

SECTION 02 42 00

REMOVALS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Removal work as required on drawings and as specified in this section and repair of damage to existing facilities to remain.
- B. Related Sections:
 - 1. 31 20 00 - Earthwork.

1.2 SUBMITTALS

- A. Removal Procedure for Site Work: If requested by A/E, submit proposed procedure of removal work.
 - 1. Procedure shall provide:
 - a. Means for safe conduct of work, careful removal, and disposition of materials specified to be salvaged for the Board.
 - b. Protection of property to remain undisturbed.
 - c. Timely disconnection of utility services.
 - 2. Procedure shall include a detailed description of methods and equipment to be used for each operation, and sequence of each operation.

1.3 PROJECT/SITE CONDITIONS

- A. Existing sidewalks, curbs, paving, landscaping, or other existing work not specified for removal that is temporarily removed, damaged, exposed, or disturbed or altered by removal work shall be repaired, patched, or replaced at no cost to the Owner.
- B. Existing Trees:
 - 1. Do not damage trees within project site specified to be left in place.
 - 2. Protect trees indicated to remain as required with acceptable barricades or temporary fencing during construction.
- C. Environmental Protection:
 - 1. Dust Control:
 - a. Control dust resulting from demolition to prevent spread of dust to occupied portions of buildings and to avoid creation of a nuisance in surrounding areas.
 - b. Do not use water to control dust when it will result in flooding or pollution or other hazardous or objectionable conditions.

2. Fire: Do not dispose of demolished materials or trees, etc., by burning.
3. Explosives: The use of explosives is not allowed.

D. Site Inspection: Inspect entire project area to determine extent of removal, salvage, and patching work.

1.4 SCHEDULING

A. Activities in areas next to removal areas cannot be interrupted or disturbed during normal facility hours.

1. Consult with the Owner and A/E to schedule the work.

B. Utility Companies:

1. Coordinate with applicable utility companies and the Board for utility line removal, if any, and related capping and utility shutdowns required by such removal work.

C. Removals:

1. Assign removals to appropriate trades under respective sections, best suited for this type of work to avoid unnecessary damage due to the efforts of unskilled workers.

PART 2 PRODUCTS

2.1 DISPOSITION OF MATERIALS NOT INDICATED OR SPECIFIED TO BE SALVAGED

A. Title to Materials:

1. Title to materials and equipment to be removed, except salvageable equipment to be retained by the Board, is vested in the Contractor upon receipt of Notice to Proceed.
 - a. The Owner will not be responsible for condition, loss of, or damage to such materials and equipment after receipt by Contractor of Notice to Proceed.

B. Remove excess materials and equipment not specified to be salvaged from site and premises upon completion of removal operations.

PART 3 EXECUTION

3.1 REMOVAL WORK

A. Perform removal work indicated on drawings or as specified in an orderly manner according to accepted construction schedule.

1. Protect work specified to remain.
2. Protect adjacent areas from damage or undue dirt and dust.

3. Wet down debris or rubbish, if necessary, to minimize flying dust.

3.2 EXISTING UTILITIES

A. Utility work shall be performed according to these specifications for the particular type of utility service involved.

3.3 EXISTING WORK

A. Existing work may be cut, altered, removed, or temporarily removed and replaced as necessary for the performance of work required.

1. Exception: Unless otherwise indicated on drawings, do not cut or alter structural members without authorization by the A/E.

B. Filling: Holes and other hazardous openings created by removal work shall be filled following procedures specified in Section 31 20 00 - Earthwork.

C. Restore damaged or defaced areas or items, remaining in place, of work performed under this Contract to comparable conditions existing before the work.

END OF SECTION

SECTION 03 30 53
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Cast-in-place concrete indicated on drawings and specified in this section.
- B. Related Sections:
 - 1. 31 20 00 - Earthwork

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. A185 Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - 2. A615 Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 3. D994 Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - 4. D1751 Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - 5. D1752 Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.3 SUBMITTALS

- A. Submit the following items and processes for review:
 - 1. Shop drawings for reinforcement and accessories.
 - 2. Concrete materials and mix designs.

1.4 STANDARDS

- A. ACI 301 "Standard Specifications for Structural Concrete for Buildings".
 - 1. Contractor shall keep one copy on the job, for reference.

PART 2 PRODUCTS

2.1 MANUFACTURERS

2.2 MATERIALS

- A. Concrete Strengths (Normal weight concrete):
 - 1. Exterior Slabs on Fill: 2,500 psi.
 - 2. Footings: 3,000 psi.
 - 3. Unspecified Concrete: 3,000 psi.
- B. Reinforcing: Deformed bars according to ASTM A615, Grade 60FY=60,000 psi, domestic manufacture.
- C. Form Ties: Form ties leaving plastic tube lined holes through members are not allowed.
- D. Welded Wire Mesh: According to ASTM A185, galvanized smooth wire, sizes as indicated.
- E. Expansion Joint Filler: According to Paragraphs 6.2.2.1 of ACI 301 and ASTM D1752 non-bituminous Type I compatible with polysulfide joint caulking compound for joints with caulking or sealant. Other joints, without caulking, bituminous treated fiber board type according to ASTM D994 and ASTM D1751.
- F. Adhesion and Patching Material: Proprietary materials for adhesion or patching are allowed.

PART 3 EXECUTION

3.1 INSPECTION

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.2 CONCRETE WORK

- A. Comply with ACI 301, Specifications for Structural Concrete for Buildings, except as otherwise specified.
 - 1. Proportioning: ACI 301, Method 2 for normal weight concrete.
 - 2. Bond Development at Construction Joints: Comply with Paragraphs 6.1.4.3 and 8.5 of ACI 301.
 - 3. Placing of concrete under water is not allowed.
 - 4. The use of earth cuts as forms is not allowed.

3.3 FIELD QUALITY CONTROL TESTING

- A. Perform field quality control testing according to following requirements: Comply with Chapter 16 of ACI 301.
- B. Mold 2 additional cylinders for 3 and 7 day tests (total of 5 cylinders required per batch tested).

- C. Tests specified in ACI 301 Paragraphs 16.3.4 and 16.5 will be performed by the Board Testing Laboratory.

3.4 FINISHES

- A. As specified in ACI 301, Paragraphs 10.4 and 11.8, unless otherwise specified or noted on drawings.
- B. Exterior Platforms, Sidewalks, Curbs, and Ramps: Light broom finish unless otherwise specified or noted on drawings.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Remove surface debris.
- B. Remove paving, curbs, and rock base in areas shown on drawings.
- C. Remove designated trees and shrubs including root systems.

1.2 RELATED SECTIONS

- A. Section 31 20 00-Earthwork.
- B. Section 02 42 00 - Removals
- C. Section 32 93 23-Sodding.

1.3 REGULATORY REQUIREMENTS

- A. Coordinate clearing work with utility companies.
- B. Conform to applicable Municipal and Broward County codes for legal disposal of debris and environmental protection. Contractor shall pay all fees.
- C. Conform to applicable Municipal and Broward County codes limiting generation of noise.

1.4 QUALITY ASSURANCE

- A. Certified Arborist: utilize a ISA (International Society of Arboriculture) Certified Arborist to:
 - 1. Provide tree protection plan to avoid damage to during construction
 - 2. Perform trimming of branches and root pruning with clearing limits.
 - 3. Extend pruning operation to restore natural shape of entire tree.
 - 4. Trim branches from trees, which are to remain, if required to provide horizontal and vertical clearance for construction equipment.
 - 5. Perform tree repair work for damages incurred by new construction.

1.5 SUBMITTALS

- A. Certification: Submit written certification by a Certified Arborist that trees indicated to remain have been protected during the course of construction under provisions of recognized standards of the industry. Indicate that damaged trees were promptly

and properly treated. Indicate which damaged trees, if any, are incapable of retaining full growth potential and are recommended to be replaced.

- B. Certification: Submit copy of demolition firm's current license to operate in Broward County, Florida. Tree demolition shall be conducted/supervised by a Certified Arborist (CA), Florida Certified Landscape Contractor (FCLC) or Landscape Architect.

1.6 TRAFFIC AND SITE OCCUPANCY

- A. During site clearing operations, ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- B. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from the Owner and applicable municipal authorities for areas outside the Owner's property line.
- C. Provide traffic control devices, flagmen and other controls to ensure safe passage of traffic and pedestrians.

1.7 TEMPORARY PROTECTIONS

- A. Temporary protection: Protect streets, roads, adjacent property, active utilities, and existing landscape materials and other site improvements designated to remain from damage through the use of temporary fencing, barricades, or guards.
- B. Protect root systems. Do not store construction materials, debris, or excavated material within the drip line, which is the outer perimeter of branches. Do not permit vehicles within the drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.
- C. Protect tree root systems from damage due to noxious materials in solution caused by run-off or spillage during mixing and placement of construction materials or drainage from stored materials. Protect root systems from flooding, erosion, or excessive wetting resulting from dewatering operations.
- D. Burning of plants or fires of any kind is strictly prohibited.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Tree pruning compound: Waterproof, antiseptic, elastic and free of kerosene, coal tar, creosote, and other substances harmful to plants.
- B. Drainage Fill: Selected stone or gravel graded to pass a 2.0-inch sieve and retained on a 0.5-inch sieve.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify that existing plant life and features designated to remain, be located or removed are tagged or identified.

3.2 INSPECTION OF SITE

- A. Visit the site and gain thorough familiarity with existing conditions such as existing grades, locations of buildings, poles, trees and landscape elements, and other site improvements, which may impact the Work.

3.3 PROTECTION

- A. Protect utilities that remain from damage.
- B. Protect trees, plant growth, and features designated to remain as final landscaping.
- C. Protect benchmarks and existing structures from damage or displacement.
- D. Relocate and protect large boulders and rocks identified by Owner to remain as final landscaping elements.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove paving, curbs, and rock base from areas indicated.
- C. Remove trees and shrubs as indicated. Remove stumps, main root ball, root system to a depth of 24 inches, and surface rock not to remain as final landscaping.
- D. Clear undergrowth and deadwood without disturbing subsoil.
- E. Apply herbicide to remaining stumps to inhibit growth.
- F. Carefully and cleanly cut roots and branches of trees indicated to remain, where roots and branches obstruct new construction, with sharp pruning instruments. Do not break or chop roots or branches. Paint cuts over 1/2 inch in size with tree pruning compound.
- G. Remove all topsoil containing roots and organic material, grass roots, organic soil, trees, shrubs, brush, grass, weeds, and other debris.
- H. Selective Clearing: In areas where trees are to remain, remove all undergrowth, dead trees, stumps, roots, vines, and other debris.

- I. Grubbing: Scarify the areas where vegetation or other unsuitable materials occur to a minimum depth of 6 inches until all such materials are loosened and remove from the site.
 - 1. Use only hand methods for grubbing inside the drip line of trees indicated to remain.
 - 2. Fill depressions caused by clearing and grubbing operations with satisfactory soil materials and compact and grade under provisions of Section 31 00 00 - Earthwork.

- J. Topsoil: Strip topsoil to whatever depths encountered by methods, which will avoid the intermingling of topsoil with underlying subsoil's or other objectionable materials. Stockpile topsoil in area on site as directed by the Project Consultant. Construct piles to freely drain surface water. Securely cover topsoil piles to prevent wind-blown dust.
 - 1. Topsoil is defined as friable clay loam sandy surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 1 inch in diameter and without weeds, roots, and other objectionable material.
 - 2. Remove heavy growths of grass from areas before stripping.
 - (a) Where trees are indicated to remain, stop topsoil stripping a sufficient area from the tree to prevent damage to the main root system.

3.5 EXCAVATION AROUND TREES

- A. Do not excavate within drip line of trees.

- B. Where trenching for utilities is required within the drip line, tunnel around roots by hand digging. Do not cut main lateral roots or tap roots; cut smaller roots, which interfere with installation of new work. Cut roots with sharp pruning instruments: do not break or chop.

- C. Do not allow exposed roots to dry out before permanent backfill is placed; provide temporary earth cover, or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with earth. Prune branches to balance loss to root system caused by damage or cutting of root system.

3.6 GRADING AND FILLING AROUND TREES

- A. Maintain existing grade within drip line of trees, unless otherwise indicated.

- B. Lowering grades: Where existing grade is above new finish grade shown around trees, carefully hand excavate within drip line to new finish grade. Cut roots exposed by excavation or provide permanent protections as recommended by tree surgeon.

3.7 RAISING GRADES

- A. Minor filling: Where existing grade is 6 inches or less below elevation of finish grade shown, use a topsoil fill material. Place in single layers and compact as required; hand grade to required finish elevations.
- B. Moderate filling: Where existing grade is more than 6 inches, but less than 12 inches, below finish grade elevation, place a layer of drainage fill on existing grade prior to placing topsoil. For balance of area, place drainage fill to an elevation 6 inches below grade and complete fill with a layer of topsoil to finish grade elevation. Do not compact gravel or topsoil layers receiving vacative cover; hand grade to required elevations.

