



Natural Grass vs Synthetic Turf ***A Comparison of Construction*** ***And Yearly Maintenance Costs***

A Texas Multi-Chem White Paper



Great Sports Fields Start Here.



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INTRODUCTION

Most comparative data that has been published and ultimately used in sports field purchasing decisions in recent years is dramatically slanted by the synthetic turf manufacturers and/or construction companies. Decision makers in many organizations (many of them public school districts) are often told there is no choice in the matter when deciding how to spend their sports field dollars. All too often, when considering natural grass versus synthetic turf, the only decision being offered is to install a synthetic turf field, forcing organizations (and their tax payers) to take on more needless debt to pay for something that - in almost all situations - is not needed.

It's ironic that as public school administrators are attempting to deal with the real world effects of a weak economy and lower revenues, more and more money is being spent on synthetic turf field installations. To be clear, there are legitimate reasons for choosing to install a synthetic turf sports field. Cost is **NOT** one of these reasons; and yet vast amounts of misinformation about natural grass and synthetic turf costs is readily available to try and justify the selection of a synthetic turf playing surface.

In the most extreme cases, school athletic departments are coached to worsen the condition of their current natural grass field by purposefully increasing the amount of foot traffic on the field every day to try and make a better public case for synthetic turf. Tactics such as allowing more time for band practice on the field, opening up the field to more city youth sports organizations and events, as well as reducing any existing maintenance efforts on the field are used in an attempt to help persuade people that the current natural grass field should be eliminated.

Because the cost differences between natural grass and synthetic sports turf are so great, it's important that the people faced with making athletic field purchasing decisions have as much factual information available to them as possible.

The information provided here is intended to be an accurate and unbiased comparison and discussion of construction and maintenance costs for high performance natural grass sports fields as compared to synthetic turf. It is based largely on our company's experience and knowledge acquired while building, renovating, and maintaining hundreds of quality natural grass sports fields all over Texas for more than 25 years. Customer interviews were also conducted to document the maintenance practices and costs for organizations responsible for managing synthetic turf fields in use today.



CONSTRUCTION COSTS

Synthetic Turf (Infill Type) - \$700K to \$1.2M

Most of the newer synthetic turf installations consist of a compacted subgrade soil, internal drainage with poly liner followed by a rock aggregate layer, synthetic turf (in rolls) then a crumb rubber or sand mix groomed into the synthetic grass surface. Inlaid lines, numbers, hash marks and logos are typical to most installations now, as well.

Upgrade Options

- **Cushion pad** between the grass and rock layer is an upgrade most manufacturers offer that provides a softer playing surface.
- **Herringbone Internal Drainage.** This system is an upgrade that catches internal water more efficiently and is deposited into the collector drains.
- **Turf Model Upgrades.** There are many grass upgrades to choose from. Coarse texture is less expensive than fine texture. Grass density upgrades are also available. Higher density means more expensive, requiring less infill.
- **Infill Material.** Options can vary from black crumb rubber to a silica sand and rubber mix. There are now lighter color, synthetic infill options claiming to help reduce ground temperatures which can be in excess of 140F degrees on a hot day.
- **Irrigation Systems.** Installed on the sidelines to help wash the field surface. Some sports facilities use water in an attempt to temporarily cool the surface, although many athletic training staffs try to avoid this claiming this creates a worse environment with higher humidity for players trying to cool down in excessive temperatures.
- **Colored End Zones and Logos.** These can be installed in any variety of school colors. Also, goal posts can be reused or new ones can be installed along with the new field surface.

Other Factors Affecting Price

- **Size of Existing Drainage Pipes and Catch Basins.** Since an infill synthetic surface percolates rain water quickly, the exit drains need to be sufficiently large enough to handle the water volume. Substantial drainage improvements may be required based on a site's existing capabilities.



