# SPECIAL BOARD OF EDUCATION MEETING

Tuesday, March 31, 2026 7:00 PM
Town Council Chambers
Glastonbury Town Hall
2155 Main Street
Glastonbury, CT 06033

1. Call to Order
2. Pledge of Allegiance
3. Information Session for Public Comment
4. Business Requiring Action
   A. Turf Field Construction at Glastonbury High School
5. Adjournment
   A. Please note: It is possible that the Board of Education may go into Executive Session

# How to Participate in Board of Education Meeting Public Comments

At this time, there are two options for participating in public comment during Board of Education meetings.:

**1) In-Person Comment.**

The Board sets aside thirty (30) minutes for public comments. Comments are limited to 3 minutes per speaker and a person may speak only once. Each speaker must start by stating their name and address. There will be a sign-up sheet in the back of the room. In-person meetings are held in the Town Hall Town Council Chambers, 2155 Main Street, Glastonbury, unless otherwise noted on the Board of Education Meeting webpage and the Board Meeting agenda.

**2) Written Comment.**

Use the form below to submit a written comment before 12 noon on the meeting day. Written comments are attached to the BOE Meeting Agenda.

**Public Comments for Glastonbury Board of Education Meeting**

| Timestamp | Your Full Name | Your STREET Address | Your Comment to be attached to the agenda of the next Glastonbury Board of Education meeting. NOTE: This field accepts up to 2500 characters. Please submit a second response to this form if you require additional text. |
|---|---|---|---|
| 3/29/2026 19:17:22 | Emery Santora | 191 Manchester Rd | Dear Members of the Glastonbury Board of Education,<br><br>I am writing to you today to strongly urge the Board to move forward with the installation of the two proposed new turf fields. First, I would like to sincerely thank the Board for your ongoing support of our student-athletes; your commitment to their success and well-being is deeply appreciated by the community.<br><br>As you consider this project, I would like to emphasize several key points in favor of proceeding now:<br><br>- Cost Efficiency: Completing both fields simultaneously offers significant cost savings. By consolidating the construction timeline and mobilization of resources, the town can avoid the inevitable price increases and redundant expenses associated with delaying the second field to a later date.<br>- Increased Access: The addition of these surfaces will provide much-needed relief for our athletic schedules, significantly increasing access for both high school teams and our various youth programs. This ensures more students have the opportunity to participate in sports without the constraints of limited field space.<br>- Safety and Reliability: In our region, weather can be unpredictable and harsh. An all-weather turf surface provides the safest possible practice environment by offering consistent, reliable, and durable conditions that grass fields simply cannot maintain under heavy use.<br>- Long-Term Community Benefit: Beyond the immediate athletic advantages, these fields represent a vital investment in our community infrastructure. They will serve Glastonbury for years to come, strengthening our athletic programs and enhancing the quality of life for families across the town.<br><br>I believe that moving forward with both turf fields now is the most fiscally responsible and impactful decision for the future of our students. Thank you for your time and for all that you do for the Glastonbury school system.<br><br>Sincerely,<br><br>Emery Santora |
| 3/29/2026 20:21:44 | Mei Chai | 372 Monaco ln | Thank the BOE for supporting student-athletes.<br>It is the most cost savings of completing both fields now instead of wait.<br>Field turf updating is increasing access for high school and youth programs.<br>And the long-term benefit to our community and athletic programs. As a football player's mom, safe playing is my first priority to my son, so please providing the safest possible practice environment — an all-weather turf surface allows for more consistent, reliable, and safer conditions in our region.<br>Appreciate! |

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| 3/29/2026 20:51:26 | Mark Sproule | 80 Jeremiah's Way | Dear Board Members,<br>I am writing in support of the replacement / installation of new turf fields at the High School. The additional fields will help to support multiple seasonal activities for both boys and girls, reduce risk of injury from worn / damaged natural fields, and increase student activity levels. Glastonbury is a great town with subpar facilities as compared with all Fairfield County schools. We have the opportunity to create additional facilities, comparable with other towns, and increase the options for children of all ages. I also believe, over time, the additions will save money which otherwise is spent on seasonal upkeep of grass fields.<br>Sincerely,<br>Mark Sproule |
| 3/30/2026 11:10:36 | Eric Hennessy | 220 Belle Woods Drive | Dear Members of the Glastonbury Board of Education,<br><br>Thank you for your continued commitment to our schools and for always focusing on what is best for our students.<br><br>From a financial standpoint, completing the full project including all three fields and the track resurfacing at once is the most responsible decision. Doing the work together avoids significantly higher costs in the future and ensures we make the most efficient use of community resources. Delaying portions of the project will ultimately cost more, which is not in the best interest of our community.<br><br>However, while the financial savings matter, the most important reason to move forward now is to provide the safest possible environment for our student-athletes.<br><br>Weather damaged grass fields create inconsistent and unsafe playing surfaces that increase the risk of injury. An all weather turf surface provides a consistent, reliable space for daily, year round use, improving safety for all athletes.<br><br>Reliable field access also allows practices to end at a reasonable time, giving students the opportunity to be home for dinner, complete schoolwork, and get proper rest, supporting both their physical and mental health.<br><br>High quality facilities for all teams also reinforce that every student-athlete is valued. Many sub varsity teams currently practice and compete on fields worn down from overuse and weather, which does not provide the same safe environment. Athletics are an extension of the classroom, and just like we would not place students in inadequate learning spaces, we should provide our athletic spaces with the same level of care and importance.<br><br>Investing in the physical and mental health of our students is never a bad decision. Completing this project now prioritizes safety, well being, and the overall experience of every student-athlete in Glastonbury.<br><br>Thank you for your time and consideration.<br><br>Eric Hennessy |

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| 3/30/2026 11:44:55 | Bernisha williams | 95 wyllys street | I support the funding for the resurfacing. There are so many benefits with this opportunity. One being the players mental health as it contributes to their self esteem and confidence o the field. When you feel great you perform well in all areas. It can also do the town some justice as it will lower maintenance costs compared to natural grass. |
| 3/30/2026 11:54:04 | Matthew Cartwright | 36 Douglas Rd | I strongly support fully funding the track resurfacing and turf field project for Glastonbury. Completing the entire project now is the most fiscally responsible decision and avoids higher costs in the future and I believe that if actions are taken now it will be financially smarter and investment for the community and the athletic programs in Glastonbury. More importantly, it provides a safe, reliable space for our student-athletes to train and compete year round. Weather damaged fields increase the risk of injury and limit access, often pushing practices late into the evening. This project improves safety, supports student well-being, and ensures all athletes have access to quality facilities. Investing in our students and our community always the right choice. |
| 3/30/2026 11:54:29 | Rich Pingel | 100 Wood Pond Rd., Glastonbury, CT 06033 | I strongly support fully funding the track resurfacing and turf field project. As a parent of a son who plays football, I've seen firsthand how important safe, reliable fields are, and our family fully supports the expansion of turf facilities. As the team's kicker, he frequently has to compete for limited space on the town's only turf field just to get the practice time he needs. A town like Glastonbury should have multiple turf fields to properly support both its student-athletes and the broader community.<br><br>Completing the entire project now is the most fiscally responsible approach, avoiding higher costs down the road. Just as importantly, it ensures consistent, year-round access to high-quality playing surfaces. Weather-damaged fields not only increase the risk of injury but also limit availability, often forcing practices later into the evening and creating unnecessary strain on students and families.<br><br>This investment enhances safety, supports student well-being, and provides equitable access to facilities for all athletes and community members. Investing in our students and community infrastructure is the right decision. Thank you! |
| 3/30/2026 11:55:18 | Jennifer Sproule | 80 Jeremiah's Way | I strongly support fully funding the track resurfacing and turf field project. Completing the entire project now is the most fiscally responsible decision and avoids higher costs in the future. More importantly, it provides a safe, reliable space for our student-athletes to train and compete year round. Weather damaged fields increase the risk of injury and limit access, often pushing practices late into the evening. This project improves safety, supports student well-being, and ensures all athletes have access to quality facilities. Investing in our students is always the right choice. We moved here in 2025 from Ridgefield, CT, a town with fewer students enrolled in the high school and far more turf fields, all of which were bustling with students of all ages. |
| 3/30/2026 11:55:56 | Shihao Ji | 372 Monaco ln | I strongly support fully funding the track resurfacing and turf field project. Completing the entire project now is the most fiscally responsible decision and avoids higher costs in the future. More importantly, it provides a safe, reliable space for our student-athletes to train and compete year round. Weather damaged fields increase the risk of injury and limit access, often pushing practices late into the evening. This project improves safety, supports student well-being, and ensures all athletes have access to quality facilities. Investing in our students is always the right choice. |

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| 3/30/2026 14:48:28 | Guy Budinscak | 277 old farms Rd, South Glastonbury, CT 06073 | I strongly support fully funding the track resurfacing and turf field project. Completing the entire project now is the most fiscally responsible decision and avoids higher costs in the future. More importantly, it provides a safe, reliable space for our student-athletes to train and compete year round. Weather damaged fields increase the risk of injury and limit access, often pushing practices late into the evening. This project improves safety, supports student well-being, and ensures all athletes have access to quality facilities. Investing in our students is always the right choice. My family believes that quality sport is essential to education and preparing our children for the future, and this project is essential. |
| 3/30/2026 16:14:15 | Thomas Gilday | 66 Partridge Landing | I strongly support fully funding the track resurfacing and turf field project. Completing the entire project now is the most cost-effective approach and will help us avoid higher expenses down the road.<br><br>More importantly, this project provides a safe and reliable space for our student-athletes to train and compete year-round. Damaged fields can increase the risk of injury and limit access, often pushing practices into late evening hours. By completing this project, we are improving safety, supporting student well-being, and ensuring that all athletes have access to high-quality facilities.<br><br>Investing in our students is always the right choice, and this project is a clear way to do just that.<br><br>Thank you for your consideration. |
| 3/30/2026 22:34:11 | Kenneth Gillingham | 91 Heritage Drive | Part 1/2<br>There are several statements worth clarifying in the FieldTurf responses:<br>-#2: There was a claim that EPDM has higher injury rates. This is incorrect and not based on any studies. EPDM is considered entirely on-par with crumb rubber.<br>-#4: It discusses testing being performed by FieldTurf. We obviously don't want to do this. We need a true third-party independent tester as we have evidence that FieldTurf has misled other towns.<br>-#14: The answer "No" provides no explanation and it is not clear what question it is responding to, so we can't really take this as a response. They have not ever said that they don't use PVDF or PVDF-HFP (or a variant) in the process, which most likely they do since that is the standard in the industry.<br>-#15: This is the most objectionable answer. There is so much evidence now that the PFAS and toxins contained in crumb rubber fields – and that have been demonstrated to leech out – are problematic to human health. Here are just a few of the many studies: (1) in the "Journal of Hazardous Materials" https://www.sciencedirect.com/science/article/abs/pii/S0304389420329897, (2) in the journal "Environmental Pollution" https://pmc.ncbi.nlm.nih.gov/articles/PMC10262297/, (3) in the journal "Environmental Challenges" https://pubmed.ncbi.nlm.nih.gov/36644410/, (4) in the top journal of environmental engineering ES&T https://pubs.acs.org/doi/full/10.1021/acs.est.4c00047, (5) an article in the International Journal of Environmental Research and Public Health on the mental health impacts of PFAS https://pubmed.ncbi.nlm.nih.gov/40724183/, (6) in the journal "Water, Air, and Soil Pollution" https://link.springer.com/article/10.1007/s11270-018-3711-7. |

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| 3/30/2026 22:36:24 | Kenneth Gillingham | 91 Heritage Drive | Part 2/2<br>Further clarifications to the FieldTurf responses:<br>-#16: The EU HAS indeed banned new crumb rubber fields with only remaining fields with contracts already signed allowed. No more are allowed to be put in after 2031, but basically almost everyone in the EU has transitioned to the organic options.<br>-#19: This question was not answered. The answer is that most fields are reused and not recycled.<br>-#20: No sources whatsoever were provided for the 4:1 grass to artificial turf contention. This is clearly not a reliable estimate. Something like 2:1 is more likely to be accurate, depending on the exact circumstances. Here is one source from a pro-turf advocate that uses the 2:1 number: https://galeassociates.com/wp-content/uploads/2019/02/Alternative-Infills-for-Synthetic-Turf-Fields-JMP.pdf.<br>- #21: An attached study that received funding from FieldTurf was included. There is one other FieldTurf-funded study that comes to a similar conclusion. Both have been critiqued for being either problematic or only narrowly applicable. All other studies that I am aware of come to a different conclusion. Here are some other studies: (1) knee sprains and ankle sprains on FieldTurf fields are 22% higher than grass https://journals.sagepub.com/doi/abs/10.1177/0363546512458888, (2) “the incidence rate of lower extremity injury was 1.22 injuries/game for natural grass and 1.42 injuries/game for artificial turf” https://pmc.ncbi.nlm.nih.gov/articles/PMC11363235/. This is probably the best and most objective source on turf vs grass injuries from Mass General: https://www.massgeneralbrigham.org/en/about/newsroom/articles/turf-vs-grass-fields-sports-injury-prevention. |
| 3/30/2026 22:46:27 | Kenneth Gillingham | 91 Heritage Drive | This is a must-read article for the BOE in the journal "Sustainability" from 2025 that does a very careful analysis of the key details of artificial turf. My main critique of the article is that it does not compare different forms of infill in a complete way as it should have. But I especially encourage the BOE to look at the cost comparison, which does a much more fair cost comparison to the ones that have been posted on the BOE website. Artificial turf is much more expensive and would have the resources to install and properly maintain two grass fields for every artificial turf field.<br><br>Here is the link, and the article is open-source:<br>https://www.mdpi.com/2071-1050/17/14/6292 |

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| 3/30/2026 23:46:54 | Clay Tabor | 100 Heritage Dr | Dear Board of Education,<br><br>As a Glastonbury resident and parent of a child who will attend Glastonbury Public Schools in a few years, I am concerned about the plan to implement artificial turf fields at our schools.<br><br>Most artificial turf systems, including those manufactured by FieldTurf, use crumb rubber made from recycled tires. This material can release a range of chemicals, including PAHs, VOCs, and heavy metals. Research has also identified the presence of “forever chemicals” in some fields, along with contribution to microplastic pollution. The available evidence suggests that these substances can be detrimental to human and environmental health.<br><br>Artificial turf is also a significant investment and far from a necessity. It is disappointing that public funds are being used for a project with potential risks to our children and environment.<br><br>Sincerely,<br>Clay Tabor |

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| 3/31/2026 9:19:27 | Jorge Montoya | 71 Heritage Drive | I am a parent of two children in this school district, and I appreciate the time and effort that has gone into evaluating improvements to our athletic facilities. I understand the goal of providing durable and accessible fields for students and the broader community.<br><br>However, at this time, I respectfully oppose the installation of a turf field. My concerns center around student health, environmental impact, and long-term sustainability. There continues to be uncertainty around the safety of synthetic turf materials, particularly related to heat retention and potential exposure to chemicals found in recycled tire infill. Turf fields can reach significantly higher temperatures than natural grass, which raises safety concerns and may limit use during warmer months.<br><br>In addition, there are concerns related to air quality. Synthetic turf fields can release certain compounds, and higher temperatures may increase these emissions. While research is still evolving, the combination of elevated heat and potential inhalation exposure raises valid questions, especially for children who would be using these fields regularly.<br><br>From an environmental standpoint, synthetic turf contributes to microplastic pollution and does not provide the natural cooling and absorption benefits of grass. Beyond that, I am concerned about long-term financial and liability risks. Historically, materials like asbestos and lead paint were once considered safe and cost-effective, only for us to later discover serious health consequences that required costly remediation. While synthetic turf is not the same, it serves as a reminder that decisions made today can carry unintended consequences in the future.<br><br>As a parent, I believe we should take a cautious and forward-looking approach. When there is uncertainty, particularly involving materials used daily by children, it is worth asking whether we are introducing unnecessary risk when safer, natural alternatives exist.<br><br>I encourage the district to continue investing in well-maintained natural grass fields and to pursue solutions that prioritize student safety, environmental responsibility, and long-term financial prudence.<br><br>Thank you for considering my perspective.<br><br>Jorge Montoya |

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| 3/31/2026 9:49:09 | Julie Fosdick Gillingham | 91 Heritage Drive | Dear Members of the Board of Education,<br>Thank you for engaging in important recent discussion of community concerns about the health risks of artificial turf. With all the new revelations about the proposed materials from FieldTurf (and lack of transparency for lubricants), I am deeply concerned that you plan to vote anyway on 1, 2, or 3 artificial turf fields made of PFAS-containing crumb rubber. I am a parent of two young boys – and a baby on the way – with enthusiasm and excitement for them to participate in the athletic programs in Glastonbury. Many of our friends feel the same. I urge you to have another option on the table for your vote…. At the very least, please consider a proposal using less harmful chemicals in EPDM-type turf fields rather than the crumb-rubber. I appreciate the value of playing time and the high cost of maintaining natural grass fields. But it can be done. High heat days will also lessen playing time on artificial turf. Please consider placing a higher value on our children's long-term health rather than making an active decision to install forever chemicals in their playing fields. Thank you for your consideration and for your service on the board. |

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| 3/31/2026 10:59:29 | Amy Hennessy | 220 Belle Woods Drive | Dear Members of the Board of Education,<br><br>I am writing as a parent and community member to request your consideration respectfully but urgently in expanding the turf fields within our school district.<br><br>As you've heard in previous discussions, our existing grass fields are consistently overused and frequently unavailable due to weather conditions, maintenance requirements, and scheduling conflicts. As a result, students are already experiencing reduced practice time, canceled games, and fewer opportunities to participate. These challenges are not temporary—they are ongoing and worsening, directly impacting students' athletic development as well as their access to the physical, social, and emotional benefits that extracurricular involvement provides.<br><br>Timely action is critical. Delaying improvements will only intensify the strain on our facilities, further limiting student opportunities and placing additional burden on staff, coaches, and programs striving to meet demand with inadequate resources.<br><br>The addition of turf fields presents a practical and long-term solution. Turf surfaces allow for consistent, multi-season use with significantly less downtime, enabling more flexible scheduling and broader access for students across all grade levels and programs. Advancing this project in the near term would directly support student wellness, participation, and equity—key priorities for our district.<br><br>In addition, upgraded facilities would serve as a valuable asset to the broader community, providing safe and reliable space for physical education, youth programs, and potential community use. Acting now ensures that we not only address current deficiencies but also proactively plan for continued growth.<br><br>I understand that a project of this scale requires careful financial consideration and planning. However, completing this project now, in its entirety, may ultimately prove more fiscally responsible than a phased, multi-year approach that could introduce higher long-term costs and prolonged disruption.<br><br>Thank you for your leadership, your service, and your ongoing commitment to our students. Given the growing impact of this issue, I respectfully urge the Board to prioritize this matter and consider timely action. |

## GHS TURF CONSTRUCTION

**Net 2026 Cost Difference 2 Fields vs. 1 Field**: **$100,000 to $200,000**

Option 1 cost (2 fields plus stadium) compared to Option 2 cost (1 field plus stadium).

## GHS STADIUM TURF/TRACK FUNDING

The Town Council did not fund the completion of the GHS stadium turf and track replacement. $270,000 was allocated by the Council in FY26 CIP toward the project. The turf and track need to be replaced at the same time for construction reasons. While the turf could wait to be replaced, the track needs to be replaced in 2026.

The Town Council requested up to an additional $830,000 to complete the project.

## TWO TURF FIELDS AT GHS (BALDWIN FIELDS): COST

BACKGROUND:

The Board approved two new turf fields as part of its current Five-Year Facilities plan for 2022-2027.

The Board approved 2 new turf fields as part of its CIP requests in fall 2022, 2023, and 2024 for fiscal years 2024, 2025, and 2026, respectively.

The Board has selected Baldwin Fields (fields #12 and #13) as the location.

OPTIONS:

The Board has identified two options for consideration now:

Option 1: Install two turf fields simultaneously in 2026

Option 2: Install one turf field in 2026

A committed contribution of $350,000 is available for 2 turf fields (Option 1).

A state DRIP grant of $225,000 is available for use. The Board can decide at a later date to use this grant for this project. This grant is not included in any of the calculations since it affects both options equally.

**Option 1: Approve the installation of two turf fields now.**

The Board has a binding bid for two turf fields from FieldTurf for the amount of $2,650,000. The installation would be on fields #12 and #13.

**Option 2: Approve one turf field now.**

The Board has a written cost estimate for the installation of one field on field #12 (where graduation is held) of $2,100,000 to $2,200,000+.

FieldTurf estimates that a second field at field #13 next year would be at least an additional $1,200,000 to $1,400,000+. The total cost over two years for 2 fields would then be $3,300,000 to $3,600,000+.

## Options Cost Comparison

| | **Option 1:**<br>**2 Turf Fields** | **Option 2:**<br>**1 Turf Field** |
|---|---|---|
| Cost | $2,650,000 | $2,100,000 to $2,200,000+ |
| Less Donation Option 1 | ($350,000) | $0 |
| Total Cost | $2,300,000 | $2,100,000 to $2,200,000+ |

## FUNDING

The Board's savings account (known as the nonlapsing account) contains $4,218,251 to pay for one-time expenditures such as these projects.

The total cost of each option including stadium costs are:

**Option 1 (2 fields) + Stadium Costs:** $3,130,000*
* Includes final cost offset of $350,000 in committed fundraising.

**Option 2 (1 field) + Stadium Costs High:** $3,030,000
**Option 2 (1 field) + Stadium Costs Low:** $2,930,000

$100,000 to $200,000 net cost difference between Option 1 and Option 2.

