City of

Portsmouth

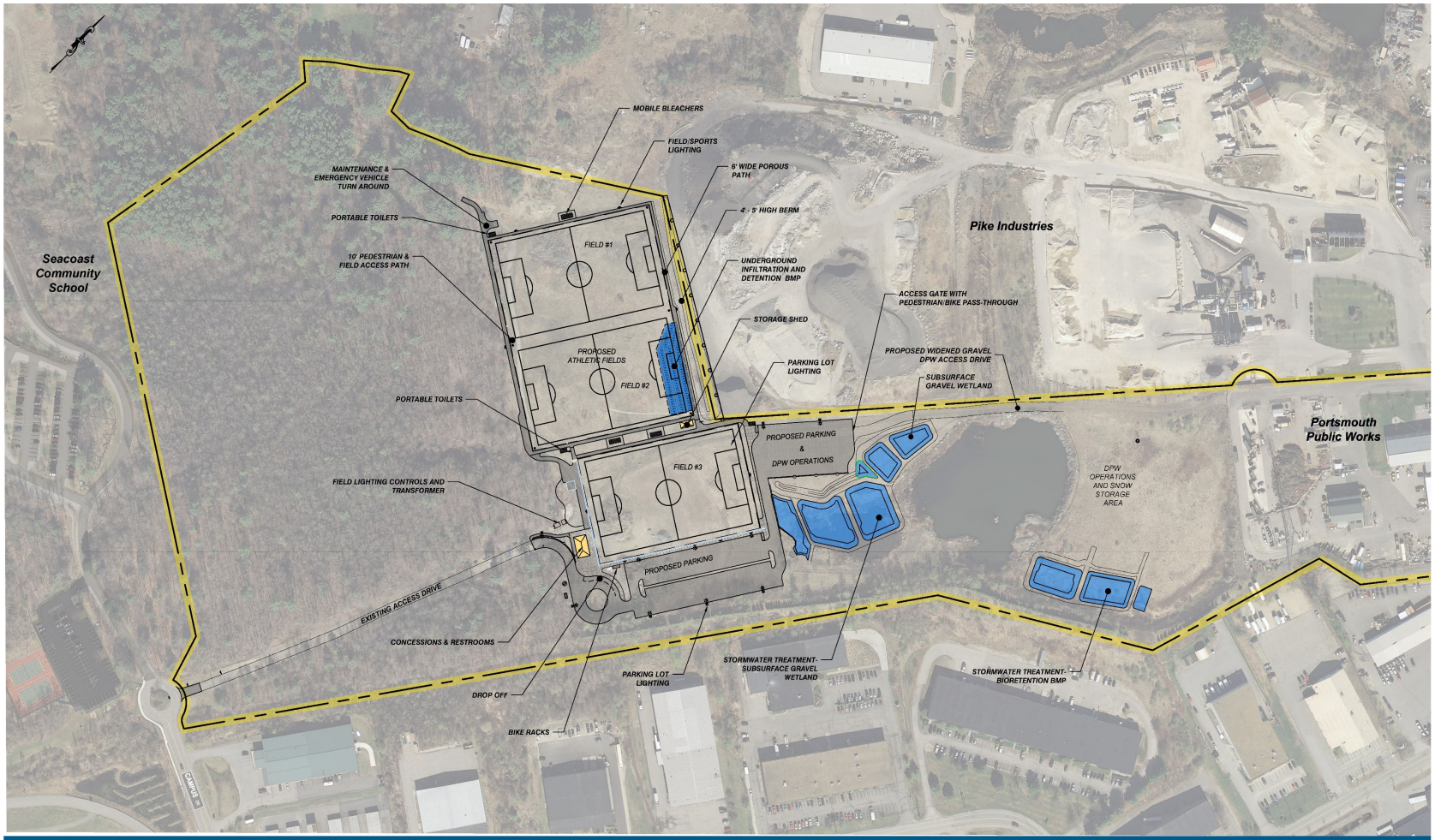
New Hampshire

# Multi-purpose Recreation Fields

February 18, 2020

# Presentation Objectives & Requested Action

- Project components:
  - Recreation fields
  - Regional stormwater facilities
  - PW operations and snow storage
- Field type selection process & recommendations
- Schedule requirements: 12/31/20 Regional Stormwater Consent Decree Deadline
- Select field type to facilitate bid of the project




