



Bristol Warren Regional School District RIDE Necessity of School Construction



PMA Consultants

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EASTMAN

SCHOOL BUILDING COMMITTEE | 09.19.2024

AGENDA

**BRISTOL WARREN REGIONAL SCHOOL DISTRICT
SCHOOL BUILDING COMMITTEE MEETING**

**Reynolds Building, 1st Floor Conference Room
235 High Street
Bristol, RI 02809**

Thursday, September 19, 2024 8:30AM

<https://www.youtube.com/@bwrsdri>

AGENDA

- I. OPEN MEETING**
- II. PUBLIC COMMENTS**
- III. DISCUSSION AND/OR POSSIBLE ACTION**
 - A. Approval of 8/08/24 Meeting Minutes - VOTE
 - B. General Project Update
 - C. Design Update
 - 1. Exterior Finishes
 - 2. Synthetic Turf Field
 - 3. Fire Department Scope Changes
 - 4. UST Soil Removal
 - 5. Geothermal/Irrigation Well
 - D. Project Schedule / Next Steps
- I. ADJOURNMENT**

GENERAL PROJECT UPDATE



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STAGE III PROGRESS UPDATE

01Jul24 - AE/OPM Coordination Meeting

08Aug24 - School Building Committee

Last SBC meeting

08Aug24 - School Building Committee

08Aug24 - AE/OPM Coordination Meeting

15Aug24 - AE/OPM Coordination Meeting

19Aug24 - School Committee

20Aug24 - ACS/Security Options Meeting

22Aug24 - AE/OPM Coordination Meeting

23Aug24 - Audio Enhancement Meeting

28Aug24 - Bristol TRC Meeting

29Aug24 - AE/OPM Coordination Meeting

03Sep24 - Warren FD Fire Protection System Review

03Sep24 - Bristol FD Fire Protection System Review

05Sep24 - Light Controls Meeting

09Sep24 - School Committee

09Sep24 - AE/OPM Coordination Meeting

12Sep24 - Bristol Planning Meeting

16Sep24 - Abutters Meeting

19Sep24 - School Building Committee

Upcoming

19Sep24 - AE/OPM Coordination Meeting

23Sep24 - Warren Planning Review

23Sep24 - User Group Meetings at MHHS

24Sep24 - User Group Meetings at MHHS

25Sep24 - Target Date: RIDE DD Review comments

30Sep24 - Test Drilling (Geothermal & Irrigation)

10Oct24 - Bristol Planning Board

DESIGN UPDATE: UST SOIL REMOVAL



DESIGN UPDATE



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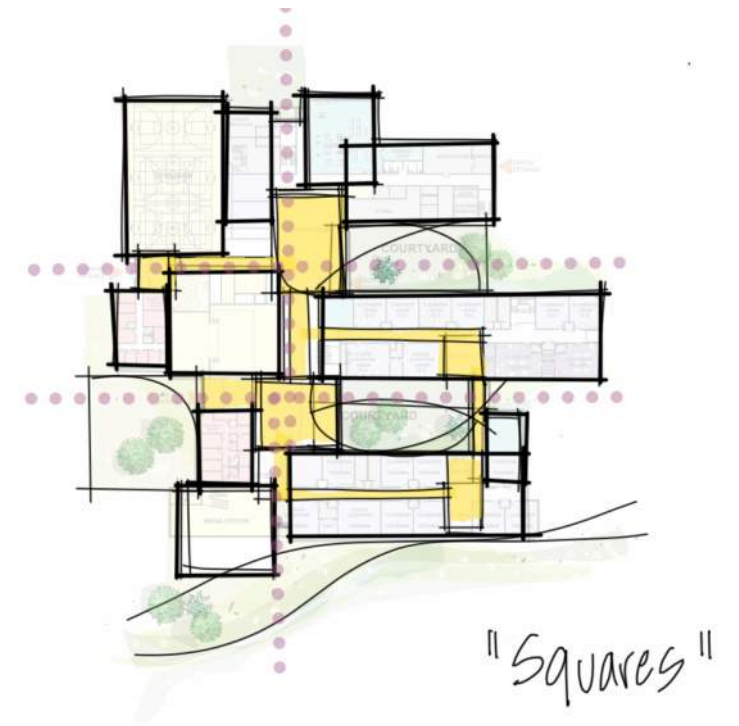
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BWRSD WORK PLAN

Bristol Warren Regional School District			
Project # 0099110.00			
Design Schedule			9/17/2024
CONSTRUCTION DOCUMENTS	07/29/24	12/23/24	
SBC DD Page Turn with Owner		08/08/24	
SBC meeting - Exterior Finishes and Turf Field presentation		09/19/24	
SBC meeting - Interior Finishes and Systems		10/17/24	
SBC meeting - Project update		11/14/24	
SBC meeting - Approve 60% CD Budget		12/12/24	
SBC meeting - CD Update prior to Bidding		01/16/25	
SC Meetings		09/09/24	
SC Meetings		09/23/24	
SC Meetings		10/28/24	
SC Meetings		11/18/24	
SC Meetings		12/16/24	
Neighborhood Meeting		09/16/24	BWRSD to confirm date
Signage Meeting at MHHS - entry sign		TBD	Mid Septmeber?
MHHS Final User Meetings	09/23/24	09/24/24	MHHS to send a schedule
Meet with MHHS students to review history of school		09/24/24	Need a group of students to meet
Fire Department and Building Inspector Review - Warren		9/3/24 at 1:00	
Fire Department and Building Inspector Review - Bristol		9/3/24 at 10:30	
Security Meeting with Cloud based system		08/20/24	
Integrated Design Team Meeting - Commissioning?		TBD	Commissioning Agent
Permitting	07/01/24	11/25/24	
Warren review meeting with Fire Chief		6/20/2024 at 10:30	in person
Submit Bristol Masterplan Application		08/05/25	
Warren Permit Application Meeting		7/31/2024 at 1:00	
Submit Warren Permit Application		08/12/24	
Bristol TRC Meeting		8/28/24 at 10:00	
Warren TRC Meeting		TBD	
Bristol Planning Board Master plan Review		9/12/24 at 6:00	
Bristol TRC Meeting - review before 10/10 hearing		10/02/24	
Bristol Masterplan Hearing - Continued		10/10/24	
Warrant Planning Board Review		TBD	
RIDEM submission for MHHS	09/01/24	12/01/24	Refer to PARE schedule
Bristol Planning Board Hearing		Nov./Dec. MTG TBD	
Warren Planning Board Hearing		Nov./Dec. MTG TBD	
CRMC Submissions for KMS and HC		08/06/24	Drawings sent to CRMC on 8/6/24
CRMC Review Meeting		8/27/24 at 10:00	
CRMC Approval		TBD	
Carry over items - Investigation work	07/01/24	11/25/24	
Geoenvironmental - soil from tank at high school		09/23/24	Soil Removal
Geoenvironmental - soil from tank at high school		09/13/24	Additional Soil Removal
Test pits at KMS and HC		Sept.-TBD	
Geothermal test wells		09/30/24	
Surveys		09/19/24	Some follow up needed - 100% due on 9/19
Additional Survey scope of east side of KMS		TBD	
Incentive - RIBE		TBD	Send DD set
Historic Documentation Site wall		08/02/24	
Historic Documentation Draft		10/25/24	
Historic Documentation Comments due from client		11/15/24	
Historic Documentation Draft to RIHPHC		11/29/24	
Traffic Summary for new		Ongoing	Bryant to send summary for MHHS and KMS

