SECTION 32.18.13
SYNTHETIC GRASS SURFACING

PART 1 GENERAL

1.01 WORK INCLUDED
A. Furnish all labor, materials, tools and equipment necessary to install, in place, all synthetic turf material as indicated on the plans and as specified herein.
B. The turf system shall be grass-like in appearance and play. This includes grass-like levels of traction, energy restitution, ball rebound, and shock attenuation. The turf shall provide a stable surface for play with little infill displacement in use and shall be ideal for college football in all weather conditions without special footwear.
C. The installation shall be performed in strict accordance with the manufacturer's installation instructions and in accordance with all approved shop drawings.

1.02 RELATED SECTIONS
A. Section 31.10.00 - Site Clearing.
B. Section 31.20.00 - Earthwork.
C. Section 33.40.00 - Storm Drainage Utilities.

1.03 REFERENCES
B. ASTM Standard Test Methods:
17. ASTM D5793-05 - STITCHES PER 3 INCHES Standard Test Method for Binding Sites Per Unit Length or Width of Pile Yarn Floor Coverings.
18. ASTM D5793-05 - MACHINE GAUGE Standard Test Method for Binding Sites Per Unit Length or Width of Pile Yarn Floor Coverings.
21. BS7044-Method 4 - INFILTRATION RATE Determination of Infiltration Rate-Buffered Ponding-Type Infiltrometer.

1.04 SUBMITTALS

A. See Section 01.30.00 - Administrative Requirements for submittal procedures.
B. Prior to the Owner approval of a specified artificial turf system, the Manufacturer shall specify in writing that their turf system does not violate any other manufacturer's patents, patents allowed or patents pending.
C. Submit the following during the bid process. All items listed must be submitted to be considered as a responsible bidder for the project. Items may be submitted directly to the Board office prior to the time of bid:"

1. Material Samples
   a. 12"x12" sample piece of each of the actual colors of turf used on the field (with perforations)
   b. One (1) sample of material with infill in standard sample container
   c. 12" by 12" raw sample of a 4" tufted line (white) – without infill
   d. 12" by 12" raw sample of the specified seaming method – without infill
   e. 12" by 12" raw sample of an inlaid line (White) – without infill
   f. One (1) pound of the proposed infill material
   g. Sample Hand Wraps of the actual fiber construction and color to be utilized, Green, White, Gold and Navy Blue.
   h. Calculations of prepared weights of infill materials to ensure proper installation. This is the total amount of infill projected to arrive on site that can be compared to the bill of lading.
2. Insurance and Warranty Requirements per Paragraph 1.8
a. Synthetic Turf System Providers Warranty Document
b. Sample Warranty certificate
c. Sample Insured Warranty Accord (Minimum 25 Million Aggregate / 1 Million per field)
d. Sample Insurance Accord – General Liability, Auto, and Workmen’s Compensation
e. Sample Insured Warranty Policy Accord
f. AM Best Rating sheet for Insurance Provider
g. AM Best Rating sheet for the Insured Warranty Provider

3. Documentation
a. Product Data Sheet (PDS) for the proposed turf product with relative characteristics and all associated details.
b. All Mandatory Testing Documents for the actual product, conducted by a third party laboratory, as required and listed in paragraph 1.3.B. Any Contractor that does not submit all of the required testing, or does not meet the minimum qualifications outlined in the specifications, may be disqualified and may no longer be considered a responsible bidder for the project
c. Third party testing indicating fiber yarns being produced from 100% C8 Ethylene Copolymers.
d. Submit a copy of the Synthetic Turf System Providers maintenance manual.
e. Submit a copy of the Synthetic Turf System Providers installation standards.
f. Resumes for three potential superintendent or quality assurance professionals, one of which will be directly responsible for overseeing the project directly.
g. Submit a copy of any required contractors licenses to perform the work proposed in the bid documents.
h. Submit a copy of any required business licenses and registrations to perform the work proposed in the bid documents.
i. Submit a legal letter to indemnify the Owner for the allegation of patent infringement by other Contractors.
j. Submit a Non-Collusion and Anti-Trust Statement from the Contractor for the proposed project.
k. Submit a lead and heavy metal letter, outlining that the synthetic turf system proposed is in compliance with the proposed 2011 standard of a maximum of 100 parts per million for the entire synthetic turf system including infill for lead and heavy metals.
l. Submit a representation letter to outline and confirm the details of the local representative for the Contractor, certifying that the local representative is authorized to act on behalf of the Turf Manufacturer.
m. Submit an installation letter, from the Contractor to confirm the staff that will complete the project has the proper trained and professional experience in the methods required to complete the installation of the synthetic turf system as required in the Bid Document. The letter should certify that the installation will be constructed to the specifications, and that the specifications are approved by the Turf Manufacturer for use with the proposed synthetic turf system.
n. Submit the required Gmax-Shock Attenuation Covenant, which clearly commits the Synthetic Turf System Provider to the various Gmax-Shock Attenuation values as detailed in paragraph 1.5. Any vendor who does not submit the Covenant at the time of bid is subject to disqualification for this project.