## *Portsmouth Multi-purpose Recreation Fields*

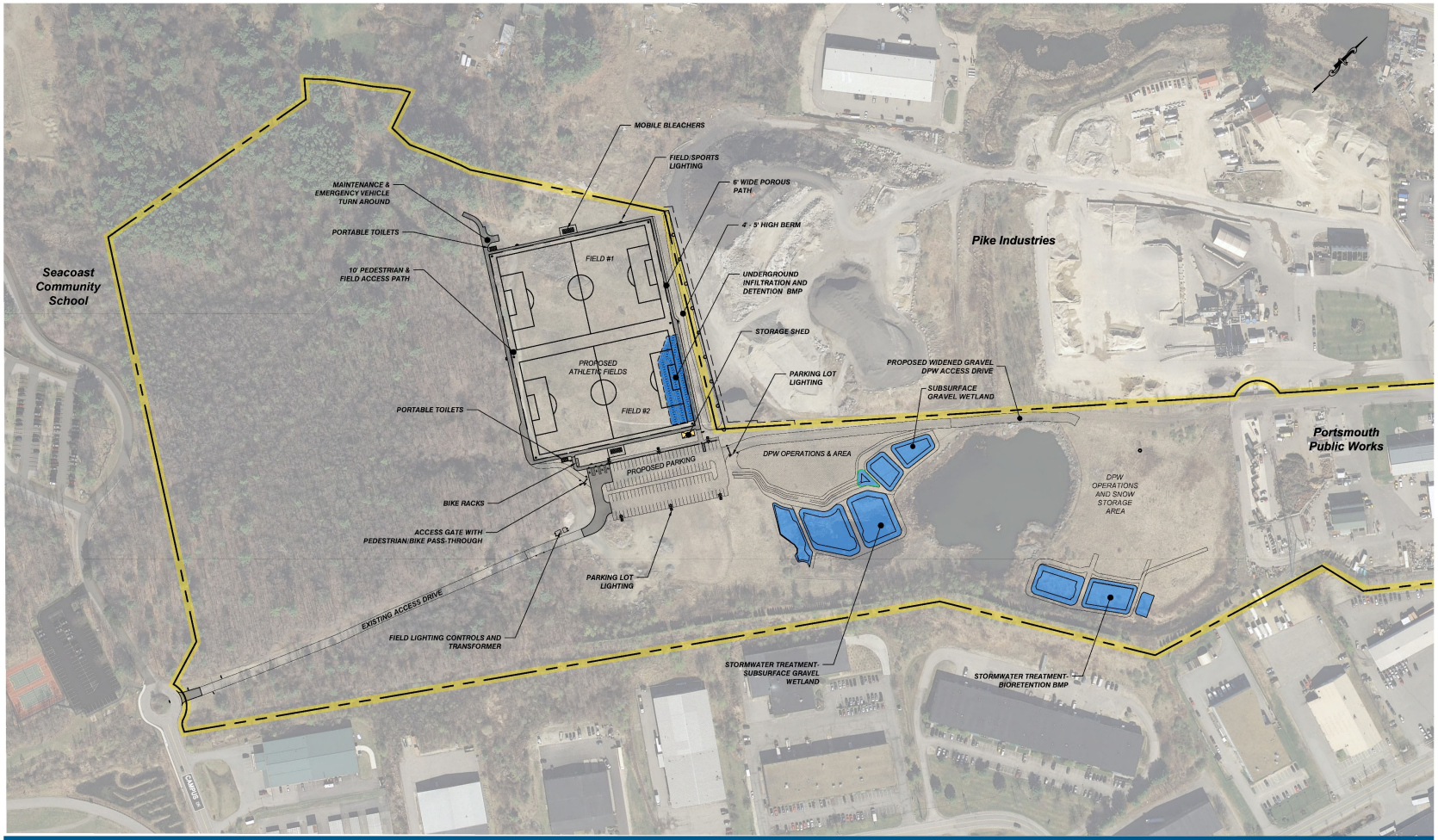
### Full Build-Out Plan (Conceptual)

