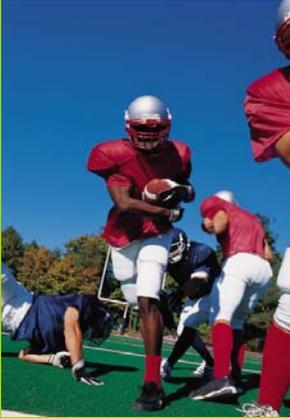


# Engineering Benefits

## Problem Avoidance

Our playbook consists of plays that work. Proper engineering techniques and procedures coupled with effective project management reduce the risk of major problems on a project.



## Better Vendor Selection

Our vendor selection process helps us bring aboard the best draft picks. Our processes make the selection more objective rather than subjective.



## School Administration Support

We have specialized expertise in this area. We support your educational staff. You do what you do best, and we do what we do best.



# Statement of Qualifications Artificial Turf Playing Surface



Enprotec / Hibbs & Todd, Inc.  
402 Cedar Street  
Abilene, Texas 79601  
325.698.5560

[www.e-ht.com](http://www.e-ht.com)



Enprotec / Hibbs & Todd

## Statement of Qualifications for Artificial Turf Playing Surface

Dear School District Official:

Enprotec, Hibbs & Todd, Inc. (eHT) is pleased to provide our Statement of Qualifications for your consideration. In order to make our objective clear, we would first like to discuss the services that our company provides for these types of projects. eHT is a professionally licensed Civil and Environmental Engineering firm that employs experts in the design and construction management of a wide variety of improvement projects. One area we have expertise is the design and construction management of Granular-Infill Synthetic Turf projects. Our firm is a leader in the State of Texas in this field and currently works with schools across the state.

The scope of work for turf fields, i.e. soil stabilization, earthwork, compaction, drainage, gradations, etc. falls within the expertise of Civil Engineering. *Competitively bidding various turf companies without engineering the field, is equivalent to bidding construction services for structures without a plan.* It leaves you wide open for a number of pitfalls. Our company is leading the way to educating clients about the importance of engineering their turf fields. By utilizing a civil engineer and treating the turf installation as other professionally designed projects, you will realize a number of benefits:

### Quality Field Design

Proper engineering techniques and procedures, coupled with effective project management and materials testing procedures can reduce the risk of major problems on a turf project, and typical problems associated with non-engineered fields.

### Quality Turf Materials

All turf fields are not the same. Our company has researched turf manufacturers and we understand what materials make up a quality field. As an engineering consultant, we wanted to understand and research the manufacturing process to know which materials were the best quality, stood up to wear and tear, and provided the best value for clients. Based on our research and expertise, we have developed product specifications and engineering plans for turf systems that function and endure to best serve school districts.

*Environmental, Civil & Geotechnical Engineers*

#### Abilene Office

402 Cedar  
Abilene, Texas 79601  
P.O. Box 3097  
Abilene, Texas 79604  
325.698.5560 | 325.691.0058 fax

#### Lubbock Office

6310 Genoa Avenue, Suite E  
Lubbock, Texas 79424  
806.794.1100 | 806.794.0778 fax  
[www.e-ht.com](http://www.e-ht.com)

#### Granbury Office

Avalon Town Center  
1030 East Highway 377, Suite 200  
Granbury, Texas 76048  
817.579.6791 | 817.579.6114 fax

### Qualified Turf Contractors

By utilizing professional engineering services, the process for contractor qualification is greatly enhanced. Contractors bidding the turf field will be screened for experience and competence. Competitive bidding also helps the district to realize the best value for their budget.

eHT is strictly a Civil Engineering firm and we do not sell or install artificial turf. We provide engineering design and specify fields that meet a minimum standard. Our design and specifications require all companies to provide products and perform construction activities in a similar manner. We compile the design drawings and specifications into a "Request for Sealed Proposals" bid packet and assist the client in soliciting all turf companies who market in the State of Texas. This document puts all proposing companies on a level playing field and results in apples-to-apples proposals. The goal in this process is to procure a top quality field at the best price possible. Thereafter, we provide project management, inspection, and materials testing and in every way work with the Client and the Contractor to see that the field has been constructed per the Contract Documents.

In addition to this brochure, please review our white paper on turf fields; it provides a comparative study and answers many key questions with regard to turf installation. We know you will find it beneficial.

We hope to serve you and look forward to the opportunity to work with you on your field project.

