DHS Dunaway Field Proposed Synthetic Turf Stormwater Estimate

Synthetic turf is designated an [impervious surface in the state of NH]

*Impervious Surface- Any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas and other areas created using non porous material; buildings, rooftops, structures, **artificial turf** and compacted gravel or soil.*

From PennStateExtension[1]

a. One inch of rainfall on an acre of impervious surfaces produces 27,000 gallons of stormwater to manage.
b. Stormwater runoff from 1 acre of impervious surface = runoff from 20 acres of grassland

From Weather & Climate[2]:

c. Dover gets 48 inches of precipitation annually

From HMFH Architects Schematic Design 2016[3]

h. Football Field Dimensions = 77,461 sq ft

From National Institute of Standards and Technology (NIST)[4]:

i. 1 acre = 43,560 square feet

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[1] Cotrone, V. (n.d.). *The Role of Trees and Forests in Healthy Watersheds*. Retrieved September 19, 2022, from https://extension.psu.edu/the-role-of-trees-and-forests-in-healthy-watersheds

[2] https://weather-and-climate.com/average-monthly-precipitation-Rainfall,dover-new-hampshire-us,United-States-of-America

[3] a likely underestimate of the current schematic design by Tighe & Bond's square footage for Dunaway field

[4] https://www.nist.gov › appc-18-hb44-finaldocx

Calculating:

1. <u>Total Area of Artificial Turf being proposed</u>
    a. 77,461 sq ft / 43,560 sq ft per acre =
    b. ~ 1.7 acres of artificial turf

2. <u>Approximate Total Liquid Precipitation At Site</u>
    a. Using figure from Weather & Climate
    b. ~ **48 inches of liquid water per year on average**

2. <u>Stormwater from Artificial Turf Field Surfaces</u>
    a. From 1 inch of Rainfall: 1 inch of rain on the 1.7 acres of impervious surface of the field is equivalent to 27,000 x 1.7 = 45,900 gallons of stormwater runoff from the proposed synthetic field installation from 1 inch of rainfall
    b. For the average year, 48 inches x 45,900 gallons of stormwater per inch = 2,203,200 or
    ~ **2.2 Million gallons of stormwater to manage on average annually**

3. <u>Stormwater from Natural Grass Field Surfaces</u>
    a. From 1 inch of Rainfall: 1 inch of rain on the 1.7 acres of impervious surface on the site is equivalent to 27,000 x 1.7 = 45,900 gallons of stormwater runoff from the proposed installation, but
        i. since 1 acre of impervious surface has the same stormwater as 20 acres of grassland
        ii. 45,900 / 20 = 2,295 gallons of stormwater runoff from natural grass fields of the same size in this location from 1 inch of rainfall
    b. For the average year, 48 inches x 2,295 gallons of stormwater per inch = 110,160 or
    ~ 110,000 gallons of stormwater to manage on average annually if the football field is to be natural grass with proper design and maintenance

4. <u>Difference in Average Annual Stormwater</u>
    a. 2,203,200 - 110,160 =
    2,732,400
    ~ 2.1 million gallon difference

Therefore:

<u>A properly designed and maintained grass field would prevent approximately 2.1 million gallons of excess stormwater runoff, on average, per year from this area</u>

This difference is a 20 times reduction in stormwater runoff