Athletic Facility Fundraising
Focused On Artificial Turf at CR North Stadium

Administrative Proposal September 4, 2008

A Brief History.

In November of 2005, Council Rock administrators and coaches met after a series of games and events were canceled at our stadium field based on a few days of rain. The concerns expressed by this group centered on the use that the CR North Stadium field endured with two high school programs and three middle schools scheduling events. This group made a recommendation to look at other options for the field surface at CR North. Soon after, involvement from the board, coaches, community, and staff led to a proposal to plan for the installation of a modern artificial turf surface at CR North and CR South.

A formal proposal was made to address the following issues and goals:

- Create a project plan that would provide funding from our community and other alternate revenue sources for artificial turf fields, rather than make them taxpayer funded projects.
- Expand the use of a durable artificial turf stadium field to accommodate multiple uses by district and community groups rather than the 30 - 40 events that can be safely scheduled on natural turf.
- Develop this alternative fund raising process to allow Council Rock to explore the potential for fund raising, naming rights, and other revenue opportunities for maintaining and improving athletic facilities without investment from the taxpayers.

In December of 2005, a group was formed to begin this work. The initial group included coaches, members of various athletic organizations in our community, members of the administrative team, representatives appointed by the school board, and interested community members. After early discussions, it was concluded that the project would be most successful if artificial turf at both schools was planned. Initial cost estimates indicated that the proposed fields would cost approximately $800,000 each. With
contingencies, a figure of $900,000 was used for each field, totaling $1.8 million for both high schools. The fundraising task was outlined in general terms as follows:

- Raise one-third (approximately $600,000 of $1.8 million for two fields) from general fundraising.
- Raise one-third (approximately $600,000) from naming rights.
- Council Rock contribution of one-third (approximately $600,000) from capital project funds to be repaid through increased revenue opportunities and maintenance savings.

This plan was presented to the Board of School Directors in February of 2006. After careful discussion, the Board approved this direction and fundraising activities began. When this presentation was made to the Board, we set milestones for progress. When our fundraising reached 33% of the estimated project cost, design would begin and when fundraising reached 80% we would bid the project.

At the outset, we explained that this was an ambitious goal given the magnitude of the project and we made it clear that we were traveling an uncharted path. However, the opportunity to develop this turf plan along with the alternative funding is consistent with two important strategies in the strategic plan

1. Developing alternative revenue sources and
2. Developing community support needed due to known and difficult financial challenges.

Since the project started, we have realized the financial challenges of addressing critical facility maintenance issues. The financial challenges are exacerbated by the Act 1 constraints. These past two years have clearly shown that our principal focus for district revenue will need to go to school facilities and programs.

It was our primary goal to create a fundraising and revenue generating process that will ultimately allow the district to improve athletic facilities without contributions from the district’s general fund. Artificial Turf and other athletic facility improvements can be accomplished with either funds raised in advance or reliable funding sources used to repay debt service payments.

In December of 2006, the Board authorized the administration to hire an architect to begin planning for installation of an artificial surface at both North and South. Joe DeGeronimo, an experienced athletic facility architect, was selected from a pool of architects with artificial turf expertise. Based on input from meetings with coaches, the architect’s contract also included basic athletic facility planning to answer important questions related to any changes of athletic facilities at both high schools. The work began in the winter of 2007 and was put on hold in April as it became clear that there were differences of opinion on the School Board related to the best way to achieve our goals. At this point, both the fund raisers and the architect were directed to postpone further work until the district refined its commitment to the project. To date, the architect
has not completed an initial design nor has he billed the district for any of the preliminary work done toward this project. The funds for this design work are to be paid from our community fundraising activities.

**Our Current Plan.**

As we have worked to make this project a reality, it has been apparent that our initial plan needs to be phased to focus first on the construction of the stadium field at North and then follow with another artificial turf field at CR South.

In July, 2008, the School Board reviewed the progress toward the project. At the direction of the Board, the administration submits this proposal to illustrate the current funding available and our design toward future fundraising. This plan will bring this project to completion for the 2009 fall season:

**Plan If No Additional Community Fundraising or Naming Rights Achieved**

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<thead>
<tr>
<th>Source</th>
<th>Original Concept</th>
<th>Amounts by August 2008</th>
<th>Notes</th>
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<tr>
<td>Naming Rights</td>
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<td>$200,000</td>
<td>If offer approved</td>
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<tr>
<td>District Commitment Repaid by Revenue Opportunities</td>
<td>$300,000</td>
<td>$505,000* (Assumes that no further revenue or fundraising is realized)</td>
<td>Requires annual rental income of $63,000 to repay amount borrowed over 10 years.</td>
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**Original Plan – Continuation of the work of school and community fundraising**