Sincerely,

**Enprotec/ Hibbs & Todd, Inc.**



James David Todd, P.E., President

## A. Company Profile



### Enprotec / Hibbs & Todd, Inc. (eHT, Inc.)

#### Corporate Headquarters

402 Cedar Street  
Abilene, Texas 79601  
(325) 698-5560

#### Regional Offices

6310 Genoa Ave., Suite E  
Lubbock, Texas 79424  
(806) 794-1100

Avalon Town Center, Suite 200  
1030 East Highway 377  
Granbury, Texas 76048  
(817) 579-6114

#### Geotec Labs

402 Cedar Street  
Abilene, Texas 79601  
(325) 698-5563

1470 Loop 306, Suite D  
San Angelo, Texas 76904  
(325) 651-7192

From its *corporate* offices in Abilene, Texas, eHT manages regional offices across Texas. We are dedicated to our mission and the superior engineering consulting services we provide to our clients.

## Principals / Titles

David Todd, P.E., President  
Scott F. Hibbs, P.E., Principal  
Aubrey A. Spear, P.E., Principal

Our in-house capabilities consist of civil, environmental and geotechnical services for a varied range of clients. We will handle in-house, the design and geotechnical services. This gives us better control of the quality of the delivered project by maintaining a participating role in every step of the design.

## Point of Contact

The following individuals are main points of contact for this statement of qualifications:

David Todd, P.E., President, dtodd@e-ht.com

Mr. Todd may be reached at 325.698.5560 or via e-mail.

### *Client Vision Statement*

*Our goal is to be an organization where we attract clients with whom we can create enduring relationships. We want our clients to feel that we care about them personally and to view our people as being knowledgeable (experts) and honest. We desire to be a "user friendly" company, providing clear, informative communication and quality work. We define product quality as timely, accurate, and complete work. We define service quality as being dependable, trustworthy, and confident in our work.*



## B. Statement of Qualifications



### Availability of Personnel

eHT has a unique personnel profile. We are a company of civil and geotechnical engineers, scientists, construction materials testing personnel and labs, surveyors, construction inspectors and regulatory and operations specialists. Our distinctive company profile helps us to provide turn-key services for engineering turf fields. We test the soils in-house and engineer appropriate under drainage specific to soil characteristics. This process goes a long way to prevent typical drainage problems associated with turf fields.

### Personnel Profile

Civil/Environmental Engineers	12
Geotechnical Engineer	1
Chemical Engineer	1
Hydrogeologists/Geologists	6
Regulatory Specialists	2
Construction Materials Testing	4
Operations Specialist	2
Construction Inspectors	5
Surveyors	5
Technicians	4
Administrative	13
<b>Total Personnel</b>	<b>55</b>

The scope of work for turf fields, i.e. soil stabilization, earthwork, compaction, drainage, gradations, etc. falls within the expertise of Civil Engineering. *Competitively bidding various turf companies without engineering the field, is equivalent to bidding construction services for structures without a plan.* It leaves you wide open for a number of pitfalls. Our company is leading the way to educating clients about the importance of engineering their turf fields. By utilizing a civil engineer and treating the turf installation as other professionally designed projects, you will realize a number of benefits: **quality engineered field design** specific to the area's soil type providing better drainage and serviceability, **specification of quality turf materials** so that all contractors/suppliers are bidding the same materials and competitively bidding those materials, **qualification of turf contractors/suppliers** to help the district make the best value determination with regard to experience and price.

### Geotechnical Services

Our advanced professional investigations provide data necessary to solve a wide variety of geotechnical problems. We use truck-mounted drilling units, in-house testing of soil and construction materials, and the latest in field sampling equipment.

These investigations help determine foundation types, depths, allowable loadings and construction observation requirements for all types of structures.

Our geotechnical expertise lies in:

- Exploration borings
- Drainage for turf fields
- Pavement design and evaluation
- Roadway and parking lot upgrades
- Airfield pavements
- Settlement studies
- Lateral soil pressure studies
- Foundation designs

All turf fields are not equal. Our company has researched turf manufacturers and we understand what materials make up a quality field. As an engineering consultant, we researched the manufacturing process to evaluate the best quality materials, assessed performance with regard to normal wear and tear, and rated them according to the best value for clients. Based on our research and expertise, we have developed product specifications and engineering plans for turf systems that function and endure to best serve school districts.

## Abilene ISD, Shotwell Stadium



Construction Cost: \$1,090,000  
 \$788,000-Stadium Field  
 \$302,000-ADA Compliance & Miscellaneous

Field Size: 95,000 s.f.

Client Contact: Glenn Petty  
 Athletics Director  
 325.671.4076

Contractor/Turf Company: SafePlay International

Client Recommendation  
 May 22, 2003

This letter is to candidly and emphatically express my opinion and experiences as the Athletic Director for the Abilene ISD regarding our association with Hibbs and Todd, Inc.

For the past year I have been very closely involved with Hibbs and Todd, Inc. through the renovation of Shotwell Stadium. Shotwell is the site for our school district's high school football and soccer games, as well as games for Abilene Christian University, playoff games, and other events.