3.8 REPAIR AND REPLACEMENT OF TREES

- A. Repair trees damaged by construction operations. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged trees.
- B. Remove and replace dead and damaged trees, which are determined by the SBBC Arborist to be incapable of restoration to normal growth pattern.
- C. Provide replacement trees 1.5 times the canopy of those trees to be replaced. Replacement trees should be the same species as selected by the A/E /Certified Arborist.

3.9 REMOVAL

- A. Remove debris, rock, and extracted plant life from site on a daily basis.
- B. Do not allow accumulations of debris.
- C. Burning of debris is not allowed.
- D. Use of blowers to distribute dust is not allowed.

END OF SECTION

31 20 00
EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Earthwork for buildings, athletic playing fields, and other grassed or landscaped areas as indicated on Drawings and specified in this section.

- B. Related Sections:
 - 1. 31 10 00 – Site Clearing
 - 2. 31 23 01 – Excavating & Backfilling.
 - 3. 32 93 23 - Sodding.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM), latest edition:
 - 1. C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 2. D422 Test Method for Particle-Size Analysis of Soils.
 - 3. D698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - 4. D1556 Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - 5. D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - 6. D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 7. D2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 8. D2974 Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Materials.
 - 9. D 4972 Test Method for pH of Soils.

- B. Florida Statute, Chapter 556, Underground Facility Damage Prevention and Safety.

- C. Consumer Products Safety Commission (CPSC): A Handbook for Public Playground Safety.

1.3 QUALITY ASSURANCE

- A. Trench Safety Act:
 - 1. Comply with the Trench Safety Act, sections 553.60 through 553.64 Florida Statutes.

1.4 DEFINITIONS

- A. "Satisfactory Fill Materials" include materials classified in ASTM D2487 as GW, GP, SW and SP properly worked by Contractor to obtain optimum moisture and compaction.
 - 1. For Playing Fields, and Other Grassed or Landscaped Areas:
 - a. Within 1.5 feet of the surface of the indicated grade, limit rock size to 3 inches.
 - b. Below 1.5 feet of the surface of indicated grade, limit rock size to 12 inches.
 - c. Deeper than 6 feet limit rock size to 24 inches.
 - 2. For Buildings:
 - a. Within 2 feet of the surface of indicated grade, limit rock size to 2 inches.
 - b. Below 2 feet of the surface of indicated grade limit rock size to 6 inches.
- B. "Unsatisfactory Materials" include materials other than "Satisfactory Fill Materials". Materials of any classification determined by testing laboratory as too wet or too soft for providing a stable foundation for structure, paving, and walks will be classified as "unsatisfactory".
- C. Degree of Compaction: Required compaction is expressed as a percentage of maximum density obtained by test procedures of ASTM D1557.
- D. Building Area: The area bounded by lines not less than 4 feet beyond the outside line of the building perimeter footings.
 - 1. Increase the 4 foot dimension by 1 foot for each foot of excavation depth required exceeding 4 feet.

1.5 SUBMITTALS

- A. Submit the following before starting work:
 - 1. Compaction Machinery Specifications.
 - 2. Compaction Tests (by the Owner).
 - 3. Soil Classification Tests using ASTM classification for subgrade materials and USDA classifications for topsoil materials.
 - 4. Stabilized Subgrade Composition and Density.
 - 5. Testing Laboratory (by the Owner).

1.6 SITE CONDITIONS

- A. Determine location and nature of work, character of equipment, and facilities needed for performance of work, general, and local conditions prevailing at site, and other matters affecting work under this contract according to Instructions to Bidders and General Conditions.
- B. Subsurface data, including soil borings, ground water elevations, or conditions, if shown on the drawings or attached to these specifications, are presented only as information available indicating conditions found and limited to exact locations and shall not be interpreted as an indication of conditions that may actually develop during construction.

1. Make deductions of subsurface conditions that may affect methods or cost of construction and agree that no claim for damages or other compensation shall be made, except as are provided for in the agreement, should conditions be found during construction different from those as calculated or anticipated by the Contractor.
 2. Neither the Owner nor the A/E will be held responsible for variations found to exist between the subsurface data referred to above and actual field conditions that may develop during construction.
- C. Where existing grades, utility lines, or substructures are shown on drawings, Contractor, the Owner, and A/E assume no responsibility for correctness of existing conditions indicated.
1. Contractor shall locate indicated existing utility lines or substructures that may be affected by this Project, and shall be responsible for any damage or injury they may sustain as a result from working on or near these existing utilities or substructures not specified to be removed or demolished.
- D. Bench Marks and Monuments:
1. Maintain existing bench marks, monuments, and other reference points, and if disturbed or destroyed, replace as directed by A/E.

1.7 JOB CONDITIONS

- A. Condition of Premises: Accept site as found and excavate, fill, compact, and backfill site as indicated on drawings and specified in this section.
- B. Protection:
1. Adjacent Structures and Property:
 - a. Take precautions to guard against movement, settlement, injury, or loss to existing structures or to equipment and furnishings housed therein arising directly or indirectly in connection with this contract according to Instructions to Bidders and General Conditions.
 - b. Provide and place bracing or shoring as necessary or proper according to Instructions to Bidders and General Conditions.
 - c. Be responsible for the safety and support of such structures and facilities and be liable for any movement or settlement, damage, or injury caused by or resulting therefrom.
 - 1) If, at any time, the safety of any adjacent structures or facilities appears to be in doubt, cease operations and take immediate precautions to support such structures and facilities and notify A/E at once.
 - 2) Resume operations only after permission has been granted by A/E.
 2. Adjacent Sidewalks and Streets:
 - a. Take precautions to guard against movement, settlement, or collapse of any sidewalks, curbs, or street passages on adjoining sites and be liable for any such movement, settlement, or collapse according to Instructions to Bidders and General Conditions.

- 1) Repair such damage promptly when so ordered at no cost to the Owner.
 - 2) Install necessary shoring, including sheet piling as may be required, to protect banks, adjacent paving, structures, and utilities during excavations.
 - 3) Be responsible for any damage to existing structures, equipment, and furnishings due directly or indirectly to construction operations. Except where removal is needed by site grading or location of new buildings, use every possible precaution to prevent injuries to landscaping, drives, curbs, and walks on or next to site of the work and replace, at no expense to the Owner, any of the above destroyed.
3. Existing Landscaping, Drives, Curbs, and Walks: Except where removal is required by site grading or location of new buildings, take every possible precaution to prevent injuries or loss to individual trees, groups of trees, and other existing landscaping, drives, curbs and walks on or next to the site of the work according to Instructions to Bidders and General Conditions, and replace any such damaged or destroyed at no cost to the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. Athletic Field Topsoil Mixture:

1. Sand Component:

- a. Sands shall be clean, sharp, natural sands, predominantly silica in nature.
- b. The sand shall have the following particle size distribution using the USDA classification system:

<u>PARTICLE NAME</u>	<u>SIZE (MM)</u>	<u>ALLOWABLE %</u>
Gravel	(2.00-4.75)	Combined
Very Coarse Sand	(1.00-2.00)	Less than 12
Coarse	(0.50-1.00)	Combined
Medium Sand	(0.25-0.50)	60-80
Fine Sand	(0.10-0.25)	0-20
Very Fine Sand	(0.05-0.10)	0-5
Total Sand	90-100	
Silt	(0.002-0.05)	1-10 *
Clay	(minus 0.002)	1-10 *

(* Silt and clay combined shall not exceed 12 percent)

- c. The sand shall have a pH less than 7.6 and a soluble salt value of less than 2.5 mmohs/cm.

2. Soil/organic Component:

- a. A muck type soil shall be used. The soil shall have a USDA soil texture classification of loam, sandy clay loam, or sandy loam.
- b. The soil shall contain 15 to 30 percent by weight organic matter (ASTM D 2974 Method C).
- c. The soil shall have a pH between 5.5 and 7.5.

d. The soil shall have a soluble salt content less than 3.0 mmohs/cm.

3. Athletic Field Topsoil Mixture:

a. The athletic field topsoil mixture shall be a blended soil consisting of the approved sand and the approved soil/organic amendment material. Thorough blending using soil blending is required. Material shall be blended off-site.

b. Blend volumes of sand: Soil shall be in the range of 3 parts and 1 part soil/organic to 2 parts sand and 1 part soil/organic.

1) The blending volumes of sand to soil/organic amendment shall be determined by a laboratory using United States Golf Association methods and accredited by the American Association for Laboratory Accreditation. The contractor shall be provided a list of approved laboratories.

c. Blended soils shall meet the following specifications:

Infiltration rate (K-sat)	4 - 6 inches/hr.
Total Porosity	35 - 55 percent
Aeration Porosity	15 - 30 percent
Capillary Porosity	12 - 25 percent

d. Provide organic matter analysis on laboratory blended material and on field blended athletic field topsoil batches of each 1,000 cu. yds. Field blended batches shall not vary by more than + 1.0 point from the laboratory blend.

e. Mixture shall be free of rocks, limbs, roots, and other deleterious matter.

B. Baseball and Softball Fields:

1. Clay: Florida red clay, free from rocks and shall contain a minimum of 20 percent clay, and a maximum of 75 percent sand with the balance of soil being silt.

PART 3 EXECUTION

3.1 INSPECTION

A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.2 GENERAL

A. Public Safety: Accomplish work in a manner providing for the safety of the public and workers and the protection of property.

B. Construction: Do not close, obstruct, or store material or equipment in streets, sidewalks, alleys, or passageways without a permit according to local ordinances, regulations, codes, and the Owner's approval.

C. Interference: Conduct operations with minimum interference with roads and other facilities.

D. Removal:

1. Unless otherwise noted or specified to be relocated or stored, materials removed become property of Contractor and shall be removed completely away from site.
2. Do not store or allow debris to accumulate on site.
3. If Contractor fails to remove excess debris promptly, the Owner reserves the right to remove the debris at Contractor's expense.

E. Temporary Structures: Remove temporary structures when no longer required.

F. Repair:

1. Clean up, repair, or replace, at no cost to the Owner, property damage arising in connection with this Contract.
2. Patch and repair work shall match existing and be performed in a neat and professional manner by workers skilled in the trade involved.
3. This applies to damage to the newly graded areas within the building area limits and damage to adjacent properties by eroded materials.

G. Erosion Repair:

1. Take every precaution and temporary measure to prevent damage from erosion of freshly graded areas.
 - a. Repair and reestablish grades to required elevations and slopes where settlement or washing occurs before acceptance of work at no cost to the Owner.
 - b. This applies to damage to the newly graded areas within the building area limits and damage to adjacent properties by eroded materials

3.3 LOCATIONS AND ELEVATIONS

A. Be responsible for surveys, measurements, and layouts required for proper execution of the work.

1. Lay out lines and grades from existing survey control system and as shown on drawings.

B. Locate by stake and mark locations and elevations of following:

1. Elevations of existing earth cut and fill.
2. Final grades for landscape contours.
3. Other items as required to execute work as specified.

3.4 CLEARING AND GRUBBING

A. Within limits of areas designated for building area, grading and site construction work, remove trees, brush, stumps, wood debris, and other deleterious materials not required to remain as part of finished work.

B. Remove grass, plants, vegetation, and organic material from same area.

C. Burning of materials is not allowed on the site.

- D. Remove accumulated material daily or as necessary to prevent fire hazard condition.

3.5 STRIPPING

- A. Strip turf, organic material, surface litter, rubble, and overburden for entire depth of root system of grass or other vegetation within areas indicated on Site Plan.
- B. Stockpile topsoil on site where directed.
- C. For building area, remove muck or organic material above the limestone layer. Clean potholes, larger than 6 inches in any horizontal direction, in rock filled with muck or organic material.

3.6 EXCAVATION

- A. Begin excavation after stripping, clearing, and grubbing has been completed.
- B. Excavate to grades required to accommodate the proposed construction.
- C. Dewater as specified.
- D. Excavations for structures shall conform to dimensions and elevations indicated for each building.
 - 1. Extend excavations a sufficient distance from walls and footings to allow for placing and removal of forms and installation of services, except where the concrete for walls and footing is authorized to be deposited directly against excavation surfaces.
 - 2. Excavation below general machine excavation for footings and foundations shall be hand worked.
 - 3. Bottoms of footings shall be on level planes.
- E. Excavate in such a manner that quick and efficient drainage of storm water will occur.
- F. Remove "unsatisfactory materials" encountered from the building areas.
- G. Classify excavated materials and stockpile separately suitable soils for use as backfill materials. If sufficient quantities of excavated materials meeting requirements for backfill are not available on site, provide materials meeting these requirements.
- H. Stockpile excavated material suitable for use as fill and backfill where directed by A/E.