<table>
<thead>
<tr>
<th>Source</th>
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<th>Plans for September 2008 to Sept. 2009</th>
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<td>Assumes current offer approved, plus approval of offers by naming rights consultant</td>
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<tr>
<td>District Commitment</td>
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<td>$300,000</td>
<td>$37,000 in annual</td>
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An important part of this financial proposal is the commitment of the Council Rock United Soccer Association (CRUSA) to commit to lease the field for a five year period, with payments to be made monthly. They are requesting 3 hour blocks of time when the field is not needed for school events, including weekends and some weekday evenings. Their proposal to rent three-hour blocks of field time would fund a maximum of $60,000/year of rental revenue with four blocks of field time and a minimum of $30,000/year with two blocks of field time. (These calculations are based on $125/hour and 40 weeks of commitment per year, which excludes winter months.)

It is important to note that we will continue on a path toward implementation of our initial proposal with fundraising activities through the fall and winter. At this point in time, assuming Board approval of the naming rights contract, $395,000 has been raised, which is almost two-thirds of the general fundraising and naming rights commitment for a field at Council Rock North. With the revenue opportunities secured by a long-term lease agreement, the district share of the funding is no longer just a hope that reliable revenue is possible. This will allow the project to be completed at no cost to the taxpayer. Rental revenue is not possible without artificial turf.

In addition, numerous other sources of funding are being developed including:
- Naming rights and sponsorships of 3 to 5 years with annual payments.
- Additional fundraising events in the fall of 2008 involving school and community members.
- Gate receipts and concessions income from additional events.
- Maintenance cost savings, cautiously estimated at $15,000 per year.
- In-kind contributions from community members to reduce construction costs.

Based on the proposal funding methods above, we are seeking approval from the Board for the following proposal:

- Immediately restart the design process with the intent to prepare drawings and specifications for fields at both North and South, determining more specifically the government approval process, design decisions, construction costs, and construction issues.
- In the late fall of 2008, prepare bid documents for the construction of an artificial turf field at Council Rock North
- In January or February of 2009, bid the work for the North field.
- In June of 2009, begin construction.

See Attachment 1-Project Schedule
Since we began this effort, four school districts in Bucks County have installed or approved artificial turf fields at taxpayer expense: Central Bucks, Palasades, Centennial, Pennridge. Council Rock followed a different path – one that was designed to test a model of fundraising that was bold and difficult but was ultimately designed to draw alternative revenue to Council Rock for installation of this field and for future projects across the district. This ultimate proposal should be seen as innovative and responsible. It is a model that brings a community resource to Council Rock without taxpayer contributions and sets the stage for future fundraising potential to offset other academic and athletic needs.
FREQUENTLY ASKED QUESTIONS:

As we have traveled this path over the past three years, many questions have been posed by the Board and by the public about Artificial Turf. The information presented below is presented to address some of these questions.

Is a modern synthetic turf field safe?

**Lead** - In July of 2008, the Consumer Product Safety Commission released its evaluation of various synthetic athletic surfaces. The evaluation concludes that there is no risk from exposure to lead or other chemicals in these fields. A copy of that study is found as Attachment 2.

**Heat** - Some artificial turf fields overheat due to reflected sunlight from buildings and poor ventilation. This has been addressed by spraying water on the field.

**Injuries**. An NCAA study comparing injury rates during the 2003-2004 academic year showed that the injury rate during practice was 4.4% on natural turf and 3.5% on synthetic turf. Synthetic turf fields are more uniform and consistent in surface and the resiliency of the materials and subsurface make these fields safer for athletes.

An abstract of research on Artificial Turf fields is found as Attachment 3.

How will the rental of the stadium field be accomplished with the many uses desired by our high schools?

The North stadium artificial turf field will be used by Council Rock athletes during fall and spring sports seasons – approximately 5 months out of the year. During the peak fall season, our field sport athletes (football, soccer, field hockey, lacrosse) and the marching band will have priority use of the field. During the spring season, a similar schedule will be developed to allow for spring sports and the dominant use of the track. During “off-peak” use, the stadium field will be more available to outside organizations. The durability of artificial turf allows additional time to be available in the peak season for other community organizations. In addition, the artificial turf field will provide many opportunities for physical education use during the school day. Given the emerging 12 month commitment for club teams in soccer, lacrosse, and field hockey, there will be significant rental revenue available. This model has been tested and confirmed at surrounding turf fields.