The Abilene ISD chose to employ Hibbs and Todd to work with us throughout the \$1.1 million Shotwell Stadium renovation project, and it was the best decision we made when undertaking this project. I would not only strongly recommend an engineering firm for such

Client	Met Schedule	Met Budget
Abilene ISD	✓	✓
Andrews ISD	✓	✓
Canyon ISD	✓	✓
Dyess AFB	✓	✓
Everman ISD	*	*
Hallsville ISD	✓	✓
Longview ISD	✓	✓
Pecos ISD	✓	✓
Rogers, AR Public Schools	*	*
Socorro ISD	*	*
Tarleton State University	✓	✓

*\*in Design*

projects, but also enthusiastically recommend Hibbs and Todd.

The engineers at Hibbs and Todd have been unbelievably helpful, cooperative, resourceful, and beneficial to all of us associated with this project. It has been very obvious they have gone the extra mile for us. Even though they were involved with a number of other ongoing projects at the same time as ours, from day one of our project they have worked with us as though we were the only client they had. They have provided us on-going, continual service and assistance as well as having been instantly responsive to our needs and requests. There have been NO negative, doubtful, or problematic circumstances whatsoever between the Abilene ISD and Hibbs and Todd throughout this project; quite the contrary—it has been and still is outstanding.

From the beginning our administration and maintenance staff quickly developed a tremendous respect for their professionalism, knowledge, and friendly style of doing business. Our stadium renovation was a huge success, and the project continues to benefit from their expertise and assistance.

Sincerely,

Glenn Petty, Athletic Director  
Abilene ISD

## Andrews ISD, Mustang Stadium



Construction Cost: \$456,000  
Field Size: 100,000 s.f.  
Client Contact: Tom Carroll  
Assistant Superintendent  
432.523.3640  
Contractor/Turf Company: SRI, Inc.

Client Recommendation  
January 21, 2004



I'd like to take this opportunity to express my sincere appreciation to your firm for the outstanding job they did on our turf project this past year.

The extensive planning, development and on-site supervision, that your company provided proved to be invaluable to our district.

I also feel that Jeff Bresee deserves special recognition for his dedication and efforts on this project. Mr. Bresee went "above and beyond" what was expected of him to make sure this project was successful and that Andrews I.S.D. was satisfied. The endless hours he spent, in order to deliver the "best product available", have not gone unnoticed.

I would highly recommend Hibbs and Todd to any school district or business that is in need of engineering services.

Respectfully,

Tom Carroll  
Assistant Superintendent of Operations  
Andrews Independent School District

## Canyon ISD, Kimbrough Stadium



Construction Cost: \$595,000  
*\$524,000-Stadium Field*  
*\$ 71,000-Retaining Wall & Indoor Practice Turf*

Field Size: 95,000 s.f.

Client Contact: Mike Wartes  
Assistant Superintendent  
806.677.2600

Contractor/Turf Company: VibraWhirl

## Dyess AFB

Construction Cost: \$350,000

Field Size: 61,300 s.f.

Client Contact: Ron Miller  
Director of Contracting  
325.696.3685

Contractor/Turf Company: Turf Technologies,  
San Diego, California

## Everman ISD

Estimated Construction Cost: \$530,000

Field Size: 97,000 s.f. Turf

Client Contact: Gary Emery  
Director of Maintenance  
817.568.3500

Contractor/Turf Company: Design Phase

## Hallsville ISD

Construction Cost: \$475,000

Field Size: 80,000 s.f. Turf

21,000 s.f Asphalt &Track Surface in  
D-Zones

Client Contact: Greg Wright  
Superintendent  
903.668.5590 ext. 5000

Contractor/Turf Company: VibraWhirl

## Longview ISD

Estimated Construction Cost: \$470,000

Field Size: 99,100 s.f.

Client Contact: Rick Malloy  
Director of Facilities  
903.753.4512

Contractor/Turf Company: VibraWhirl

## Pecos ISD

Construction Cost: \$517,000 including resurfacing  
adjacent track

Field Size: 90,200 s.f.

Client Contact: Don Love  
Superintendent  
432.447.7201

Contractor/Turf Company: Field Turf

## Rogers, AR Public Schools

Estimated Construction Cost: \$500,000

Field Size: 82,000 s.f. Turf

21,000 s.f. Asphalt Surface in D-Zones

Client Contact: David Cauldwell  
Business Manager  
479.636.3910

Contractor/Turf Company: Bid Letting Phase

## Socorro ISD

Estimated Construction Cost: \$520,000

Field Size: 95,000 s.f. Turf

Client Contact: Tom Eyeington  
Assistant Superintendent, Operations  
915.937.0381

Contractor/Turf Company: Design Phase

## Tarleton State University

Construction Cost: \$475,000

Field Size: 94,000 s.f.