Bristol Warren Regional School District			
Project # 0099110.00			
Design Schedule			9/17/2024
Crack Monitoring at KMS		Ongoing	RIK to visit monthly
Hugh Cole Condensation report		Ongoing	
KMS Hydrant		Ongoing	
Hugh Cole condensation issue		07/29/24	Site visit
Hugh Cole review Fire Suppression system with WFD		07/29/24	Site visit
Construction Documents Drawings	07/22/24	01/31/25	
Consultant Coordination Meetings			
Structure and MEP Coordination - RSE/CMTA		Friday's at 10:00	
Site Coordination - Pare/Traverse		Thursday's at 2:00	
Lighting Coordination - HLB		Wednesday at 4:00	9/24 - next lighting review meeting
Technology review of Audio Enhancement system		8/23/24 at 11:00	
Acoustics Coordination - CT		DD report received	
AV and Theater Coordination - CT		8/22/2024 at 11:00	
Kitchen Coordination - CM		8/22/2024 at 9:30	
Code Review Meeting with JS		8/16/2024 at 9:00	
Lighting Control Review		9/5/2024 at 3:00	
Spec Review meeting - Kalin		10/10/24	
Spec - Front End Coordination		TBD	
Security Coordination - PP		TBD	
Hardware Coordination		8/20/2024 at 2:00	Send drawings to Assa Abloy on 9/3
Hardware spec review		TBD	
RIK Envelop review		Ongoing	Details sent to RIK on 9/13
FF&E and MEP coordination		TBD	
Technology Review Meeting		TBD	
60% Construction Document Set	07/22/24	11/01/24	
Check Set Due		10/09/24	
Final comments to Consultants		10/23/24	
60% CD Drawings due to PE from Consultants		10/30/24	
60% CD Due to Estimator		11/01/24	
Cost Estimate			
Estimating	11/01/24	11/29/24	
Receive and Review Estimate from Cost Estimator	11/29/24	12/05/24	
Reconcile Cost Estimate - Value Engineering		12/06/24	
Final Reconciliation - Revised Estimate Due		12/11/24	
Approval of 60%CD Scope and Budget		12/12/24	
Compile and Submit 60%CD Pkg to Owner and RIDE		12/13/24	
RIDE Review Period	12/13/24	12/31/24	
Review final comments from RIDE		TBD	
Holiday Week	12/24/24	01/01/25	
CD checkset due for final coordination		01/10/25	
Final Drawing Review	01/13/25	01/17/25	
Final Redlines to Consultants		01/20/25	
Bid Documents Due from Consultants		01/28/25	
Bid Documents Due		01/31/25	
BIDDING	02/03/25	03/03/25	
Contractor Pre-qual			
Addendum		02/17/25	
Final Question			
Bids Due			
Construction to Begin			

