

## APPENDIX B PERFORMANCE SPECIFICATIONS

RFP No. 21-005 CENTENNIAL SYNTHETIC TURF FIELD

SUPPLY AND INSTALLATION OF SYNTHETIC TURF AND  
DRAINAGE/SHOCK PAD

PERFORMANCE SPECIFICATION

Date: 31 March 2021

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## PART 1 - GENERAL INFORMATION

### 1.1 SCOPE OF THE RFP

- A. In this Request for Proposals (RFP) City of Coquitlam is seeking Proponents capable of the supply and install of a new synthetic mixed infill turf field. The Proposal is to include all necessary works and materials to complete the scope of work. Specifically, the City of Coquitlam requires a Turf Contractor to provide the following:
1. Supply and install of (1) multi-use synthetic turf field with shock pad and infill whose primary use will be soccer, BC High School football, and field hockey. Includes approximately 9,298 square meters of synthetic turf and all additional product required to complete synthetic turf surface including seams, cuts, and repairs.
  2. **Color** shall be a natural green. Linemarkings shall be white (soccer), orange (football), and yellow (field hockey). All markings shall be tufted or inlaid as described in these Specifications.
  3. Review and certification of the field base, anchor curb, and all other installed work that directly affects the Work in this Contract.
  4. Provide extra turf materials to the Owner for future repairs and protective purposes.
  5. Shock pad/drainage pad to be supplied and installed. Pre-approved shock/drainage pad include Proplay 23D or approved equivalent.
  6. Provide all relevant maintenance and repair manuals and warranty package to Owner.
  7. Provide any added value that can be provided to the Owner.
  8. The Proponent is to provide a maximum of four (4) options to the Owner.

### 1.2 REFERENCE STANDARDS

- A. American Standard Testing Materials (ASTM)
- B. Synthetic Turf Council – Suggested Guidelines for the Essential Elements of Synthetic Turf Systems
- C. European Standards/European Norms (EN)
- D. Federation Internationale de Football Association (FIFA) – Soccer
- E. International Hockey Federation – Field Hockey (latest edition)
- F. BC High School Football – American Football

### 1.3 MINIMUM QUALIFICATIONS FOR SYNTHETIC TURF SYSTEM

- A. Approved synthetic turf system shall be manufactured, sold, and warranted by a single vendor. Manufacture of the system shall include, at a minimum, assembly of the constituent components.
- B. The manufacturer of the synthetic turf system must have produced a minimum of five (5) successful full sized, outdoor in-filled fields within the past two (2) years.
- C. The installer of the synthetic turf system must have installed a minimum of five (5) successful full sized, in-filled synthetic turf football or soccer fields within the past two (2) years. The installer must have installed a minimum of five (5) successful full sized, in-filled synthetic turf fields with the selected vendor. Consideration shall be given to a Turf Contractor that has a designated representative available for service based in British Columbia.

### 1.4 SUBMITTALS

- A. Product Data:
  - 1. Product cut sheets
  - 2. Manufacturer's standard specification for material construction and installation
  - 3. Manufacturer's maintenance instructions.
  - 4. Third party test results demonstrating compliance with the specifications for the products used on this project including a test report from an independent lab showing the product passed the requirements for FIFA Quality Pro PLUS a test result showing the product passed 6,000 cycles for the Lisport XL test.
  - 5. Key personnel of the project team to include the project manager and project superintendent. Include the credentials and experience of each person.
  - 6. Submit a schedule with an assumed start date.
- B. Shop Drawings: For synthetic grass surfacing.
  - 1. Total infill depth.
  - 2. Seam details and layout.
  - 3. Gluing patterns.
  - 4. Roll layout plans.
  - 5. Attachment details showing edge conditions consistent with design documents.
  - 6. Dimensional shop drawings showing the layout of game lines, numbers, letters and logos. Indicate application method of each line and marking.
  - 7. Shock pad/drainage pad
- C. Samples: For each type of synthetic grass surfacing.
  - 1. One 150mm by 150mm sample of monofilament turf showing backing and perforations.
  - 2. One 150mm by 150mm sample of monofilament turf for each additional color used for the proposed lines and markings. Colors to be confirmed during submittal process from standard colors available from vendor.

