APPENDIX

LIFE CYCLE COST ANALYSIS: SYNTHETIC VS NATURAL TURF

ASSUMPTIONS:

SYNTHETIC TURF

1. INITIAL cost to install synthetic turf (no asphalt required): for 78,000 sq. ft. (suitable for soccer as well as football): $375,000.00

2. Estimated cost to install porous dynamic base [including engineering, demolition, stabilization, materials and placement, including sod as necessary -- $200,000.00

3. Annual Maintenance Costs for Synthetic Turf -- $3500.00 (Including Prorated Cost of a Sweeper; 30 Sweepings of the Turf; Miscellaneous Repairs)

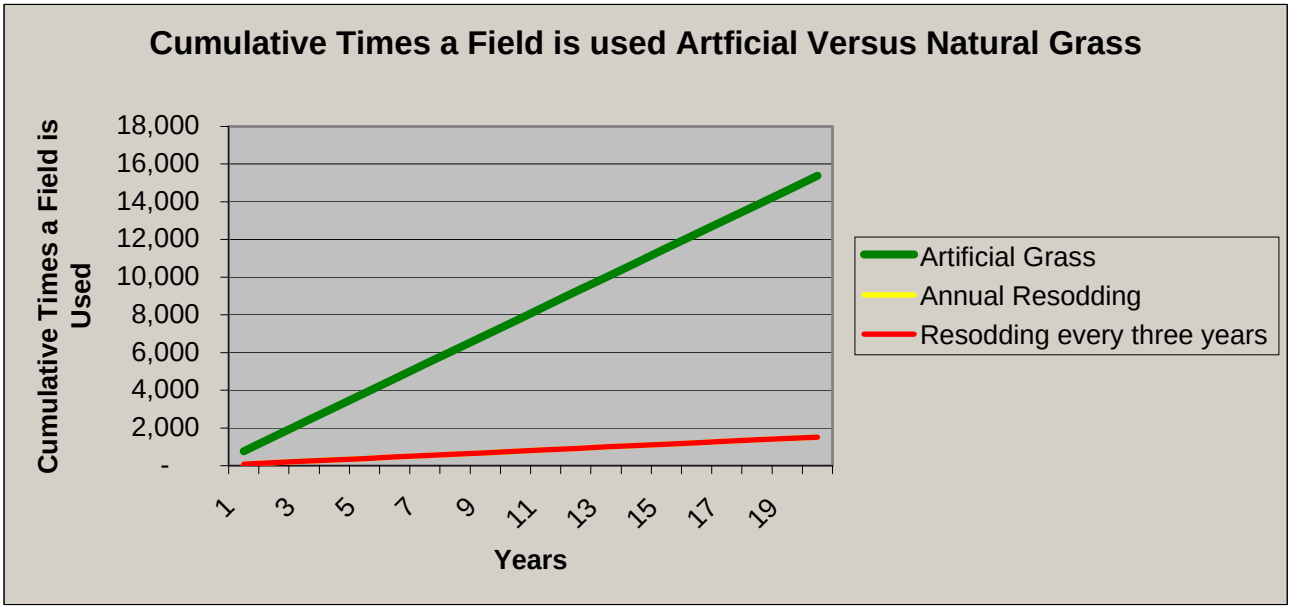
4. Annual **Minimum** Number of Events to be Used on the Synthetic Turf Field

- Football Games = 20
- Intramural/ P.E./classes = 160
- Football Practice = 90
- Football Playoff = 2
- Playoff Football (Rental) = 20
- Band Practice = 10
- Lacrosse = 50
- Soccer Games (m/w) = 45
- Soccer Practice = 200
- Graduation = 2
- Misc. (Community Use) = 100
- Field Hockey = 60

TOTAL = 769

5. **Total Minimum Twenty-year Life Cycle Number of Events – 15,380**
6. **Expected Minimum Life Cycle of Synthetic Turf – 10 years**
7. **Cost for Replacement of synthetic turf after ten years (fabric only) $375,000.00**
8. **Total life cycle cost (over 20 years in 2001$) = $1,020,000.00**