CONSTRUCTION COSTS

Synthetic Turf (Infill Type) - \$700K to \$1.2M (con'td)

- **Freight.** Long hauls of rock material for base construction will be a huge budget item affecting the overall price.
- **Preparation of the Existing Surface.** Soil excavation and haul off of spoils varies from field to field. There is usually a large amount of topsoil that can be stockpiled and used for other projects.



CONSTRUCTION COSTS

Natural Grass (Sandy Soil) - \$120K to \$250K

Many sports field decision makers do not realize that there is a more scientific way to build natural grass playing surfaces now than in the past. Soil science has come a long way in the past 20 years as well as improved grass cultivars. A typical high performance sports field installation consists of a medium compacted subgrade soil, commercial grade irrigation system, internal drainage system, 6 to 8 inches of select sand-base rootzone mix and hybrid bermuda grass (sprigged or sodded in big roll form).

Upgrade Options

- **4 Inch Gravel Layer.** Installing this layer on top of the subgrade will dramatically improve the internal drainage capabilities of a field. If the gravel layer is used then an 8 to 10 inch rootzone would be needed.
- **Rootzone Amendments.** Peat, calcined clay and fiber soil stabilizers can be used to improve the overall quality of the soil.

Other Factors Affecting Price

- **Size of Existing Storm Drain System.** Most high quality natural grass fields can percolate anywhere between 3 and 10 inches of water per hour. The storm drain system must be sufficiently large enough to handle the water volume. Substantial drainage improvements may be required based on a site's existing capabilities.
- **Freight.** Large volumes of quality rootzone mix will have to be imported so freight costs for materials will be a huge budget item affecting the overall price.
- **Preparation of the Existing Surface.** This typically includes killing the old grass, stripping the grass and soil and the related haul off cost of the removed materials.
- **Irrigation Water Pressure / Volume.** Low water pressure and water volume may need to be improved for a high performance irrigation system. In some instances a booster pump may be needed or a larger supply line may need to be installed.



MAINTENANCE METHODS

Synthetic Turf

Most schools that were surveyed are performing minimal maintenance at the present time. These practices consist of sweeping, grooming the infill, trash and gum removal, repairing seams and occasionally washing soiled areas. A few schools are deep cleaning at least once per year usually followed by a disinfectant application.

At the college and professional level all of these maintenance practices are being performed at more regular intervals even though field traffic is much lighter than the typical high school field.

Many school districts in Texas have found that their synthetic surfaces start to show heavy wear patterns after the 4th and 5th years of service and need replacing after 7 to 8 years, even though they were told (and thus expected) that they would last at least 10 years.

School districts and colleges that have had to prematurely replace their turf are looking for ways to make these surfaces last longer. Surveys conclude that deep cleaning, regularly scheduled grooming and cutting back on field traffic will make these surfaces last longer.

Deep cleaning is a process that removes some or most of the infill material, filters and removes dirt and debris, lays the infill back into the turf while grooming the synthetic grass fibers so they stand up properly. This process decompacts the infill so that the "cushion" feel is back in the surface and straightens the grass fibers which helps prevent fiber breakdown. It's not unusual to deep clean once or twice per year for heavily used fields.

Sweeping and grooming are normally performed weekly during the time of year when a field is most heavily used and less frequently during the slower periods. Trash pick up, removing gum, animal feces removal and sanitation are usually performed several times per week.

Seam maintenance is performed as soon as a problem is noticed by the maintenance staff responsible for the field.

Washing the field down with a sideline irrigation system (if available) would be preferred, as needed, during dry weather periods.



MAINTENANCE METHODS

Natural Grass

High performance natural grass sports fields require regularly scheduled maintenance practices. These practices include mowing, aerification, fertilization, pest and weed control and irrigation system maintenance. Painting boundary lines and logos are in-season chores normally performed by maintenance personnel.

During the growing season it is normal to mow every other day (Mon/Wed/Fri). Early spring and late fall mowing every third day (Mon/Thurs) is normal.

Aerification frequency can vary according to field use but to keep the field in pristine shape aerating 4 to 6 times per year would be normal.

Deep tine aerification and topdressing once per year during the off-season is normal for high use fields.

