

BIBLIOGRAPHY *The Issues with Artificial Turf – Centennial Field Presentation*

Slide 2 – Heat Island map

Source: Sustainable Jersey Heat Island Map

Slide 3 – 2024 Centennial Field Study

MSU Green Team Study for Verona:

<https://www.veronanj.org/news/post/19813/>

MSU Study published in MDPI

<https://www.mdpi.com/2071-1050/17/14/6292>

Slide 4 – Origination

Manufacturing a full-size artificial turf field is estimated to require roughly 34,000 gallons (129,000 liters) of water, primarily for producing the plastic fibers, backing, and coatings. This estimate refers to manufacturing only. Based on published estimates of water use associated with polyethylene and polypropylene production and the quantity of plastic used in a typical synthetic turf system, manufacturing one full-size artificial turf field is estimated to require on the order of 30,000–40,000 gallons of water.

Slide 5 – Plastic Barrier

Soil Biodiversity Studies:

<https://e360.yale.edu/digest/soil-species-biodiversity>

<https://www.pnas.org/doi/10.1073/pnas.2304663120>

NJ field estimate:

<https://srhub.org/2023/08/16/turf-wars-raging-as-n-j-residents-face-off-over-replacing-grass-with-artificial-fields/>

Slide 6 – PFAS

<https://pubs.acs.org/doi/10.1021/acs.est.2c02765#>

<https://ecori.org/state-officials-warn-burrillville-about-installing-turf-field-following-pfas-contamination-in-north-smithfield/>

<https://thenationaldesk.com/news/spotlight-on-america/toxic-forever-chemicals-detected-on-kids-skin-after-playing-on-turf-fields-health-concerns-pfas>

<https://www.theguardian.com/environment/2025/aug/15/forever-chemicals-pfas-exposure-gene-activity>

<https://pubs.acs.org/doi/10.1021/acs.estlett.2c00260>

Slide 7 – PPT vs. PPM

https://nontoxicdovernh.wordpress.com/wp-content/uploads/2020/06/june1_portsmouthpfas.pdf

Slide 8 – TenCate website myths

<https://playingforkeeps.info/myths/>

Slide 9 – Runoff & Well Remediation

<https://myveronanj.com/2025/03/11/linn-drive-water-well-reopens/>

<https://www.nature.com/articles/s41370-024-00742-2>

<https://nmwrri.nmsu.edu/publications/technical-reports/tr-reports/tr-410.html>

Slide 10 – Plastic Pollution

Ecological Impacts of Nano- and Microplastics from Artificial Turf Systems:

<https://www.mdpi.com/2076-3298/12/4/109>

Slide 11 – Plastic Shedding

Pictured at left: drain within 10' of Centennial Field, Verona, NJ

Pictured at top right: plastic blade shedding at Santee SportsPlex, San Diego, CA

Pictured at bottom right: plastic blade shedding at MKA's Van Brunt Field, Montclair, NJ

Slide 12 – Plastic Pollution - effect on avian life, marine life

The dark side of artificial greening: Plastic turfs as widespread pollutants of aquatic environments:

<https://www.sciencedirect.com/science/article/pii/S0269749123010965>

<https://www.nhm.ac.uk/discover/news/2024/october/dolphins-exhaling-microplastics-blowhole.html>

Slide 13 – Pivot Cool Infill

https://geosurfaces.com/wp-content/uploads/2025/07/Pivot-Cool-Cutsheet-PIV-009_V1.0_7.2.25.pdf

Slide 14 – Heat Issues

Refer to the MSU study for extensive temperature measurement data

Slide 15 – Rutgers Youth Sports Council

Rutgers Youth Sports Council recommendations provided by Verona Rec Director Dave Rowbotham

New Jersey State Interscholastic Athletic Association (NJSIAA) – Heat Participation Policy:

<https://www.njsiaa.org/health-safety/heat-participation>

Slide 16 – Cost

Refer to the MSU study for extensive cost analysis

Slide 17 – Recycling Issues

<https://turfrecycling.us>

Slide 18 – Player Preference

Kelce Brothers New Heights podcast episode 58

Thanks to VHS Capstone students Ayden Serfaty and Owen Church for Verona athlete feedback and to Ayden Serfaty for video editing to shorten length

<https://www.foxsports.com/stories/nfl/nflpa-head-says-92-percent-of-players-prefer-playing-on-grass>

Slide 19 – Product is New

Refer to TenCate Pivot's Warranty

Slide 20 – NJ Legislation

https://pub.njleg.state.nj.us/Bills/2026/S3000/2936_I1.PDF

https://njleg.gov/bill-search/2026/S3254/bill-text?f=S3500&n=3254_S1

<https://www.facilitiesdive.com/news/Polyloom-accused-stopping-Grassroots-webinar-turf-health-impacts/751984/>

<https://peer.org/artificial-turf-company-hit-with-big-slapp-suit/>

Slide 22 – Natural Grass Fields

Use of compost: https://agenviro.com/473_Ozwater20_Technical_Paper_Paul_Lamble_Revised.pdf

Slide 24 – Sports Fields Managers

Back to Grass Webinar with Zack Holm: the webinar recording is available online [here](#). You can also check out another Back to Grass webinar with Keith Fisher for a deeper dive into baseball fields, and more [here](#).

Slide 25 – Local Natural Grass Fields

Ramapo High School – Baseball & Soccer Field Franklin Lakes, NJ

Ramapo High School – Drew Gibbs Field Franklin Lakes, NJ

Ramapo High School – Softball & JV Soccer Field Franklin Lakes, NJ

https://pioneerathletics.com/fields-of-excellence?srsId=AfmBOoqkUACwdo0qZnPO5VB51ASD3gIV_o-dpSB1tkcXXaDqn5vzO94I

Maryland Soccer Plex - <https://mdsoccerplex.org/maryland-soccerplex/field-information/>