

Cal Poly Humboldt

SECTION 32 12 93.10

ARTIFICIAL GRASS

Office of the State Fire Marshal
Reviewed, No Exception Taken

Shane Wilson, DSFM

Date 3-23-22

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all labor, materials, tools and equipment necessary to install slit-film artificial grass FieldTurf as indicated on the plans and as specified herein; including components and accessories required for a complete installation including but not limited to
 1. Acceptance of prepared sub-base.
 2. Perimeter wood nailer.

1.2 REFERENCE STANDARDS

- A. FM Factory Mutual
 1. P7825 - Approval Guide; Factory Mutual Research Corporation; current edition
- B. ASTM – American Society for Testing and Materials.
 1. D1577 - Standard Test Method for Linear Density of Textile Fiber
 2. D5848 - Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Covering
 3. D1338 - Standard Test Method for Tuft Bind of Pile Yarn Floor Covering
 4. D1682 - Standard Method of Test for Breaking Load and Elongation of Textile Fabrics
 5. D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
 6. F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces
 7. D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity
 8. D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
 9. F355 - Standard Test Method for Shock-Absorbing Properties of Playing Surfaces.
 10. F1936 - Standard Test Method for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field

PROJECT WORK ORDER #
XPL 205

BUILDING PERMIT APPROVAL
This project has demonstrated conformance with applicable codes and standards established by statute and University policy. Based on this determination the documents are

'APPROVED FOR CONSTRUCTION'

[Signature]
Campus Deputy Building Official
Humboldt State University
The California State University
Date: 03/23/2022

Permit #: 2021/22-005

Other approvals, as applicable:
Special Approval: _____
Fire Safety Approval: _____
Other: _____

1.3 SUBMITTALS

- A. Substitutions: Other products are acceptable if in compliance with all requirements of these specifications. Submit alternate products to Architect for approval prior to bidding in accordance Section 01 25 13, Product Substitution Procedures.
 1. Provide substantiation that proposed system does not violate any other manufacturer's patents, patents allowed or patents pending.
 2. Provide a sample copy of insured, non-prorated warranty and insurance policy information.
- B. Comply with Section 01 33 00, Submittals Procedures. Submit for approval prior to fabrication.
- C. Shop Drawings:
 1. Indicate field layout; field marking plan and details for the specified sports; i.e., NCAA Football; roll/seaming layout; methods of attachment, field openings and perimeter conditions.
 2. Show installation methods and construction indicating field verified conditions, clearances, measurements, terminations, drainage.
 3. Provide joint submission with related trades when requested by Architect.
- D. Product Data: Due at time of Bid
 1. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures,

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- specifications; preparation and installation instructions and recommendations; storage, handling requirements and recommendations.
 - 2. Submit fiber manufacturer's name, type of fiber and composition of fiber.
 - 3. Submit cryogenic suppliers name, sieve analysis and origin of materials.
 - 4. Submit data in sufficient detail to indicate compliance with the contract documents.
 - 5. Submit manufacturer's instructions for installation.
 - 6. Submit manufacturer's instructions for maintenance for the proper care and preventative maintenance of the synthetic turf system, including painting and markings.
- E. Samples: Due at time of Bid Submit samples, 9 x 12 inches, illustrating details of finished product in amounts as required by General Requirements, or as requested by Architect.
- F. Product Certification: Due at time of Bid
- 1. Submit manufacturer's certification that products and materials comply with requirements of the specifications.
 - 2. Submit test results indicating compliance with Reference Standards.
- G. Project Record Documents: Record actual locations of seams, drains and other pertinent information in accordance with Specifications, General Requirements.
- H. List of existing installations: Due at time of Bid Submit list including respective Owner's representative and telephone number.
- I. Warranties: Submit warranty and ensure that forms have been completed in Owner's name and registered with approved manufacturer.
- J. Submit Bills of Lading/Material Delivery Receipts for synthetic turf infill materials. Bills of lading shall bear the name of the project/delivery address, quantity of materials delivered, source/location of origin of infill materials and/or manufacturer, and date of delivery.
- K. Testing Certification: Due at time of Bid Submit certified copies of independent (third-party) laboratory reports on ASTM testing:
- 1. Pile Height, Face Weight & Total Fabric Weight, ASTM D5848.
 - 2. Primary & Secondary Backing Weights, ASTM D5848.
 - 3. Tuft Bind, ASTM D1335.
 - 4. Grab Tear Strength, ASTM D1682 or D5034.
 - 5. Water Permeability, ASTM D4491
- L. The Turf Vendor shall submit a document holding the Owner and it's representatives harmless as to any liability and or costs of any type, including but not limited to legal costs, royalties, replacement costs, etc. associated with any claim by the Turf Vendor or others associated and with any patents or infringements of any current or future patent issued for the synthetic turf product, infill materials, installation methods or drainage characteristics. It is not the intent of these documents to promote or induce the use of intellectual property belonging to others or promote infringement of any known or currently not known patents, licenses or rights of others.

