

Date: February 2, 2022

To: Plan Holders

Company:

Project No.:

Phone No.:

Fax No.:

From: Poplarville High School - Poplarville School District

Subject: ADDENDUM NO. 1
ARTIFICIAL TURF PROJECT-
POPLARVILLE SCHOOL DISTRICT
Poplarville, Mississippi

Attached is Addendum No. 1 for the above referenced project.

**Plan Holders are reminded that this Addendum must be acknowledged on
Page 00300-6 of the Bidders Proposal.**

Please acknowledge receipt of this Addendum by signing in the space provided below and return this page by facsimile to: Neel-Schaffer, Inc., Fax Number: (601) 545-2267, or e-mail your acknowledgment to Jennifer.Nobles@neel-schaffer.com before 3:30 P.M., Friday, February 4, 2022.

NAME: _____ DATE: _____ TIME: _____

COMPANY (Please Print): _____

You should receive (26) pages **including this cover sheet**. Please notify us if the message is incomplete or unclear. Thank you.

SPECIFICATIONS

Replace CONTENT form in their entirety and replace with attached **CONTENT** form.
(2 PAGES)

Replace 907-242-1 Artificial Turf Forms in their entirety and replace with attached **907-242-1A INFILLED SYNTHETIC TURF (FOOTBALL/SOCCER) & 907-242-1B INFILLED SYNTHETIC TURF (BASEBALL/SOCCER)**.
(22 PAGES)

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SPECIAL PROVISION 907-242-1A

INFILLED SYNTHETIC TURF (FOOTBALL/SOCCER FIELD) SLIT-FILM/MONOFILAMENT w/COOLING TECHNOLOGY FIELDTURF VERTEX PRIME (BASIS OF DESIGN)

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all labor, materials, tools and equipment necessary to install slit-film/monofilament artificial grass 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. Coordination with related trades to ensure a complete, integrated, and timely installation: Aggregate base course, sub-base material (tested for permeability), grading and compacting, piping and drain components (when required); as provided under its respective trade section.
- B. PRE-APPROVED PRODUCTS (Football/Soccer Turf & Infill)
 - 1. FieldTurf – Vertex Prime Turf - Coolplay Infill (BASIS OF DESIGN)
 - 2. Hellas – Fusion XP2 Turf - Sand/Rubber with Ecotherm Cap Infill
 - 3. Astroturf – Rootzone 3D3 Blend Turf – Sand/Rubber/Zio Mix Infill
 - 4. Or Approved Equal – Approved Equal Submissions must be greater than or equal to the Specifications Provided within this section, as determined by Project Landscape Architect & Owner. Is it the responsibility of the bidder to prove that the product substitution is equal or greater than the (Basis of Design) product.
 - 5. At time of Bid Opening, bidder submitted characteristics & specifications related to Pre-Approved Products must match typical manufacturer recommendations in recognition that each individual product is different. The products must maintain the high standards of quality and major characteristics that are desired by the client. This will be determined by the Project Landscape Architect & Owner.
 - 6. Infill Products for football/soccer field MUST NOT contain coconut or walnut.
 - 7. No Shock Pad
- C. *** All Product submittals are required at the time of bidding. Bidders who do not provide the required product submittals may have their bid determined to be non-responsive. Additionally, the Artificial Turf Submittal Sheet, located after this section is required to be filled out and submitted at the time of bidding. ***

1.2 RELATED SECTIONS

- A. Section 00 0000 - Site Preparation
- B. Section 31 23 00 – Excavation and Fill
- C. Section 31 23 16 – Excavation
- D. Section Series 31 23 23 - Fill
- E. Section 31 23 23.13 - Backfill
- F. Section Series 32 13 23 - Aggregate Base Courses

- G. Section 12 93 00 - Site Furnishings

1.3 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. D1907 - Standard Test Method for Denier
 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. F1551 - Standard Test Method for Water Permeability
 7. D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
 8. F355 - Standard Test Method for Shock-Absorbing Properties of Playing Surfaces.
 9. F1936 - Standard Test Method for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field

1.4 SUBMITTALS

- A. Substitutions: Submit alternate products at time of Bid. Alternate products must comply with 1.1-B-4 (first sheet of this section)
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 Landscape Architect.
- D. Product Data:
1. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures, 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 data in sufficient detail to indicate compliance with the contract documents.
 4. Submit manufacturer's instructions for installation.
 5. Submit manufacturer's instructions for maintenance for the proper care and

preventative maintenance of the synthetic turf system, including painting and markings.