3.7 FILLING, BACKFILLING, AND COMPACTION

- A. Compaction:
 - 1. Compact existing earth surfaces (exclude rock) after excavation, backfilling, and compaction of said areas to levels required with "Suitable Backfill Materials".
 - a. Compact with equipment suited for soil compaction.
 - b. Moisten or aerate material, as necessary, to provide moisture content to facilitate obtaining specified compaction with equipment being used.
 - c. Compact each layer to not less than percentage of maximum density specified below, determined according to ASTM D1557, Method D.

- d. Insure compaction of previously prepared fill areas has been maintained before placing new layers.

	<u>Location</u>	<u>Percent</u>
1)	Under structures and building slabs, except footings, each layer.	95
2)	Under footings, top 1 foot in cut, each layer of fill.	95
3)	Under pavements and sidewalk areas, top 12 inches, each layer.	95
4)	Under pavements and sidewalk areas, below 12 inches, each layer.	90
5)	Under landscaped areas, each layer including physical education fields.	80-85

B. Filling and Backfilling:

- 1. Materials: "Satisfactory Fill Materials" shall be used in fills and backfills.
- 2. Place "Satisfactory Fill Material" in horizontal layers not exceeding 12 inches in loose depth.
 - a. Compact as specified in this section.
 - b. Do not place materials on muddy surfaces.

C. Reconditioning of Subgrade:

- 1. Where approved compacted subgrades are disturbed by the Contractor's subsequent operations or adverse weather, scarify and compact the subgrade as specified to required density before further construction occurs.
- 2. Use power driven hand tampers for recompaction over underground utilities

D. Backfilling:

- 1. Do not begin backfilling until:
 - a. Construction below finished grade has been accepted.
 - b. Underground utilities systems have been inspected, tested, and accepted.
 - c. Forms have been removed.
 - d. Excavation cleaned of trash and debris.
- 2. Bring backfill to indicated finished grades.
- 3. Backfill materials and compaction shall be as specified.
- 4. Do not place backfill in wet areas.
- 5. Do not operate heavy equipment for spreading and compacting backfill closer to foundation or retaining walls than a distance equal to height of backfill above top of footing.
- 6. Compact the area remaining by power-driven hand tampers suitable for material being compacted.
- 7. Place backfill carefully around pipes to avoid damage to the pipes.

E. Protection: Settlement or washing occurring in backfilled areas before acceptance of work shall be repaired and grades reestablished to required elevation and slope.

3.8 DISPOSAL OF EXCESS EXCAVATED MATERIALS

- A. Excess "Satisfactory Fill Materials" and "Unsatisfactory Materials" shall become the property of the Contractor.
 - 1. Remove from site.

3.9 LASER GRADING

- A. Provide gradients and elevations as shown in Construction Documents with current industry standard laser grading procedures using laser automated graders and laser automated dozers to ensure specified tolerances.

3.10 FILL AND GRADING FOR FOOTBALL AND PLAYING FIELDS, AND OTHER GRASSED AREAS

- A. Physical Education Fields and Other Grassed Areas: Clean, satisfactory fill, free from rock and debris and of such quality to not interfere with future installation of grass.
- B. Football and Playing Fields:
 - 1. Base material shall be "Satisfactory Fill Materials" with no rocks larger than 3 inches.
 - 2. Rough grade a minimum of 8 inches below finish topsoil grade in preparation for fill consisting of athletic field topsoil mixture.
 - 3. Crown and contour base material according to the gradient as specified.
 - 4. Athletic field topsoil mixture as specified shall be placed over graded base to a depth of not less than 8 inches. Athletic field topsoil mixture shall be contoured and firmed in 4 inch lifts according to the gradient as specified.
 - 5. Gradient: Provide longitudinal 12 inch high crown at the center of the field **unless otherwise indicated on drawings** extending the entire length of the field including end zones with a uniform slope to the sidelines. Final finished grade of the surface shall meet elevations as shown on the drawings.
- C. Other Grassed Areas:
 - 1. Rough grade: At least 4 inches below finish topsoil grade in preparation for topping consisting of at least 4 inches of compacted 80-20 top soil mix as specified in Section 02900.
 - 2. Grass: As specified in Sections 02900 and 02935.
 - 3. Gradient: According to grading plan.
- D. Landscaped Areas other than Grass:
 - 1. Fill and grade according to "Other Grassed Areas" as specified with variations per specific plant material, as specified in Section 02900.
 - 2. Gradient according to grading plan.

3.11 FILL AND GRADING FOR BASEBALL FIELDS

- A. Rough grade in preparation for infield and outfield fill is as follows:
 - 1. Clay Infield Areas and Warning Tracks:

- a. Rough Grade: At least 6 inches below finish grade.
- b. Base: 2 inches of fine satisfactory fill material with no rocks larger than 1 inch.
- c. Topping: At least 4 inches of Florida Red Clay.

2. Infield and Outfield Grass Areas:

- a. Base material shall be "Satisfactory Fill Materials" with no rocks larger than 3 inches.
- b. Rough grade a minimum of 8 inches below finish topsoil grade in preparation for fill consisting of athletic field topsoil mixture.
- c. Crown and contour base material according to the gradient given in the grading plan for the baseball/softball fields.
- d. Athletic field topsoil mixture shall be placed over graded base soil to a depth of not less than 8 inches. Athletic field topsoil mixture shall be contoured and firmed in 4 inch lifts according to the grading plan for the baseball/softball fields.

3. Grass: Sod as specified in Section 32 93 23.

B. Finish Grade:

1. Grade infield and outfield areas in concentric circles from a radius center at home plate or pitcher's mound as indicated on the drawings.

- a. Infield: Make finish grade smooth and even. Blade after compaction to give skinned finish.
- b. Outfield: Make finish grade smooth and even in preparation for grassing as specified in Section 32 93 23.

2. Infield skinned area gradient: See Plans

3. Infield turf area gradient: See plans

4. Outfield turf area gradient:

a. Baseball: See Plans.

b. Softball: See Plans.

3.12 DEWATERING

A. Dewater excavations for inspection and for construction. Concrete or fill shall not be placed in water and concrete less than 8 hours of age shall not be subjected to ground water pressure.

- 1. Keep excavations free of water while backfilling or construction takes place.
- 2. Dispose of water resulting from dewatering operations according to city, county, state, and federal regulations.
- 3. Conduct operations to insure storm water runoff sediment is not discharged to the adjacent lakes, waterways, sewers, streets, and adjacent properties.

3.13 TESTING

A. If requested by the Owner, the Contractor will provide services of a Testing Laboratory to perform specified tests.

1. Notify, through A/E, the contracted Testing Laboratory to perform specified tests at the Contractor's expense.
- B. Tests of Materials:
1. Soil Classification:
 - a. One test from each type of material encountered or proposed to be used.
 2. Laboratory Tests for Moisture-Content and Density According to ASTM D1557:
 - a. One test for each material encountered or proposed to be used.
 3. Field Tests for Moisture-Content and Density:
 - a. According to ASTM D1556 or ASTM D2922, one test per layer of fill per 10,000 square feet of area, plus one test per 10,000 square feet of subgrade in cut.
 4. Laboratory Tests for Athletic Field Topsoil Mixture:
 - a. As specified.
- C. Fill and topsoil mixture may be inspected at any stage of operation to determine compaction characteristics, densities and freedom from organic and plastic materials.
- D. Notification:
1. Give sufficient notification of placing of orders for fill and topsoil with supplier to allow full inspection including testing for compaction characteristics at source of supply.
 2. Obtain approval from A/E before placing topsoil mixture at project site, without exception.

END OF SECTION

SECTION 31 23 01

EXCAVATING, BACKFILLING AND COMPACTION FOR UTILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections:

1. 31 30 00 - Earthwork.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM), latest edition:

1. D1556 Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
2. D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
3. D2487 Practice of Classification of Soils for Engineering Purposes (Unified Soil Classification System).

B. Occupational Safety and Health Administration (OSHA): Trench Safety Act.

1.3 DEFINITIONS

- A. "Satisfactory Fill Materials" include materials classified in ASTM D2487 as GW, GP, SW, and SP properly worked by Contractor to obtain optimum moisture and compaction. Maximum size of rock limited to 6 inches. Use 2 inch maximum size for the top 2 feet below the finish indicated grade.

1.4 SUBMITTALS

- A. Submit copies of tests and records performed as specified to A/E for review before starting work.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with OSHA, Trench Safety Act, Standard 29 C.F.R.s., Chapter XVII, Subpart P (para. 1926.650 thru 1926.653).

1.6 PROJECT CONDITIONS

- A. Excavation, filling, and backfilling for utilities complete for underground utility lines and structures as specified and as shown on the drawings.
- B. Sidewalks and Streets:

1. Take precautions to guard against movements, settlement, or collapse of sidewalks or street passages on site or on adjoining property.
2. Be liable for any such movement, settlement, or collapse.
3. Repair promptly such damage.
4. Install shoring, including sheet piling, as may be required during excavation to protect trench banks, adjacent paving, structure, and utilities.

C. Existing Utilities:

1. Protect existing utilities from movement, settlement, or other damages according to Instructions to Bidders and General Conditions.

D. Trench Safety Act: Provide trench safety systems at all trench excavations where workers may be exposed to moving ground or cave-ins regardless of depth of trench. All trenches more than 5 feet in depth shall comply with OSHA "Trench Safety Act".

PART 2 PRODUCTS

2.1 MATERIALS

- A. Trench Backfill Materials: Either satisfactory excavated material or fill materials as specified.
- B. Pipe Bedding Material: Bedding material shall be selected or satisfactory backfill material and free of any rocks or stones larger than 2 inches in diameter for cast iron and PVC pipe. Limerock screenings or sand shall be used for copper tubing. (Underground copper lines are 3 inch diameter or less.)

PART 3 EXECUTION

3.1 INSPECTION

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.2 EXCAVATION

A. General:

1. Perform excavating of every description and of whatever substance encountered to depths indicated or specified.
2. Pile materials suitable for backfilling a sufficient distance from banks of trenches to prevent slides or cave-ins.
3. Keep surface drainage of adjoining areas unobstructed.
4. Remove excavated materials not required nor suitable for backfill from site.
5. Remove water by pumping or other acceptable method and discharge at a safe distance from excavation. Continue dewatering until deemed proper or desirable for the installation of utility lines.

6. Comply with the applicable standards and regulations of Broward County and the city where project is located.
 7. Sheet piling and shoring shall be done as is necessary for protection of work and for safety of personnel. Excavating shall be by open cut.
- B. Special requirements relating to specific utilities are as follows:
1. Excavating for Appurtenances:
 - a. Excavations for structures shall be sufficient to leave at least 12 inches in the clear between their outer surfaces and the embankment or shoring used.
 - b. Whenever unstable soil is incapable of properly supporting the structure is encountered in the bottom of the excavation, such soil shall be removed and excavation
 - c. Unauthorized over-depths or under-depths in wet or otherwise unstable soil shall be filled with selected backfill material or concrete, as directed, at the expense of the Contractor.

3.3 EXCAVATION OF UNCLASSIFIED MATERIAL

- A. Materials encountered during the excavating to the depth and extent specified and indicated on drawings may include rock, concrete, masonry, or other similar materials.
1. No adjustment will be made in the Contract Price because of the presence (or absence) of rock, concrete, masonry, or other similar materials.

3.4 PROTECTION OR REMOVAL OF UTILITY LINES

- A. Protection:
1. Protect existing utility lines indicated on drawings (or the locations of which are made known to Contractor before excavating and trenching) specified to remain, including utility lines constructed during trenching operations, from damage during trenching, backfilling, and compacting operations.
 - a. If such new or existing utility lines are damaged during trenching, backfilling, and compacting operations, repair or replace at no cost to A/E.
 2. When utility lines specified to be removed or replaced are encountered within the area of operations, issue notices in ample time for measures to be taken to coordinate necessary interruption of services.
- B. Repair of Damage to Unknown Existing Utility Lines:
1. Existing utility lines not shown on drawings (or the location of which is not known to Contractor in time to avoid damage) damaged during trenching operations shall be repaired by Contractor and an adjustment to the Contract Price will be made according to Instructions to Bidders and General Conditions.

3.5 BACKFILLING

A. General:

1. Leave sheeting in place where damage is likely to result from withdrawal.
2. Carefully backfill trenches with satisfactory specified materials.
3. Bring backfill up evenly in 9 inch maximum layers, loose depth, and thoroughly and carefully compact with mechanical or hand tampers until pipe has a minimum cover of one foot. Take care not to damage the pipe.
4. Deposit remainder on the satisfactory backfill material in the trench in one foot layers and compact by mechanical means to percentages as specified.
 - a. Trenches and excavation pits improperly backfilled or where settlement occurs shall be reopened to the depth required for proper compaction, refilled and compacted, with the surface restored to the specified grade and compaction.
 - 1) Keep excavations free of ground and surface water until backfilling operation is complete.

