

## **ADDENDUM**

Addendum No. 1 (April 11, 2017)

To

Bid Documents

**TOWN OF DAVIE**

Bamford Park Artificial Turf Installation

Town Bid No. B-17-99

CGA Project No. 96-1630.112

To All Bidders:

Bidders for the above-referenced project shall take note of the following changes, additions, deletions, clarifications, etc. to the Plans and Specifications, which in accordance with the Contract Documents shall become a part of and have precedence over anything shown or described otherwise.

### **IN THE BID SPECIFICATIONS:**

1. Duplication of pdf pages 236 – 336 of the specs have been removed and replaced with the following Technical Specifications:
  - 02100 – Site Preparation
  - 02200 – Earthwork
  - 02205 – Clearing & Grubbing
  - 02210 – Finish Grading
  - 02221 – Trench Bedding Backfill for Pipe
  - 02276 – Stormwater Pollution Prevention Greater than 1 acre
  - 02420 – Soil Preparation and Soil Mixes
  - 02430 – Sodding
  - 02510 – Walkways
  - 02513 – Asphaltic Concrete Paving
  - 02631 – HDPE Drainage Pipe
  - 02632 – Synthetic Turf Grass Drainage System
  - 02830 – Chain Link Fence
  - 02863 – Synthetic Turf Grass System
  
2. Technical Specifications Table of Contents is to be inserted into the bid documents after Section 00900 and before Section 01010.

3. Front End Specifications Table of Contents is to be inserted into the bid documents before document 00010.

All other documents, specifications, drawings, terms and conditions remain the same.  
Bidders must acknowledge receipt of Addendum on Page 00300-8

## TABLE OF CONTENTS

### TECHNICAL SPECIFICATIONS

#### DIVISION 1 - GENERAL REQUIREMENTS

01010	Summary of Work
01012	Measurement and Payment Unit Price
01015	General Requirements
01021	Owner Allowances
01045	Cutting and Patching
01046	Modifications to Existing Structures, Piping and Equipment
01050	Field Engineering and Surveying
01090	References
01152	Applications for Payment
01200	Project Meetings
01310	Construction Schedules
01340	Shop Drawings, Working Drawings and Samples
01370	Schedule of Values
01380	Construction Photographs
01381	Audio/Video Pre-Construction Record
01400	Quality Control
01410	Materials and Installation Testing
01505	Control of Work
01510	Temporary Utilities
01530	Existing Utilities
01531	Protection of Existing Property
01540	Security
01550	Site Access and Storage
01570	Traffic Regulation
01600	Material and Equipment
01610	Manufacturers Field Services
01630	Substitutions
01700	Contract Closeout
01710	Cleaning
01720	Project Record Documents
01730	Operating and Maintenance Data
01740	Warranties and Bonds

## **DIVISION 2 - SITEWORK**

02100	Site Preparation
02200	Earthwork
02205	Clearing & Grubbing
02210	Finish Grading
02221	Trenching, Bedding and Backfill for Pipe
02276	Stormwater Pollution Prevention Greater than 1 acre
02420	Soil Preparation and Soil Mixes
02430	Sodding
02510	Walkways
02513	Asphaltic Concrete paving
02631	HDPE Drainage Pipe
02632	Synthetic Turf Grass Drainage System
02830	Chain Link Fence
02863	Synthetic Turf Grass System

## **APPENDIX A - Geotechnical Report**

## SECTION 02100

### SITE PREPARATION

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Section covers clearing, grubbing, stripping and demucking of the construction site, complete as specified herein.
- B. Clear and demuck the area within the limits of construction as required, including drainage easements.

##### 1.02 RELATED SECTIONS

- A. Section 02221 - Trenching, Bedding & Backfill for Pipe
- B. Section 02510 - Walkways
- C. Section 02513 - Asphaltic Concrete Paving
- D. Other Sections as applicable.

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 - EXECUTION

##### 3.01 CLEARING

- A. The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish and all other objectionable obstructions resting on or protruding through the surface of the ground. However, those trees which are designated by the Engineer shall be preserved as hereinafter specified. Clearing operations shall be conducted so as to prevent damage to existing structures and installations, and to those under construction, so as to provide for the safety of employees and others. Clearing for structures shall consist of topsoil and vegetation removal. Clearing for pipelines shall consist of vegetation removal.

##### 3.02 GRUBBING

- A. Grubbing shall consist of the complete removal of all stumps, roots larger than 1<sup>1</sup>/<sub>2</sub> inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

##### 3.03 STRIPPING

- A. In areas so designated, top soil, not muck shall be stockpiled. Topsoil stockpiled shall be protected until it is placed as specified. Any topsoil remaining after all work is in place shall be disposed of by the Contractor.

3.04 DEMUCKING

- A. When encountered, organic material (muck) shall be excavated and removed. This material may be stockpiled temporarily, but must be disposed of as directed by the Engineer or the Owner.

3.05 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

- A. The Contractor shall dispose of all material and debris from the clearing and grubbing operation by shipping such material and debris and disposing such material to a suitable location as required by the Engineer or the governmental agencies. Disposal by deep burial will not be permitted. The cost of disposal of material (including hauling) shall be considered a subsidiary obligation of the Contractor, the cost of which shall be included in the contract prices.

3.06 PRESERVATION OF TREES

- A. Those trees which are designated by the Engineer or as shown on the drawings for preservation shall be carefully protected from damage. The Contractor shall erect such barricades, guards, and enclosures as may be considered necessary by him for the protection of the trees during all construction operations.

3.07 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

- A. The Contractor shall exercise extreme care to avoid necessary disturbance of developed private property as applicable. Trees, shrubbery, gardens, lawn and other landscaping, which in the opinion of the Engineer must be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.
- B. All soil preparation procedures and replanting operations shall be under the supervision of nurseryman experienced in such operations.
- C. Improvements to the land such as fences, walls, outbuildings, etc., which of necessity must be removed shall be replaced with equal quality materials and workmanship.
- D. The Contractor shall clean up the construction site across developed private property directly after construction is complete upon approval of the Engineer.

3.08 PRESERVATION OF PUBLIC PROPERTY

- A. The appropriate paragraphs of Articles 3.06 and 3.07, of these specifications shall apply to the preservation and restoration of all damaged areas of public lands, rights-of-way, easements, etc.

END OF SECTION

## SECTION 02200

### EARTHWORK

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Earthwork operations necessary to achieve the Work including, but not limited to, excavation of soil, grading, removal and replacement of unsuitable soil, fill, backfill, embankment and compaction more specifically described as follows:
  - 1. Earthwork operations generally consists of excavation and embankment of soil materials from the existing elevations to the proposed elevations.
  - 2. Embankment necessary to achieve the proposed elevations may consist of in situ soils, whether classified as suitable or unsuitable, or imported suitable soil material. All imported soil material for embankment is to be included in the Contract price.
  - 3. Soil material categorized as sub-grade is to be imported suitable soil. The Owner reserves the right to decline imported sub-grade material should in-situ suitable material be encountered and seek a credit for imported, placed and compacted sub-grade per the Unit Price Schedule.
  - 4. Where unsuitable soil materials are encountered under or around sidewalks, pipes, exfiltration trenches or structural elements, the Owner reserves the right to specify removal and replacement of unsuitable soil with imported suitable soil. All imported suitable soil material for placement under of around structural elements is to be paid out of the Owners Contingency.

##### 1.02 RELATED SECTIONS

- A. Section 01410 – Materials and Installation Testing
- B. Section 02100 – Site Preparation
- C. Section 02210 – Clearing and Grubbing
- D. Section 02210 – Finish Grading
- E. Other Sections as applicable.

##### 1.03 REFERENCES

- A. FDOT Standard Specifications for Road and Bridge Construction
- B. FDOT Design Standards

- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- D. AASTHO M-145 - Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.

#### 1.04 PROJECT CONDITIONS

- A. Locate existing underground utilities in areas of work. Provide adequate means of support and protection during earthwork operations.
- B. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
- C. Do not interrupt existing utilities serving occupied facilities.
- D. Use of Explosives: If the use of explosives is necessary for the execution of the Work, and the use of explosives is allowed by local government, the Contractor shall conduct his blasting operations in conformance with these specifications and all applicable state and local codes and regulations.
  - 1. The contractor shall obtain a testing laboratory to perform pre and post blasting surveys of all nearby structures at no cost to the Owner.
- E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

#### PART 2 - PRODUCTS

##### 2.01 SOIL MATERIALS

- A. Satisfactory or Suitable Soil Materials: ASTM D2487 soil classification groups GW, GP, GP-GM and SW.
- B. Unsatisfactory or Unsuitable Soil Materials: ASTM D2487 soil classification groups GM, GC, SW, SM, SC, CL, ML, OL, CH, MH, OH and PT.
- C. Satisfactory and unsatisfactory soil materials for roadway embankment, including pipe trench backfill under roadways, shall meet the requirements as defined in AASHTO M-145 soil classification groups and FDOT index 505.
- D. Satisfactory materials encountered during excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.
- E. Sub-base material:

1. Satisfactory materials may be Select, Structural or Common fill.
- F. Select or Structural Fill or backfill:
1. Select or structural fill material shall be a satisfactory soil material, well graded, consisting of a minimum of 60 percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material. Rock in excess of 2 inches in diameter shall not be permitted.
- G. Common Fill:
1. Common fill material shall be a satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2 inches in diameter.
- H. Course Aggregate:
1. Course aggregate, or gravel, shall be used for rock bedding, drainage rock or as otherwise depicted in the Drawings. Unless otherwise noted, course aggregate shall consist of washed and graded crushed limerock meeting FDOT specification 901, size number 57 or approved equal.
- I. Sand
1. Where specified, sand, clean sand, silica sand or other nomenclature shall refer to silica sand meeting FDOT specification 902-2.
- J. Satisfactory or suitable soil materials shall free of muck, clay, rock or gravel larger than 2-1/2 inches in any dimension, debris, trash, waste, frozen materials, broken concrete, masonry, rubble, vegetable or other similar materials or deleterious matter. Materials of this nature encountered during the excavation which, in the opinion of the Engineer, is not suitable for reuse shall be stockpiled for disposal as unsuitable materials.
- K. Material substitutions may be permitted if accompanied by a geotechnical engineers report substantiating the proposed substitution which is approved by the Engineer and is at no cost to the Owner.

## PART 3 - EXECUTION

### 3.01 EXCAVATION

- A. The contractor shall perform trench excavations in accordance with applicable trench safety standards and is responsible to determine any safety or safety related standards that apply to the Project. The Owner and Engineer are not responsible to review and/or assess safety precautions, programs and costs, and the means, methods, techniques or technique adequacy, reasonableness of cost, sequences and procedures of any safety precaution, including, but not limited to, compliance with any and all requirements of Florida Trench Safety Act.

- B. Excavation is Unclassified, and includes excavation to sub-grade elevations indicated, regardless of character of materials and obstructions encountered.
- C. Unauthorized Excavation: Removal of materials beyond indicated sub-grade elevations or dimensions without specific direction. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.
- D. Additional Excavation:
  - 1. Where unsuitable soil materials are encountered under or around structural elements, the Owner reserves the right to specify removal and replacement of unsuitable soil with imported suitable soil. All imported suitable soil material for placement under or around structural elements is to be paid out of the Owners Contingency.
- E. Stability of Excavations:
  - 1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction.
  - 2. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
  - 3. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- F. Shoring and Bracing:
  - 1. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
  - 2. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
- G. Dewatering:
  - 1. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer.
  - 2. Prevent surface water and sub-surface or ground water from flowing into excavations. Do not allow water to accumulate in excavations.
  - 3. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
  - 4. The Contractor shall obtain all dewatering permits as required from agencies having jurisdiction
- H. Stockpile satisfactory excavated materials where directed, until required for embankment, backfill or fill. Place, grade and shape stockpiles for proper drainage.
- I. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide minimum 6 in. clearance on each side of pipe or conduit.

1. Excavate trenches to depth indicated or required for indicated flow lines and invert elevations.
  2. Where rock is encountered, carry excavation 6 in. below scheduled elevation and backfill with a 6 in. layer of crushed stone or gravel prior to installation of pipe.
  3. For pipes or conduit 5 in. or less, excavate to indicate depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
  4. For pipes or conduit 6 in. or larger, tanks and other work indicated to receive sub-base, excavate to sub-base depth indicated, or, if not otherwise indicated, to 6 in. below bottom of work to be supported.
  5. Except as otherwise indicated, excavate for exterior water-bearing piping so top of piping is minimum 3'-6" below finished grade.
  6. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
- J. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Engineer.