Model Field Schedule-Fall Sports
(Existing Natural Turf vs. New Artificial Turf)
The chart above illustrates the following advantages of **one** artificial turf field. The schedule above indicates a worse case scenario in a week where there are 5 athletic contests and one band cavalcade. Even so, with this schedule, the following possibilities exist:

- **Seven** new opportunities for high school sports **practices and games** (3 hour blocks)
- **Seven** new opportunities for **community sports** (3 hour blocks at $125/hour or $375 per block, each block is potentially worth $15,000/year)
- **New physical education** opportunities. While this use is limited to Council Rock North, it relieves the use of the soccer fields that are currently used by PE classes - increasing the wear on these fields.

**How will you manage track competition?**

Recognizing that installation of artificial turf fields will impact other athletic activities in the stadium at North and the South complex, the architect contract includes a requirement to provide assistance in addressing these issues.

**Track and Field issues:**

The artificial turf fabric can be damaged by discus, shot put, and javelin events. Therefore, it may be necessary to move throwing events off the artificial turf to other locations. While the shot put can be relocated easily, the discus and javelin need to be moved to a location easily supervised area. Due to safety and liability concerns, throwing events are generally separated from track events. The exact location of these functions is part of the contracted athletic facility planning services of the architect.
Why are we making this extraordinary commitment just because we cancelled 2 games in 2005?

The use of natural turf fields by two high school programs causes significant scheduling limitations everywhere, not just Council Rock, because, despite the best efforts to maintain the field, only 30 to 40 events can be scheduled on natural turf each year, with fewer in adverse weather conditions. At Council Rock, middle school football and soccer events have been cancelled each year. Other games – soccer, hockey – have been cancelled or rescheduled each year. Most importantly, our ability to host these evening events continues to be limited to 30 or less each year. This is in contrast to 200 or more school and community events possible with an artificial turf field.

Beginning in the 2006 season, district playoff games in field hockey and soccer have been scheduled for turf fields. Field hockey play-offs are now played exclusively on turf fields. Our competitiveness in these sports will be enhanced by the availability of artificial turf surfaces in Council Rock.

What is the plan for CR South?

The commitment has always been to put artificial turf at North and South. The exact location of a field at South will be decided as part of the athletic facility planning contracted with the architect. We believe the momentum and enthusiasm created by the field at North will carry over to future fundraising for the field at South. The funding sources under development allow us to propose a new funding method for South that is more reliant on annual payments from naming and sponsorship rights and less dependent on general fundraising. In addition, we believe that having a complex of artificial and natural turf fields at both high schools allows us to develop revenue sources available to few school districts in our region.

Attachments:

Attachment 1 - Proposed Project Schedule for the installation of Artificial Turf at the stadium field in the summer of 2009.


Attachment 3 – Research Abstracts on Synthetic Turf Fields
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NEWS from CPSC
U.S. Consumer Product Safety Commission

Office of Information and Public Affairs

FOR IMMEDIATE RELEASE
July 30, 2008
Release #08-348

CPSC Staff Finds Synthetic Turf Fields OK to Install, OK to Play On

WASHINGTON, D.C. - The U.S. Consumer Product Safety Commission (CPSC) staff today released its evaluation (pdf) of various synthetic athletic fields. The evaluation concludes that young children are not at risk from exposure to lead in these fields.

CPSC staff evaluation showed that newer fields had no lead or generally had the lowest lead levels. Although small amounts of lead were detected on the surface of some older fields, none of these tested fields released amounts of lead that would be harmful to children.

Lead is present in the pigments of some synthetic turf products to give the turf its various colors. Staff recognizes that some conditions such as age, weathering, exposure to sunlight, and wear and tear might change the amount of lead that could be released from the turf. As turf is used during athletics or play and exposed over time to sunlight, heat and other weather conditions, the surface of the turf may start to become worn and small particles of the lead-containing synthetic grass fibers might be released. The staff considered in the evaluation that particles on a child's hand transferred to his/her mouth would be the most likely route of exposure and determined young children would not be at risk.

Although this evaluation found no harmful lead levels, CPSC staff is asking that voluntary standards be developed for synthetic turf to preclude the use of lead in future products. This action is being taken proactively to address any future production of synthetic turf and to set a standard for any new entrants to the market to follow.

As an overall guideline, CPSC staff recommends young children wash their hands after playing outside, especially before eating.

Consumers can also view a video clip (transcript) about lead and synthetic turf. This is in "streaming video" format.

Send the link for this page to a friend! The U.S. Consumer Product Safety Commission is charged with protecting the public from unreasonable risks of serious injury or death from more than 15,000 types of consumer products under the agency's jurisdiction. Deaths, injuries and property damage from consumer product incidents cost the nation more than $800 billion annually. The CPSC is committed to protecting consumers and families from products that pose a fire, electrical, chemical, or mechanical hazard. The CPSC's work to ensure the safety of consumer products - such as toys, cribs, power tools, cigarette lighters, and household chemicals - contributed significantly to the decline in the rate of deaths and injuries associated with consumer products over the past 30 years.

