

# LACKAWANNA COUNTY STADIUM NATURAL TURF PLAYING FIELD SYSTEM

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## Exhibit A. Scope of Work and Specifications

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### PROJECT REQUIREMENTS AND CONDITIONS

#### A. General Requirements

1. Time requirements for completion of the work are of the essence. Work described herein requires special expertise in several diverse areas of construction, as well as soil science and sports turf management.
2. The contractor will design, furnish, install and consult on the management of a complete natural grass athletic surface. The system will be state-of-the-art for natural turf gravity drain fields. The existing drainage system (undisturbed during construction) has a design discharge rate in excess of 3" per hour. With proper turf maintenance, it is intended that events continue during adverse weather without freestanding water on the turf surface.
3. The major portion of the work to be accomplished under this contract includes a system for passive control of surface and subsurface moisture content for a natural turf playing field and baseball diamond components constructed with specialty clays and aggregates. The field system will allow for the rapid movement of water through the planted surface, sand rootzone, gravel drainage blanket and subsurface drainage matrix.
4. Design services by the contractor shall include shop and contract drawings and technical specifications in sufficient detail for review and approval by the owner prior to commencement of work and oversight by the owner during the construction process. Additionally, the contractor will provide cut sheets on all construction materials, including but not limited to drainage pipe, drainage aggregate, rootzone sand, irrigation pipes, heads, fittings and controller, sod source and bluegrass varieties, infield and mound clays and warning track aggregate. All designs, shop and contract drawings, and specifications will be the property of the Authority.

5. Following completion of all work, the contractor will provide record drawings, a turf maintenance manual and all owners' manuals for the manufactured components included in the project.
6. The contractor will assure the protection of persons and property. Open excavations shall be marked or barricaded. All structures and utilities will be protected from undermining and washout caused by the settlement or lateral movement of soils during or as result of earthwork operations.
7. All benchmarks, elevation control points, monuments and line pins/stakes, etc, shall be preserved and maintained. If disturbed or destroyed by the contractor, the contractor will replace or repair at no cost to the owner.
8. The Contractor shall be responsible to obtain the blue grass sod from Tuckahoe Turf Farms, Hammonton, New Jersey.

#### B. Quality Assurance

1. The contractor will comply with all applicable federal, state and local building codes, rules and regulations: UPC – Uniform Plumbing Code; UBC – Uniform Building Code; NEC – National Electric Code; and where appropriate, install labeled equipment certifying approval by: NSF – National Sanitary Foundation; UL – Underwriters Laboratories.
2. The contractor will pay for all laboratory tests performed for qualification of rootzone sand, trench gravel, drainage blanket gravel and specialty infield and track aggregates and supply test results to owner as part of submittals packet. Approved testing laboratories for rootzone sand, infield mix and aggregates are:

Penn State University  
Soil Science  
University Park PA  
814-863-1368

Hummel and Co, Inc  
35 King Street  
Trumansburg NY 14886  
607-387-5694

CLC LABS  
325 Venture Drive  
Westerville OH 43081  
614-888-1663

#### C. Warranties and Guarantees

1. The contractor will provide a full system warranty signed by an officer of the company that guarantees repair or replacement of the field system's materials and workmanship for a period of one (1) year following substantial completion of the project. Included in the field system are the following:
  - a. Irrigation system
  - b. Grades and elevations within contract tolerances
  - c. Rootzone sand meeting specifications and test results for every 500 tons brought to site

- d. Infield clay and track aggregate are true to specification
- e. All materials used were new and true to specifications.

2. Substantial completion shall be defined as:

- a. A smooth playing surface, including natural turf, infield skin and warning track, installed and leveled to grade tolerances.
- b. Sod installed absent of seams and cracks, with uniform color and without objectionable levels of noxious weeds or disease symptoms. All edges cut cleanly at material interfaces.
- c. Infield skin, pitcher's mound and bullpens installed according to the rules of baseball.
- d. Bases, rubbers and plates installed.
- e. Additional field materials stockpiled.
- f. Irrigation system fully operational.

#### D. Attic Stock

1. The contractor shall provide the owner with the following material stockpiles or inventories. It is the owner's responsibility to provide adequate storage space, either indoors or out.