4. Lists providing specific contacts and telephone numbers of the following:
a. A minimum of two full-sized football fields using the specified slit film fiber and fill, in play for at least 12 months. These installations must have used the same manufacturer and product proposed for this field, including the same slit-film fiber.
b. A list of 25 fields in the United States that have been in play for the past 3 years.
c. Five (5) existing clients for whom significant after-the-sale service work has been performed or significant synthetic turf warranty services have been performed.

CONSTRUCTION DOCUMENTS PACKAGE
ISSUED: 06-APR-16
D. On Site Requirements
   1. Drainage Testing: BS7044-Method 4
   2. After the base construction is complete, but before the synthetic turf installation begins.
   3. Upon completion of the synthetic turf system installation, but before first use.
   5. Before Substantial Completion

E. Prior to ordering of materials:
   1. The Contractor shall submit Shop Drawings indicating:
      a. Drawing of the project in color to illustrate the lines, logos, lettering and layout for the
         specified sport of NCAA Football.
      b. Drawing of the project in Black and White to illustrate the roll/seam locations
      c. Drawing of the project in Black and White to identify all tufted lines
      d. Drawing of the project in Black and White to identify all Inlaid lines, markings and logos
      e. Drawing of the goal post and event details as proposed for the project
      f. Drawing of all associated design details as proposed for the project

F. Prior to Final Acceptance, the Contractor shall submit to the Owner:
   1. Three (3) copies of Maintenance and Equipment Repair Manuals, which will include all necessary
      instructions for the proper care and preventative maintenance of the synthetic turf system, including
      painting and markings.
   2. Project Record Documents: Record actual locations of seams, drains or other pertinent information.
   3. Warranty: Submit all Manufacturer Warranty and ensure that forms have been completed in
      Owner's name and registered with Manufacturer per paragraph 1.9. Response time for warranty
      repairs is 48 hours or less. Submit information confirming that 3rd Party Insurance Policy,
      non-cancelable and pre-paid, is in effect covering this installation, and underwritten by an AM Best
      A+ Rated Insurance Carrier. Supply Warranty Insurance Certificate with complete information on
      contacting the Insurance Carrier should a claim need to be made.
   4. Written verification of a minimum half-day training session for the Owner's staff on how to
      maintain the completed installation.

1.05 GMAX AND PERFORMANCE REQUIREMENTS

A. Required Test Method
   1. The required test method for determining the various Gmax values as detailed within this section is
      Systems and Materials. All results must be stated to include both the standard Gmax value based on
      ASTM F355-01, and the Head Injury Coefficient (HIC).

B. Required Gmax Values and Limits
   1. At time of installation:
      a. The maximum Gmax Value at time of installation shall not exceed 120G
      b. The average Gmax Value at time of installation shall not exceed 110G.
      c. The various Gmax Values should not vary by more than 15G above or below the average at
         time of installation for any individual drop.
   2. Lifecycle Gmax Values
      a. The maximum Gmax Value throughout the warranted lifecycle of the synthetic turf playing
         surface is not to exceed 160G.
      b. The HIC Value throughout the warranted lifecycle of the synthetic turf playing surface is not
         to exceed 1000.
      c. Required Gmax Covenant
   3. The vendor must submit a Gmax-Shock Attenuation Covenant obligating the Sports Field
      Contractor to remediate and/or replace the synthetic turf playing surface as detailed in the Gmax
      Covenant Procedure section.
4. The Gmax-Shock Attenuation Covenant must reference and acknowledge the Gmax Covenant Procedure specifically as detailed below, be placed on official letterhead of the vendor and executed by a corporate officer with the authority to bind the corporation.