To report a dangerous product or a product-related injury, call CPSC's hotline at (800) 638-2772 or CPSC's teletypewriter at (800) 638-8270, or visit CPSC's web site at www.cpsc.gov/talk.html. To join a CPSC email subscription list, please go to https://www.cpsc.gov/cpслиst.aspx. Consumers can obtain this release and recall information at CPSC's Web site at www.cpsc.gov.
CPSC Staff Analysis and Assessment of Synthetic Turf “Grass Blades”

CPSC staff identified synthetic turf products for analysis of total lead content and accessible lead. Staff obtained samples of turf that had been left over after installation or that became available when a field was dismantled. Staff also visited in-service synthetic turf fields, and used portable X-ray Fluorescence (XRF) testing equipment to detect the presence of lead in the product, as well as a portable field wiping apparatus to measure the exposure potential to the lead.

The staff considered that exposure to the lead present in some synthetic turf products could occur if some of the lead gets on children’s hands, perhaps when synthetic grass blades break or become worn and release small particles of lead-containing material. The lead on the children’s hands may then get transferred from their hands to their mouths through normal hand-to-mouth activity during or after playing on the field.

Analytical Methods

Lead Content

Small pieces of synthetic grass blades were dissolved in concentrated nitric acid using a microwave digestion. The digested sample solutions were then analyzed for lead content using inductively coupled plasma atomic emission spectroscopy.

Accessible Lead (Wipe Sampling)

Products found to contain lead were tested for accessibility of the lead; i.e., whether children using the product could be exposed to the lead that is present.

Staff adapted the approach for estimating exposure to lead from contact with lead-containing synthetic turf fields from the approach used to assess children’s exposure to arsenic from playing on playground structures built using chromated copper arsenate (CCA) pressure-treated wood (Appendix A).

The wipe testing methodology developed for testing pressure-treated wood was used to measure transfer of lead from synthetic grass blades, with one modification. Ghost Wipe™ was used in place of the polyester cloth wipe used in the wipe sampling for wood. Ghost Wipe™ is a commercially available wiping material, 15 cm x 15 cm, pre-moistened with deionized water, and sold in individually sealed packets. Company literature indicates that the Ghost Wipe™ meets all ASTM E1792-96E specifications for sampling materials for lead in surface dust.

The general method involves attaching a Ghost Wipe™ to a 1.1 kg weighted disk, 8 cm in diameter, installed in a device built to provide a standardized and consistent surface wiping. The disk is dragged down a 50-cm length of turf sample for 10 back and forth strokes. The wipe is then removed for analysis.

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1 These comments are those of the CPSC staff, have not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.
Results

Several of the products obtained by staff contained lead in the synthetic grass with concentrations ranging from 0.09 percent lead by weight to 0.96 percent. The testing showed that lead content varied between synthetic turf installations, and also within a field depending on color.

The data show that wiping of the surface of lead-containing synthetic turf with firm pressure results in transfer of some lead or lead-containing material to the wipe medium (Ghost Wipe™).

Exposure Assessment and Results

If it is assumed that transfer of lead-containing residue from the surface of synthetic turf has similar characteristics to transfer of arsenic-containing residue from wood (Appendix A) (i.e., that the amount of residue collected does not increase infinitely, but plateaus at some point during play), then the amount of lead that might collect on the hands of children as they play on turf fields can be estimated from laboratory studies of synthetic turf.

As discussed in Appendix A, the experimental wipe method using polyester cloths overestimated the amount of residue that might be transferred to a person’s bare skin by a factor of between five and 13 times, depending on whether a wet or dry cloth was used. Although the relationship between surface residue removal by a Ghost Wipe™ and bare skin has not been fully characterized, preliminary tests indicate that the Ghost Wipe™ overestimates to a similar degree the transfer of material from the turf surface to bare hands.

The staff believes that dividing the results obtained through use of using Ghost Wipes™ by five is a reasonable approximation of the amount of lead-containing material that may transfer to children’s hands.

The exposure assessment described above concerns the accessibility of the lead. Another important point to consider is the bioavailability of the lead, which relates to the amount of lead that is absorbed by the body. The staff assumed, in this case, that the bioavailability of lead from the material that transfers to skin from contact with lead-containing synthetic turf is the same as the bioavailability of lead from food and drink in the epidemiological studies of lead exposure.