October 2019 0 100 200

Proposed Stormwater BMP

CMA ENGINEERS

Weston & Sampson




## *Portsmouth Multi-purpose Recreation Fields*

**Phase 1**

October 2019

0 100 200

Proposed Stormwater BMP

CMA ENGINEERS

Weston & Sampson

# Project Development: Timeline

- In the 2003 CIP, the City included funding for new field
- In 2010, updated in 2016, the City commissioned a *Comprehensive Recreation Needs Study*
- *Route 33*
- *Votes on fields / synthetic turf*

# Recreational Field Type Selection

## Primary Considerations

- Athlete Safety
- Environmental Considerations
- Recreational Needs
- Cost

# Project Development: Recreational Needs

## Recreational Needs

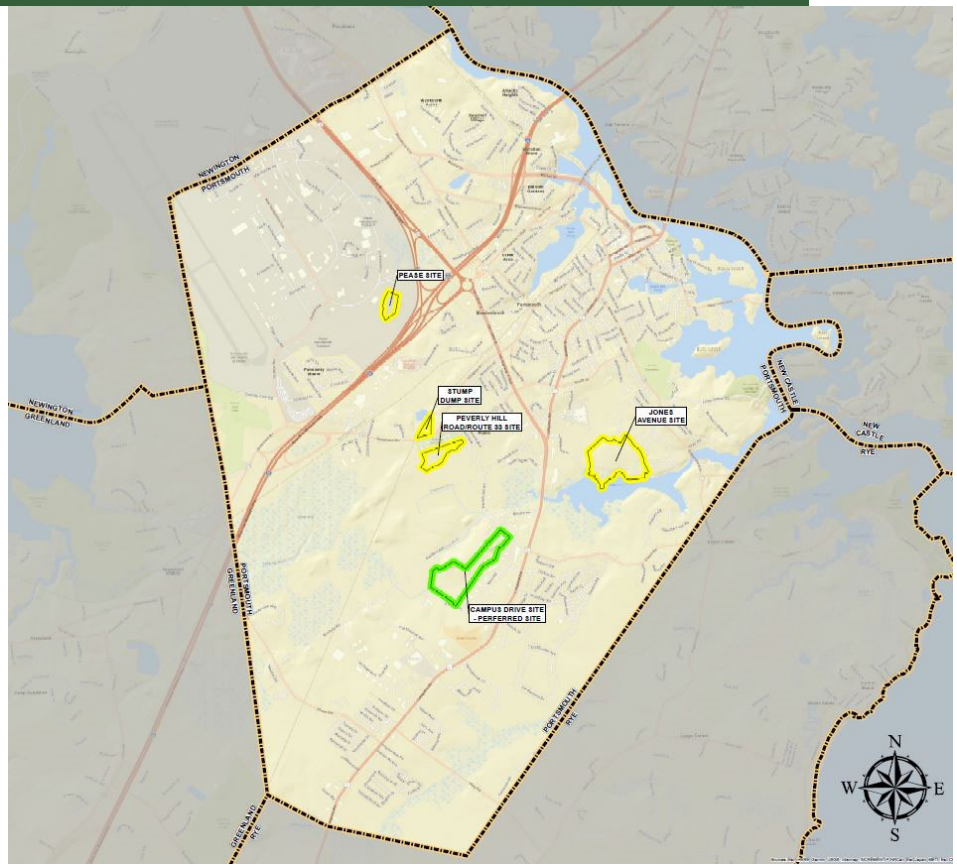
- Substantial Demand
  - Demand exceeds supply
  - Organizations limit participation
- Existing Fields
  - Current fields are multi-use
  - No capacity for rotation of fields or resting to allow recovery
  - Existing sod fields are overused – need to recover and be improved
- Critical Field Shortage:
  - 2010 Rec Study recommended 3-4 New rectangular synthetic turf fields w/ lighting
  - Equivalent playability of sod fields: 8 - 12 new sod fields
  - Comparison: Portsmouth 17 fields, Dover 25 fields, Rochester 44 fields

# Multi-use Fields

# Project Development: Site Selection

## Recreational Assessment

- Reviewed five potential sites
- Four sites: abutter opposition, environmental constraints
- Remaining site the preferred alternative
  - Owned by the City
  - Large in size
  - Relatively flat topography
  - Minimizes and avoids wetland impacts
  - Multiple fields at one site