### 3.02 COMPACTION

- A. Areas to be compacted shall be moistened and compacted by either rolling, tamping or any other approved method by the Engineer in order to obtain the desired density.
- B. Hydraulic compaction will require a geotechnical engineers' recommendation, observation and certification at the Contractors expense.
- C. The Contractor shall inspect all compacted areas prior to further construction operations to ensure that satisfactory compaction has been obtained.
- D. All sub-grade shall be compacted as indicated on the Drawings unless otherwise stated in the FDOT Standard Specifications for Road and Bridge Construction
- E. All embankment shall be compacted by proof-rolling to achieve 95% of AASHTO T-99.
- F. All soil beneath structures shall be compacted to 98% of AASHTO T-180.
- G. Hydraulic compaction shall be permitted if accompanied by a geotechnical engineers' report substantiating the proposed methods. The geotechnical engineers report shall be submitted to the Engineer prior to any work and shall be at no cost to the Owner.
- H. The frequency of testing shall be as indicated on the Drawings unless otherwise stated in the FDOT Standard Specifications for Road and Bridge Construction
- I. All earthwork testing shall be at the expense of the Contractor unless otherwise stated in the Contract Documents.

- J. The Contractor shall instruct the testing laboratory to forward copies of all test reports to the Engineer.
- K. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

### 3.03 EMBANKMENT, BACKFILL AND FILL

- A. Place specified soil material in layers required to achieve proposed elevations:
  - 1. Place materials in layers of 8 inches loose depth for material compacted by heavy compaction equipment and 4 in. in loose depth for material compacted by hand operated tampers.
  - 2. Place materials in layers of 12 inches loose depth for material compacted by proof rolling equipment.
  - 3. Under grassed areas, use satisfactory or unsatisfactory excavated or imported soil material if approved by the Engineer.
  - 4. Under walks and pavements, use sub-base material, or satisfactory excavated or borrow material, or combination of both. Place shoulders along edges of sub-base course to prevent lateral movement with satisfactory excavated or borrow material.
  - 5. Under steps, use sub-base material.
  - 6. Under building slabs, use drainage fill material.
  - 7. Under piping and conduit, use sub-base material where sub-base is indicated under piping or conduit; shape to fit bottom 90 degrees of cylinder.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
  - 1. Acceptance of construction below finish grade including waterproofing and perimeter insulation.
  - 2. Inspection, testing, approval, and recording locations of underground utilities.
  - 3. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
- C. Remove all trash, roots, vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
- D. When existing ground surface has a density less than that specified for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

- E. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- F. Place backfill and fill materials evenly adjacent to structures, without wedging against structures or displacement of piping or conduit. Compaction equipment used within 10 ft. of buried walls and soil supported structures shall not exceed 2000 lbs.

### 3.04 GRADING

- A. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding and as follows:
  - 1. Finish to within not more than 0.10 ft. above or below required sub-grade elevations.
  - 2. Walks: Shape surface to line, grade and cross-section, with finish surface not more than 0.10 ft. above or below required sub-grade elevation.
  - 3. Pavements: Shape surface to line, grade and cross-section, with finish surface 1/2 in. above or below required sub-grade elevation.
  - 4. Sod: Where sod abuts pavement, sidewalks, etc., finish surface below as required to accommodate thickness of sod as not to prohibit drainage.
- B. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to 1/2 in. below required elevation.

### 3.05 QUALITY CONTROL

- A. Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Contractor will engage soil testing and inspection service for quality control testing during earthwork operations.
- C. Allow testing service to inspect and approve sub-grades and fill layers before further construction work is performed.
- D. If in opinion of Engineer, based on testing service reports and inspection, sub-grade or fills which have been placed below specified density, provide additional compaction and testing at no additional expense to Owner.

### 3.06 CLEANING AND PROTECTION

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

- C. Remove excess excavated and waste materials, including unacceptable excavated material, trash and debris, and legally dispose of it at no cost to the Owner.

END OF SECTION

## SECTION 02205

### CLEARING AND GRUBBING

#### PART 1 - GENERAL

##### 1.01 DISCRIPTION

- A. This Section includes removal and disposal of all designated trees, palms, brush, stumps, grass, roots, and other such protruding objects.

##### 1.02 RELATED SECTIONS

- A. Section 01410 – Materials and Installation Testing
- B. Section 02100 – Site Preparation
- C. Section 02200 - Earthwork
- D. Section 02210 – Finish Grading
- E. Other Sections as applicable.

#### PART 2 - PRODUCTS - NOT USED

#### PART 3 - EXECUTION

##### 3.01 CLEARING AND GRUBBING

- A. Clearing and Grubbing within areas specified in the Contract Documents or as directed by the Owner's representative included but not limited to the following:
  - 1. Removal and disposal of all designated trees, palms, brush, stumps, grass, roots, and other such protruding objects.
  - 2. Removal and disposal of fencing, existing pavement, and debris not required to remain or to be salvaged that is necessary to prepare the area for the proposed improvements.
  - 3. Removal and disposal of existing irrigation system within the existing two fields that is necessary to prepare the area for the proposed improvements. The existing irrigation system shall be cut and capped at the limits of the improvements shown on the plan.
  - 4. Contractor shall notify all utility companies or utility owners, both public and private of their intent to perform such work and shall coordinate field location of utility lines prior to commencement of construction.

5. Other miscellaneous work considered necessary for the complete preparation of the overall project site is also included under this Section, included, but is not limited to, the following:
  - a. Leveling, harmonization and restoration of terrain outside the limits of construction for purposes of facilitating maintenance, proper grading and other post-construction operations.
  - b. Trimming of certain trees and shrubs within project limits for utilization in subsequent landscaping of the project.
- B. Unless otherwise shown in the Drawings or Contract Documents, Clearing and Grubbing shall be done within the following areas:
  1. In all athletic field areas.
  2. All areas where any type of excavation is to be done.
  3. All areas where any type of filling and embankment will be constructed.
  4. All areas where any type of pavement will be constructed.
  5. Other areas designated in the Plans or by the Specifications.
  6. No clear and grubbing shall take place beyond the wetland delineation line established by the Engineer and the Broward County Environmental Division.
- C. Depths of Removal
  1. In the areas listed below all roots and other debris shall be removed to a depth of at least one foot below ground surface. The surface shall then be plowed to a depth of at least six inches and all roots exposed shall be removed to a depth of at least one foot. All stumps including subsurface roots shall be completely removed to the satisfaction of the Landscape Architect.
- D. Trees to Remain: As an exception to the above provisions, where so directed by the Existing Tree Disposition Plan, the Landscape Architect or Engineer, desirable trees within the clearing limits shall be protected and left standing. No equipment shall stand, stop, or travel across or inside the drip line of any trees or vegetation designated to be saved or protected.
- E. Boulders: Any rocks or boulders greater than two (2) inches in diameter laying on the top of the existing surface or otherwise encountered during the Clearing and Grubbing shall be removed and disposed of by the Contractor. No boulders or rock shall be left or placed on-site.

### 3.02 SELECTIVE CLEARING AND GRUBBING

- A. Selective Clearing and Grubbing shall consist of removing and disposing of all vegetation, obstructions, etc. as provided above except that in non-structural areas

where the Contractor so elects, roots may be cut off flush with the ground surface. Stumps shall be completely removed. Undergrowth shall be completely removed except in areas designated by the Landscape Architect for aesthetic purposes.

- B. Desirable trees, that are designated by the Landscape Architect to remain, shall be protected and trimmed in such a way to avoid damage to limbs during construction. All pruning of trees and palms shall be performed by, or under the direct supervision of, a certified arborist.

### 3.03 ERADICATION OF EXOTIC VEGETATION

- A. N/A

### 3.04 REMOVAL OF EXISTING STRUCTURES

- A. Work specified in this Article shall include removal and disposal of existing sidewalks, footers, pipes, and structures of whatever type as specifically shown in the plans to be removed or as otherwise specified for removal in the Contract Documents. Also included are structures of whatever type or portions thereof which are encountered during construction operations. Where partial removal of a structure is approved by the Engineer, or Landscape Architect, the portion of the existing structure to remain shall be backfilled, plugged, or filled in such a way that will prevent the settlement, movement, erosion or collapse of the adjacent soils.

### 3.05 DISPOSAL OF MATERIALS

- A. All materials from Clearing and Grubbing operations shall be legally disposed of off-site as determined by the Contractor.
- B. All disposal costs shall be included in the Bid.

### 3.06 OWNERSHIP OF MATERIALS

- A. Except as may be otherwise stated in the Contract Documents, or directed by the Owner's Representative, all buildings, structures, appurtenances and other materials removed by the Contractor shall become the property of the Contractor, to be disposed of in areas provided by him.

### 3.07 MEASUREMENT AND PAYMENT

- A. Unless stated otherwise, the cost of Clearing and Grubbing shall be incidental to the cost of construction.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

## SECTION 02210

### FINISH GRADING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Provide all labor, materials, necessary equipment or services to complete the Finish Grading work, as indicated on the Contract Documents.

##### 1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork
- B. Section 02420 – Soil Preparation and Soil Mixes
- C. Section 02430 – Sodding
- D. Other Sections as applicable.

##### 1.03 SITE INSPECTION

- A. The Contractor shall visit the site and acquaint himself with all existing conditions. The Contractor shall be responsible for his own subsurface investigations, as necessary, to satisfy requirements of this Section. All subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Engineer or Owner's Representative.

##### 1.04 EXISTING CONTOURS

- A. The existing elevations shown on the drawings are approximate only. The contractor is responsible for grading to meet existing elevations as required.
- B. The contours and elevations established under contract will be the finished grades shown. The Contractor under this Contract shall perform the work for construction using the finished grades previously established and making whatever corrections and/or repairs to grades to make them consistent with the requirements of the drawings and specifications.

##### 1.05 UTILITIES

- A. Before starting site operations verify that the earlier contractors have disconnected all temporary utilities which might interfere with the fine grading work.
- B. Locate all existing, active utility lines traversing the site and determine the requirements for their protection. Preserve in operating condition all active utilities adjacent to or transversing the site that are designated to remain.

- C. Observe rules and regulations governing respective utilities in working under requirements of this section. Adequately protect utilities from damage, remove or relocate as indicated, specified or required. Remove, plug or cap inactive or abandoned utilities encountered in excavation. Record location of active utilities.

#### 1.06 QUALITY ASSURANCE

- A. Requirements of all applicable building codes and other public agencies having jurisdiction upon the work.
- B. Primary emphasis should be given to the aesthetic appearance and functioning of berming and swales, as directed by the Engineer or Owner's Representative. The Contractor shall employ skilled personnel and any necessary equipment to ensure that finish grading is smooth, aesthetically pleasing, drains well, and is ideal for receiving sod and plant materials.
- C. As-build survey drawings of all finished grading are to be submitted to the Engineer for review prior to landscape installation or agency certifications.

#### PART 2 - MATERIALS

##### 2.01 TOP SOIL

- A. Refer to Related Sections for material specifications.
- B. In areas to receive turf, rough grade shall be a minimum of 2 inches below finished grades.
- C. Rough grade fill is to be fine, compacted, satisfactory fill material, with no rocks larger than 2-inches.
- D. Both surface and subsurface, both before and after fill operations, shall be checked to confirm that percolation/compaction levels meet the needs of the proposed planting for that area.

#### PART 3 - EXECUTION

##### 3.01 EXCAVATION

- A. Excavate where necessary to obtain subgrades, percolation, and surface drainage as required.
- B. All unsatisfactory soil materials are to be removed and replaced with satisfactory soil materials.
- C. Remove entirely any existing obstructions after approval by the Engineer's or Owner's Representative.
- D. Remove from site and dispose of debris and excavated material not required.

### 3.02 GRADING

- A. The Contractor shall establish finished grades as shown on the Engineers grading plans, and as directed by Engineer and/or Owner's Representative, including areas where the existing grade has been disturbed by other work.
- B. Finished grading shall be smooth, aesthetically pleasing, drain well and ready to receive sod and other plant material to full satisfaction of Engineer and Owner's Representative.
- C. Finish grading accuracy is to be within 1/10 foot of specified elevations.
- D. Finish grading is to be performed using hand raking throughout and shall remove all objectionable material and rocks greater than 1 inch in diameter.
- E. A finish grading inspection is required prior to sod placement.