B. Appurtenances:

1. At structures, remove forms and trash before backfilling:
 - a. Place satisfactory backfill materials symmetrically on all sides in 9 inch maximum loose depth layers.
 - b. Moisten each layer, if necessary, and compact with mechanical or hand tamper, taking care not to injure the structure by excessive tamping.
2. Materials and density shall be as previously specified for trenches depending upon location of the structure.

C. Compaction:

1. Material may be compacted by a hand tamper, a powered hand tamper, a vibrating tamper, or mechanized power tamper provided such compaction percentages meet the required density as specified below.
2. Backfilling and compacting by means of hydraulic methods will not be allowed except as may be approved by A/E.
 - a. Compact each layer to not less than the percentage of maximum density specified below, determined according to ASTM D1557, Method D:

<u>FILLS AND BACKFILL</u>	<u>COHESIONLESS SOIL</u>
Under slabs and pavement	95%
Under walk areas, top 12 inches	95%
Under walk areas, below top 12 inches	90%
Under landscape areas	85%
Under other areas noted on Site Plan	85%

3.6 TESTING

- A. Notify, through A/E, the Board contracted Testing Laboratory to perform specified tests at the Board's expense.
- B. Tests of Materials shall be as follows:
 - 1. Laboratory Tests for Moisture Content and Density:
 - a. According to ASTM D1557, one test for each material encountered or proposed to be used.
 - 2. Field Tests for Moisture Content and density:
 - a. According to ASTM D1556, one test per layer per 100 linear feet of ditch.

END OF SECTION

SECTION 32 16 00
CONCRETE SIDEWALKS, & CURBS

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections:

1. 31 20 00 - Earthwork.
2. 03 30 00 – Cast-In-Place Concrete

1.2 REFERENCE STANDARDS

- A. City of West Park or Broward County Engineering Standards, latest edition. Most stringent requirements shall apply
- B. Florida Department of Transportation (FDOT), latest edition, Standard Specifications for Road and Bridge Construction.

1.3 SUBMITTALS

- A. Submit properly identified manufacturer's literature and installation instructions before starting work.
- B. Shop Drawings: Submit concrete mix design.
- C. Concrete Tests: Submit for review.

1.4 QUALITY ASSURANCE

- A. Perform tests according to the specified standards.
- B. Provide reinforcing at extruded curbing.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete:

1. Provide concrete for sidewalks, straight curbs, curbs, gutters, and as specified in Section 03 30 00 – Cast-In-Place Concrete.

PART 3 EXECUTION

3.1 INSPECTION

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.2 INSTALLATION

- A. Concrete Sidewalks: Provide as indicated on drawings and specified in Section 145 of M-DCPW.

3.3 TESTING

- A. Provide tests as specified in Section 03 30 00, **or as instructed by City of West Park**

END OF SECTION

SECTION 32 80 00
IRRIGATION SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections:

1. 02200 - Earthwork.
2. 02221 - Excavating, and Backfilling,.
3. 02935 - Sodding.

1.2 WORK INCLUDED

A. Provide labor, materials, necessary equipment, and services to complete, repair or modify the underground sprinkler systems work, as indicated on the drawings and as specified herein.

B. Where applicable, the completed and proper construction of the landscape irrigation system shall include, but not be limited to:

1. A complete and operable system for the irrigation of areas to be landscaped on the project site.
 - a. Size the pump for the number of circuits/zones for proper irrigation during a maximum 5 hour per day irrigation cycle to achieve 1.5 inches per week.
 - b. Maintain operation of the remaining existing system where needed, while construction of the new system is under way.
 - c. Plans and specifications are intended to include items obviously necessary and requisite for the proper irrigation of the project.
 - d. Provide any additional labor, materials, and equipment required for a proper system.
 - 1) For existing school sites, locate, interface, and connect, where indicated, the existing system to the proposed.
 - 2) Repair any of the existing irrigation system damaged during construction.
 - 3) M-DCPS will supply as-built-plans of the existing system.

C. On-Site Conditions.

1. Protection of Property:

- a. Preserve and protect site conditions to remain from damage due to this work. In the event damage does occur, damage shall be completely repaired to its original condition at no additional cost to M-DCPS.

2. Trenching:

- a. Trenching or other work under the leaf canopy of trees shall be done by hand or by other methods so that no branches are damaged in any way.

- b. Trenching around existing plant material shall be done by hand to minimize root disturbance.
- c. Buildings, walks, walls, and other property shall be protected from damage. Open ditches left exposed shall be flagged and barricaded by approved means.
- d. Restore disturbed areas to their original condition.

3. Protection and Repair of Underground Utilities:

- a. Request the proper utility company to stake the exact location of any underground lines including but not limited to electric, gas, telephone service, water, and cable.
- b. Take whatever precautions necessary to protect underground lines from damage. In the event damage does occur, damage shall be completely repaired to its original condition, at no additional cost to M-DCPS.

4. Protection of Existing Plants and Site Conditions:

- a. Take necessary precautions to protect site conditions to remain. Should damages be incurred, repair the damage to its original condition at no additional cost to M-DCPS.
- b. Any disruption or disturbance of any existing plant, tree, shrub, or turf, or any structure shall by completely restored to the satisfaction of the Board at no additional cost to M-DCPS.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

- 1. A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- 2. D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- 3. D2564 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- 4. D2855 Standard Practice for the Two-Step (Primer Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.

1.4 SUBMITTALS

A. Submit properly identified manufacturer's literature before starting Work.

B. Submit Shop Drawings on the following:

- 1. Pipe and Fittings.
- 2. Sprinkler Heads.
- 3. Swing joints.
- 4. Pump.
- 5. Gate Valve.
- 6. Electric Control Valve.
- 7. Pressure Gage.
- 8. Controller.
- 9. Foot Valve.

10. Compound Gage.
11. Pressure Switch.
12. Backflow Preventors.
13. Valve Boxes.
14. Pressure Relief Valve.
15. Hydropneumatic Tank.

C. Record Drawings:

1. After completion of installation, furnish completed set of as-built drawings showing locations of sprinkler heads, valves, drains, and piping to scale, with dimensions where required or necessary.
 - a. Show vertical and horizontal deviations from the bid documents made during construction affecting, but not limited to, the mainline pipe, controller locations, remote control valves, quick-coupling valves, and sprinkler heads.
 - b. The drawing shall also indicate and show approved substitutions of size, materials, manufacturers' names, and catalog numbers.
 - c. Piping shall be dimensioned and drawn to scale.
 - d. Remote control valves and isolation valves shall have 2 measurements from fixed objects.
2. The A/E will supply one complete set of digital prints to be used for Record Document submittal. Transfer record documents information outlined above to these reproducible prints.
3. At contract close out, deliver the completed set of as-builts fully updated and containing the information outlined above to the A/E and M-DCPS.
4. Furnish two hard-copies of the "as-built" drawings and one copy in digital format. These drawings shall be delivered to the A/E before his review for Substantial Completion of the work.

D. Operation and Maintenance Manuals:

1. Prepare and deliver to the A/E within ten calendar days before completion of construction a minimum of three hard cover binders with three rings containing the following information:
 - a. Index sheet stating the contractor's address and business telephone number, list of equipment with names and addresses of local manufacturers' representatives.
 - b. Catalog and parts sheet on every material and equipment installed under this contract.
 - c. Complete operating and maintenance instructions on major equipment components.
 - d. Furnish a reduced color-coded copy of the as-built drawings laminated in plastic and mounted inside the controller cover. Note the valve number on drawings and include same number on tag attached to valve or engrave on outside cover of valve box.

1.5 WARRANTY

- A. Fully warrant the landscape irrigation system for a period of one year after the written confirmation from the A/E that the warranty period is in effect.

- B. During the warranty period, enforce manufacturer's and supplier's warranties. Any malfunctions, deficiencies, breaks, damage, disrepair, or installation by the contractor and his suppliers shall be immediately and properly corrected as directed by M-DCPS and/or the A/E.
- C. Make full and immediate restoration for any damages caused by system malfunction at no additional cost to M-DCPS.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pipe and Fittings:

1. All materials throughout the system shall be new and in working condition.
2. Underground Piping:
 - a. Main lines (Irrigation lines on the supply side of the system up to the zone control valves).
 - 1) Pipe 4" Diameter and Less: Schedule 40 PVC plastic pipe 1120 or 1220, NSF approved, and complying with ASTM D1785.
 - 2) Pipe Larger than 4" Diameter: PVC plastic pipe, SDR 21, 1120, or 1220, complying with to ASTM D2241 with a minimum pressure rating of 200 psi.
 - 3) Fittings: PVC molded fittings manufactured of the same material as the pipe and suitable for solvent weld.
 - 4) Slip joint ringtie seal (SCH 40) complying with ASTM D 2466 or threaded connections (SCH 80) complying with ASTM D2464.
 - b. Lateral lines (Irrigation lines on the sprinkler head side of the system from the control valves to the sprinkler heads.)
 - 1) Schedule 40 PVC plastic pipe 1120 or 1220, NSF approved, and complying with ASTM D1785.
 - c. Swing Joints:
 - d. Triple elbow swing joints for all rotors and quick coupling valves.
 - e. Nipples: PVC complying with ASTM D1785, Type 1, Grade 1, Schedule 80.
 - f. Poly-pipe swing joints are not allowed.
 - g. Fittings (all types):
 - 1) Schedule 40 PVC for pipe sizes less than 3" diameter.
 - 2) Schedule 80 PVC for pipe sizes 3" diameter or greater.
3. Above Ground Piping:
 - a. Spray nozzle riser pipe: UV radiation resistant SCH 80 PVC nipple.
4. Pipe Sleeves: Schedule 40 galvanized steel pipe providing minimum 1/2" clearance between sleeve and PVC sprinkler pipe.

- B. Solvent Cement: Heavy body grey, according to ASTM D2564.
- C. Thrust Blocks:
1. Main line piping shall have thrust blocks sized and placed according to pipe manufacturer's recommendations and as shown on drawings.
 2. Thrust blocks shall be standard concrete mix according to ASTM C150, ASTM C33, and ASTM C94 with a 28-day compressive strength of 3,000 PSI.
 3. Thrust blocks shall be installed at tees, elbows, 45's crosses, reducers, plugs, caps, and valves.
 4. Ensure stability of thrust blocks.
- D. Sprinkler Heads:
1. Provide sprinkler heads as scheduled on Drawings.
 2. Paint above grade risers for stationary head with 2 coats of exterior flat black paint unless already black painted by manufacturer.
- E. Gate Valve: Nibco Model T-111, all bronze body, Class A, Type II, or accepted equivalent.
- F. Control Valve Box: Precast polymer concrete box and green lockable cover with the words "Irrigation Valve".
1. L.R. Nelson Corp.
 2. Quazite by Strongwell, Lenoir City, TN.
- G. Irrigation Control Wire:
1. Electrical control and ground wire shall be irrigation control cable. Wiring used for connecting the automatic remote-control valves to the automatic independent station controllers shall be Type "UF", 600-volt, solid copper, single conductor wire with PVC insulation and bear UL approval for direct underground burial feeder cable.
 2. Insulation shall be 4/64" thick minimum covering of an approved thermoplastic compound for positive waterproof protection of the following sizes:
 - a. Control wire from independent station controllers to electric valves shall be AWG Size 14/1.
 - b. Any major controller wire splices (10-12 wires) need to be in junction box.
 3. Verification of wire types and installation procedures shall be checked to conform to local codes.
 4. All zone control wiring shall be enclosed in PVC electrical conduit and be installed in the same trench as the water lines.
- H. Quick Coupler Valves:
1. Quick coupling valves shall be 3/4" Rainbird #3RC Series single piece valve.
 2. Valve shall be mounted on tripe swing joint as shown on drawings.
 3. Provide Rainbird #33K Series quick coupler keys and two 3/4" swivel hose ells to the Board for each quick coupling valve installed.
 4. Quick couplers shall be located and installed as specified.

I. Pumps:

1. Self-priming centrifugal end suction type with capacitor start motor designed for continuous operation and with ball bearings and steel shaft by Sta-Rite or accepted equivalent.
2. Furnish starter with pump.
 - a. Base and diffuser shall be cast iron with bronze impeller.
 - b. Capacity as indicated on Drawings.

J. Electric Zone Control Valve:

1. Brass body rated at 200 psi with, with brass valve, flow control and manual shut-off, Toro 21.
2. Non-corrosive piston and cylinder assembly, 24 volts AC solenoid.

K. Controller:

1. Electromechanical, 14-day, 24 hour, 110 volts, 60 Hz AC with 24 volts output, RC Series by Rainbird or Monitor by Toro.
2. Provide number of stations as shown in Drawings.
3. Provide complete with internal transformer.
4. Provide pump switch control circuit.

