

SECTION 02100 - SITE PREPARATION REMOVALS AND GRADING

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 Specification Sections, apply to work of this section.
- B. The following related items of work are included under other sections:
  - 1. Topsoil - Section 02925

**1.2 SUMMARY**

- A. The work required under this Section consists of furnishing all labor, materials, equipment, services and related items necessary to complete all the Site Preparation, Removals & Salvaging work as indicated on the drawings and described in the specifications.
- B. Site Preparation, Removals & Salvaging work includes, but is not limited to the following:
  - 1. General debris and trash removal and disposal.
  - 2. Demolition and removals.
    - a. Saw cutting and removal of concrete pavement in the areas indicated on the plan
    - b. Demolition of concrete curb
    - c. Removal of steel edging, gravel and weed barrier
    - d. Removal and salvaging of existing bollard lights
    - e. Removal and salvaging irrigation lines (Consult SU for Final Disposition)
    - f. Demolition hose support
    - g. Removal of wearing course of asphalt pavement in designated areas
  - 3. Removal of all plant material in the areas indicated on the plan.
  - 4. Protection for plant material that is to remain.
  - 5. Protection of existing utilities and site structures to remain.
  - 6. Staking lines and grades.

**1.3 JOB CONDITIONS**

- A. Traffic (PEDESTRIAN)

Conduct Site Preparation, Removals, & Salvaging operations to ensure minimum interference with adjacent Plaza, other adjacent occupied buildings and University facilities. Do not close or obstruct pedestrian traffic or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Protection
  - 1. Contractor shall be responsible for the protection of existing facilities and improvements, indicated to remain in place, within the area of the site where his work is being done.
  - 2. Contractor shall be responsible for the protection of existing facilities on adjoining properties.
  - 3. Any disturbances to the work and improvements or any impairments of facilities resulting from work of this section, shall be promptly restored, repaired or replaced at no extra cost.

C. Protection of Existing Plant Material to Remain

1. All plant material adjacent to the property shall be protected against damage during construction operations.
2. Before starting work, protect all groundcover planting indicated to be saved.
3. The Contractor shall take whatever precautions necessary during construction to ensure that no damage is done to the items designated to remain; this shall include, but not be limited to, the use of construction equipment of size and weight which will not injure root systems.

D. Protection of Existing Utilities

1. The existence and location of underground utilities are not guaranteed and shall be investigated and verified in the field by the Contractor before starting work. Excavation in the vicinity of the existing utilities shall be carried on with extreme caution.
2. The Contractor shall be responsible for all utility locations and identification of public and Owner owned utilities, including, but not limited to, electricity, gas, water, sanitary and storm sewers and cable TV.
3. Utility companies owning services which could be affected by alteration, removal and demolition work shall be notified in advance, according to the requirements of the utility, requesting verification of utility service lines.

**PART 2 - PRODUCTS**

**2.1 GENERAL**

Products and materials utilized in this item of work shall be subject to the approval of the Site Architect.

**2.2 RESTORATION**

Products and materials used in restoration and repair of damaged property shall be of a quality equal to, or better than, the original project or material.

**2.3 SALVAGEABLE MATERIAL**

- A. Certain materials resulting from excavation, demolition and other tasks of this section may be salvageable and reusable by the Contractor on the premises, or by the Owner elsewhere. The Contractor shall advise the Site Architect three (3) weeks in advance of his contemplated removal of, or use of any salvageable materials and secure the Site Architect's prior approval for said use.
- B. The Site Architect may, during the construction, specify certain materials as salvageable and/or reusable. Upon direction from the Site Architect, the Contractor shall move, or place on site, or load any materials so specified.

**PART 3 - EXECUTION**

**3.1 GENERAL**

A. Inspection

Visit the premises and verify all conditions covering the work of this section and verify all dimensions. Examine all drawings covering the work of this section and refer to all other drawings

which may effect the work of this section or require coordination with other trades. Before starting the work of this section, make a thorough examination of all portions of the premises in which the work of this section is to be performed. Check all of the work adjoining, adjacent to and underlying the locations where the work of this

section is to be installed. Report to the Site Architect any and all conditions which might interfere with or otherwise affect or prevent the proper execution and/or completion of the work of this section. Do not commence work until any and all such conditions have been corrected by the trade or trades responsible.

**B. Discrepancies**

In the event of discrepancy, immediately notify the Site Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved. Should any work performed under this section expose previously unknown major conditions, all work shall be stopped and the matter reported immediately to the Site Architect for instructions. However, the Contractor shall use any measures necessary to insure adequate safety conditions.

**C. Clean-Up**

1. Execute work in such a manner as to avoid interference with, or use of, passage to and from adjoining spaces and facilities.

Do not burn materials or debris on premises. Remove from the site all rubbish and debris resulting from work of this section.

2. Do not allow the accumulation of scraps and debris arising from the work of this section. Maintain the premises in a neat and orderly condition at all times. Daily clean-up of construction areas is required.