### 3.03 COMPACTION

- A. Compact each layer of fill in designated areas with approved equipment in accordance with Section 02200.
  - 1. In landscaped areas, compaction shall not exceed 85% of maximum density and no less than 75%.
  - 2. In landscaped areas which are sloped at 1:4 or steeper, compaction shall not exceed 90% of maximum density and no less than 85%.
- B. No backfill shall be placed against any masonry or other exposed building surface until permission has been given by the Owner's Representative, and in no case until the masonry has been in place seven days.
- C. Compaction in limited areas shall be obtained by the use of mechanical tampers or approved hand tampers. When hand tampers are used, the materials shall be deposited in layers not more than four inches thick. The hand tampers used shall be suitable for this purpose and shall have a face area of not more than 100 square inches. Special precautions shall be taken to prevent any wedging action against masonry, or other exposed building surfaces.

### 3.04 CORRECTION OF GRADE

- A. Bring to required grade levels areas where settlement, erosion, or other grade changes occur. Adjust grades as required to carry drainage away from buildings and to prevent ponding around the buildings and on pavements.
- B. All soil surfaces shall have sufficient percolation and surface drainage to support grasses and plant material.
- C. Contractor shall be responsible for stabilizing grades by approved methods prior to landscaping, and shall be responsible for correction of grades as mentioned above, and cleanup of any wash outs or erosion.

END OF SECTION

## SECTION 02221

### TRENCHING, BEDDING, AND BACKFILL FOR PIPE

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Furnish labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, fill, grading, and slope protection required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to, manholes, vaults, duct conduit, pipe, roadways, paving, bedding, backfilling, fill, required borrow; grading, disposal of surplus and unsuitable materials, and all related work such as sheeting, bracing, and dewatering

##### 1.02 RELATED SECTIONS

- A. Section 01340: Shop Drawings, Working Drawings and Samples
- B. Section 02100: Site Preparation
- C. Section 02200 - Earthwork
- D. Other Sections as applicable.

##### 1.03 REFERENCES

- A. FDOT Standard Specifications for Road and Bridge Construction
- B. FDOT Design Standards
- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D. AASTHO M-145 - Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

##### 1.04 JOB CONDITIONS

- A. The Contractor shall examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the available test borings were made.
- B. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
  - 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the Owner of such piping or utility immediately for directions.
  - 2. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
  - 3. Demolish and completely remove from site existing underground utilities indicated on the drawings to be removed.

- C. Protection of Persons and Property: Contractor shall barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
  - 1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

#### 1.05 SUBMITTALS

- A. The Contractor shall furnish the Engineer, for approval, a certificate of origin and compliance with specifications for any fill material obtained from off-site sources.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Satisfactory Soil Materials: ASTM D2487 soil classification groups GW, GP, SW, and SP.
- B. Unsatisfactory Soil Materials: ASTM D2487 soil classification groups GM, GC, SM, SC, CL, ML, OL, CH, MH, OH and PT.
- C. Satisfactory and unsatisfactory soil materials for roadway embankment, including pipe trench backfill under roadways, shall meet the requirements as defined in AASHTO M-145 soil classification groups and FDOT index 505.
- D. Satisfactory materials encountered during excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for legal disposal at the cost of the Contractor as unsuitable materials.
- E. Sub-base material:
  - 1. Refer to roadway section and/or specifications.
- F. Select or Structural Fill or backfill:
  - 1. Select or structural fill material shall be a satisfactory soil material, well graded, consisting of a minimum of 60 percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material. Rock in excess of 1 inches in diameter shall not be permitted.
- G. Common Fill:
  - 1. Common fill material shall be a satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2 inches in diameter.
- H. Course Aggregate:
  - 1. Course aggregate, or gravel, shall be used for rock bedding, drainage rock or as otherwise depicted in the Drawings. Unless otherwise noted, course aggregate shall consist of washed and graded crushed limerock meeting FDOT specification 901, size number 57 or approved equal.

- I. Sand:
  - 1. Where specified, sand, clean sand, silica sand or other nomenclature shall refer to silica sand meeting FDOT specification 902-2.
- J. Satisfactory soil materials shall free of muck, clay, rock or gravel larger than 2-1/2 inches in any dimension, debris, trash, waste, frozen materials, broken concrete, masonry, rubble, vegetable or other similar materials or deleterious matter. Materials of this nature encountered during the excavation which, in the opinion of the Engineer, is not suitable for reuse shall be stockpiled for disposal as unsuitable materials.
- K. Material substitutions may be permitted if accompanied by a geotechnical engineers report substantiating the proposed substitution which is approved by the Engineer and is at no cost to the Owner.

### PART 3 - EXECUTION

#### 3.01 GENERAL

- A. All excavation, backfill and grading necessary to complete the work shall be made by the Contractor and the cost thereof shall be included in the Contract price.
- B. Material shall be furnished as required from off-site sources and hauled to site.
- C. The Contractor shall take all necessary precautions to maintain the work area in a safe and workable condition.
- D. The Contractor shall protect his work at all times by flagging, marking, lighting and barricading. It shall also be the Contractor's responsibility to preserve and protect all above and underground structures, pipe lines, conduits, cables, drains, or utilities which are existing at the time he encounters them. Failure of the Drawings to show the existence of these obstructions shall not relieve the Contractor from this responsibility. The cost of repair of damage which occurs to these obstructions during or as a result of construction shall be borne by the Contractor without additional cost to the Owners.

#### 3.02 DEWATERING

- A. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer.
- B. Prevent surface water and sub-surface or ground water from flowing into excavations. Do not allow water to accumulate in excavations.
- C. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- D. The Contractor shall obtain all dewatering permits as required from agencies having jurisdiction

#### 3.03 TRENCH EXCAVATION

- A. Excavation for all trenches required for the installation of pipes shall be made to the depths indicated on the Drawings. Excavate trench to provide minimum of 30-inch clear cover over the pipe bell unless otherwise noted on the Drawings. Excavate in

such manner and to such widths as will give suitable room for laying the pipe within the trenches, for bracing and supporting and for pumping and drainage facilities. The trench width at the top of the pipe shall not exceed the allowable as determined by the depth of cut and indicated on the Drawings.

- B. Rock shall be removed to a minimum 8-inches clearance around the bottom and sides of all the pipe or ducts being laid.
- C. Where pipe is to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench remains undisturbed.
- D. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery. The last of the material being excavated shall be done manually in such a manner that will give a flat bottom true to grade so that pipe can evenly and uniformly supported along its entire length on undisturbed material or bedding rock. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barrel only.
- E. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer. Excavate any organic soil material from the bottom of the trench and replace with rock bedding, at least 6 inches thick.

#### 3.04 TRENCH PROTECTION

- A. The contractor shall perform trench excavations in accordance with applicable trench safety standards and is responsible to determine any safety or safety related standards that apply to the Project. The Owner and Engineer are not responsible to review and/or assess safety precautions, programs and costs, and the means, methods, techniques or technique adequacy, reasonableness of cost, sequences and procedures of any safety precaution, including, but not limited to, compliance with any and all requirements of Florida Trench Safety Act.
- B. The Contractor shall construct and maintain sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing piping, and foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids form, they shall be immediately filled and compacted.
- C. For pipe trench sheeting, no sheeting is to be withdrawn if driven below mid-diameter of any pipe, and no wood sheeting shall be cut off at a level lower than 1 foot above the top of any pipe unless otherwise directed by the Engineer. If during the progress of the work the Engineer decides that additional wood sheeting should be left in place, he may direct the Contractor in writing. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the Engineer for an alternate method of removal.
- D. All sheeting and bracing not left in place, shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. All voids left or caused by withdrawal of sheeting shall immediately be refilled with sand or rammed with tools especially adapted to that purpose, by watering or otherwise as may be directed.

- E. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

### 3.05 PIPE INTERFERENCES AND ENCASEMENT

- A. The contractor shall abide by the following schedule of criteria concerning interferences with other utilities.
  - 1. In no case shall there be less than 0.5 feet between any two pipe lines and structures.
  - 2. Class I Concrete Encasement: Wherever there is more than 0.5 foot, but not less than 1.5 foot clearance between water mains or water services, then a concrete encasement shall be provided in accordance with the typical detail as shown on the Drawings.
  - 3. Class II Concrete Encasement: Wherever there is more than 0.5 foot, but less than 1.0 foot clearance between any two pipe lines, or between pipe lines and structures, then a concrete encasement shall be provided in accordance with the typical detail as shown on the Drawings.
- B. The Engineer shall have full authority to direct the placement of the various pipes and structures in order to facilitate construction, expedite completion and to avoid conflicts.

### 3.06 BACKFILLING

- A. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Engineer.
- B. Perform backfill in lifts and compact as specified in the Drawings.
- C. Backfilling over pipes shall begin as soon as practical after the pipe has been laid, jointed, and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.
- D. Backfilling over ducts shall begin not less than three days after placing concrete encasement.
- E. All backfilling shall be prosecuted expeditiously as detailed on the Drawings.
- F. Any space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of pipe.
- G. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.
- H. The Contractor shall take all precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.
- I. In areas where unsuitable soil is discovered in the pipe bedding, the unsuitable soil shall be removed and stockpiled for disposal by the contractor. Suitable soils shall

be substituted at a depth as directed by the Engineer. If gravel is required by the Engineer as suitable bedding, the gravel shall be wrapped in filter fabric prior to backfill operations.

- J. Gravel bedding shall not be used under any circumstances as a drain for ground water.
- K. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least 1 foot above the bottom of the pipes:
  - 1. Place structural fill in such areas for a distance of not less than 3 feet either side of the centerline of the pipe in level layers not exceeding 6-inches in depth.
  - 2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper to the satisfaction of the Engineer.

### 3.07 COMPACTION

- A. Perform compaction and compaction tests as specified in the Drawings.
- B. Hydraulic compaction shall be permitted if accompanied by a geotechnical engineers report substantiating the proposed methods. The geotechnical engineers report shall be submitted to the Engineer prior to any work and shall be at no cost to the Owner.

### 3.08 GRADING

- A. Grading shall be performed at such places as are indicated on the Drawings, to the lines, grades and elevations shown or as directed by the Engineer and shall be made in such manner that the requirements for formation of embankments can be followed. All unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as directed. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution or condition of the work.
- B. If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extras will be considered for the stockpiling or double handling of excavated material.
- C. The right is reserved to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies on the Drawings or in order to obtain satisfactory construction.
- D. Stones or rock fragments larger than 2 1/2 inches in their greatest dimensions will not be permitted in the top 6 inches of the subgrade line of all fills or embankments.
- E. All fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings, or as directed by the Engineer.
- F. In cut, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings or as specified by the Engineer.

- G. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines which must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and drains plugged at manholes.
- H. The Contractor shall replace all pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein or as shown on the Drawings.

### 3.09 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

- A. All surplus and unsuitable excavated material shall be disposed of at the Contractor's cost in one of the following ways as directed by the Engineer.
  - 1. Transport to soil storage area on Owner's property and stockpile or spread as directed by the Engineer.
  - 2. Transport from Owner's property and legally dispose of. Any permit required for the hauling and disposing of this material beyond Owner's property shall be obtained prior to commencing hauling operations. Copies of all required permits shall be provided to the Engineer.
- B. Suitable excavated material may be used for fill if it meets the specifications for common fill and is approved by the Engineer. Excavated material so approved may be neatly stockpiled at the site where designated by the Engineer provided there is an area available where it will not interfere with the operation of the facility nor inconvenience traffic or adjoining property owners.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

## SECTION 02276

### STORMWATER POLLUTION PREVENTION

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Implementation of the Stormwater Pollution Prevention Plan as depicted in the Drawings, as required by law and specified herein.
- B. Permitting as required through the Florida Department of Environmental Protection (FDEP) - Florida's National Pollutant Discharge Elimination System (NPDES) program for construction activities.
- C. Designing, providing, maintaining, and removing temporary erosion and sedimentation controls and/or Best Management Practices as necessary.
- D. Temporary erosion controls may include, but are not limited to, mulching, netting, and watering, on site surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations that will ensure erosion during construction will be either eliminated or maintained within acceptable limits as established by the Owner.
- E. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, booms/curtains, and appurtenances at the foot of sloped surfaces and other areas that will ensure sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Owner.

##### 1.01 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01015 - General Requirements
- C. Other Sections as applicable.