L. Pressure Relief Valve:

1. Watts No. 53L or accepted equivalent.
2. Sized as indicated on Drawings.

M. Pressure Gage:

1. 4-1/2" diameter drawn steel case, 0-100 psi range, Marshalltown No.23, or accepted equivalent.
2. Provide gage cock.

N. Foot Valve:

1. Flomatic Model 60-S, bronze body, or accepted equivalent.
2. Valve shall be 4-inch size.

O. Compound Gage:

1. 4-1/2" steel case, Marshalltown Model 45, or accepted equivalent.
2. Provide gage cock.

P. Pressure Switch: Mercoid Series "D", with visible calibrated dial or accepted equivalent.

Q. Backflow Preventor: Reduced pressure type. Comply with local authority requirements and as indicated on Drawings.

R. Hydropneumatic Tank: As indicated on Drawings.

S. Wells:

1. Wells shall comply with South Florida water management guidelines.
 2. 6-inch nominal diameter, standard weight galvanized steel drive pipe with butt welded joints, flow capacity as shown on Drawings.
 3. Bronze fitted pump with air and heat release valves.
 4. Provide domestic water hose bibb in pump room.
 5. Provide hose bibb connection at pump piping suitable for priming connection.
 6. Well system suction line from well to pump and discharge pipe from pump to 10 feet outside building wall shall be schedule 40 galvanized.
 7. Provide a well system for all other areas consisting of either a turbine pump or centrifugal split case pump with a 60-gallon minimum pressure tank, depending on the type of area being irrigated.
 - a. System design shall include a pressure switch interlocked with the controller and pump starter.
 - b. Pressure switch shall have high and low settings for emergency shut down.
- T. Solvent Cemented Joints in PVC Pipe and Fittings: According to ASTM D2855.
- U. Rain Sensor/Rain Switch: As indicated on drawings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.2 INSTALLATION

- A. Excavation, Placing Piping, and Backfilling:

1. Excavate trenches for underground piping to provide:
 - a. A minimum of 24 inches cover under pavement without pipe sleeve.
 - b. A minimum of 12 inches cover with pipe sleeve:
 - c. A minimum of 12 inches cover in landscaped areas for lateral lines 4" and under.
 - d. A minimum of 18 inches cover in landscaped areas for main lines.
 - e. A minimum of 24 inches cover in landscaped areas for main lines larger than 4".
 - f. The pipe and fittings shall be carefully inspected before installation of trench.
 - g. Rocks over 2 inches in diameter and unsuitable bearing material shall be removed from trench according to manufacturer's recommendations.
2. Backfill shall be carefully placed to avoid pipe dislocation.
 - a. Backfill material shall be free of rocks, stumps, roots and other unsuitable material.
 - b. Backfill shall be placed in six-inch lifts and shall be thoroughly compacted, except in planting area where planting soil is used.
 - c. In planting areas, the top six inches shall be suitable planting soil.

- d. Backfill under pavement or sidewalks shall be compacted to 98 percent of maximum A.A.S.H.O. T-180 density.
 - e. The surface of backfilled trenches shall be even with the surrounding ground surface.
 3. Plant and portable classroom locations shall take precedence over sprinkler and pipe locations. The contractor shall coordinate the routing of lines and final head locations with the placement of specimen trees, shrubs and portable classrooms.
 4. After pipe has been installed and tested, cover with 3 inches of rock-free soil and backfill trenches to grade.
 - a. Backfill shall be tamped in place.
 - b. Remove from the site, materials not suitable or required for backfill.
 5. Coordinate underground piping location with new tree locations and portable building locations to avoid interference.
- B. Swing Joints: Install sprinkler heads on the swing joints as indicated on Drawings.
- C. Threaded Joints in PVC Pipe and Fittings:
 1. Use Teflon thread tape or liquid Teflon thread lubricant.
 2. Do not use pipe wrenches or pump pliers on PVC pipe or fittings.
- D. Sprinkler Heads:
 1. Install flush with the finished grade, or as called for in Drawings.
 2. Sprinkler heads located along curbs and edges of paving shall be installed 6 inches from back of curb or paving. Along roadways without curbs, sprinkler heads shall be located 18 inches from edge of pavement.
- E. Controllers:
 1. Equip with lightning protection and grounded to a standard 5/8" copper clad steel ground rod driven a minimum of 8 feet into the ground and clamped.
 2. Surge protection of 10 OHMS or less is required. If grounding rods will not give the 10 OHMS or less, 150 feet of bare #6 wire shall be installed 8 inches to 12 inches deep into an irrigated area.
 3. This wire shall be connected to the ground rod by a brass, single piece clamp.
 4. Wire used to connect equipment to grounding rod shall be one size larger than largest wire used on the irrigation system at same location, and connected with a brass, single piece clamp.
- F. Control Wire Installation:
 1. Install control wires at least 18 inches below finish grade and lay to the side of the main line. Provide a minimum of 24 inches of looped wire slack at valves and snake wires in trench to allow for contraction of wires. The color-coded wires in bundles at 10-foot intervals. The wire shall be laid in the trench before the installation of the pipe. The wire shall be beneath and 6 inches to the side of the main line pipe.

2. Underground splices shall be made at electric valves in valve boxes. Solder splices and coat with elastomeric waterproof cement. Wrap with electrical tape and coat again with elastomeric waterproof cement.
3. Wire passing under existing or future paving or construction shall be encased in Schedule 40 PVC conduit extending at least 12 inches beyond edges of paving and stabilized for construction. Any wire in plant beds shall be placed in 3/4" Class 160 PVC with 18-inch minimum burial. Installation procedures shall comply with local codes.
4. Electrical connections to electrical control devices shall be made with Rainbird Pen-Tite connector or accepted equivalent.

G. Well:

1. Case the well through sand and seat in rock.
2. Develop the well by pumping continuously at the rate of 240 gpm minimum or until the water is free of sand.
3. Well Depth: Minimum 50 feet.

H. VALVE AND VALVE BOX INSTALLATION

1. Gate Valves: Install as located and detailed on the drawings. Position boxes in straight line layouts.
2. Quick Coupling Valves:
 - a. Install on main line pipe in areas shown on the drawings.
 - b. The connection between the main line and quick coupler valve shall be with a threaded Schedule 40 PVC pipe and triple swing joint.
3. Electric Control Valves:
 - a. Install in specified valve boxes.
 - b. The valve shall have 6 inches of 3/4" pea gravel installed below the bottom of the valve.
 - c. The valve shall be connected to the main line as shown in the details.
 - d. If the valve box does not extend to the base of the valve, a valve box extension shall be installed.
 - e. Electric control valves shall be installed where shown and grouped together where practical. Place no closer than 36 inches to walk edges, building, and walls. Placement shall neatly reflect the adjacent site geometry.
 - f. Adjust the valve to provide flow rate or rated operating pressure required for each sprinkler circuit.

I. PAINT

1. Exterior alkyd enamel, forest green, or as accepted by the Board, shall be used on aboveground PVC risers and other designated irrigation equipment.
2. Provide paint sample before starting painting.

3.3 CLEANING, TESTING, AND BALANCING

A. Before testing, thoroughly flush piping system until clean.

B. Do not cover piping system with backfill until tests are satisfactorily performed.

- C. Hydrostatically test the piping system at 100 psi for 1 hour with no loss in pressure.
 - 1. Test the piping system with plugs at swing joint and branch the locations.
 - 2. Install swing joints after hydrostatic testing is satisfactorily performed.
- D. Notify A/E 24 hours before any test and obtain acceptance of tests from A/E before covering piping.
- E. Provide pattern, throw, and delivery as shown on Drawings.
- F. Adjust and balance the components of the piping system to provide complete coverage with a minimum of overflow.
- G. Provide an 8" x 10" reduced laminated photocopy, inside controller box door, of the irrigation plan with color coded circuits noted in sequence equal to automatic operation.

END OF SECTION

SECTION 32 93 23

SODDING

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections:

1. 31 20 00 - Earthwork.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM), latest edition of the following;

1. D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
2. D2974 Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
3. E70 Standard Test Method for pH of Aqueous Solutions with the Glass Electrode.

1.3 SUBMITTALS

A. Samples:

1. A sample of the athletic field topsoil mixture and a sample of the 80/20 silica sand and Florida Peat mixture (by volume) shall be submitted to OWNER for approval before installation.

B. Contract Closeout Submittals:

1. Record Drawings: Provide blueprint with red line markings indicating changes made to the planting system layout during installation.
2. Manual: Deliver 1 copy giving complete instructions regarding maintenance of materials, complete nomenclature of items used, and a copy of the guarantee issued to A/E upon final completion of installation.

C. Soil Testing and Amendment:

1. Obtain and test, one representative mixed sample, each, of planting soil and topsoil materials intended for use on this project. These samples shall be blended mixes composed uniformly of materials taken from the stockpile of the two respective soil types.
2. Test soils for horticultural purposes and submit the test results to the A/E accompanied by a recommendation from the testing agency regarding the suitability of the samples and appropriate soil amendments required to correct any detrimental or deficient soil conditions.
3. Testing shall include, but not be limited to:

- a. Tests to determine soil pH and the identification and quantity of soluble salts or other common pollutants that may be in the samples. Soil pH range for sodded areas shall be 6.0-6.5.
- b. The inorganic constituent of the soil mix shall be tested to verify that it consists of 100 percent coarse silica sand, not a Calcium Carbonate derivative such as coral rock or lime rock.
- c. After application of topsoil and amendments, a representative soil sample shall be obtained by collecting 15 to 20 samples from the top 4 inches of soil from various areas.
- d. Samples shall be combined and mixed thoroughly.
- e. Submit samples to an independent testing firm for analysis.
- f. Analysis shall provide pH and fertility levels of soil along with recommended actions for appropriate soil amendments to adjust pH levels and fertility levels.
- g. Contractor shall amend soil according to analysis recommendations by roto-tilling the amendments thoroughly into the top 4 inches of soil.
- h. A second soil sample shall be submitted for analysis after soil amendments have been incorporated into the soil.
- i. Final soil testing analysis results shall be submitted to OWNER before any planting of sod.

D. Certificates:

- 1. Submit certificates from supplier stating the delivered topsoil mix, sod, and other landscaping materials comply with requirements specified.
- 2. Deliver certificates upon final completion of the installation.
- 3. Certificates of Inspections: Shipments or orders of plant material shall be properly inspected at nursery or growing site by authorized federal and state authorities. Include certificates with shipment.

1.4 QUALITY ASSURANCE

- A. Qualifications of Workers: Provide at least 1 person who shall be present at all times during execution of this portion of work thoroughly familiar with type of materials being installed and best methods for their installation and who shall direct the work performed under this section.
- B. Obtain written acceptance from A/E for any variation from specified requirements before proceeding with work.
- C. Planting Materials shall meet or exceed specifications of federal, state, and county laws requiring inspection for plant disease and insect control.
- D. Sod shall comply with Florida Department of Agriculture quarantine requirements.
- E. The sod supplier shall certify on the invoice that the sod product is St. Augustine Floratam grass, for use in areas as designated on the Plans.
- F. Sod shall be grown in soils that contain a minimum of 70 percent grade sand.
- G. Sod shall be healthy, thick turf having undergone a program of regular fertilization and a two-month pre-harvest fertilization program. Sod shall be a minimum of one year old at the time of installation. Sod shall be free of any weeds.

- H. Before sod is installed, test topsoil and amend the topsoil as recommended by the testing lab to verify topsoil pH is between 6.0 and 6.5 and inorganic constituent of soil mix be comprised of coarse silica sand and is suitable for intended use.
- I. In the event that A/E suspects deficiencies in materials used on this project, such materials will be tested by Owner approved contracted testing laboratory.
 - 1. Cost of Testing:
 - a. Initial Testing: By Owner
 - b. Retesting: By Contractor, at no additional cost to the Owner
 - 2. Evidence of non-compliance will result in rejection of all work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage:
 - 1. Deliver items to the site in original containers with labels intact and legible at time of A/E inspection.
 - 2. Immediately remove from the site materials not complying with these specifications.
 - 3. Use all means necessary to protect materials before, during, and after installation and to protect installed work and materials of all other trades.
- B. Replacements: Upon damage or rejection, immediately make repairs and replacements necessary for the acceptance of A/E at no additional cost to Owner.
- C. Plant material shall be protected from weather, adequately packed to prevent breakage and drying out during transit. The use of anti-transparent protection, according to the manufacturer's specification, is encouraged.
- D. Plant material shall not be planted on job until they have been inspected at receiving site and accepted by A/E.
- E. Legible identification tags shall be attached to at least one plant of each species. Packages, boxes, or bunches of plants shall also be identified with a similar tag. Plants showing improper handling, bruised trunks, broken branches, or root balls, or arrive on site in an unsatisfactory condition will be rejected.
- F. Shipment and Delivery: Acceptance of plant material will be given by the A/E and Owner only after the material is planted and after meeting all of the incidental requirements specified and on drawings.
- G. Protect solid sod before, during, and after installation from over-heating, drying out, and physical damage.
- H. Replace damaged or rejected solid sod at no cost to Owner.