3. One 150mm by 150mm sample monofilament turf showing the method of seaming and perforations. One sample to have inlaid lines.
4. One 1kg sample of each type of infill material.
5. One 150mm by 150mm sample of shock pad.

D. Site Acceptance:

1. Prior to the synthetic turf system installation, the Turf Contractor shall provide a written certification as described in section 3.1.
2. The Turf Contractor will not be held responsible for any hidden substandard field subgrade and base conditions, or for the repair of the field subgrade and base work installed by others outside of the Contract (unless expressly provided for in the Contract).

E. Warranty:

1. A sample of the warranty including any necessary amendments described in section 1.7 and shall be submitted to the Consultant prior to delivery of turf materials to the site.

F. Maintenance Materials:

1. Submit manufacturers maintenance manual including but not limited to:
  - a. Recommended general maintenance.
  - b. Approved turf maintenance equipment.
  - c. Approved cleaning products.
  - d. Painting application and removal procedures (include approved paint).
  - e. Procedures for minor repairs.
  - f. Forms for logging maintenance activities.
  - g. Discussion of precautions and best practices to protect the turf surface and maintain the warranty on the installation.

## 1.5 QUALITY CONTROL

- A. Submit to the Consultant a quality control plan designating a quality control representative and specifying the testing procedures for the field materials.
- B. Turf samples are to be taken by the Contractor from the project site for testing. All tests will be reviewed by the Consultant. A minimum of (3) samples are to be provided. The testing laboratory shall be completely independent with no ties to the turf manufacturer. The testing shall include the following:
- |  |                 |
|--|-----------------|
| 1. Pile height, face width and total fabric weight | ASTM D 5848-20  |
| 2. Backing Perforation Diameter and Spacing        | ASTM D418       |
| 3. Tuft Bind (without infill) as per               | ASTM D1335      |
| 4. Grab/Tear Strength                              | ASTM D5034      |
| 5. Shock Attenuation as per                        | ASTM D355       |
| 6. Infiltration rate through turf materials        | min of 500mm/hr |
| 7. Yarn Denier as per                              | ASTM D1577      |
| 8. Yarn breaking strength as per                   | ASTM D2256      |

- |     |                           |                                  |
|-----|---------------------------|----------------------------------|
| 9.  | Yarn Melting Point as per | ASTM D789                        |
| 10. | Backing Perforations      | Perforation Diameter and Spacing |
| 11. | Pill Burn Test as per     | ASTM D2859                       |
| 12. | Fibre Thickness           |                                  |
| 13. | Fibre Tensile Strength    |                                  |
| 14. | Lisport XL test to        | 6000 cycles                      |

- C. Copies of the test results shall be transmitted to the Owner and Engineer directly from the testing laboratory. The synthetic turf materials shall not be shipped to the site without written authorization from the Consultant after the Owner and Consultant have approved the test results.
- D. Samples of the synthetic turf material tested shall also be transmitted to the Consultant for approval by the independent testing laboratory prior to shipment of the synthetic turf materials to the job site. Sample size shall be a minimum 150mm by 150mm.
- E. All fees and costs associated with the pre-shipment sampling and testing shall be paid by the Turf Contractor.
- F. An infill material sample taken from site must be tested for:
1. Toxicity and shown to be in accordance with EN 71-3 – Safety of Toys Part 3 Migration of Certain Elements. The elements tested are to include aluminum, antimony, arsenic, barium, boron, cadmium, chromium (III and VI), cobalt, copper, lead, manganese, mercury, nickel, selenium, strontium, tin, and Zinc.
  2. Benzene, Phenols, Phthalates, Polycyclic Aromatic Hydrocarbons (PAH) to comply with the British Columbia Ministry of Health Standards.