Client Contact: Aaron Wand  
Facilities Planning Manager  
254.968.9967

Contractor/Turf Company: Progreen



C. Background, current workload and available personnel.



Enprotec/Hibbs & Todd (eHT) is a multi-disciplined civil, environmental and geotechnical engineering team with a core group of engineers specifically focused on turf engineering projects. Our experience with regional construction materials and methods allows contractors to bid successfully on our turf projects, thereby helping to *prevent* any unnecessary increases in construction costs. In addition, our detailed knowledge of the construction and installation practices of turf contractors also allows us to maintain a fast paced construction schedule and circumvent unnecessary construction delays.

- ✓ Perhaps the biggest advantage of hiring eHT is *time*. Our team is ready to proceed immediately on your project. With our history of experience, we have developed a system of delivery that saves time allowing us to move quickly into the design phase once notified of a contract award.

Further, you will enjoy working with our knowledgeable, helpful and friendly staff. Our company will represent you well and take professional care of your project.

**Current Projects Under Construction**

Client	Design	Construction	Bid Letting
Dyess AFB		✓	
Longview ISD		✓	
Pecos ISD		✓	
Tarleton State University		✓	
Hallsville ISD		✓	
Rogers, AR			✓
Socorro ISD	✓		
Everman ISD		✓	

**Key Staffing**

Principal & Contract Administrator: David Todd, P.E.  
 Drafter(s): In-house and through Kuna Drafting consultant, Abilene, Texas

Our available staff includes 12 civil engineers, 1 geotechnical engineer, 5 construction inspectors, surveyors, 3 drafting personnel, and related administrative support.

**James David Todd, P. E.**

**Project Manager**

BS, Civil Engineering, Texas A&M University  
 Mr. Todd has 30 years of solid experience in civil and surveying design and manages numerous projects including synthetic turf fields, pavement and airport design, irrigation design, wastewater reuse, private development and park development.

**Scott Yungblut, P. E.**

**Geotechnical Engineer**

BS, Civil Engineering, University of Texas at Arlington  
 Mr. Yungblut performs engineering analysis and design on geotechnical and construction materials testing projects throughout Texas. He supervises engineering, field and laboratory staff and activities for construction materials testing and geotechnical projects, including exploration borings, soil settlement studies, foundation design and soil property evaluations.



## D. Professional Services

Our firm can provide all services to engineer the field in-house. We would recommend the same process for field design as you would for a building project. By engineering the field and then bid letting it to contracting companies and turf suppliers you will reap the following benefits:

### *Quality Field Design*

Proper engineering techniques and procedures, coupled with effective project management and materials testing procedures can reduce the risk of major problems on a turf project, and typical problems associated with non-engineered fields.

### *Quality Turf Materials*

All turf fields are not the same. Our company has researched turf manufacturers and we understand what materials make up a quality field. As an engineering consultant, we wanted to understand and research the manufacturing process to know which materials were the best quality, stood up to wear and tear, and provided the best value for clients. Based on our research and expertise, we have developed product specifications and engineering plans for turf systems that function and endure to best serve school districts.

### *Qualified Turf Contractors*

By utilizing professional engineering services, the process for contractor qualification is greatly enhanced. Contractors bidding the turf field will be screened for experience and competence. Competitive bidding also helps the district to realize the best value for their budget.

The following process will be utilized to deliver design, construction and contract management for turf projects:

#### A. Preliminary Engineering Report Phase

1. Attend pre-design conference
2. Advise School District regarding any additional services, if needed
3. Identify and analyze requirements of project
4. Provide analysis of the school district needs, planning surveys and site evaluations

5. Perform field design surveys
6. Perform soils and material investigations
7. Prepare Preliminary Engineering Report

#### B. Preliminary Design Phase

1. Refine general scope of project as defined in Preliminary Engineering Report
2. Attend meetings and conferences
3. Establish scope of special surveys boundary survey, or special tests
4. Prepare preliminary design documents
5. Review preliminary design documents with School District
6. Prepare Preliminary Cost Estimate

#### C. Final Design Phase

1. Refine general scope of project as defined in preliminary design phase documents
2. Obtain approvals of governmental agencies
3. Revise cost estimate
4. Prepare contract documents
5. Prepare for final review plans, specifications and contract documents
6. Revise final documents based upon review
7. Prepare construction management program
8. Attend meetings for final design matters
9. Make amendments to Preliminary Engineering Report to reflect revisions to the scope of project