GLASTONBURY GUARDIANS

# GHS TURF CONSTRUCTION

GLASTONBURY PUBLIC SCHOOLS

# DECISION ITEMS TONIGHT

1. GHS Stadium Track/Turf Replacement
2. New Turf Field Construction

# NET COST DIFFERENCE
# 2 FIELDS VS. 1FIELD

$100,000 to $200,000

Both Options Include Stadium

# GHS STADIUM TURF/TRACK

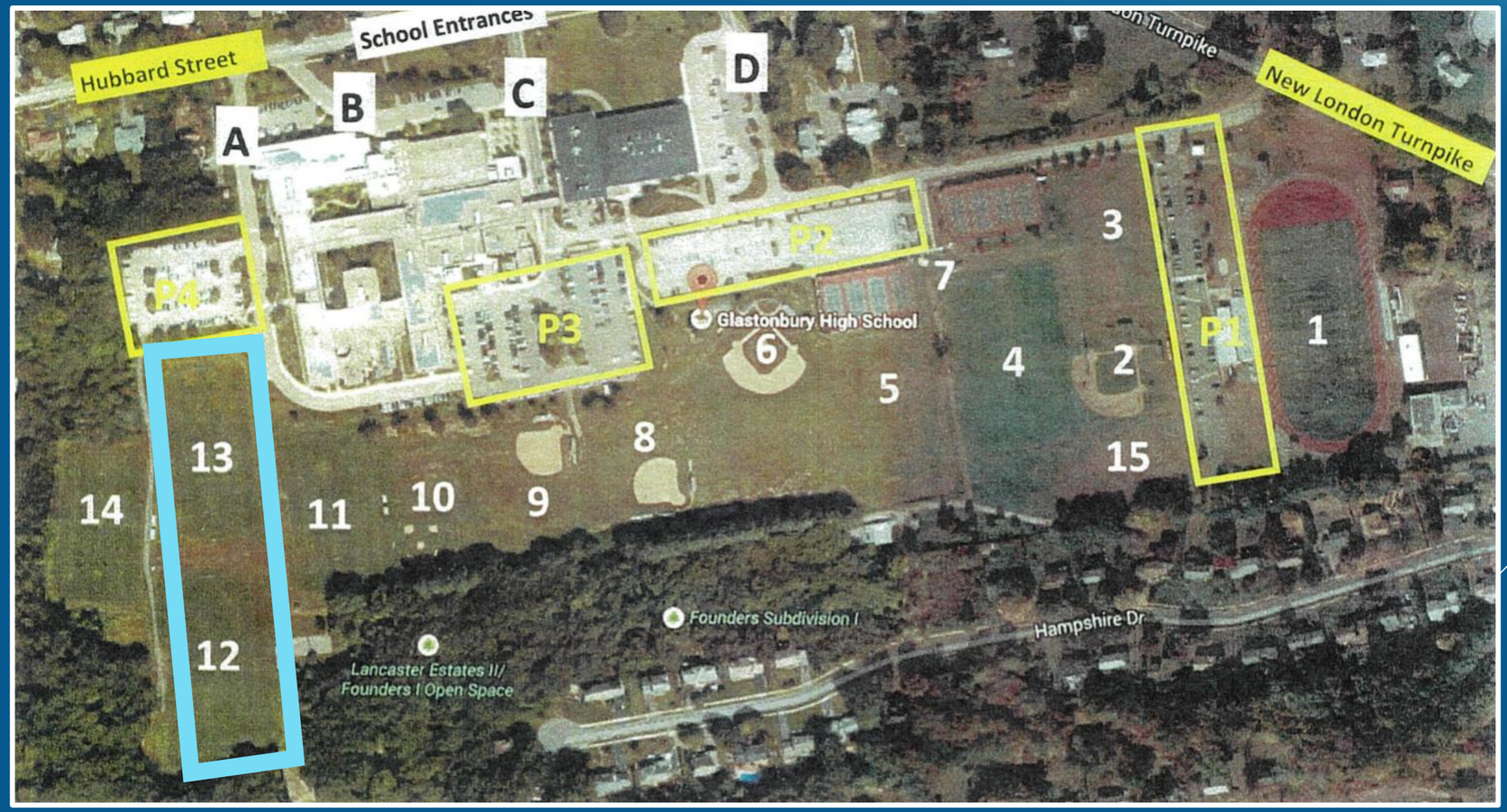
Up to $830,000 Requested from Town Council

# TWO NEW TURF FIELDS
# BOE APPROVAL HISTORY

- 2022-2027 Five Year Facilities Plan
- CIP Requests for FY24, FY25, FY26

# FIELD LOCATION APPROVAL

## #12 & #13 (BALDWIN FIELDS)



# OPTION 1
# 2 FIELDS (FIELDS #12 AND #13)

- Cost: $2.65 million (binding bid)
- Donation offset: $350,000
- Net Cost: $2.3 million

# OPTION 2
# 1 FIELD (FIELD #12)

- Net Cost: $2.1 million to $2.2 million+
- **Not included—2nd Field Later:**

  Field #13 later: $1.2 to $1.4 million +
- Total 2 Field cost: $3.3 to $3.6 million

# OPTION COST COMPARISON

| | Option 1<br>2 Turf Fields | Option 2<br>1 Turf Field |
|---|---|---|
| **Cost** | $2,650,000 | $2,100,000 to $2,200,000+ |
| **Less Donation** | ($350,000) | $0 |
| **Total Cost Now** | $2,300,000 | $2,100,000 to $2,200,000+ |
| **2nd Field** | — | $1,200,000 to $1,400,000+ |
| **Total 2 Field Cost** | $2,300,000 | $3,300,000 to $3,600,000+ |

# 2026 FUNDING

Board Nonlapsing Fund Savings: $4,218,251

- Option 1 (2 Fields & Stadium) = $3,130,000
- Option 2 High (1 Field & Stadium) =$3,030,000
- Option 2 Low (1 Field & Stadium) = $2,930,000

**Net Cost Difference: $100,000 to $200,000**

**TRACK SALES AGREEMENT**

This AGREEMENT dated on December 1, 2025.

Between: **Glastonbury Public Schools**
628 Hebron Ave
Glastonbury, CT 06033
Attn: Alan Bookman

Tel: 860-652-7961
Fax: bookmana@glastonburyus.org

And: **FieldTurf USA, Inc.**
7445 Côte-de-Liesse Road Suite 200
Montreal Quebec H4T 1G2
(the "Supplier")

Tel: (514) 340-9311
Fax: (514) 340-9374

**WHEREAS** Supplier wishes to sell, supply and install an athletic track identified as **BSS-100** measuring approximately 5,200 square yards as well as prepare the base in accordance with the specifications listed in **Schedule B,** to the Customer located at 330 Hubbard St., Glastonbury, CT 06033 (the "**Site**").

**WHEREAS** the Customer wishes to purchase same on the terms and conditions set out below;

**NOW THEREFORE, THE PARTIES HERETO AGREE AS FOLLOWS:**

## 1. SALE

The Supplier hereby agrees to sell, to supply and to install for the Customer who hereby agrees to purchase the Supplier's **BSS-100** athletic track having a thickness of 13 mm and a structural spray coat having a thickness of 2-3 mm, including track striping and measuring approximately 5,200 square yards (the "**Product**") to be installed upon a suitable base.

The Sale includes:

a) Furnish and install structural spray coat of existing track lane lines.
b) Remove and replace existing northern d-zone with new BSS-100 track system. Color: Red.
c) Furnish and install new track lines to match existing lines.
d) Demobilize and restore site

This Agreement is subject to final approval of funds by the Town. The Town shall not be obligated to disbursement of any funds until final funding is approved. It is further understood that FieldTurf will not order, produce or ship any materials and/or perform services until it receives confirmation of funding for the project from the Town.

## 2. EQUIPMENT

The following maintenance equipment is included in the sale: None**.**

## 3. SUPPLY OF PRODUCT

The Supplier shall perform the work required by this Agreement as diligently and expeditiously as is consistent with professional standards and the orderly progress of the work and in a good and workmanlike fashion, and subject to and in accordance with the terms and conditions hereof.

## 4. SITE PREPARATION AND BASE WORK

The Supplier shall provide the site preparation work in accordance with the specifications provided in this **Agreement** as well as shall carry out the required base work in accordance with the specifications in **Schedule B,** if any. The site preparation and any base work will be subject to the same conditions and requirements indicated in Section 8 "Installation" hereof.

On occasion, a base will present unique issues once uncovered upon removal of the existing track, which may require the import of additional materials and/or the provision of labor to remedy planarity or other deflections in the existing surface. In the event this becomes necessary at the Site, and without prejudice to any specifications and/or contingencies stipulated in **Schedule B**, the Supplier can assist with this process at an additional cost.

## 5. PRICE

The purchase price for the Product fully installed, including the base work, shall be **TWO HUNDRED SEVENTY-ONE THOUSAND DOLLARS AND 00/100 ($271,000.00)** (the "**Purchase Price**") plus any other applicable taxes and/or bonding costs. The Price is subject to increase if affected by a tax increase, new taxes, levies or any new legally binding imposition affecting the transaction.

The Purchase Price shall be payable to Supplier by way of wire transfer or banker's check in accordance with the following payment schedule:

1.1 **Fifty percent (50%)** of the Purchase Price due on or before June 15, 2026;

1.2 **Forty percent (40%)** of the Purchase Price due on or before July 31, 2026;
Remaining balance of **ten percent (10%)** upon substantial completion of the field, which shall be achieved when Customer is able to use the field for its intended purpose, even if punchlist items remain and the Certificate of Completion has not been executed by Customer.

Supplier will issue an invoice to Customer upon the occurrence of each of the events listed above, and payment of each invoice is due within ten (10) days following the date to the applicable invoice.

If this project is located in a state in which release of final payment and/or retainage is governed by statute or other applicable law, Customer shall use its best efforts to undertake all appropriate measures, including without limitation the recording of a notice of completion, so that final payment hereunder, including retainage, if any, shall be released to Supplier without delay. In all cases, Supplier shall be entitled to receive final payment, including retainage, if any, no later than the earliest eligible date according to applicable statute or law. If the lawful payment or release is delayed through no fault of Supplier, Owner shall pay Supplier interest thereon at the rate indicated below, as of the date when payment or release first became due by law.

Supplier shall be entitled to recover all costs and expenses, including attorney fees, associated with

collection procedures in the event that Supplier pursues collection of payment of any past due invoice.

Any unpaid balance bears interest at a rate of ten percent (10%) per year or at the legal rate to the extent required by applicable law or statute.

## 6. FUNDING AND PAYMENT CONTINGENCY

Supplier's obligations provided for in this Agreement are expressly conditioned upon (1) evaluation and verification of Customer's creditworthiness and (2) ability to timely issue payment in accordance to Section **Error! Reference source not found.** "Payments" of this Agreement. In the event the results of s uch evaluation and verification aren't satisfactory to the Supplier and/or there is sufficient uncertainty to indicate that the Customer is not apt to timely issue payment to the Supplier; Supplier shall have the right to terminate this Agreement without penalty.

## 7. ACCEPTANCE

Upon the Supplier giving the Customer notice of completion of the work, the parties agree, acting reasonably, to mutually determine whether same conforms to the requirements of this Agreement and in the event the parties mutually determine that there are deficiencies, the Supplier will undertake to correct the deficiencies noted ("**Acceptance**");

Upon Acceptance, the Customer agrees to sign a Certificate of Completion in the form currently in force, herein attached as **Schedule A**.

The form of Manufacturer's Limited Warranty currently in force takes effect upon the signing of the Certificate of Completion.

No use whatsoever shall be made of the athletic track by the Customer until the Certificate of Completion is signed and delivered to Supplier.

Any such use will be deemed as Acceptance of the athletic track, triggering final payment and will automatically void any and all warranty of the work, subject to the reinstatement of the Warranty later at the discretion of the Supplier upon the signing of the Certificate of Completion and final payment.

The Customer shall prohibit use of the track if the Customer alleges said track to be incomplete or dangerous. For greater security, in the event that the Customer deems the track to be incomplete or dangerous the Customer will immediately notify its insurers of this additional risk.

## 8. INSTALLATION

The installation of the Product shall be performed by Supplier's designated and approved installers. The Customer agrees to allow representatives of Supplier all necessary uninterrupted access and suitable staging area to the site for purposes of installation, and inspection. All lighting and electrical supply must be operational during the installation process. The Installation of the Product shall be in accordance to **Schedule B**.

Minimum staging area required is square footage of field x 0.12 and no more than 100 feet from the track. Minimum access should be 15 feet wide by 15 feet high. A 25 foot wide by 25 foot long hard or paved surface area located within 50 feet of the playing surface shall be provided for purposes of proper mixing

of in-fill material. Access to the track will include suitable bridging by the Customer over the curbs from the staging area to permit suitable access to the track by low clearance vehicles.

*Force Majeure*. No Party shall be liable for delay or failure to perform under this Agreement if such delay or failure is due to any contingency beyond its reasonable control, including acts of God, war, explosion, fire, flood or civil disturbance or labor actions, disputes and disruptions by the employees or sub-trades of either Party hereto or delay or destruction caused by public carrier.

In addition to *Force Majeure*, the parties recognize that in certain cases severe weather while not constituting *Force Majeure* could delay the installation process of the work contemplated under this agreement.

The Supplier shall not be responsible for any acts of violence or vandalism. The Customer holds Supplier harmless and indemnifies the Supplier from vandalism and acts of violence regarding the present project.

**9. SITE SECURITY**

Adequate and reasonable security shall be provided during the installation process of Supplier's materials, products, and equipment. Vandalism of the Supplier's materials, products, and equipment shall be the sole responsibility of the Customer.

**10. PERMITS**

Although the Supplier may be responsible for obtaining its own permits or corporate authorizations, the Customer will use its best efforts to assist the Supplier in obtaining any local permits or corporate authorizations required.

**11. ENTIRE AGREEMENT**

The provisions herein contained, together with **Schedules A and B,** constitutes the entire agreement between the parties and cancel all previous communications, representations and agreements whether verbal or written between the parties with respect to the subject matter hereof. Other than as provided herein Customer hereby acknowledges that it is not relying on any representations of the Supplier as to the performance of the work, except as stated expressly herein.

**12. CLAIMS FOR CONSEQUENTIAL DAMAGES**

The Supplier and the Customer waive claims against each other for consequential damages arising out of or relating to this Agreement. This mutual waiver is applicable, without limitation, to all consequential damages, including but not limited to:

**12.1** damages incurred by the Customer for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

**12.2** damages incurred by the Supplier for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the work under this agreement.

**13. NOTICE**

Supplier shall not entertain any claim for damages caused by itself or by persons for whom it is responsible unless the Customer advises the Supplier in writing of the damage–causing event, including photographs, within seven (7) days of the event, addressed to the project administrator as well as the contract administration of Supplier.

**14. TERM OF AGREEMENT**

This Agreement shall be effective as of the date and year first written above and shall remain in effect until thirty (30) days after the date on which (a) both parties sign the Certificate of Completion; and/or (b) Customer pays Supplier the full Purchase Price, whichever is later, at which time the Agreement shall terminate.

**15. GOVERNING LAW AND CONSENT**

The rights of the parties hereto and the provisions hereof shall be interpreted and construed according to the laws of the State of Connecticut. The parties consent to the exclusive jurisdiction and venue of the court of competent jurisdiction in said State.

**IN WITNESS WHEREOF** the parties have duly executed this Agreement as of the date and year first above written.

| **FieldTurf USA, Inc.** | **Glastonbury Public Schools** |
|---|---|
| Per:_____ | Per:_____ |
| Name: | Name: |
| Title: | Title: |

**Attachment:** **Schedule A – Certificate of Completion**
**Schedule B – Supplier's Pricing Proposal dated November 26, 2025**

**Schedule A**
**Certificate of completion**

FieldTurf®
A Tarkett Sports Company

# CERTIFICATE OF COMPLETION

This certificate will confirm that the installation of the FieldTurf product located as indicated below, has been completed to the satisfaction of the Owner.

*To be completed with certified installer on site.*

Field Name: ..... School/City or Company Name: .....

Address: .....
Tel: ..... City: .....
Fax: ..... State & Zip: .....
Contact Name: ..... E-mail: .....

Date of Substantial Completion: .....
Sporting Activities: .....

**OWNER INFORMATION**

Owner: ..... Address: .....
City: ..... State & Zip: .....

Signature: ..... Organization: .....
Print Name: ..... Title: .....
City: ..... State & Zip: .....

**COACH APPROVAL – *OPTIONAL***

Name: ..... Signature: .....

This ..... day of ....., 20 .....

PUNCH LIST: ☐ NONE ☐ ATTACHED ☐ TO FOLLOW

The Owner acknowledges that in the event that the Product is used for purposes other than the specific activities it was designed for or any other uses for which FieldTurf gives its written authorization, it being understood that FieldTurf has tested the Product for use in connection with these activities and may not have tested it for other uses, FieldTurf shall not be responsible for any and all damages incurred and any warranties registered will become null and void.

The Owner hereby acknowledges that the Product may be protected by patents worldwide.

The Owner undertakes to carry on the proper maintenance of the Product as described in the maintenance guidelines, which will accompany the Warranty.

1.800.724.2969 | info@fieldturf.com | fieldturf.com

**Schedule B**
**Supplier's Pricing Proposal dated November 26, 2025**

# PROJECT PROPOSAL

FieldTurf
A Tarkett Sports Company

# GLASTONBURY HIGH SCHOOL TRACK RENOVATION

**November 26, 2025**

FieldTurf USA, Inc. is pleased to present the following proposal. FieldTurf pricing is based on the Capital Region Education Council (CREC) program. CREC is a member of The Association of Educational Purchasing Agencies (AEPA) program. The AEPA is a purchasing co-op that provides member schools with pre-determined preferential pricing by approved vendors. Since the product has already been bid at the national level, individual schools do not have to duplicate the formal bid process. AEPA IFB #024-A.

AEPA Association of Educational Purchasing Agencies

CREC Excellence in Education

Click on the following AEPA hyperlink for more information: AEPA IFB #24-A.

FieldTurf is pleased to offer to supply and install the following high performance turf system:

All pricing includes prevailing wage rates.

**Prepared For:** Dr. Alan Bookman – Superintendent of Schools, Glastonbury

**Prepared By:** Andrew Dyjak – Regional Vice President, FieldTurf
Chris Hulk, PE – Director of Design & Construction, New England
Jonathan Luster, PE – Regional Construction Manager, FieldTurf

**Address:** Glastonbury High School | 330 Hubbard St, Glastonbury, CT 06033

## BASE BID: TURF REPLACEMENT

| | |
|---|---|
| FIELD NAME | Glastonbury High School – Track |
| SQUARE FOOTAGE | +/- 5,200 s.y. |
| PRODUCT | BSS-100 |
| FIELD MARKINGS | Track Striping per NFHS Standards |
| TOTAL PRICE | **$ 271,000.00** |

# PROJECT PROPOSAL

**Project Description:**

This project proposes to renovate the existing track at Glastonbury High School with a structural spray coat of the existing track surface. Additionally, the northern track d-zone is required to be removed and replace. This proposal will remove the d-zone surface, clean the existing pavement and install a new BSS-100 track system in the d-zone. All proposed striping will match existing striping, No alterations are proposed for the pavement, fencing or other track items.

The project is anticipated to be constructed in a +/- ½ month timeframe. It is also anticipated that access and staging areas will be available adjacent to the field.

- **Track Renovation**
  - Furnish and install structural spray coat of existing track lane lines.
  - Remove and replace existing northern d-zone with new BSS-100 track system. Color: Red.
  - Furnish and install new track lines to match existing lines.
  - Demobilize and restore site

***EXCLUSIONS:***

- *Any costs associated with necessary charges relating to the delineation of the field*
- *The supply of manholes or clean-outs or grates, or supply of the manhole covers*
- *Any alteration or deviation from specifications involving extra costs, which alteration or deviation will be provided only upon executed change orders, and will become an extra charge over and above the offered price*
- *Soil stabilization or remediation of any type*
- *Mass Excavation as required to achieve subgrade*
- *Rock removal or excavation*
- *Excavation or disposal of unsuitable or contaminated soils*
- *Site security*
- *Any work to pavement of existing track*
- *Once subgrade has been established, a proof roll will be performed to ensure structural stability of the soils; in the event that unsuitable soils are encountered, a price to remedy these areas can be negotiated based on recommended methods per project Engineer*
- *Testing or Inspection Fees*
- *Site restoration, sodding, landscaping or grow-in beyond disturbed areas*
- *Repair or resurfacing existing asphalt parking lot if damaged by truck traffic*
- *All union labor or other labor law levies*
- *Bond fees, permit fees and permits*
- *Contingency*
- *Any work not listed in the inclusions*

**Please feel free to reach out to any member of our project team with questions about our offer:**


**Andrew Dyjak**
Regional Vice President
(860) 333-7839
Andrew.Dyjak@Fieldturf.com

**Christopher Hulk, PE**
Director of Design and Construction
(203) 676-4445
Christopher.Hulk@Fieldturf.com

# SALES AGREEMENT

This AGREEMENT dated November 26, 2025.


Between: **Glastonbury Public Schools**
628 Hebron Ave
Glastonbury, CT 06033
Attn.: Alan Bookman

Tel: 860-652-7961
Email: bookmana@glastonburyus.org

(the "Customer")

And: **FieldTurf USA, Inc.**
7445 Côte-de-Liesse Road Suite 200
Montreal Quebec H4T 1G2

Tel: (514) 340-9311
Fax: (514) 340-9374

(the "Supplier")


**WHEREAS** Supplier wishes to sell, supply and install an artificial in-filled playing surface identified as **FieldTurf FTHD-1** for use as an outdoor field measuring approximately 90,214 square feet to the Customer located at 330 Hubbard St., Glastonbury, CT 06033 (the "**Site**"), and, prepare the base in accordance with the specifications in Schedule B.

**WHEREAS** the Customer wishes to purchase same on the terms and conditions set out below;

**NOW THEREFORE, THE PARTIES HERETO AGREE AS FOLLOWS:**

## 1. SALE

The Supplier hereby agrees to sell, to supply and to install for the Customer who hereby agrees to purchase the Supplier's **FieldTurf FTHD-1,** 2.5 inches thick outdoor all green artificial grass in-filled playing surfaces for use as a football, soccer, lacrosse and field hockey field measuring approximately 90,214 square feet (the "**Product**") to be installed on a suitable existing bases at the Site.

The Sale also includes:

a) Remove and dispose of existing synthetic turf
b) Fine grade in preparation of synthetic turf
c) Furnish and install new synthetic turf with inlaid field markings (football, soccer, lacrosse and field hockey) for up to 5 sports
d) Furnish and install 'G' center logo
e) Perform post installation GMax testing

This Agreement is subject to final approval of funds by the Town. The Town shall not be obligated to disbursement of any funds until final funding is approved. It is further understood that FieldTurf will not order, produce or ship any materials and/or perform services until it receives confirmation of funding for the project from the Town.

**Voluntary Alternate 1:**
Endzone Lettering 'GLASTONBURY' 'GUARDIANS'. Receipt of an executed change order by the Supplier in the additional Cost of the Voluntary Alternate shall be required prior to order of materials and furnishing of work associated with this Voluntary Alternate.

**Cost of the Agreement Alternate 1:** $21,600.00**.**

## 2. EQUIPMENT

The following maintenance equipment is included in the sale: None.

## 3. SUPPLY OF PRODUCT

The Supplier shall perform the work required by this Agreement as diligently and expeditiously as is consistent with professional standards and the orderly progress of the work and in a good and workmanlike fashion, and subject to and in accordance with the terms and conditions hereof.