#### 1.6 TURF SYSTEM HOLD HARMLESS

- A. The synthetic turf manufacturer and installer shall not infringe upon any current or pending patents held by other synthetic turf manufacturers or installers or infill material suppliers.
- B. The Turf Contractor shall hold the Owner and the Consultant harmless from infringement of any current or future patent issued for the synthetic turf system, pad system, installation methods and vertical draining characteristics.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace synthetic grass surfacing that fails in materials or workmanship within specified warranty period.
1. Warranty Period: 8 years from date of Substantial Completion.

- B. In addition to the synthetic turf manufacturers standard warranty the following items shall be included and indicated on the provided warranty.
1. Warranty shall cover defects in synthetic turf materials, installation or workmanship and damage from UV degradation.
  2. Synthetic turf must maintain a G max value of less than 165 throughout the warranty period and be less than 120 following substantial completion.
  3. Synthetic turf must maintain a minimum infiltration rate of 500mm of precipitation per hour without visible surface ponding throughout the warranty period.
  4. Synthetic turf surface above the infill material must not decrease by more than 10% per year, or exceed 50% during the Warranty period.
  5. Warranty shall extend a minimum of 8 years from the date of substantial completion and be non-prorated.
  6. Warranty shall be third party insured by an A+ rated or better carrier.
  7. Warranty shall not restrict the hours of use or exclude high wear areas (e.g. the goal area for soccer, or the base area for baseball/softball).

#### 1.8 COORDINATION

- A. Coordinate schedule and installation of synthetic turf with General Contractor. Provide submittals to Consultant with adequate time for review and approval while conforming to General Contractors schedule.

#### 1.9 TRAFFIC CONTROL

- A. The Turf Contractor is to coordinate all traffic with the onsite Civil Contractor and School District 44's Contractor.
- B. The Turf Contractor is to ensure the safety of all persons on and off the site. Provide flag persons as required.
- C. The Turf Contractor is to limit heavy traffic during critical school times to include school start, school end, and lunch breaks.
- D. The Turf Contractor shall not obstruct any relevant fire lane, access, alley, or road as required by the fire department having jurisdiction.

#### 1.10 DELIVERY AND STORAGE

- A. The Turf Contractor is to pack, deliver, and store all materials in accordance with the manufacturer's requirements. Products should not be opened prior to arriving at the project site.

- B. The Turf Contractor is to coordinate with the Civil Contractor, School District 44, and the Owner to select an appropriate staging area for the turf materials.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. The synthetic turf system shall be a vertical-draining permeable synthetic turf system. The turf shall consist of a synthetic grass-like surface pile, which shall be tufted into a synthetic backing.
- B. All backing layers and coating shall be firmly bonded together. Coating materials must be completely cured and bonded to the other backing layers. Synthetic turf panels or rolls that do not meet this requirement will be rejected.
- C. The entire system shall be resistant to moisture, rot, mildew, bacteria, fungus growth and ultraviolet ray degradation at all field locations. It should resist damage from wear and tear during athletic and recreational usage. All components should be non-toxic not cause commonly known allergic reactions.

### 2.2 SYNTHETIC TURF SYSTEM

- A. All weather synthetic turf carpet infilled with crumb rubber designed for athletic applications. Both fields and all associated run-out zones to be a monofilament type turf.
- B. Notify Consultant of any discrepancies between these Specifications and the manufacturers current standard specifications prior to submitting the Proposal.
- C. Synthetic Turf Requirements:
1. The product shall meet the FIFA Quality Pro standards
  2. The product shall meet the requirements of the Lisport XL 6,000 cycles test
  3. The pile height of the turf shall be 50 – 63mm (2 – 2.5 inches)
  4. Infiltration rate of 500mm/hr
  5. Rolls shall be 4.57m in width
- D. Impact Attenuation Requirements:
1. The field (entire shock pad and turf system) should have a G-Max value of less than 165 throughout the warranty period and be less than 120 following substantial completion.

### 2.3 DRAINAGE/SHOCK PAD/ELAYER

- A. Pre-approved drainage/shock pad products include ProPlay 23d or an approved equivalent.