#### D. Bidding Phase

1. Provide required number of copies of plans, specifications, and contract documents
2. Prepare "Notice of Bid" document
3. Conduct a pre-bid conference
4. Issue addenda as necessary to clarify bidding documents or amend quantities
5. Attend bid opening
7. Prepare bid tabulation
8. Consult and advise School District as to acceptability of contractors and subcontractors
8. Consult and advise School District concerning the acceptability of substitute materials and equipment
9. Make recommendation of selected contractor

**E. Construction Phase**

1. Conduct a preconstruction conference
2. Provide construction staking
3. Provide for resident inspection services
4. Make periodic visits to the site
5. Prepare routine change orders as necessary
6. Review submittals of samples, catalog data, schedules, shop drawings, mill tests and equipment
7. Prepare partial and final pay estimates
8. Conduct a final inspection

**F. Closeout Phase**

1. Prepare "As-Built" drawings
2. Provide assistance with financial closing
3. Provide a final test and quality control report
4. Furnish catalogs and warranties
5. Conduct an inspection prior to the expiration of warranty period

## E. Professional Liability Insurance

Our company maintains the following insurance through John Korman Insurance Agency:

- ✓ Professional Liability \$1,000,000
- ✓ General Liability \$1,000,000
- ✓ Automobile Liability \$1,000,000
- ✓ Workers Compensation \$1,000,000

F. Specialized services and supplemental services offered by eHT.

<i>Civil Engineering</i>
<b>Airport &amp; Highway Engineering Services</b>
Bridge and Culvert Design
Street and Highway Design
Paving Design
Master Planning
Airport Improvements and Planning
Park and Subdivision Planning
<b>Surveying &amp; Geotechnical Services</b>
Exploration Borings
Pavement Design /Evaluation
Roadway and Parking Lot Upgrades
Airfield Pavements
Settlement Studies
Lateral Soil Pressure Studies
Foundation Investigations
<b>Construction Management Services</b>
Construction Inspection and Start-Up
Partnering Facilitation
Construction Materials Testing
Quality Control and Assurance
Systems Operation Support and Training
Construction Materials Testing Services
Materials Sampling
Sieve Analysis
Moisture Contents
Core Sampling
Abrasion Testing
Soundness Testing
Slump Testing
Air Content Testing
Concrete Design
Hot Mix Design
Plant Inspection
Specific Gravity and Absorption
Plasticity Index
Proctor's
Field Density Testing
Concrete Beams and Cylinders
<b>Water Resources Services</b>

Groundwater Discharge Standards
Groundwater Field Development
Water Management Plans
Water Supply Wells and Systems
Water Distribution Systems
Groundwater Modeling
Water Treatment
Wetlands Protection
Planning And Zoning Impacts
Elevated/Ground Storage
Pump Stations/Systems

<i>Environmental Engineering</i>
<b>Storm Water Management Services</b>
Stormwater Retention/Detention Studies and Design
Stormwater Conveyance System Studies and Design
Dredging Studies and Design
Dams and Spillways Studies and Design
Spillways Studies and Design
TNRCC Dam Permit
TPDES Permits
Flood Control Systems
Erosion and Sedimentation Control
FEMA Flood Studies
<b>Wastewater Services</b>
Wastewater Treatment Plant Design
Discharge Permit Applications
Construction Inspection / Start-Up Training
Septic Systems
Wastewater Collection System Design
Wastewater Reuse Alternatives
<b>Solid Waste Services</b>
Landfill Design and Permitting
Solid Waste Planning
Landfill Construction Quality Control and Assurance
Soil Liner Evaluation Inspections and Reports
Landfill Closure/Post Closure Monitoring
Hazardous Waste Management Plans
RCRA Facility Permitting
TSD Facility Audits
<b>Air Quality Services</b>
Clean Air Act (Title V) Permitting
Emission Point Inventory
Air Quality Audits
Regulatory Compliance Audits
Air Permitting and Emission Source Definition



<b>Assessment Services</b>
Monitoring Programs
Feasibility Studies
Risk-Based Assessments
Air Quality Sampling
Water and Soil Sampling
Aquifer Testing
Soil Vapor Surveys
Subsurface and Groundwater Assessments
Phase I and II Transaction Assessments
Mold Assessments / Abatement Plans
<b>Remediation Services</b>
Corrective Action Plans
Feasibility Studies
Pilot Tests
Groundwater Recovery
Vapor Extraction
Bioremediation
Soil Venting
Air Sparging
Water, Soil and Air Treatment
Plume Stability Monitoring
Closure Plans
<b>Regulatory Compliance Services</b>
Process Safety Management
Risk Management Plans
Risk Management
Compliance Audits
Sara Title III Compliance
Regulatory Agency Interface
Expert Witness
Database Research
<b>Health and Safety Training Services</b>
OSHA Hazardous Waste Site Worker
OSHA Incident Command
OSHA Confined Space Entry
OSHA Hazardous Communication (HAZCOM)
Bloodborne Pathogen
Laboratory Safety
Health and Safety Audits
<b>Pollution Prevention Services</b>
Recycling and Resource Recovery
Waste Stream Reduction and Alternatives
Stormwater Management
Pollution Prevention Plans