A Village



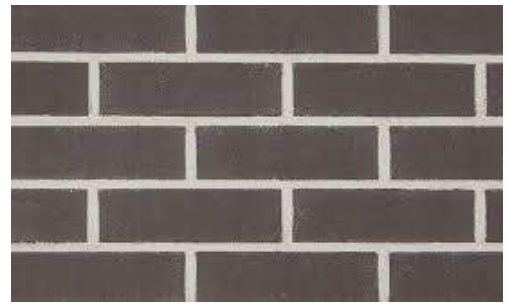
MASSING & SCALE

Color + Texture



INSPIRATION FROM THE VERNACULAR

Open Specifications | Multiple Manufacturers



SPAULDING BRICK

CONSOLIDATED BRICK

Façade Studies



Façade Studies



DESIGN UPDATE: EXTERIOR FINISHES



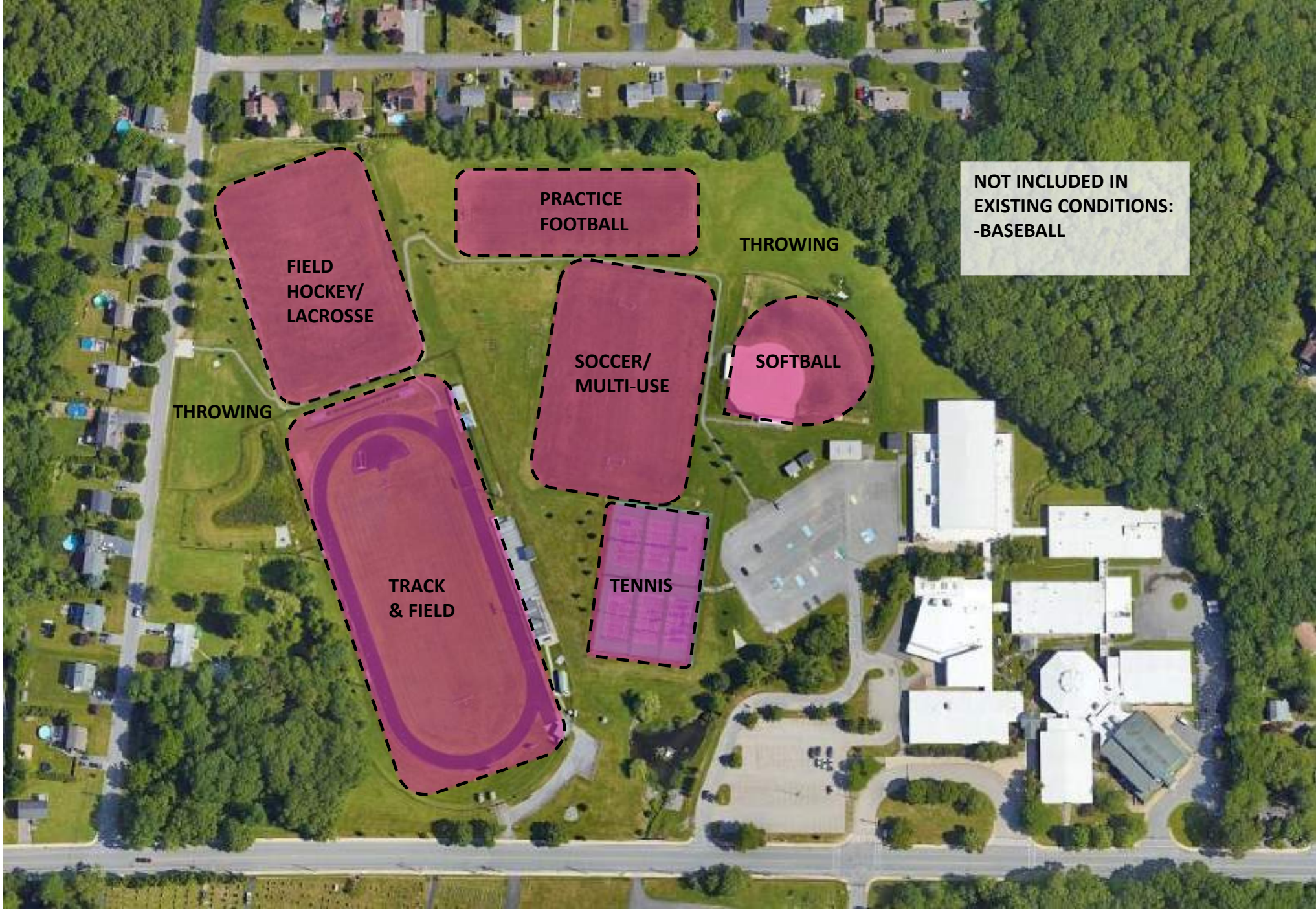
Mt Hope High School

SYNTHETIC TURF FIELDS



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EST. 1971

**PERKINS —
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**FIELD
HOCKEY/
LACROSSE**

**PRACTICE
FOOTBALL**

**SOCCER/
MULTI-USE**

**TRACK
& FIELD**

TENNIS

SOFTBALL

THROWING

THROWING

**NOT INCLUDED IN
EXISTING CONDITIONS:
-BASEBALL**

NOT INCLUDED IN -PURPOSE
-ONE TENNIS COURT

EX. FIELD
HOCKEY/
LACROSSE

PRACTICE
FOOTBALL

SOFTBALL

THROWING

THROWING

TRACK
&
SYNTHETIC
FIELD

NEW MT HOPE
HIGH SCHOOL

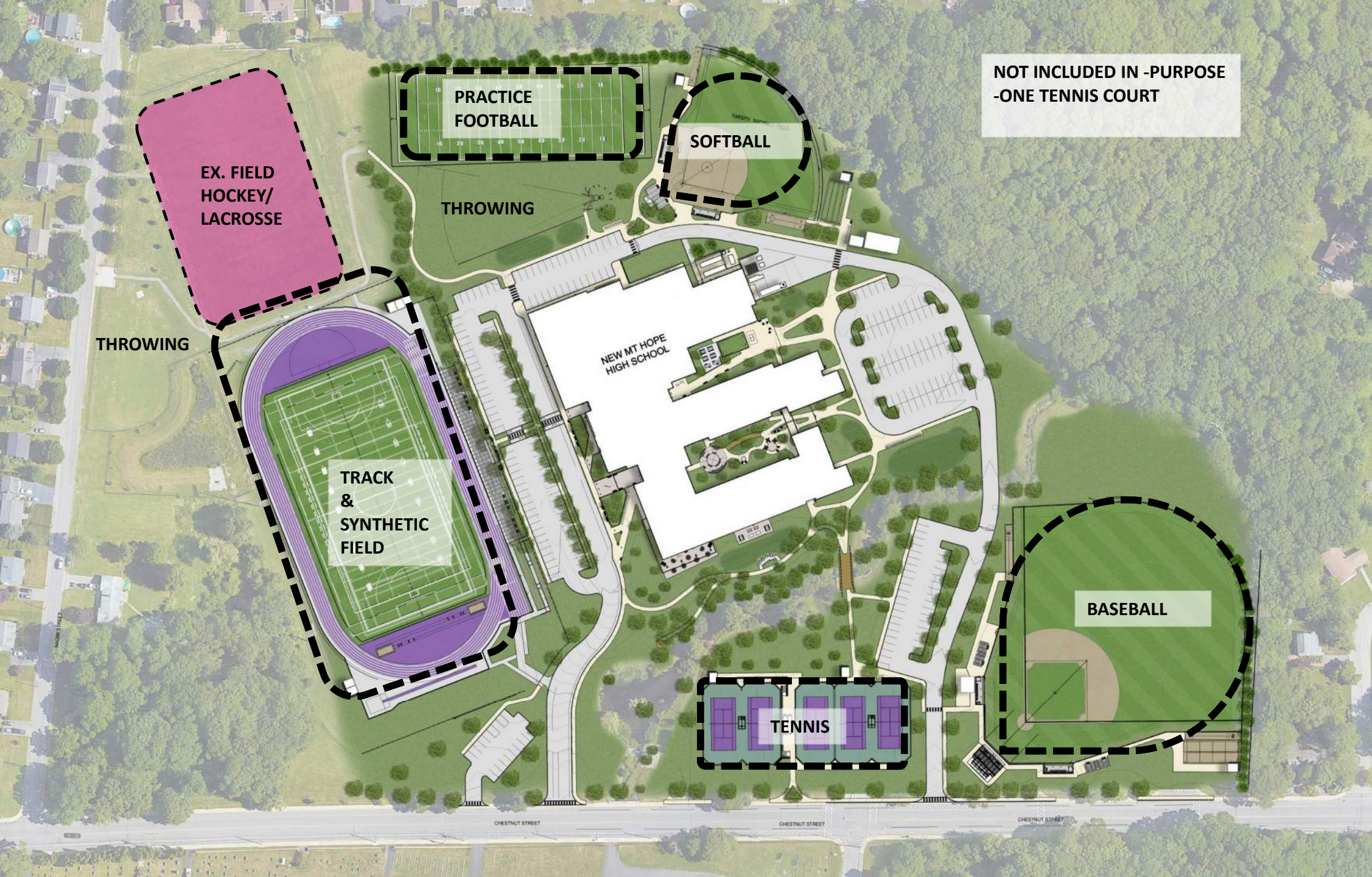
BASEBALL

TENNIS

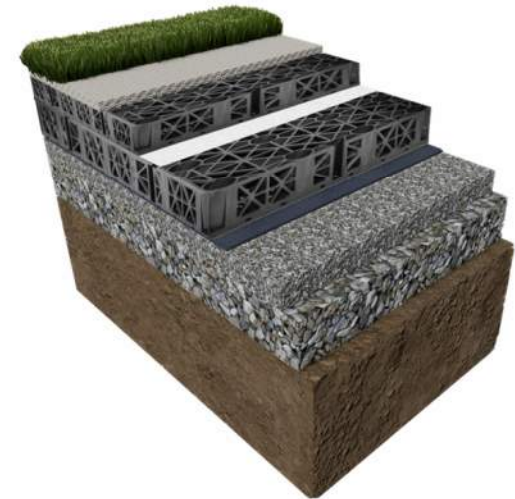
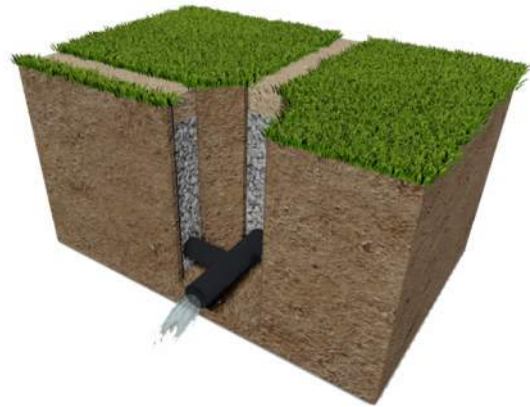
CHESTNUT STREET

CHESTNUT STREET

CHESTNUT STREET



	Low-End Grass Field	High-End Grass Field	Synthetic Turf Field
Installation Cost	\$300,000-400,000	\$700,000-800,000	\$1,200,000-1,600,000
Annual Maintenance Cost	\$35,000-40,000	\$50,000-55,000	\$15,000 -18,000
Hours of Use	550-850	850	3,000+



Environmental Concerns

Environmental Concerns of Synthetic Turf

- Contribution to waste
- Microplastics and PFAs (Pollution and Runoff)
- Implications for Climate Resilience
- Contribution to Urban Heat Island Effect

ENVIRONMENTAL CONCERNS OF NATURAL GRASS

- CARBON EMISSIONS FROM MAINTENANCE
 - PESTICIDE AND NUTRIENT RUNOFF
 - PFAs FROM FERTILIZERS
- WATER USAGE FROM IRRIGATION

Health Impacts

Research

- There is still limited and inconclusive research on the health effects of synthetic turf compared to natural grass including a significant number of recent health and safety studies that rely on older data.