1.4 QUALITY ASSURANCE

- A. Comply with Section 01 43 00, Quality Assurance.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section. The turf contractor and/or the turf manufacturer:
- 1. Shall be experienced in the manufacture and installation of specified type of infilled slit-film synthetic grass system for a minimum of three years. This includes a slit-film fiber, backing, the backing coating, and the installation method.
 - 2. The manufacturer must have ISO 9001, ISO 14001 and OHSAS 18001 certifications demonstrating its manufacturing efficiency with regards to quality, environment and safety management systems.
 - 3. The manufacturer must be a FIFA Preferred Producer and a FIFA Licensee

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4. The manufacturer must be licensed by all of the following major international governing bodies: FIFA, World Rugby and International Hockey Federation (FIH)
 5. Shall have a minimum of 100 installations in the State of California.
 6. Shall have a minimum of 1 FIFA Quality Pro recommended field in North America.
 7. The fiber and turf carpet being proposed must have a documented Fiber Performance Index of at least 70. Official testing to be completed by Labosport.
 8. Artificial turf fiber proposed for the field(s) must have successfully undergone a Lisport wear test as part of Penn State University's fiber wear testing program. This fiber must be exactly the same fiber that is being proposed for the field(s). Official Penn State test reports must be provided.
 9. Manufacturer must provide proof that its turf systems have been subject to long-term independent, epidemiological and peer reviewed studies proving its ability to provide for a safe surface.
- C. Installer: Company shall specialize in performing the work of this section. The Contractor shall provide competent workmen skilled in this specific type of synthetic grass installation.
1. The designated Supervisory Personnel on the project shall be certified, in writing by the turf manufacturer, as competent in the installation of specified slit-film material, including sewing seams and proper installation of the infill mixture.
 2. Installer shall be certified by the manufacturer and licensed.
 3. The installer supervisor shall have a minimum of 5 years experience as either a construction manager or a supervisor of synthetic turf installations
- D. Pre-Installation Conference: Conduct conference at project site at time to be determined by Architect. Review methods and procedures related to installation including, but not limited to, the following:
1. Inspect and discuss existing conditions and preparatory work performed under other contracts.
 2. In addition to the Contractor and the installer, arrange for the attendance of installers affected by the Work, The Owner's representative, and the Architect.
- E. The Contractor shall verify special conditions required for the installation of the system.
- F. The Contractor shall notify the Architect of any discrepancies.
- 1.5 DELIVERY, STORAGE, AND HANDLING**
- A. Comply with Section 01 60 00, Product Requirements.
 - B. Prevent contact with materials that may cause dysfunction.
 - C. Deliver and store components with labels intact and legible.
 - D. Store materials/components in a safe place, under cover, and elevated above grade.
 - E. Protect from damage during delivery, storage, handling and installation. Protect from damage by other trades.
 - F. Inspect all delivered materials and products to ensure they are undamaged and in good condition.
 - G. Comply with manufacturer's recommendations.
- 1.6 SEQUENCING AND SCHEDULING**
- A. Coordinate the Work with installation of work of related trades as the Work proceeds.
 - B. Sequence the Work in order to prevent deterioration of installed system.