Fertilizer applications every 4 to 6 weeks during the growing season along with seasonal insect and weed control measures are necessary to keep natural grass sports fields performing at a high level.

Painting field lines are performed weekly in-season as well as logos for home varsity games.

Irrigation system maintenance check ups should be performed about every 3 months.



TOTAL COST COMPARISON

Years 1-5

Natural Grass



\$393 K

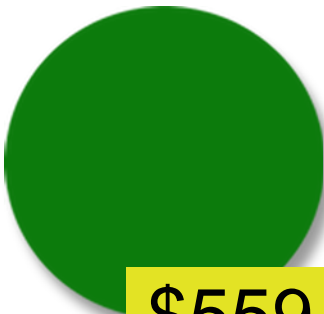
Synthetic Turf



\$936 K

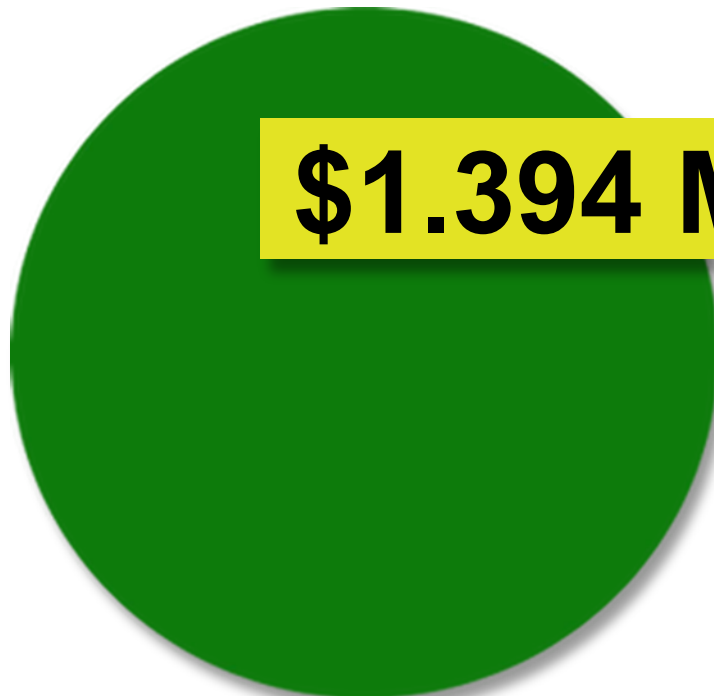
Years 6-10

Natural Grass



\$559 K

Synthetic Turf



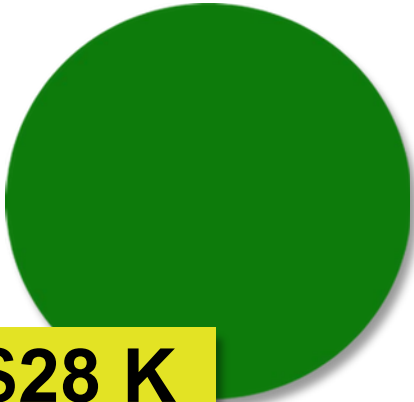
\$1.394 M



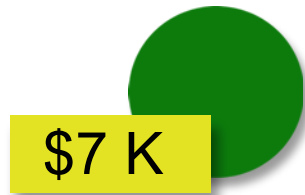
AVERAGE YEARLY MAINTENANCE & OPERATION COST COMPARISON

Years 1-5

Natural Grass

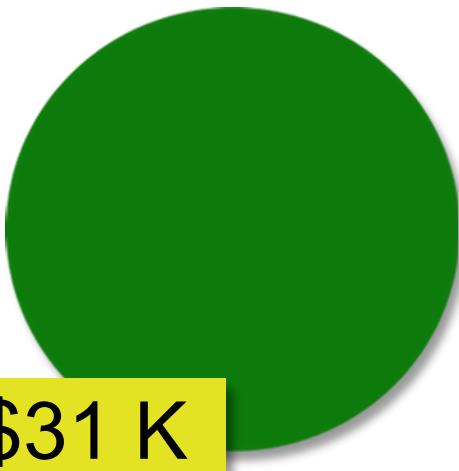


Synthetic Turf

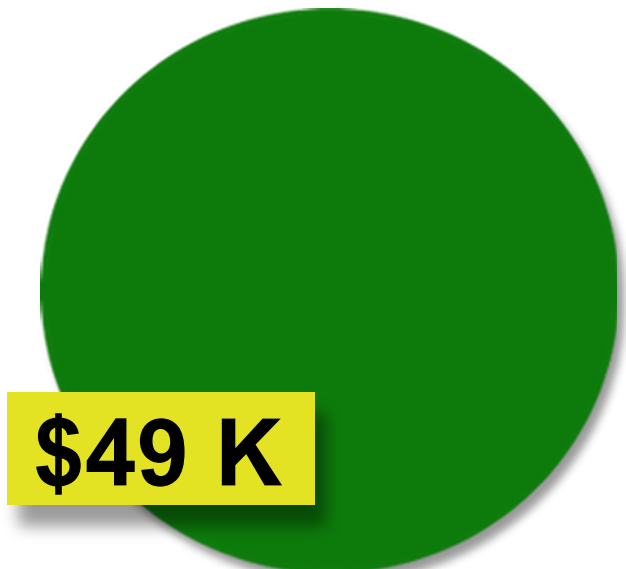


Years 6-10

Natural Grass



Synthetic Turf



COST COMPARISON BREAKDOWN

Years 1-5

Natural Grass	Item	Synthetic Turf
\$250,000	New installation of football field	\$900,000
\$26,460	Maintenance Labor	\$9,100
\$43,050	Materials	\$0
\$11,000	Outsource Services	\$17,500