The staff’s approach, based on the assessment of exposure to arsenic in pressure-treated wood, is that during play, lead-containing residue is transferred to a child’s hands and then a portion of that “handload” is transferred to the mouth during the day. The staff practice for assessing whether exposure to a product would result in excessive lead exposure is to assume that about half of the residue that collects on a child’s hands ends up in their mouths (i.e., transfer efficiency is 50 percent).

The staff used the wipe-testing data to estimate transfer of lead to children’s hands during contact with a synthetic turf surface during play. Each wipe value was divided by five to correct the overestimation of transfer using the Ghost Wipe™, and divided by two to account for the amount of lead that is transferred from the hands to the mouth.

CPSC staff recognizes a level of 10 micrograms of lead per deciliter of blood (10 μg/dL) as a level of concern with respect to lead poisoning. To prevent children from exceeding this level, the staff suggests that chronic ingestion of lead from consumer products should not exceed
15 μg lead/day\textsuperscript{3}. This value was determined from epidemiological studies of ingestion of lead through food and drink (as discussed above with respect to bioavailability).

The results (Table 1) for this set of tested synthetic turf fields show no case in which the estimated exposure for children playing on the field would exceed 15 μg lead/day.

\textit{Study Limitations}

This assessment is subject to a number of limitations including the accuracy of the wipe sampling method for estimating exposure to lead-containing residue from touching or other contact with the synthetic turf surface; the accuracy of the assumptions about the capacity of bare skin to collect surface residues during a typical play event at a field; and the accuracy of the assumptions related to hand-to-mouth transfer of lead-containing residues. Further, the staff did not make adjustments in its assessment to account for the non-uniformity of lead content of synthetic turf fields; \textit{i.e.}, some fields had striped areas that contained lead that constitute only a small part of the total playing surface of the field that otherwise had no detectable lead levels. Children playing on such fields might have some contact with the lead-containing striped areas, but most of their contact with the surface would be expected to be with the other parts of the turf (not lead-containing). Finally, the bioavailability of lead from synthetic turf may not be the same as it is for the food and drink exposures that were the basis of the dose-response assessment used to determine the staff's recommended 15 μg/day exposure limit for lead.

Appendix A

The staff's previous assessment of children's exposure to arsenic from playing on playground structures built using chromated copper arsenate (CCA) pressure-treated wood informed the current approach to analysis of synthetic turf surfaces and the assessment of potential exposure to the lead contained in the turf "grass" fibers. Lessons learned from the CCA studies include:

1) Development of a treated wood sampling method: A saline-wetted polyester cloth wipe was attached to a 1.1 kg weighted disk, 8 cm in diameter. The disk was dragged down a 50-cm length of wood for 10 back and forth strokes. When compared to results of residue transfer using volunteers with bare hands, the polyester cloths picked up approximately 13 times more residue; the experimental values were multiplied by a conversion factor of 0.076 to get human skin equivalent handloadings. When the polyester cloths were used dry, they picked up, on average, about 5 times more residue than the volunteer's bare hands did.

2) Understanding of some of the characteristics of treated wood surface residues: Removal of surface residue arsenic correlated with several experimental design features including the material used to wipe the surface, whether the material was wetted or dry, the amount of force applied during wiping, and the area wiped. A key observation was that the amount of dislodged residue did not necessarily simply increase with changes in method that would likely remove more residue. Rather, the amount of dislodged residue approached a plateau, i.e., it appeared that the transfer of material depended on the capacity of the transfer medium (whether the skin of hands of volunteers or wipes made of cloth or other materials) to collect residue, which was not infinite.

3) Understanding of the nature of children's contact with playground structures and potential exposure to surface residues: The data, in conjunction with activity analysis of children playing on playgrounds, led to the conclusion that despite the large variability in children's playground activities and time spent at a playground, their hands would likely collect surface residues from the wood structures they happened to touch fairly quickly in a play session—what the staff termed "maximum handloading". For the exposure and risk analysis, then, the staff assumed that a child's hands would become contaminated with an amount of arsenic as determined by the experimental study of residue transfer. Data from cloth wipes were adjusted for the finding that the cloth wipes always picked up more residue from the wood surfaces than the bare skin of volunteers.