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1.7 WARRANTY AND GUARANTEE

- A. See Section 01780 - Closeout Submittals, For Additional Warranty Requirements.
- B. The Contractor shall provide a warranty to the Owner that covers defects in materials and workmanship of the turf for a period of five (5) years from the date of substantial completion. The turf manufacturer must verify that their representative has inspected the installation and that the work conforms to the manufacturer's requirements. The manufacturer's warranty shall include general wear and damage caused from UV degradation. The warranty shall specifically exclude vandalism, and acts of God beyond the control of the Owner or the manufacturer. The warranty shall be fully third party insured; prepaid for the entire 5 year term and be non-prorated. The Contractor shall provide a warranty to the Owner that covers defects in the installation workmanship, and further warrant that the installation was done in accordance with both the manufacturer's recommendations and any written directives of the manufacturer's representative. Prior to final payment for the synthetic turf, the Contractor shall submit to owner notification in writing that the field is officially added to the annual policy coverage, guaranteeing the warranty to the Owner. The insurance policy must be underwritten by an "AM Best" A rated carrier and must reflect the following values:
- Pre-Paid 5-year insured warranty from a single source.
 - Maximum per claim coverage amount of \$15,000,000.
 - Minimum of fifteen million dollars (\$15,000,000) annual.
 - Must cover full 100% replacement value of total square footage installed, minimum of \$7.00 per sq ft. (in case of complete product failure, which will include removal and disposal of the existing surface)
 - Provide a sample copy of insured, non-prorated warranty and insurance policy information.
 - Policy cannot include any form of deductible to be paid by the Owner.
- C. The artificial grass system must maintain a G-max of less than 200 for the life of the Warranty as per ASTM F1936.

1.8 MAINTENANCE SERVICE

- A. Contractor shall train the Owner's facility maintenance staff in the use of the turf manufacturer's recommended maintenance equipment.
- B. Manufacturer must provide maintenance guidelines and a maintenance video to the facility maintenance staff.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Approved manufacturers are as follows:

1. FieldTurf USA Inc.
175 N. Industrial Blvd
Calhoun, GA 30701
P: 800-724-2969

Model: FieldTurf Classic HD 2" Indoor

2. Or approved equal.

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2.2 MATERIALS AND PRODUCTS

- A. Artificial grass system materials shall consist of the following:
1. Carpet made of slit-film polyethylene fibers tufted into a perforated backing.
 2. Infill: graded sand and cryogenic rubber crumb that partially covers the carpet.
 3. Glue, thread, paint, seaming fabric and other materials used to install and mark the artificial grass.

- B. The installed artificial grass shall have the following properties:

Standard	Property	Specification
ASTM D1577	Fiber Denier	10,800
ASTM D5823	Min. Pile Height	2"
ASTM D1577	Fiber Thickness	130 Microns
ASTM D5793	Stitch Gauge	3/4"
ASTM D5848	Pile Weight	30oz/square yard
ASTM D5848	Primary Backing	8+oz/square yard
ASTM D5848	Secondary Backing	22+oz/square yard
ASTM D5848	Total Weight	60+oz/square yard
ASTM D1335	Tuft Bind (Without Infill)	8+ lbs
ASTM D5034	Grab Tear (Width)	200 lbs/force
ASTM D5034	Grab Tear (Length)	200 lbs/force
ASTM D4491	Carpet Permeability	>40 inches/hour
ASTM F1936	Impact Attenuation (Gmax)	<200
	Min. Infill Material Depth	1.25 inches
	Min. Sand Infill	3.65lbs/square foot
	Min. Cryogenic Rubber Infill	2.2lbs/square foot
	Total Product Weight	960oz/square yard

Variation of +/- 5% on above listed properties is within normal manufacturing tolerances