- E. Samples: **Submit with the bid**, a synthetic turf sample, 12 x 12 inches, representing the turf carpet portion of the product proposed for this project, and other items as required by the Artificial Turf Submittal Sheet, located after this section.
- F. Product Certification:
 - 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 Division 1 Specifications Series, General Requirements.
- H. Warranties: Submit warranty and ensure that forms have been completed in Owner's name and registered with approved manufacturer.
- I. Testing data to the Owner to substantiate that the finished field meets the required shock attenuation, as per ASTM F1936.
- 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: 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. Shock Attenuation, ASTM F1936
 - 6. Water Permeability, ASTM F1551

1.5 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/monofilament synthetic grass system for a minimum of three years. This includes a slit-film/monofilament fiber, backing, the backing coating, and the installation method.
 - 2. Shall have 100 fields or more in play for at least two years. Fields shall be 65,000 ft² or more
 - 3. Shall have a minimum of 25 fields that are at least 8 years old, which is equal to the respective warranty period.
 - 4. 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.
 - 5. Shall have a minimum of 100 installations in North America, each of 65,000 ft² or more.

6. 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.
 - 7.
- 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/monofilament 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 Landscape 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 Landscape Architect.
- E. The Contractor shall verify special conditions required for the installation of the system.
- F. The Contractor shall notify the Landscape Architect of any discrepancies.

1.6 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.

1.7 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.

1.8 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 eight (8) 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; pre-paid for the entire eight (8) 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 8-year insured warranty from a single source.
- Maximum per claim coverage amount of \$25,000,000.
- Minimum of thirty-three million dollars (\$25,000,000) 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.

1.9 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 PRE-APPROVED PRODUCTS & MANUFACTURERS

- A. See 1.1 B 1-7 SUMMARY For Pre-Approved Products & Other Notes

Basis of Design: FieldTurf – Vertex Prime Turf - Coolplay Infill

2.2 MATERIALS AND PRODUCTS

- A. Artificial grass FieldTurf system materials shall consist of the following:
 - 1. Carpet made of slit-film and monofilament polyethylene fibers tufted together into each individual stitch, into a non-perforated backing. Alternating row monofilament and slit-film carpet constructions are not permitted.
 - 2. Infill: Controlled mixture of graded sand and cryogenic rubber crumb that partially covers the carpet. A top infill layer of the extruded cooling composite is mandatory.

3. Glue, thread, paint, seaming fabric and other materials used to install and mark the artificial grass slit-film/monofilament FieldTurf.

- B. The installed artificial grass slit-film/monofilament FieldTurf shall have the following properties:

Standard	Property	Specification
	Pile Yarn Type	UV-resistant polyethylene
	Yarn Structure – A	Slit-Film
ASTM D1907	Yarn Denier - A	5,000
	Yarn Structure – B	Ridged Monofilament
	Yarn Denier – B	14,500
ASTM D5823	Pile Height	2.25”
ASTM D5793	Stitch Gauge	1/2” - 3/4”
ASTM D5848	Pile Weight	43+oz/square yard
ASTM D5848	Primary Backing	7+oz/square yard
ASTM D5848	Secondary Backing	14+oz/square yard
ASTM D5848	Total Weight	64+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 F1551	Carpet Permeability	>40 inches/hour
ASTM F1936	Impact Attenuation (Gmax)	<200
	Infill Material Depth	1.5 inches
	Extruded Cooling Composite	0.6lbs/square foot
	Sand Infill Component	6.2lbs/square foot
	Cryogenic Infill Component	1.6lbs/square foot
	Total Product Weight	1274oz/square yard

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

- C. Carpet shall consist of slit-film/monofilament 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.
 2. 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 double-layered polypropylene fabric.
 2. Secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place.
 3. Perforated (with punched holes), backed carpet are **unacceptable**.
- F. Monofilament fibers shall be 14,500 denier, slit-film fibers shall be 5000 denier - both fibers shall be low friction, and UV-resistant, measuring not less than 2.25 inches high.
 1. Systems with less than 2.25 inch fibers are unacceptable.
- G. Infill materials shall be approved by the manufacturer.
 1. Infill shall consist of a resilient layered granular system, comprising selected and graded sand and cryogenically hammer-milled SBR rubber crumb with a top layer of the extruded cooling composite.
 2. The extruded cooling composite must be applied as a topical layer of not less than