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# Natural Turf Fields

## Pro's + Cons:

- Cheaper initial cost per field
- Playability is limited by weather, season and use
- Higher maintenance costs
- Native soils may contain elevated levels of metals, carcinogens, etc.
- Environmental impacts related to improper maintenance
- Requires irrigation for proper turf maintenance

# Synthetic Turf Fields

## Pro's + Cons:

- More Playing Time
  - Supports higher intensity of use
  - Extends the playing season
  - No rain days
- Less intensive maintenance program
  - No pesticides or fertilizers
  - No irrigation or mowing
- Conserves water
- Fewer Injuries: even playing surface and consistent G-max performance
- Higher Initial Cost per field

# Natural Grass Compared to Synthetic Turf

| | Native Soil Natural - 4 Fields | Sand Based Natural - 2 Fields | Synthetic Turf 1 Field |
|---|---|---|---|
| Initial Construction Cost | $2,000,000 | $1,400,000 | $1,100,000 |
| Annual Maintenance Cost | $100,000 | $80,000 | $15,000 |
| Replacement Cost After 12 Years | $340,000 | $200,000 | $500,000 |
| Life-Cycle Cost over 12 Years | $3,540,000 | $2,560,000 | $1,780,000 |
| Hours of Recommended use per Year | 1200 | 1200 (Max.) | 2,000+ |
| Average Cost per Hour of Use per Year | $246 | $178 | $74 |

Conclusions:

*Figures based on a field with an area of 93,000 square feet (360' x 225')

-Native Soil Field – less playing time available

-Sand Based Natural Field – less playing time available

-Synthetic Turf Field – most playing time available; BEGIN alleviating critical field shortages

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# Synthetic Turf Field Infill Options

| Rubber \| Plastic | Natural \| Organic | Minerals/Coated Minerals |
|---|---|---|
| Wide use, best performance + resiliency | Organic | Longest life before replacement |
| Some recycled | Prone to migrating, more maintenance | Less resiliency, harder surface |
| Perception of toxicity | Requires shock pad, higher cost | Requires shock pad, higher cost |
| Heavy metals in trace amounts, not releasable | Moisture required to retain resiliency, can freeze | Can be abrasive |
| Shock pad required with some products | May contain pesticides, heavy metals in trace amounts that are releasable | |

# Synthetic Turf Field Infill Options

| | Infill Type | Life Span | Maintenance | Irrigation System | Estimated Infill Cost - HIGH SCHOOL (90,620 s.f.) | Estimated Infill Cost - LOKER (75,250 s.f.) | Annual Maintenance Cost |
|---|---|---|---|---|---|---|---|
|  | Crumb Rubber Infill | Life of the carpet | - Grooming per 100 hours<br>- Decompaction every 3-4 years<br>- Top dressing every 2-3 years<br>- Annual G-MAX monitoring | Not required | --- | --- | $5,000 - $10,000 (Plus 300 hours of labor) |
|  | EPDM Infill | 8-10 years | - Grooming per 100 hours<br>- Decompaction every 3-4 years<br>- Top dressing every 2-3 years<br>- Annual G-MAX monitoring | Not required | + $181,240 | + $150,500 | $5,000 - $10,000 (Plus 300 hours of labor) |
|  | Coated Silica Sand Infill | 16 year maximum | - Grooming per 100 hours<br>- Top dressing every 2-3 years<br>- Annual G-MAX monitoring | Not required | + $181,240 | + $150,500 | $5,000 - $10,000 (Plus 300 hours of labor) |
|  | Cork & Coconut Fibers (GreenPlay) | 8 years | - Grooming per 100 hours of play<br>- Replace 10% of infill every 2-3 years<br>- Decompaction 2 times a year<br>- Annual G-MAX Monitoring<br>- Monitor moisture content twice a week | $40,000.00 | + $181,240 | + $150,500 | $12,000 - $18,000 (Does not include cost of water. 12,000 gallons twice a week is the recommended average) |
|  | Coconut Husk, Rice Husk and Cork (Infill-Pro Geo) | 8 years | - Grooming per 100 hours of play<br>- Replace 10% of infill every 2-3 years<br>- Decompaction 2 times a year<br>- Annual G-MAX Monitoring<br>- Monitor moisture content twice a week | $40,000.00 | + $181,240 | + $150,500 | $14,000 - $20,000 (Does not include cost of water. 12,000 gallons twice a week is the recommended average) |
|  | Walnut Shells (SafeShell) | Life of carpet | - Grooming per 100 hours<br>- Decompaction every 3-4 years<br>- Top dressing every 2-3 years<br>- Annual G-MAX monitoring | Not required | + $158,585 | + $131,688 | $5,000 - $10,000 (Plus 300 hours of labor) |

# Synthetic Turf - Post Life

## Re-use:

Home lawns, playgrounds, batting cages, golf course club houses, etc.