5. The following steps and procedures will be followed should the Owner be in possession of a professional Gmax-Shock Attenuation report that results in an average Gmax value of over 160G at any point within the warranted lifecycle of the synthetic turf playing surface.
   a. The Owner must provide written direction to the Sports Field Contractor for reclamation of the synthetic turf playing surface within 10 days of the testing being completed. Failure by the Owner to provide all the documentation within 10 days will relieve the Sports Field Contractor of their obligation to react.
   b. The Owner must provide full copies of all documentation associated with the G-Max-Shock Attenuation report to the Sports Field Contractor within 10 days of the testing being completed. Failure by the Owner to provide all the documentation within 10 days will relieve the Sports Field Contractor of their obligation to react.
   c. The Owner must provide the Sports Field Contractor with primary access to the synthetic turf playing surface for 30 calendar days from the date the Sports Field Contractor received notification.
   d. The Sports Field Contractor will be given 30 calendar days of primary access to the synthetic turf playing surface in which to perform any necessary reclamation procedures.
   e. The Sports Field Contractor will be required to contract an independent third party Gmax testing at the Sports Field Contractors sole financial expense to retest the field within the 30 calendar day period.
   f. Should the independent third party Gmax test provide an average Gmax value of less than 160G, then the process is complete.
   g. Should the Sports Field Contractor fail to provide an independent third party Gmax test that confirms an average Gmax value of 160G or lower, then the Sports Field Contractor will be solely responsible for the remove and dispose of the existing field surface, and the full installation of a new synthetic turf playing surface that meets all the specifications of the original bid documents and is independently tested to be safe by the original Gmax-Shock Attenuation requires as listed within this section.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
   1. Turf Manufacturer Qualifications:
      a. Must be experienced in the manufacture and installation of this specific type of synthetic infill slit-film grass system for at least two years with the same manufacturer, product and company they are proposing for this field. This includes the same fiber, backing, the backing coating, and the installation method.
      b. Must have a football field of 65,000 sq. ft or more of the exact specified material, including the infill material and fiber, in play for at least three (3) year’s with the same manufacturer and company they are proposing for this field.
      c. Must have manufactured and installed fields at every level of competition, including high school, college and professional.
      d. Must have less than 5% field failures in the past five (5) years.
   2. Installer Qualifications: Company specializing in performing the work of this section.
      a. The Turf Contractor must provide competent workmen skilled in this specific type of synthetic grass installation.
      b. The designated Supervisory Personnel on the project must be certified, in writing by the turf Manufacturer, as approved by the Manufacturer in the installation of Manufacturer’s synthetic grass surfacing system, including sewing seams and proper installation of the infill mixture.
      c. The Manufacturer shall have a representative on site to certify the installation and Warranty compliance.

CONSTRUCTION DOCUMENTS PACKAGE
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3. To ensure quality control, a minimum of three (3) samples from roll cutoffs may be sent in for independent testing to ensure compliance with the material properties set forth in paragraph 2.2B. Turf vendor/manufacturer will be responsible for all costs associated with the testing including shipping of the materials.

4. To ensure required infill weights meet specifications and calculated weights, the Testing Agency will randomly sample 1-ft square areas utilizing a vacuum for removal.

1.07 PRE-INSTALLATION MEETING
   A. Convene a minimum of thirty days prior to starting work of this section and prior to the installation of the top surfacing in-fill.

1.08 DELIVERY, STORAGE, AND PROTECTION
   A. Deliver products to project site in wrapped condition.
   B. Store products under cover and elevated above grade, and in conformance with manufacturer's written instructions.