<u>Material</u>	<u>Minimum Quantity</u>
Rootzone sand	20 tons
Infield mix	10 tons
Warning track grit	10 tons
Quick coupler keys/swivels	3
Hunter rotors	2 each type used

## EARTHWORKS

### A. Summary

The following work will be completed by the owner:

1. The existing synthetic turf field stripped off and discarded.
2. The asphalt foundation will be milled off and discard/recycled.
3. The concrete curbs in the infield will be demolished and discarded.
4. The #57 stone base will be excavated to +/- 0.1' of design subgrade elevations.

### B. Materials and Submittals

1. None.

### C. Execution

None.

## ROOTZONE PROFILE

### A. Summary

1. Laser grade and roll the #57 stone base.
2. Install a geotextile barrier over the prepared stone base.
3. Install specified rootzone sand over drainage blanket and laser grade.

### B. Materials and Submittals

1. Prior to commencement of the project, the contractor, at his expense, will pre-qualify the supplier(s) of the sand rootzone. One-gallon samples of candidate materials will be submitted to one of the approved testing laboratories below:

Dr Norm Hummel  
Hummel and Co, Inc  
35 King Street  
Trumansburg, NY 14886  
607-387-5694

Dr Andy McNitt  
Penn State Soil Science  
116 Ag Sci and Ind Bldg  
University Park PA 16802  
814-863-1368

2. The rootzone shall be a clean silica sand meeting the sizing and physical performance criteria below.

USDA Particle	Sieve No.	Size in mm	Max % Retained
Gravel	6	3.35	0
Fine Gravel	10	2.00	3
Very Coarse Sand	18	1.00	10
Coarse Sand	35	0.50	Approx equal portions; 60-80 combined
Medium Sand	60	0.25	
Fine Sand	100	0.15	20
Very Fine Sand	270	0.05	5
Silt		0.002	6
Clay		<0.002	6

Fineness modulus:	1.4 - 2.5	Air-filled porosity:	20% - 30%
Uniformity coefficient:	2.5 - 3.5	Capillary porosity:	15% - 25%
Hydraulic conductivity:	15-25"/hr	Total porosity:	40% - 55%
Bulk density (g/cc):	1.2 - 1.6		

3. Once the rootzone sand has been selected CLC LABS shall test it for nutrient analysis, including macro and micronutrients, pH and organic matter percentage. Nutrient test results shall be submitted and will become the basis for the contractor's pre-plant fertility applications.

### C. Execution

1. Verify that the finished #57 stone delivered by the owner meets elevation and grade tolerances.
2. Place the rootzone sand carefully to avoid disruption of the drainage blanket and irrigation systems. Dump the sand at the mouth of the access tunnel in center field and distribute across the field using laser-actuated LGP dozers. Spread the sand to design elevations; laser level with a small grading box (6' - 8' wide).
3. Once graded, saturate the rootzone to field capacity using the overhead irrigation system. Regrade, drag or rake the sand to exact elevations.
4. Verify finished elevation of the rootzone mix using laser equipment in the presence of the owner. Rootzone shall be +/- 0.04' of design elevation, with no more than 0.025' variance in any 25 linear feet. If the surface is found to be within grade tolerance, the owner will give the contractor written approval to continue. If the surface falls outside of tolerance levels, the contractor will be required to meet tolerances and subsequently have the surface certified by a registered Pennsylvania surveyor on a 25' grid before turf installation can begin.

## IRRIGATION

### A. Summary

1. Install irrigation main, laterals, electric valves, isolation gate valves, swing joints, quick couplers, rotors, valve boxes.
2. Water is available (2" lines) in each of the dugouts. Extend lines through the dugout wall to the field.

### B. Materials and Submittals

1. Mainline pipe larger than 3" shall be PVC pressure pipe Schedule 40, conforming to ASTM D1785 and NSF-pw standards. Main and lateral lines 3" and smaller shall be PVC pressure pipe Class 200 SRD-21, conforming to ASTM D2241 and NSF-pw standards.

All pipe shall be new from the factory and absent cracks, blisters, striations and all other defects. The pipe must be clearly and continuously marked with the manufacturer's name, material/class, pipe size and quality control identifications. Crestline Plastic Pipe Company, or approved equal.