The Supplier requires a minimum of twenty-one (21) days after receiving final approvals on shop drawings to manufacture, coordinate delivery and schedule arrival of installation crew. Under typical field size and scenario, Supplier further requires twenty-eight (28) days per field to install the Product subject to weather and *Force Majeure*.

This Agreement is based on a single mobilization. If the site is not ready and additional mobilizations are necessary, additional charges will apply.

## 4. SITE PREPARATION WORK

The Supplier shall provide the site preparation work, which shall be limited to minor touch-ups of the base surface, the whole in accordance with the specifications provided in this Agreement. The site preparation work will be subject to the same conditions and requirements indicated in Section 8 "Installation" hereof. Notwithstanding, any work regarding the base and ensuring its planarity is specifically excluded from the Supplier's scope of work. On occasion, a base will present unique issues, once uncovered upon removal of the existing turf, which may require the import of additional materials and/or the provision of labor to remedy planarity or other deflections in the existing surface. In the event this becomes necessary at the Site, the Supplier can assist with this process at an additional cost.

## 5. PRICE AND PAYMENT TERMS

The purchase price for the Product fully installed, shall be **SEVEN HUNDRED FORTY-NINE THOUSAND TWO HUNDRED FIFTY DOLLARS AND 00/100 ($740,250.00)** (the "**Purchase Price**") plus any other applicable taxes and/or any bonding costs. The Price is subject to increase if affected by a tax increase, new taxes, levies or any new legally binding imposition affecting the transaction.

The Purchase Price shall be payable to Supplier by way of wire transfer or banker's check in accordance with the following payment schedule:

1.1 **Fifty percent (50%)** of the Purchase Price due on or before June 15, 2026;
1.2 **Forty percent (40%)** of the Purchase Price due on or before July 31, 2026;

Remaining balance of **ten percent (10%)** upon substantial completion of the field, which shall be achieved when Customer is able to use the field for its intended purpose, even if punchlist items remain and the Certificate of Completion has not been executed by Customer.

Supplier will issue an invoice to Customer upon the occurrence of each of the events listed above, and payment of each invoice is due within ten (10) days following the date to the applicable invoice.

If this project is located in a state in which release of final payment and/or retainage is governed by statute or other applicable law, Customer shall use its best efforts to undertake all appropriate measures, including without limitation the recording of a notice of completion, so that final payment hereunder, including retainage, if any, shall be released to Supplier without delay. In all cases, Supplier shall be entitled to receive final payment, including retainage, if any, no later than the earliest eligible date according to applicable statute or law. If the lawful payment or release is delayed through no fault of Supplier, Owner shall pay Supplier interest thereon at the rate indicated below, as of the date when payment or release first became due by law.

Supplier shall be entitled to recover all costs and expenses, including attorney fees, associated with collection procedures in the event that Supplier pursues collection of payment of any past due invoice.

Any unpaid balance bears interest at a rate of ten percent (10%) per year or at the legal rate to the extent required by applicable law or statute.

## 6. FUNDING AND PAYMENT CONTINGENCY

Supplier's obligations provided for in this Agreement are expressly conditioned upon (1) evaluation and verification of Customer's creditworthiness and (2) ability to timely issue payment in accordance to Section 5 "Price" of this Agreement. In the event the results of such evaluation and verification aren't satisfactory to the Supplier and/or there is sufficient uncertainty to indicate that the Customer is not apt to timely issue payment to the Supplier; Supplier shall have the right to terminate this Agreement without penalty.

## 7. ACCEPTANCE

Upon the Supplier giving the Customer notice of completion of the work, the parties agree, acting reasonably, to mutually determine whether same conforms to the requirements of this Agreement and in the event the parties mutually determine that there are deficiencies, the Supplier will undertake to correct the deficiencies noted ("**Acceptance**");

Upon Acceptance both parties sign the Certificate of Completion in the form currently in force, a sample of which is attached hereto as **Schedule A**;

The form of Manufacturer's Limited Warranty currently in force takes effect upon the signing of the Certificate of Completion.

No use whatsoever shall be made of the field by the Customer until the Certificate of Completion is signed and delivered to Supplier. Any such use will be deemed as Acceptance of the field, triggering final payment and will automatically void any and all warranty of the work, subject to the reinstatement of the Warranty later at the discretion of the Supplier upon the signing of the Certificate of Completion and final payment.

The Customer shall prohibit use of the field if the Customer alleges said field to be incomplete or dangerous. For greater security, in the event that the Customer deems the field to be incomplete or dangerous the Customer will immediately notify its insurers of this additional risk.

## 8. INSTALLATION

The installation of the Product shall be performed by Supplier's designated and approved installers. The Customer agrees to allow representatives of Supplier all necessary uninterrupted access and suitable staging area to the site for purposes of installation, and inspection. All lighting and electrical supply must be operational during the installation process.

Minimum staging area required is square footage of field x 0.12 and no more than 100 feet from the field. Minimum access should be 15 feet wide by 15 feet high. A 25 foot wide by 25 foot long hard or paved surface area located within 50 feet of the playing surface shall be provided for purposes of proper mixing of in-fill material. Access to any field will include suitable bridging by the Customer over the field curbs from the staging area to permit suitable access to the field by low clearance vehicles.

*Force Majeure*. No Party shall be liable for delay or failure to perform under this Agreement if such delay or failure is due to any contingency beyond its reasonable control, including acts of God, war, explosion, fire, flood or civil disturbance or labor actions, disputes and disruptions by the employees or sub-trades of either Party hereto or delay or destruction caused by public carrier.

In addition to *Force Majeure*, the parties recognize that in certain cases severe weather while not constituting *Force Majeure* could delay the installation process of the work contemplated under this agreement.

The Supplier shall not be responsible for any acts of violence or vandalism. The Customer holds Supplier harmless and indemnifies the Supplier from vandalism and acts of violence regarding the present project.

The Customer understands that it is to its benefit and therefore undertakes to accept and store for the length of the warranty period, the remaining synthetic turf left over from the project in case of need.

## 9. SITE SECURITY

Adequate and reasonable security shall be provided during the installation process of Supplier's materials, products, and equipment. Vandalism of the Supplier's materials, products, and equipment shall be the sole responsibility of the Customer.

## 10. PERMITS

Although the Customer is responsible for obtaining its own permits or corporate authorizations, the Supplier will use its best efforts to assist the Customer in obtaining any local permits or corporate authorizations required.

## 11. ENTIRE AGREEMENT

The provisions herein contained, together with **Schedule A and B**, constitute the entire agreement between the parties and cancel all previous communications, representations and agreements whether verbal or written between the parties with respect to the subject matter hereof. Other than as provided herein Customer hereby acknowledges that it is not relying on any representations of the Supplier as to the performance of the work, except as stated expressly herein**.**

## 12. CLAIMS FOR CONSEQUENTIAL DAMAGES

The Supplier and the Customer waive claims against each other for consequential damages arising out of or relating to this Agreement. This mutual waiver is applicable, without limitation, to all consequential damages, including but not limited to:

**12.1** damages incurred by the Customer for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

**12.2** damages incurred by the Supplier for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the work under this agreement.

## 13. NOTICE

Supplier shall not entertain any claim for damages caused by itself or by persons for whom it is responsible unless the Customer advises the Supplier in writing of the damage–causing event, including photographs, within 7 days of the event, addressed to the project administrator as well as the contract administration of Supplier.

## 14. TERM OF AGREEMENT

This Agreement shall be effective as of the date and year first written above and shall remain in effect until thirty (30) days after the date on which (a) both parties sign the Certificate of Completion; and/or (b) Customer pays Supplier the full Purchase Price, whichever is later, at which time the Agreement shall terminate.

## 15. GOVERNING LAW AND CONSENT

The rights of the parties hereto and the provisions hereof shall be interpreted and construed according to the laws of the State of Connecticut. The parties consent to the exclusive jurisdiction and venue of the court of competent jurisdiction in said State.

**IN WITNESS WHEREOF** the parties have duly executed this Agreement as of the date and year first above written.

| **FieldTurf USA, Inc.** | **Glastonbury Public Schools** |
|---|---|
| Per: | Per: |
| Name: | Name: |
| Title: | Title: |

**Attachment:** **Schedule A – Certificate of Completion**
**Schedule B – Supplier's Pricing Proposal dated November 26, 2025**

**SCHEDULE A**
**Certificate of Completion**

FieldTurf®
A Tarkett Sports Company

# CERTIFICATE OF COMPLETION

This certificate will confirm that the installation of the FieldTurf product located as indicated below, has been completed to the satisfaction of the Owner.

*To be completed with certified installer on site.*

Field Name: _____ School/City or Company Name: _____

Address: _____
Tel: _____ City: _____
Fax: _____ State & Zip: _____
Contact Name: _____ E-mail: _____

Date of Substantial Completion: _____
Sporting Activities: _____

**OWNER INFORMATION**

Owner: _____ Address: _____
City: _____ State & Zip: _____

Signature: _____ Organization: _____
Print Name: _____ Title: _____
City: _____ State & Zip: _____

**COACH APPROVAL – *OPTIONAL***

Name: _____ Signature: _____

This _____ day of _____, 20 _____

PUNCH LIST: ☐ NONE ☐ ATTACHED ☐ TO FOLLOW

The Owner acknowledges that in the event that the Product is used for purposes other than the specific activities it was designed for or any other uses for which FieldTurf gives its written authorization, it being understood that FieldTurf has tested the Product for use in connection with these activities and may not have tested it for other uses, FieldTurf shall not be responsible for any and all damages incurred and any warranties registered will become null and void.

The Owner hereby acknowledges that the Product may be protected by patents worldwide.

The Owner undertakes to carry on the proper maintenance of the Product as described in the maintenance guidelines, which will accompany the Warranty.

**Schedule B**
**Supplier's Pricing Proposal dated November 26, 2025**

# PROJECT BUDGET

# GLASTONBURY HIGH SCHOOL STADIUM FIELD REPLACEMENT

**November 26, 2025**

FieldTurf USA, Inc. is pleased to present the following proposal. FieldTurf pricing is based on the Capital Region Education Council (CREC) program. CREC is a member of The Association of Educational Purchasing Agencies (AEPA) program. The AEPA is a purchasing co-op that provides member schools with pre-determined preferential pricing by approved vendors. Since the product has already been bid at the national level, individual schools do not have to duplicate the formal bid process. AEPA IFB #024-A.

Click on the following AEPA hyperlink for more information: AEPA IFB #24-A.

FieldTurf is pleased to offer to supply and install the following high performance turf system:

All pricing includes prevailing wage rates.

**Prepared For:** Dr. Alan Bookman – Superintendent of Schools, Glastonbury

**Prepared By:** Andrew Dyjak – Regional Vice President, FieldTurf
Chris Hulk, PE – Director of Design & Construction, New England
Jonathan Luster, PE – Regional Construction Manager, FieldTurf

**Address:** Glastonbury High School | 330 Hubbard St, Glastonbury, CT 06033

## BASE BID: TURF REPLACEMENT

| | |
|---|---|
| FIELD NAME | Glastonbury High School – Field 1 |
| SQUARE FOOTAGE | +/- 88,000 s.f. |
| PRODUCT | FieldTurf Classic HD |
| FIELD MARKINGS | Football, Soccer, Lacrosse and Field Hockey and Center 'G' Logos |
| TOTAL PRICE | **$ 749,250.00** |

# PROJECT BUDGET

**Project Description:**

This project proposes to replace the existing synthetic turf field in the location that it currently exists. The pricing includes striping for up to 5 inlaid sports lines, center 'G' logo and fine grade of existing stone base. No alterations are proposed for existing football goal posts, fencing, or existing site features such as curbing.

The project is anticipated to be constructed in a +/- 2-3 month timeframe. It is also anticipated that access and staging areas will be available adjacent to the field.

- **Main Field Area**
  - Remove and dispose of existing synthetic turf
  - Fine grade in preparation of synthetic turf
  - Furnish and install new synthetic turf with inlaid field markings for up to 5 sports
  - Furnish and install 'G' center logo
  - Perform post installation GMax testing

---

## ALTERANTES:

| **Alternate 1: Endzone Lettering** | **'Glastonbury' 'Guardians'** |
|---|---|
| Furnish and install endzone lettering | $21,600.00 |

***EXCLUSIONS:***

- *Any costs associated with necessary charges relating to the delineation of the field*
- *The supply of manholes or clean-outs or grates, or supply of the manhole covers*
- *Any alteration or deviation from specifications involving extra costs, which alteration or deviation will be provided only upon executed change orders, and will become an extra charge over and above the offered price*
- *Soil stabilization or remediation of any type*
- *Mass Excavation as required to achieve subgrade*
- *Rock removal or excavation*
- *Excavation or disposal of unsuitable or contaminated soils*
- *Site security*
- *Any work to pavement of existing track*
- *Once subgrade has been established, a proof roll will be performed to ensure structural stability of the soils; in the event that unsuitable soils are encountered, a price to remedy these areas can be negotiated based on recommended methods per project Engineer*
- *Testing or Inspection Fees*
- *Site restoration, sodding, landscaping or grow-in beyond disturbed areas*
- *Repair or resurfacing existing asphalt parking lot if damaged by truck traffic*
- *All union labor or other labor law levies*
- *Bond fees, permit fees and permits*
- *Contingency*
- *Any work not listed in the inclusions*

**Please feel free to reach out to any member of our project team with questions about our offer:**


**Andrew Dyjak**
Regional Vice President
(860) 333-7839
Andrew.Dyjak@Fieldturf.com

**Christopher Hulk, PE**
Director of Design and Construction
(203) 676-4445
Christopher.Hulk@Fieldturf.com

# SALES AGREEMENT

This AGREEMENT dated December 1, 2025

Between: **Glastonbury Public Schools**
628 Hebron Avenue
Glastonbury, CT 06033
Attn.: Alan Bookman

Tel: 860-652-7961
Email: bookmana@glastonburyus.org

(the "Customer")

And: **FieldTurf USA, Inc.**
7445 Côte-de-Liesse Road Suite 200
Montreal Quebec H4T 1G2

Tel: (514) 340-9311
Fax: (514) 340-9374

(the "Supplier")

**WHEREAS** Supplier wishes to sell, supply and install an artificial in-filled playing surface identified as **Fieldturf Vertex Prime** for use as an outdoor field measuring approximately 179,000 square feet to the Customer located at Glastonbury High School, 330 Hubbard Street, Glastonbury, CT 06033 (the "**Site**"), and, prepare the base in accordance with the specifications in **Schedule B.**

**WHEREAS** the Customer wishes to purchase same on the terms and conditions set out below;

**NOW THEREFORE, THE PARTIES HERETO AGREE AS FOLLOWS:**

## 1. SALE

The Supplier hereby agrees to sell, to supply and to install for the Customer who hereby agrees to purchase the Supplier's **Fieldturf Vertex Prime,** 2.25 inches thick outdoor all green artificial grass in-filled playing surface for use as a soccer, lacrosse and field hockey field measuring approximately 179,000 square feet (the "**Product**") to be installed on a base prepared by Supplier in accordance with the specifications in **Schedule B.**

The Sale also includes:

Performance and Payment Bonds

a) Furnish and supply performance and payment bonds for project

Removals/Sediment & Erosion Controls

b) Furnish and install construction signage and orange construction fencing along existing site
c) fencing for security as needed
d) Install sediment and erosion controls as required
e) Strip, load, and dispose of topsoil
f) Remove and dispose of irrigation system within field and cut/cap at appropriate location

Site Civil Construction

g) Earthmoving activities (cuts/fills) to achieve proposed subgrade

h) Compact subgrade
i) Install storm drainage perforated collector pipe
j) Install perimeter turf anchor curb
k) Furnish and install geotextile fabric on subgrade
l) Import, spread, grade, roll, and laser grade dynamic base stone (4")
m) Import, spread, grade, roll, and laser grade dynamic topping stone (2")

Synthetic Turf

n) Furnish and install synthetic turf for field with PFAS free Turf.
o) Synthetic turf with SBR rubber and sand infill
p) Center 'G' logos and up to 4 field markings per field
q) Post installation GMAX field testing

Site Improvements

r) Supply and install 20' height ball safety netting includes foundations, ground sleeves, posts, netting, and hardware on lacrosse field. Foundations only on soccer field.
s) Supply and install turf communication boxes within synthetic turf field
t) Furnish and install conduits for future electrical and lighting system
u) Furnish and install stone dust pathways around field
v) Furnish and install concrete base for permanent bleacher system

225 Seat Permanent Bleacher System

w) Furnish and install metal system of bleachers with ADA access ramp and ADA seating

Project Closeout

x) Clean site and demobilize
y) Provide project as-built and warranty information
z) Provide field care training to staff

**Voluntary Alternate 1:**
Ball Netting Soccer Field. Receipt of an executed change order by the Supplier in the additional Cost of the Voluntary Alternate shall be required prior to order of materials and furnishing of work associated with this Voluntary Alternate.

**Cost of the Agreement Alternate 1:** $49,600.00.

**Voluntary Alternate 2:**
Scoreboard. Receipt of an executed change order by the Supplier in the additional Cost of the Voluntary Alternate shall be required prior to order of materials and furnishing of work associated with this Voluntary Alternate.

**Cost of the Agreement Alternate 2:** $55,600.00.

**Voluntary Alternate 3:**
Additional Scoreboard. Receipt of an executed change order by the Supplier in the additional Cost of the Voluntary Alternate shall be required prior to order of materials and furnishing of work associated with this Voluntary Alternate.

**Cost of the Agreement Alternate 3:** $25,000.00.

**Voluntary Alternate 4:**
Scoreboard Upgrades. Receipt of an executed change order by the Supplier in the additional Cost of the Voluntary Alternate shall be required prior to order of materials and furnishing of work associated with this Voluntary Alternate.

**Cost of the Agreement Alternate 4:** $39,600.00.

## 2. EQUIPMENT

The following maintenance equipment is included in the sale: none.

## 3. SUPPLY OF PRODUCT

The Supplier shall perform the work required by this Agreement as diligently and expeditiously as is consistent with professional standards and the orderly progress of the work and in a good and workmanlike fashion, and subject to and in accordance with the terms and conditions hereof.

The Supplier requires a minimum of twenty-one (21) days after receiving final approvals on shop drawings to manufacture, coordinate delivery and schedule arrival of installation crew. Under typical field size and scenario, Supplier further requires twenty-eight (28) days per field to install the Product subject to weather and *Force Majeure*.

This Agreement is based on a single mobilization. If the site is not ready and additional mobilizations are necessary, additional charges will apply.

## 4. BASE WORK

The Supplier shall carry out the required base work in accordance with the specifications in **Schedule B**. The base work will be subject to the same conditions and requirements indicated in Section 8 "Installation" hereof. The scope of services listed above at Section 1 is based upon FieldTurf's typical dynamic base drainage system and storm water calculations. However, the said services and associated pricing are subject to change in the event of: (i) design and/or construction requirements of the local permitting authorities which dictate a change in design and/or construction and/or (ii) existing site conditions which are concealed, unknown and/or differ from readily available published data for the region.

## 5. PRICE

The purchase price for the Product fully installed, shall be **TWO MILLION SIX HUNDRED FIFTY THOUSAND DOLLARS AND 00/100 ($2,650,000.00)** (the "**Purchase Price**") plus any other applicable taxes and/or any bonding costs. The Price is subject to increase if affected by a tax increase, new taxes, levies or any new legally binding imposition affecting the transaction.

Based upon Applications for Payment submitted to the Customer by the Supplier, the Customer shall make progress payments on account of the Purchase Price to the Supplier as provided below and elsewhere in the Agreement.

The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

The Customer shall make payment of the certified amount to the Supplier, less 10% retainage, within thirty (30) days of the date of the Application for Payment.

Payments due and unpaid under the Agreement shall bear interest from the date payment is due at the rate of ten Percent (10%) per annum.

Final payment, constituting the entire unpaid balance of the Purchase Price, shall be made by the Customer to the Supplier when:

- The Supplier has fully performed the all the work; and
- Supplier's Certificate of Completion for the Turf Product has been signed by the Customer

The Customer's final payment to the Supplier shall be made no later than thirty (30) days after the conditions in this Section 5 have been met.

Supplier shall be entitled to recover all costs and expenses, including attorney fees, associated with collection procedures in the event that Supplier pursues collection of payment of any past due invoice.

If this project is located in a state in which release of final payment and/or retainage is governed by statute or other applicable law, Customer shall use its best efforts to undertake all appropriate measures, including without limitation the recording of a notice of completion, so that final payment hereunder, including retainage, if any, shall be released to Supplier without delay. In all cases, Supplier shall be entitled to receive final payment, including retainage, if any, no later than the earliest eligible date according to applicable statute or law. If the lawful payment or release is delayed through no fault of Supplier, Owner shall pay Supplier interest thereon at the rate indicated below, as of the date when payment or release first became due by law.

## 6. FUNDING AND PAYMENT CONTINGENCY

Supplier's obligations provided for in this Agreement are expressly conditioned upon (1) evaluation and verification of Customer's creditworthiness and (2) ability to timely issue payment in accordance to Section 5 "Price" hereof. In the event the results of such evaluation and verification aren't satisfactory to the Supplier and/or there is sufficient uncertainty to indicate that the Customer is not apt to timely issue payment to the Supplier; Supplier shall have the right to terminate this Agreement without penalty.

## 7. ACCEPTANCE

Upon the Supplier giving the Customer notice of completion of the work, the parties agree, acting reasonably, to mutually determine whether same conforms to the requirements of this Agreement and in the event the parties mutually determine that there are deficiencies, the Supplier will undertake to correct the deficiencies noted ("**Acceptance**");

Upon Acceptance both parties sign the Certificate of Completion in the form currently in force, a sample of which is attached hereto as **Schedule A**;

The form of Manufacturer's Limited Warranty currently in force takes effect upon the signing of the Certificate of Completion.

No use whatsoever shall be made of the field by the Customer until the Certificate of Completion is signed and delivered to Supplier. Any such use will be deemed as Acceptance of the field, triggering final payment and will automatically void any and all warranty of the work, subject to the reinstatement of the Warranty later at the discretion of the Supplier upon the signing of the Certificate of Completion and final payment.

The Customer shall prohibit use of the field if the Customer alleges said field to be incomplete or dangerous. For greater security, in the event that the Customer deems the field to be incomplete or dangerous the Customer will immediately notify its insurers of this additional risk.

## 8. INSTALLATION

The installation of the Product shall be performed by Supplier's designated and approved installers. The Customer agrees to allow representatives of Supplier all necessary uninterrupted access and suitable staging area to the site for purposes of installation, and inspection. All lighting and electrical supply must be operational during the installation process.