- Turfix - https://turfix.com/reuse-repurpose-recycle-artificial-turf-fields/
- BellinTurf- http://www.bellinturf.com/product/

## Recycled:

Example: Feed stock for the plastic molding industry.

- Artificial Grass Recyclers, (AGR) - https://artificialgrassrecyclers.com/
- Turf Reclamation Solutions, (TRS) - http://www.recyclingartificialturf.com/
- Target Technologies International INC, (TTII) - https://www.ttiionline.com/products/synthetic-turf-recycling/

## Infill Re-use:

Replacement field, resilient surfacing, and top dressing for Natural Turf Fields.

- Sports Fields Management - https://sportsturfonline.com/2012/03/05/re-using-synthetic-turf-infill/
- King Sports Construction- https://www.kingsportsconstruction.com/recycled-turf-infill-for-horse-arena-footing

# Discussing Health and Environmental Issues

## Marie Rudiman (Weston & Sampson)

Human Health Risk Assessor/Toxicologist

- Northeastern University |Toxicology
- Experience: 23 Years

# Standards Synthetic Turf Fields Meet

- ASTM F 3188-16 for Safety of Toys - restricts concentrations of metals (US)
- EN 71-3 Category III for Safety of Toys - restricts concentrations of metals (European Union)
- CA Prop 65 - restricts carcinogens and other toxic compounds (California)
- REACH standards of safety - restricts carcinogens and other toxic compounds (European Union)

# Findings of Peer Reviewed Studies – Public Health

- Dutch National Institute for Public Health and the Environment, 2017
  https://www.rivm.nl/en/news/playing-sports-on-synthetic-turf-fields-with-rubber-granulate-is-safe
- Dr. Archie Bleyer, pediatric oncologist, Children's Cancer Group (a Swiss agency), 2017
  https://www.recycledrubberfacts.org/wp-content/uploads/2017/06/Crumb-Rubber-Alleged-Cancer-Risk-Sports-Med-2017-5-11.pdf
- European Chemicals Agency, 2017
  https://echa.europa.eu/-/recycled-rubber-infill-causes-a-very-low-level-of-concern
- Washington State Department of Public Health, 2017
  https://www.doh.wa.gov/Portals/1/Documents/Pubs/210-091.pdf

From EPA website: https://www.epa.gov/sites/production/files/2019-07/spreadsheet_with_toxicity_reference_information_0.xlsx

California Office of Environmental Health Hazard Assessment, (2010)

Norwegian Institute of Public Health and the Radium Hospital, 2006

New York Department of Environmental Conservation (NYDEC), 2009

Beausoleil, et al (2009), Birkholz, et al (2003), Connecticut Department of Public Health (CDPH), (2010)
Hofstra, U. (2009), Cheng, et al. (2014), Denly, et al. (2008), Ginsberg, et al. (2011)

## Consensus: Synthetic Turf Fields are safe for use and do not pose a health risk

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# Per - Polyfluorinated Alkyl Substance (PFAS)

## Background

- Group of man-made chemicals that have been in use since the 1940s
- Found in many consumer products: cookware, food packaging, and stain repellants.
- Manufacturing/processing facilities, airports, military installations; firefighting foams
- Longer chained PFAS (PFOS, PFOA) have been phased out; shorter chained still in use.