Limitations

1. The type of playing field is not solely responsible for injuries according to many recent studies.
2. Significant number of studies rely on examination of older generations of turf with high pile heights and crumb rubber infill
3. Most studies are based on high levels of competition (i.e., Professional and Collegiate Athletes)

DATA

2022 SYSTEMATIC REVIEW PUBLISHED IN THE AMERICAN JOURNAL OF SPORTS MEDICINE OF 53 STUDIES CONDUCTED FROM 1972-2020 FOUND THAT 32 OF THE ARTICLES COMPARED OVERALL INJURY RATES ON GENERATION 3 OR NEW SYNTHETIC TURF AND NATURAL GRASS.

1. OVER HALF (54%) REPORTED NO DIFFERENCES IN INJURY RATES OVERALL BETWEEN PLAYING SURFACES.
2. 36% REPORTED INJURY RATES HIGHER ON SYNTHETIC TURF AND
3. 10% REPORTED HIGHER RATES ON NATURAL GRASS

NATURAL GRASS

Advantages	Disadvantages
<p>Environmental Benefits. Natural grass contributes to small amounts of carbon sequestration, reduces stormwater surface runoff, and helps maintain a healthier ecosystem by supplying oxygen, filtering stormwater, and absorbing heat.</p>	<p>Environmental Drawback. Natural grass athletic fields often require the use of pesticides to ensure playability.</p>
<p>Cooler Surface. Natural grass remains cooler than synthetic turf during hot weather, reducing the risk of heat-related injuries and making it more comfortable for athletes.</p>	<p>Maintenance. Keeping natural grass up to the highest playing standards requires more consistent upkeep compared to a synthetic turf field. Natural grass requires regular mowing, watering, fertilizing, and pest control, which requires labor and incurs costs.</p>
<p>Cost-Efficiency. The installation cost of natural grass is typically lower than that of synthetic turf.</p>	<p>Weather Dependency. Use of natural grass fields can be heavily influenced by weather conditions. Fields are typically closed for use due to rain or extreme weather, which can disrupt scheduled events. Fields often cannot be used for several days after a big rainfall because use can significantly damage wet fields</p>
<p>No Waste. Natural grass fields do not have an end of life and, therefore, do not create waste that must be recycled or disposed of.</p>	<p>Playability Issues. The overuse of a natural grass field can result in uneven and damaged playing surfaces, affecting the quality of gameplay and increasing the risk of injuries to players. Further, rainfall or moisture on natural grass can create a slick surface.</p>
	<p>Water Dependency. Natural Grass athletic fields require constant watering.</p>
	<p>Limited Hours. Often, natural grass fields are not available for play during winter months because the field needs to “rest.” In addition, hours of use must be limited throughout the rest of the year to maintain fields in playable condition.</p>

SYNTHETIC TURF

Advantages	Disadvantages
<p>Less Maintenance. Synthetic turf fields typically require less maintenance than natural grass fields. Where natural grass fields require regular mowing, watering, and fertilizing, synthetic turf requires less. Required labor and maintenance costs are typically lower for synthetic turf fields.</p>	<p>Chemical Exposure. Synthetic turf fields using crumb rubber infill can leach certain chemicals from there makeup.</p> <p>Use of organic or natural infills significantly reduces any exposures and new legislation in Rhode Island will require PFAs free turf also reducing any further chemical exposure</p>
<p>Water Conservation. Cornell College of Agriculture and Life Sciences reports that natural grass should receive about 1"-2" of water per week during the growing season. Synthetic turf does not need to be watered unless certain organic infills are used.</p>	<p>Waste. Current recyclability is challenging because the locations to recycle turf are limited and someone must incur the cost of shipping the turf to be recycled. PFAs and synthetic turf's complex makeup will also make future recycling a challenge.</p>
<p>Year-Round Usage. Synthetic turf fields are typically available for use year-round except when the ground is frozen.</p>	<p>Drainage. Synthetic turf does not pull water out of soil and release it into the air nor filter pollution to protect water quality of waterways like natural grass can.</p>
<p>Consistent Play. Synthetic turf creates flat fields available for year-round play and provide more predictable play for athletes such as predictable ball bounce and consistent player footing.</p>	<p>Heat Issues. Synthetic turf can reach significantly greater temperatures than natural grass under the same weather conditions, which can increase the risk of heat-related illnesses for players and create uncomfortable play conditions.</p>
<p>Durability/More Hours of Play. Synthetic turf can withstand heavy use and is less susceptible to wear and tear compared to natural grass. Fields are not susceptible to bald spots or other damage from overuse like natural grass fields, allowing for longer hours of play on synthetic turf field. However, significant use can shorten the lifespan of a synthetic turf field.</p>	<p>Capital Cost. The initial cost of installing synthetic turf can be relatively high compared to natural grass. Underlying soil conditions and additional stormwater infrastructure can add to initial costs.</p>
<p>Play During Most Weather. Synthetic turf can be used in various weather conditions, including during and after rain.</p> <p>*Synthetic turf can be dangerous to play on when the heat index ranges above 91 °F, due to high surface temperatures</p>	<p>Limited Lifespan. Synthetic turf typically has a life span of 10-12 years. Lifespan can be impacted by local climate, maintenance, and use.</p> <p>Movement of infill. Synthetic turf infill requires proper depth and weight or it can move throughout a season. Some organic infills in particular require a certain moisture level to keep from drying out and blowing away. Some organic infills are hydrophobic meaning they tend not to mix well with water and have a potential to float.</p>

key takeaway #1 the overall safety of a field both synthetic turf and natural grass is proper maintenance.

If not properly maintained, all playing surfaces can be unsafe and cause injuries. For natural grass in particular, the level of maintenance directly corresponds to the consistency and safety of its surface.

Systems based approach for Athletic Field design Promotes



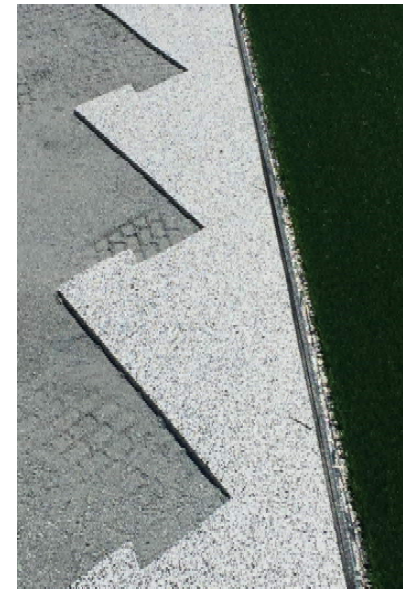
Safety



Performance/Consistency



Durability



Evolution of synthetic turf

GENERATION 1- 1960's

- NYLON FIBERS (ABRASIVE)
- SHORT PILE HEIGHTS
- GLUED OVER ASPHALT OR CONCRETE
- SMALL CUSHION LAYER



GENERATION 2- 1970's

- POLYPROPYLENE FIBERS (LESS ABRASIVE)
- SHORT PILE HEIGHTS
- SAND INFILL
- SMALL CUSHION LAYER



GENERATION 3- 2000's

- INTRODUCTION OF SOFTER POLYETHYLENE FIBERS.
- SAND AND RUBBER USED TO IMPROVED TRACTION, SAFETY AND SOFTNESS UNDERFOOT
- TALL PILE HEIGHT 2- 2 1/2"