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4 Briefing Package, Petition to Ban Chromated Copper Arsenate (CCA)-Treated Wood in Playground Equipment (Petition HP 01-3), February 4, 2003.
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<th>Firm</th>
<th>Description</th>
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<td></td>
<td></td>
<td>Average</td>
<td></td>
<td>68.1</td>
<td>6.8</td>
</tr>
<tr>
<td>1</td>
<td>Green, indoor field; installed 2000; in use</td>
<td></td>
<td>0.88</td>
<td>14.3</td>
<td>1.4</td>
</tr>
<tr>
<td>1</td>
<td>Green; new, 2008</td>
<td>1</td>
<td>0.1</td>
<td>1.2</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0.09</td>
<td>1.2</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>0.09</td>
<td>0.9</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average</td>
<td></td>
<td>1.1</td>
<td>0.11</td>
</tr>
<tr>
<td>1</td>
<td>Green; new, 2008</td>
<td>1</td>
<td>0.42</td>
<td>1.3</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0.47</td>
<td>0.4</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
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<td>3</td>
<td>0.4</td>
<td>0.4</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average</td>
<td></td>
<td>0.7</td>
<td>0.07</td>
</tr>
<tr>
<td>2</td>
<td>Green and other colors; installed 2005; in use</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Green; unused sample sent to lab for analysis</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Green; unused sample sent to lab for analysis</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Green; unused sample sent to lab for analysis</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Green; unused sample sent to lab for analysis</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Green; unused sample sent to lab for analysis</td>
<td>trace</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Red; unused sample sent to lab for analysis</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Yellow stripes; field in use</td>
<td>Sideliner, 1</td>
<td>0.53</td>
<td>0.9</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sideliner, 2</td>
<td></td>
<td>0.5</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Midfield</td>
<td></td>
<td>2.4</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>Green with yellow stripes; installed 2007; in use</td>
<td>Green</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow, 18</td>
<td>0.96</td>
<td>0.7</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow, 19</td>
<td></td>
<td>1.4</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow, 20</td>
<td></td>
<td>0.8</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow, Average</td>
<td></td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>Green; white stripes; installed 2004; in use</td>
<td>nd</td>
<td>nt</td>
<td>neg</td>
<td></td>
</tr>
</tbody>
</table>

Note: nd = none detected; nt = not tested; neg = negligible
Amount of lead collected on Ghost Wipe™ during wipe testing; if multiple wipes were conducted on a sample, the result of the first wipe is shown; all values are total lead removed during wipe.

Laboratory wipe results divided by 5 to account for differences in lead residue removal efficiency of the Ghost Wipe™ and bare skin. The factor of 5 was taken from the staff's CCA studies; a similar trend was found in limited hand sampling of synthetic grass blades. Staff assumes that half of the residue that collects on a child's hands will be transferred to the mouth and ingested. Thus, the estimated daily ingestion of lead is the Ghost Wipe™ result divided by 5 divided by 2.

The estimated daily ingestion of lead is an estimate of exposure for children playing on a synthetic turf field. Each estimate in this analysis may be compared to the 15 μg/day level that CPSC staff suggests not be exceeded in order to prevent young children from exceeding the 10 μg/dL blood lead level of concern.
What Do the Experts Say?

Dig into recent research and current thinking about synthetic turf and its components.

Official Position Statements - Regulatory Agencies, Sports Authorities

"**Athletes Susceptible to Antibiotic-resistant Staph Infections**"
*American Academy of Dermatology, June 2008*

"**Media Alert: Experts Agree There is No Scientific Evidence of Health Risks in New Jersey Synthetic Turf Fields**"
*April 2008*

"**Artificial Turf: Environmental and Occupational Disease and Epidemiology**"
*New York City Department of Health and Mental Hygiene, January 2008*

"**New York City Department of Parks and Recreation Position Statement**"
*January 2008*

"**Fact Sheet: Artificial turf fields - Health Questions**"
Connecticut Department of Public Health, October 2007

Following the publication of the EHHL report, the CT Department of Public Health issued this Fact Sheet concluding that the potential risks warrant study, but concluding that there is no "reason to stop installation of these fields."

"Synthetic Turf Beneficial Use Determination"
Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, Department of Environmental Protection, July 2007

Position statement - use of tire crumb in synthetic turf sports fields is an acceptable recycling/reuse of tire rubber.

"Environmental Assessment and Risk Analysis - Preliminary Assessment of the Toxicity from Exposure to Crumb Rubber: its use in Playgrounds and Artificial Turf Playing Fields."
New Jersey Department of Environmental Protection, Division of Science, Research, and Technology
Thomas Ledoux, Ph.D., Research Scientist, June 2007

Position statement - with the possible exception of the potential for an allergic reaction, "there is no obvious toxicological concern raised that crumb rubber in its intended outdoor use on playgrounds and playing fields would cause adverse health effects in the normal population.

"An Open Letter concerning the potential cancer risk from certain granulate infills from artificial turf"
Prof. Dr. Jiri Dvorak, FIFA, July 2006

Results of investigation by FIFA and UEFA: "PAH's are not released or at most negligibly released from tyre abradate." Epidemiological studies by health organizations do not implicate tyre wear particles in ambient air to contribute to respiratory and cardiovascular disease. The large granules used in artificial turf have very low potential for emissions. Cites Danish Study #3 above.