- B. Drainage/shock pad to meet requirements for FIFA Quality Pro.
- C. Product to meet specified performance for drainage and shock absorption for temperatures between -20 and +40 degrees Celsius
- D. Drainage/shock pad to be warrantied for a period of (25) years (full replacement). Drainage and shock absorption to be at rates 80% or greater of originally specification for duration of warranty period.
- E. Drainage/shock pad to have continuous flow between all panels/sections. Flow through shock pad to be unobstructed in direction of field slope.

## 2.4 PERMEABILITY REQUIREMENTS

- A. The entire synthetic turf system (turf, pad, and infill) shall drain vertically at a minimum of 250 mm precipitation per hour without visible surface ponding. The Turf Contractor will ensure that the system meets this requirement before being installed.

## 2.5 INFILL

- A. Crumb rubber infill shall:
  1. Be derived from used whole vulcanized truck tires produced in compliance with North American tire manufacturing specifications.
  2. Have a specific gravity greater than 1.1 and less than 1.2 as per ASTM D297.
  3. Have an ash content of between 5% and 15% as determined by ASTM D297.
  4. Not contain more than 0.01% liberated fiber (no more than 0.2 lbs per ton) tested per ASTM D5603. The liberated fiber remaining in the CRI shall be free flowing and not agglomerated into clumps of fiber as received at the job site.
  5. Be dry and free flowing.
  6. Be produced cryogenically or ambiently.
  7. All infill and sand blended fields to have silica sand (silt free). Contractor to provide sieve sample for all proposed sand and ratio of sand to rubber infill.
  8. Infill material shall be clean and not include any metal or fibre glass.
  - 9.
- B. OPTIONAL - TPE
  1. Be derived from virgin thermoplastic elastomers.
  2. Have a specific gravity greater than 1.45 and less than 1.51 as per ASTM D792.
  3. Be free of heavy metals.
  4. Abrasion resistance 460-580 (mg loss) per ASTM D1044 per DINS3516.
  5. Be dry and free flowing.
  6. Filler materials must be inorganic.

## 2.6 LINES AND MARKINGS

- A. A complete field lining, marking and boundary system shall be provided prior to installation of the surfacing system. Layouts shall be accurately surveyed and marked prior to installation. In addition to the drawings provided, the lines and markings shall comply with the following standards:

1. Federation Internationale de Football Association (FIFA) – Soccer
2. BC High School Football/American Football
3. International Hockey Federation – Field Hockey

- B. The color of the lines and markings shall be as follows:

- |                 |        |
|-----------------|--------|
| 1. Soccer       | White  |
| 2. Football     | Orange |
| 3. Field Hockey | Yellow |

The order of priority shall be soccer over football over field hockey.

- C. All lines and field markings shall be tufted or installed as synthetic turf inlays. Wherever possible, lines shall be tufted into the turf panel in lieu of inlays. All markings shall be uniform in color, providing a sharp contrast with the turf color, and shall have sharp and distinct edges. Markings shall be true and shall not vary more than 1cm from the specified width and location, except that markings shall not be uniformly smaller or larger than specified.

### Soccer Field Markings:

- |                                 |   |
|---------------------------------|---|
| 1. Playing field boundaries:    | 120mm wide white lines  |
| 2. Mid-Field line:              | 120mm wide white line   |
| 3. Goal and penalty boxes:      | 120mm wide white lines  |
| 4. Center circle & penalty arc: | 120mm wide white lines 9.15m radius                                     |
| 5. Corner kick arc:             | 120mm wide white lines 1.0m radius                                      |
| 6. Center spot/Penalty Mark:    | 230mm diameter solid white dot  |
| 7. Sideline Tick Marks          | 120 wide white lines, length 300mm offset from perimeter lines by 100mm |

### American Football Markings:

- |                            |                                       |
|----------------------------|---------------------------------------|
| 1. Goalline/Endline:       | 200mm wide orange lines               |
| 1. 5 Yard Sideline Marker: | 100mm wide orange lines, length 600mm |
| 2. 5 Yard Inbounds Line:   | 100mm wide orange lines, length 600mm |
| 3. 3 Yard line             | 100mm wide orange lines, length 600mm |