Minimum staging area required is square footage of field x 0.12 and no more than 100 feet from the field. Minimum access should be 15 feet wide by 15 feet high. A 25 foot wide by 25 foot long hard or paved surface area located within 50 feet of the playing surface shall be provided for purposes of proper mixing of in-fill material. Access to any field will include suitable bridging by the Customer over the field curbs from the staging area to permit suitable access to the field by low clearance vehicles.

*Force Majeure*. No Party shall be liable for delay or failure to perform under this Agreement if such delay or failure is due to any contingency beyond its reasonable control, including acts of God, war, explosion, fire, flood or civil disturbance or labor actions, disputes and disruptions by the employees or sub-trades of either Party hereto or delay or destruction caused by public carrier.

In addition to *Force Majeure*, the parties recognize that in certain cases severe weather while not constituting *Force Majeure* could delay the installation process of the work contemplated under this agreement.

The Supplier shall not be responsible for any acts of violence or vandalism. The Customer holds Supplier harmless and indemnifies the Supplier from vandalism and acts of violence regarding the present project.

The Customer understands that it is to its benefit and therefore undertakes to accept and store for the length of the warranty period, the remaining synthetic turf left over from the project in case of need.

## 9. SITE SECURITY

Adequate and reasonable security shall be provided during the installation process of Supplier's materials, products, and equipment. Vandalism of the Supplier's materials, products, and equipment shall be the sole responsibility of the Customer.

## 10. PERMITS

Although the Customer is responsible for obtaining its own permits or corporate authorizations, the Supplier will use its best efforts to assist the Customer in obtaining any local permits or corporate authorizations required.

## 11. ENTIRE AGREEMENT

The provisions herein contained, together with **Schedule A and B**, constitute the entire agreement between the parties and cancel all previous communications, representations and agreements whether verbal or written between the parties with respect to the subject matter hereof. Other than as provided herein Customer hereby acknowledges that it is not relying on any representations of the Supplier as to the performance of the work, except as stated expressly herein.

## 12. CLAIMS FOR CONSEQUENTIAL DAMAGES

The Supplier and the Customer waive claims against each other for consequential damages arising out of or relating to this Agreement. This mutual waiver is applicable, without limitation, to all consequential damages, including but not limited to:

12.1 Damages incurred by the Customer for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

12.2 Damages incurred by the Supplier for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the work under this agreement.

## 13. NOTICE

Supplier shall not entertain any claim for damages caused by itself or by persons for whom it is responsible unless the Customer advises the Supplier in writing of the damage–causing event, including photographs, within 7 days of the event, addressed to the project administrator as well as the contract administration of Supplier.

## 14. TERM OF AGREEMENT

This Agreement shall be effective as of the date and year first written above and shall remain in effect until thirty (30) days after the date on which (a) both parties sign the Certificate of Completion; and/or (b) Customer pays Supplier the full Purchase Price, whichever is later, at which time the Agreement shall terminate.

## 15. GOVERNING LAW AND CONSENT

The rights of the parties hereto and the provisions hereof shall be interpreted and construed according to the laws of the State of Connecticut. The parties consent to the exclusive jurisdiction and venue of the court of competent jurisdiction in said State.

**IN WITNESS WHEREOF** the parties have duly executed this Agreement as of the date and year first above written.

| **FieldTurf USA, Inc.** | **Glastonbury Public Schools** |
|---|---|
| Per:_____ | Per:_____ |
| Name: | Name: |
| Title: | Title: |

**Attachment:** **Schedule A – Certificate of Completion**
**Schedule B – Supplier's Pricing Proposal dated November 18, 2025**

**SCHEDULE A**
**Certificate of Completion**

FieldTurf®
A Tarkett Sports Company

# CERTIFICATE OF COMPLETION

This certificate will confirm that the installation of the FieldTurf product located as indicated below, has been completed to the satisfaction of the Owner.

*To be completed with certified installer on site.*

**Field Name:** _____ **School/City or Company Name:** _____

Address: _____

Tel: _____ City: _____

Fax: _____ State & Zip: _____

Contact Name: _____ E-mail: _____

Date of Substantial Completion: _____

Sporting Activities: _____

**OWNER INFORMATION**

Owner: _____ Address: _____

City: _____ State & Zip: _____

Signature: _____ Organization: _____

Print Name: _____ Title: _____

City: _____ State & Zip: _____

**COACH APPROVAL – *OPTIONAL***

Name: _____ Signature: _____

This _____ day of _____, 20 _____

**PUNCH LIST:** ☐ NONE ☐ ATTACHED ☐ TO FOLLOW

The Owner acknowledges that in the event that the Product is used for purposes other than the specific activities it was designed for or any other uses for which FieldTurf gives its written authorization, it being understood that FieldTurf has tested the Product for use in connection with these activities and may not have tested it for other uses, FieldTurf shall not be responsible for any and all damages incurred and any warranties registered will become null and void.

The Owner hereby acknowledges that the Product may be protected by patents worldwide.

The Owner undertakes to carry on the proper maintenance of the Product as described in the maintenance guidelines, which will accompany the Warranty.

**Schedule B**
**Supplier's Pricing Proposal dated November 18, 2025**

# PROJECT PROPOSAL

FieldTurf
A Tarkett Sports Company

# GLASTONBURY HIGH SCHOOL FIELDS 12 & 13 RENOVATIONS

**December 8, 2025 Revised**

FieldTurf USA, Inc. is pleased to present the following proposal. FieldTurf pricing is based on the Capital Region Education Council (CREC) program. CREC is a member of The Association of Educational Purchasing Agencies (AEPA) program. The AEPA is a purchasing co-op that provides member schools with pre-determined preferential pricing by approved vendors. Since the product has already been bid at the national level, individual schools do not have to duplicate the formal bid process. AEPA IFB #024-A.

AEPA Association of Educational Purchasing Agencies

CREC Excellence in Education

Click on the following AEPA hyperlink for more information: AEPA IFB #24-A.

FieldTurf is pleased to offer to supply and install the following high performance turf system:

All pricing includes prevailing wage rates.

**Prepared For:** Dr. Alan Bookman – Superintendent of Schools, Glastonbury

**Prepared By:** Andrew Dyjak – Regional Vice President, FieldTurf

Chris Hulk, PE – Director of Design & Construction, New England

Jonathan Luster, PE – Regional Construction Manager, FieldTurf

**Address:** Glastonbury High School | 330 Hubbard St, Glastonbury, CT 06033

## BASE BID 8 Pickleball Courts

| | |
|---|---|
| FIELD NAME | Glastonbury High School – Fields 12 and 13 |
| SQUARE FOOTAGE | +/- 179,000 s.f. |
| PRODUCT | PFAS Free - FieldTurf Vertex Prime |
| FIELD MARKINGS | Soccer, Lacrosse and Field Hockey and Center 'G' Logos |
| TOTAL PRICE | **$ 2,650,000.00** |

**Project Description**

This proposal is based on existing site conditions, review meetings with the school, and a target construction period in winter / spring or summer 2026. The pricing assumes FieldTurf will provide a turnkey design-build delivery, including all necessary engineering, site protection, site construction, synthetic turf installation, and project closeout.

This pricing proposal proposes to convert the existing grass fields 12 & 13 to synthetic turf with various other site improvements included at Glastonbury High School.

For the conversion of the grass field to synthetic turf, all topsoil and irrigation systems will be removed. Earthmoving activities will be conducted to achieve proposed grades. The field will then have a perimeter concrete turf anchor curb, stone base, and a drainage system installed. The field will then be laser graded to achieve planarity before the turf is laid down and installed on the field. Additionally, 20' height ball safety netting along the lacrosse field end lines and electrical communication boxes within the synthetic turf field have also been added in the total base construction cost. Lastly, a concrete pad will be installed with ADA accessible bleacher system for 225 seats. Alternates have been included for additional ball netting.

The project is anticipated to be constructed in a ±3 – 4 month timeframe depending on start date. It is also anticipated that access and staging areas will be available in the adjacent parking lot.

**BASE PROJECT TOTAL**

- **Performance and Payment Bonds**
  - Furnish and supply performance and payment bonds for project

- **Removals/Sediment & Erosion Controls**
  - Furnish and install construction signage and orange construction fencing along existing site fencing for security as needed
  - Install sediment and erosion controls as required
  - Strip, load, and dispose of topsoil
  - Remove and dispose of irrigation system within field and cut/cap at appropriate location

- **Site Civil Construction**
  - Earthmoving activities (cuts/fills) to achieve proposed subgrade
  - Compact subgrade
  - Install storm drainage perforated collector pipe
  - Install perimeter turf anchor curb
  - Furnish and install geotextile fabric on subgrade
  - Import, spread, grade, roll, and laser grade dynamic base stone (4")
  - Import, spread, grade, roll, and laser grade dynamic topping stone (2")

- **Synthetic Turf**
  - Furnish and install PFAS Free synthetic turf for field
  - Synthetic turf with SBR rubber and sand infill
  - Center 'G' logos and up to 4 field markings per field
  - Post installation GMAX field testing

- **Site Improvements**
  - Supply and install 20' height ball safety netting includes foundations, ground sleeves, posts, netting, and hardware on lacrosse field. Foundations only on soccer field.
  - Supply and install turf communication boxes within synthetic turf field
  - Furnish and install conduits for future electrical and lighting system
  - Furnish and install stone dust pathways around field
  - Furnish and install 4' ht. chain link fencing and gates around field
  - Furnish and install concrete base for permanent bleacher system

- **225 Seat Permanent Bleacher System**
  - Furnish and install metal system of bleachers with ADA access ramp and ADA seating

- **Project Closeout**
  - Clean site and demobilize
  - Provide project as-built and warranty information
  - Provide field care training to staff and deliver attic stock to Town specified location on site

**Alternate 1: Ball Netting Soccer Field** **$ 49,600.00**

- Furnish and install 16' netting above 4' tall fencing
- Includes, poles, hardware for poles, netting and installation
- +/- 200 l.f. each side of field

**Alternate 2: Scoreboard** **$ 55,600.00**

- Furnish and install new LED fully programable scoreboard 4.5' x 18' scoreboard
- Furnish and install foundations

**Alternate 3: Additional Scoreboard** **$ 25,000.00**

- Furnish and install additional scoreboard on foundation

**Alternate 3: Scoreboard Upgrades** **$ 39,600.00**

- Furnish and install decorative truss above scoreboard
- Furnish and install naming panel above scoreboard
- Increase foundation size to accommodate upgrades

***EXCLUSIONS:***

- *Any costs associated with necessary charges relating to the delineation of the field*
- *The supply of manholes or clean-outs or grates, or supply of the manhole covers*
- *Any alteration or deviation from specifications involving extra costs, which alteration or deviation will be provided only upon executed change orders, and will become an extra charge over and above the offered price*
- *Soil stabilization or remediation of any type*
- *Rock excavation and/or ledge removal*
- *Offsite disposal of generated spoils other than topsoil*
- *Excavation or disposal of unsuitable or contaminated soils*
- *Site security*
- *Wetland remediation*
- *Alterations to buildings or structures*
- *All electrical wiring*
- *New scoreboard or existing scoreboard relocation*
- *Once subgrade has been established, a proof roll will be performed to ensure structural stability of the soils; in the event that unsuitable soils are encountered, a price to remedy these areas can be negotiated based on recommended methods per project Engineer*
- *Testing or Inspection Fees*
- *Site restoration, sodding, landscaping or grow-in beyond disturbed areas*
- *Repair or resurfacing existing asphalt parking lot if damaged by truck traffic*
- *All union labor, prevailing wages or other labor law levies*
- *Permits and permit fees*
- *Contingency*
- *Plantings*
- *Any work not listed in the inclusions*

*The price is valid for a period of 90 days. The price is subject to increase if affected by an increase in raw materials, freight, or other manufacturing costs, a tax increase, new taxes, levies or any new legally binding imposition affecting the transaction.*

**Please feel free to reach out to any member of our project team with questions about our offer:**

**Andrew Dyjak**
Regional Vice President
(860) 333-7839
Andrew.Dyjak@Fieldturf.com

**Chris Hulk, PE**
Director of Design & Construction
(203) 676-4445
Christopher.Hulk@FieldTurf.com

**Jonathan Luster, PE**
Regional Construction Manager
(860) 227-4915
Jonathan.Luster@FieldTurf.com

Thank you again for your interest in FieldTurf, we look forward to working with you.

Per: _____

Marie-Christine Raymond, Director of Operations
FieldTurf USA, Inc. / Tarkett Sports Canada, Inc.

**FieldTurf USA, Inc. holds the Cooperative Purchase contract, any PO for Contract must be made out to FieldTurf USA, Inc. 175 N Industrial Blvd NE. Calhoun, GA 30701**

If you have questions regarding the FieldTurf and Beynon SmartBuy Cooperative Purchasing Program, please contact Eric Fisher at: Eric.Fisher@smartbuycooperative.com.

Smart Buy
PURCHASING PROGRAM
FIELDTURF • BEYNON

## CONDITIONS

Notwithstanding any other document or agreement entered into by FieldTurf in connection with the supply and installation only of its product pursuant to the present bid proposal, the following shall apply:

a) This bid proposal and its acceptance is subject to strikes, accidents, delays beyond our control and *force majeure.*

b) FieldTurf's preferred payment terms are as follows: (i) 50% of the Price upon Customer's execution of contract; (ii) 40% of the Price upon shipment of materials from FieldTurf's manufacturing facility; and (iii) Remaining balance of ten percent (10%) upon substantial completion of the field, which shall be achieved when Customer is able to use the field for its intended purpose, even if punchlist items remain and the Certificate of Completion has not been executed by Customer.

c) Accounts overdue beyond 30 days of invoice date will be charged at an interest rate of 10% per annum.

d) FieldTurf requires a minimum of 21 days after receiving a fully executed contract or purchase order and final approvals on shop drawings to manufacture, coordinate delivery and schedule arrival of installation crew. Under typical field size and scenario, FieldTurf further requires a minimum of 28 days per field to install the Product subject to weather and force majeure

e) FieldTurf requires a suitable staging area. Staging is anticipated in the last row of parking in the adjacent parking lot. minimum access of 15 feet wide by 15 feet high, and, no more than 100 ft from the site. A 25 foot wide by 25 foot long hard or paved clean surface area located within 50 feet of the playing surface shall be provided for purposes of proper mixing of infill material. Access to any field will include suitable bridging over curbs from the staging area to permit suitable access to the field by low clearance vehicles. Staging area surface shall be suitable for passage with motor vehicles used to transport materials to the site and/or staging area. FieldTurf shall not be liable for any damages to the staging area or its surface unless such damages are caused by FieldTurf's intentional misconduct or negligence.

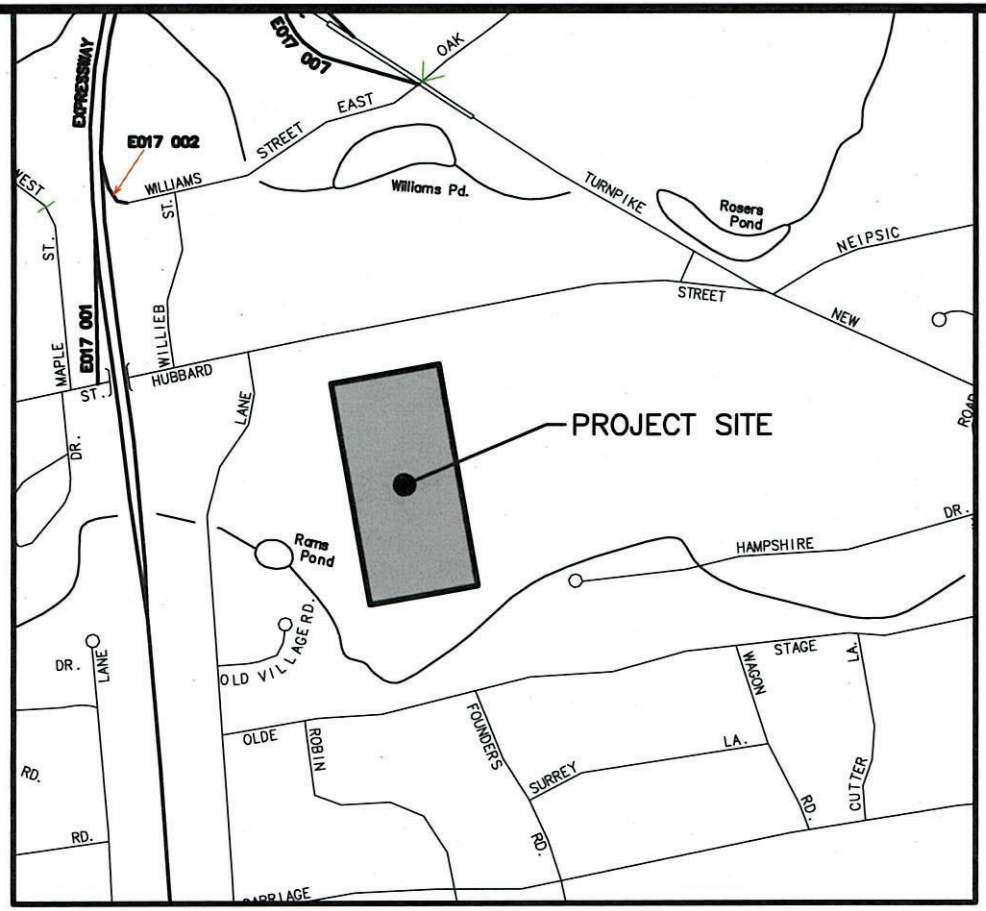
f) This proposal is based on a single mobilization. If the site is not ready and additional mobilizations are necessary, additional charges will apply.

g) Upon substantial completion of FieldTurf's obligations, the Customer shall sign FieldTurf's Certificate of Completion in the form currently in force; to accomplish this purpose, the Customer will ensure that an authorized representative is present at the walk-through to determine substantial completion and acceptance of the field, which may include a list of punch list items.

h) FieldTurf shall not be a party to any penalty clauses and/or liquidated damages provisions.

i) FieldTurf shall be entitled to recover all costs and expenses, including attorney fees, associated with collection procedures in the event that FieldTurf pursues collection of payment of any past due invoice.

j) All colors are to be chosen from FieldTurf's standard colors.




**LOCATION MAP**

SCALE: 1"=1000'