GENERATION 4- 2010's

- CONT. USE OF POLYETHYLENE FIBERS.
- SAND RUBBER INFILL
- TALL PILE HEIGHTS 2-2 1/2"
- INTRODUCTION OF SHOCK PAD FOR IMPROVED SAFETY



GENERATION 5- PRESENT

- CONT. USE OF POLYETHYLENE FIBERS.
- SAND AND ALTERNATIVE INFILLS
- TALL PILE HEIGHTS 1.75"-2"
- PERFORMANCE PAD FOR SAFETY AND FINE TUNING OF SYSTEMS BASED ON FIELD AND BIOMETRIC TESTING





SAFETY- GMax



- The GMax test is not correlated with head injury risk. The GMax test drops a 20 lb. flat missile from just 2 feet high.
- GMax is the maximum acceleration of an object at impact expressed in “g’s”
- The higher the GMax value, the harder the surface. A good natural grass field (the benchmark for a quality athletic field) will produce a GMax below 100 and often below 80.
- A low GMax does not necessarily mean there is a lack of stability in the playing surface.
- Artificial turf with a sand rubber infill over stone will produce a GMax above 140 and frequently higher, meaning far more impact energy is absorbed by the body than by the surface.



SAFETY- H.I.C

- The HIC test correlates with the likelihood and severity of a head injury.

- The **average value** of the acceleration over a time interval,

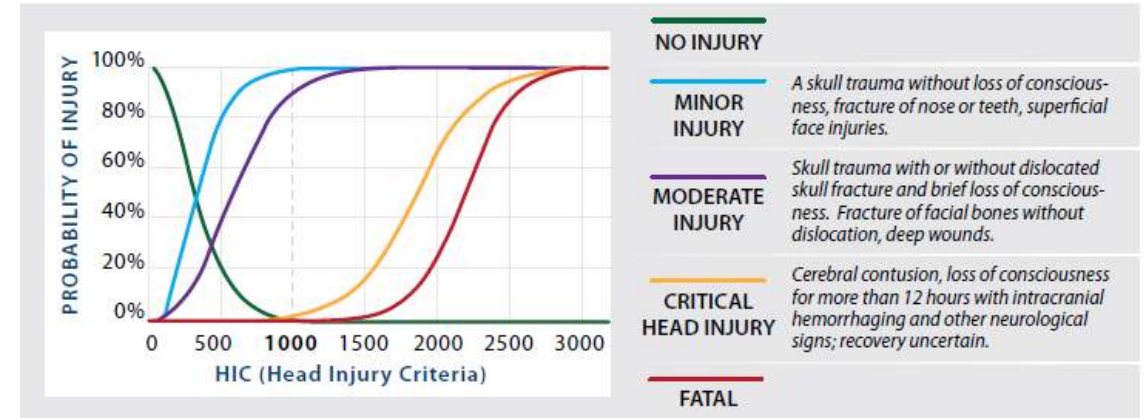
- H.I.C developed by the National Highway Insurance Safety institute and has been used as a standard since 1995

- H.I.C has been used to test playground surfaces for decades, and was adopted by ASTM for athletic fields in 2016.

- The HIC impact test drops a 10.1 lb. hemisphere projectile (curved like a human head) multiple times from increasing heights and determines the surface's Critical Fall Height.

- The higher the Critical Fall Height, the safer the surface. A good natural grass field will produce a minimum critical fall height of about 6 feet or higher.

- The world Rugby requirement for Critical fall height is >1.3M or 4'-3"



HIC Related to Head Injury Probability

HIC Value	Minor Head Injury	Moderate Head Injury	Critical Head Injury	Fatal Head Injury
0	0%	0%	0%	0%
250	40%	20%	0%	0%
500	80%	40%	2%	0%
750	95%	70%	4%	0%
1000	98%	90%	8%	2%
1250	100%	95%	10%	2%
1500	100%	98%	20%	4%
1750	100%	100%	45%	10%
2000	100%	100%	70%	30%
2250	100%	100%	90%	70%
2500	100%	100%	95%	90%
2750	100%	100%	98%	95%
3000	100%	100%	100%	100%



- Do Gmax and H.I.C give you a full evaluation of the performance of a field and its safety Characteristics.

NO



Vertical Deformation



- This test simulates the heel strike of an adult running athlete in stride. In other words, it measures the softness or hardness underfoot during play on a field.

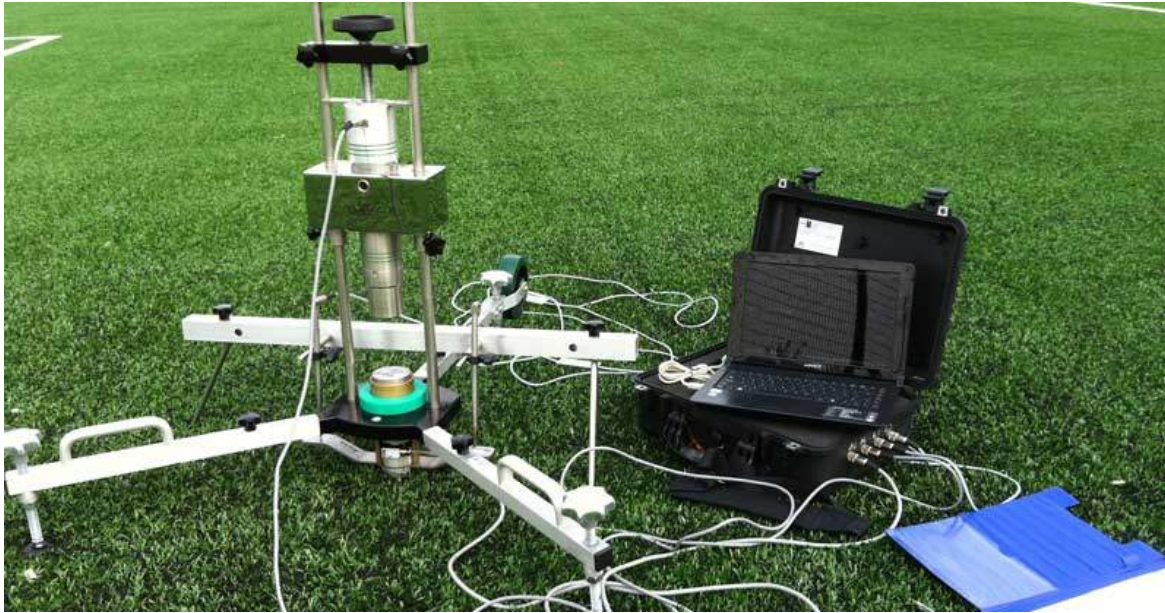
- Too High**- The field will deform too much under the player which will result in overstretching of ligaments.