## Approach

- Reached out to vendors to see if PFAS-free synthetic turf available
- Two Vendors indicated they do not use PFAS in manufacturing and provided documentation to back up those claims
- We will require PFAS-free materials in the bid specifications

# Portsmouth High School Field

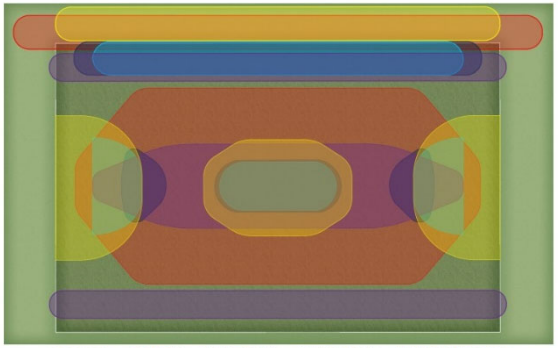
## PHS Field Capacity (prior to synthetic turf)

- 5 football games (5 freshman, 5 J.V. 5 varsity) = 30 hrs
- 6 boys lacrosse games (8 J.V. and 8 varsity) = 24 hrs

No other uses to allow for turf regeneration. Even with limited use field impacts 20 yard line to the 20 yard line.

## TOTAL use per year = 54 hours

High School Field, September 2009



# Portsmouth High School Field

## Current Field Users

- PHS phys. ed. classes
- PHS boys soccer
- PHS girls soccer
- PHS field hockey
- PHS boys lacrosse
- PHS girls lacrosse
- PHS baseball
- PHS softball
- PHS track
- PHS band
- PHS frisbee club
- PHS special events
- Portsmouth City Soccer Club
- Seacoast United Soccer
- Portsmouth Youth Football
- Lighthouse Lacrosse
- Seacoast Lacrosse
- Portsmouth elementary track
- PMS boys soccer
- PMS girls soccer
- PMS field hockey
- PMS boys lacrosse
- PMS girls lacrosse
- Great Bay United Soccer
- Fusion Soccer
- Chad Soccer
- NHIAA boys soccer
- Girls soccer
- Boys lacrosse
- Girls lacrosse
- Field hockey
- Seacoast Phantoms (soccer)
- Seacoast Vipers (football)
- Many other small groups and one time users

High School Sod Field

54 HOURS OF USE PER YEAR


High School Turf Field

3,000+ HOURS OF USE PER YEAR

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# The Recommended Improvement

## Synthetic Turf Field 360’ x 225’

- Consistent with planning objectives
  - Safe for athletes and the environment
  - Lowest cost per hour of use
  - Maximizes periods of uses – hours per day over extended season
- Precedent well established
- System has performed well (High School)
- Supports heavy use
- Reduces burden on other natural turf fields

# Questions?

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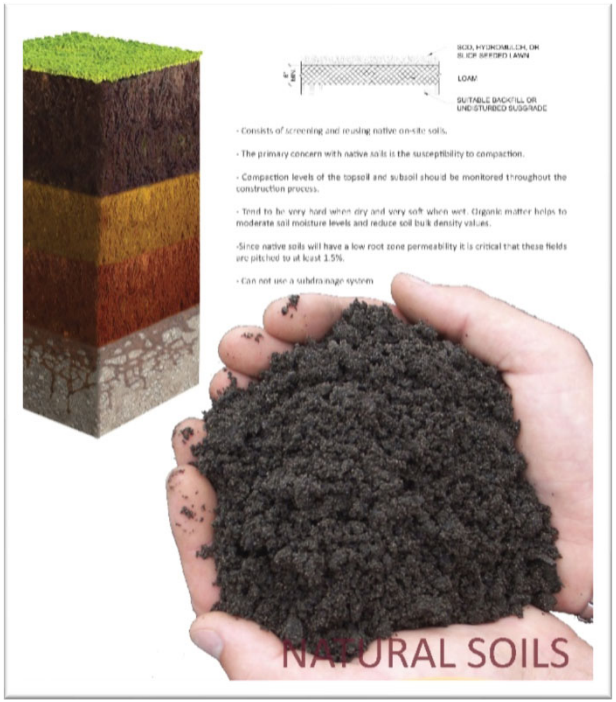
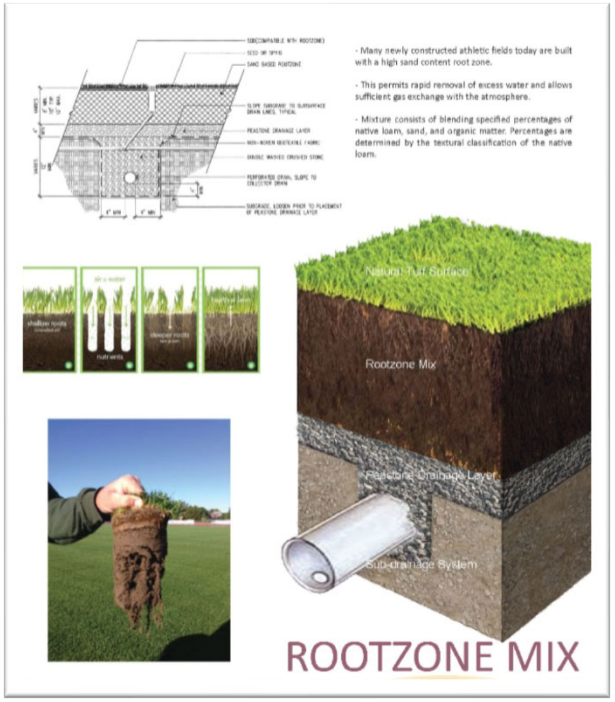
# Fields – Natural Turf & Synthetic Turf