2. Fittings and connections shall be PVC Schedule 40, solvent-welded or threaded, meeting ASTM D1784 and 2466 standards. Christy's "Red Hor" glue and "Purple Primer" or approved equals.
3. All slip fittings shall be primed with deep-etching and slow-acting primer meeting ASTM standard F656 and then joined using solvent cement meeting ASTM standard D2564.
4. Nipples shall be factory threaded PVC Schedule 80, meeting ASTM standards D1784, D2464 and D2467 standards.
5. Irrigation heads shall be rotary gear driven, with stainless steel risers and rubber capped tops. Nozzles shall be installed as site-specific conditions require. Acceptable heads are Hunter I-40/I-20 and PGP with low angle nozzles, or approved equal.
6. Swing joints shall be 1" PVC Schedule 80 factory-fabricated triple joint style. Lasco, or approved equal.
7. Electric valves shall be 2" high pressure plastic globe, with pressure regulation at the valve (Hunter ICV Accu-Set or approved equal), placed in valve boxes set in the warning track and fitted with an isolation valve.

8. Quick coupler valves shall be 2-piece brass construction, spring-loaded rubber cover, 1" threaded inlet and be mounted in a 6" valve box at locations shown on drawings. Hunter "Wing Thing," or approved equal. Supply three each QCV keys and 1" hose swivels.
9. The quick coupler valves shall be housed in 6" valve boxes covered with synthetic turf. The boxes shall be constructed of high-density polyethylene with lids containing UV inhibitors. Carson, Ametek or approved equal.
10. The irrigation controller shall be a commercial hybrid electromechanical unit with add-on modules to provide flexibility in controlling the ultimate number of zones installed. The controller will be a wall-mounted Hunter ICC, in a stainless steel case, or approved equal. Mount controller in owner-approved location. Owner shall provide power to the clock and perform the hook-up.
11. The system shall be operable from a location away from the controller through the use of a remote radio connection. Remote radio controller shall interface with the Hunter ICC controller and allow for operation of multiple irrigation zones simultaneously. Hunter ICR or approved equal.

### C. Execution

1. Extend the water supply line from the bullpen out to the warning track. Trench in the 2" main around the entire field within the warning track. Set electric and isolation valves in boxes per the drawing.
2. Lay the system out prior to assembly of any pipe. Confirm the location of heads and quick coupler valves and adjust to accommodate site requirements. Notify the owner immediately if irrigation system cannot be installed with only slight modifications to the drawings.
3. All lateral lines will be laid into the gravel drainage blanket so the top of the PVC pipe is at the top of the gravel. Set swing joints and cover threaded end with a weep cap to accommodate location of joints following rootzone installation.
4. All plastic pipe shall be laid in accordance with local codes and as recommended by the manufacturer. Pipe shall be cleanly and squarely cut and freed of burrs, shavings and other debris prior to gluing. Pipe surfaces shall be dry and free of soil and primed with the recommended solvent. Glue both surfaces to be joined and when joined rotate the pipe within the socket no more than ¼ turn. Hold pipes together for 15 seconds and then immediately wipe excess glue from exposed surfaces. Do not pressurize pipe for at least 12hrs following assembly.



5. After assembly has set but prior to installation of the rotors, pressurize each zone to full head and flush lines. Locate swing joints within rootzone and attach rotors in accordance with manufacturer's recommendations. Set heads to correct elevations.
6. Install the 2" electric globe valves and 2" isolation gate valves. Connect the valves to the automatic irrigation controller and connect the remote radio unit into the control box. Mount the radio's antenna on an outside wall where it will freely receive signals from the field and be vandal resistant.
7. To be considered substantially complete, the irrigation contractor shall demonstrate to the owner that all heads are set to grade, properly located and equipped with the correct nozzle for full coverage, all valves operate smoothly and without leakage and the remote radio operates all valves and programs from the field.

## NATURAL TURF

### A. Summary

1. The sand based bluegrass sod is being produced on a turf farm. This section relates to the harvest and installation of the turf only.