\$17,500	Maintenance Equipment (amortized)	\$10,000
\$45,360	Irrigation Water	\$0
\$28,674	Avg Yrly Maint & Ops Cost (Years 1-5)	\$7,120
\$393,370	5 Year Total Cost (Out of Pocket)	\$936,600

Years 6-10

Natural Grass	Item	Synthetic Turf
\$250,000	New installation of football field	\$900,000
\$54,243	Maintenance Labor	\$18,655
\$88,253	Materials	\$0
\$22,550	Outsource Services	\$32,735 *
\$35,875	Maintenance Equipment (amortized)	\$18,450
\$15,000	Major Field Maint or Renovation / Resurfacing	\$425,000
\$92,988	Irrigation Water	\$0
\$30,891	Avg Yrly Maint & Ops Cost (Years 1-5)	\$49,448
\$558,909	10 Year Total Cost (out of pocket) **	\$1,394,480

* No deep cleaning during the year the field is resurfaced

** Figuring 5% Inflation in Yrs 6-10

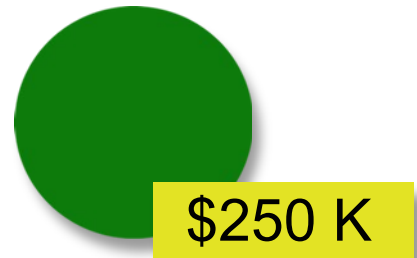


COST COMPARISON BREAKDOWN

New Field Installation Costs

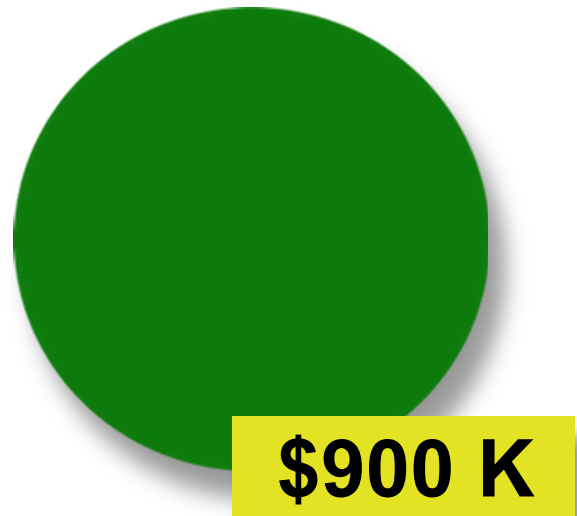
Natural Grass

- New internal drainage system
- New irrigation system
- Kill and remove old grass
- Install 6 to 7 inches of imported sand-based topsoil
- Close tolerance grading with laser grading system
- Plant solid sod hybrid bermuda
- Topdress new sod after installation