1.6 WARRANTY

- A. Contractor is to replace, at no additional cost to OWNER, grass areas in unsightly or damaged condition, for 90 days after final completion. Replace dead grass at no additional cost to OWNER for one year.
 - 1. Irrigate the newly planted grass until final completion. Irrigation shall occur in sufficient quantity to insure the orderly establishment of the grass.
- B. Warrant sod for 90 days after final completion and the satisfactory conclusion of the maintenance period. Any grass that fails or dies within that period shall be replaced and replanted immediately without expense to OWNER, The Contractor shall not be held responsible for losses beyond his control arising from "Acts of Providence", acts of vandalism, or loss arising from documented neglect by OWNER to properly care for planting after final completion.
- C. Make periodic reviews of the grass, at no extra cost to OWNER, during the warranty period to determine what changes, if any, should be made in OWNER maintenance program. Proposed changes shall be submitted, in writing, to OWNER and, jointly by copy, to the A/E.
- D. At conclusion of the 1 year and 90-day warranty periods, the A/E will make a construction review to determine the condition of sodding. Sod that has died or, in the opinion of the A/E, is in an unhealthy or badly impaired condition for reasons other than vandalism, "Acts of Providence", or documented neglect by OWNER, shall be replaced by the Contractor as soon as possible, except that replacement will not be required in any season definitely unfavorable for the kinds of sod involved.

1.7 MAINTENANCE

- A. Maintain sod, starting at the time of planting and continuing for 90 calendar days after final completion.
- B. Maintain and protect sodding until end of maintenance period.
- C. Sodding Maintenance:
 - 1. Provide a complete maintenance cultural program until final completion.
 - 2. Cultural program shall consist of watering, fertilizing, mowing, insect and disease control, and weed control.
 - a. Begin mowing program as soon as sod is firmly rooted.
 - 1) St. Augustine Floratam sod shall be mowed with a rotary type mower at least three times per month at a 3-inch mowing height.
 - 2) Mowing program shall include weed-eating and edging of beds, and along walks, curbs, and buildings.
 - 3. Final completion is contingent upon full coverage of the sodded area resulting in healthy, vigorous turf, free of insects, disease, and weeds.
 - 4. Contractor shall submit a written schedule for proposed maintenance of sodded areas.
- D. General Maintenance:

1. Maintenance shall include watering, weeding, fertilizing, cultivating, spraying, adjustment of guying, staking, and pruning necessary to keep plant materials in a healthy vigorous growing condition and to keep planted areas neat and attractive.
2. Provide equipment and means for proper application of water to those planted areas not provided with an irrigation system.

E. Replacements:

1. At the end of maintenance period, plant material shall be in a healthy growing condition.
2. During maintenance period immediately replace any plants showing weakness and probability of failure with a new healthy plant of the same type and size, without additional cost to OWNER.

F. Extension of Maintenance Period: Continue maintenance period, at no additional cost to OWNER, for additional 30 days after previously noted deficiencies have been corrected. Warranty extension period shall start upon acceptance of planting and at the end of the maintenance period.

G. The Contractor shall conclude maintenance (exclusive of replacement within warranty period) upon written acceptance of the A/E at the end of the maintenance period or, as provided for above, at the end of the extended maintenance period.

H. Protection:

1. Irrigate the newly planted grass until final completion.
2. Planting areas shall be kept weed free with a herbicide program until final completion.

PART 2 PRODUCTS

2.1 MATERIALS

A. Athletic Field Topsoil Mixture:

1. Sand Component:

- a. Sands shall be clean, sharp, natural sands, composed of 100% quartz silica sand.
- b. The sand shall have the following particle size distribution using the USDA classification system:

<u>PARTICLE NAME</u>	<u>SIZE (MM)</u>	<u>ALLOWABLE</u>
Gravel	(2.00-4.75)	Combined
Very Coarse Sand	(1.00-2.00)	Less than 12%
Coarse	(0.50-1.00)	Combined
Medium Sand	(0.25-0.50)	60-80%
Fine Sand	(0.10-0.25)	0-20%
Very Fine Sand	(0.05-0.10)	0-5%

Total Sand		90-100%
Silt	(0.002-0.05)	1-10%*
Clay	(minus 0.002)	1-10%*

(* Silt and clay combined shall not exceed 12 percent)

c. The sand shall have a pH less than 7.6 and a soluble salt value of less than 2.5 mmohs/cm.

2. Soil/organic Component:

- a. A muck type soil shall be used. The soil shall have a USDA soil texture classification of loam, Sandy clay loam, or sandy loam.
- b. The soil shall contain 15 to 30 percent by weight organic matter (ASTM D 2974 Method C).
- c. The soil shall have a pH between 5.5 and 7.5.
- d. The soil shall have a soluble salt content less than 3.0 mmohs/cm.

3. Athletic Field Topsoil Mixture:

- a. The athletic field topsoil mixture shall be a blended soil consisting of the approved sand and the approved 80/20 quartz silica sand and organic peat amendment material. Thorough blending using soil blending is required. Material shall be blended off-site.
 - 1) Blend volumes of sand: Soil in a ratio of 80 percent medium to coarse silica sand and 20 percent organic peat. The peat shall be decomposed so that there are no discernable vegetation parts visible.
 - 2) The blending volumes of sand to soil/organic amendment shall be determined by a laboratory using United States Golf Association methods and accredited by the American Association for Laboratory Accreditation. The contractor shall be provided a list of approved laboratories.

b. Blended soils shall meet the following specifications:

Infiltration rate	(K-sat) 4 - 6 inches/hr.
Total Porosity	35 - 55%
Aeration Porosity	15 - 30%
Capillary Porosity	12 - 25%

c. Provide organic matter analysis on laboratory blended material and on field blended athletic field topsoil batches of each 1,000 cu. yds. Field blended batches shall not vary by more than + 1.0 point from the laboratory blend.

B. Solid Sod:

- 1. St. Augustine Floratam: At football, soccer, baseball infields, right-of-ways, areas not occupied by structures, roadways, walkways, other plantings or sod, or parking lots as indicated on the Plans.
- 2. Mow sod to a height not to exceed 1-1/2" before lifting.
- 3. Lifts shall have uniform thickness with not over 1-1/2" nor less than 1 inch of soil.
- 4. Sod shall be strongly rooted and free of pernicious weeds, 1-1/2" minimum root structure, freshly dug, brought to the site and placed immediately.

5. Sod showing discoloration or wilting will be rejected.
6. Sod containing nutgrass, lippia, water sedge, and dollar weed is not acceptable.

C. Commercial Fertilizers:

1. Commercial grade fertilizer, uniform in composition, dry, free flowing, and delivered to site in fully labeled, unopened containers, bearing name, trade name or trademark and warranty of producer.
2. Fertilizers shall comply with applicable State and Federal law.
3. At least 50 percent of the nitrogen content shall be derived from natural organic sources, be in a slow release form, and potash derived from sulphate of potash.
4. Each container of fertilizer shall bear manufacturer's statement of analysis or a manufacturer's certificate of compliance shall be submitted to the A/E upon delivery to the site.
5. The following minimum percentages of available plant food by weight are required.
6. Fertilizer:

- a. Milorganite 6-2-0 is to be applied to sod beds before installation of sod.
- b. 30 days after the installation of sod or as directed by the A/E, apply a 12-4-8 granular blend.

7. 16-4-8 Fertilizer:

- a. Total Nitrogen: Not less than 16.00 percent.
 - b. Nitrate Nitrogen: Not less than 1.5 percent.
 - c. Ammoniacal Nitrogen: Not less than 5.7 percent.
- 1) Secondary Plant Foods:

<u>OXIDE</u>	<u>ELEMENTAL</u>
Magnesium 2 or	Mg 1.20 percent
Manganese 1 or	Mn 0.70 percent

2) From F.T.E. 504 - 30 lbs. per ton shall be composed of the following elements:

<u>ELEMENTAL</u>				
Boron	B ₂ O ₃	0.1845%	B	0.05%
Copper	CuO	0.1312%	Cu	0.10%
Iron	Fe ₂ O ₃	0.3360%	Fe	0.26%
Manganese	MnO	0.1372%	Mn	0.10%
Molybdenum	MoO ₃	0.0015%	Mo	
Zinc	ZnO	0.1312%	Zn	0.10%

3) Derived from the following source materials:

- a) Ammonium nitrate.
- b) Sulfate of ammonia.
- c) Ureaform or I.B.D.U.
- d) Triple superphosphate.
- e) Muriate of potash.
- f) Sulfa-mag.
- g) Manganese sulfate.

8. All materials shall be prilled or granular except the Manganese Sulfate.
 - a. Statement of Analysis: Each container of fertilizer shall bear producer's statement of analysis or producer's certificate of compliance shall be submitted to A/E upon delivery of fertilizer to jobsite.

PART 3 EXECUTION

3.1 INSPECTION

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.
- B. Inspect work of other trades and verify work is complete to the point landscape work may start. Verify planting may be completed according to Construction Documents.
- C. Discrepancies:
 1. In event of discrepancy, immediately notify A/E.
 2. Do not proceed with installation of materials or plants in areas of discrepancy until such discrepancies have been fully resolved to the satisfaction of the A/E.
- D. It shall be the Contractor's responsibility to thoroughly test the irrigation system before planting and report any malfunctions to OWNER. No planting shall be done until the irrigation system is operating properly.

3.2 PREPARATION OF ROUGH GRADING AND SUBGRADE

- A. Rough grading and subgrade shall be correct and suitable materials and proper drainage shall exist before placing sod. Soil or drainage conditions detrimental to growth of plant material shall be corrected.
- B. Existing subgrade shall be scarified to a minimum depth of 3 inches before spreading of topsoil. Subgrade shall be brought to true and uniform grade and shall be cleared of stones greater than 2 inches, sticks, and other extraneous materials.
- C. Soil in compacted areas shall be tilled to a depth of 12 inches to produce a loose friable soil.
- D. Sodding shall not begin if any areas exhibit ponded conditions.

3.3 SPREADING OF TOPSOIL

- A. Subgrade shall be damp when topsoil is spread.
- B. Areas where sod is to be planted shall have a subgrade 6 inches lower than the finish grade. A 4-inch layer of topsoil shall be added before the placing of sod.
- C. Topsoil in areas to receive sod shall be fine graded with drag or rake. Remove sticks, stones, and extraneous matter. Grading shall round out breaks in grade, smooth down lumps and ridges, and fill in holes and crevices. Grade shall be maintained until placement of sod.

- D. Topsoil shall be partially incorporated into the subsoil to avoid potential layering effect of different soil layers. Apply 1/3 topsoil depth. Roto-till, plow, or disk into subsoil, then apply remainder.

3.4 INSTALLATION OF SODDING

- A. Install sod as soon as practical following placement and grading of topsoil mixture.
- B. Sod shall be free of mesh before installation.
- C. Fertilizer: Spread 30 pounds of commercial 16-4-8 fertilizer per 1,000 square feet of finished topsoil, lightly rake in and level.
- D. Sod Placement:
 - 1. Lift sod from trucks or storage piles and place by hand with closed joints and no overlapping.
 - 2. Ground shall be leveled with the back of a rake and sod laid with joints closely butted so no voids are visible, keeping surface of sod flush with the adjoining pavements.
 - 3. All sprinkler heads shall be flagged by the playing field contractor before laying of the sod. The sod supplier/installer shall cut sod away from all sprinkler heads.
 - 4. After laying, sprinkle sod thoroughly, and tamp sufficiently to incorporate sod with topsoil blanket and to insure tight joints between sections or strips.
 - 5. After laying, cover sod with sufficient sand top dressing to fill voids remaining and then thoroughly water to wash top dressing into sodded surface.
 - 6. Completed sod surface shall be true to finish grade indicated on plans, even and firm at all points and shall, after settlement, be flush with top of abutting walks, paving, concrete borders, catch basins and the like.
 - 7. Keep new sod properly watered until final completion.
 - 8. Protect sodded areas against trespassing and damage of any kind for the duration of maintenance period.

3.5 ADJUSTMENT AND CLEANING

- A. Site Clean-Up:
 - 1. Upon completion of any landscape project, thoroughly clean up the project site.
 - 2. Remove equipment, unused materials, deleterious material, and surplus excavated material.
 - 3. Fine grade disturbed areas and the areas adjacent to the new plantings to provide a neat and uniform site.
 - 4. Damaged or altered existing structures, because of the landscape work, shall be corrected.

END OF SECTION

SECTION 32 96 23

TREE RELOCATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Labor, materials, necessary equipment and services to complete the tree relocation work.
- B. Before tree excavation, pruning, removal, or relocation of existing trees, contractor shall notify:
 - 1. The Owner of schedule of operation.
 - 2. Appropriate utility companies and the Board for flagging and coordination of service disconnection as necessary to complete work.
 - 3. Coordinate work with other trades.