- 0.6lbs per square foot, and replacing not more than 0.6lbs of rubber infill material per square foot.
 - 3. Artificial Grass products without cryogenically processed rubber and a top layer of the extruded cooling composite will not be acceptable.
 - 4. Extruded cooling composite must have a bulk density of $0.55\text{g/cm}^3 \pm 15\%$ and a specific gravity of greater than 1.
 - 5. Coated infill and infill needing to be watered for activation or maintenance are unacceptable.
 - 6. Shall provide third-party laboratory testing proving heat reduction qualities to an average of not less than 35 degrees Fahrenheit average during peak temperatures, of the same infill materials used in the proposed turf system, including the top layer extruded cooling composite.
 - 7. Must have a minimum of 250 fields installed of the proposed cooling system in the United States with references provided at time of bid.
- H. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.
 - I. Thread for sewing seams of turf shall be as recommended by the synthetic turf manufacturer.
 - J. 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 in North America. Both 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 either is unacceptable.
- B. The manufacturer shall have full-time certified in-house inspectors at their manufacturing plant that are experts with industry standards.
- C. The manufacturer's full-time in-house certified inspectors shall perform pre-tufting fiber testing on tensile strength, elongation, tenacity, denier, shrinkage, and twist i.e., turns per inch, upon receipt of fiber spools from fiber manufacturer.
- D. Primary backing shall be inspected by the manufacturer's full-time certified in-house inspectors before tufting begins.
- E. 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.
- F. 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.
- G. 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.
- H. 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 – ADDITIVE ALTERNATE #4

- A. Supply field groomer as part of the work. (ONE FOR ALL FIELDS)
 - 1. Field Groomer and Sweeper shall include a towing attachments compatible with a field utility vehicle.
 - 2. Field Groomer shall be a FieldTurf GroomRight – OR APPROVED EQUAL
 - 3. Field Sweeper shall be a FieldTurf SweepRight – OR APPROVED EQUAL

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.
- 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. Prior to the beginning of installation, inspect the sub-base for tolerance to grade.
- B. 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.
- C. 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.
- D. When requested by Architect, installed sub-base shall be tested for porosity prior to the installation of the slit-film/monofilament turf. A sub base that drains poorly is an unacceptable substrate

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, top-dressing 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. Each roll shall be attached to the next roll utilizing standard state-of-the-art sewing procedures.
 - 3. 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 selvedge 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, 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. The infill material shall be installed to a depth determined by the manufacturer.
 - 2. Three-layered infill shall be installed in a systematic order.
 - 3. 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 a

base layer of sand followed by a mix of sand and cryogenic SBR rubber. A final application of the specifically sized extruded cooling composite completes the system. The Infill shall be installed to the depth of 1 1/2”.

- 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.

SPECIAL PROVISION 907-242-1B

INFILLED SYNTHETIC TURF (BASEBALL/SOFTBALL FIELDS) FIELDTURF DOUBLEPLAY NATURAL (BASIS OF DESIGN)

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all labor, materials, tools and equipment necessary to install artificial grass 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. Coordination with related trades to ensure a complete, integrated, and timely installation: Aggregate base course, sub-base material (tested for permeability), grading and compacting, piping and drain components (when required); as provided under its respective trade section.
- B. PRE-APPROVED PRODUCTS (Baseball/Softball Turf & Infill)
 - 1. FieldTurf- Double Play Natural Turf – Double Play Natural Infill (BASIS OF DESIGN)
 - 2. Hellas- Major Play Matrix Turf – Sand/Rubber mix Infill
 - 3. Astroturf- Diamond Series OPS Turf System – Sand/Rubber Mix Infill
 - 4. Or Approved Equal – Approved Equal Submissions must be greater than or equal to the Specifications Provided within this section, as determined by Project Landscape Architect & Owner. Is it the responsibility of the bidder to prove that the product substitution is equal or greater than the (Basis of Design) product.
 - 5. At time of Bid Opening, bidder submitted characteristics & specifications related to Pre-Approved Products must match typical manufacturer recommendations in recognition that each individual product is different. The products must maintain the high standards of quality and major characteristics that are desired by the client. This will be determined by the Project Landscape Architect & Owner.
 - 6. Infill Products for baseball/softball field MUST NOT contain coconut or walnut.
 - 7. No Shock Pad