Independent Professional Position Statements

"Synthetic Turf Sports Fields and the Environment"
Written to Westford Township (Mass) by John Amaton, P.E., STC Certified Independent Consultant, 2007

Excellent and practical discussion on synthetic vs. natural turf.

"A Survey of Microbial Populations in Infilled Synthetic Turf Fields"
By Andy McNitt, Ph.D., Associate of Professor of Soil Science, Penn State University, and Dianne Petrunak, M.S., and Thomas Serensits, M.S.
June 2007

"Evaluation of Playing Surface Characteristics of Various In-Filled Systems"
By Andy McNitt, Associate Professor of Soil Science, Penn State University, and Dianne Petrunak
December 2006

Table of Contents reflects the scope of the research:

The research:

- Introduction and Objectives
- Construction of Experimental Area
- Characterization of Infill Systems
- Simulated Foot Traffic and Grooming
- Surface Hardness (G-Max)
- Infill Media and Underlying Pad
- Traction
- Abrasion
- Microbial Populations in Synthetic Turf
- Temperature and Color
- Summary and Considerations

Technical Papers - Environmental and Health Risk

"Review of the Human Health & Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields"

A report by an independent environmental firm on the human health and ecological risks from ground rubber in playgrounds and sports fields, and based on a thorough review of studies from advocates and opponents to the use of recycled tire materials.

"A Review of the Potential Health and Safety Risks from Synthetic Turf Fields Containing Crumb Rubber Infill"
Prepared for New York City Department of Health and Mental Hygiene by TRC, May 2008

A comprehensive 180-page review of available scientific literature and research on synthetic turf with crumb rubber infill covering such topics as chemical composition and human health risks from crumb rubber infill, risks of physical injury, heat-related illness, staph, etc. A summary of the available research is also included.

"Evaluation of Potential Environmental Risks Associated with Installing Synthetic
Turf Fields on Bainbridge Island
D. Michael Johns, Ph.D., Windward Environmental LLC, Seattle, WA, February 2008

Review of available scientific literature and publications in order to provide an assessment about potential risks to the environment from zinc and chemicals contained in crumb rubber infill. "...water that percolates through turf fields with tire crumb is not toxic..."

"Initial Evaluation of Potential Human Health Risks Associated with Playing on Synthetic Turf Fields on Bainbridge Island"
D. Michael Johns, Ph.D., Windward Environmental LLC, Seattle, WA, January 2008

Review of available scientific literature and publications in order to provide an assessment about potential risks of human health to children and teenagers and the risks to the environment from precipitation runoff.

"Rubber - Its Implications to Environmental Health"
A FIFA presentation, Dr. Eric Harrison, Zurich, June 2007

Presentation on the chemical composition of SBR rubber and its health and environmental risks. Summary of relevant studies, and comments about the risks of SBR rubber relative to risks already present in the environment.

"Assessing the Health and Environmental Impact from the Use of End-of-Life Tire Rubber Crumb as Artificial Turf in Sports Arenas"
D.A. Birkholz, Director, Research & Development, ALS Laboratory Group, Edmonton, Alberta, October 18-20, 2006

Overview of various health and environmental questions, including exposure to carcinogenic PAHs, amines, and N-nitrosamines from skin contact and ingestion of toxic chemicals, leaching of toxic chemicals, releasing of toxic chemicals and particulates with use.

"Toxicological Evaluation for the Hazard Assessment of Tire Crumb for Use in Public Playgrounds"
Detlef A. Birkholz, Enviro-Test Laboratories, Edmonton, Alberta, Canada
Kathy L. Belton, Alberta Centre for Injury Control and Research, Edmonton, Alberta, Canada
Tee L. Guidotti, Department of Public Health Sciences, University of Alberta, Edmonton, Alberta, Canada
Journal of the Air & Waste Management Association, July 2003

Oral ingestion - low hazard
Inhalation of toxic vapors - inconsequential and negligible
Dermal exposure - low overall hazard
Cancer hazard through ingestion - small amounts will not result in unacceptable hazard 
Species - specific lethality from leachate - moderate toxic risk, but not significant

Research and Chemical Analysis - Environmental and Health Risk

"Follow-up Study of the Environmental Aspects of Rubber Infill, A Laboratory study (perform weathering tests) and a field study, rubber crumb from car tyres as infill on artificial turf"
INTRON, commissioned by two tyre associations, and supervised by the National Institute for Public Health and Environment and by the Ministry of Housing, Spatial Planning and the Environment in the Netherlands, April 2008

"The impact of weathering of the rubber crumb for the technical lifetime of an artificial turf field (approx. 10 to 15 years) does not cause the leaching of zinc from the rubber crumb...to exceed the threshold values..."

