

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

DIRECTIVE 2-10

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### SYNTHETIC TURF SYSTEM

#### 1. General

This Directive outlines the Fund's recommended requirements for the design and installation of Synthetic Turf Systems.

#### 2. Design Criteria

a. Review and discuss the goals and objectives for this field with the Campus stakeholders, considering the following:

- (1) The anticipated type, frequency and intensity of athletic activities that may occur on the field and their suitability for the type of synthetic turf systems available.
  - (a) Review the applicability of the National Collegiate Athletic Association (NCAA) Dimensions and Specifications Requirements and standards
  - (b) Review non-athletic activities as well, such as maintenance activities, outdoor assemblies and concerts, helicopter or emergency vehicle access, etc.
- (2) The field markings and line types and colors for the primary field activities. Review painted versus inlaid markings, flexibility for secondary events, maintainability and performance requirements. Review design of special center logo.
- (3) The effect of system fill levels, pile height and seams on athletic play.
- (4) The anticipated weather conditions during field activities, whether activities are expected to continue during those weather conditions, and how the field will be maintained to permit activities to continue despite local weather conditions.
- (5) The anticipated methods and frequency of campus provided maintenance versus the requirements and exclusions in manufacturers' standard warranties.

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- (6) The location of communications and power outlets and their integration into the system and waterproofing. Review requirements of athletic equipment, such as goal posts, adjacent track and field pits, field lighting, etc.
    - (7) The location of alternate fields and facilities for use during the construction period.
  - b. Overall area coverage of synthetic turf system shall include the following:
    - (1) Provide a minimum 10'-0" space, on all sides shall of the actual field of play. Provide additional safety zone space for athletes where overrunning into foul territory (out of bounds) from the field of play requires more distance as identified by NCAA but never less.
    - (2) Extend synthetic turf system to paved, hard surface areas where required to avoid having athletes track soil from natural turf areas onto the system, where mowing of natural turf may adversely impact the system, and where required to provide a usable field without having to wait for full establishment of natural turf perimeter areas.
    - (3) Where natural turf abuts the synthetic turf system, require a sod installation with sufficient maintenance or an irrigation system to insure its establishment. Do not specify a seeded lawn within 10'-0" of the synthetic turf since it may not be established concurrently with the acceptance of the synthetic turf.
  - c. Single Contract Responsibility: The specifications should require that the same company (subcontractor) that installs the synthetic turf shall be responsible for the installation of the sub base. That company may subcontract portions of the work, but shall be contractually liable for the installed quality of both the sub base and synthetic turf. The Consultant should determine if this restriction reduces the available pool of bidders in the local campus market and notify the Fund prior to bidding.
3. Site Specific Conditions
  - a. Update topographical and utilities survey of existing site conditions.

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- b. Conduct Soil Borings, including soil percolation test and determination of water table, to determine subsurface conditions and subgrade drainage rates. Space drains at a minimum of 50' O.C. on short field axis and 100" O.C. on long field axis.
- c. Acquire local data for weather conditions, including rainfall amounts and depth and duration of frost.
- d. Review the impact of direct sunlight on the field activities on the potential field layouts.

#### 4. System Choice and Specifications

Review applicable reference standards for system characteristics and performance, such as those created by American Society of Testing & Materials (ASTM) or the Synthetic Turf Council (Guidelines for the Essential Elements of Synthetic Turf System Specifications).

- a. System choice should reflect the actual intended usage and the safety of athletes in combination with system warranty of minimum 8 years commencing with the date of final acceptance. Warranty shall be fully insured and shall not be prorated nor limited to the amount of usage. Warranty should include an Installer certification, requirements of resistant to UV fading, degradation of pile height, G-Max rating, system performance testing, turf striping and markings. Specify manufacturer warranty that the system as installed meets or exceeds the manufacturer's product specifications. Include provisions permitting snowplowing, concerts, etc. where they may occur.
- b. Acceptable Synthetic Turf System: Provide an analysis of standard top tier products compared to the athletic program for the field. Initial basis for design shall be 2¼" (minimum) long, minimum 10,000 denier, 100 % Polyethylene, non-abrasive fiber with a crumb rubber or rounded sand /crumb rubber infill type. Review available products with the campus prior to completing the schematic submission. Three manufacturers and their systems designations must be specified in the final bid documents.
  - (1) If required by the synthetic turf system manufacturer to achieve the System G – Max rating, provide a base pad of the material and thickness recommended by the manufacturer.

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- (2) Sand in fill materials shall meet ASTM C33, Standard Specification for Concrete Aggregates.
- (3) Review marking and seam layout with the campus and show the preferred layout on the drawings. The system should be laid out to minimize the impact of seams and to keep turf sections oriented in the same direction throughout the system, including the sidelines. Avoid bi-directional seaming in the playing areas.
- (4) Review the difference between glued and sewn seams and recommend the seaming method most appropriate for the field usage. Consider the environmental conditions under which gluing may occur, the additional labor that sewing requires, and the preferences of the synthetic turf system manufacturers specified.
- (5) Consider the dimensional stability of the backing material during the range of environmental conditions anticipated and its effect on the seam choice and spacing.
- (6) Specify the maximum amount of repairs that may occur after initial placement of the synthetic turf system, by percentage of the overall system components (seams, turf section, inlaid lines etc.) and by maximum individual repair area. If maximum area of repair is exceeded, require complete removal of the system and its replacement with a new system in compliance with the project specifications.
- (7) Specify random sampling of synthetic turf components for quality assurance testing, to confirm that the underling fabric, seaming, rubber or sand infill, fabric permeability, etc. is in compliance with the specifications.
- (8) Require a mock-up of the synthetic turf system, installed prior to any field work and retained until acceptance of the field, as the standard to which acceptability of the installed system will be evaluated
- (9) Specify that the synthetic turf system manufacturer review, monitor and confirm in writing the acceptability of the sub-base materials and installation for levelness, density, permeability, and any other sub-base quality that may affect the installed performance of the synthetic turf system.