N

# GLASTO FIELDS

ETC
ETC
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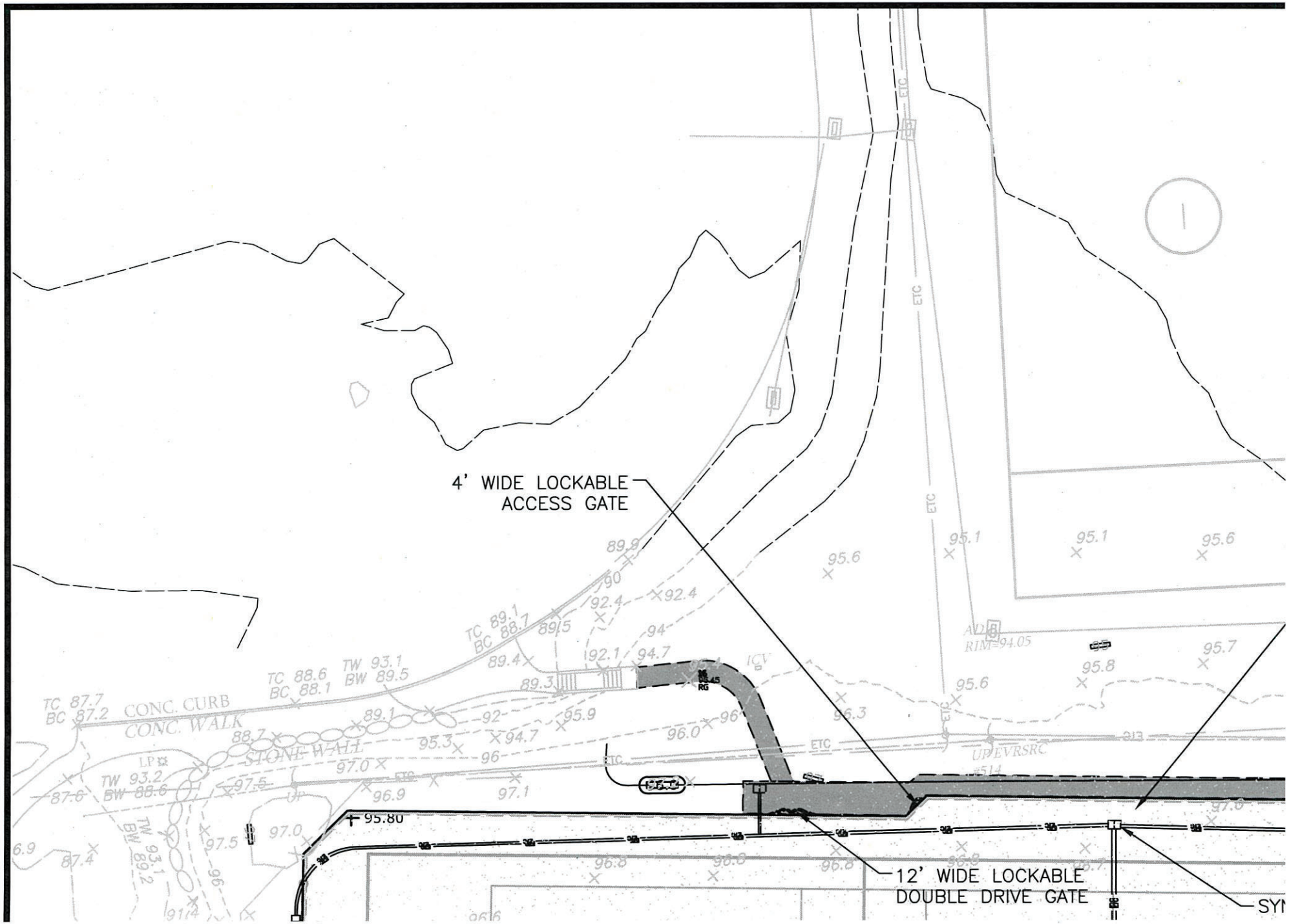
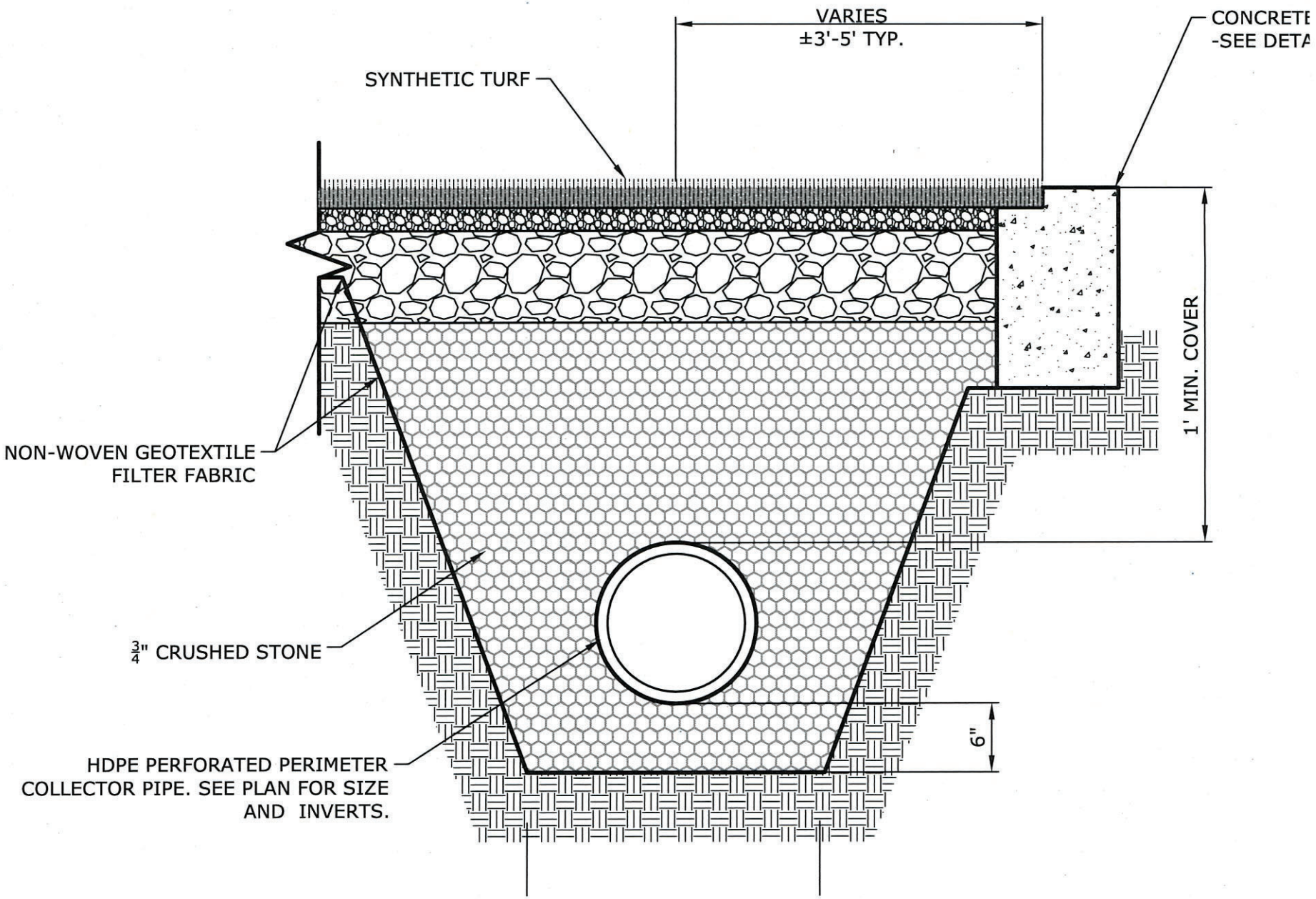
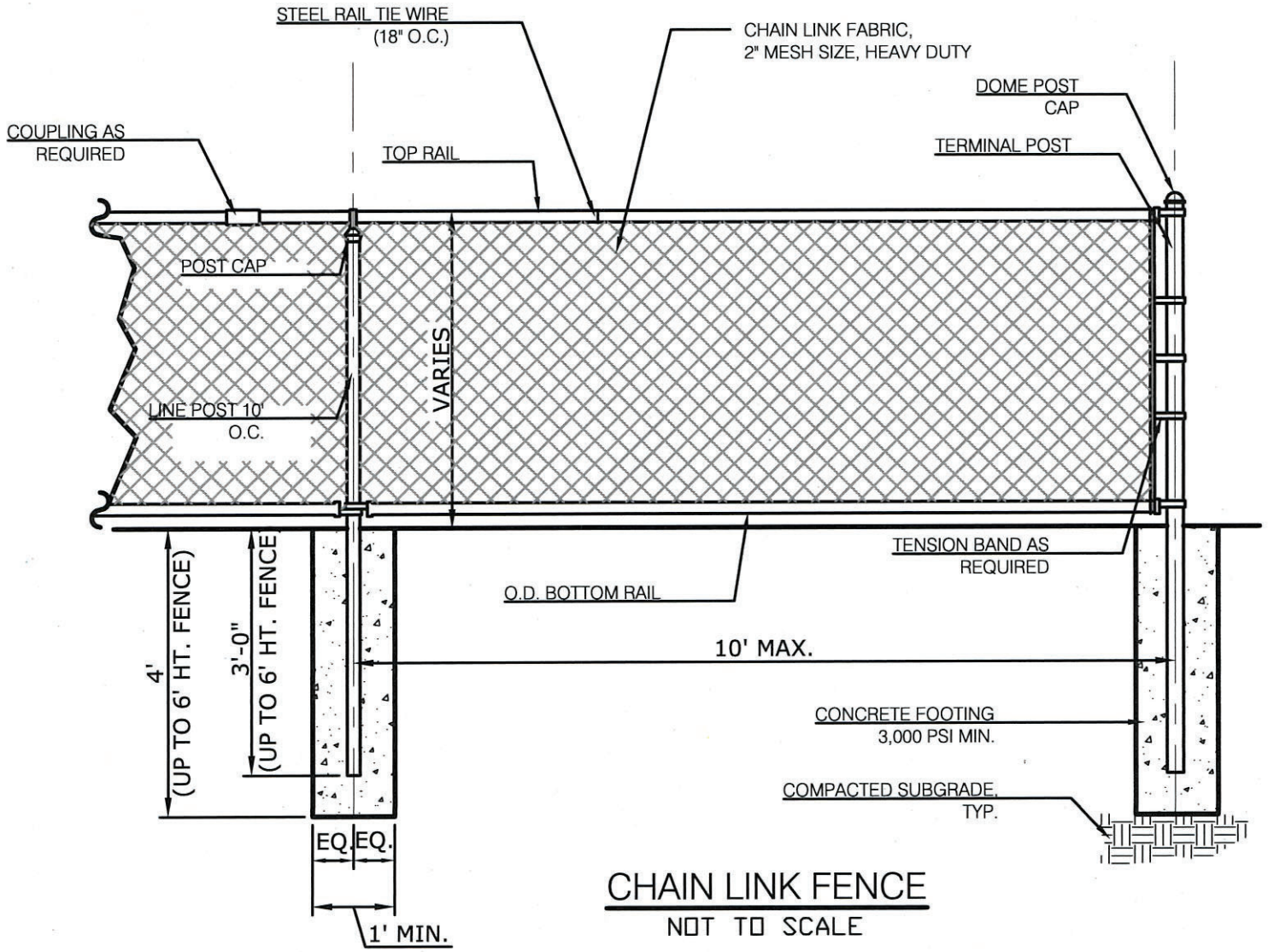

4' WIDE LOCKABLE
ACCESS GATE
12' WIDE LOCKABLE
DOUBLE DRIVE GATE
SYN
CONC. CURB
CONC. WALK
STONE WALL
ETC
95.80


VARIES
±3'-5' TYP.
SYNTHETIC TURF
CONCRETE
-SEE DETA
1' MIN. COVER
NON-WOVEN GEOTEXTILE
FILTER FABRIC
¾" CRUSHED STONE
6"
HDPE PERFORATED PERIMETER
COLLECTOR PIPE. SEE PLAN FOR SIZE
AND INVERTS.

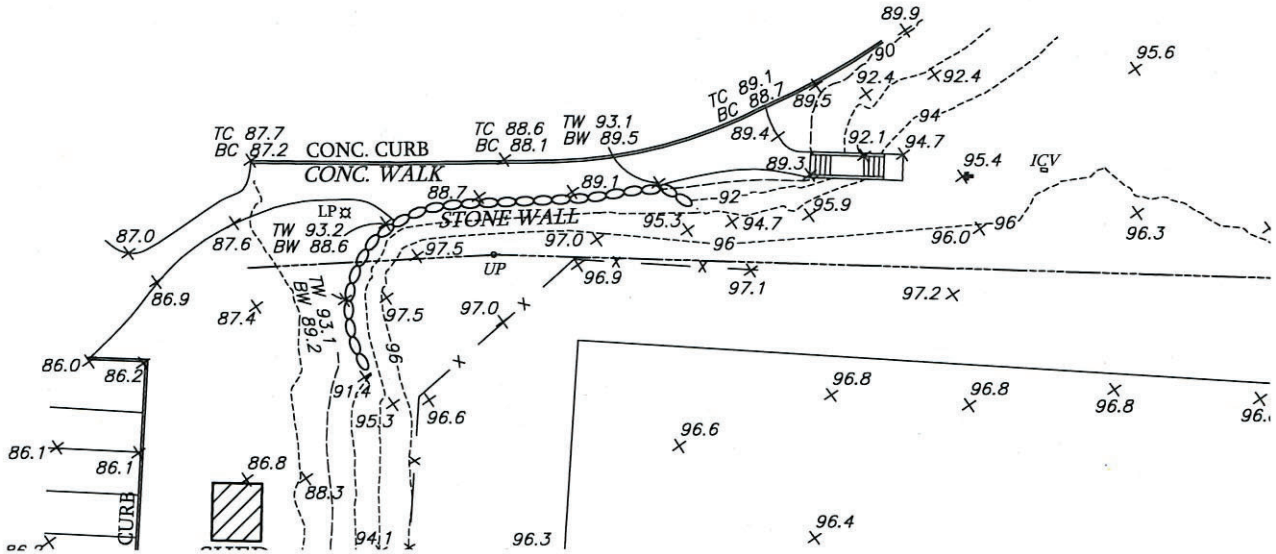



## CHAIN LINK FENCE
NOT TO SCALE

**CHAIN LINK FENCE**
**POST AND RAIL SIZING**

**NOTE:**

1. ALL CHAIN LINK POSTS, RAILS, FABRIC AND HARDWARE TO BE BLACK VINYL


TC 87.7
BC 87.2
CONC. CURB
CONC. WALK
TC 88.6
BC 88.1
TW 93.1
BW 89.5
TC 89.1
BC 88.7
LP
TW 93.2
BW 88.6
STONE WALL
UP
TW 93.1
BW 89.2
CURB
ICV
89.9
90
92.4
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94
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97.5
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96
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97.2
86.9
87.4
97.5
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96
86.0
86.2
91.4
95.3
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96.8
96.8
96.6
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86.1
86.8
88.3
94.1
96.3
96.4

## COSTS

If one field was done this year the cost out be around $2.1 - $2.2mm and if the 2nd field waited another year, it would be an additional $1.2-1.4mm. As an example, if you asked a contractor to build half a duplex then stop for a year and then build the 2nd half of the duplex it would cost more. Economies of scale and annual cost increases, especially at a time when oil is in flux creates the increase in prices.

1. Please provide a cost estimate for the stadium turf field replacement if Glastonbury were to use: A) An EPDM infill, or B) the best-performing of Field Turf's natural infills (not sure if this would be cork or other material).

   EPDM - $2.40 per square foot adder and that includes a pad or $216,000
   Cork - $1.90 per square foot adder and that includes a pad or $171,000

2. Does EPDM infill require an underlayment pad, and would it increase the risk of injuries compared to the current proposal of cryogenic rubber & sand? (I already understand that the natural infills require an underlayment and increase the risk of injuries, I just wasn't sure for EPDM.)

   It is not required but it is strongly recommended to use a pad. Yes, data shows injuries go up the less amount of infill you can install in a field and with EPDM you can get a maximum of 6 lbs. of infill per square foot, which is about 30% less than the cryogenic rubber and sand infill.

3. What would be the cost to add on the CoolPlay option for each of the 3 infill options?

   You can only add the cool play to the cryo rubber and sand infill because it is the substitute for the smaller cryo rubber top layer. The adder is .70 per square foot or $63,000

4. If the GHS existing infill were to be tested and reused:

   - What would it be tested for, who would do the testing, what protocols would be used, and which lab(s) would physical samples be sent to?

     The lab that tests it is in our production factory in GA. It tests for the degradation of the rubber and the amount, if any, of organic matter. This will determine the life of the rubber and the anticipated infiltration rate of the infill. A technician would go to the field and in a variety of areas vacuum up the infill, send it to our lab via mail and the lab would test it.

   - What is the timeline for completing the testing and getting an independent written report of the results?

     We could send the infill for testing in a few days and the report (it is basically a pass / fail on whether or not the infill should be re-used) would take a week or so.

5. Does FieldTurf typically cover the testing cost? Always

6. What would be the "small credit" for reusing the infill, assuming the testing results are acceptable?

   It depends on the quality of the infill, and it averages about .20 - .22 cents per square foot or $18,00 - $20,000.

7. What are the maintenance issues and maintenance costs of the proposed turf outlined in the FieldTurf contract?

   The fields have to be groomed and swept a few times a season. This is not much of an issue for most fields. If it becomes an issue we provide a professional service and that is approximately $3,500 a visit but goes down the number of times per year you groom and amount of fields are groomed at one site.

8. What are the maintenance issues and maintenance costs regarding EPDM infill material and cork infill?

   EPDM needs to be groomed more because it gets displaced easier and cannot be re-used in a replacement. Cork, absorbs water, freezes, gets displaced and has to be re-infilled and cannot be re-used during a replacement.

9. Is there special equipment needed to clean the surface and keep it from getting moldy of the proposed fields versus EPDM versus cork infill. No.

10. To renovate the HS football field, what would be the additional cost of using EPDM infill material and cork infill – Answered above.

11. What's the additional cost of using EPDM infill material and cork infill for the new two artificial fields proposed –

    Field 12
    EPDM - $2.40 a square foot or $230,000
    Cork - $1.90 a square foot or $181,000

    Field 13
    EPDM - $2.40 a square foot or $220,000
    Cork - $1.90 a square foot or $175,000

12. What would be the estimated cost one year from now of turning the HS artificial football field back to natural grass?

    We have never done a project like that before but the estimated cost is approximately $1.9 - $2.1mm

13. How often should these artificial fields be cleaned?

    The do not have to have any special cleaning. If blood or throw up is on the fields then there is a special cleaner that can be used and then washed with water.

14. Is the lubricant that FieldTurf refuses to name a forever chemical? A PFAS precursor? No

15. Can you explain why we should not be concerned about crumb rubber infill from recycled tires that is banned in the EU due to having PFAS and other toxins in it?

    Because there is not one study that has shown there are any negative health affect from playing on an artificial turf field.

16. What materials and technology is FieldTurf selling in Europe given that the current proposal is for material that is banned in the EU?

    The European Union did vote in favor of a Microplastics ban was accepted with an 8 year transition plan which takes effect October 17, 2031.
    So, it currently is NOT banned in the European Union, but in a phase out. As a result, in many cases, fields around the EU still do utilize crumb rubber.
    For those looking to transition before October 2031, organic options have become the most popular solution.

17. What is the price difference for replacing the existing stadium field with a field with EPDM infill? Cork infill? Olive infill? What are the durability differences? Sources? – See above.

18. Do you have sources or statistics on the durability of EPDM infill versus crumb rubber infill in the Northeast? About 15% less and it cannot be re-used for a replacement.

19. What is the fraction of currently disposed FieldTurf fields that is recycled? Sold to others to be reused?

    Our recycling plant recycles about 35 fields a year, mostly from the New England Area. If a field is supposed to be recycled it is done so. Other areas of the country it is not recommended so it is not done as often.

20. Can you please provide sources and detailed calculations for the FieldTurf-provided 4:1 estimates of the number of grass turf fields that an artificial turf field would replace?

    It is based on hours of use and depends on each field. A normal grass field can maintain about 10 hours of play in good weather per week. A synthetic field can do at least 4 times that amount and in all weather

conditions thus many more months throughout the year. Also, a natural field should rest for growing once every 4 or so years.

21. Can you please provide sources for statements made about the safety of turf fields relative to grass fields? See attached document "*Incidence, Causes, and Severity of High School Football Injuries on FieldTurf Versus Natural Grass"*

# Incidence, Causes, and Severity of High School Football Injuries on FieldTurf Versus Natural Grass

## A 5-Year Prospective Study

Michael C. Meyers,*† PhD, FACSM, and Bill S. Barnhill,‡ MD
*From the †Human Performance Research Center, West Texas A&M University, Canyon, Texas, and ‡Panhandle Sports Medicine Associates, Amarillo, Texas*

**Background:** Numerous injuries have been attributed to playing on artificial turf. Recently, FieldTurf was developed to duplicate the playing characteristics of natural grass. No long-term study has been conducted comparing game-related, high school football injuries between the 2 playing surfaces.

**Hypothesis:** High school athletes would not experience any difference in the incidence, causes, and severity of game-related injuries between FieldTurf and natural grass.

**Study Design:** Prospective cohort study.

**Methods:** A total of 8 high schools were evaluated over 5 competitive seasons for injury incidence, injury category, time of injury, injury time loss, player position, injury mechanism, primary type of injury, grade and anatomical location of injury, type of tissue injured, head and knee trauma, and environmental factors.

**Results:** Findings per 10 team games indicated total injury incidence rates of 15.2 (95% confidence interval, 13.7-16.4) versus 13.9 (95% confidence interval, 11.9-15.6). Minor injury incidence rates of 12.1 (95% confidence interval, 10.5-13.6) versus 10.7 (95% confidence interval, 8.7-12.7), substantial injury incidence rates of 1.9 (95% confidence interval, 1.4-2.6) versus 1.3 (95% confidence interval, 0.8-2.1), and severe injury incidence rates of 1.1 (95% confidence interval, 0.7-1.7) versus 1.9 (95% confidence interval 1.2-2.8) were documented on FieldTurf versus natural grass, respectively. Multivariate analyses indicated significant playing surface effects by injury time loss, injury mechanism, anatomical location of injury, and type of tissue injured. Higher incidences of 0-day time loss injuries, noncontact injuries, surface/epidermal injuries, muscle-related trauma, and injuries during higher temperatures were reported on FieldTurf. Higher incidences of 1- to 2-day time loss injuries, 22+ days time loss injuries, head and neural trauma, and ligament injuries were reported on natural grass.

**Conclusions:** Although similarities existed between FieldTurf and natural grass over a 5-year period of competitive play, both surfaces also exhibited unique injury patterns that warrant further investigation.

**Keywords:** artificial surface; knee; head; adolescent; environment

Over the past decades, numerous studies have attributed a greater risk and incidence of articular and concussive trauma to playing on artificial turf when compared to natural grass.[2,10,23,26,32,45,55,60] More recently, a new generation of synthetic surface called FieldTurf, which is composed of a polyethylene/polypropylene fiber blend stabilized with a graded silica sand and ground rubber infill, was developed to duplicate the playing characteristics of natural grass.

Although FieldTurf has been recommended as a viable option to natural grass in the prevention of injuries, research into the long-term effects of FieldTurf on injuries, during actual game conditions over several seasons of competition, has not been published in the scientific literature. With more than 1 million athletes playing high school football,[43] the rising number and cost of knee surgeries and rehabilitation alone reaching more than $1 billion each year,[16,22] coupled with the psychological trauma and setbacks in training typically experienced by athletes

*Address correspondence to Michael C. Meyers, PhD, FACSM, Human Performance Research Center, Department of Sports & Exercise Science, WTAMU Box 60216, West Texas A&M University, Canyon, TX 79016 (e-mail: mmeyers@mail.wtamu.edu).

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after a significant injury,[40] efforts to address ways to minimize predisposition to injury are warranted. Therefore, the purpose of this study was to quantify incidence, causes, and severity of game-related high school injuries on FieldTurf versus natural grass. It was hypothesized that high school athletes would not experience any difference in the incidence, causes, and severity of game-related injury between FieldTurf and natural grass.

## MATERIALS AND METHODS

### Population

A final total of 8 Texas high schools, classified as either 4A (900-1909 students) or 5A (1910+ students) by the University Interscholastic League governing body, were evaluated for game-related football injuries sustained while playing on both FieldTurf and natural grass during a 5-year period from year 1998 to 2002. The specific schools were selected based on availability of both playing surfaces during the competitive season, uniformity of sport skill level, and the presence of a full-time certified athletic training (ATC) staff, minimizing the potential for injury reporting bias.[13,56] The study initially started with 4 high schools over the first 4 years, resulting in an initial total of 165 seasonal and playoff games. An additional 4 high schools were added to the initial 4 schools in year 5, resulting in an additional 85 games. With the exception of deleting games played on other artificial surfaces (n = 10), selection bias was avoided by reporting all remaining games and subsequent injuries on either FieldTurf or natural grass. This resulted in a total of 240 games over the 5-year period played on either FieldTurf (n = 150) or natural grass (n = 90).

Two district stadiums using FieldTurf were used by all 8 schools. Both FieldTurf surfaces were installed within 3 years of each other and were considered new, high-quality surfaces by the ATCs. Different natural grass fields were used across the same geographical region, with similar quality and environmental influences. All teams, however, practiced on grass.

To quantify the history and potential influence of prior injuries, all athletes underwent preparticipation physical examinations under the care of an orthopaedic surgeon (B.S.B.). Criteria for exclusion included (1) any known preexisting congenital or developmental factor that predisposed an athlete to potential injury and (2) the acknowledgment, complaint, or observed evidence of any medical or orthopaedic problem severe enough to compromise an athlete's performance or endanger his health as determined by self-response, medical history, and interview.[9,66]

### Procedures

Based on paradigms suggested in prior research,[19,33,38,68] it was decided that a multifactorial approach that encompassed teams playing on both surfaces during the same time period, using a definitive but brief injury surveillance form, would provide several advantages. These include gaining a greater comparison of the nuances of each surface's influence on injury, avoiding limitations in data collection (eg, seasonal variation, subject randomization by surface), and minimizing difficulties in analyses and interpretation of findings that former studies have had.[2,51] For this prospective cohort study, a 2-sided, single-page injury surveillance form was developed based on prior criteria recommended and established in the literature (available as an appendix in the online version of this article at www.ajsm.org/cgi/content/32/7/1626/DC1).[28,33,41,44,46,50] The form includes the following: athletic identification number; athletic trainer; date of injury; athlete weight; school; type of playing surface; surface quality; surface age; temperature and humidity at game time; year/skill level of athlete; where the injury occurred; weather/field conditions; injury category; time period of injury; injury classification; injury time loss; position played at time of injury; injury situation; injury mechanism; personnel determining the injury; injury site location; principle body part; primary type of injury; grade of injury; occurrence of external bleeding; injury because of illegal action; head, eye, knee, shoulder, and thoracic/abdominal diagnosis; surgical intervention and time; and musculoskeletal, joint, or organ location of injury. The injury surveillance form was initially introduced to the high school ATCs at a preseason staff meeting to discuss and ensure face validity of the instrument. The form was then pretested during preseason practices and scrimmages to again quantify accuracy, comprehensiveness of information, and ease of application, and it was deemed adequate by ATCs and physicians.