## G. References

Abilene ISD  
Glenn Petty, Director of Athletics  
325.671.4076

Andrews ISD  
Tom Carroll, Assistant Superintendent  
432.523.3640

Canyon ISD  
Mike Wartes, Assistant Superintendent  
806.677.2600

Dyess AFB  
Ron Miller, Director of Contracting  
325.696.3685

Everman ISD  
Gary Emery, Director of Maintenance  
817.568.3500

Hallsville ISD  
Greg White, Superintendent  
903.668.5990, ext. 5000

Longview ISD  
Rick Malloy, Director of Facilities  
903.753.4512

Pecos ISD  
Don Love, Superintendent  
432.447.7201

Rogers, AR Public Schools  
David Cauldwell, Business Manager  
479.636.3910

Socorro ISD  
Tom Eyeington, Assistant Superintendent,  
Operations  
915.937.0381

Tarleton State University  
Aaron Wand, Facilities Planning Manager  
254.968.9967



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# *White Paper*

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PRESENTED BY ENPROTEC/HIBBS & TODD, INC.

## Granular-Infill Synthetic Turf Is It Worth The Cost?

HIBBS & TODD, INC.

402 Cedar Street  
Abilene, Texas 79601  
325.698.5660 | 325.691.0058 Fax  
[www.e-ht.com](http://www.e-ht.com)



Over the past few years, many Schools across the State of Texas and across the country have replaced their athletic field surfaces with technologically advanced Granular Infill Synthetic (GIS) Turf. To our knowledge, all of these schools have been satisfied with the product and would recommend its use to others. In the past, the cost of constructing this type of field has proven to be prohibitive to many schools. However, costs are decreasing making GIS Turf more attractive to even smaller schools.

The following GIS Turf benefit and economic analysis is based on our experience with design, specification, and installation oversight.

## GIS TURF BENEFITS

Natural grass fields that are properly watered and maintained typically provide adequate service. However, it is very difficult to maintain natural grass in a good condition when it is continually exposed to intense traffic related to sporting events. Most football fields experience significant deterioration towards the latter part of the playing season due to a combination of over usage and adverse weather. The middle portion of the field experiences the most deterioration becoming relatively unsafe for play.

### SAFETY

Serious turf related injuries generally fall under two categories: **rotation injuries to the legs** and **head to ground impact** injuries. Turf burn is the primary minor injury related to turf. GIS Turf has proven to greatly reduce the risk of these injuries.

### LEG INJURY

Because of the granular nature of the infill used in GIS Turf, leg injuries due to a shoe or cleat binding during rotation are nearly eliminated. Granular rubber has a low degree of cohesiveness and therefore has little to no ability to lock or bind a shoe or cleat in place. As torsion is applied to

the shoe or cleat, the rubber granules give way allowing the foot to release. This principle is also true for well-maintained natural grass, but as the grass surface begins to deteriorate, so does the turfs ability to give and prevent injury.

### HEAD INJURY

The granular rubber infill used in GIS Turf will maintain a G-Max rating (measure of shock absorption) between 100 and 120, well below the allowable rating of 200<sup>1</sup>. Natural grass when properly maintained, typically has a G-Max rating of 120 to 130. However, areas of a field that are in poor condition can have G-Max ratings ranging from 150 to 220, or more. The likelihood of head to ground impact injuries is greatly increased as the condition of the field deteriorates.

### TURF BURN

Unlike its synthetic turf predecessor, GIS turf is relatively nonabrasive to the skin. Natural grass is also relatively nonabrasive, but again, as the field condition deteriorates, natural grass gives way to bare ground that is obviously much more abrasive.

### RELIABILITY

GIS Turf, when properly maintained, remains uniform and safe regardless of the amount of use and/or weather conditions it has experienced. Thus, GIS Turf offers a more reliable, year-round playing surface than natural grass is able to provide.

### DURABILITY & LONGEVITY

As stated above, natural grass fields can deteriorate significantly as a result of high usage and/or weather conditions. Most sports fans have witnessed how quickly a natural grass surface can almost disappear when there is heavy play on a wet field. Re-establishing the field surface thereafter can be nearly impossible until the next growing season. As a result, the amount of play

scheduled on a natural grass field usually must be limited in order to minimize turf deterioration.

GIS Turf is capable of “around the clock” usage. As long as the field is properly maintained, the surface remains uniform, safe and aesthetically pleasing, independent of usage during its anticipated lifespan.