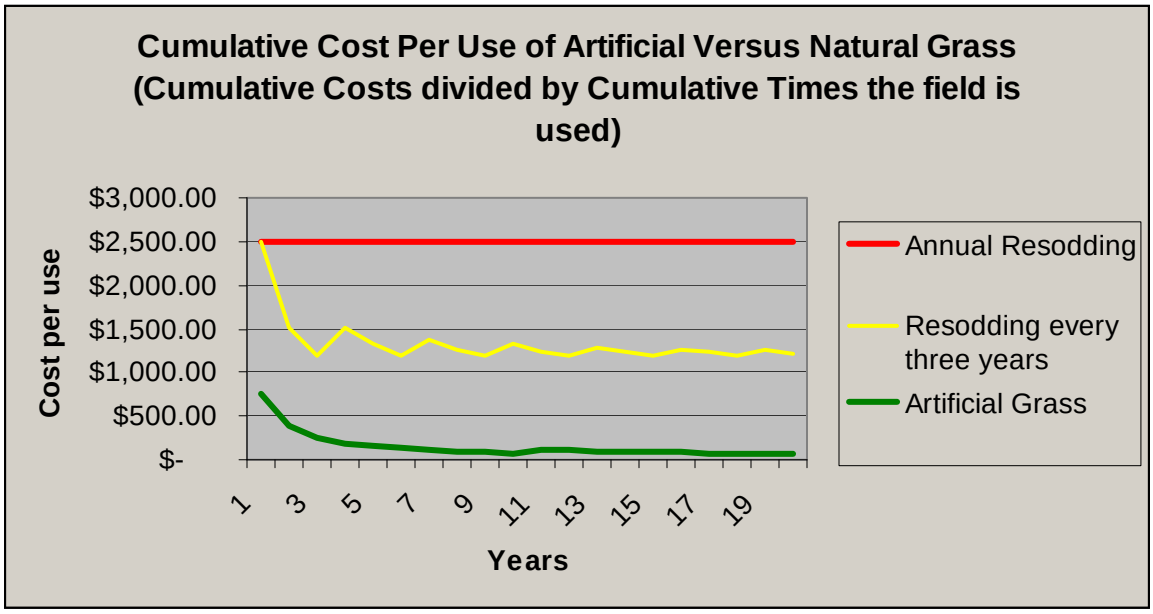
The artificial grass can be used 7 to 10 times as often as a natural grass field:



Cumulative Number of Uses

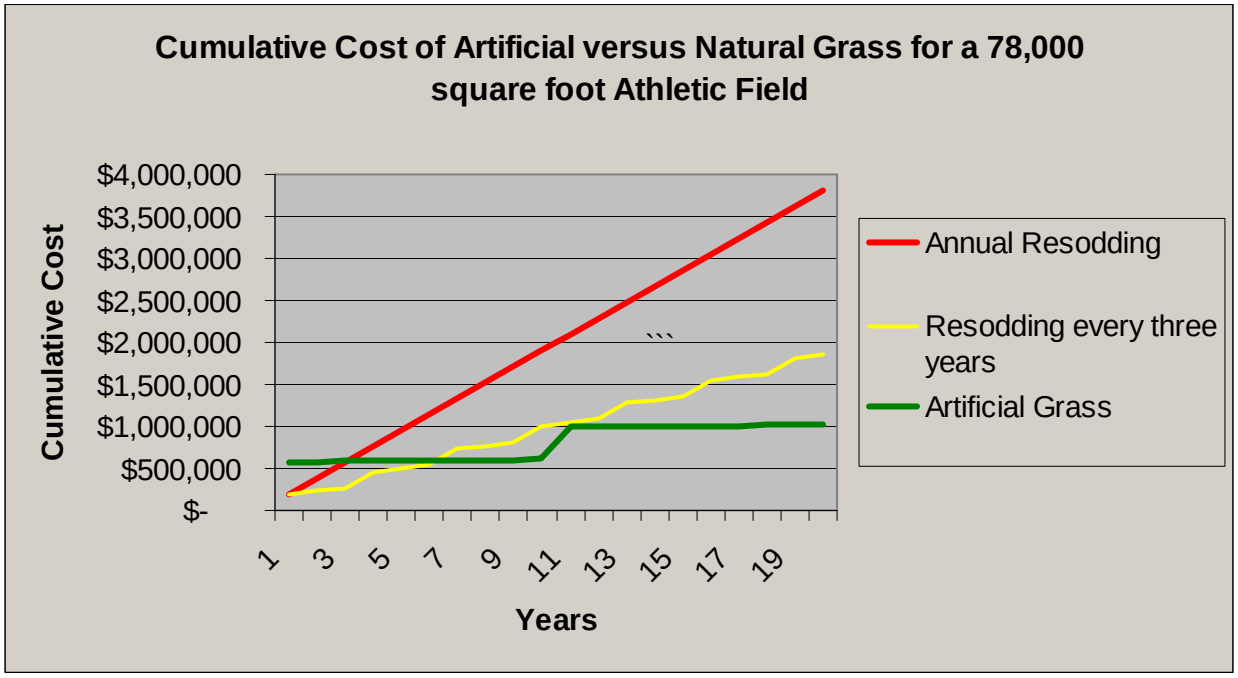
Years	1	5	10	15	20
Artificial Grass	769	3,845	7,690	11,535	15,380
Annual Resodding	76	380	760	1,140	1,520
Resodding every three years	76	380	760	1,140	1,520

The artificial grass becomes an attractive solution as it is not only more practical but also less costly financially