The respective ATCs for each school were initially approached because of their daily interaction with the athletes and coaches during and after sport trauma and their expertise in injury recognition.[3,13] During a scheduled offseason meeting, we provided all ATCs with an overview of the purpose, procedures, benefits, time demands, and importance of the study. They were also provided with copies of the injury surveillance form and detailed instructions for completion to avoid the potential for performance and detection biases.[51,56] After full explanation, all ATCs appeared enthusiastic and agreed to participate in the data collection without financial incentive. Informed consent was voluntarily obtained from the appropriate reporting staffs, and the study was conducted in accordance with the guidelines for use of human subjects as stipulated by the American College of Sports Medicine.[4]

All regular season conference and nonconference varsity games and postseason varsity playoff games were included. Injury data were recorded after game completion, with additional support from ATC notes to avoid lapse of memory leading to inaccuracy or response distortion.[51,68] All game-related injuries were evaluated by the attending head athletic trainer and team physicians on site and subsequently in the physician's office when further follow-up and treatment was deemed necessary. Any sport trauma that occurred toward the end of the competitive schedule was monitored beyond the player's specific season to determine date of recovery and functional return to play.[2,24]

Completed injury surveillance forms were either mailed or faxed to us within 3 working days after a game and were entered in the database before the next game. A follow-up telephone visit was used to obtain any additional information pertaining to any changes or additions in diagnosis, treatment, or time to return to play. To avoid the potential for on-the-field detection bias,[56] a single-blind outcome approach was maintained throughout the study period, with total data collection, compilation, and analyses limited to the data coordinator.

## Definitions

Although any definition of injury and level of trauma lacks universal agreement and has its shortcomings,[13,46,51] we attempted to define injury based on a combination of functional outcome, observation, and treatment.[13,24,46,50,64] A *reportable injury* was defined as any game-related football trauma that resulted in (1) an athlete missing all or part of a game, (2) time away from competition, (3) any injury reported or treated by the athletic trainer or physician, and (4) all cranial/cervical trauma reported. Although some authors have recommended omitting minor injuries,[46,51] others have expressed a need to quantify and track these typically overlooked minor traumas to avoid underreporting of injury and to monitor those injuries that may turn into chronic or overuse problems.[14,28,41,69,71] Prior studies have also revealed that 42% to 60% of competitive trauma results in minimal time loss and medical cost.[52,68] Therefore, we felt that a definition that included functional outcome, observation, and treatment on all injuries would more clearly quantify the unique nuances or trauma observed with each playing surface and reduce the individual and player bias that allegedly influences injury reporting based solely on time loss.[51]

Injury time loss was based on the number of days absent from practice or game competition and was divided into 0, 1 to 2, 3 to 6, 7 to 9, 10 to 21, and 22 days or more of recovery time. Not surprisingly, a review of the literature revealed high subjectivity in the determination of what constitutes moderate or severe injury. Whereas any injury resulting in time loss of approximately 7 to 28 days has been considered moderate trauma and a time loss range of 21 to 28 days has been defined as severe,[35,68] others have defined severe injury as trauma resulting in ≥7 days of time loss.[6,28,33,42,48,54,59,62] Furthermore, what constitutes a moderate injury in one athlete (eg, elbow injury in an offensive lineman) may be considered severe when diagnosed in the throwing arm of a quarterback.[59,69] Therefore, we chose to define any trauma that required 0 to 6 days of time loss as a *minor injury*, an injury that required 7 to 21 days of time loss resulting in the athlete being unable to return to play at the same competitive level as a *substantial injury*, and trauma that required 22+ days of time loss as a *severe injury*. The delineation and subsequent analysis of minor, substantial, and severe injury primarily served to minimize potential time loss bias.[13,64]

Injury category was quantified by player-to-player collision, player-to-turf collision, injuries attributed to shoe-surface interaction during player contact, injuries attributed to shoe-surface interaction without player contact, and muscle-tendon–related overload. Time of injury by pregame and game quarter of play was documented to delineate the influence of fatigue over time from the potential surface influence on injury occurrence.[68,71]

Acute trauma was delineated from recurrent and overuse injury according to criteria previously published,[34,38,67] with acute trauma linked to an incidence that specifically occurred during a competitive game versus repetitive exposure resulting in symptoms and injury to the same location during the season (recurrent). An *overuse injury* was defined as repetitive exposure resulting in trauma and sequelae with no definitive onset.[38,71]

To enhance optimal cell size and interpretation, the 23 player positions were condensed and analyzed by offense, defense, and special teams. *Mechanism of injury* was defined as occurring while a player was blocked above or below the waist, tackled above or below the waist, blocking, tackling, impacting with the playing surface, stepped on, fallen on or kicked, blocking a kick or punt, or sprinting or running with no player contact.

To optimize analyses, primary type of injury was combined into the following categories: surface/epidermal (abrasion, laceration, puncture wound), contusion, concussion, inflammation (bursitis, tendinitis, fasciitis, synovitis, capsulitis, apophysitis), ligament sprains, ligament tears, muscle strain/spasm, muscle tear, tendon strain, hyperextension, neural (burner, brachial plexus), subluxation/dislocation, and fracture (standard, epiphysial, avulsion, stress, osteochondral). Injuries were also defined according to grade (1, 2, or 3). Anatomical location of injury was combined from 40 physical areas and analyzed by cranial/cervical, upper extremity, thoracic, and lower extremity trauma and further analyzed by type of tissue injured (bone, joint, muscle, neural, other). Cranial/cervical trauma included grade 1 to 3 concussion, hematoma, postconcussion and second-impact syndromes, neurological sequelae (eg, stingers/burners, transient quadriplegia), vascular or dental injury, or associated fractures, sprains, and strains.[9] Neural trauma was restricted to any injury involving only concussion, associated syndromes, and neurological sequelae. Because of growing concerns addressing excessive head and knee trauma in football,[9,10,13,22,27,31,51,53] these areas were specifically identified for further analyses (Table 1).

Although one study has associated a greater rate of injury with competing under dry surface conditions,[58] there has been a paucity of information on factors such as weather conditions and the effect of playing under surface conditions that influence injury frequency.[22,61,65] Therefore, environmental factors such as field conditions, temperature, and humidity were obtained before game time by each team's respective ATC and/or through the local airport climatic data center to ascertain the potential influence on injury from changes in weather throughout the season.[2]

## Statistical Analyses

Because of variations in the frequency of injury within several categories potentiating inadequate cell size, statis-

TABLE 1
Frequency and Rate of Game-Related High School Football Injuries Between FieldTurf and Natural Grass by Head and Knee Trauma[a]

| | FieldTurf | | | | Natural Grass | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Number of Injuries | % | IRR | 95% CI | Number of Injuries | % | IRR | 95% CI |
| Head injury | | | | | | | | |
| 1° cerebral concussion | 7 | 58.4 | 0.5 | 0.2-0.9 | 11 | 68.8 | 1.2 | 0.7-2.1 |
| 2° cerebral concussion | 3 | 25.0 | 0.2 | 0.1-0.6 | 4 | 25.0 | 0.4 | 0.2-1.1 |
| 3° cerebral concussion | 0 | 0.0 | 0.0 | 0.0-0.0 | 1 | 6.2 | 0.1 | 0.0-0.6 |
| Posttraumatic headache | 1 | 8.3 | 0.1 | 0.0-0.4 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Second-impact syndrome | 1 | 8.3 | 0.1 | 0.0-0.4 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Concussion injuries combined | 10 | 83.4 | 0.7 | 0.4-1.2 | 16 | 93.8 | 1.8 | 1.1-2.7 |
| Knee injury | | | | | | | | |
| Medial collateral | 17 | 65.5 | 1.1 | 0.7-1.7 | 9 | 42.9 | 1.0 | 0.5-1.8 |
| Lateral collateral | 1 | 3.8 | 0.1 | 0.0-0.4 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Anterior cruciate | 3 | 11.5 | 0.2 | 0.1-0.6 | 4 | 19.0 | 0.4 | 0.2-1.1 |
| Posterior cruciate | 0 | 0.0 | 0.0 | 0.0-0.0 | 1 | 4.8 | 0.1 | 0.0-0.6 |
| ACL and associated tissue | 3 | 11.5 | 0.2 | 0.1-0.6 | 5 | 23.8 | 0.6 | 0.2-1.2 |
| Patellar tendon/syndrome | 2 | 7.7 | 0.1 | 0.0-0.5 | 2 | 9.5 | 0.2 | 0.1-0.8 |
| ACL injuries combined | 6 | 23.0 | 0.4 | 0.2-0.8 | 9 | 42.8 | 1.0 | 0.5-1.8 |

[a]%, percentage of total injuries within each category that occurred on the specific playing surface; IRR, injury incidence rate = (number of injuries ÷ total number of injuries) × 10; CI, confidence interval.

tical power, and limitations on analysis, data were combined after the 5-year period based on prior recommendations in the literature.[33,46] This step resulted in the following categories: injury category, time of injury, injury classification, injury time loss, position played at time of injury, injury mechanism, injury site location, primary type of injury, grade of injury, anatomical location of injury, type of tissue injured, head diagnosis, knee diagnosis, and environmental factors. Tabular-frequency distributions were computed for data in each category using the Statistical Package for Social Sciences (version 10.0, SPSS Science Inc, Chicago, Ill) software. For ease of interpretation, the percentages of total injuries within each category that occurred on the specific playing surface were calculated, and 95% confidence intervals (95% CIs) were determined as described elsewhere.[57]

Because most high schools schedule a similar number of games each season, exposure to injury was defined in terms of team games, as previously recommended.[68] Using this definition, injury incidence rate (IRR) was expressed using (1) injuries per 10 team games = (number of injuries ÷ number of team games) × 10 and (2) injuries per team game = number of injuries ÷ number of team games.

To achieve a more thorough understanding beyond traditional frequency analyses and to eliminate the possibility of irrelevant sources of error,[37,38] data were numerically recoded, grouped by playing surface (FieldTurf, natural grass), and subjected to multivariate analyses of variance (MANOVAs) and Wilks' lambda criteria using general linear model procedures.[37] Data screening revealed no violations of multivariate normality, linearity, outliers, homogeneity of variance, multicollinearity, or singularity.[63] When significant main effects were observed, univariate post hoc procedures were performed within each dependent variable based on the total percentage of injuries reported on each playing surface. An experiment-wise type I error rate of 0.05 was established a priori, and least squared means procedures were required because of the uneven number of observations on which to compare differences between variables. Statistical power analyses ($1 - \beta$; n size calculations) were performed and ranged from .063 to .814 at the $P$ value selected to establish significance in this study.

## RESULTS

### Injury Incidence

A total of 240 high school games were evaluated for game-related football injuries sustained while playing on FieldTurf or natural grass during a 5-year period (Table 2). Overall, 150 (62.5%) team games were played on FieldTurf versus 90 (37.5%) team games played on natural grass. A total of 353 injuries were documented, with 228 (64.6%) occurring during play on FieldTurf as compared to 125 (35.4%) on natural grass.

When comparing IRRs between types of playing surface, injuries per 10 team games of 15.2 (95% CI, 13.2-16.4) versus 13.9 (95% CI, 11.9-15.6) and injuries per team game of 1.5 (95% CI, 1.0-2.2) versus 1.4 (95% CI, 0.8-2.3) were documented on FieldTurf versus natural grass, respectively. When comparing substantial IRRs (injuries requiring 7-21 days of injury rehabilitation) between type of playing surface, injuries per 10 team games of 1.9 (95% CI, 1.4-2.6) versus 1.3 (95% CI, 0.8-2.1) and injuries per team game of 0.19 (95% CI, 0.07-0.44) versus 0.13 (95% CI, 0.03-0.46) were documented on FieldTurf versus natural grass, respectively. When comparing severe IRRs (injuries

TABLE 2
Incidence of Game-Related High School Football Injuries Between FieldTurf and Natural Grass

| Variable | FieldTurf | Natural Grass | Total/ Mean |
|---|---|---|---|
| Games evaluated | | | |
| Number of team games | 150 | 90 | 240 |
| Team games, % | 62.5 | 37.5 | 100.0 |
| All injuries | | | |
| Number of injuries | 228 | 125 | 353 |
| Injuries, % | 64.6 | 35.4 | 100.0 |
| Injuries per 10 team games[a] | 15.2 | 13.9 | 14.7 |
| Injuries per team game[b] | 1.52 | 1.38 | 1.47 |
| Minor injuries[c] | | | |
| Number of injuries | 182 | 96 | 278 |
| Injuries, % | 65.0 | 35.0 | 100.0 |
| Injuries per 10 team games | 12.1 | 10.7 | 11.6 |
| Injuries per team game | 1.21 | 1.07 | 1.16 |
| Substantial injuries | | | |
| Number of injuries | 29 | 12 | 41 |
| Injuries, % | 70.7 | 29.3 | 100.0 |
| Injuries per 10 team games | 1.9 | 1.3 | 1.7 |
| Injuries per team game | 0.19 | 0.13 | 0.17 |
| Severe injuries | | | |
| Number of injuries | 17 | 17 | 34 |
| Injuries, % | 50.0 | 50.0 | 100.0 |
| Injuries per 10 team games | 1.1 | 1.9 | 1.4 |
| Injuries per team game | 0.11 | 0.19 | 0.14 |

[a]Injuries per 10 team games = (number of injuries ÷ number of team games) × 10.
[b]Injuries per team game = number of injuries ÷ number of team games.
[c]Minor injury = 0 to 6 days of injury time loss; substantial injury = 7 to 21 days of injury time loss; severe injury = 22 or more days of injury time loss.

requiring 22 or more days of injury rehabilitation) between type of playing surface, injuries per 10 team games of 1.1 (95% CI, 0.7-1.7) versus 1.9 (95% CI, 1.2-2.8) and injuries per team game of 0.11 (95% CI, 0.03-0.35) versus 0.19 (95% CI, 0.05-0.52) were documented on FieldTurf versus natural grass, respectively.

The majority of trauma comprised acute injuries on both FieldTurf (94.3%; IRR = 14.3; 95% CI, 12.8-15.6) and natural grass (94.4%; IRR = 13.0; 95% CI, 11.1-14.9). Only 11 of 228 (4.8%; IRR = 0.7; 95% CI, 0.4-1.3) injuries reported on FieldTurf and 7 of 125 (5.6%; IRR = 0.8; 95% CI, 0.4-1.5) reported on natural grass were classified as recurrent trauma. As expected, upperclassmen received the majority of trauma on both playing surfaces. On FieldTurf, 161 injuries occurred to seniors (70.6%; IRR = 10.7; 95% CI, 9.1-12.3), 61 to juniors (26.8%; IRR = 4.1; 95% CI, 3.3-4.9), and 6 to sophomores (2.6%; IRR = 0.4; 95% CI, 0.2-0.8). On natural grass, 82 injuries were reported among seniors (65.6%; IRR = 9.1; 95% CI, 8.3-9.5), 28 among juniors (22.4%; IRR = 3.1; 95% CI, 2.2-4.1), and 15 among sophomores (12.0%; IRR = 1.7; 95% CI, 1.0-2.6). No injuries were documented among freshman on either playing surface.

## Injury Category

Multivariate analysis indicated no significant playing surface effect by injury category ($F_{4,348} = 1.582$; $P = .178$; $1 - \beta = 0.488$). As shown in Table 3, injury incidences between playing surfaces were similar across player-to-player collision ($P = .39$), player-to-turf collision ($P = .27$), injuries attributed to shoe-surface interaction during player contact ($P = .30$), and injuries attributed to shoe-surface interaction during no contact ($P = .33$). A higher incidence of muscle-tendon overload injuries ($P = .07$), however, was reported on FieldTurf (7.0%; IRR = 1.1; 95% CI, 0.7-1.7) as compared to natural grass (2.4%; IRR = 0.3; 95% CI, 0.1-0.9).

## Time of Injury

No significant main effect between playing surface was observed across time of injury ($F_{1,231} = 0.111$; $P = .740$; $1 - \beta = 0.063$). IRRs (Table 3) for FieldTurf revealed that a limited number of injuries occurred during the pregame, increased from the first to second quarters, and remained steady throughout the third and fourth quarters. Records on natural grass, however, revealed that no injuries occurred during pregame, increased from the first to second quarters, but declined from the third to the fourth quarter of play.

## Injury Time Loss

Findings indicated a significant playing surface effect by injury time loss ($F_{5,334} = 2.343$; $P = .041$; $1 - \beta = 0.749$), with subsequent post hoc analyses revealing a significantly greater rate of injuries ($P = .02$) resulting in 0-day time loss reported on FieldTurf (40.8%; IRR = 6.5; 95% CI, 5.7-7.2) when compared to natural grass (28.8%; IRR = 4.1; 95% CI, 3.2-5.1) but a higher incidence of injuries ($P = .04$) resulting in a 1- to 2-day time loss reported on natural grass (28.0%; IRR = 4.0; 95% CI, 3.0-5.0) versus FieldTurf (19.3%; IRR = 2.9; 95% CI, 2.3-3.7). There was also a greater incidence of injury ($P = .06$) resulting in 22 days or more time loss reported on natural grass (14.4%; IRR = 2.0; 95% CI, 1.3-2.9) when compared to FieldTurf (7.9%; IRR = 1.2; 95% CI, 0.8-1.8).

## Position Played at Time of Injury

No significant playing surface effect by player position was observed ($F_{1,283} = 1.910$; $P = .168$; $1 - \beta = 0.281$). Although the incidences of injuries were similar across offensive and defensive positions, special teams play resulted in a higher number of injuries reported on FieldTurf (8.8%; IRR = 1.3; 95% CI, 0.98-2.0) versus natural grass (4.0%; IRR = 0.6; 95% CI, 0.2-1.2).

## Injury Mechanism

A significant playing surface effect by injury mechanism was found ($F_{7,305} = 2.163$; $P = .037$; $1 - \beta = 0.814$), with post

TABLE 3
Frequency and Rate of Game-Related High School Football Injuries Between FieldTurf and Natural Grass by Category, Time, Severity, Player Position, and Mechanism[a]

| | FieldTurf | | | | Natural Grass | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Number of Injuries | % | IRR | 95% CI | Number of Injuries | % | IRR | 95% CI |
| Injury category | | | | | | | | |
| Player-to-player collision | 114 | 50.0 | 7.6 | 6.9-8.2 | 69 | 55.2 | 7.7 | 6.7-8.4 |
| Player-to-turf collision | 32 | 14.0 | 2.1 | 1.6-2.9 | 12 | 9.6 | 1.3 | 0.8-2.2 |
| Shoe surface (contact) | 61 | 26.8 | 4.1 | 3.3-4.9 | 40 | 32.0 | 4.4 | 3.5-5.5 |
| Shoe surface (noncontact) | 5 | 2.2 | 0.3 | 0.1-0.8 | 1 | 0.8 | 0.1 | 0.0-0.6 |
| Muscle-tendon overload | 16 | 7.0 | 1.1 | 0.7-1.7 | 3 | 2.4 | 0.3 | 0.1-0.9 |
| Time of injury | | | | | | | | |
| Pregame | 4 | 1.8 | 0.3 | 0.1-0.7 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| First quarter | 34 | 14.9 | 2.3 | 1.7-3.0 | 23 | 18.4 | 2.6 | 1.8-3.5 |
| Second quarter | 72 | 31.6 | 4.8 | 4.0-5.6 | 34 | 27.2 | 3.8 | 2.8-4.8 |
| Third quarter | 58 | 25.4 | 3.9 | 3.1-4.7 | 38 | 30.4 | 4.2 | 3.3-5.3 |
| Fourth quarter | 60 | 26.3 | 4.0 | 3.3-4.8 | 30 | 24.0 | 3.3 | 2.4-4.4 |
| Injury time loss | | | | | | | | |
| 0 days | 97 | 42.5 | 6.5 | 5.7-7.2[b] | 37 | 29.6 | 4.1 | 3.2-5.1 |
| 1-2 days | 44 | 19.3 | 2.9 | 2.3-3.7 | 36 | 28.8 | 4.0 | 3.0-5.0[c] |
| 3-6 days | 39 | 17.1 | 2.6 | 2.0-3.4 | 22 | 17.6 | 2.4 | 1.7-3.4 |
| 7-9 days | 7 | 3.1 | 0.5 | 0.2-0.9 | 5 | 4.0 | 0.6 | 0.2-1.2 |
| 10-21 days | 23 | 10.1 | 1.5 | 1.0-2.2 | 7 | 5.6 | 0.8 | 0.4-1.5 |
| 22 days or more | 18 | 7.9 | 1.2 | 0.8-1.8 | 18 | 14.4 | 2.0 | 1.3-2.9 |
| Position played at time of injury | | | | | | | | |
| Offense | 112 | 49.1 | 7.5 | 6.7-8.1 | 54 | 43.2 | 6.0 | 5.0-7.0 |
| Defense | 96 | 42.1 | 6.4 | 5.6-7.1 | 66 | 52.8 | 7.3 | 6.3-8.1 |
| Special teams | 20 | 8.8 | 1.3 | 0.9-2.0 | 5 | 4.0 | 0.6 | 0.2-1.2 |
| Injury mechanism | | | | | | | | |
| Blocked below waist | 26 | 11.3 | 1.7 | 1.2-2.4 | 14 | 11.5 | 1.6 | 1.0-2.4 |
| Blocked above waist | 10 | 4.4 | 0.7 | 0.4-1.2 | 10 | 8.3 | 1.1 | 0.6-1.9 |
| Tackling | 46 | 20.0 | 3.1 | 2.4-3.8 | 35 | 28.1 | 3.9 | 2.9-4.9 |
| Tackled below waist | 25 | 10.8 | 1.7 | 1.2-2.3 | 13 | 10.4 | 1.4 | 0.9-2.3 |
| Tackled above waist | 20 | 8.8 | 1.3 | 0.9-2.0 | 20 | 15.6 | 2.2 | 1.5-3.2 |
| Blocking | 41 | 18.1 | 2.7 | 2.1-3.5 | 14 | 11.5 | 1.6 | 1.0-2.4 |
| Impact with playing surface | 26 | 11.3 | 1.7 | 1.2-2.4 | 13 | 10.4 | 1.4 | 0.9-2.3 |
| Stepped on/fallen/kicked | 19 | 8.3 | 1.3 | 0.8-1.9[d] | 3 | 2.1 | 0.3 | 0.1-0.9 |
| No contact/sprints/running | 15 | 6.4 | 1.0 | 0.6-1.6[e] | 3 | 2.1 | 0.3 | 0.1-0.9 |
| Blocking a kick/punt | 1 | 0.5 | 0.1 | 0.0-0.4 | 0 | 0.0 | 0.0 | 0.0-0.0 |

[a]%, percentage of total injuries within each category that occurred on the specific playing surface; IRR, injury incidence rate = (number of injuries ÷ total number of injuries) × 10; CI, confidence interval.
[b]$P = .021$.
[c]$P = .040$.
[d]$P = .041$.
[e]$P = .036$.

hoc analyses indicating a higher incidence of noncontact/running/sprinting injuries ($P = .036$) reported on FieldTurf (6.4%; IRR = 1.0; 95% CI, 0.6-1.6) when compared to natural grass (2.1%; IRR = 0.3; 95% CI, 0.1-0.9). A higher incidence of injuries ($P = .041$) resulting from being stepped on, fallen on, or kicked was also reported during competition on FieldTurf (8.3%; IRR = 1.3; 95% CI, 0.8-1.9) than on natural grass (2.1%; IRR = 0.3; 95% CI, 0.1-0.9).