The only major factor in GIS Turf deterioration is exposure to sunlight. It takes approximately eight (8) years of exposure to ultraviolet rays for GIS Turf to show signs of deterioration. Within 10 to 15 years the deterioration will progress and during that span, the turf will need to be replaced.

## GIS TURF ECONOMICS

### DECREASING CAPITAL COST

We have established that GIS Turf offers many benefits when compared to natural grass, but the cost to design and construct one of these fields is relatively high. However, these costs have fallen significantly over the past season. Consider a standard football/soccer field that measures between 90,000 and 95,000 square feet (s.f.) Historically, the cost to construct a GIS turf field with an under-drain system, and other miscellaneous required improvements, has been between \$7.50 and \$8.50 per s.f. or between \$700,000 and \$800,000. However, due to competition, mass production and design improvements these costs have fallen dramatically over the past year to approximately \$5.50 per s.f. or around \$500,000 per field.

- Construction of field \$500,000
- Engineering, Surveying, Project Management, Inspection and Material Testing \$55,000
- Total Cost to Construct Field \$555,000

### REDUCED MAINTENANCE COSTS

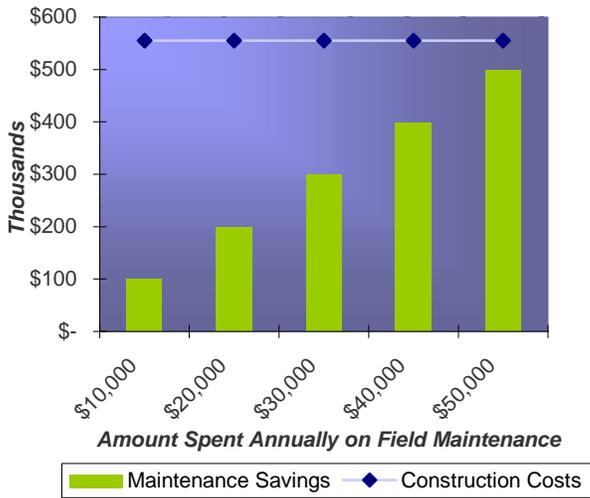
Once the GIS Turf is installed, it begins to offset the initial capital outlay as a result of reduced maintenance costs, but the question still remains, “Is it worth the cost?”

The life of a GIS Turf field is estimated to be between 10 and 15 years. The following evaluation assumes the life of a GIS Turf field to be 12 years.

By replacing natural grass with synthetic turf, the cost of field maintenance is reduced by eliminating watering, fertilizing, pest/weed control, re-seeding, mowing and striping. GIS Turf does require grooming, but instead of mowing the grass weekly or bi-weekly, synthetic turf needs only to be brushed every 4-6 weeks during periods of use. The amount a school may save in maintenance costs will vary. Assuming an inflation rate of 3.0% per year, the following chart shows the present value of maintenance cost savings that will be realized over a twelve-year period versus the costs of design and construction.

## Granular Infill Synthetic Turf

**Present Value of Turf Costs vs. Maintenance Savings Over One Life Cycle (12 Years)**



The degree GIS Turf will pay for itself in maintenance cost savings depends on the amount a school spends annually to maintain its natural turf field.

Regardless of the amount a school spends on field maintenance during the first life cycle period, GIS Turf will become more cost effective as it is used over additional life cycles. The cost for replacing the GIS Turf will be considerably less than the cost to construct the initial field, as the drain system and other field improvements are already in place. The following information illustrates the economic analysis of GIS Turf over two turf life cycles (24 years):

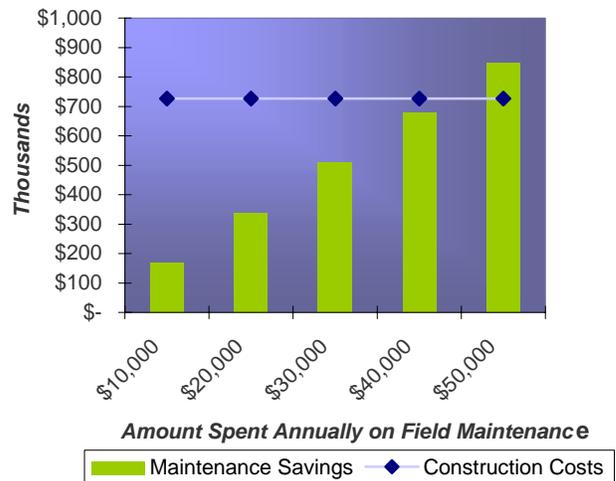
- Replacement of Turf \$230,000
- Engineering, Surveying, Project Management, Inspection and Material Testing \$15,000
- Total Cost to Replace Turf \$245,000