Synthetic Turf

- New internal drainage system
- Remove topsoil and grass
- Install base layers and gravel
- Install underlay pad
- Install new synthetic turf
- Install new infill/sand material

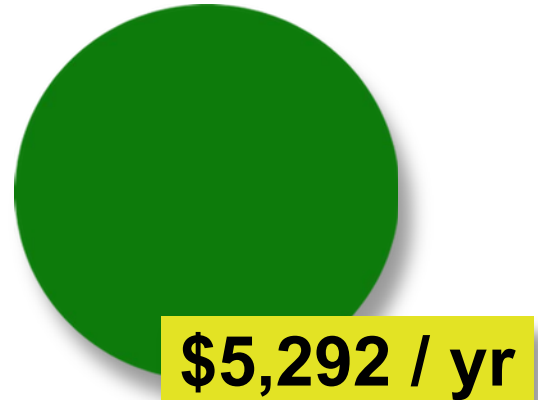


COST COMPARISON BREAKDOWN

Yearly Maintenance Labor Costs

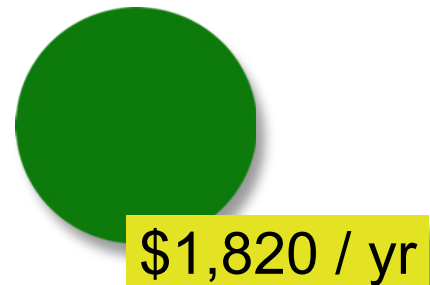
Natural Grass

Item ***	Cost
Mowing (130 hrs)	\$1,820.00
Painting	\$2,492.00
Aerification (5 times - 20 hrs)	\$280.00
Misc Labor (irrigation repair, fertilization - 50 hrs)	\$700.00
Total	\$5,292.00



Synthetic Turf

Item ***	Cost
Patching and Special Cleaning (52 hrs)	\$728.00
Sweeping (26 times - 52 hrs)	\$728.00
Grooming Infill Material (13 times - 26 hrs)	\$364.00
Total	\$1,820.00



*** Using an average maintenance wage rate of \$14/hour

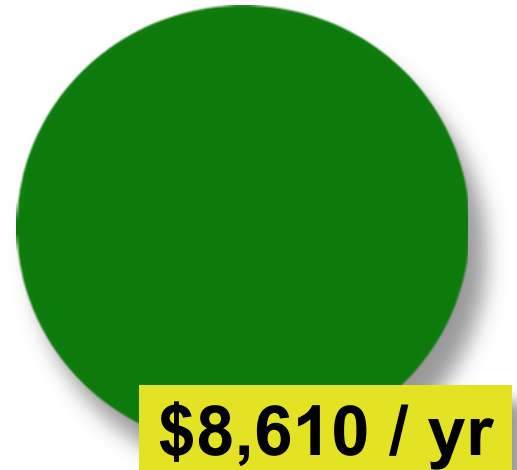


COST COMPARISON BREAKDOWN

Yearly Materials Costs

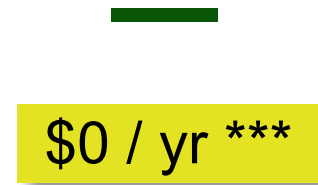
Natural Grass

Item	Cost
Fertilizers, Insecticides, Herbicides, Rye Seed	\$3,800.00
Field Marking Paint (120 gal)	\$1,560.00
Topdressing Sand (100 cu yds)	\$2,500.00
Special Turf Treatments	\$750.00
Total	\$8,610.00