1.09 INSURED WARRANTY REQUIREMENT
   A. The synthetic turf provider shall provide an eight (8) year non-prorated, non-cancelable, pre-paid warranty that is insured by a policy of insurance issued by a reputable insurance company and must have the following policy features:
      1. Insurance coverage shall specifically provide for reimbursement to the warranty holder in the event of bankruptcy of the synthetic turf provider.
      2. Insurance coverage shall apply to playing surface inclusive of infill, seaming, labor and colored inlays for event markings.
      3. Provide the following documents with bid: Warranty Certificate, Accord Certificate, the actual Insurance Policy, and proof of A.M. Best Rating for the insured warranty provider.
      4. Insurance coverage shall apply to the full 8-year period from completion date of project, with no uninsured periods or periods of self-insurance.
      5. Insurance is provided by a third party insurer with an A.M. Best financial strength rating of "Excellent" or higher.
      6. Insurance coverage shall not have exclusions for epidemic or catastrophic failure.
      7. Insurance coverage shall not limit the hours of use.
      8. Insurance coverage shall not exclude heavy trafficked areas or related uses such as team or band practices.
      9. Insurance coverage shall not exclude any colored turf fibers. Colored turf cannot change by more than 5 gray scales.
     10. Insurance coverage shall not exclude the use of flat soled shoes.
     11. The Insurance Carrier must be licensed in the state of the facility.
     12. Insurance coverage offers a minimum claim limit of (US) $25 million in the aggregate per annum.
     13. Insurance coverage offers a minimum claim limit of (US) $1 million per field.
     14. Warranty shall include the cost of eight (8) annual visits for grooming and consultation.
     15. Must be a warranty from a single source covering both the materials and installation of the surfacing system.
     16. The entire system shall be resistant to rot, mold, insects, microbial attack, and shall be non-toxic to humans.
     17. The artificial grass field must maintain an ASTM F355-01 Gmax of 90-160 for the life of the Warranty.

   B. See Section 01.77.70 - Closeout Procedures, for additional warranty requirements and Operations & Maintenance manuals requirements.
1.10 MAINTENANCE SERVICE

A. Equipment:
   1. Supply the equipment listed which shall include a towing mechanism compatible with a tractor or other utility vehicle. The cost to supply, deliver, set-up and remove/dispose all packaging is to be incorporated within the cost of the Work.
      a. Sweeper – Greens Groomer 720 LitterKat – with 5 or 6-ft tow behind magnet attachment or pre-approved equivalent
      b. Groomer – Greens Groomer 720SED with Spring Tine Rake Attachment and finishing brush, SMG TurfCare TCA 1400, or pre-approved equivalent

B. Annual Maintenance for eight (8) years.
   1. Provide contact information and schedule first visit. The Owner is responsible to supply a list of selected personnel to the Contractor within 72 hours of a written request. Contractor shall provide operations and maintenance that includes:
      a. Annual on-site inspection analysis of seams, infill, inlay, edge, and field insert repair as required. The scheduling of the Annual Maintenance shall be within 15 days of the annual installation anniversary. The Sports Field Contractor is to obtain written confirmation and acceptance of the scheduled time from the Owner a month prior to the Annual Maintenance Service. The scheduling requirement along with all associated work for the Annual Maintenance Service is to be the sole responsibility of the Sports Field Contractor.
      b. Annual deep cleaning of synthetic turf consisting of de-compaction, deep cleaning, and finish clean/turf grooming.
      c. Annual synthetic turf report with results of inspection analysis, photos, results of cleaning process, and recommendations for future cleaning/maintenance.
      d. GMAX attenuation testing results per ASTM F1936, by an independent testing agency, shall be provided to the Owner at initial installation and within 12 months upon initial install and each year thereafter for the full duration of the warranty (2022). If the Gmax values are found to be higher than the maximum of 160 at any time, the contractor shall be responsible to bring the field in compliance at the contractor’s cost.
   2. Work with Owner to install additional infill product in low areas as required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Approved Base Bid manufacturers are as follows:
   1. UBU Sports: System S5-M
      a. 3110 Woodcreek Drive
      b. Downers Grove, IL 60515
      c. Tel: (800) 828-1300
   2. APT: Grid RS+52T
      a. 109 Conica Lane
      b. P.O. Box 160
      c. Harmony, PA 16037
   3. Shaw Sports Turf: Momentum 51
      a. 185 South Industrial Blvd
      b. Calhoun, GA 30701
      c. Tel: (515) 865-3645

2.02 MATERIALS

A. The component materials of the artificial grass field turf System consist of:
1. The system shall be tufted on a maximum 1/2" gauge. The fiber tufts shall be in a uniform pattern with symmetrical spacing between the tufts. The pile height shall be nominal 2-3/8".

2. Fiber yarns must be produced from 100% C8 Ethylene Copolymers. The slit-film shall be made of polyethylene non post-fibrillated long fibers, tufted into a fibrous, perforated porous backing.