Once again, using an inflation rate of approximately 3.0% per year, the following can be calculated:

- Present Value of Construction Costs for Initial GIS Field & GIS Turf Replacement \$726,838

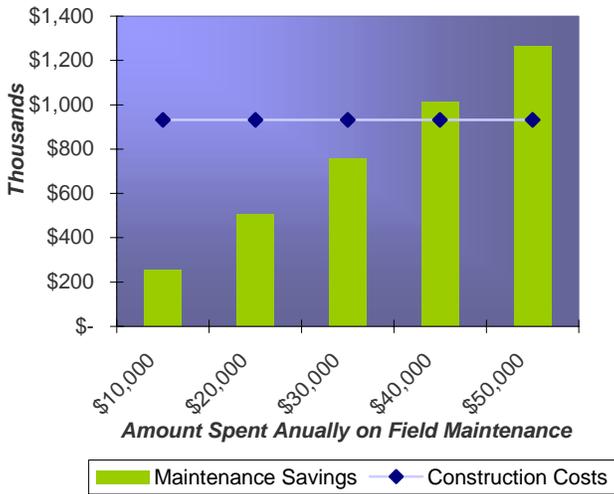
The following chart shows the present value of construction costs versus the present value of maintenance cost savings realized over the twenty-four year period. These are further compared with the present value of design and construction for both surfaces.

**Present Value of Turf Costs vs. Maintenance Savings Over Two Life Cycles (24 Years)**



Having illustrated that GIS Turf increases in its ability to pay for itself over time, consider the ultimate scenario. The under-drain system and miscellaneous field improvements constructed initially have an expected life of at least 50 years, or approximately 4 life cycles of turf carpet. Continuing the above calculations over a 48-year period of time yields the following chart for comparison.

**Present Value of Turf Costs vs. Maintenance Savings Over Four Life Cycles (48 Years)**



As shown, it can be assumed that GIS Turf may not pay for itself by maintenance savings alone, but in some cases it can pay for itself, and in all cases it provides a significant offset.

**ELIMINATING WATER COSTS & WATER CONSERVATION**

Periods of drought and conservation of diminishing water supplies are now key concerns for much of Texas. The maintenance savings illustrated above assumes that water is available in sufficient amounts to support adequate irrigation of the playing field. As many Texans and especially West Texans know, this is not always the case. Much of Texas has been experiencing the worst drought period on record. Under situations of water shortage, water costs can become much higher and/or water restrictions imposed making it near impossible to properly maintain a natural grass field.

When GIS Turf is installed correctly, it has the appearance of natural grass and is completely independent of water.

**ADDITIONAL ECONOMIC CONSIDERATIONS**

As GIS fields have become more predominant across the state, playoff football has gravitated heavily towards them because of their reliable nature. Natural grass fields are a limited usage field, and typically restricted to use during football season. Granular infill synthetic turf is a continual usage field, unharmed by the normal wear and tear factors of natural grass fields. The fields are marketable to adjacent communities for playoff games and other uses, thereby potentially impacting community economies. This report does not attempt to evaluate the economic impact of playoff games to a community, but we feel safe to say that they can be significant.

**SUMMARY**

Deciding whether Granular Infill Synthetic Turf is worth the cost is dependent on many factors. Enprotec / Hibbs & Todd, Inc. has shown that GIS Turf helps pay for itself as a result of reduced maintenance costs, and provides many other potential benefits. Each school must individually weigh the value of Granular Infill Synthetic Turf and decide if it is a sound investment for their school. Enprotec/Hibbs & Todd, Inc., a leading engineering design firm of GIS Turf fields in the State of Texas, has determined that GIS Turf is a viable alternative and a high quality product that can provide superior performance for a school for generations to come.

### About eHT

Enprotec and Hibbs & Todd (eHT) are integrated engineering firms serving the State of Texas, offering specialized services for a variety of civil, environmental and geotechnical projects. Our clients include a full range of private, industrial, municipal, state and federal agencies and entities. Our companies have a combined service total of 40 years in civil engineering. Additionally, we provide in-house geotechnical testing services and environmental engineering services.

Hibbs & Todd specializes in the design, specification and installation of granular infill synthetic (GIS) turf fields. We have explored various methods of turf manufacturing and worked with the turf industry to optimize the manufacturing design of GIS Turf. HTI has extensive knowledge of drainage and geotextile materials and methods to redesign the standard methods of GIS Turf drainage.

HTI also has expertise in the design, specification and installation of other athletic venues such as synthetic tracks, softball fields and baseball fields.

[www.e-ht.com](http://www.e-ht.com)

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<sup>1</sup>ASTM test: ASTM F 355 Test for Shock Absorbing Properties of Playing Surfaces and Materials