***** All Product submittals are required at the time of bidding. Bidders who do not provide the required product submittals may have their bid determined to be non-responsive. Additionally, the Artificial Turf Submittal Sheet, located after this section is required to be filled out and submitted at the time of bidding. *****

1.2 RELATED SECTIONS

- A. Section 00 0000 - Site Preparation
- B. Section 31 23 00 – Excavation and Fill
- C. Section 31 23 16 – Excavation
- D. Section Series 31 23 23 - Fill
- E. Section 31 23 23.13 - Backfill

- F. Section Series 32 13 23 - Aggregate Base Courses
- G. Section 12 93 00 - Site Furnishings

1.3 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. D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity

1.4 SUBMITTALS

- A. Substitutions: Submit alternate products at time of Bid. Alternate products must comply with 1.1-B-4 (first sheet of this section)
 - 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 Baseball; 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 Landscape Architect.
- D. Product Data:
 - 1. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures, 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 data in sufficient detail to indicate compliance with the contract documents.
 - 4. Submit manufacturer's instructions for installation.
 - 5. Submit manufacturer's instructions for maintenance for the proper care and preventative maintenance of the synthetic turf system, including painting and

markings.

- E. Samples: Submit a synthetic turf sample, 12 x 12 inches, representing the turf carpet portion of the product proposed for this project, and other items as required by the Artificial Turf Submittal Sheet, located after this section.
- F. Product Certification:
 - 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 Division 1 Specifications Series, General Requirements.
- H. Warranties: Submit warranty and ensure that forms have been completed in Owner's name and registered with approved manufacturer.
- I. 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.
- J. Testing Certification: 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

1.5 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 infilled synthetic grass for a minimum of three years.
 - 2. Shall have 100 fields in play for at least two years. Fields shall be 65,000 ft² or more
 - 3. Shall have a minimum of 25 fields that are at least 8 years old, which is equal to the respective warranty period.
 - 4. 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.
 - 5. Shall have installed a minimum of 25 NCAA Division 1 game and/or practice fields for baseball.
 - 6. Shall have a minimum of 100 installations in North America, each of 65,000 ft² or more.
 - 7. 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.

8. The manufacturer must provide evidence with the bid of real-life data derived from video footage and images supporting claims on the long-range speed, bounce, and line of the ball compared to a natural clay and natural grass 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 the turf system.
 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 Landscape 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 Landscape Architect.
- E. The Contractor shall verify special conditions required for the installation of the system.
- F. The Contractor shall notify the Landscape Architect of any discrepancies.

1.6 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.

1.7 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.

1.8 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 eight (8) years from the date of substantial completion. The infield turf area is under warranty for 2 years where the remainder of the

field is under warranty for 8 years. 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; pre-paid for the entire 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 8-year insured warranty from a single source.
- Maximum per claim coverage amount of \$33,000,000.
- Minimum of thirty-three million dollars (\$33,000,000) 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.

1.9 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 PRE-APPROVED PRODUCTS & MANUFACTURERS

- A. See 1.1 B 1-7 SUMMARY For Pre-Approved Products & Other Notes

Basis of Design: FieldTurf - Double Play Natural Turf – Double Play Natural Infill

2.2 MATERIALS AND PRODUCTS – CLAY AREAS (INFIELD / WARNING TRACK)

- A. Artificial grass FieldTurf system materials shall consist of the following:
 - 1. Carpet made of polyethylene fibers tufted into a porous backing.
 - 2. Infill: Controlled mixture of graded sand and ambient rubber which partially covers the carpet.
 - 3. Glue, thread, paint, seaming fabric and other materials used to install and mark the

artificial grass FieldTurf.

4. Removable home plate area and pitcher's mound landing strip, if desired. Velcro must be sewn on to the perimeter of each removable piece in addition to each removable piece having a strengthened backing layer designed to improve cleat puncture resistance.