##### 1.02 REQUIRMENTS

- A. Obtain a Generic Permit for Stormwater Discharge from Large and Small Construction Activities (CGP). From the Florida Department of Environmental Protection (FDEP) for all construction disturbances in size greater than one (1) acre.
  - 1. Disturbance includes clearing, grading and excavating.

2. Projects which disturb less than one (1) acre will not require a CGP but will require the appropriate Best Management Practices and directed by the Owner, Engineer or governing authorities.
- B. Implement and maintain a Stormwater Pollution Prevention Plan (SWPPP).
    1. The SWPPP found in the Drawings is pictorial in nature, is provide to depict the general layout of SWPPP elements and is not intended to depict all the possible requirements.
    2. The Contractor is the entity that owns and operates the project and has authority to ensure compliance and is therefore considered the "Operator".
    3. Neither the Owner nor the Engineer are responsible to specify, implement or maintain the SWPPP plan.
  - C. Submit a CGP Notice of Intent (NOI) and the commencement of Construction.
  - D. Submit reporting forms throughout the duration of Construction.
  - E. Submit a CGP Notice of Termination (NOT) to discontinue permit coverage. An NOT may be submitted only when the site meets the eligibility requirements for termination specified in the CGP.
  - F. For additional information on the NPDES Stormwater Program including all regulations and forms cited in the brochure visit: [www.dep.state.fl.us/water/stormwater/npdes/](http://www.dep.state.fl.us/water/stormwater/npdes/).

## PART 2 - PRODUCTS

### 2.01 EROSION CONTROL

- A. Mulch: FDOT type per Section 981-3.2, Green Mulch
- B. Netting: Fabricated of material acceptable to the Owner.
- C. Other means as necessary and approved by FDEP and the Owner.

### 2.02 SEDIMENTATION CONTROL

- A. Bales: Clean, seed free cereal hay type
- B. Netting: Fabricated of material acceptable to the Owner
- C. Filter stone: Crushed stone conforming to Florida Department of Transportation specifications.
- D. Other means as necessary and approved by FDEP and the Owner.

## PART 3 - EXECUTION

### 3.01 EROSION CONTROL

- A. Minimum procedures for mulching and netting are:
  - 1. Apply mulch loosely to a thickness of between 3/4 inch and 1 1/2 inches.
  - 2. Apply netting over mulched areas on sloped surfaces.

### 3.02 SEDIMENTATION CONTROL

- A. Install and maintain silt dams, traps and barriers, and booms/curtains as shown on the approved schedule. Hay bales and fabric that deteriorates and filter stone that becomes dislodged shall be replaced as required.

### 3.03 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results that comply with the requirements of the Owner, Contractor shall immediately take any and all necessary steps to correct the deficiency at his own expense.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

## SECTION 02420

### SOIL PREPARATION AND SOIL MIXES

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Provide all labor, materials, necessary equipment and services to complete the soil preparation and soil mixes work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".
- B. Including, but not limited to:
  - 1. Topsoil
  - 2. Soil Conditioners
  - 3. Planting Soil Mixes

##### 1.02 RELATED WORK

- A. Section 02430 – Sodding
- B. Other Sections as applicable.

##### 1.03 QUALITY ASSURANCE

- A. Testing Agency: Approved Independent testing laboratory utilizing EPA, ASTM, USGS methods.
- B. Requirements or Regulatory Agencies: Conform to requirements of all Municipal, County and State agencies.
- C. Reference standards.

##### 1.04 SUBMITTALS:

- A. Certificates:
  - 1. The Contractor must submit certificates from suppliers stating that the planting/topsoil mix, turfgrass sod and other landscape material used comply with requirements specified.
  - 2. Manufacturer's certificate of fertilizer's chemical composition including but not limited to percentage and derivation of nitrogen, phosphorus, potassium, and micronutrients.
  - 3. Testing laboratory certification that content of soil conditioners meet specification requirements.

1.05 JOB CONDITIONS

- A. Contractor shall become familiar with the site and the required work to complete this section in accordance with the drawings and what is specified herein.
- B. Responsibility for finish grading shall occur under a separate contract. Any changes, modifications, or disturbances to the finish grading shall be corrected by the responsible contractor.
- C. PROTECTION: Protect and avoid any damage whatsoever to existing walks, pavement, curbs, utilities, plant material, and any other existing work.

PART 2 - PRODUCTS

2.01 TOP SOIL

- A. Topsoil shall be an 80-20 mix, 80% fresh water sand (medium to coarse grade) and 20% inland glades muck thoroughly mixed with a commercial shredder/blender or equivalent. It shall be suitable for ornamental plant growth and free from hard clods, stiff clay, hardpan, gravel, subsoil, brush, large roots, weeds, refuse or other deleterious material, and of reasonably uniform quality. No site mixing will be acceptable.
- B. Mechanical analysis: Topsoil and soil mixture(s) shall meet these specifications and the following mechanical analysis, and shall be proportioned by volume rather than by weight.

Sieve Size	% Passing By Dry Weight
1 inch	99-100
1/4 inch	97-99
No. 100	40-60

Materials larger than one-half inch shall be disposed of off the site or as directed by the architect. Existing leaf litter and plant material shall be excluded from topsoil and soil mix.

- C. Maximum Soluble Salts: 300 ppm.
- D. Sterilize topsoil to be used in soil mixture(s) to make free of all viable nut grass, and other undesirable weed seeds.
- E. A sample of the sand and a sample of the 80-20 sand and muck mixture shall be submitted to the Owner for approval prior to installation.
- F. The Landscape Architect has the right to reject topsoil utilized at anytime during the execution of work that does not meet specifications. Topsoil and planting soil

will be tested at Owners request for suitability of horticultural use.

## 2.02 SOIL CONDITIONERS

- A. Dolomitic Limestone: Approved product, designated for agriculture use.
- B. Aluminum Sulfate: Manufacturer's standard commercial grade.
- C. Florida Peat: Suitable for plant growth, capable of sustaining vigorous plant growth, and specifically pulverized for agricultural use. Florida peat shall be free of deleterious materials that would be harmful to plant growth, shall be free of nematodes, shall be of uniform quality, and shall have a pH value between 5.5 and 6.5 (as determined in accordance with ASTM E70). Florida peat shall be sterilized to make free of all viable nut grass and other undesirable weeds.
- D. Pesticides: As recommended by applicable Agricultural Public Agencies.
- E. Herbicides: As recommended by applicable Agricultural Public Agencies.
- F. Soil Fumigants: As recommended by applicable Agricultural Public Agencies.
- G. Fertilizer:
  - 1. Specified commercial grade fertilizer to comply with State of Florida Fertilizer laws. Chemical designation shall be as specified with at least 50% of the nitrogen derived from a non-water soluble organic source and all potash to be derived from sulfate forms for all plantings excluding sod and plantings on the lake edges.  

Chemical designation shall be as specified with at least 80% of the nitrogen derived from a non-water-soluble organic source and all potash to be derived from sulfate forms for all sod and plantings on lake edges.

The following minor elements shall be included:

2.2% ZnO	0.25% CuO
4.0% MgO	0.005% Fe2O3
0.5% MnO	0.1% B2O3
  - a. Federal Specifications O-F0241 Type 1, Grade A or B.
  - b. The chemical designation for granular fertilizer for all plantings shall be 12-8-8.
- H. Water: Free of substances harmful to growth of plants. Water shall also be free of staining agents as well as elements causing odors.
- I. Soil Sterilizers: As recommended by State and Local Agriculture agencies.
- J. Sand: Clean, white, coarse-grained builders sand, free of substances harmful to growth of plants.

- K. Supply complete information on all analysis/test methodologies and results; laboratory certifications, manufacturer's specifications, and agency approvals to Landscape Architect prior to placement of soil conditioners. Landscape contractor shall make all modifications and improvements to soil and soil mixes deemed necessary by Landscape Architect to meet requirements herein, and to ensure proper growing medium for all plant material without cost to Owner, prior to planting.

### 2.03 PLANTING SOIL MIXES

- A. Planting soil shall be an evenly blended mixture of 80% sand/20% muck, (with any other soil conditions per Testing Agency recommendations) specified to each cubic yard of soil and thoroughly mix. Mix shall be suitable for plant growth and free from hard clods, stiff clay, hardpan, gravel, brush, large roots, nematodes, weeds, refuse, or other deleterious material, and of reasonably uniform quality.
- B. Palms: Planting soil mixture to be placed as backfill around the root balls of all Palms shall consist of a mixture as specified above.  
  
Note: Bottom 1/4 of planting pit shall be backfilled with clean, coarse-grained builder's sand.
- C. Trees, Shrubs, and Groundcovers: Planting soil mixture to be placed as backfill around the root balls of all trees, shrubs, and groundcovers shall consist of a mixture of 80% sand and 20% muck.
- D. Sterilize planting soil mixtures to make free of all viable nut grass, and other undesirable weed seeds.
- E. All planting soil mixes shall be thoroughly blended to form a uniform planting medium suitable for exceptional plant growth.
- F. Test PH of existing soil and planting soil mixtures by method acceptable to current industry standards. If pH is not between 6.0 and 7.0, add approved soil conditioner/additive to bring PH within that range.
- G. Supply complete information on all analysis/test methodologies and results; laboratory certifications, manufacturer's specifications, and agency approvals and recommendations shall be made by the testing agency as to the type and quantity of soil additives required to bring the nutrient and pH to an acceptable or optimum range for planting to Landscape Architect prior to placement of soil mixtures. In addition, provide Landscape Architect with thoroughly mixed sample of all soil mixes for approval prior to placement (note PH ranges). Landscape Contractor shall make all modification and improvement to soil mixes deemed necessary by Landscape Architect to meet requirements herein, and to ensure proper growing medium for all plant material without cost to Owner, prior to planting.

## PART 3 - EXECUTION

### 3.01 INSPECTIONS

- A. Examine areas to receive soil preparation to assure work of other trades has been completed.
- B. Verify that plants to remain undisturbed have been clearly identified and protected from injury during construction. If not, identify and protect plants to remain according to procedures set forth in Section 02490 - Trees, Plants and Groundcover. Refer to Protective Fencing on plans.
- C. Remove all construction materials and debris from all areas to be landscaped, without additional expense to Owner, prior to subsoil preparation.
- D. Do not proceed with soil preparation until all unsatisfactory conditions are corrected.

### 3.02 SITE PREPARATION

- A. General: Within the entire area to be landscaped as shown on the drawings, the contractor shall complete the following site topsoil preparation items to eradicate all existing weed and/or natural groundcover. Initiate site topsoil preparation as stated herein and coordinate all work with the existing underground sprinkler system and electrical lines.
- B. Post Emergence Herbicide: Apply "Roundup" as manufactured by Monsanto Corp. according to manufacturer's recommended rate and specification within the limits of all areas to be landscaped not specified as existing, to be relocated, or to be removed. Protect existing plants from overspray.
- C. Pre-Emergence Herbicide: Apply "Ron-Star" or approved equal to all areas to be landscaped according to the manufacturer's recommended rate and specification. Contractor shall be responsible to re-apply appropriate herbicide to eradicate all remaining weeds and maintain a weed-free condition in all areas throughout all landscape planting operations.

### 3.03 PERFORMANCE

- A. Subsoil: Remove all debris, gravel, rocks and other deleterious material, within 12 inches of surface in areas to receive topsoil mixture, from the project site. Fine grade subsoil to assure finish grades are achieved by adding the specified depth of topsoil/planting mixture.
- B. Soil mixtures:
  - 1. Remove rocks and other objects
  - 2. Smooth soil mixtures to two 2 inches below top of surrounding paving, wherever planting beds abut paved surfaces.

3. Do not compact planting soil mixture, but do wet-soak planting areas to assure proper settlement. Replace topsoil/planting soil mixture to specified grade after watering, where necessary.
4. Smooth topsoil to two inches (2") below finish grade in areas to be sodded. Remove plant material not indicated as existing or be relocated in order to adhere to sod lines.
5. Prior to installing planting soil, test tree pits and planting areas for percolation. If areas do not drain, it is the contractor's responsibility to assure percolation by approved means.
6. Remove limerock or soil cement in tree planter islands within paved parking areas at the depth specified on the plans. Do not damage sub-base material for paved surfaces. Assure percolation and then backfill with approved planting soil mix.

#### 3.04 CLEAN-UP

- A. Immediately clean up spills, soil and conditioners on paved and finished surface areas.
- B. Remove debris and excess materials from project site immediately.