1.02 REFERENCES

- A. American National Standards Institute (ANSI): Z60.1 American Standard for Nursery Stock.
- B. Florida Department of Agriculture and Consumer Services: "Grades and Standards for Nursery Plants".
- C. National Arborist Association (NAA): Ref.1 Transplanting of Trees and Shrubs in the Southeastern United States.

1.03 DEFINITIONS

- A. Toxic Substances:
 - 1. Do not deliver any toxic substance or item as defined in Florida Statute 442.102(21) to the site without furnishing to the Board a Material Safety Data Sheet (MSDS).
 - 2. Provide current MSDS information with each initial shipment.
 - 3. The MSDS shall contain the following information:

- a. The chemical name and the common name of the toxic substance.
- b. The hazards or other risks in the use of the toxic substance, including:
 - 1) The potential for fire, explosion, corrosivity and reactivity.
 - 2) The known acute and chronic health effects of risks from exposure, including the medical conditions which are generally recognized as being aggravated by exposure to the toxic substance.
 - 3) The primary routes of entry and symptoms of overexposure.
- c. The proper precautions, handling practices, necessary personal protective equipment, any other safety precautions in the use of or exposure to the toxic substance including appropriate emergency treatment in case of overexposure.
- d. The emergency procedure for spills, fire disposal, and first aid.
- e. A description in lay terms of the known specific potential health risks posed by the toxic substance intended to alert any person reading this information.
- f. The year and month, if available, that the information was compiled and the name, address, and emergency telephone number of the manufacturer responsible for preparing the information.

1.04 DESCRIPTION

- A. Protect existing trees to remain during construction phases. Provide tree protection barriers for those existing trees adjacent to tree transplantation operations. Any trees scarred or destroyed, designated to remain, will be replaced at the Contractor's expense, with similar species, size, and quality.
 - B. Remove other vegetation as necessary and as directed by the A/E to accommodate new plantings.
 - C. Resulting tree pits of relocated material shall be backfilled with clean fill and brought back flush with surrounding grade, unless the pits are to be immediately replanted. Stabilize grade if required. Correct problems caused by erosion, wind, etc., in the reclaimed area. Pits to be quickly replanted shall be surrounded by safety barricades to prevent accidental falls into pits.
1. In areas where new plant material will replace relocated plant material, appropriate planting soil mix shall be used as backfill.

1.05 SUBMITTALS

- A. Submit a list of equipment, procedure, and labor force anticipated for use for tree relocation for approval by the Board.
- B. Submit a schedule by day indicating units to be dug and relocated. Note materials requiring root pruning, and that the relocation schedule is to begin at the end of the specified root pruning period.
- C. Obtain permits required by authority having jurisdiction.
- D. Submit written certification that trees indicated to remain have been protected during the course of construction according to recognized standards of the industry. Certify that where damage did occur:
 - 1. Trees were promptly and properly treated.
 - 2. Indicate which damaged trees (if any) are incapable of retaining full growth potential and are recommended to be replaced.
- E. Submit for approval, proposed methods, and schedule for effecting tree and plant protection.

1.06 QUALITY ASSURANCE

- A. The Contractor's crew used for the relocation of existing trees shall have minimum 10 years experience in relocation of existing plant materials and be recognized by the American Association of Nurserymen.
- B. Unless otherwise specified, tree transplanting shall comply with NAA Ref.1.
- C. Comply with NAA standards for pruning and remove branches from trees to remain to clear new construction.
- D. Recommend procedures to compensate for loss of roots (if any) and perform initial pruning of branches and stimulation of root growth where removed to accommodate new construction.
- E. Perform tree repair work for damage incurred by new construction.
- F. Provide routine progress evaluation reports on relocated trees until the end of the maintenance period.
- G. Evaluate existing trees and verify trees are free of disease and ready to survive relocation from the site to their new location on-site or off-site.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Properly handle trees and palms during moving so trunks will not be scarred or damaged and to

avoid broken limbs. Broken limbs not causing the tree to be rejected shall be repaired as follows:

1. Properly prune dead, dying, or damaged branches with clean, sharp equipment.
 2. Remove injured bark and wood of a tree wound with a clean, sharp knife to a point where healthy bark and wood make contact at their margins.
 3. Inspect and treat wound for insect and disease.
 4. Seal wounds with bituminous base wound paint for all oak limbs greater than 3 inch diameter.
- B. Transport trees on vehicles of adequate size to prevent overcrowding, broken limbs, foliage damage, or root ball damage.
- C. Keep root balls moist during relocation.
- D. Protect tree crowns with shade cloth to prevent desiccation and wind burn. Crowns shall be periodically sprayed with water to help ensure against desiccation.
- E. Handle plant material only in ways and means accepted by the landscaping industry and accepted by the Board.
- F. Plant material shall be planted the same day it is dug. Coordinate preparation of planting pits or beds to ensure this schedule.

1.08 WARRANTY

- A. Relocated plant material does not fall under the standard 12 month guarantee.
- B. For relocated trees or palms that die, replace their canopy area with new trees as specified.
1. Canopy spread for all palms and trees shall be listed on proposal when submitted for relocation work.
 2. Replacements (mitigation plantings) shall be provided at no additional cost to the Board.
 3. Submit the attached form to the Board for review and approval.
 4. Proposed replacement canopy tree species shall be Board accepted trees and palms.
 5. See list at the end of this section.
 6. The specification requirements for these trees and palms are according to Section 02900.
- C. Repair damage to other plants and lawn or construction work within the relocation area during tree transplantation at no cost to the Owner. This includes, but is not limited to, damage to curbs, walks, roads, fences, site furnishings, etc.

1.09 MAINTENANCE

- A. Maintain relocated plant materials immediately after each item is planted and continued until the 90 day watering period is completed, upon which time the Owner will take over maintenance of materials following procedures and recommendations of contractor and specifications.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Bone meal shall be readily available steamed bone meal, useable as a natural organic nitrogen fertilizer.
- B. Peat moss, topsoil, planting soil, mulch, staking, and guying, shall be as specified in section 32 90 00 Landscaping.
- C. Fill materials shall be as specified in Section 32 90 00 Landscaping.

PART 3 EXECUTION

3.01 TRANSPLANTATION

- A. Transplanting shall consist of on-site or off-site transplanting of existing trees or palms from proposed school construction areas to permanent positions as noted on the drawings.
- B. Digging, Wrapping, and Handling: Plants shall be dug and prepared for moving in a manner that will not cause damage to branches, shape, root system, and development.
- C. Balled and Burlapped Plants:
 - 1. Balls shall be firmly wrapped with burlap or accepted cloth substitute.
 - 2. No balled plant will be acceptable if the ball is cracked and broken or if the stem or trunk is loose in the ball, either before or during transplanting.
 - 3. Balled plants shall be lifted and handled from the bottom of the ball.
 - 4. Protect ball and deliver to the site, plant immediately, and water thoroughly.
 - 5. Ball sizes shall be as recommended in ANSI Z60.1

3.02 PLANTING

- A. Relocated Material:
 - 1. Relocated trees/palms shall be planted according to procedures described for new material, Section 02900. Verify final grades have been established before planting operations. Ensure proposed planting pits drain by test-filling with water before transplantation.
 - 2. Continue watering and caring for relocated material as specified.
 - 3. Mulch tree pit areas to reduce weeds, discourage foot traffic, conserve moisture, and minimize temperature fluctuations.
 - 4. Brace trunk and leave in place for approximately one year until trees are wind firm.
 - 5. Wrap trunks and structural branches of thin-barked trees to protect against sun scald

and dehydration. Retain through at least one growing season, and through cold season.

6. Feed with a diluted solution of N-P-K in solution form with a soil needle, providing water, air, and nutrients.
7. Where foliage is retarded, spray with one of the soluble types of foliage feeders.
8. At time of planting, fill air pockets and keep roots, especially feeder roots, moist, live, and healthy. Use soil needles for watering new transplants. Direct fine spray at foliage to help harden-off new leaves.

3.03 STAKING AND GUYING

A. Staking Installation :

1. Drive stakes perpendicularly, 3 ft. into ground at edge of root ball. Do not drive stake through root ball or soil separator or drainage gravel if present.
2. b. Number of stakes as shown on details

B. Tying and cross-bracing:

1. For trees over 4 in. in caliper.
 - a Stake and tie firmly with 1-1/4" sisal strapping as shown.
2. For trees under 4 in. in caliper.
 - a Tie sisal strapping to vertical stakes.

C. Support Tree with machinery until bracing is complete

D. Maintenance: Trees and palm to remain braced continuously during duration of project.

3.04 WATERING

- A. Following transplantation, water trees daily for the first two weeks, every other day for the next three weeks, and every third day for the balance of the three month watering/maintenance period. Such watering shall thoroughly saturate the root ball to its full depth.
- B. Following relocation, trees designated for transplanting shall be watered as specified in this section. Such watering shall thoroughly saturate the root ball to its full depth.
- C. Provide manual watering of relocated plant materials for 90 days. If used, after watering period, Contractor shall be responsible for the complete removal of all temporary watering systems.

3.05 TAGGING

- A. Trees within the designated areas for relocation shall be clearly marked by means of yellow plastic surveyor's ribbons and coordinated with, inspected, and accepted by the Owner before root pruning and digging.

3.06 ROOT PREPARATION

- A. Trees to be relocated shall be root pruned at least 45 days before digging with clean, sharp equipment.
 1. Maintain root pruned materials by watering, weeding, mowing, spraying, fertilizing,

- and other horticulture practices.
- 2. After root pruning, backfill with good rooting medium, fertilize with organic fertilizer to promote root growth.
- 3. Mulch to reduce weeds, discourage foot traffic, conserve moisture, and minimize temperature fluctuation.

B. Root Ball Size Chart: Root ball sizes shall be according to minimum standards set forth in Grades and Standards for Nursery Plants Part II, Palms and Trees, Florida Department of Agriculture.

1. Trees-Minimum Ball Sizes:

<u>Caliper</u>	<u>Minimum Ball Diameter</u>
3-1/2" to 4"	28"
4" to 4-1/2"	30"
4-1/2" to 5"	32"
5" to 5-1/2"	34"

Larger sizes increase proportionally.

2. Minimum Ball Depth:

<u>Ball Diameter</u>	<u>Depth</u>
Less than 20"	Not less than 75 percent of diameter.
20" to 30"	Not less than 65 percent of diameter.
30" to 48"	Not less than 60 percent of diameter.

3.07 CROWN PREPARATION

A. Shade and Flowering Trees:

- 1. Shade Trees: Selectively prune and thin crown to remove approximately one third of the branches. Preserve the basic shape and form of the tree, eliminate cross-branching and dead or diseased branches.
- 2. Hand strip selected species of all leaves following pruning and before moving.

B. Palms: Follow standard procedure for transplantation of palms.

3.08 HAND DIGGING

A. Burlapping is required. Trees that are burlapped for relocation shall comply and be handled in following manner:

- 1. Place in pit on planting soil backfill material that has been hand-tamped prior to placing plant.
- 2. Place with burlap intact so location of ground line at top of ball is same as at nursery where grown.

3. Remove binding at top half of the planting ball and cut off exposed burlap.
4. Do not pull wrapping from under planting ball.
5. Do not plant if planting ball is cracked, broken or showing evidence of voids before or during planting process. Replace with plant of same species, size, and specification

3.09 SPECIAL CONDITIONS

- A. Multi-Trunk Trees: Relocate multi-trunk tree as one unit. Measure unit by taking the aggregate total of all DBH measurements.
- B. Multi-Trunk Palms: Relocate multi-trunk palms as one unit. Unit shall be measured as follows:
 1. 50 percent of the value in dollars of the largest trunk in the grouping times the number of trunks in the clump.
- C. On-site relocation:
 1. On-site relocation shall include root pruning, canopy pruning, on-site transportation, hauling and dumping of debris, and 90-day maintenance.
 2. If the tree or palm should die within the 90 day maintenance period, remove the tree, replace the material, and restore the site at no additional cost to the Board.

3.010 CLEANING

- A. Site Clean-up:
 1. Upon completion of the work, thoroughly clean up the project site.
 2. Remove equipment, unused materials, deleterious material, and surplus excavated material.
 3. Fine grade all disturbed areas and the areas adjacent to the transplanted material to provide a neat and uniform site.
 4. All damaged or altered existing structures, as a result of the landscape work, shall be corrected.

END OF SECTION

TREE CANOPY REPLACEMENT FORM

Contractor _____ Project Location _____

Replacement canopy required _____ sq. ft.

Instructions

Select tree types and numbers such that the canopy credit equals the replacement canopy required (see above). Contractor shall submit a plan for approval showing the proposed locations of proposed replacement trees. Upon approval, the contractor may begin his planting operations. The canopy replacement plantings must be completed before final contract payment.