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

<u>Standard</u>	<u>Property</u>	<u>Specification</u>
	Yarn Structure	Slit-Film
ASTM D1577	Yarn Denier	10,800
ASTM D5823	Pile Height	2"
ASTM D5793	Stitch Gauge	3/8"
ASTM D5848	Pile Weight	42oz/square yard
ASTM D5848	Primary Backing	7+oz/square yard
ASTM D5848	Secondary Backing	16+oz/square yard
ASTM D5848	Total Weight	65+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
	Sand Infill Component	5.4lbs/square foot
	Ambient Rubber Infill Component	1.5lbs/square foot
	Total Product Weight	1059oz/square yard

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

C. Carpet Rolls shall be 15' wide rolls.

D. Backing:

1. Primary backing shall be a double-layered polypropylene fabric.
2. Secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place.
3. Perforated (with punched holes), backed carpet are acceptable.

E. Infill materials shall be approved by the manufacturer.

1. Infill shall consist of a resilient layered granular system, comprising selected and graded sand and ambient rubber.
2. Artificial Grass products without ambient rubber and sand will not be acceptable.

F. 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
- Produce < 0.4%, -50M in API crush test at 80psig

G. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.

H. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the

synthetic turf manufacturer.

2.3 MATERIALS AND PRODUCTS – CLAY AREAS (BATTERS BOXES / MOUND)

- A. Artificial grass FieldTurf system materials shall consist of the following:
1. Carpet made of polyethylene fibers tufted into a perforated or non-perforated backing.
 2. Infill: Controlled mixture of a specific graded sand and ambient rubber which partially cover the carpet.
 3. Glue, thread, paint, seaming fabric and other materials used to install and mark the artificial grass FieldTurf.
 4. The home plate circle and pitcher's mound area turf carpet must feature a strengthened backing layer designed to improve cleat puncture resistance.

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

<u>Standard</u>	<u>Property</u>	<u>Specification</u>
ASTM D1577	Yarn Structure – A	Slit-Film
	Yarn Denier - A	10,800
	Yarn Structure – B	Thatch
	Yarn Denier – B	5000
ASTM D5823	Pile Height	2"
ASTM D5793	Stitch Gauge	3/8"
ASTM D5848	Pile Weight	60oz/square yard
ASTM D5848	Primary Backing	8+oz/square yard
ASTM D5848	Secondary Backing	20+oz/square yard
ASTM D5848	Total Weight	88+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
	Sand Infill Component	5.4lbs/square foot
	Ambient Rubber Infill Component	1.5lbs/square foot
	Total Product Weight	1082oz/square yard

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

- C. Carpet Rolls shall be 15' wide rolls.
- D. Backing:
1. Primary backing shall be a double-layered polypropylene fabric.
 2. Secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place.
- E. Infill materials shall be approved by the manufacturer.
1. Infill shall consist of a resilient layered granular system, comprising selected and graded sand and ambient crumb rubber infill.
 2. Artificial Grass products without sand and ambient rubber infill material will not be acceptable.

3. Perforated (with punched holes), backed carpet are acceptable.
- F. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.
- G. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the synthetic turf manufacturer.

2.4 MATERIALS AND PRODUCTS – GRASS AREA

- A. Artificial grass FieldTurf system materials shall consist of the following:
 1. Carpet made of slit-film and monofilament polyethylene fibers tufted together into each individual stitch, into a non-perforated backing. Alternating row monofilament and slit-film carpet constructions are not permitted.
 2. Infill: Controlled mixture of graded sand and ambient rubber that partially covers the carpet.
 3. Glue, thread, paint, seaming fabric and other materials used to install and mark the artificial grass slit-film/monofilament FieldTurf.

- B. The installed artificial grass slit-film/monofilament FieldTurf shall have the following properties:

<u>Standard</u>	<u>Property</u>	<u>Specification</u>
ASTM D1577	Pile Yarn Type	UV-resistant polyethylene
	Yarn Structure – A	Slit-Film
	Yarn Denier - A	5,000
	Yarn Structure – B	Ridged Monofilament
	Yarn Denier – B	14,500
ASTM D5823	Pile Height	2"
ASTM D5793	Stitch Gauge	3/4"
ASTM D5848	Pile Weight	39+oz/square yard
ASTM D5848	Primary Backing	7+oz/square yard
ASTM D5848	Secondary Backing	16+oz/square yard
ASTM D5848	Total Weight	62+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
	Sand Infill Component	3.65lbs/square foot
	Ambient Rubber Infill Component	2.6lbs/square foot
	Total Product Weight	962oz/square yard