END OF SECTION

## SECTION 02430

### SODDING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Provide all labor, materials, necessary equipment and services to complete the turfgrass Sodding work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".

##### 1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork
- B. Section 02210 - Finish Grading
- C. Section 02420 - Soil Preparation and Soil Mixes
- D. Other Sections as applicable.

##### 1.03 QUALITY ASSURANCE

- A. Standards: Federal Specifications (FS) 0-F-241c (1), Fertilizers, Mixed, Commercial.
- B. Requirements or Regulatory Agencies: Conform to the requirements of the State Department of Agriculture.

##### 1.04 SUBMITTALS

- A. Growers Certifications:
  - 1. Turfgrass Sod species and location of field from which turfgrass sod is cut.
  - 2. Compliance with state and federal quarantine restrictions. Manufacturer's certification of fertilizer and herbicide composition.
  - 3. All Contractors' licenses and or certifications for the uses and or application of herbicides, pesticides and fertilizers per the State, County and governing municipality.

##### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver turfgrass sod on pallets.
- B. Protect root system from exposure to wind or sun.
- C. Protect turfgrass sod against dehydration, contamination, and heating during transportation and delivery. Such protection shall encompass the entire period during which the turfgrass sod is in transit, being handled, or in temporary storage. Evidence of inadequate protection against drying out shall be cause for rejection.
- D. Do not deliver more turfgrass sod than can be installed within 24 hours.
- E. Keep stored turfgrass sod moist and under shade, or covered with moistened burlap.
- F. Do not break, tear, stretch, or drop turfgrass sod. The Landscape Architect may reject sod that has been damaged by poor handling.

- G. Unless otherwise authorized by Landscape Architect, the Contractor shall notify the Landscape Architect at least 48 hours in advance of anticipated delivery date of the turfgrass sod. A legible copy of the invoice showing species and variety of the turfgrass sod included for each shipment shall be submitted to the Landscape Architect for approval.

#### 1.06 JOB CONDITIONS

- A. Begin installation of turfgrass sod after preceding related work is accepted.
- B. Environmental Requirements:
  - 1. Install turfgrass sod during months acceptable to the Landscape Architect.
  - 2. Do not install turfgrass sod on saturated soil.
- C. Protection: Erect signs and barriers against vehicular traffic on areas prepared for sod

#### 1.07 GUARANTEE

- A. Guarantee turfgrass sod for period of twelve months after date of Final Approval.
- B. Replacement turfgrass sod under this guarantee shall be guaranteed for twelve months from the date of installation.
- C. Repair damage to other plants during turfgrass sod replacement at no cost to the Owner.

### PART 2 - PRODUCTS

#### 2.01 TURFGRASS SOD

- A. Turfgrass Sod Species: Refer to species indicated on approved landscape plans.
  - 1. Turfgrass Producers International Grade: Premium Grade Turfgrass Sod.
- B. All turfgrass sod shall conform to the following requirements:
  - 1. Furnish in pads that are not stretched, broken, or torn.
    - a. Turfgrass Sod pads shall be 18x24 inches in size (plus or minus 5%) with a 1-1/2 inch thickness (excluding top growth and thatch). Broken and torn or uneven ends will not be accepted.
  - 2. Uniformly mowed height when harvested:
    - a. Turfgrass Sod - 2 inches in height.
  - 3. Thatch: Maximum 1/2 inch uncompressed.
  - 4. Inspected and found free of diseases, nematodes, pests, and pest larvae, by entomologist of State of Florida Department of Agriculture.
  - 5. Weeds:
    - a. Free of horse grass, nut grass or other objectionable weeds or weed seeds.
  - 6. Uniform in green color, leaf texture, and density.

## 2.02 WATER

- A. Free of substances harmful to plant growth, objectionable odor or staining agents.

## 2.03 FERTILIZER

- A. FS 0-F-241c(1), Grade A or B.
- B. The Chemical designation for slow release granular fertilizer with minor trace elements in addition to 12% Nitrogen, 8% Phosphorous, and 8% Potassium (Lesco or approved equal) shall have at least 50% of the nitrogen from a non-water-soluble organic source for all plantings except on lake banks.
- C. Apply and distribute by methods and rates as recommended by manufacturer.
- D. All State, County, and Municipal governmental regulations must be met including any licensing or certification requirements for uses and/or applications.

## 2.04 HERBICIDES

- A. As recommended by the State of Florida Department of Agriculture.
- B. Post-emergent Herbicide: Roundup as manufactured by Monsanto Corp. or approved equal.
- C. Pre-emergent Herbicide: Ron Star or approved equal.
- D. When next to an aquatic water body, an approved aquatic herbicide or approved equal must be utilized that will meet the State, County or Municipal requirements.
- E. All State, County and municipal governmental regulations must be met including any licensing or certification requirements for uses or applications.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Verify that excavation for turfgrass sod is 4 inches below finish grade and approved Planting/Top Soil Mix to depth of 2 or more inches for turfgrass sod (2 inches) to meet finish grade.
- B. Water dry soil to depth of 6 inches 48 hours before turfgrass sodding.

### 3.02 INSTALLATION

- A. All areas to be turfgrass sodded shall receive finish grading per Section 02210.
- B. Transplant turfgrass sod within 48 hours after harvesting.
- C. Turfgrass Sod coverage must provide 100% coverage at Final Approval.
- D. Begin turfgrass sodding at bottom of slopes. When installing turfgrass sod adjacent to a water body, install turfgrass sod to the waterline.
- E. Lay first row of turfgrass sod in straight line with long dimension of pads parallel to slope contours.
- F. Butt side and end joints. Ensure that joints are tight, thereby eliminating the need to patch and/or top-dress to eliminate gaps.
- G. Stagger end joints in adjacent rows.

- H. Do not stretch or overlap rows.
- I. Water turfgrass sod immediately after transplanting.
- J. Top dressing for turfgrass sodded areas may be clean sand(sterilized), mined from fresh water sources. Sand mined from salt water is unacceptable. Sand shall be free from construction debris, weeds, turfgrass sod, biodegradable materials, noxious pests and diseases and other deleterious materials.

### 3.03 LAWN ESTABLISHMENT

- A. Maintenance of sodded areas shall begin immediately after so installation and shall continue until final approval. Maintenance shall consist of protecting, watering, weeding, cutting, fertilizing, repairing eroded area and re-sodding dead and or damaged turfgrass sod.
- B. Watering:
  - 1. Keep turfgrass sod moist during first week after planting.
  - 2. After first week, supplement rainfall to produce a total of 2 inches per day until final acceptance.
  - 3. It is the contractors' responsibility to water all plant material.
- C. Mowing:
  - 1. Maintain turfgrass sod between 2 inches and 2-1/2 inches in height. When turfgrass sod reaches 3 inches in height, mow to 2 inches in height.
  - 2. Do not cut off more than 40% of grass leaf in single mowing.
  - 3. Remove all turfgrass sod clippings throughout.
- D. Re-turfgrass sod areas which in the opinion of the Landscape Architect is required to establish a uniform stand of turfgrass sod.
- E. Weed Eradication:
  - 1. Apply specified or approved equal post-emergent herbicide per manufacture's rate and method of application to all areas to receive sod.
  - 2. Apply specified or approved equal pre-emergent herbicide before sodding and between second and third mowing, per manufacturer's rate and method of applications.
  - 3. Verify that the herbicide and applicant technique will not damage sod prior to application, and replace all damaged sod and any other landscaping due to herbicide at no cost to the owner.
- F. Fertilizer: Apply fertilizer uniformly at manufacturer's recommended rate 30 days after turfgrass sodding and at three-month intervals thereafter. Water in to avoid "burning" or damaging turfgrass sod.
- G. Establishment period shall extend until final acceptance by the Owner according to the conditions of the Contract.

### 3.04 CLEANING

- A. Immediately clean spills from paved and finished surface areas.
- B. Remove debris and excess materials from project site.

- C. Dispose of protective barricades and warning signs at termination of lawn establishments.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

## SECTION 02510

### WALKWAYS

#### PART 1 - GENERAL

##### 1.01 WORK INCLUDED

- A. Furnish all labor, materials and equipment necessary to complete all walkways and related items depicted in the Drawings and specified herein.

##### 1.02 REFERENCES

- A. FDOT Standard Specifications for Road and Bridge Construction
- B. ASTM C 171 – Specification for Sheet Materials for Curing Concrete
- C. ACI 308 – Standard Practice for Curing Concrete

##### 1.03 RELATED SECTIONS

- A. Section 01340 – Shop Drawings, Working Drawings and Samples
- B. Section 02200 – Earthwork
- C. Section 02210 – Finish Grading
- D. Other Sections as applicable.
- E.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS

- A. All materials for work under this Section, including concrete, sub-grade or foundation and joint material shall be as depicted in the Drawings.

#### PART 3 - EXECUTION

##### 3.01 INSTALLATION

- A. All work shall be performed in accordance with the Reference standards.
- B. Sub-grade or foundation installation and compaction specifications shall be as depicted in the Drawings.

- C. Forms shall conform to the shapes, lines and dimensions of the members as depicted in the Drawings and shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape.
- D. Finishing:
  - 1. Float concrete until 1/4-inch cement gel is brought to surface; steel trowel until dense surface is obtained.
  - 2. Finish with broom at right angles to alignment of work, then round all exterior edges with 1/2-inch radius after brooming.
- E. Curing:
  - 1. The Contractor shall take appropriate precautions to retain moisture by applying materials to cover the walkways and provide water during the curing period or a minimum of six (6) consecutive days.
  - 2. The Contractor shall remove and replace any concrete section which has been damaged, stained or otherwise has become unacceptable due to curing techniques.
  - 3. Acceptable materials to cover walkways and retain moisture include burlap or cotton mats, bags and rugs.
    - a. The edges of materials shall be lapped and weighted down.
    - b. Water shall be applied by sprinkler or soaker hose.
    - c. Coverings shall not be allowed to dry out during the curing period.
    - d. Straw may be used in 6" thick layers covered with a tarp.
    - e. Plastic sheets may not be used.
    - f. Soil may not be used.
- F. Cover walks until final clean-up to prevent damages.
- G. Concrete walks shall be constructed to lines, widths, slope, grades and thickness as depicted in the Drawings.
- H. Expansion joint material shall be placed to separate concrete for any pipes, structures, poles, etc.

### 3.02 CLEANUP

- A. At the completion of the work, Contractor shall clean up all scraps, rubbish and surplus materials caused by this work and haul them away from the site and leave job in a neat, clean and orderly condition.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

## SECTION 02513

### ASPHALTIC CONCRETE PAVING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Furnish all labor, materials, equipment and incidentals required and place asphaltic concrete pavement in accordance with the elevations and typical sections as depicted in the Drawings and specified herein.

##### 1.02 RELATED SECTIONS

- A. Section 01340 – Shop Drawings, Working Drawings and Samples.
- B. Section 01410 – Materials and Installation Testing.
- C. Section 02100: Site Preparation.
- D. Other Sections as applicable.

##### 1.03 REFERENCES

- A. The Work under this Contract shall be in strict accordance with the following codes and standards.
  - 1. The applicable municipality,
  - 2. Broward County Traffic Engineering Division,
  - 3. Florida Department of Transportation Specifications (FDOT),
  - 4. OSHA Safety and Health Standards for Construction.