### B. Materials and Submittals

1. Soil test results on the rootzone sand from a qualified testing laboratory.
2. Written record of pre-plant fertility applications.

### C. Execution

1. Do not lay sod until the owner has accepted the results of the conformance survey of the rootzone by the contractor.
2. Sod will be harvested using a 48" Magnum harvester, cut to a uniform depth of ¼" below the thatch layer. Rolls will be cut to the maximum length possible to allow for safe handling. Sod roll lengths should be a minimum of 60'.
3. Coordinate harvesting and laying to assure that sod is installed in the stadium within 18 hours of being lifted in the field. Sod showing any stage of dehydration shall be rejected.
4. Make all pre-plant fertility applications as outlined by the soil testing laboratory. It is anticipated that the recommendations will include application of dolomitic limestone or gypsum, a composted or biologically inoculated organic fertilizer and a granular micronutrient. Scratch the fertilizer applications into the surface with a drag mat.
5. Lay the first strip of sod in a straight line and all adjacent strips tightly abutting. Lateral joints should be no less than 24" apart. Overlap ends of each roll; cut ends cleanly and abut tightly. Dress/rake the rootzone prior to laying each sod roll to assure a smooth consistent surface.
6. Water newly installed sod as soon as possible to minimize stress.
7. Roll sod lightly following installation to consolidate the sward and where necessary, hand-fill the seams or gaps with rootzone sand.

8. At the conclusion of the rolling and dressing procedures, visually inspect the field with the owner. If the turf installation is acceptable, management of the field shall be turned over to the owner at that time.
9. The contractor shall provide the owner with a turf management consultation package that includes periodic soil, tissue and water testing (through CLC LABS) and telephone consultation for a period of two years following substantial completion.

## INFIELD, BULLPENS, BATTING CAGE AND WARNING TRACK

### A. Summary

1. Install 3oz non-woven geotextile, infield clay and bases, pitcher's mound and pitching rubber and batters' circle and home plate.
2. Install mounds and pitching rubbers in bullpen areas in track.
3. Install cap of new warning track material.

### B. Materials and Submittals

1. The owner has chosen Partac/Beam Clay as the supplier for the infield clay (Beam Clay Baseball Diamond Mix) and natural aggregate for the warning track (3/16<sup>th</sup> Red Argillite c/ 5% Beam Clay binder). The contractor shall supply samples of the respective materials as requested by the owner.
2. Game bases shall be Hollywood™ Pro-Style Jack Corbett; pitcher's rubbers shall be Hollywood™ 4-sided with aluminum insert and game plate shall be Hollywood™ 3" thick buriable rubber, or approved equals for each.

### C. Execution

1. Following sod installation, carefully mark location of all interfaces between the playing field grass and infield skin. Excavate the sand rootzone in the areas to be filled with infield clay to a depth of 4" below finished elevation. Cut all edges cleanly and perpendicular to the surface. Keep rootzone moist to avoid breakdown of the edges. Grade the excavated area to a smooth, consistent finish.
2. Install 3oz non-woven geotextile fabric over the excavation, taking care to have the material lay on the floor and against the sidewalls with a minimum of buckling. Immediately pack a wedge of infield clay material against the sidewalls of the excavation to maintain the integrity of the cut.
3. Cover the infield with diamond mix, working to achieve a uniform compaction level and to avoid distinct layers of compacted material atop one another. Laser grade the infield to design elevations and a tolerance of +/- 0.02'.
4. Spread two tons of Pro's Choice Select Red calcined clay over the skin infield in an even layer. Using a heavy duty nail drag, work the material into the top 1" of diamond mix. Drag, regrade and recompact the infield and assure final grade tolerances are met.

5. Build the pitcher's mound and home plate circle with diamond mix and bring to finished elevation. Excavate the material from the areas to be stabilized with mound clay and fill according to manufacturer's recommendations.
6. Build the bullpen mounds with diamond mix to correct specifications. Excavate the material from the areas to be stabilized with mound clay and fill according to manufacturer's recommendations.
7. Remove the top 3"-4" of existing warning track material and discard. Grade the subgrade track material to slopes shown on the drawings.
8. Install the warning track material over the base track to finished elevation. Laser grade, roll and drag to finish.