3. The primary backing shall consist of two layers of woven fabric and one layer of non-woven fabric (minimum of (3) separate backing layers).
   a. The fibers shall include two (2) shades of green as noted on the drawings (or owner approved equal) parallel fibrillated tape yarn. The turf fabric shall be filled with 70% SBR rubber and 30% rounded silica sand by weight.

4. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The materials as hereinafter specified should be able to withstand full climatic exposure in all climates, be resistant to insect infestation, rot, fungus, mildew, ultraviolet light, heat degradation, foot traffic, water and airborne pollutants, and shall have the basic characteristics of flow-through drainage, allowing free movement of surface runoff through the synthetic turf fabric where such water may flow to the existing base and into the field drainage system.

5. The finished playing surface shall appear as natural grass with no irregularities and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use. The system shall be suitable for NCAA football, marching band, etc.

6. Glue, thread, paint, seaming fabric and other materials used to install and mark the artificial grass parallel slit-film synthetic turf.

B. The installed synthetic turf shall have the following properties:

   - **Face Weight** ASTM D5848-07 Min 48.0 oz/sy
   - **Primary Backing Weight** ASTM D5848-07 Min 7.5 oz/sy
   - **Secondary Backing Weight** ASTM D5848-07 Min 25.0 oz/sy
   - **Total Product Weight** ASTM D5848-07 Min 80.5 oz/sy
   - **HUD Density Rating** HUD Rating Min 700 / Max 800
   - **Tufting Gauge** ASTM D5793-05 Max 1/2"
   - **Fiber Height** ASTM D5823-05a Nominal 2-3/8"
   - **Stitches Per 3"** ASTM D5793-05 Min 7 Stitches
   - **Tuft Bind Value** ASTM D1335-05 STC Minimum
   - **Flammability – Pill Burn Requirement** ASTM D2859-06 Pass (ASTM D2859-06)
   - **Grab Tear Strength** ASTM D5034-09 220 LBS (Both MD and CMD)
   - **Infiltration Rate** BS7044-Method 4 Exceed 30" Per Hour
   - **Wheel Chair Accessibility** ASTM F1951-09 Pass (ASTM F1951-09)
   - **Fiber Denier** ASTM D1907-07 Min 9,000 Denier
   - **Fiber Thickness / Width** ASTM D3218-07 Min 110 Micron
   - **Fiber Breaking Load** ASTM D2256-02 Min 22 LBS
   - **Fiber Elongation A** ASTM D2256-02 Min 45%
   - **Fiber Specific Gravity** ASTM D792-08 Min 0.90
   - **Fiber Melting Point** ASTM D789-07 Min 220°F / 104°C

C. Infill shall have the following properties:
   - **Rubber Sieve Specification** 10 – 20 Mesh
Sand Sieve Specification 20 – 40 Mesh
Rubber Weight Min. 3.8 LBS
Sand Weight (Per Square Foot) Min 1.7 LBS
Total Infill Weight (Per Square Foot) Min 5.5 LBS

Infill Height Min 1.75 Inches

1. The Infill materials shall be approved by the Manufacturer. The Infill shall consist of SBR rubber crumb and rounded silica sand. The vendor shall provide weight tickets and calculations for infill upon arrival to the project site to verify compliance of weights.

D. Performance Testing:

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<th>TEST CODE</th>
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<td>ASTM F1015-03</td>
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<tr>
<td>Average Ball Rebound Height</td>
<td>ASTM F2117-01</td>
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<tr>
<td>Coefficient of Restitution (CR)</td>
<td>ASTM F1551-03</td>
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<td>Average Ball Bounce</td>
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E. Carpet Requirements:

1. The Carpet shall consist of multifilament fibers tufted into a primary backing with a secondary backing.
2. The Carpet shall be furnished in minimum 15’ wide rolls. Rolls shall be long enough to go from sideline to sideline without splicing. For football, the perimeter white line shall be tufted into the individual sideline rolls. Head seams, other than at sidelines, will not be acceptable.
3. Systems with less than a 2.25” fiber and/or shock pad enhancements will not be accepted as equivalent.