## Primary Type of Injury

As shown in Table 4, differences in primary type of injury were noted between the two playing surfaces. A higher incidence of surface/epidermal injuries (5.8%; IRR = 0.9; 95% CI, 0.5-1.4) was reported on FieldTurf as compared to natural grass (0.8%; IRR = 0.1; 95% CI, 0.0-0.6). In addition, a higher incidence of muscle strains/spasms was also observed on FieldTurf (14.2%; IRR = 2.1; 95% CI, 1.6-2.9) than on natural grass (8.0%; IRR = 1.1; 95% CI, 0.6-1.9). Of special concern is the greater incidence of concussion observed during competition on natural grass (12.8%; IRR = 1.8; 95% CI, 1.1-2.7) when compared to competition on FieldTurf (4.4%; IRR = 0.7; 95% CI, 0.4-1.2), as well as a higher rate of ligament tears on the natural grass surface (7.2%; IRR = 1.0; 95% CI, 0.5-1.8) as opposed to FieldTurf (3.1%; IRR = 0.5; 95% CI, 0.2-0.9).

TABLE 4
Frequency and Rate of Game-Related High School Football Injuries Between FieldTurf and Natural Grass By Primary Type of Injury, Grade, Location, and Tissue Injured[a]

| | FieldTurf | | | | Natural Grass | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Number of Injuries | % | IRR | 95% CI | Number of Injuries | % | IRR | 95% CI |
| Primary type of injury | | | | | | | | |
| Surface/epidermal | 13 | 5.8 | 0.9 | 0.5-1.4 | 1 | 0.8 | 0.1 | 0.0-0.6 |
| Contusion | 58 | 25.2 | 3.9 | 3.1-4.7 | 30 | 24.0 | 3.3 | 2.4-4.4 |
| Concussion | 10 | 4.4 | 0.7 | 0.4-1.2 | 16 | 12.8 | 1.8 | 1.1-2.7 |
| Inflammation | 6 | 2.7 | 0.4 | 0.2-0.8 | 3 | 2.4 | 0.3 | 0.1-0.9 |
| Ligament sprain | 76 | 33.2 | 5.1 | 4.3-5.9 | 40 | 32.0 | 4.4 | 3.5-5.5 |
| Ligament tear | 7 | 3.1 | 0.5 | 0.2-0.9 | 9 | 7.2 | 1.0 | 0.5-1.8 |
| Muscle strain/spasm | 32 | 14.2 | 2.1 | 1.6-2.9 | 10 | 8.0 | 1.1 | 0.6-1.9 |
| Muscle tear | 1 | 0.4 | 0.1 | 0.0-0.4 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Tendon strain | 2 | 0.9 | 0.1 | 0.0-0.5 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Hyperextension | 1 | 0.4 | 0.1 | 0.0-0.4 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Neural | 5 | 2.2 | 0.3 | 0.1-0.8 | 5 | 4.0 | 0.6 | 0.2-1.2 |
| Subluxation/dislocation | 7 | 3.1 | 0.5 | 0.2-0.9 | 7 | 5.6 | 0.8 | 0.4-1.5 |
| Fracture | 10 | 4.4 | 0.7 | 0.4-1.2 | 4 | 3.2 | 0.4 | 0.2-1.1 |
| Grade of injury | | | | | | | | |
| First degree | 88 | 38.6 | 5.9 | 5.1-6.6 | 49 | 39.2 | 5.4 | 4.4-6.4 |
| Second degree | 36 | 15.8 | 2.4 | 1.8-3.1 | 20 | 16.0 | 2.2 | 1.5-3.2 |
| Third degree | 18 | 7.9 | 1.2 | 0.8-1.8 | 16 | 12.8 | 1.8 | 1.1-2.7 |
| Not applicable | 86 | 37.7 | 5.7 | 4.9-6.5 | 40 | 32.0 | 4.4 | 3.5-5.5 |
| Anatomical location of injury | | | | | | | | |
| Cranial/cervical | 23 | 10.1 | 1.5 | 1.0-2.2 | 24 | 19.2 | 2.7 | 1.9-3.7[b] |
| Upper extremity | 64 | 28.1 | 4.3 | 3.5-5.1 | 29 | 23.2 | 3.2 | 2.3-4.2 |
| Thoracic | 18 | 7.9 | 1.2 | 0.8-1.8 | 8 | 6.4 | 0.9 | 0.5-1.7 |
| Lower extremity | 123 | 53.9 | 8.2 | 7.5-8.7 | 64 | 51.2 | 7.1 | 6.1-7.9 |
| Type of tissue injured | | | | | | | | |
| Bone | 11 | 4.8 | 0.7 | 0.4-1.3 | 5 | 4.0 | 0.6 | 0.2-1.2 |
| Joint | 101 | 44.3 | 6.7 | 5.9-7.4 | 60 | 48.0 | 6.7 | 5.6-7.6 |
| Muscle | 82 | 35.9 | 5.5 | 4.7-6.2 | 36 | 28.8 | 4.0 | 3.0-5.0 |
| Neural | 17 | 7.5 | 1.1 | 0.7-1.7 | 21 | 16.8 | 2.3 | 1.6-3.3[c] |
| Other | 17 | 7.5 | 1.1 | 0.7-1.7 | 3 | 2.4 | 0.3 | 0.1-0.9 |

[a]%, percentage of total injuries within each category that occurred on the specific playing surface; IRR, injury incidence rate = (number of injuries ÷ total number of injuries) × 10; CI, confidence interval.
[b]$P = .009$.
[c]$P = .007$.

## Grade and Anatomical Location of Injury

As shown in Table 4, there were no significant playing surface effects by injury grade ($F_{3,221} = 1.171$; $P = .322$; $1 - \beta = 0.313$). Injury incidences between playing surfaces were similar across first-, second-, and third-degree injuries ($P$s = .16-.62).

In regard to location of injury, a significant playing surface effect was observed ($F_{3,349} = 2.419$; $P = .046$; $1 - \beta = 0.601$), with a higher incidence of cranial/cervical trauma ($P = .009$) reported on natural grass (19.2%; IRR = 2.7; 95% CI, 1.9-3.7) compared to FieldTurf (10.1%; IRR = 1.5; 95% CI, 1.0-2.2). No significant differences in the incidence of upper extremity, thoracic, or lower extremity trauma were observed between playing surfaces ($P$s = .25-.62).

## Type of Tissue Injured

A significant playing surface effect was found by type of tissue injured ($F_{4,348} = 3.007$; $P = .018$; $1 - \beta = 0.797$). A higher incidence of neural injuries (16.8%; IRR = 2.3; 95% CI, 1.6-3.3; $P = .007$) was reported on natural grass versus FieldTurf (7.5%; IRR = 1.1; 95% CI, 0.7-1.7). Again, a higher incidence of muscle trauma was also observed on FieldTurf (35.9%; IRR = 5.5; 95% CI, 4.7-6.2) than on natural grass (28.8%; IRR = 4.0; 95% CI, 3.0-5.0).

## Head and Knee Trauma

As shown in Table 1, a higher incidence of 1° cerebral concussions was reported on natural grass (68.8%; IRR = 1.2; 95% CI, 0.7-2.1) than on FieldTurf (58.4%; IRR = 0.5; 95% CI, 0.2-0.9), as well as total number of concussion injuries combined (natural grass: 93.8%; IRR = 1.8; 95% CI, 1.1-2.7; vs FieldTurf: 83.4%; IRR = 0.7; 95% CI, 0.4-1.2). Although no significant injury rates were found between playing surfaces across specific knee cases, a higher incidence of knee trauma was observed on natural grass (42.8%; IRR = 1.0; 95% CI, 0.5-1.8) than on FieldTurf (23.0%; IRR = 0.4; 95% CI, 0.2-0.8) when all ACL injuries were combined.

TABLE 5
Frequency and Rate of Game-Related High School Football Injuries Between FieldTurf and Natural Grass by Environmental Factors

| | FieldTurf | | | | Natural Grass | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Number of Injuries | % | IRR | 95% CI | Number of Injuries | % | IRR | 95% CI |
| Field conditions | | | | | | | | |
| No precipitation/dry field | 201 | 88.3 | 13.4 | 11.8-14.8 | 106 | 84.4 | 11.8 | 9.7-13.7 |
| Rain | 19 | 8.4 | 1.3 | 0.8-1.9 | 13 | 10.4 | 1.4 | 0.9-2.3 |
| Snow | 0 | 0.0 | 0.0 | 0.0-0.0 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Sleet | 0 | 0.0 | 0.0 | 0.0-0.0 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| No precipitation/wet field | 8 | 3.3 | 0.5 | 0.3-1.0 | 6 | 5.2 | 0.7 | 0.3-1.4 |
| Temperature, °F | | | | | | | | |
| <40 | 3 | 1.2 | 0.2 | 0.1-0.6 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| 40-49 | 10 | 4.2 | 0.7 | 0.4-1.2 | 21 | 16.9 | 2.3 | 1.6-3.3 |
| 50-59 | 31 | 13.8 | 2.1 | 1.5-2.8 | 11 | 8.5 | 1.2 | 0.7-2.1 |
| 60-69 | 41 | 18.0 | 2.7 | 2.1-3.5 | 30 | 23.7 | 3.3 | 2.4-4.4 |
| 70-79 | 46 | 20.3 | 3.1 | 2.4-3.8 | 55 | 44.1 | 6.1 | 5.1-7.1 |
| 80-89 | 78 | 34.1 | 5.2 | 4.4-6.0 | 4 | 3.4 | 0.4 | 0.2-1.1 |
| 90-99 | 18 | 7.8 | 1.2 | 0.8-1.8 | 4 | 3.4 | 0.4 | 0.2-1.1 |
| >100 | 1 | 0.6 | 0.1 | 0.0-0.4 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| Cold days (≤69°F) | 85 | 37.2 | 5.7 | 4.9-6.4 | 62 | 49.1 | 6.9 | 5.9-7.8 |
| Hot days (≥70°F) | 143 | 62.8 | 9.6 | 9.1-9.8 | 63 | 50.9 | 7.0 | 6.0-7.8 |
| Humidity, % | | | | | | | | |
| <40 | 125 | 55.0 | 8.3 | 7.7-8.8 | 55 | 44.0 | 6.1 | 5.1-7.1 |
| 40-49 | 18 | 8.0 | 1.2 | 0.8-1.8 | 32 | 26.0 | 3.6 | 2.6-4.6 |
| 50-59 | 10 | 4.3 | 0.7 | 0.4-1.2 | 3 | 2.0 | 0.3 | 0.1-0.9 |
| 60-69 | 27 | 11.7 | 1.8 | 1.3-2.5 | 3 | 2.0 | 0.3 | 0.1-0.9 |
| 70-79 | 17 | 7.4 | 1.1 | 0.7-1.7 | 5 | 4.0 | 0.6 | 0.2-1.2 |
| 80-89 | 16 | 6.8 | 1.1 | 0.7-1.7 | 0 | 0.0 | 0.0 | 0.0-0.0 |
| 90-99 | 4 | 1.9 | 0.3 | 0.1-0.7 | 7 | 6.0 | 0.8 | 0.4-1.5 |
| 100 | 11 | 4.9 | 0.7 | 0.4-1.3 | 20 | 16.0 | 2.2 | 1.5-3.2 |

[a]%, percentage of total injuries within each category that occurred on the specific playing surface; IRR, injury incidence rate = (number of injuries ÷ total number of injuries) × 10; CI, confidence interval.

### Environmental Factors

The attempt to quantify weather conditions at time of injury revealed that the majority of injuries occurred during dry conditions, warm temperatures, and low humidity (see Table 5). Conditions of no precipitation (dry surface) were associated with 201 (88.3%) injuries on FieldTurf and 106 (84.4%) injuries on natural grass. Rain or wet field conditions were associated with 27 (11.7%) trauma cases on FieldTurf and 19 (15.6%) on natural grass. No injuries were reported during snow or sleet conditions.

Although no significant differences were noted between playing surfaces across temperature, interestingly, when analyzing data by cold days (eg, ≤69°F) as compared to hot days (eg, ≥70°F) as suggested by others,[48] a significantly higher incidence of injury was observed during hot days on FieldTurf (62.8%; IRR = 9.6; 95% CI, 9.1-9.8) as compared to natural grass (50.9%; IRR = 7.0; 95% CI, 6.0-7.8). On cold days, the incidence of injury was similar on both surfaces (FieldTurf: 37.2%; IRR = 5.7; 95% CI, 4.9-6.4; vs natural grass: 49.1%; IRR = 6.9; 95% CI, 5.9-7.8).

## DISCUSSION

The purpose of this prospective cohort study was to quantify the incidence, causes, and severity of game-related high school football injuries on FieldTurf versus natural grass. It was hypothesized that high school athletes would not experience any difference in the incidence, causes, and severity of game-related injury between FieldTurf and natural grass. Although similarities did exist between FieldTurf and natural grass, significant and unique differences in sport trauma were observed between the two playing surfaces.

### Injury Incidence

Over the 5-season study, the greater absolute number of injuries occurring on FieldTurf was primarily related to the increasing popularity resulting in a greater number of games played on the artificial surface. Overall, 353 game-related injuries, or 8.8 injuries per high school per season, were recorded among 8 high schools competing on both surfaces. This is consistent with the number of injuries

observed in prior studies, ranging from 2.4 to 15.7 injuries per high school per season.[2,13,51] The incidence of acute injury (94.3%) was higher than reported in earlier studies, ranging from 72% to 84%.[44,52,53] The incidence of substantial trauma recorded in this study was also similar to the incidence of severe injury per high school per season reported elsewhere.[13] Although the large variation in injury definition among these studies prevents an accurate comparision,[46] both the total number and the number of minor, substantial, and severe injuries recorded in this study still reflect the typical level of trauma observed at the high school level of play.

In addition to acute injury, repetitive or recurrent trauma is considered a major contributor to future trauma.[19,24,71] The incidence of recurrent cases over 5 seasons in this study ranged from 4.8% on FieldTurf to 5.6% on natural grass, quite lower than the 13% to 17% of recurrent trauma reported in collegiate football, soccer, lacrosse, and professional soccer during a single season.[18,44,68] Whether recurrent trauma was observed over the same surface is not known. The increased interest but paucity of studies that address recurrent trauma prevents further discussion at the high school level of play.

The higher incidence of injury to upperclassmen on both surfaces is solely attributed to greater playing time and subsequent predisposition to injury typically observed at the varsity level of play, in which lower classmen receive limited playing time. With regard to foul play, the incidence (1.1%) of injury attributed to illegal action was negligible. This is similar to the 0.8% occurrence reported in National Collegiate Athletic Association football[44] but in contrast to the 25% to 62% reported among other youth, intercollegiate, and senior sports.[15,49,73-75]

The greater rate of overall injury documented on FieldTurf may be attributed to the high number of minor injuries (eg, abrasions, muscle strains, noncontact trauma) or influenced by the greater number of games or potential exposure to injury on FieldTurf over 5 competitive seasons. Despite the lower number of games played on natural grass, findings still clearly indicate a similar incidence of substantial injury cases documented on natural grass.

## Injury Category

Results of this study indicate no significant differences between playing surfaces across injury categories. As previously described, however, there was a greater incidence of muscle-tendon overload injuries on FieldTurf. This may have been a function of faster play with the concomitant assistance of a more compliant, elastic surface than observed with natural grass.[24]

## Time of Injury

It has been noted that with increasing fatigue over time, concomitant declines in available energy substrate and coordination predispose an athlete to injury.[68,71] The nonsignificant differences within and between playing surfaces in this study, however, indicated minimal influence on injury incidence from pregame through the fourth quarter of play. As previously noted, the acute differences in the composition and quality of surfaces may have influenced the type and severity of trauma but did not affect the time of injury observed over the 5-season period. Findings may also be reflective of the score and subsequent play calling of coaches.[2,7]

## Injury Time Loss

The polyethylene/polypropylene nature of FieldTurf, although promoted as a nonabrasive surface with a natural earth feel, still resulted in a significantly greater incidence of minor injuries such as abrasions, contusions, and lacerations requiring 0 days of time loss. Findings also indicated, however, that a greater incidence of injuries ranging from 1 to 2 days of time loss and 22 days or more of time loss was associated with competing on natural grass. It should be noted that the majority of football fields in this region are typically of a resilient Bermuda grass blend that becomes dormant as temperatures drop and is supported by a mean annual rainfall of ≤18 inches and humidity of <40%. This playing surface is often overseeded with annual rye grass, adding minimal surface compliance and energy absorption with a high coefficient of restitution.[45] Previous research has documented a greater incidence of noncontact ACL injuries when competing on a dry surface.[22,58] Whether these findings with the natural grass surface are a function of decreasing turf quality with declining temperatures throughout the season, overuse because of increased multipurpose use, or simply the low rainfall and subsequent surface hardness is not clear and is beyond the control of this study.

## Position Played at Time of Injury

The IRRs and subsequent multivariate analyses indicated no significant effect of playing surface on position played at the time of injury. The greater incidence of injuries during special teams play on FieldTurf, however, may be attributed to the faster, more consistent surface resulting in greater impact forces and concomitant trauma.[24,51] The similar incidence of injury among offensive and defensive players, however, is inconsistent with prior research indicating a greater incidence of trauma among offensive backs and numerous defensive positions.[30,43] Unfortunately at this time, the limited frequency of injury among some specific positions led to combining positions into either offense or defense, preventing further in-depth analyses and discussion of potential injury differences and position susceptibility that have been described by others.[19-21,30]

## Injury Mechanism

The greater incidence of injuries from being stepped on, fallen on, or kicked while competing on FieldTurf (Table 3) as well as the higher incidence of noncontact, running, or sprinting injuries are related to the inherent nature of FieldTurf, which was proposed to combine the best of per-

formance with safety. The more consistent artificial composition enhances the speed of the game but may also allow for greater opportunity for injury because of overextension and greater fatigue potential of muscles as players perform at a greater rate of acceleration, speed, and torque.[35,61] Although numerous other mechanisms may be at play,[19,33,35,39,71] risk factors repeatedly mentioned in the literature have included pivoting, change of direction, direct contact with an opposing player, deceleration, unfortunate mishaps (eg, piling on, moving pileup), and being jolted during an uncontrolled or compromised movement.[22,38] Others have identified equipment (eg, shoe/cleat design), the abrasive nature of artificial surfaces, and various anatomical and biomechanical influences.[2,5,6,22,30]

### Primary Type of Injury

The greater incidence of surface/epidermal injuries and muscle strains/spasms documented on FieldTurf, as previously described, may be a result of greater velocity of play and fatigue potential.[35,39] The greater incidence of concussion and ligament tears on natural grass may be related to the shoe-surface traction usually associated with a harder, drier surface[47] and the inconsistent nature of natural grass in more arid regions of the country. Others have noted a similar incidence of ligament trauma on similar noncompliant surfaces.[22,58] Further investigation will be necessary to elucidate more definitive causes.

### Grade and Anatomical Location of Injury

Although no significant playing surface effect was observed across injury grade (Table 4), the greater incidence of cranial/cervical trauma observed on natural grass may reflect the lower impact attenuation of the harder, drier surface. Interestingly, the incidence of concussion on both surfaces in this study was greater than cranial trauma previously reported among both high school and college athletes.[13,23,31,45,52,53,78] These findings are also in contrast to earlier studies indicating a lower concussion rate on natural grass when compared to the earlier generation of artificial surfaces.[23,45] The higher incidence of lower versus upper extremity trauma observed in this study was similar to earlier findings reported among high school and professional athletes.[6,12,13,24,51,52]

### Type of Tissue Injured

The higher incidence of neural injuries reported on natural grass (Table 4) is consistent with prior work indicating an inverse relationship between a playing surface's energy absorbency or compliance and the degree of tissue trauma.[45,71] Although the coefficient of restitution or degree of rebound was not established in this study, the drier, noncompliant qualities of natural grass and its subsurface, when compared to the polyethylene/polypropylene/rubber composition of FieldTurf, seemed to result in minimal energy absorption at ground impact. The energy of impact is subsequently transferred back into the cranial/cervical region, increasing the potential for concussion.[71] Interestingly, cervical strains were more common on FieldTurf than on natural grass, although some have noted that cranial impact does not necessarily coincide with cervical trauma.[76] These strains, provoking similarities to whiplash, may be a function of the rubber-based surface, with further investigation needed to monitor this unique response not observed with natural grass.[71] The higher incidence of injury to muscle tissue on FieldTurf is reflective of the strains/spasms, as previously described.

### Head and Knee Injuries

The greater incidence of first-degree and total concussions combined, as well as the greater incidence of ACL-involved trauma, further reiterates the level of severe trauma observed during competition on natural grass (Tables 1 and 2). Although this is in contrast to prior studies that indicated a higher incidence of severe injury on artificial surfaces,[2,10,23,26,32,45,55,60] the earlier findings may be a reflection of traditional synthetic materials as opposed to the newer generation of artificial surfaces being installed today.

### Environmental Factors

Limited attention has been directed toward the potential influence of weather conditions on injury during competition.[2,22,24,48] The majority of play and injuries occurred during conditions of no precipitation and low humidity, therefore minimizing the opportunity to thoroughly ascertain possible influences under various field conditions. Of greater concern is the clinically significant increase in the incidence of injury on FieldTurf during temperatures ≥70°F when compared to cooler temperatures, similar to findings previously reported on artificial surfaces.[48] Although others have either indicated enhanced shoe-surface interaction potentiating articular trauma with increasing turf temperature[48,65] or reported greater frequency of knee trauma with higher temperatures,[47] overall, no significant environmental differences were observed between playing surfaces.