##### 1.04 SUBMITTALS

- A. Submit mix design for approval in accordance with Section 01340.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS

- A. Asphaltic concrete pavement shall conform to the following FDOT Standard Specifications:
  - 1. Section 160 - Stabilization.
  - 2. Section 200 - Limerock base.
  - 3. Section 300 – Prime and tack coats.
  - 4. Section 334 –Superpave asphalt concrete.
- B. The materials of the asphaltic concrete surface shall conform the applicable sections of FDOT Standard Specifications for Asphaltic Concrete with the following exception:
  - 1. Recycled asphalt may not be used for the final course.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. All asphalt installation shall be in accordance with FDOT Standard Specification 330 – Hot Mix Asphalt General Construction Requirements.
- B. All soft and yielding material and other portions of the subgrade which will not compact readily shall be removed and replaced with suitable material and the whole subgrade brought to line and grade and to a foundation of uniform compaction and supporting power. The cost of removing and replacing unsuitable material shall be included in the bid for the paving.
- C. The subgrade, in both cut and fill sections, shall be compacted to a density and LBR as indicated in the Drawings. Unless the subgrade material at the time of compacting contains sufficient moisture to permit proper compaction it shall be moistened as necessary and then compacted. Subgrade material containing excess moisture shall be permitted to dry to the proper consistency before being compacted. The subgrade shall be shaped prior to making the density tests. The required density shall be maintained until the base or pavement has been laid or until the aggregate materials for the base or pavement course have been spread in place.
- D. The minimum compacted thickness of the limerock base shall be as depicted in the Drawings applied in four-inch maximum layers of equal depth unless otherwise depicted in the Drawings. The width of the limerock base shall be wider than the pavement as depicted in the Drawings.
- E. Before the prime coat is applied, all loose material, dust, dirt or other foreign material which might prevent bond with existing surface shall be moved to the shoulders to the full width of the base by means of revolving brooms, mechanical sweepers, blowers, supplemented by hand sweeping or other approved methods. The glazed finish shall have been removed from the base. The prime coat shall be applied by a pressure distributor so that approximately 0.1 gallons per square yard is applied uniformly and thoroughly to a clean surface.
- F. Prior to the application of the surface course, all loose material, dust, dirt and all foreign material which might prevent proper bond with the existing surface shall be removed to the full width of the repair by means of approved mechanical sweepers and supplemented by hand sweeping if required.
- G. Apply bituminous tack coat at a rate between 0.02 and 0.10 gallons per square yard. Bituminous material shall be heated as per manufacturers' recommendations.
- H. All manhole castings, valve boxes or other utility castings within the area to be surfaced shall be adjusted to the proposed surface elevation by the Contractor. The work shall be accomplished in such a manner as to leave the casting fixed permanently in its correct position.

### 3.02 PAVEMENT REPAIR

- A. All damage to pavement as a result of the work (construction or maintenance) under this contract shall be repaired according to the plans and specifications at the Contractor's cost. Pavement shall be repaired to match the original surface material and original grade; however, the asphalt concrete thickness shall not be less than 1 inch. The repair shall include the preparation of the subgrade, the placing and

compacting of the limerock base, the preparation and priming of the base, the placing and maintaining of the surface treatment, all as specified herein and as shown on the Drawings.

- B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage or as shown on the Drawings. The edge of the pavement to be left in place shall be saw cut to a true edge and should provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities.

### 3.03 TESTING

- A. Refer to Section 01410 – Materials and Installation Testing.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

## SECTION 02631

### HIGH DENSITY POLYETHELENE (HDPE) PIPE

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install High Density Polyethylene pipe (HDPE) and appurtenances as described herein.

##### 1.02 RELATED WORK

- A. Section 01015 – General Requirements
- B. Section 01025 – Measurement and Payment
- C. Section 01340 – Shop Drawings, Working Drawings and Samples
- D. Section 02221: Trenching, Bedding and Backfill for Pipe
- E. Other Sections as applicable

##### 1.03 DESCRIPTION OF SYSTEM

- A. A black high-density polyethylene corrugated pipe with an integrally formed smooth invert used to convey storm water. Corrugation shall be either annular or spiral.
- B. HDPE drainage piping shall be installed as indicated on the Drawings.

##### 1.04 QUALIFICATIONS

- A. All HDPE and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. All HDPE shall be manufactured and installed in accordance with the best practices and methods and shall comply with these Specifications as well as the requirements of the Owner and Broward County.

##### 1.05 SUBMITTALS

- A. Shop drawings shall be submitted to the Engineer in accordance with Section 01340 and shall include dimensioning and technical specification for all piping to be furnished.

##### 1.06 INSPECTION

- A. The manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the Engineer a notarized affidavit

stating all pipe meets the requirements of AASHTO M252 and M294.

- B. The quality of the finished pipe shall be subject to inspection and approval by the Engineer and other representatives of the Owner. Pipe rejected after delivery shall be marked for identification and shall be removed from the project at once.

1.07 TOOLS

- A. Special tools, solvents, lubricants, and sealing compounds, etc. required for normal installation shall be furnished with the pipe.

PART 2 - PRODUCTS

2.01 HIGH DENSITY POLYETHYLENE PIPE

- A. Pipe shall comply with the requirements for test methods, dimensions, and markings found in AASHTO Designations M252 and M294. Pipe and fittings shall be made from virgin PE compounds which conform with the requirements of cell class 324420C as defined and described in ASTM D3350.
- B. The minimum parallel plate stiffness values, when tested in accordance with ASTM D2412, shall be as follows:

Diameter	Pipe Stiffness	Diameter	Pipe Stiffness
4" (100 mm)	50 psi (340 kN/m <sup>2</sup> )	18" (450 mm)	40 psi (280 kN/m <sup>2</sup> )
6" (100 mm)	50 psi (340 kN/m <sup>2</sup> )	24" (600 mm)	34 psi (240 kN/m <sup>2</sup> )
8" (100 mm)	50 psi (340 kN/m <sup>2</sup> )	30" (750 mm)	28 psi (200 kN/m <sup>2</sup> )
10" (100 mm)	50 psi (340 kN/m <sup>2</sup> )	36" (900 mm)	22 psi (150 kN/m <sup>2</sup> )
12" (100 mm)	50 psi (340 kN/m <sup>2</sup> )	42" (1050 mm)	19 psi (140 kN/m <sup>2</sup> )
15" (100 mm)	42 psi (290 kN/m <sup>2</sup> )	48" (1200 mm)	17 psi (120 kN/m <sup>2</sup> )

2.02 PIPE FITTINGS

- A. The fittings shall not reduce or impair the overall integrity or function of the pipeline. Fittings may be either molded or fabricated. Common corrugated fittings include in-line joint fittings, such as couplers and reducers, and branch or complimentary assembly fittings such as tees, wyes, and end caps. These fittings may be installed by various methods, such as snap-on, screw-on, bell and spigot, and wrap around. Couplings shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joints. Only fittings supplied or recommended by the pipe manufacturer shall be used. A neoprene or rubber gasket shall be supplied at each coupling joint.

## 2.03 MANHOLE CONNECTIONS

- A. HDPE pipe shall be grouted into the concrete manhole wall using an approved non-shrink grout.

## PART 3 - EXECUTION

### 3.01 INSTALLATION, HANDLING PIPE AND FITTINGS

- A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe. Pipe and fittings shall not be dropped. All pipe and fittings shall be examined before laying, and no piece shall be installed which is found to be defective. Any damage to the pipe shall be cause to reject it.
- B. All pipe and fittings shall be subjected to a careful inspection prior to being installed.
- C. If any defective pipe is discovered after it has been installed it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional expense to the Owner. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when installed, shall conform to the lines and grades required.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

## SECTION 02632

### SYNTHETIC TURF GRASS DRAINAGE SYSTEM

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Furnish all labor, materials, equipment and incidentals required and install a synthetic turf grass drainage system and appurtenances as depicted in the Drawings and specified herein.
- B. This work shall include materials and installation of a drainage system comprised of high-density polyethylene (HDPE) collector drains install in drainage rock and wrapped in geo-fabric discharging to HDPE mainlines which are tied-into drainage catch basins.
- C. The quantities of drainage system materials as shown on the plans may be increased or decreased based on actual site conditions that occur during construction of the project. Such variations in quantity is considered incidental to the scope of the drainage system.

##### 1.02 RELATED SECTIONS

- A. Section 01340 – Shop Drawings, Working Drawings and Samples
- B. Section 02221 - Trenching, Bedding and Backfill for Pipe
- C. Section 02863 - Synthetic Turf Grass System
- D. Other Sections as applicable

##### 1.03 REFERENCES

- A. ASTM D-3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

##### 1.04 QUALIFICATIONS

- A. All synthetic turf grass drainage system materials and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished for a minimum of five (5) years.
- B. The synthetic turf grass drainage system manufacturer shall have a minimum of three similar installations in the State of Florida.
- C. The synthetic turf grass drainage system manufacturer shall be Multi-Flow Drainage Systems by Varicor Technologies or approved equal.

1.05 SUBMITTALS

- A. Shop drawings shall be submitted to the Engineer in accordance with Section 01340 and shall include dimensioning and technical specification for all piping to be furnished.

1.06 INSPECTION

- A. The manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness.
- B. The manufacturer shall furnish to the Engineer a notarized affidavit stating all pipe meets the requirements of this specification.
- C. The quality of the finished pipe & associated material shall be subject to inspection and approval by the Engineer and other representatives of the Owner.
- D. Pipe & associated material rejected after delivery shall be marked for identification and shall be removed from the project at once.

1.07 TOOLS

- A. Special tools, solvents, lubricants, and sealing compounds, etc. required for normal installation shall be furnished with the pipe and associated materials.

PART 2 - PRODUCTS

2.01 SYNTHETIC TURF GRASS DRAINAGE SYSTEM

- A. The collection system shall be of a flexible, prefabricated, rounded rectangular shaped, composite product, consisting of an inner core described in B (Below) and an outer geotextile wrap. The outer wrap shall function only as a filter and shall not be a structural component of the core.
- B. The synthetic turf grass drainage system shall be manufactured using virgin high density polyethylene (HDPE) meeting the minimum requirements of cell classification 424420C as defined and described in ASTM D3350, except that the carbon black content is from 2% to 4%.
- C. The collection system core shall be constructed using interconnected corrugated pipes that define and provide the flow channels and structural integrity of the collection system. Perforations shall be evenly distributed on both faces of the core. The core of the collection system shall conform to the following physical property requirements:

1.	Thickness, inches	ASTM D-1777	1.0
2.	Outflow Rate, gpm/ft*	ASTM D-4716	6-inch - 17 12-inch - 29 18-inch - 45

- |    |                              |   |      |
|----|------------------------------|---|------|
| 3. | Compressive Strength, psf    | ASTM D-1621<br><br>(modified sand method) | 6000 |
| 4. | Perforations / sq. ft. --- > |   | 300  |

D. The connectors used with the collection system shall be of a snap together design. In no case shall any product be joined without the use of the manufacturer's connector designed specifically for the purpose.

## 2.02 PIPE FITTINGS

- A. The fittings shall not reduce or impair the overall integrity or function of the pipeline. Fittings may be either molded or fabricated.
- B. Common corrugated fittings include in-line joint fittings, such as couplers and reducers, and branch or complimentary assembly fittings such as tees, wyes, and end caps.
- C. These fittings may be installed by various methods, such as snap-on, screw-on, bell and spigot, and wrap around. Couplings shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joints.
- D. Only fittings supplied or recommended by the pipe manufacturer shall be used. A neoprene or rubber gasket shall be supplied at each coupling joint.

## 2.03 DRAINAGE CONNECTIONS

- A. Drainage pipe connections shall be performed by core-drilling as indicated in the Drawings.
- B. Drainage pipe shall be grouted into the concrete drainage structures using an approved non-shrink grout.
- C. All pipe connections shall be sealed inside and out.

## PART 3 - EXECUTION

### 3.01 INSTALLATION AND CONSTRUCTION REQUIREMENTS

- A. The collection system shall be installed in a horizontal orientation and placed directly upon the geotextile soil separator.
- B. The collection system and the transport pipe shall be installed per the lines and grades shown on the plans.
- C. The collection system shall be securely connected to the transport pipe using connectors approved by the manufacturer.

- D. All fitting and connectors shall be installed in accordance with the manufacturer's recommendations.
- E. Any damaged collection system or transport pipe shall be replaced or repaired by splicing in an undamaged section of like material.

END OF SECTION

SECTION 02830  
CHAIN LINK FENCE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases; concrete foundation for posts and center drop for gates.
- C. Manual gates and related hardware.
- D. Procurement of municipal fence permit with Contractor provided detail drawings sealed by a Professional Engineer registered in the State of Florida.

1.02 REFERENCES

- A. ANSI/ASTM A123 - Zinc (Hot Dip Galvanized) Coating on Iron and Steel Products.
- B. ANSI/ASTM F567 - Installation of Chain-Link Fence.
- C. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
- D. ASTM A121 - Zinc-Coated (Galvanized) Steel Barbed Wire.
- E. ASTM A392 - Zinc-Coated Steel Chain-Link Fence Fabric.
- F. ASTM C94 - Ready - mixed Concrete.

1.03 SYSTEM DESCRIPTION

- A. Fence Height: As indicated on the plans.
- B. Line Post Spacing: At intervals not exceeding 10 feet.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI/ASTM F567 and Florida Building Code.