- C. Carpet shall consist of slit-film fibers tufted into a primary backing with a secondary backing.
- D. Carpet Rolls shall be 15' wide rolls.
1. Rolls shall be long enough to go from field sideline to sideline.
Where the playing field is for football, the perimeter white line shall be tufted into the individual sideline rolls.
- E. Backing:
1. Primary backing shall be a minimum double-layered polypropylene fabric
 2. Secondary backing shall permanently lock the fiber tufts in place.
 3. Perforated (with punched holes), backed carpet are acceptable.
- F. Fiber shall be measuring no less than 2 inches high.
1. Systems with less than a 2 inch fibers are unacceptable.
- G. Infill materials shall be approved by the manufacturer.
1. Infill shall consist of a resilient granular system, comprising selected and graded sand and cryogenically hammer-milled SBR rubber crumb.
 2. Artificial Grass products without cryogenically processed rubber shall not be accepted.
- H. The sand infill will comply within the following characteristics:
- Average Particle size between 20 and 30 mesh [calculated based on summing the midpoint of sieve pan fractions times the % retained on given screen fractions]
 - Average Particle shape > 0.4 on the Krumbein scale
 - Particle structure predominantly single grain

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- Produce < 0.4%, -50M in API crush test at 80psig
- I. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.
- J. Thread for sewing seams of turf shall be as recommended by the synthetic turf manufacturer.
- K. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the synthetic turf manufacturer.

2.3 QUALITY CONTROL IN MANUFACTURING

- A. The manufacturer shall own and operate its own manufacturing plant. Manufacturing the fiber, tufting of the field fibers into the backing materials and coating of the turf system must be done in-house by the turf manufacturer. Outsourcing of any of these major processes is unacceptable.
- B. The manufacturer shall have full-time certified in-house inspectors at their manufacturing plant that are experts with industry standards.
- C. Primary backing shall be inspected by the manufacturer's full-time certified in-house inspectors before tufting begins.
- D. The manufacturer's full-time in-house certified inspectors shall verify "pick count", yarn density in relation to the backing, to ensure the accurate amount of face yarn per square inch.
- E. The manufacturer's full-time, in-house, certified inspectors shall perform turf inspections at all levels of production including during the tufting process and at the final stages before the turf is loaded onto the truck for delivery.
- F. The manufacturer shall have its own, in-house laboratory where samples of turf are retained and analyzed, based on standard industry tests, performed by full-time, in-house, certified inspectors.
- G. The manufacturer must have ISO 9001, ISO 14001 and OHSAS 18001 certifications demonstrating its manufacturing efficiency with regards to quality, environment and safety management systems.

2.4 FIELD GROOMER & SWEEPER

Supply field groomer as part of the work.

- 1. Field Groomer shall include a towing attachment compatible with a field utility vehicle.
- 2. Field Groomer shall be a FieldTurf GroomRight
- 3. Field Sweeper shall include a towing attachment compatible with a field utility vehicle.
- 4. Field Sweeper shall be a FieldTurf SweepRight

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that all sub-base leveling is complete prior to installation.
- B. Installer shall examine the surface to receive the synthetic turf and accept the sub-base planarity in writing prior to the beginning of installation.
 - 1. Acceptance is dependent upon the Owner's test results indicating compaction and planarity are in compliance with manufacturer's specifications.
 - 2. The surface shall be accepted by Installer as "clean" as installation commences and shall be maintained in that condition throughout the process.
- C. Compaction of the aggregate base shall be 95%, in accordance with ASTM D1557 (Modified Proctor procedure); and the surface tolerance shall not exceed 0-1/4 inch over 10 feet and 0-1/2" from design grade.

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- D. Correct conditions detrimental to timely and proper completion of Work.
- E. Do not proceed until unsatisfactory conditions are corrected.
- F. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Remove existing turf system. Recycle all components. Provide documentation of recycled material at project closeout.
- B. Prior to the beginning of installation, inspect the sub-base for tolerance to grade.
- C. Inspect perimeter wood nailer and replace as necessary where damaged.
- D. Sub-base acceptance shall be subject to receipt of test results (by others) for compaction and planarity that sub-base is in compliance with manufacturer's specifications and recommendations.
- E. Dimensions of the field and locations for markings shall be measured by a registered surveyor to verify conformity to the specifications and applicable standards. A record of the finished field as-built measurements shall be made.