"Ambient Air Sampling for PAH's, Comsewogue High School Football Field"
"Ambient Air Sampling for PAH's, Schreiber High School Football Field"

In response to a news report that the above fields had three cancer-causing chemicals that were in excess of state (NY) safety levels, this independent environmental consulting and testing firm tested the fields to determine the potential routes of exposure for athletes, coaches, etc. using these fields. Broderick & Associates concluded that the potential for exposure to PAH’s (sometimes referred to as an exposure to out-gassing or off-gassing of chemicals from crumb rubber infill) is “minimal or insignificant.”

Environmental and Health Evaluation of the Use of Elastomer Granulates (Virgin and from Used Tyres) as Filling in Third-Generation Artificial Turf"
Author: Dr. Robert Moretto (EDEMS) 1 ADEME/ALIAPUR/FIELDTURF TARKETT 2007 Scientific long-term study for French organizations

Study of quality of water passing through SBR, TPE and EPDM granules, and of gases emitted by the sports fields. No impact from these materials on water resources; no effect on health from inhaling VOC and aldehydes emitted by materials in close, poorly ventilated indoor facility or outdoors; ecotoxicologically, no impact on the environment. Extensive bibliography.

"Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products"
Office of Environmental Health Hazard Assessment of California EPA, January 2007

Evaluation of toxicity due to ingestion based on existing literature - risk is well below de
minimus level considered an acceptable cancer risk.

Evaluation of toxicity due to ingestion based on gastric digestion simulation - same as above.

Evaluation of toxicity due to chronic hand-to-surface-to-mouth activity - low risk of adverse noncancer health effects. Slightly higher than de minimus level for chronic ingestion of chrysene, but low enough to be considered an acceptable cancer risk.

Skin sensitization - no sensitization observed.

Evaluating the potential for damage to the local environment and ecology - soil samples under a playground surface burned in a fire contained levels of metals, VOCs, PAHs, dioxins and furans at or below background, suggesting low risk. Air above the burn site was judged by the U.S. EPA as posing no health risk. Concentrated leachate from tire shreds produced in a lab was toxic to several organisms, but a rain event would not likely produce leachate in such concentrations to cause toxicity to these organisms. Shredded tires used above the ground water table produced no toxicity in sentinel species.

"Environmental and Health Risks of Rubber Infill, rubber crumb from car tyres as infill on artificial turf"
INTRON, commissioned by two tyre associations, and supervised by the National Institute for Public Health and the Environment and by the Ministry of Housing, Spatial Planning and the Environment in the Netherlands, January 2007

"Based on the available literature on exposure to rubber crumb by swallowing, inhalation and skin contact and our experimental investigations on skin contract we conclude that there is not a significant health risk due to the presence of rubber infill... from used car tyres."

"Twenty Questions [and Answers] on Rubber Granulate"
Dr. Bryan B. Willoughby, March 2007
Prepared for the Sports and Play Construction Association (SAPCA)

Q & A summary in layman's terms. Published in conjunction with British Standards Institute and SAPCA.

"Rubber - Its Implications to Environmental Health (Hydrocarbon Rubbers)"
Dr. Bryan Willoughby, Independent Consultant in Polymer Chemistry, 2006
Presented by Synthetic Turf Council at its November 2006 Annual Membership Meeting

Presentation of chemical analysis of SBR rubber, and the likelihood that leachate containing PAHs, benzene, phthalates and alklyphenols, and zinc present a health or environmental hazard. Zinc presents a localized environmental risk, but all other risks judged insignificant.
"Artificial turf pitches - an assessment of the health risks for football players and the environment" - A Summary
Norwegian Institute of Public Health, Oslo, October 2006
Presentation by Dr. Christine Bjorge at the ISSS Technical Meeting 2006 in Dresden

See above. No elevated human health risk from use of indoor synthetic turf halls, from VOCs (more study needed), from benzene, from PAHs. Environmental risk is local. Perhaps risks from latex rubber, but not enough research.

"PAHs and Other Organics in Tyres - Origins and Potential for Release"
Dr. Bryan G. Willoughby, Independent Consultant in Polymer Chemistry, June 23, 2006

Summary of exposure risks from inhalation, leachates, and skin contact.

"Artificial turf pitches - an assessment of the health risks for football players"
Norwegian Institute of Public Health and Radium Hospital, Oslo, January 2006

Nine exposure scenarios - inhalation, skin, and oral exposures to adults, juniors, older children and children.