1.05 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Framing (Steel): ASTM A120; Schedule 40 steel pipe, standard weight, welded joints permitted.
- B. Fabric Wire (Steel): ASTM A392 zinc coated wire fabric.
- C. Concrete: ASTM C94; Normal Portland Cement, 3,000 psi strength at 28 days, 3 inch (75 mm) slump.

### 2.02 COMPONENTS

- A. Line Posts: 2.375 inch outside diameter.
- B. End, Corner and Pull Posts: 2.875 inch outside diameter.
- C. Gate Posts: Up to 6 foot gate leaf - 4.0 inch outside diameter. From 6 foot to 13 foot leaf - 6.625 inch outside diameter.
- D. Top, Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- E. Gate Frame: 1.90 inch outside diameter for welded fittings and truss rod fabrication.
- F. Fabric: 2 inch diamond mesh interwoven wire, 6 gage, top and bottom selvages twisted tight.
- G. Truss Rods: 3/8 inch diameter steel.
- H. Tension Band: 1/8 inch thick steel..
- I. Tension Bar: steel; minimum cross-section of 3/16 inch x 3/4 inch.
- J. Tension Wire: 6 gage steel.
- K. Tie Wire: 9 gage steel wire.

### 2.03 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.
- C. Gate Hardware: For double swing gates, provide center gate stop and drop rod; for single swing gates, include fork latch; 3 - 180 degree non-lift off gate hinges per leaf and hardware for padlock.
- D. Vinyl Inserts: Match existing inserts for color and installation pattern.

## 2.04 FINISHES

- A. Components and Fabric: Galvanized to ANSI/ASTM A123; 2.0 oz/sq. ft coating.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ANSI/ASTM F567.
- B. Set corner, end, gate and line posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- C. Line post footing depth below finish grade: ANSI/ASTM F567.
- D. Corner, pull, gate and end post footing depth below finish grade: ANSI/ASTM F567.
- E. Brace each gate, end and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.
- F. Provide top rail through line post and splice with 6 inch long rail sleeves.
- G. Install bottom brace rail or tension wire (to be specified by the City) between all terminal (end, corner and gate), and line posts.
- H. Stretch fabric between terminal posts or at intervals of 300 feet maximum, whichever is less.
- I. Position bottom of fabric 2 inches above finished grade.
- J. Fasten fabric to stop rail, line posts, braces, and bottom rail/tension wire with tie wire at maximum 15 inches on centers.
- K. Attach fabric to end, corner, pull and gate posts with tension bars and tension bands.
- L. Install support arms sloped outward and attach barbed wire (where applicable); tension and secure.
- M. Install gate with fabric and barbed wire overhang (where applicable); to match fence. Install three hinges per leaf, latch, catches, and drop bolt.
- N. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

### 3.02 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.

- B. Maximum Offset From True Position: 1 inch.
- C. Components shall not infringe adjacent property lines.

END OF SECTION

## SECTION 02863

### SYNTHETIC TURF GRASS SYSTEM

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Furnish all labor, materials, tools and equipment necessary to install the synthetic turf grass system as depicted in the Drawings and specified herein.
- B. The installation of all synthetic turf grass shall be performed in strict accordance with the manufacturer's installation instructions.
- C. The synthetic turf grass and the infill shall be provided by the synthetic turf grass manufacturer.

##### 1.02 RELATED SECTIONS

- A. Section 01050 – Field Engineering and Surveying
- B. Section 01340 – Shop Drawings, Working Drawings and Samples
- C. Section 01410 – Materials and Installation Testing
- D. Section 02210 – Finish Grading
- E. Section 02632 – Synthetic Turf Grass Drainage System
- F. Other Sections as Applicable

##### 1.03 REFERENCES

At a minimum, and in addition to other industry reference standards, the following reference standards must be met:

- A. ASTM Standard Test Methods
  - 1. D1335 Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
  - 2. D 1577 Standard Test Method for Linear Density of Textile Fibers
  - 3. D 2859 Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.
  - 4. D 4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  - 5. D 5034 Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
  - 6. D 5848 Standard Test Method for Mass per Unit Area of Pile Yarn Floor Coverings
  - 7. F 355-A Standard Test Method for Impact Attenuation of Playing Surface Systems and Materials
  - 8. F 1015 Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces

9. F 1551 Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials
10. F 1936 Standard Specification for Impact Attenuation of Turf Playing Systems as Measured in the Field.
11. F 2898 Standard Test Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-Confined Area Flood Test Method
- B. The Fédération Internationale de Football Association (FIFA)
- C. 2001 NCAA and/or National Federation Football Rules and Interpretations; FIFA Rules of the Game. Where discrepancies are noted, the rules of the NCAA shall apply.
- D. International Artificial Turf Standards and test methods.
- E. FDOT Standard Specifications for Road and Bridge Construction

#### 1.04 SUBMITTALS

- A. Prior to construction, Contractor shall submit the following:
  1. Shop Drawings in accordance with Section 01340 – Shop Drawings, Working Drawings and Samples, including, at a minimum the following:
    - a. Field Layout
    - b. Field Marking Plans (colorized) and details as noted on the construction plans.
    - c. Roll/Seaming Layout
    - d. Methods of attachment, field openings and perimeter conditions.
  2. Quarry certifications demonstrating compliance with the material specifications for the drainage base stone and finishing stone.
  3. Synthetic Turf Grass
    - a. Submit two samples, minimum of 6x6 inch in size, illustrating details of finished product.
    - b. A letter and specification sheet certifying that the products of this section meet or exceed specified requirements.
  4. Infill Material
    - a. Submit a detail indicating the number and thickness of the layers of the infill materials and the type and percentage of materials used.
    - b. Heat reducing composite mix – provide a list of the type and source of the composite infill material included, and the thickness and percentages of the material in the top layer of the infill system, along with the types of materials and thickness of the layers under the top layer, as well as the certification of the grade and quality of all the infill materials used.
    - c. Documentation shall be provided for the proposed heat reducing composite infill which demonstrate heat reducing properties with testing results.

PART 2 - PRODUCTS

2.01 SYNTHETIC TURF GRASS

- A. Synthetic turf grass shall consist of a carpet made of slit-film, UV resistant, polyethylene fibers tufted into a fibrous, porous backing.
- B. The installed Synthetic turf grass system shall meet the International Artificial Turf Standards and have the following properties:

<b>Standard</b>	<b>Property</b>	<b>Specification</b>
ASTM D D5823	Pile Height	2-1/4" nominal, minimum*
ASTM D 1577	Fiber Denier	9000 <u>minimum</u>
ASTM D 5848	Pile Weight	40 oz./sq. yd. <u>minimum</u>
ASTM D 1335	Tuft Bind	8 lbs. (with infill)
ASTM D 5034	Grab Tear (width)	>200 lbs./force
ASTM D 5034	Grab Tear (length)	>200 lbs./force
ASTM F 1015	Relative Abrasiveness Index	<25
ASTM D 4491	Carpet Permeability	>40 inches /hour
ASTM F 355 & F 1936	Impact Attenuation, G-Max	100 Minimum 200 Maximum Less than 125 at Acceptance

\*Pile height may be greater as determined by synthetic turf grass manufacturer if need to achieve required G-Max values given the infill system, with the approval of the Owner and Engineer.

- C. The carpet shall consist of fibers tufted into a primary backing with a secondary backing.
  - 1. The carpet's primary backing shall be a double-layered polypropylene fabric treated with UV inhibitors or per listed approved vendor's specifications.
  - 2. The secondary coating shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place. Perforated (i.e. with punched or burned holes) backed carpet shall be acceptable as an alternate, per manufacturer's recommendations.
- D. The carpet shall be furnished in 15' wide rolls or the metric equivalent. Rolls shall be long enough to go from sideline to sideline without splicing. The perimeter white line shall be tufted into the individual sideline rolls. Head seams, other than at sidelines, will not be acceptable.
- E. Non-tufted or inlaid lines and markings shall be painted with paint approved by the Synthetic Turf Grass Manufacturer.

- F. Thread for sewing seams of turf shall be UV resistant and as recommended by the Synthetic Turf Grass Manufacturer.
- G. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the Synthetic Turf Grass Manufacturer.
- H. Manufacturer Qualifications:
  - 1. The synthetic turf grass manufacturer must have installed a minimum of either 5 fields in the State of Florida, or 50 fields in the United States of 40,000 square feet or more in service for a minimum of eight (8) years with the same products being proposed for this field.
    - a. Provide contact names, email addresses and phone numbers.
  - 2. The synthetic turf grass manufacturer must be ISO 9000 certified.
- I. The synthetic turf grass shall be provided by one of the following manufacturers:
  - 1. Field Turf
  - 2. Astro Turf
  - 3. A Turf
  - 4. UBU Sports
  - 5. Shaw Sports Turf
  - 6. Limonta Sport

2.02 HEAT REDUCING COMPOSITE INFILL

- A. The infill system shall consist of resilient layered granular system, comprising of selected and graded sand, or a mixture of sand and S.B.R. crumb rubber or similar material, and a top layer of composite material with heat reducing properties.
  - 1. Documentation shall be provided for the proposed heat reducing composite infill which demonstrate heat reducing properties with testing results.
- B. The combination of infill materials shall be installed in the ratio and combined weight as determined by the Synthetic Turf Grass manufacturer which yields the required G-Max values.
  - 1. The addition of a mat is at the discretion of the synthetic turf grass manufacturer and shall not contribute to the combined weight or G-Max value.
  - 2. The addition of a mat must be approved by the Owner and Engineer.
- C. The infill materials shall be approved and supplied by the synthetic turf manufacturer.
- D. The composite material shall be comprised of an exclusive cork composite, or an approved equal composite infill material proven in the synthetic turf industry.
- E. System Qualifications:
  - 1. The infill system must meet the standards and testing criteria for synthetic turf fields and applied as such with at least 15 fields installed in the United

States.

2. The infill system must prove reliable by having been installed in synthetic turf fields for commercial use for a minimum of a complete 8-year life cycle.
3. The use of the infill system must be proven by having been utilized in a minimum of 50 full sized synthetic turf fields worldwide with no incidence of failure or replacement.

#### 2.03 FIELD GROOMER

- A. Provide one field grooming (sweeping) device for the maintenance of the synthetic turf grass system.
- B. Field groomer shall have adjustable tine rake & brush, consisting of four rows of spring tines ahead of a six-foot-wide stiff brush. Tines and brush are height adjustable to be utilized independently or in tandem.
- C. The field groomer shall include a towing mechanism compatible with a field utility vehicle, i.e. Taro Sand Pro, John Deere Gator, Club Car.
- D. The field groomer shall be approved by the synthetic turf grass manufacturer.
- E. The Synthetic Turf grass manufacturer shall train the Town's maintenance staff in the use of the field groomer.

#### 2.04 SYNTHETIC TURF PERIMETER EDGE ATTACHMENT

- A. As required by the Synthetic Turf Grass manufacturer.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Verify that area is ready to receive work, and excavation, dimensions, and elevations are as indicated on Construction plans.
- B. Beginning of installation means acceptance of existing conditions.
- C. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Town prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

#### 3.02 PROTECTION OF WORK

- A. Make provisions for, and take the necessary precautions to protect existing and new work from damage during the entire life of the project.
- B. It is the responsibility of the Contractor to protect all work in progress from damage due to extremes of cold, moisture, or drying, or mechanical damage from equipment traffic or foot traffic and to alert the Town to the presence or likelihood of conditions that may adversely affect the quality of the work, the physical structure of soils, or transport of site soils off-site.
- C. Protect soils from excessive moisture. During periods of prolonged precipitation, take aggressive steps to avoid over-saturation, erosion, or homogenization of soils by covering with protective plastic sheeting, collection and controlled dewatering, detention for sediment removal, and allowing excessively wetted soils to remain

fallow until approved by the Town as appropriate for continued work.

- D. Apply supplemental moisture to overly dry soils.
- E. Do not operate heavy equipment near excavations where pipe, trench wall or cut-slope failure may result.

### 3.03 QUALITY ASSURANCE

- A. Laser fine grading is mandatory.
- B. The Contractor is responsible for verifying the quality of the work and shall perform compaction and density tests on request of the Town to check compliance with these specifications. A copy of the test reports shall be furnished to the Town.

### 3.04 PROJECT/SITE CONDITIONS

- A. Work of this section shall not be executed when site conditions are detrimental to quality of work as determined by the Town.