Synthetic Turf

Item	Cost
Total ***	\$0.00



**** Note: Recommend purchasing some additional infill material to have on hand during the year to help maintain consistent levels on field*



COST COMPARISON BREAKDOWN

Yearly Outsourced Labor Costs

Natural Grass

Item	Cost
Deep Tine Aerification	\$1,200.00
Topdressing	\$1,000.00
Total	\$2,200.00



\$2,200 / yr

Synthetic Turf

Item	Cost
Deep Cleaning & Disinfecting	\$3,500.00
Total ***	\$3,500.00



\$3,500 / yr

**** Note: Not included in costs, but recommend having GMAX field test each year*

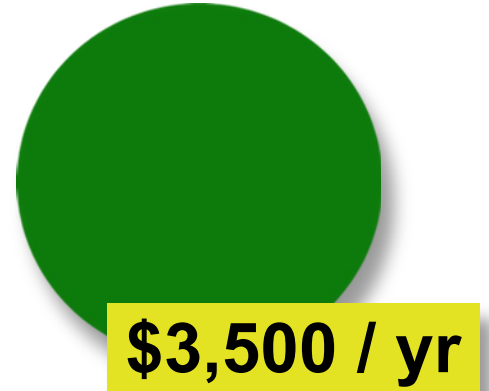


COST COMPARISON BREAKDOWN

Yearly Equipment Maintenance Costs (Amortized)

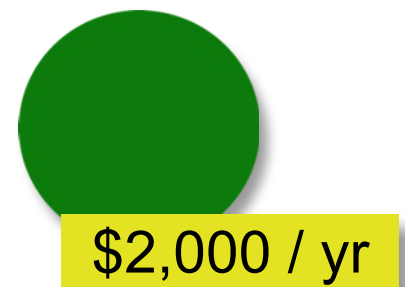
Natural Grass

Item	Cost
Triplex Reel Mower (\$22,000 / 10 yrs)	\$2,200.00
Aerator (\$9,600 / 12 yrs)	\$800.00
Service / Repairs on Equipment	\$500.00
Total	\$3,500.00



Synthetic Turf

Item	Cost
Groomer (\$12,000 / 10 yrs)	\$1,200.00
Sweeper (\$3,000 / 5 yrs)	\$600.00
Service / Repairs on Equipment (brushes)	\$200.00
Total ***	\$2,000.00

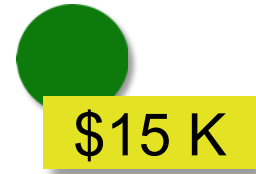


COST COMPARISON BREAKDOWN

Major Field Maint, Renovation, or Resurfacing

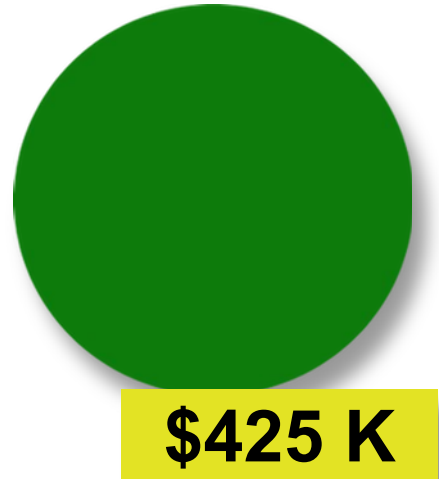
Natural Grass

Item	Cost
Minor Renovation, Resodding (If Needed)	\$15,000.00
Total	\$15,000.00



Synthetic Turf

Item	Cost
Turf and Infill Replacement (Resurfacing)	\$425,000.00
Total ***	\$425,000.00



***** Note: About every 8 years (some fields don't make it this long, a few will last longer) the synthetic turf and infill will need to be replaced. This will be a recurring expense for a facility with a synthetic turf field.**