- Too low**- The field does not have enough compressibility and will feel hard to run on resulting in potential joint and muscle soreness for the athlete.

- A great natural grass field hits the “sweet spot” of being firm underfoot while producing very low Gmax and high Critical Fall Height. That is why our Benchmark is a high quality natural grass field.



Force Reduction



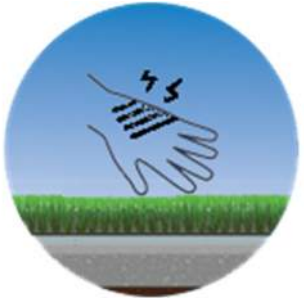
- This test measures the hardness or softness under foot
- **Too High**- Meaning the field will feel heavy “soft” under foot and will sap student athletes of their energy tiring them a lot quicker. Think of running on the beach.
- **Too low**- The surface will feel too hard and result in an increase risk of injury to players from compaction in the knee joints and spinal column.



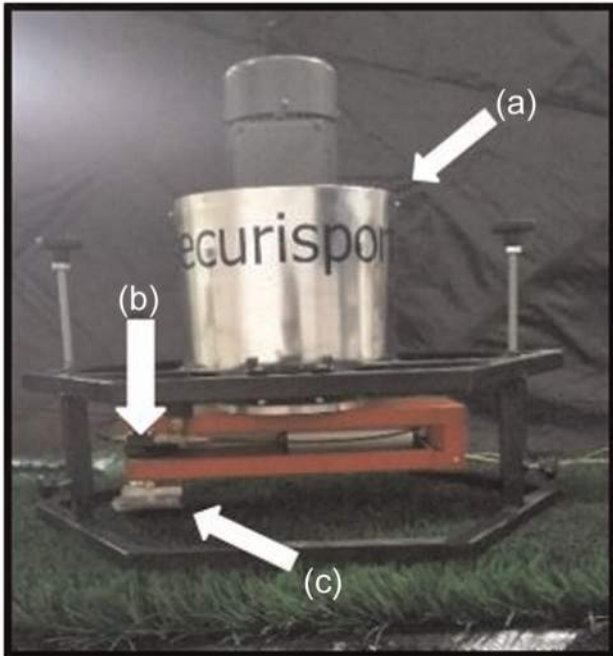
Rotational Resistance



- With a high end natural grass field an athlete expects a certain amount of slippage or release of there cleat from the surface below.
- Too High-** The natural slippage that is expected is reduced.
- There is a likelihood of excessive grip between the cleat and the surface
- There is increased risk of Potential joint injuries specifically to the knee and ankle.
- Too Low-** The players are more likely to slip and have less confidence in their foot holding.
 - it makes change of direction more difficult and slippage can result in over extension injuries



Abrasion



- The data on this test can be is important in understanding how types of infill and depth of infill can affect abrasion.
- Research is currently being conducted by third party testing agencies to improve this test to better replicate human interaction and abrasion cause by the surface while trying to mimic a soccer slide tackle.



Ball Rebound/ Ball Roll



•Ball Rebound-

- **Too High**- The surface will make ball bounce unusually high
- **Too Low**- The ball will bounce less then expected resulting in a deadening of the ball

•Ball Roll-

- While this test is a great performance metric for soccer or field hockey. It is all used as a tool in the field to identify orientation of fibers and a maintenance indication tool to potential friction burns.
- High Ball indicates that fibers are laying flat and that potential increases





Infiltration Rate



- Measures the speed of water moving through a surface.
- Not intended to measure a field's storing capacity.



Planarity



- Base is the foundation for your field and thus is one of the most important components.
- Planarity and survey should be done at every level of base construction and upon final installation.
- Planarity effects consistency, predictability, ball roll and safety of a surface.



Infill Depth



- Depth of infill effects consistency, predictability, ball roll and safety of a surface.
- Depths of infill varying from design range can effect cleat release and force transfer.

key takeaway #2 Equipment type matters with regards to specific surfaces.

Player safety can be affected by the surface on which they are playing and the type of shoes or cleats that they are wearing. Factors that can influence impact with the ground include type of surface, the material and fit of the playing shoe and the weight and stance of the student athlete. In order to help reduce injuries, experts recommend athletes wear sport-specific, surface specific and even weather specific shoes/cleats.



Synthetic Turf Carpet

	Turf Systems				
Turf Type	Slit Film	Monofilament	Hybrid Monofilament and Slit film	Nylon Thatch Layer	Nylon
Turf Image					
Performance					
Soccer	●	●	●	●	NA
Football	●	●	●	●	NA
Lacrosse	●	●	●	●	NA
Multi-use	●	●	●	●	NA
Field Hockey	●	●	●	●	●
Durability					
Tuft Bind	●	●	●	●	●
Structural Integrity	●	●	●	●	●
Fiber Loss	●	●	●	●	●
Aesthetics					
Fiber Shren	●	●	●	●	●
Infill Encapsulation	●	●	●	●	NA
Grass Like	●	●	●	●	NA
Cost	●	●	●	●	●
Legend					
● Best					
● Better					
● Good					

Monofilament

Most appropriate for lighter-use applications or soccer fields, monofilament systems feature fibers that are extruded through a spinneret in single strands.

The pros of this type of system include: great aesthetics. Because monofilaments, stand up straighter, they help slow ball roll. This is especially beneficial for soccer. At the same time, monofilament systems are the least durable. One particular problem that all synthetic turf manufacturers have had trouble with, is tuft bind. Tuft bind is the amount of force it takes to pull the fibers from the coated backing. With a monofilament system, if one fiber in a tuft is pulled out, the entire tuft becomes loose and is compromised. This is because when the fibers are punched through the backing during manufacturing, they tend to stack like spoons, so the coating applied to the backing tends to surround the outside of the fibers, rather than working its way down between the fibers. A higher face weight and heavy backing are important with a monofilament system.

Slit Film

Slit film systems, recommended for very-heavy-use applications, are extruded in a sheet that is cut (or slit), forming a sort of honeycomb pattern. Upon installation and use, the fibers break apart, or fibrillate. This is the most durable type of system, but it is less aesthetically pleasing than the less durable monofilament or hybrid-type systems

Hybrid

Hybrid or blended systems feature both monofilament and slit film fibers in the same products. It can accommodate most applications, although fields that experience extremely high use might still benefit from a slit film system. Some of the pros of the hybrid system include good aesthetics, good ball-surface interaction and good resistance to wear.

