, with all the odors, heat and environmental harms it causes; and to deny them the ability to enjoy the touch, feel, smell and coolness of real grass in order to accommodate the sportsters in our community.

The drawbacks and risks associated with artificial turf do not warrant our investing in it, even if it does mean a few more games can be played within a given period of time.

This is a community field, it needs to serve the community - natural grass accommodates the sportsters while also accommodating everyone else. And as a result it makes it the better choice.

Yours sincerely,

Maya K. van Rossum, the Delaware Riverkeeper

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[1] Glen Abrams, AICP, Philadelphia Water Department, NWQEP Notes, the NCSU Water Quality Group Newsletter, New Thinking in an Old City: Philadelphia's Movement Towards Low-Impact Development. February 2004.

[2] T. Kallqvist, Norwegian Institute for Water Research(NIVA), Environmental Risk Assessment of Artificial Turf Systems, December 2005, p. 5; T. Edeskar, Lulea University of Technology, Technical and Environmental Properties of Tyre Shreds Focusing on Ground Engineer Application, 2004 as cited in KEM, Swedish Chemicals Agency, Facts: Synthetic Turf, April 2007.

[3] T. Kallqvist, Norwegian Institute for Water Research (NIVA), Environmental Risk Assessment of Artificial Turf Systems, December 2005, p. 6.

[4] T. Kallqvist, Norwegian Institute for Water Research (NIVA), Environmental Risk Assessment of Artificial Turf Systems, December 2005, p. 17.

[5] T. Kallqvist, Norwegian Institute for Water Research(NIVA), Environmental Risk Assessment of Artificial Turf Systems, December 2005, p. 5; NIVA (The Norwegian Institute for Water Research), Evaluation of the Environmental Risks of Synthetic Turf, 2005, as cited by KEM, Swedish Chemicals Agency, Facts: Synthetic Turf, April 2007.

[6] Dr. C. Frank Williams and Dr. Gilbert E. Pulley, Synthetic Surface Heat Studies, Brigham Young University.

[7] SportsTurf Managers Association, A Guide to Synthetic and natural Turfgrass for Sports Fields, Selection, Construction and Maintenance Considerations.