F. Backing System Requirements:

1. The primary backing system must consist of a minimum of three layers, and include the specific three layers as specified in this section.
2. The top layer of the primary backing system must be an 18 pic polybac.
3. The second layer from the top of the primary backing system must be an 80 gram Colbond dimensional stability layer.
4. The bottom layer of the primary backing system must be a 5 pic action back, stitch lock layer.
5. The secondary backing layer is to be urethane and must be a minimum of 25 ounces.
6. The Synthetic Turf System Provider is to ensure that the urethane applied as the secondary backing layer has adequate penetration through all the multiple layers of the primary backing fabrics.
7. As part of the secondary backing material application, the turf material is to be perforated as part of the inline process. The perforations are to be created through a heat process that is adequate in temperature to cauterize the perforations as they are made through both the primary and secondary backing layers. Perforations are the only acceptable drainage design.

8. Each perforation shall be a minimum of 3/16 of an inch in diameter, and shall not be spaced more than 4 inches apart on a grid both with the machine direction (MD) and across the machine direction (CMD).

9. The perforations are to be constructed with a ninety percent (90%) efficiency. The drainage of the synthetic turf system is to be designed to ensure a minimum drainage of 35 inches per hour.

G. Thread for sewing seams of turf shall be as recommended by the synthetic turf Manufacturer.

H. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the synthetic turf Manufacturer. All turf roll seams must be sewn. Inlays shall be cut in so that all fiber heights are the same and applied using special hot melt adhesive. The purpose of this is to provide a consistent fiber height.

PART 3 EXECUTION

3.01 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, 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. All designs, markings, layouts, and materials shall conform to all currently applicable NCAA rules, and/or any other rules or standards that may apply to this type of synthetic grass installation. All designs, markings and layouts must first be approved by the Owner in the form of approved shop drawings. All markings will be installation full compliance with those drawings.

3.02 EXAMINATION

A. Verify that all sub-base leveling is complete prior to installation. The turf installer shall be present during the initial installation of the topdressing rock to ensure the product will work to their satisfaction for stability when the carpet is installed.

B. The surface to receive the synthetic turf shall be inspected by the Installer, and prior to the beginning of installation, the Installer must accept the sub-base planarity in writing. The acceptance will depend on the sub-base contractor providing the installer with test results indicating that compaction and planarity are in compliance with the synthetic turf manufacturer's specifications. The surface must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.

C. A licensed land surveyor in the State of Iowa shall verify grades on a 25’x25’ grid (to be completed by Shive-Hattery). The installer will accept the sub-base in writing when the sub-base contractor, if different, provides test results for compaction and planarity that are in compliance with the synthetic turf manufacturer's specifications. The Installer shall have the dimensions of the field and locations for markings measured by a licensed land surveyor to verify conformity to the specifications and applicable standards.

D. The rock shall be rolled (without vibration) with a 10-ton roller after the installation of the base rock. The surface course rock shall then be installed and rolled. The surface tolerance shall not exceed 0 - 1/4" over 10 feet and 0 - 1/4" from design grade.
E. The Base Contractor shall verify the installed sub-base has been tested for permeability prior to the installation of the synthetic turf system per paragraph 1.4.D.1. The average infiltration rate of all locations shall not be less than 30 inches/hour, with no one location having a rate less than 25 inches/hour. The Base Contractor is responsible to meet this performance specification, before proceeding with installation of the synthetic turf, and shall bear the cost of the on-site testing and the cost of any additional work.

F. The Synthetic Turf Project Superintendent shall thoroughly inspect all synthetic turf materials delivered to the

3.03 INSTALLATION

A. Install in accordance with Manufacturer's instructions. The Turf Contractor shall strictly adhere to the installation procedures outlined under this section. Any variance from these requirements must be accepted in writing, by the Manufacturer's onsite representative, and submitted to the 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.

B. The carpet rolls are to be installed directly over the properly prepared aggregate base. Extreme care should be taken to avoid disturbing the aggregate base, both in regard to compaction and planarity. It is suggested that a 2-5-ton static roller is on site and available to repair and properly compact any disturbed areas of the aggregate base.

C. The full width rolls shall be laid out across the field. Turf shall be of sufficient length to permit full cross-field installation from sideline to sideline. No head or cross seams will be allowed in the main playing area between the sidelines. Utilizing standard state of the art sewing procedures each roll shall be attached to the next. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing field turf.

D. This is a sewn installation. Gluing of rolls shall not be acceptable. Minimum gluing will only be permitted to repair problem areas, corner completions, and to install any logos, numbers or inlaid lines as required by the specifications. Seams shall be flat, tight, and permanent with no separation or fraying.