### Field Hockey Markings:

- |                                |   |
|--------------------------------|---|
| 1. Goalline/Sideline/23 Meter: | 75mm wide yellow lines                    |
| Centreline                     |   |
| 2. Penalty spot:               | 150mm diameter yellow dot                 |
| 3. Shooting Circles:           | 75mm wide yellow lines                    |
| 4. 5 Yard Mark                 | 75mm dashed line 3M spacing, length 300mm |

- D. Manufacturer shall guarantee that synthetic turf is adaptable to painted lines in the event painting is utilized in the future.

## 2.7 SYNTHETIC TURF PERFORATIONS

- A. Synthetic turf with tufted fibers and a coated backing must provide a vertical drainage. The minimum infiltration rate is stated in section 2.2.C – Synthetic Turf Requirements.
- B. The turf shall be even perforated over the entire surface. Holes must be full diameter, completely through the underside of the turf backing with no material residue or fragmented fibers remaining.
- C. If a non-permeable backing material exceeds 300mm in width it shall be perforated to match the standard size and pattern of perforations on the artificial turf. Perforations shall be drilled from the surface after the adhesive has set.

## PART 3 - EXECUTION

### 3.1 SITE ACCEPTANCE CERTIFICATION

- A. Prior to installation of the synthetic turf system the Turf Contractor shall perform an inspection of the field base, anchor curb, and any other areas relevant to the performance of the artificial turf system. The Turf Contractor will then submit written certification of acceptance for the installation of the synthetic turf system. A planarity test is to be conducted to Turf Contractor's standards prior to acceptance of site. The expected test method is a string line test.
- B. Summary of the certification shall include, but not be limited to:
1. A summary of the activities that made up the inspection, including date and approximate duration of each activity.
  2. Any discrepancies, problems, or conflicts. If no problems are found, that shall be noted.
  3. Acceptance of the field base permeability, planarity, anchor curb, and any other factors that the Turf Contractor considers relevant to synthetic turf installation.
  4. Assurance that the synthetic turf installation carried out on the field subgrade will result in a superior quality athletic surface, fully warranted for the period and conditions specified herein.
- C. All discrepancies between the required materials, applications and tolerance requirements noted by the turf installer shall be brought immediately to the attention of the Consultant. Failure of the turf installer to immediately notify the Consultant of any prior work that does not meet the required Specifications will result in the turf installer being required to perform any work needed to bring the base to acceptable condition.

### 3.2 INSPECTION OF MATERIALS

- A. Prior to installation, and immediately upon delivery of synthetic turf system materials to the project site, the Turf Contractor shall inspect the materials as follows:
  - 1. For damaged or defective items.
  - 2. Measure turf pile height and thickness of each roll.
  - 3. Measure backing perforation diameter and spacing.
  - 4. Reject damaged materials and all materials out of tolerance with this specification.
- B. After installation, inspect project area for acceptable seaming, adhesive bonding, uniformity of color of turf, bubble and wrinkle free surface, field lines and markings, insert installations, and edge details. Remove and/or repair deficient workmanship in a manner consistent with these specifications prior to requesting the Consultant's inspection to accept the work.

### 3.3 Owner's Test

- A. The Owner may have samples of the turf submitted and tested for verification of conformance to specifications in addition to the required testing to be completed by the Contractor. Turf system acceptance is subject to the result of these tests.
- B. Any material tested and found not conforming to the specifications will be rejected and replaced with material conforming to the specification at the Turf Contractor's expense. Re-submittal shall be required.

### 3.4 Synthetic Turf Installation

- A. Perform all work in strict accordance with the drawings, shop drawings and manufacturer's specifications and instructions.
- B. The Turf Contractor is responsible for inspecting, verifying, and accepting all installed work from this section.
- C. Care should be taken during installation to account for rapid fluctuations in temperature to avoid expansion and/or contraction which can affect the final installation. Temperature extremes should be carefully monitored. The carpet should never be rolled or unrolled when frozen. Adhesive materials should not be used during the rain or when the ambient air temperature or the material temperature is less than 5 °C. The turf shall be installed in appropriate moisture conditions as stated by the manufacturer.
- D. Immediately prior to application of synthetic turf, the base shall be thoroughly cleaned of all foreign material, soil, or any other substances that may be detrimental to permeability and the installation of the turf system.