### Limitations

There were several potential limitations to the study that may have influenced the type and number of injuries reported. These included the inability to determine and control the inherent random variation in injury typically observed in high-collision team sports[8,38]; the strength and conditioning status of the athletes and variations in the type of equipment used[2,17,29,30,35,64]; weather conditions and variations in field conditions[2]; differences in postural/joint integrity, musculoskeletal structure, and biomechanics of movement[9,28,70,72]; coaching style and play calling[2,7,24,35]; quality of officiating and foul play[71]; player position and actual versus average time of exposure to injury[25,29,33]; sport skill level, intensity of play, and fatigue level at time of injury[9,23,33,36,64,70,71]; an athlete's ephemeral response to

help seeking, injury, and subsequent pain[1,9,11,35,40,52]; player eligibility[2]; unreported congenital/developmental factors predisposing an athlete to additional injury[9,30,35,71,77]; or simply unforeseen mishap.[28,38] Also, there is always the opportunity for an injury to go unreported despite the comprehensive nature of any reporting system,[35] and although our study revealed significant and unique differences in injury causes, generalizability of the findings across the country may not be warranted because of varying environmental, field, and injury management conditions.

An initial concern of this study was that more games were played on FieldTurf but all practices were conducted on natural grass, which is commonplace in school districts sharing a stadium with multiple high schools. As evidenced by the findings, the additional time on natural grass during practice, however, did not seem to offer an advantage during games. Skewness of findings, however, remains a possibility, but it would be difficult to control uniformity of practice and game surface under the present situation in many school districts.

Key strengths of the study were the opportunity to follow several high schools during the 5-year period, which prevented seasonal injury fluctuations and individual team effect[2] and enhanced the ability to identify differences and trends in surface effect. In addition, the combined method of assessing functional outcome, time loss, direct observation, and treatment records, as well as the daily interactions of ATCs and players evaluated in this study, minimized the potential for transfer bias and unreported injuries throughout the season.[11,28,56,68] The daily evaluation and follow-up telephone visits also increased the opportunity to quantify and track typically overlooked minor indices that often exacerbate into chronic or overuse problems.[11,28,68]

It must also be noted that the percentage of influence from risk factors, other than simply surface type, cannot be overlooked. Because of the inherent challenges of collecting data on multiple indices and on numerous teams and players over an extended period of time, the degree of influence from these risk factors remains a limitation that can only be acknowledged at this time. The prospective cohort multivariate design, however, did enhance sample size, result in randomization of play on both surfaces, control for seasonal and team variation, and allow for greater insight into both significant and subtle differences between a new generation of artificial turf and natural grass.[2,39,51,71]

Finally, the lack of a universally accepted definition of sport injury will continue to be a challenge and subsequent influence on injury interpretation.[51] With the concomitant difficulty in subjectively determining a plethora of surface conditions and quality of natural grass,[2] any attempt to interpret the injury-surface interaction with any degree of accuracy will continue to pose concerns.

## CONCLUSION

Although similarities did exist between FieldTurf and natural grass over a 5-year period of competitive play, there were significant differences in injury time loss, injury mechanism, anatomical location of injury, and type of tissue injured between playing surfaces. Both surfaces, from a statistical and clinical standpoint, also exhibited unique injury causes that need to be addressed to reduce the number of game-related, high school football injuries. The hypothesis that high school athletes would not experience any difference in the incidence, causes, and severity of game-related injury between FieldTurf and natural grass was not supported. It must be reiterated, however, that the findings of this study may only be generalizable to this level of competition. Because this study is still in the early stages, however, continued investigation is warranted.

## ACKNOWLEDGMENT

This research was funded by the Panhandle Sports Medicine Foundation. The authors thank Bruce King, Jena Phillips, Rachelle Shields, Shawn Urton, Larry Thom, Dee Rutherford, Kim Barnes, Tony Peppers, and Robert Ramos for their athletic training expertise and efforts throughout the study.

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## Track Replacement Justification

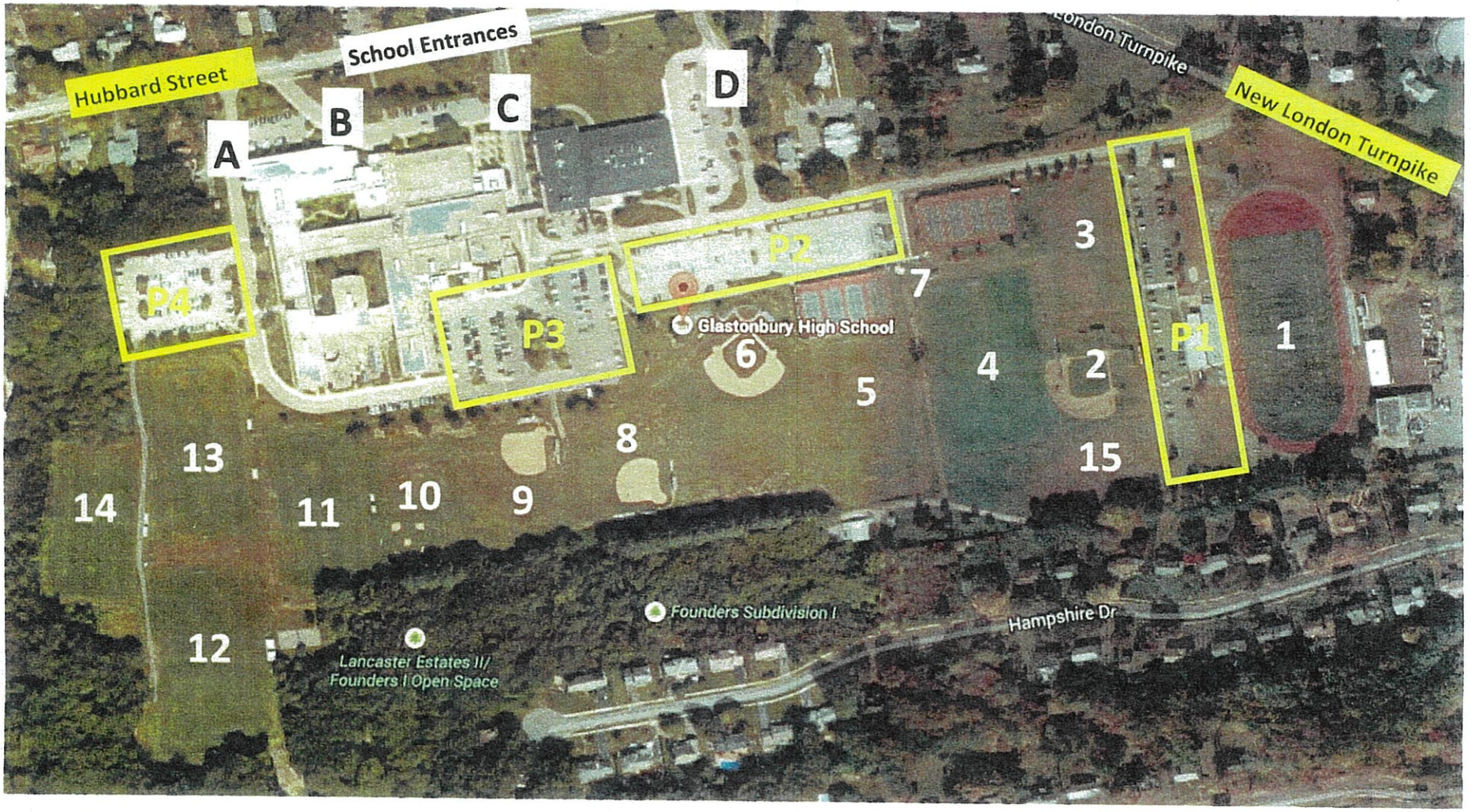
An independent third-party evaluator conducted the following assessment of the track.

The existing track has two areas of concern.  One being the “D” zones, which are the areas between the back of the end zone and the radius of the track (where jumping events occur) and the track proper (the areas that are lined for running events).  Both areas were evaluated for the ability to continue to service the facility.

**D Zones**
That surfacing materials are showing significant signs of cracking and delamination.  Because of this, the surface will need to be fully removed and reinstalled with a new track surface.

**Lane Lines**
The existing track lanes had cracking present and did not show unusual signs of delamination.  Because of the cracking and no delamination, we are able to perform a structural spray coat, instead of a full replacement of the surface. This will help to re-emulsify the running surface and enhance the red top running surface for both structural stability and color. The lane lines and track markings will also all be replaced.

# Glastonbury High School Athletic Fields




**Fields:**

1) Track, Football, Field Hockey, Lacrosse
2) JV/FR Baseball
3) Practice Football, Track and Field Events
4) Varsity Soccer
5) Practice Soccer
6) Varsity Baseball
7) Tennis Courts
8) Varsity Softball
9) JV Softball
10) Freshman Softball
11) Boys Lacrosse, Field Hockey
12) Soccer, Girls Lacrosse
13) Soccer, Boys Lacrosse, Girls Lacrosse
14) Field Hockey, Lacrosse Practice
15) Practice Football

**Parking:**

P1 Access via New London Tpke.

P2 Access via Entrance D

P3 Access via Entrance C

P4 Access via Entrance A

FLOW
WICKHAM BROOK

WL #23 WL #24 WL #25 WL #26 WL #27 WL #28 WL #29 WL #30 WL #31 WL #32

TEMPORARY STORMWATER DETENTION BASIN, RIPRAP PLUNGE POOL AND LEVEL SPREADER CONTRACTOR SHALL INSPECT LEVEL OF SEDIMENT AND MAINTAIN AS NOTED IN THE CONTRACT DOCUMENTS OR AS DIRECTED BY THE TOWN OF GLASTONBURY OR THE ENGINEER TOP ELEVATION = 60.1

100' WETLANDS REGULATED AREA

RIPRAP LINED TRAPEZOIDAL SWALE TO FOLLOW EXISTING SLOPE AND GRADE 2' WIDE, 1' DEEP 2:1 SIDE SLOPES

GRASSLINED SWALE

TENNIS COURTS

CONTRACTOR SHALL INSTALL TREE PROTECTION AT EXISTING TREES

N/F TOWN OF GLASTONBURY

205 L.F. – 12" ø RCP
S = 0.0217 FT/FT
I.E.= 84.50

15 L.F. – 6" ø H.D.P.E.
S = 0.010 FT/FT

GRASSLINED SWALE

FIELD 14

CB-3 – TYPE "C-L"
T.F. = 92.45
INV. IN (12") = 88.95
INV. OUT (12") = 88.95
INV. OUT (6") = 88.45

FIELD 12

DRYWELL #1
T.F. = 93.00
INV. = 88.33

PROPOSED HANDICAP ACCESSABLE WATER FOUNTAIN W/ 3/4" COPPER SERVICE

INSTALL ELECTRICAL HANDHOLES AS REQUIRED

MECHANICAL CONTROL HOUSE
INSTALL IRRIGATION CONTROL UNITS, ELECTRICAL SERVICE AND METERS
BUILDING TO BE INSTALLED BY OTHERS

FIELD 13

BALDWIN LOT

UNDERGROUND POWER LINE FROM POLE TO CONTROL HOUSE

CB-2 – TYPE "C"
T.F. = 86.50
INV. = 82.82

80' CL&P R.O.W.

#10 WL #9 WL #8 WL #7 WL #6 WL #5 WL #4 WL #3 WL #2 WL #1

N/F TOWN OF GLASTONBURY

100' WETLANDS REGULATED AREA

WITCHAM BROOK

N/F TOWN OF GLASTONBURY

FIELD 11

NOTE: 330 HUBBARD ST
BALDWIN PROPERTY
FILE UNDER HUBBARD ST
RAY PIRTELL SAYS TREAT
THIS PLAN AS AN
AS-BUILT PLAN (2007)

NOTE: CHECK GRAPHIC SCALES BEFORE USING DRAWINGS

40' 20' 0 40'

PROPOSED WATER METER

PROPOSED WATER SERVICE SHUT-OFF/CURBBOX

"C" CB #1
T.F. = 73.37
INV. = 71.04 (SE)
INV. = 70.09 (E)
INV. = 69.82 (W)

INSERT 12" X 4" TEE

INSTALL 4" D.I.P.

15" RCP
8" P.V.C
24" RCP
HUBBARD STREET

N/F MARK & KATHRYN J. D'ADDABO

N/F MICHAEL C. & SUSAN C. ULSAKER

N/F PAUL H. & ANDREA GARNEAU

N/F RONALD E. & BARBARA ANGELO

CB-1 – TYPE "C"
T.F. = 86.75
INV. IN = 81.17
INV. OUT = 81.17

117 L.F. – 15" RCP
S = 0.0100 FT/FT

3 LIGHTS / 1 POLE (TYP.)

165 LF – 15" RCP
SLOPE= 0.010 FT/FT

N/F TOWN OF GLASTONBURY

PROPOSED 4" ø D.I.P. WATER MAIN

12" RCP
18" RCP
15" RCP

STORM MH #43
T.F. = 88.18
INV. = 83.28 (E)
INV. = 83.28 (N)

SANITARY SEWER 8" PVC

N/F TOWN OF GLASTONBURY (HIGH SCHOOL)

GAS METER

MODIFY EXISTING MANHOLE
INSTALL TYPE "C-L" CATCH BASIN TOP
MATCH TOP OF FRAME TO EXISTING GRADE
INV. IN (SW) = 80.00

STORM MH #42
T.F. = 84.85
INV. = 79.80 (N)
INV. = 79.95 (S)

GLASTONBURY HIGH SCHOOL

| NO. | DATE | REVISIONS |
|---|---|---|
| 1 | 11/18/98 | PRELIMINARY REVISIONS TO LAYOUT |
| 2 | 12/18/98 | TOWN OF GLASTONBURY COMMENTS |
| 3 | 1/29/99 | PLANNING AND ZONING SUBMITTAL |
| 4 | 4/23/99 | PLANNING AND ZONING CONDITIONS |
| 5 | 4/30/99 | BIDDING AND CONSTRUCTION |

| | |
|---|---|
| SUPV. | S.R.M. |
| DESIGN | R.C.S. |
| DRAWN | A.W.P. |
| CHECKED | J.A.C. |
| DATE | 4/30/99 |

GLASTONBURY PUBLIC WORKS
FILE:
STREET: HUBBARD STREET
SHEET NO. 42

SCALE
1" = 40'

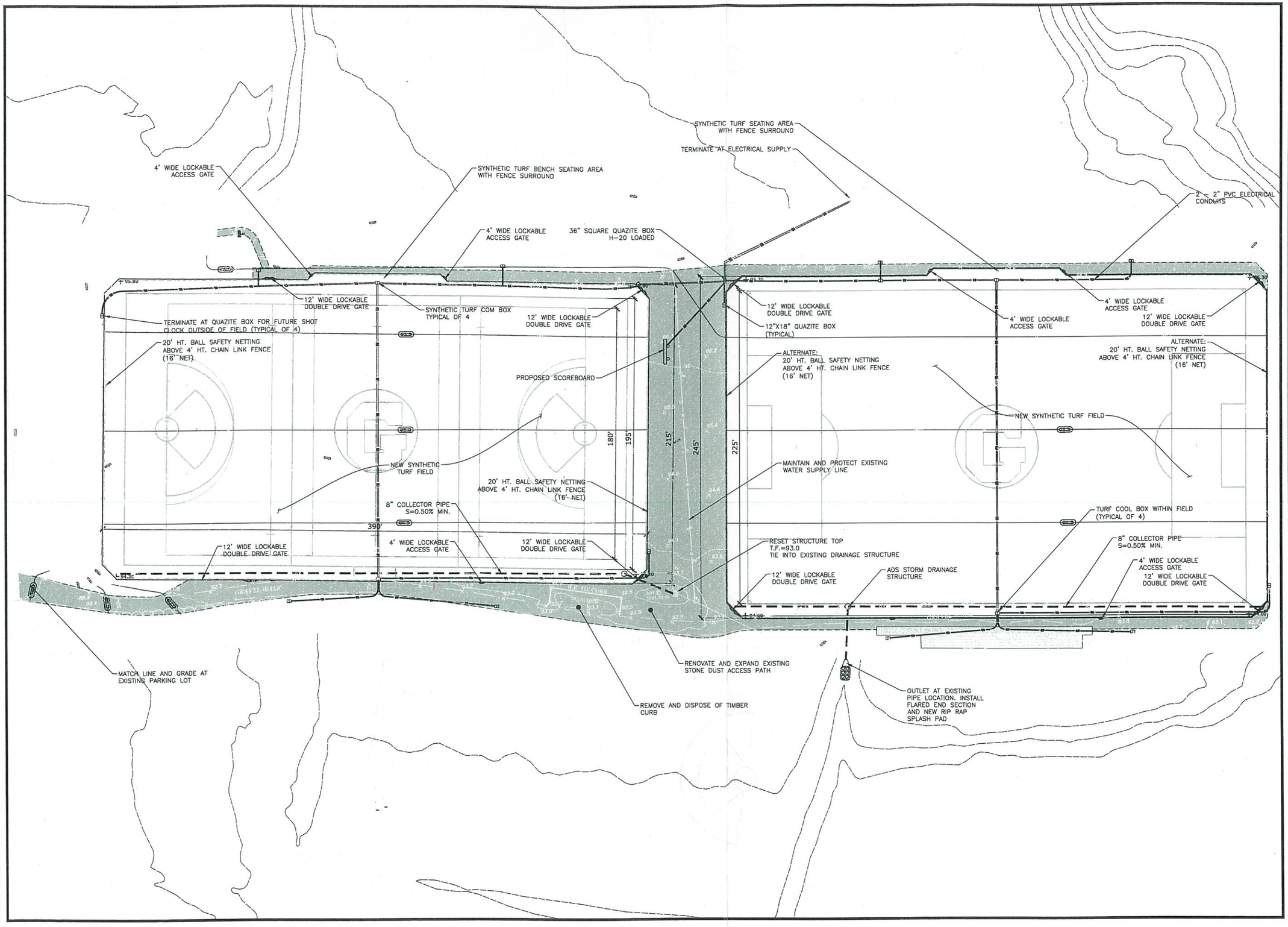
WMC CONSULTING ENGINEERS
• WENGELL, McDONNELL & COSTELLO •
87 HOLMES ROAD
NEWINGTON, CT 06111
(860) 667-9624

PREPARED FOR
TOWN OF GLASTONBURY
PARKS and RECREATION
1086 NEW LONDON TPKE
GLASTONBURY, CT 06033

# PROPOSED ATHLETIC FIELDS
# UTILITY PLAN
# TOWN OF GLASTONBURY, CONNECTICUT

GLASTONBURY
D – ATHLETIC FIELDS – BALLFLD – 98044 –
SIZE | PROJECT | FILE NAME | NUMBER | REV

SHEET 7
OF 16




Contractor Name

FieldTurf
A Tarkett Sports Company

Prepared By

CEH Engineering & Consulting

CEH ENGINEERING AND CONSULTING
580 SHEPARD AVENUE
HAMDEN, CT 06514

General Notes

N
E
S
W

0' 15' 30' 40'

SCALE: 1"=30'

| No. | Revision/Issue | Date |
|---|---|---|
| | | |
| | | |
| | | |

Project Name and Address

GLASTONBURY HIGH SCHOOL
FIELDS 12 & 13
IMPROVEMENT

330 HUBBARD STREET
GLASTONBURY, CONNECTICUT

Sheet Name

SITE DEVELOPMENT PLAN

| Drawn | Sheet |
|---|---|
| JDL | C-03 |
| Checked: CEH | |
| Date: SEPT 23, 2025 | |

# Replacing Glastonbury High School Synthetic Turf Field with Natural Grass

## Estimated Costs and Implications

## DRAFT 2-5-25

**Recommend adding four natural turf fields in place of one synthetic field**

**Changing GHS synthetic turf field to natural turf**
(removal, disposal of synthetic turf field, construction of new natural turf field) $754,750

**Construction of three additional natural turf fields** @ $523,085/Field $1,569,255

**Yearly material costs** @ $8,257/Field $33,028

**Yearly maintenance costs** @ $6,980/Field $27,920
(manhours-174.5hrs@$40/hr/per field)

**Field Covers** 4@$3,123 (purchase, every 5 years) $12,492

**Football/Soccer Goals** $9,695/set $38,780

Will need football/soccer goals for 2-4 of the newly constructed fields. The amount of play on the main regulation football field will result in the field deteriorating quicker, so practices will need to rotate to other fields to preserve playability on the main field since the field is utilized from March-November.

**Implications, Hurdles, and other Considerations**

Per athletic field contractor, town should budget $200,000 per year to replace sod in the spring on the main field. The field would need to rest 6-8 weeks until turf is established each spring.

Per Athletic Director, having to utilize fields off school property is an issue due to limited transportation options.

Transitioning from Synthetic Turf to Natural Turf, estimated timeline:

- Work to commence in June of 2026
- Estimated construction 6-8 weeks
- Estimated rest time before opening for use 6-8 weeks
- Will affect fall GHS athletic programs.

Current operations- the town closes 5 irrigated rectangular fields in the summer until mid-August. The synthetic turf field becomes instrumental during the shutdown and is used not only for the newly approved CIAC rules allowing summer practices, but also when the regular athletic season opens for practice before school starts.

# Cost Estimations for Natural Turf Fields
# 2-24-26

| | |
|---|---|
| **Estimate to construct six natural turf fields** @ $523,085/Field | $3,150,510 |
| **Cost to purchase six fields** @ $72,000/Acre @$432,000/Field | $2,592,000 |
| **Yearly material costs** @ $8,257/Field | $49,542 |
| **Yearly maintenance costs** @ $6,980/Field (manhours-174.5hrs@$40/hr/per field) | $41,880 |
| **Field Covers** 6@$3,123 (purchase, every 5 years) | $18,738 |
| **Football/Soccer Goals** $9,695/set | $58,170 |

**Implications, Hurdles, and other Considerations**

If it is the intention to replace sod on any of the fields, it is estimated it would cost $200,000. The field would need to rest 6-8 weeks until turf is established each spring.

Current operations- the town closes 5 irrigated rectangular fields in the summer until mid-August. The synthetic turf field becomes instrumental during the shutdown and is used not only for the newly approved CIAC rules allowing summer practices, but also when the regular athletic season opens for practice before school starts.

Regardless of where these fields will be located, the town would need to shut the fields down in order to properly maintain and rest the fields.

The Town is not sufficiently staffed to maintain an additional 6 fields to their current workload of maintaining 54 playing fields.

Assume two acres per field and an additional 4 acres for bleachers, benches, and a sizable parking lot.

The costs for the fields does include irrigation, but not the ongoing utility costs.