1. Seaming Methodology Requirements:
   a. All lines that run the entire expanse of the individual rolls shall be tufted with the fiber color specified in the Field Layout Plan supplied utilizing the exact same fiber as the green field fiber.
   b. All football five (5) yard lines may be placed at the edge of the yard line or centered in the middle of the roll. Contractor is required to ensure straightness.
   c. Any other inlaid lines, markings, numbers and logos are to be either sewn utilizing a Union Special 500T sewing machine, and approved thread or adhered when sewing is not possible with a manufacturer approved adhesive. Any thread utilized shall be treated to ensure it will maintain its tensile strength for a minimum of eight (8) years, under heavy sports field use and while subjected to outdoor elements. All sewn seams are to be completed utilizing the double locking thread method. The specified sewing method requires a flat seam, with no height variance and/or flap.
   d. Any adhered inlaid lines, markings, numbers and logos shall be cut-in through the entire thickness of the completed turf material, including the primary and secondary backing. The inlaid markings and numbers shall not stick up above the surrounding grass.
   e. All logos shall come from the factory in one piece ready for installation.
   f. Any adhesive or Hot Melt utilized shall be approved by the Synthetic Turf System Provider for use with the Synthetic Turf System material proposed in the bid. Both methods require the use of an approved seaming tape. The seaming tape utilized is to be approved by both the Sports Turf system provider and the vendors. These methods require a flat seam, with no height variance and/or flap.
   g. The approved adhesive shall be applied at the rate specified by the adhesive vendor and utilizing their recommended application method. If hot melt is used, the hot melt shall be
applied at the rate specified by the hot melt vendor and utilizing their recommended temperature and application method.

h. Any Inlaid and/or painted lines, markings, numbers and logos are to be as specified in the Field Layout Plan supplied. No Painting will be required as part of the contract.

i. All dimensions and colors are to be as specified in the Field Layout Plan supplied.

E. Synthetic turf shall be attached to the perimeter edge detail in accordance with the Manufacturer's standard procedures.

F. 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.

G. The Infill materials shall be installed per the manufacturer’s recommendations to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. The Infill installation consists of the sand and processed SBR rubber crumb. A final application of specifically sized processed SBR rubber crumb completes the system. The Infill shall be placed so that there is no more than ¼" or less than ½" of exposed fibers. This shall be verified after the infield has settled from end to end and side to side. Anything that is out of tolerance shall be corrected at the vendor’s expense.

H. Provide initial Gmax results per ASTM F1936 to verify initial limits per paragraph 1.4.D.2

3.04 FIELD MARKINGS

A. All markings to be installed in accordance with approved shop drawings.

B. All five yard lines will be tufted in.

C. Balance of sports markings will be inlaid in accordance with the contract drawings.

D. Field will have the following markings tufted or inlaid:

1. Football-Color shall be white except as noted.
   a. 5 yard markings
   b. 10 yard numbers
   c. Hash marks
   d. Sideline markings
   e. 50-yard line
   f. Extra point lines
   g. End zone markings
   h. Kick off markings

2. Standards
   a. All field markings, layouts and materials shall comply with all current NCAA rules and standards for football.

3.05 SIGNAGE

A. Provide six (6) aluminum signs with dimensions of 12" x 18" to be installed by the contractor with metal brackets and screws indicating what is not allowed on the field. The contractor shall provide language and incorporate the Owner’s logo. All verbiage shall be approved by the Owner.

3.06 CLEANING

A. Protect installed Turf from subsequent construction operations.

B. Do not permit traffic over unprotected surface.

C. Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.

D. All usable remnants of new material shall become the property of the Owner.

E. The Contractor shall keep the area clean throughout the project and clear of debris.
F. Surfaces, recesses, enclosures, etc., shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

3.07 OTHER MATERIALS AND EQUIPMENT

A. Repair materials:
   1. Upon substantial completion provide directly to the Owner the following items in the minimum quantities specified;
      a. Seaming tape - 200 LF
      b. Seaming epoxy - Sufficient quantity for 50 SF
      c. Turf fabric (Two-toned Green) - 250 SF with at least one-piece 15' wide x 10' long
      d. Turf fabric (Dark Green) - 100 SF
      e. 4"-wide Colored Fabric - Minimum 100 LF of each color specified for inlaid line striping.
      f. 4,000 pounds of each infill material in weatherproof bags.

END OF SECTION