COST COMPARISON BREAKDOWN

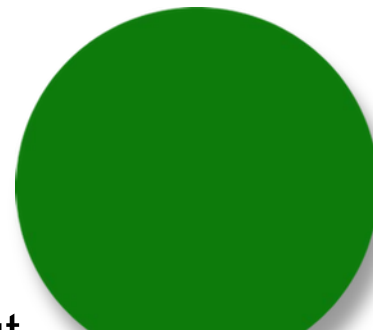
Yearly Irrigation Costs

Natural Grass

Water Needed Each Week (inches)	Months	Inches
1.00	Nov, Dec, Jan, Feb, March, April	26.00
1.25	May, June	11.25
1.75	July, Aug, Sept, Oct	29.75
	Total Water Needed For Year (inches)	67
	Less Avg Yearly Rainfall (inches)	25
	Adjusted Total Irrigation Water Needed (inches per year)	42
	Total Irrigation Water Cost Per Year	\$9,072.00

Irrigation Water Notes

It takes ~27,000 gallons to water 1” over 1 acre. Assuming the average cost of water is **\$4 per 1000 gallons** (on the high side), a quality natural grass football field would require about **2,268,000 gallons** of water per year.



\$9,072 / yr



WHEN IS SYNTHETIC TURF A LEGITIMATE OPTION?

High Traffic, No Other Fields Available

As stated earlier in the Introduction, there are legitimate reasons where choosing a synthetic turf field over natural grass can make sense. The most obvious reason is that a field that will be in constant use for various practices, games, and various other events. Compounding the problem is the fact that there are no other fields available for which to distribute the traffic. High quality natural grass fields need some time to recover from usage. In these situations where it's clear a natural grass field will have such high traffic on it and there are no other fields to use, synthetic turf may make the most sense. Of course, with such high activity, scheduling conflicts for field access will quickly become a problem especially at larger public high schools, thus naturally creating a very real need for the construction of additional fields.

Most public school districts do have other fields available for use throughout the school year, thus affording them ability to effectively manage traffic on their game field (even those schools that play a spring soccer schedule on the football game field). Only in rare situations are high schools "land locked" within in a city and cannot affordably expand their athletic field footprint as needed.

Water Issues

The other main reason for considering a synthetic turf surface has to do with water. Poor irrigation water quality and/or an overall lack of affordable irrigation water for a natural grass sports field can make synthetic turf a more viable choice. Some municipalities have such poor irrigation water quality that it makes it very difficult and expensive to grow and maintain great sports turf. In extreme cases, the inability to water sports fields at all due to state and local hyper-regulation of natural resources may force an organization or school district (and the taxpayers) to absorb the higher price of synthetic turf.

A Note About Reclaimed Water

Many counties and cities are beginning to invest more in reclaimed water infrastructure. Using reclaimed water to irrigate sports fields is a great way to make water consumption more sustainable as well as being significantly cheaper when compared to a standard city water supply. As efforts increase to bring more reclaimed water to market, public school districts and organizations with athletic fields can continue to properly irrigate their natural grass sports turf at a cheaper price, with the bonus of increased sustainability.



WHEN IS SYNTHETIC TURF A LEGITIMATE OPTION? (cont'd)

It's unfortunate that counties and cities are not farther along in providing a quality reclaimed water source to their constituents. Increasing the availability of this new alternative would help school districts and organizations (that have an interest in quality sports fields) avoid having to spend significantly larger sums of money on synthetic turf installations.



SUMMARY

As public school districts and other organizations seek to improve their athletic fields, the people responsible for making the final purchasing decisions should have access to the best information available. The process of choosing between a high quality natural grass or synthetic turf sports field should not be dominated by any particular industry. In all but the most unique situations, there is a choice to be made.

When comparing the costs to install and maintain natural grass and synthetic turf sports fields, the difference is clear - natural grass sports fields hold a significant advantage. Attempts at using long-term cost savings as a central argument in this decision should be met with considerable scrutiny. Those in favor of choosing to go with a synthetic turf surface must look to justify their decision for reasons other than cost savings.