### 3.05 PREPARATION OF SUB-GRADE

- A. The general extent of the drainage and sub-grade construction work is shown on the Drawings and includes, but is not limited to, the following:
  - 1. The sub-grade must have a minimum slope of 0.5% from the longitudinal center of the field towards the sidelines.
  - 2. The sub-grade must be compacted in both directions to attain the specified compaction rate.
  - 3. The soil bed or sub-grade must be prepared to tolerances of not more than ½" from design grade to allow for even drainage.
  - 4. Laser fine grading is mandatory.
- B. Using laser operation survey instruments, the Contractor shall verify that subgrade has been prepared according to specification with regard to compaction, grade tolerances and is free of debris to beginning work.
- C. The field sub-grade shall be final graded to form a smooth, clean basin free of any debris and/or loose soil to the tolerances. The stone drainage base shall not be installed until all sub-grading and drainage are completed in order to avoid the mixing of other soil and materials with the drainage materials. Laser fine grading is mandatory.

### 3.06 SUB-GRADE VERIFICATION

- A. Upon installation of the sub-drainage system, the Contractor shall submit to the Town for review, a sub-grade conformance survey, performed by a licensed surveyor, before any placement of the drainage stone.
  - 1. Elevations shall be taken on a 25-foot grid over the sub-grade of the entire playing field.
  - 2. Tolerance for Sub-Grade: Sub-grade shall be verified using laser-operation survey instruments. Laser fine grading is mandatory. Finish Grade must be within ½" of an inch plus or minus from the elevations shown on the construction plans. In addition, the sub-grade shall be measured so that no point within the 25-foot grid deviating more than .05 % from any other

point within the 25-foot grid.

- B. After review, the conformance survey will be returned to Contractor with areas out of tolerance noted for connection. Contractor will be required to correct areas out of tolerance and certify that connections have been made prior to base drainage stone installation.

### 3.07 SUB-GRADE CERTIFICATION

- A. Prior to installation of collection pipes or field aggregate, the Contractor shall provide a certification from the Synthetic turf grass manufacturer that the sub-grade meets the compaction, planarity and permeability requirements.

### 3.08 INSTALLATION OF SYNTHETIC TURF PERIMETER EDGE

- A. Install synthetic turf perimeter edge attachment system in accordance with manufacturer's instructions and as approved by the Town.

### 3.09 PREPARATION OF FIELD BASE AGGREGATE (FINISH AND BASE DRAINAGE STONE)

- A. Prior to commencing the base aggregate, install the horizontal multifold pipes and geotextile to the satisfaction of the Town and the Engineer.
  - 1. Care should be taken to keep machinery on the base stone without damaging the drainage pipe or fabric avoid twisting and turning on the stone base.
  - 2. Do not operate machinery directly on approved geotextile.
- B. The stone shall be washed at the quarry and damp when transported to site and shall be kept damp during installation, to minimize segregation of the materials.
- C. Base drainage stone throughout the field shall be carefully smoothed and compacted. The entire playing field surface shall then be checked for irregularities and adjusted to a uniform grade per the grading plans detailed on the construction plans, as follows:
  - 1. Place approved Base Drainage Stone in a manner that will minimize disturbance to the subgrade geotextile installation. Use only approved transport methods for placement of materials.
  - 2. Thoroughly cover subgrade geotextile with sufficient Base Drainage Stone to evenly distribute compressive forces of placement operation in 6" maximum lifts.
  - 3. Grade the base stone base with a laser equipped grading rubber tire tractor with non-ag tires.
  - 4. Roll the base stone with a double drum non-vibratory roller to the satisfaction of the Engineer. The base stone must be laid and compacted without damaging or disturbing the sub-grade, geotextile or multi flow drains
  - 5. Once the finishing stone is on grade utilize a water truck or large hoses to water the entire base very thoroughly to settle the base drainage interface.
  - 6. Then laser grade the finishing stone again and roll with Steel Double Drum Roller thoroughly in two directions.
- D. Place approved Finishing Stone in a manner that will minimize disturbance to the

approved Base Drainage Stone installation. Use only approved transport methods for placement of materials.

1. Spread a single lift of Finishing Stone to the depth specified, allowing for compaction. Perform compaction with a static roller of sufficient weight to insure proper compaction to the satisfaction of the Engineer.
2. The final lift of aggregate should not be more than 2 inches deep.
3. Provide complete compaction to the lines, grades, and slopes indicated on the Construction plans.

### 3.10 FIELD BASE AGGREGATE VERIFICATION

A. The Contractor shall submit to the Town for review, a field base aggregate verification survey,

1. Conformance Survey of Finish Stone: The Contractor shall perform a conformance survey by a licensed surveyor, before any placement of the synthetic turf, on a 25-foot grid over the finish stone of the entire playing field. Provide spot elevations, based on the established benchmark, on the Construction plans, at each grid intersection and at the intersection of the perimeter and the grid. Submit a drawing showing the results of the above survey. The drawing shall include the scaled grid, all spot elevations and show contours at  $\frac{1}{4}$ " intervals of variation from the ideal planes. Interpolate spot elevations as required to provide contours.
2. The Town will require three (3) working days to review survey. After review, the survey will be returned to Contractor with areas out of tolerance noted for correction. Contractor will be required to correct areas out of tolerance and certify that corrections have been made prior to turf installation.
3. Tolerance for Finish Stone: Finish stone elevations shall be verified using laser-operation survey instruments. Finish Grade must be within  $\frac{1}{4}$ " of an inch plus or minus from the elevations shown on the plans. In addition, the finish stone shall be measured so that no point within the 25-foot grid deviates more than  $\frac{1}{2}$ " of an inch from any other point within the 25-foot grid.

### 3.11 FIELD BASE AGGREGATE CERTIFICATION

A. Prior to installation of the synthetic turf, the Contractor shall provide a certification from the Synthetic turf grass manufacturer that the field base aggregate meets the compaction, planarity and permeability requirements.

### 3.12 SYNTHETIC TURF GRASS SYSTEM INSTALLATION

A. Pre-Installation Meeting

1. Convene one week before starting installation of the synthetic turf grass system.

B. General

1. Only trained technicians, skilled in the installation of athletic caliber

synthetic turf grass systems, working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, topdressing or brushing operations.

2. The designated Supervisory personnel on the project must be certified, in writing by the Synthetic Turf Grass Manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.
3. All designs, markings, layouts, and materials shall conform to all currently applicable National Federation of High School Association rules and other domestic and international standards that may apply to this type of synthetic turf grass installation and as detailed on the construction plans.

C. Turf Grass Installation

1. Install shall be in accordance with Synthetic Turf Grass Manufacturer's instructions and the approved shop drawings. Any variance from these requirements must be accepted in writing, by the Synthetic Turf Grass Manufacturer's onsite representative, and submitted to the Town, verifying that the changes do not in any way affect the warranty. Infill materials shall be approved by the Synthetic turf grass manufacturer and installed in accordance with the Synthetic Turf Grass Manufacturer's standard procedures.
2. 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.
3. 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 sewed or glued properly to the next in accordance with the Manufacturer's specifications. 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. These rolls shall be glued or sewn as well.
4. For sewn installation, all seams shall be sewn using double bagger stitches and polyester thread or adhered using seaming tape and high grade adhesive (per the Synthetic Turf Grass Manufacturer's standard procedures). Seams shall be flat, tight, and permanent with no separation or fraying. For glued installation, adhesives shall be hot-melt or a one-part moisture cured polyurethane obtained from a single manufacturer and be equivalent to Nordot 34-G as manufactured by Synthetic Surfaces of Scotch Plains, NJ or approved equal.
5. Prior to the application of any line painting, the turf shall be fibrillated by means of a nylon rotary brush to provide the look, feel, and safety of optimally maintained natural grass, including subtle undulations normally associated with natural grass athletic fields.
6. Non-tufted or inlaid lines and markings shall be painted according to the recommendations of the Synthetic turf grass manufacturer and of the paint manufacturer. Several applications may be required.

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

D. Infill Installation

1. Heat Reducing Composite Infill

- a. Infill materials shall be applied in numerous thin lifts. The turf shall be brushed as the mixture is applied.
- b. The infill installation mixture shall be installed in accordance with, and to a depth determined by, the Synthetic Turf Grass Manufacturer.
- c. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional.
- d. Upon completion, free pile height shall be no more than  $\frac{3}{4}$  inch and no less than  $\frac{1}{2}$  inch.
- e. The two, or three layered infill system shall be installed in a systematic order.

3.13 CLEANING

- A. Protect installed Synthetic turf from subsequent construction operations.
- B. Do not permit traffic over unprotected floor 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 Town.
- 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 Town.

3.14 UNDERGROUND UTILITIES

- A. The Contractor's attention is directed to the possible presence of water, sewer, gas mains, electric wires, conduit, communication cables (both overhead and underground), poles and house service connections in the street or common areas in which the construction project is to be performed. The Contractor shall locate all existing utilities, both private and public, and be responsible for their safety.
- B. Should any existing utilities be damaged or destroyed due to the operations of the Contractor, the damages or destroyed components shall be immediately replaced or repaired as necessary to restore the utility to a satisfactory working condition.
- C. These repairs or replacements shall be at no additional expense to the Town or the utility owner. The contractor shall notify respective utility companies in accordance with State of Florida law regarding any work to be performed in the vicinity of existing lines, cables, or other utility features.

3.15 OWNER ACCEPTANCE

- A. Prior to Final Acceptance, the Contractor shall submit to the Town:

1. Three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system including, but not limited to, turf, infill, drainage system, painting and markings.
  - a. Provide specific guidelines to address proper and adequate maintenance needed to maintain G-Max values below the maximum.
  - b. Provide specific guidelines for the operation and maintenance of the field groomer.
2. Project Record Documents in accordance with Section 01720 – Record Documents, including, at a minimum the following:
  - a. All proposed elevations.
  - b. The locations of seams, drains or other pertinent information.
  - c. The dimensions and location of all field markings.
3. Warranty: Submit Manufacturer Warranty and ensure that forms have been completed in Town's name and registered with Manufacturer.
4. Certification: Submit certification signed by Contactor that installed materials conform to specified requirements and drainage system was successfully checked and tested prior to covering with drainage gravel.
5. A certification from the synthetic turf grass manufacturer that the installation has been performed in accordance with manufactures recommendation and is suitable for play and the commencement of the warranty period.
6. Certified initial G Max test results.

### 3.16 WARRANTIES

- A. The synthetic turf grass manufacturer and a third party (insurer) shall provide a warranty to the Town that covers defects in materials and workmanship of the synthetic turf grass system for a period of 8 years from the date of Owner Acceptance.
- B. The synthetic turf grass 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 Town or the manufacturer.
- C. Warranty Insurance
  1. The synthetic turf grass manufacturer's Warranty must be supported by a prepaid, non-cancelable insurance policy in the amount of the full, non-prorated, replacement value for the full eight (8) year period, or an 8-year Warranty Bond.
  2. The Surety shall have and maintain at least an "A" rating in A.M. Best Company's rating guide.
  3. Bidders shall submit a sample 8 – year insurance policy or Warranty Bond from the manufacturer of the synthetic turf grass system that they are proposing to install for this project at the time of bid.

- D. The Contractor shall provide a Warranty to the Town 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 onsite representative.
- E. Contractor shall be responsible for the testing of the G-Max levels:
1. At the installed synthetic turf at the completion of construction and
  2. At years two, four, six, and six months prior to the completion of year eight.
  3. If any of these tests do not fall within the G-Max range as specified, the Contractor will be required to modify the field composition to the sole satisfaction of the Town so that it falls within the target G-Max range.
  4. All costs associated with such work shall be borne solely by the Contractor.
  5. Any failed test shall be retested to verify that the field meets the specifications.
  6. All testing shall be paid by the Contractor.
  7. All testing shall be completed by an independent testing laboratory accredited for such tests, and shall be pre-approved by the Town.
  8. All testing and analysis of findings shall be completed by qualified persons utilizing the required techniques outlined in the ASTM standards.

END OF SECTION

**TABLE OF CONTENTS**  
**Town of Davie**  
**Bamford Park Artificial Turf Installation**  
**Project No. 96-1630.112**

Section 00010	Notice to Bidders
Section 00100	Instructions to Bidders
Section 00300	Bid Forms
Section 00400	Bid Bond
Section 00450	Trench Safety Form
Section 00480	Bidder's Qualification Form
Section 00500	Agreement
Section 00600	Construction Payment Bond
Section 00601	Construction Performance Bond
Section 00650	Acknowledgement of Conformance with OSHA Standards
Section 00700	General Conditions
Section 00900	Addendum