Comparison of Synthetic Turf Systems



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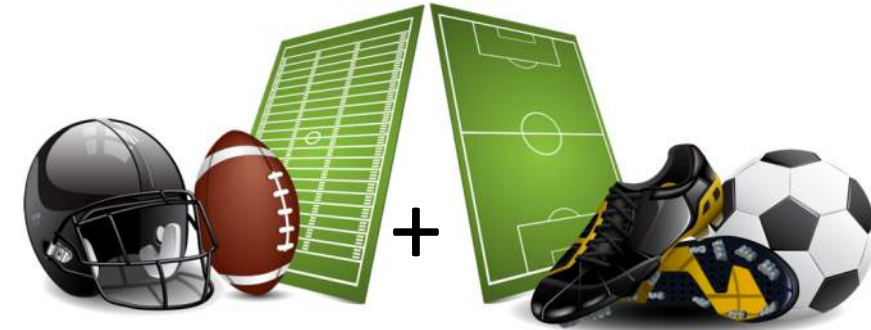
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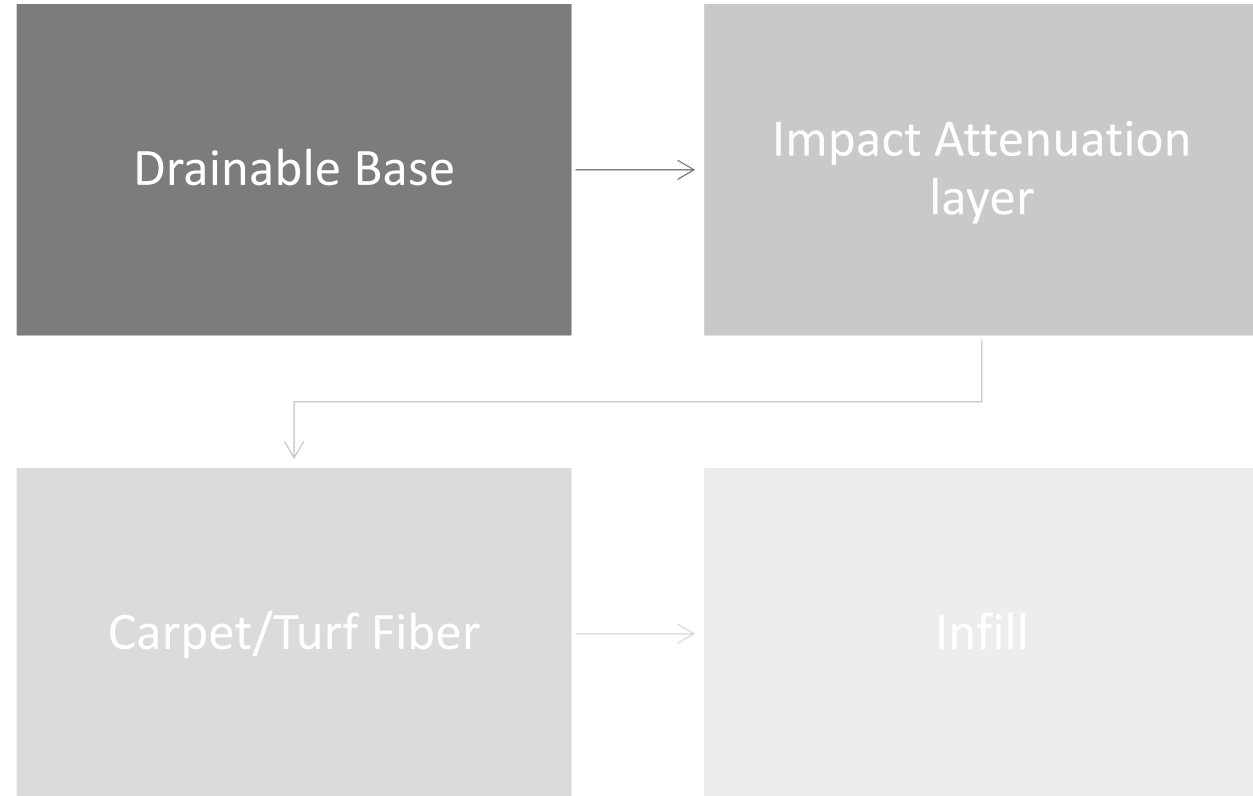
Infill

Infill Type	Petroleum Based					Sand	Plant Based (Organic)			
	Post Consumer Recycled Tires SBR Crumb Rubber	New Crumb Rubber	Post Consumer Product Grinds	New Plastic Crumb Thermoplastic Elastomer	Acrylic Coated Sand		Raw Sand	Cork	Corknut	Safeshell
infill Image										
Health										
Chemical Exposure	●	●	●	●	●	●	●	●	●	●
Heat	●	●	●	●	●	●	●	●	●	●
Injury Risk	●	●	●	●	●	●	●	●	●	●
Allergy Risk	●	●	●	●	●	●	●	●	●	●
Environmental										
Carbon Footprint	●	●	●	●	●	●	●	●	●	●
Water Consumption	●	●	●	●	●	●	●	●	●	●
Recyclability	●	●	●	●	●	●	●	●	●	●
Recreation and Performance										
Sport Specific	●	●	●	●	●	●	●	●	●	●
Consistency and Reliability	●	●	●	●	●	●	●	●	●	●
Grass Like	●	●	●	●	●	●	●	●	●	●
Cost										
Initial Capital	●	●	●	●	●	●	●	●	●	●
Annual Replenishment	●	●	●	●	●	●	●	●	●	●
Maintenance	NO	NO	YES	NO	YES	YES	YES	YES	YES	YES
Pad Requirement	●	●	●	●	●	●	●	●	●	●
Per/SF	\$0.73	\$4.55	\$4.25	\$4	\$3.35	.35	\$2.00	\$2.50	\$2.25	\$1.50
Legend	<ul style="list-style-type: none"> ● Concern ● Risk ● Benefit 									
	Post Consumer Recycled Tires SBR Rubber	Virgin EPDM Crumb Rubber	Post Consumer Grinds	Plastic Crumb Thermoplastic Elastomer TPE	Acrylic Coated Sand	Raw Sand	Cork	Cork-o-nut	Safeshell-Walnut	Brockfill-Pine

Comparison of Infill Systems

GEN 1: 1960s	GEN 2: 1970s	GEN 3: 2000s	GEN 3.5: 2010s	GEN 4: present
<ul style="list-style-type: none"> - Nylon fibers (abrasive) - Short pile heights - Glued over concrete or asphalt - Soft cushion used beneath the turf 	<ul style="list-style-type: none"> - Polypropylene fibers (less abrasive) - Short pile heights - Sand infill - Soft cushion used beneath the turf 	<ul style="list-style-type: none"> - Introduction of soft, grass-like polyethylene fibers - Sand & rubber infill used to improve traction, impact safety and softness underfoot - Tall pile height: 2.0" - 2.5" 	<ul style="list-style-type: none"> - Continued use of polyethylene fibers - Sand & rubber infill - Tall pile heights: 2.0" - 2.5" - Introduction of shock pads for improved impact safety 	<ul style="list-style-type: none"> - Continued use of polyethylene fibers - Sand & natural infill - Tall pile heights: 1.75" - 2.0" - Use of a performance pad for safety & fine tune systems based on field & biometric data

System Based Design – Athletic Fields



DESIGN UPDATE: FIRE DEPARTMENT SCOPE CHANGES

- Add new Fire Panel to Kickemuit MS
- Add new Fire Hydrant(s) to Kickemuit MS
- Add Magnetic Hold Opens to Stairway Doors in Kickemuit MS
- Review requirement for sprinklers at the entry canopies at Kickemuit MS
- Replace existing dry sprinkler system with new dry sprinkler system in Hugh Cole Attic Space