- E. The fabric surface shall be constructed and installed in 4.57m minimum widths with no longitudinal or transverse seams, except for head or tee seams at field boundaries and inlaid lines within a finished roll assembly. The seams should be spaced at 4.57m.
- F. Rolls that do not lay evenly and with full dimension width will be rejected.
- G. The bonding or fastening of all system material components shall provide a permanent, tight, secure, and hazard-free athletic playing surface. System components include:
  - 1. Bonding all seams and inlaid lines and markings.
  - 2. Bonding and seaming must maintain their integrity for the duration of the warranty period.
- H. Seams (Joints)
  - 1. All turf seams shall be sewn with high strength polyester fiber cord or nylon.
  - 2. Where cemented seams are required for inlaid lines and markings, the supplemental backing material shall bridge all seams a minimum of 100mm on each side of the seam. If the supplemental backing material is greater than 300mm in width, the backing materials shall be perforated as described in section 2.4.
  - 3. Backing layers must lie flat on the field base to provide a uniform pile surface.
  - 4. The width between fiber rows at the seam locations shall not exceed 12.5mm.
  - 5. All sewn seams shall be brushed to free any trapped fibres and provide full coverage over the thread.
  - 6. All cemented seams shall be brushed to remove any adhesive material from the fibers.
- I. Turf edges to be as shown on the edge fastening detail and nailed at the perimeter.

### 3.5 FIELD MARKINGS

- A. Complete field markings shall be provided with the initial installation of the surfacing system. Lines and markings to be in conformance with these specifications. Layouts shall be accurately surveyed and marked prior to installation.
- B. If overlapping backing materials are utilized for the inlaid lines and markings resulting in a non-permeable surface greater than 300mm wide, the backing materials shall be perforated as described in section 2.4.
- C. To the greatest extent practical, lines and markings shall be installed without compromising the primary backing.

### 3.6 INFILL INSTALLATION

- A. The infill material shall be applied in a dry condition and when the synthetic turf is dry.
- B. The sand and rubber infill system shall be installed with a minimum of 8 applications.

- C. The infill installation shall not result in fiber material trapped below the surface of the infill material. If fiber is trapped below the surface, a portion or all the infill material must be removed and reinstalled.
- D. The infill material shall be installed at a uniform depth across the entire field area. Infill depths shall not vary more than 5mm across each field area.

### 3.7 CLEANING

- A. Remove all excess materials of all types, equipment, debris, etc., from the site immediately after completion of the work. Remove all stains and other blemishes from all finished surfaces. Leave work in clean, new appearing condition, ready for use by the Owner.
- B. The Turf Contractor shall inspect the entire field area with a hand-held metal detector to identify any construction materials or tools left on the field. All such materials shall be removed prior to Owner occupancy of the field.

### 3.8 PROTECTION

- A. The Turf Contractor is responsible for adequate protection of the materials and work from damage until the field has achieved final acceptance of all contract work. All material damaged prior to acceptance by the Owner shall be replaced at no cost to the Owner.

### 3.9 EXTRA MATERIAL

- A. Deliver to Owner all extra material herein specified. Owner to provide a written receipt for all materials received to the Consultant.
- B. Turf for Future Repairs:
  - 1. Material may be roll ends or cutoffs. Each piece of fabric must be at least 2m x 3m, with at least one piece of green monofilament turf. The Owner shall select useable remnants from the work.

### 3.10 CLEAN-UP

- A. Upon completion of the Work the Contractor is to ensure the project site is free of loose material around the site. Loose material is to include infill materials, turf fibres, or any other materials related to the work. The Contractor is to ensure all equipment is removed from the site upon completion of the work.