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

- C. Carpet Rolls shall be 15' wide rolls.
- D. Backing:
 1. Primary backing shall be a double-layered polypropylene fabric.
 2. Secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place.
 3. Perforated (with punched holes), backed carpet are **unacceptable**.
- E. Monofilament fibers shall be 14,500 denier, slit-film fibers shall be 5000 denier - both fibers shall be low friction, and UV-resistant, measuring not less than 2.0 inches high.

1. Systems with less than 2.0 inch fibers are unacceptable.
- F. Infill materials shall be approved by the manufacturer.
1. Infill shall consist of silica sand and ambient rubber.
 2. Artificial Grass products without sand and ambient rubber will not be acceptable.
- G. Non-tufted or inlaid lines and markings shall be painted with paint approved by the synthetic turf manufacturer.
- H. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the synthetic turf manufacturer.

2.5 QUALITY CONTROL IN MANUFACTURING

- A. The manufacturer shall own and operate its own manufacturing plant in North America. Both 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 either is unacceptable.
- B. The manufacturer shall have full-time certified in-house inspectors at their manufacturing plant that are experts with industry standards.
- C. The manufacturer's full-time in-house certified inspectors shall perform pre-tufting fiber testing on tensile strength, elongation, tenacity, denier, shrinkage, and twist i.e., turns per inch, upon receipt of fiber spools from fiber manufacturer.
- D. Primary backing shall be inspected by the manufacturer's full-time certified in-house inspectors before tufting begins.
- E. 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.
- F. 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.
- G. 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.
- H. 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.

QUALITY CONTROL IN FIBER MANUFACTURING

Synthetic turf fiber must perform in a uniform manner or manufacturer quality control issues in the extrusion processes will be suspected. Linear Low Density Polyethylene Polymer ("LLDPE") and batch additives obtained from a reputable manufacturer are required to manufacture superior quality yarn. The master batch formula must include a UV stabilizer package added to its polymer base.

The LLDPE used to make the artificial grass fiber needs to be a "C6" LLDPE which

contains 6 carbon atoms and 12 hydrogen atoms; A C6-based LLDPE produces strong and resilient artificial grass fibers over prolonged periods and thus should provide the basis for long term performance of the system.

Adequate UV protection is essential to the long-term durability of any artificial grass fiber. Typically, stabilizer packages for polyethylene fibers have three components that protect the fibers from degradation: (1) primary antioxidants; (2) secondary antioxidants; and (3) UV stabilizers (i.e., hindered amine light stabilizers ("HALS")). HALS are a particularly important aspect of the stabilizer package. A typical HALS concentration is 10,000 ppm. More developed HALS molecules are methyl stabilized to prevent from degradation.

The fiber must contain both a short-term and a long-term active ingredient for protection during the extrusion process and when installed in the field. The pigments used in the fiber must be UV stable and heavy metal free.

The fiber and turf carpet being proposed must have a documented Fiber Performance Index (FPI) score of at least 70. Official testing to be completed by Labosport. 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.

2.6 FIELD GROOMER & SWEEPER – ADDITIVE ALTERNATE #4

- A. Supply field groomer as part of the work. (ONE FOR ALL FIELDS)
 - 1. Field Groomer and Sweeper shall include a towing attachments compatible with a field utility vehicle.
 - 2. Field Groomer shall be a FieldTurf GroomRight – OR APROVED EQUAL
 - 3. Field Sweeper shall be a FieldTurf FieldSweep – OR APPROVED EQUAL

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.
- 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. Prior to the beginning of installation, inspect the sub-base for tolerance to grade.
- B. 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.
- C. 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.
- D. When requested by Architect, installed sub-base shall be tested for porosity prior to the installation of the turf. A sub base that drains poorly is an unacceptable substrate

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, 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 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.

E. Infill Materials:

1. Infill materials shall be applied in numerous thin lifts. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth determined by the manufacturer.
- F. 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.
- G. Synthetic turf shall be attached to the perimeter edge detail in accordance with the manufacturer's standard procedures.
- H. 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.