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c. Sub-base materials and quality control shall be in accordance with New York State Department of Transportation (NYS- DOT) Standard Specifications, issued January 2, 1990, or other locally prevalent specification that is reviewed with and approved by the Fund.

- (1) Successful sub-base materials provide sufficient stability during installation without compacting into an impermeable layer or creating a perched water table. The ideal sub base material is #57 base stone and 1A topping stone per the extract of NYS DOT Table 703.4 below. Prior to submitting the Schematic Report, the Consultant should survey local material suppliers to determine if such a mix is available locally (and reconfirmed prior to bid). If not, report to the Fund the cost for shipping the mix to the site and on the quality of locally available, equivalent mixes.

Size Designation	Screen Size				
	1/2"	1/4"	1/8"	No. 80 Sieve	No. 200 Sieve
1A	-----	100%	90% - 100%	0%-15%	0% - 1.0%
#57	1 1/2 ' 100%	1" 95-100%	1/2 25-65%"	#4 0-10%	#8 0-5%

Percentage by weight passing the square screened openings listed

- (2) Specify a maximum level of compaction as well as a minimum level. Avoid specifying a sub-base that naturally or easily compacts into an impermeable layer. Carefully specify acceptable compaction methods that have the best likelihood of providing the acceptable range of compaction without over compaction.
  - (3) Drainage through the sub-base to the under drain piping system and the earth below shall meet or exceed the drainage rate of the synthetic turf system.
  - (4) Request written acceptance of the sub-base design from each specified manufacturer prior to bidding, to accept the in-place stability and permeability of the sub-base and its installation methods.
- d. Quality assurance testing of the in place sub-base materials, prior to synthetic turf installation, should include the following:

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- (1) Gradation testing per ASTM D422, Standard Test Method for Particle-Size Analysis of Soils, for each 100 tons of material delivered for installation on site.
  - (2) Survey sub-base within its entire perimeter on a 10' by 10' grid. Provide spot elevations, based on the established benchmark, at each grid intersection and at the intersection of the perimeter and the grid. Submit a drawing showing the results of the above survey. The drawing shall include the scaled grid, all spot elevations and show contours at ¼" intervals of variation from the ideal planes. Interpolate spot elevations as required to provide contours.
  - (3) Density testing per ASTM D2922, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods, for each 2,500 square feet of installed sub-base.
  - (4) Percolation testing: Infiltration testing per ASTM D3385, Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer, for each 10,000 square feet of installed sub-base, or other equivalent percolation test.
  - (5) Material soundness testing on the basis of a Magnesium Sulfate Soundness Loss after 4 cycles of 20% or less.
  - (6) Other special tests that may be suggested or recommended by manufacturers.
- e. Quality assurance testing for in place system performance should include the following:
- (1) In-place G-max rating of the synthetic turf system per ASTM F355, Standard Test Method for Shock-Absorbing Properties of Playing Surface Systems and Materials, Test Method A. System G – Max rating shall not be less than 70 nor exceed 130 at installation. System shall not exceed a G-Max rating of 165 during the warranty period Specify G-max test locations, such as centerline of playing field and other areas subject to more usage, environmental conditions during the test, and other subjective parameters that might significantly affect the test results.
  - (2) Specify three testing occasions, one at field acceptance, and another within six months of acceptance and the final one prior to

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the end of the one year guarantee. To ensure uniform results, require that this testing be performed by an independent, third party testing firm that has no manufacturer related ties or sponsorship.

- f. Geo-textile fabric shall be woven and rot proof.
- g. Provide perforated under field drainage pipe shall be minimum 12 inch panel drain or 4" diameter, 15'-0" to 20' – 0" O.C. throughout the sub-grade.
- h. Perimeter drainage collector pipe shall be 8" to 12" diameter, corrugated perforated HDPE, and sloped to drain to storm conveyance system. Provide accessible cleanouts.
- i. Open graded drainage aggregate shall be minimum 6" to 9" thick at outside edge of the field.
- j. Finish and subgrade grade shall have slope between 0.5% and 1%. Avoid specifying a slope that promotes migration of the infill from the center to the perimeter.
- k. Field perimeter securing options: provide either a 6" x 12" concrete curb around the field with 2x4 nailer fastened to curb with 3/8" x 4" stainless steel expansion bolt at 3' – 0" O.C. or a concealed, concrete encased continuous trench drain with a continuous receptor for the field fabric.
- l. Maintenance: Specify manufacturer's responsibility for maintaining the turf system for one (1) year after final acceptance and include grooming & sweeping of the turf with approved equipment. Customize maintenance plan to fit the anticipated first year usage. Maintenance should be performed after every 20 hours of field usage during the warranty period. Consider requiring turnover of the tractor and attachments used for grooming and sweeping by the manufacturer to the Campus for their use at the end of the maintenance period. Confirm all maintenance requirements with the campus prior to bidding.
- n. Specifying a pre-excavation and a pre-installation conference, providing detailed agendas of significant areas of concern. Also consider including an agenda for the end of the one year guarantee inspection, such as the review of seams, migration of infill, final G-max testing results, etc.

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