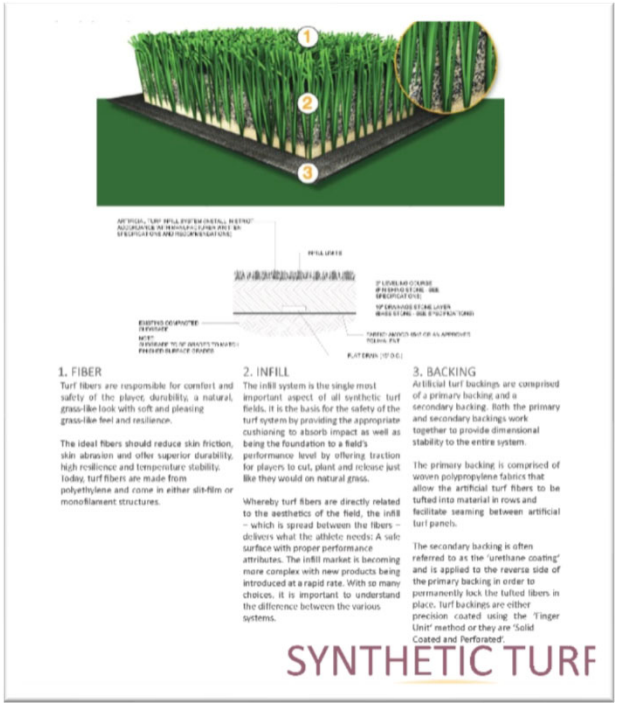
NATIVE SOIL ROOTZONE




SAND BASED ROOTZONE




TURF SYSTEM




**unbiased comparisons**

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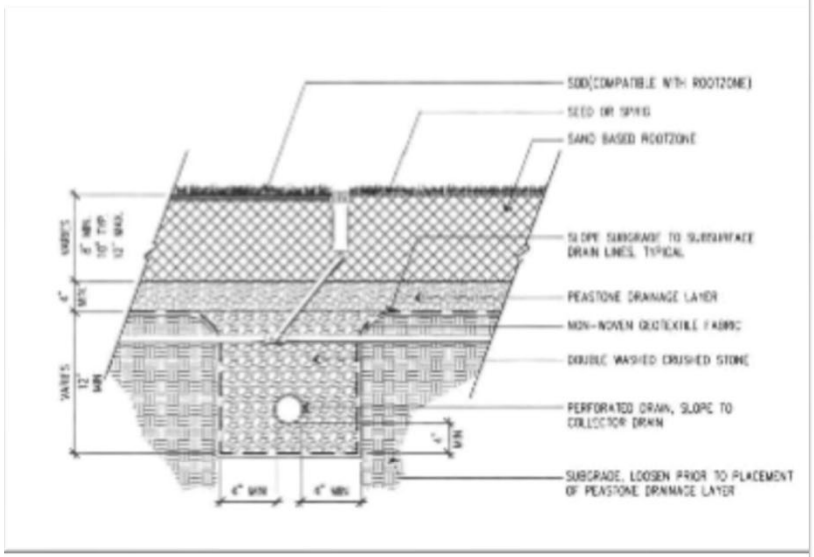
# High Performing Natural Turf System Components




# Synthetic Turf System Components