Over the lifetime of the field; the costs and usage experience can be summarized as follows:

Total Costs:
After about five years, the total costs maintenance and resodding natural grass equals or exceeds the total cost of an artificial grass field:



Cumulative Costs of Artificial and Natural Grass Fields

Years	1	5	10	15	20
Artificial Grass	$ 578,500	$ 592,500	$ 610,000	$1,002,500	$1,020,000
Annual Resodding	$ 190,300	$ 951,500	$ 1,903,000	$2,854,500	$3,806,000
Resodding every three years	$ 190,300	$ 501,500	$ 1,003,000	$1,354,500	$1,856,000

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Life Cycle Cost Analysis:

Natural vs. Synthetic Turf

Artificial grass is an investment and the return on this investment can be evaluated by two key measures; increased usages and lower cost in the long term when compared with natural grass. Look at the numbers to see how ***SmartGrass, on a cost per event basis, can mean big savings***. First, here's the bottom line for the hypothetical example detailed below.

	Natural Grass	**Synthetic Turf**
Cost per event	**$924.34**	**$66.32**
Number of events	1,520	15,380

Now, let's look at the details. Our hypothetical example considers the costs for a 78,000 square foot field suitable for both football and soccer, over a 20 year period.

	Natural Grass	Synthetic Turf
Initial cost & Periodic (re-sodding or installation)	$150,000[1]	$375,000[2]
Porous dynamic base installation	N/A	$200,000[3]
Annual maintenance costs	$40,300[4]	$3,500[5]
Annual number of events	76[6]	769 (minimum)[7]
Turf fabric replacement after 10 years	N/A	$375,000
Additional resoddings over 20 year period	$450,000[8]	N/A
Total 20 year cost in 2001 dollars	$1,405,000	$1,020,000.00

[1] Excludes excavation, irrigation system, drainage, etc.
[2] No asphalt required.
[3] Includes engineering, demolition, stabilization, materials and placement, sod as necessary.
[4] Athletic-caliber football stadium field. Mowing, maintenance, water, equipment at $30,000, overseeding at $600, fertilizer at $8000, wetting agents at $1200, weed treatment at $500.
[5] Includes prorated sweeper cost, 30 turf sweepings, miscellaneous repairs.
[6] Varsity Football (12), Varsity Practice (20), Playoff (2), Band/Dance/PE (15), Soccer (25), Graduation (2)
[7] Football Games (20), Football Practice (90), Football Playoff (2), Rental for Playoff Football (5), Intramural/PE/Classes (160), Soccer Games m/w (45), Soccer Practice (160), Field Hockey (60), Lacrosse (50), Miscellaneous Community Use (50), Band Practice (10), Graduation (2)
[8] Number of additional resoddings is 3.0.

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LIFE CYCLE COST COMPARISON
NATURAL VS. SYNTHETIC

FORMULA I (TOTAL LIFE CYCLE COST):

cost of initial + [cost of annual X 20 yrs] + cost of turf = LIFE CYCLE COST
installation maintenance replacement (Synthetic)

vs.

cost of initial + [cost of annual X 20 yrs] + cost of = LIFE CYCLE COST
installation maintenance resodding (Grass)

FORMULA II (PER USE COST):

cost of + cost of annual maintenance X 20 yrs / # events = PER USE COST
installations per yr X 20

TOTAL LIFE CYCLE COSTS

SYNTHETIC TURF
575,000 + (3500 X 20) + 375,000 = $1,020,000.00

NATURAL GRASS
150,000 + (40,300 X 20) + 450,000 = $1,405,000.00

PER USE COSTS

SYNTHETIC TURF
1,020,00/ 15,380 = **$66.32 COST PER EVENT / USE**

NATURAL GRASS
1,405,000 / 1,520 = **$924.34 COST PER EVENT / USE**

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NATURAL GRASS

1. Estimated cost for resodding new natural grass field (excluding excavation, irrigation system, drainage, etc.): $150,000.00

2. **Annual** (estimated) maintenance costs for a suitable athletic-caliber natural grass field at football stadium—
   - Over seeding = $600.00
   - Fertilizer = $8000.00
   - Wetting agents = $1200.00
   - Weed treatment = $500.00
   - Mowing/maintenance/watering/equipment (estimate) = $30,000.00

TOTAL = $40,300.00

3. Annual number of events to be held on the natural grass field a stadium
   - Varsity Football = 12
   - Varsity Practice = 20
   - Playoff = 2
   - Band/Dance/P.E. = 15
   - Soccer = 25
   - Graduation = 2

TOTAL = 76

4. Total number of events = 1520 (over twenty years)

5. Additional resodding costs over 20 year life cycle: $450,000.00 (3.0 additional resoddings over 20 years)

6. Total life cycle cost (over 20 years): $1,405,00 0.00