3.3 INSTALLATION - GENERAL

- A. The installation shall be performed in full compliance with approved Shop Drawings.
- B. Only trained technicians, skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, topdressing or brushing operations.
- C. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.
- D. Designs, markings, layouts, and materials shall conform to all currently applicable National Collegiate Athletic Association rules, NFHS rules, and/or other rules or standards that may apply to this type of synthetic grass installation. Designs, markings and layouts shall first be approved by the Architect or Owner in the form of final shop drawings. All markings will be in full compliance with final shop drawings.

3.4 INSTALLATION

- A. Install at location(s) indicated, to comply with final shop drawings, manufacturers'/installer's instructions.
- B. The Contractor shall strictly adhere to specified procedures. Any variance from these requirements shall be provided in writing, by the manufacturer's on-site representative, and submitted to the Architect and/or Owner, verifying that the changes do not in any way affect the Warranty. Infill materials shall be approved by the manufacturer and installed in accordance with the manufacturer's standard procedures.
- C. Carpet rolls shall be installed directly over the properly prepared aggregate base. Extreme care shall be taken to avoid disturbing the aggregate base, both in regard to compaction and planarity.
 - 1. Repair and properly compact any disturbed areas of the aggregate base as recommended by manufacturer
- D. Full width rolls shall be laid out across the field.
 - 1. Turf shall be of sufficient length to permit full cross-field installation from sideline to sideline.
 - 2. No cross seams will be allowed in the main playing area between the sidelines.
 - 3. Each roll shall be attached to the next roll utilizing standard state-of-the-art sewing

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- procedures.
4. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing surface.
- E. Artificial turf panel seams shall be sewn along the selvage edging flap of the turf roll. Seams secured by other means including gluing are unacceptable. Installation shall be 99% sewn.
1. Minimum gluing will only be permitted to repair problem areas, corner completions, and to cut in any logos or inlaid lines as required by the specifications.
 2. Seams shall be flat, tight, and permanent with no separation or fraying.
 3. In the case of all lines and logos, turf carpet/field fibers must be sheared to the backing (do not cut the backing) and adhered using hot melt adhesives.
- F. Infill Materials:
1. Infill materials shall be applied in numerous thin lifts. The turf shall be brushed as the mixture is applied.
 2. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. The Infill installation consists of sand and cryogenically processed rubber. The Infill shall be installed to a minimum depth of 1 1/4".
- G. Non-tufted or inlaid lines and markings shall be painted in accordance with turf and paint manufacturers' recommendations. Number of applications will be dependent upon installation and field conditions.
- H. Synthetic turf shall be attached to the perimeter edge detail in accordance with the manufacturer's standard procedures.
- I. Upon completion of installation, the finished field shall be inspected by the installation crew and an installation supervisor.

3.5 FIELD MARKINGS

- A. Field markings shall be installed in accordance with approved shop drawings. If football is designated as the primary sport, all five yard lines will be tufted-in.
- B. Balance of sports markings will be inlaid or painted in accordance with the Drawings.
- C. Center field logo shall be either painted or inlaid according to artwork indicated on Drawings and in accordance with manufacturer's standard palette of turf colors.
- D. End-zone letters and logos shall be either painted or inlaid according to artwork and fonts indicated on the Drawings, and in accordance with manufacturer's standard palette of turf colors.

3.6 ADJUSTMENT AND CLEANING

- A. Do not permit traffic over unprotected surface.
- B. Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.
- C. All usable remnants of new material shall become the property of the Owner.
- D. The Contractor shall keep the area clean throughout the project and clear of debris.
- E. Surfaces, recesses, enclosures, and related spaces shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

3.7 PROTECTION

- A. Protect installation throughout construction process until date of final completion.