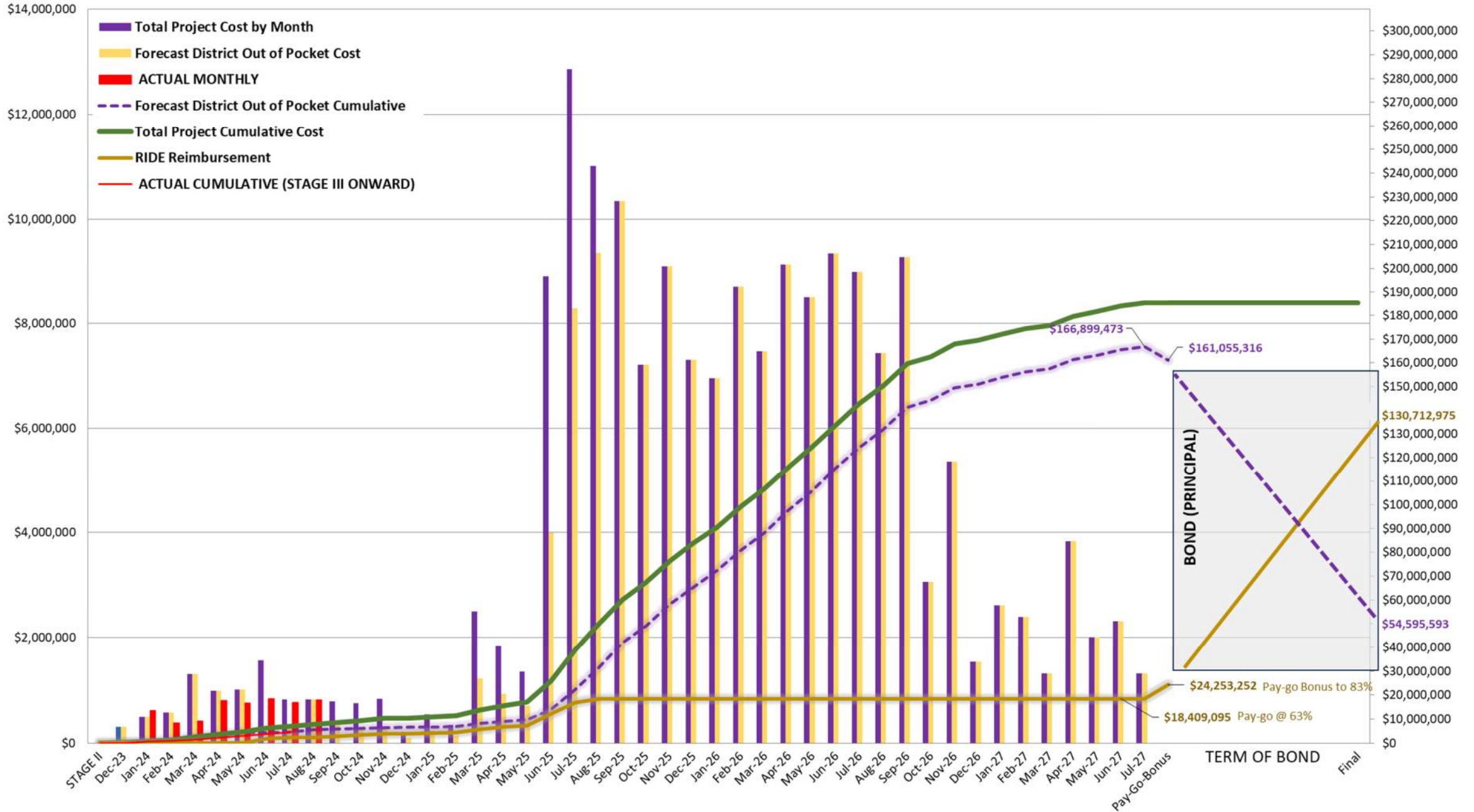
BUDGET UPDATE



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PROJECT CASHFLOW



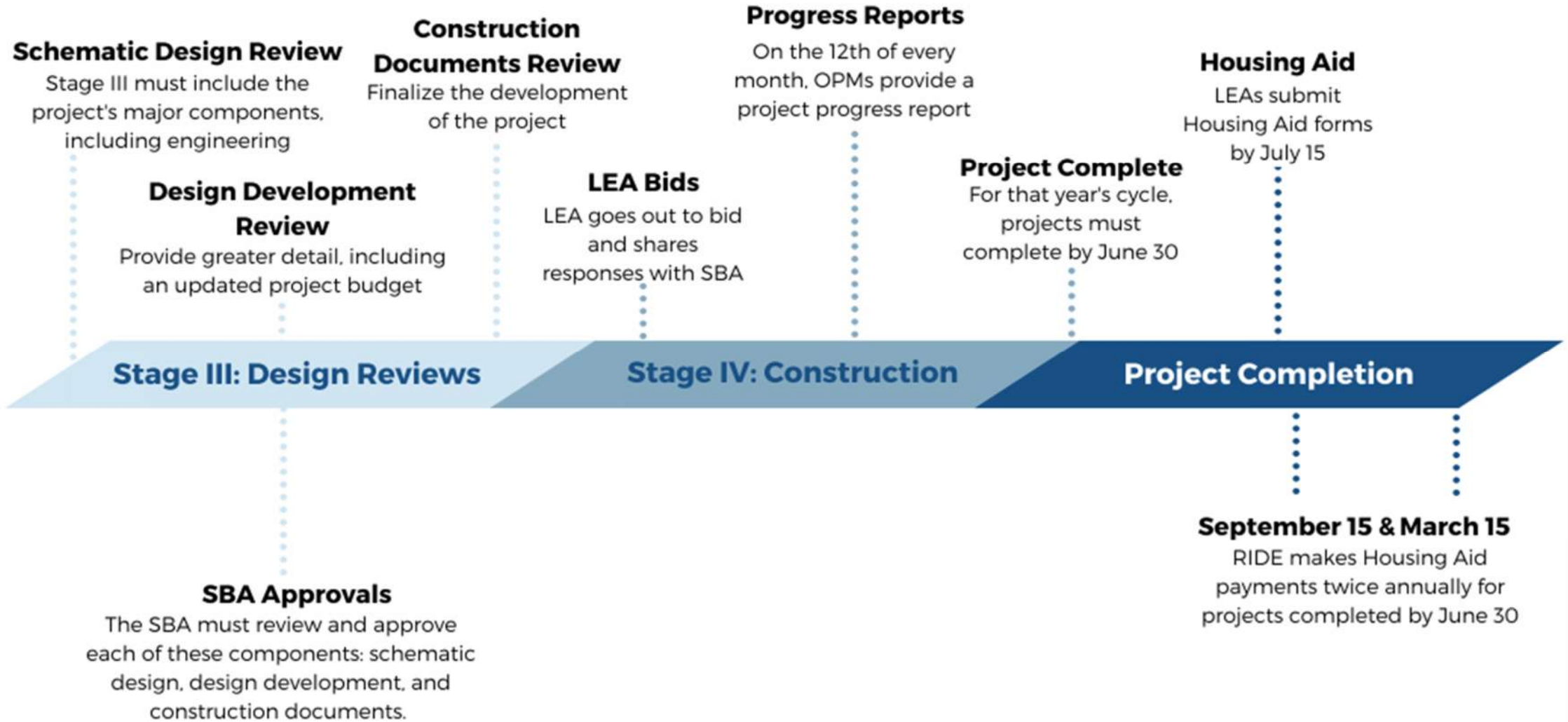
PROJECT SCHEDULE / NEXT STEPS



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NEXT STEPS





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QUESTIONS? | THANK YOU!