<u>REPLACEMENT CANOPY TYPE</u>	<u>MINIMUM SIZE AT PLANTING</u>	<u>CANOPY CREDIT (s.f.)</u>
Shade Tree 1	12' OAH	500
Shade Tree 2	8' OAH	300
Palm 1	10' OAH	300
Palm 2	3' OAH	100
Small Tree	6' OAH	200

Fill in replacement species, quantities and sizes:

<u>QUANTITY</u>	<u>SIZE</u>	<u>REPLACEMENT SPECIES</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

END OF FORM

SHADE TREE PLANT LIST

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>CONTAINER</u>
Bursera simaruba	Gumbo Limbo	18' to 20' B.B. 6' to 8' C.T.
Cassia fistula	Golden Shower	10' to 12' B.B. 5' C.T.
Chrysophyllum oliviforme	Satin Leaf	12' to 14' B.B. 5' C.T.
Quercus virginiana	Live Oak	18' to 20' B.B. 5' C.T.
Swietenia mahagoni	Mahogany	16' to 18' B.B. 6' C.T.
Tabebuia (Species)	Pink Trumpet or Silver Trumpet	12' to 14' B.B. 5' to 6' C.T.

END OF LIST

SECTION 32 96 43

TREE AND PLANT PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Protection of existing trees and plants from damage because of Contractor's operations including, but not limited to:

1. Protection of existing natural woodlands.
2. Marking of clearing limits.
3. Vegetation protective signage.
4. Tree protection fencing.
5. Boxing of tree trunks.
6. Root pruning, construction pruning, and root protection.

B. Related Sections:

1. 31 20 00 – Earthwork
2. 32 96 23 – Tree Relocation

1.02 SUBMITTALS

A. Proposed methods and schedule for tree and plant protection.

B. Proposed methods, materials, and schedule for root pruning, construction pruning, and tree fertilization.

1.03 QUALITY ASSURANCE

A. Comply with the most stringent applicable requirements of the following standards.

1. American National Standards Institute (ANSI) Z133.1 - Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush.
2. International Society of Arboriculture (ISA) - Guide for Establishing Values of Trees and Other Plants.
3. National Arborist Association (NAA) - Ref.1, Pruning Standards for Shade Trees.
4. International Society of Arboriculture (ISA) - Construction Management Guidelines.

B. Damaged Trees/palms:

1. Trees scheduled to remain and are damaged during construction shall be replaced per canopy equivalency at no expense to the Board. Refer to Section 02910 for tree

replacement form and acceptable plant list.

- C. If any shrubs designated to be saved are damaged and replacement is required, a number and diameter of shrubs of the same species and variety, as determined by the A/E shall be furnished and planted by the Contractor. The total inch diameter of the replacement shrubs shall equal the diameter of the shrub to be replaced.

PART 2 PRODUCTS

2.01 COMPONENTS

A. Tree Protection Fencing:

1. Tree protection fencing shall be 4 feet high galvanized chain link fencing.
2. Stakes for fencing shall be 8 feet galvanized steel posts, driven a minimum of 3 feet into the ground. Posts shall be spaced 10 feet o.c. maximum.

B. Boxing (Fencing):

1. Boxing shall be 4 inch x 4 inch posts spaced 8 feet o.c., with 2 inch x 4 inch rails between bays approximately 24 feet x 24 feet centered on the tree trunk, to a height of approximately 5 feet.

C. Root Pruning:

1. Peat moss and mulch materials shall be as specified under Section 02900.
2. Liquid fertilizer applied to root pruned and construction pruned trees shall be Peters M77 Sequestered-Cleated Soluble Fertilizer by W.R. Grace and Co., Cambridge, MA, or accepted equivalent.
3. Dormant oil spray shall be a dormant miscible spray, Volck Oil, by Ortho or accepted equivalent.

PART 3 EXECUTION

3.01 INSTALLATION

A. Fencing:

1. Before start of demolition work and clearing and grubbing operations, tree protection fencing shall be installed at all trees designated to be protected. Fencing shall be installed a minimum of 15 feet beyond the drip line of trees to be protected, unless otherwise accepted by the A/E.

B. Boxing:

1. Box trees to remain and not within designated tree protection areas.

C. Root Pruning:

1. Where construction will occur close to existing trees designated to remain, roots shall be pruned. Proximity shall be as determined in the field by the A/E.
2. Root pruning is the physical cutting of tree roots to minimize root damage and promote healing. Suitable means for root pruning include trenching, vibrating plow, or stump grinder. Any method capable of tearing roots or disturbing the soil beyond the grading limit is not allowed.
3. Root prune trees as noted to a depth of 24 inches by trencher, backhoe, or other approved means.
4. Backfill root pruning trench with existing soil mixed with peat moss or well-rotted sawdust to a mixture of approximately 75 percent soil and 25 percent humus. Tamp lightly to set soil.
5. Apply mulch to a depth of 4 to 6 inches at minimum dripline radius around tree to reduce compaction and increase moisture retention. Mulch depth shall be feathered to grade at base of trunk.

D. Construction Pruning and Root Protection:

1. To compensate for root zone damage by cut or fill work, prune top of tree to approximate percent of damaged root zone area.
2. Construction pruning shall consist of pruning the tree crown to compensate for root zone damage due to construction operations. Construction pruning shall include a fertilization/insecticide program.
3. Construction pruning shall comply with NAA Ref.1 for Class IV - Crown Reduction Pruning and ANSI Z133.1.
4. For those trees remaining within construction zone to be protected, apply mulch to a depth of 6 inches within dripline radius around tree to reduce compaction and increase moisture retention. Mulch depth shall be feathered to grade at base of trunk. Remove protection mulch after completion of work as specified.

E. Fertilization and Insect Spraying:

1. Treat root pruned and construction pruned trees with liquid fertilizer, dormant oil spray, and insecticide.
 - a. Liquid fertilizer shall be applied at a rate recommended by the manufacturer and as required by NAA Ref.2.
 - b. Apply dormant oil spray, at a rate recommended by the manufacturer, in early spring before buds begin to swell.

- c. Apply insecticide spray twice to root pruned trees following application of dormant oil spray. Spray insecticide at rates recommended by spray manufacturer at intervals appropriate for effective insect control.

- F. Clearing Within Protection Areas:
 - 1. Selective clearing within tree protection areas shall only be performed when and as directed by A/E.

- G. Removal of Protection:
 - 1. Except as otherwise indicated or requested by A/E, temporary protection devices and facilities installed during course of the work shall be removed only after all work that may injure or damage trees and plants is completed.

END OF SECTION

ATTACHMENT - "A"

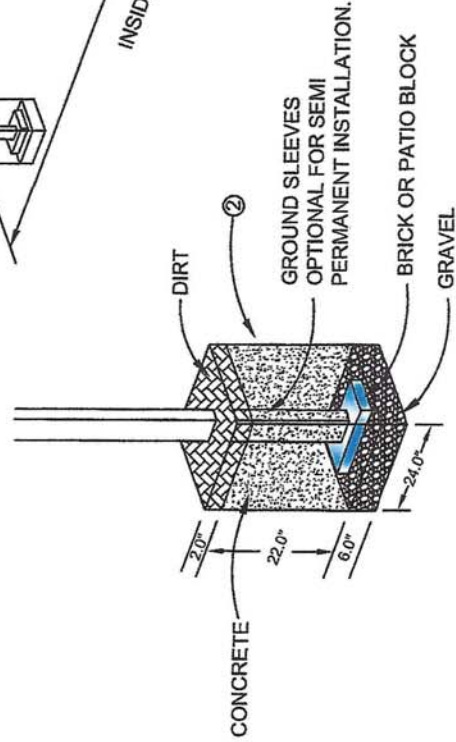
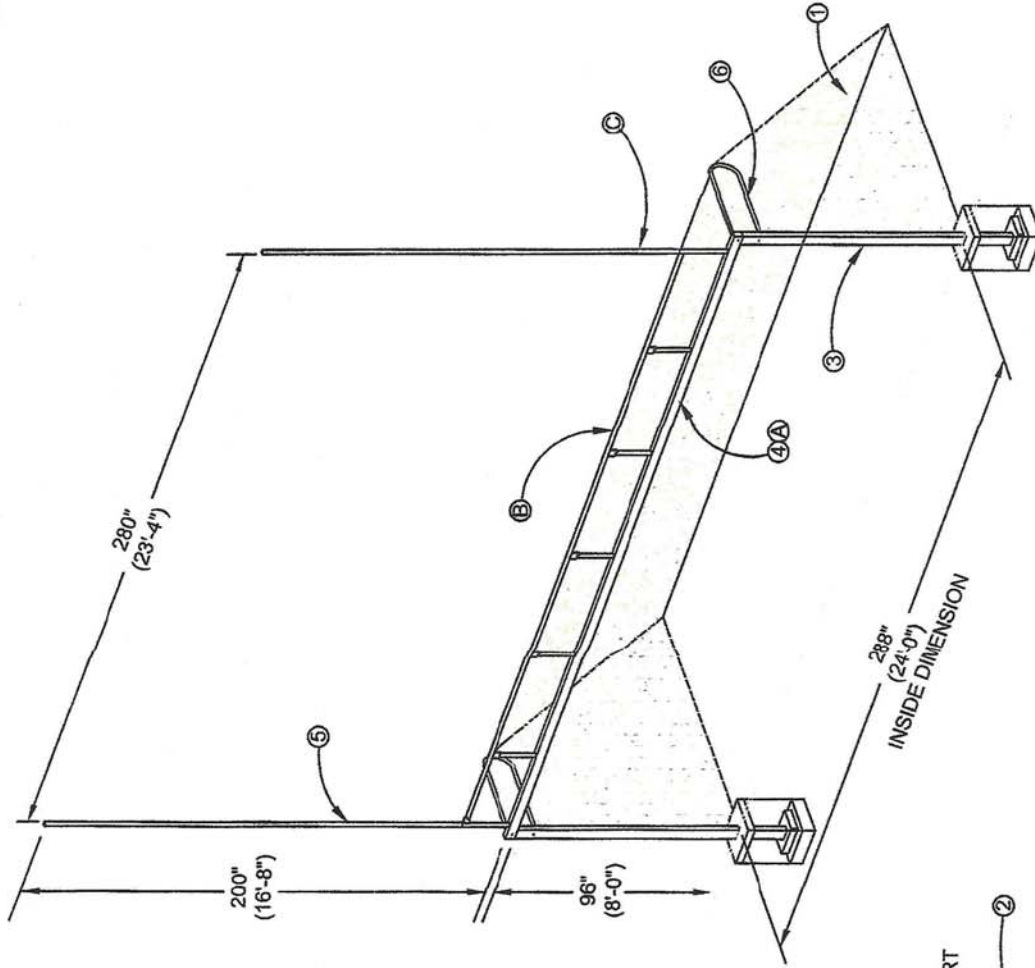
COMBINATION SOCCER / FOOTBALL GOAL SPECIFICATIONS

PRODUCT DESCRIPTION / MATERIALS / FINISHES

- 1) **NET** -
Constructed of 3mm twisted, knotted Polyethylene - 4" white mesh.
8' H x 24' W x 4' D at top x 8' D at bottom.
- 2) **GROUND SLEEVES (OPTIONAL)** -
Constructed of prefabricated steel tubing 2.35" x 4.35" x .063" wall thickness x 24" L with removable cap. Powder coated black.
- 3) **SOCCER UPRIGHTS** -
Constructed of prefabricated steel tubing 2" x 4" x .078" wall thickness x 120" L. Lower 36" of upright has a 1.77" x 3.74" x .078" wall steel tube inserted inside of it to act as a stiffener. Powder coated outdoor white after fabrication.
- 4) **SOCCER CROSSBAR** -
Constructed with prefabricated steel tubing. Powder coated white after fabrication.
A) 2" x 4" x .078" wall thickness x 296" L
B) 1.9" diameter x .078" wall thickness
C) 2.25" diameter x .120" wall thickness
- 5) **FOOTBALL UPRIGHTS** -
Constructed of prefabricated steel tubing 1.9" diameter x .079" wall x 200" L. Powder coated outdoor white after fabrication.
- 6) **SOCCER NET BACKSTAY** -
Constructed with prefabricated steel tubing. Powder coated white after fabrication.
D) 1.315" diameter x .095" wall thickness
E) .25" x 1.375" flat stock steel

7) **HARDWARE** -

Grade - 5 Zinc Plated



TOLERANCE	
.X = ±.030	
.XX = ±.010	
.XXX = ±.005	
FRACTIONAL = ± 1/32	
UNLESS OTHERWISE NOTED	
REV	DATE

DRAWN	Z. OSORIO	3/10
CHECKED		
APPROVED		

TITLE		SCALE:	NUMBER
COMBINATION SOCCER/FOOTBALL GOAL		NTS	1072679
REF:			