**D. Notification**

Utility companies owning services which will be affected by alteration, removal of demolition work shall be notified in advance, according to the requirements of the utility, requesting discontinuance, if needed, of the utility service.

**3.2 DEMOLITIONS AND REMOVALS**

Within the Contract Limit Lines, the Contractor shall remove all existing site structures/features above and below ground so indicated for removal by the drawings or as directed by the Site Architect.

**3.3 SOIL, STRIPPING AND STOCKPILING**

- A. Strip and remove soil from designated areas to a depth of twelve inches (12"). Remove heavy growth of grass from areas before stripping. Where trees are indicated to be left standing, stop soil removal a sufficient distance to prevent damage to main root system.
- C. Cover storage pile if required to prevent wind-blown dust.

**3.4 CLEARING AND GRUBBING**

- A. Clear site of shrubs and other vegetation, except for those indicated to be left standing.

- B. Completely remove stumps, roots and other debris protruding through ground surface.
- C. Within excavation areas, clear the ground of organic matter. Remove stumps and roots to a depth of at least two (2') feet below subgrade or slope surfaces.
- D. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.
- E. Backfilling of all planted areas shall conform to the requirements listed in Section 02925 - TOPSOIL. After completion of the backfilling operation, the area shall be graded to eliminate water pockets.
- F. Grading operations shall not be started in any area until all the operations of Site Clearing have been completed.

### **3.5 DISPOSAL OF DEBRIS AND UTILITIES**

All items of demolition within the Contract limits, including stones, rubbish, utility lines and fixtures, plant material and similar items shall be, unless otherwise directed, the Contractor's property and shall promptly be removed from the site and disposed of in a legal manner, in State approved disposal area.

### **3.6 STAKING LINES AND GRADES**

- A. The Contractor shall employ a registered surveyor to lay out the work and to establish all points, lines and grades from the bench marks, center lines, reference points and baselines established by the professional. All work shall be located by the Contractor from these established points.
- B. The Contractor shall have his engineer or surveyor place a sufficient quantity of stakes to clearly indicate the intent of the work.
- C. Should any discrepancy be found between points, lines or grades shown on the drawings and actual conditions found in the field, the Contractor shall immediately notify the Site Architect of such discrepancy and the Contractor shall not proceed with the work affected thereby until he has received necessary instruction from the Site Architect or his representative.
- D. The Contractor shall carefully maintain any benchmarks, monuments and other reference marks, established and if disturbed or destroyed, replace as directed by the Site Architect.

### **3.7 LIMITS OF CONCRETE PAVEMENT REMOVAL**

The limits of existing concrete pavement or curb removal and new construction shall be determined by the Site Architect and in most cases shall be based upon the location of the nearest control or expansion joint.

### **3.8 REPLACEMENT OF DAMAGED FACILITIES**

- A. It shall be the Contractor's responsibility to verify the condition of the project site with the Owner's authorized agent. They shall agree on all pre-existing conditions.
- B. The Contractor shall be responsible for the repair and/or replacement, at the option of the Owner, of any items damaged during construction.

**END OF SECTION 02100**

## **02200 - EARTHWORK**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 Specification Sections, apply to work of this section.
- B. The following related items of work are included under other sections:
  - 1. Site Preparation, Removals and Salvaging - Section 02100.
  - 2. Subbase Course - Section 02230.
  - 3. Topsoil - Section 02925.

#### **1.2 SUMMARY**

- A. The work required under this section consists of furnishing all labor, materials, equipment, services and related items necessary to complete all the EARTHWORK as indicated on the drawings and described in the specifications.
- B. Earthwork includes, but is not limited to, the following:
  - 1. Excavation for underground structures.
  - 2. Excavation of existing earth to subgrade.
  - 3. Backfilling of trenches and excavated areas and rough grading.
  - 4. Preparation of subgrade for footings, pavements and walks.
  - 5. Embankment or fill and select backfill construction.
  - 6. Finish grading.
  - 7. Placement of stone aggregate base materials.
  - 8. Protections and safeguards.
- C. Definitions
  - 1. Excavation: Consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.
  - 2. Borrow Excavation: Excavation of or obtaining satisfactory material from off site sources outside the limits of the project.
  - 3. Embankment, Fill or Backfill: Material of a specified maximum size that can readily be placed in loose layers to a specified thickness.
  - 4. Subgrade: Preparation of existing soil before receiving overlaying work.
  - 5. Stone Aggregate Subbase Course: Selected material used for placement in paved areas and designated by quality, size and/or gradation.
  - 6. NJDOT Standard Specifications: New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 1983 edition as amended.

### **1.3 QUALITY ASSURANCE**

- A. Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Owner may employ a testing laboratory and Geotechnical Engineer to perform soil testing and inspection service for quality control testing during Earthwork operations.
- C. The Contractor is responsible for contacting the local construction official and coordinating the required municipal/county inspection services for the work being performed.

### **1.4 SUBMITTALS**

The following reports shall be submitted directly to the Owner's Representative from the testing service:

- 1. Test reports on borrow material.
- 2. Verification of each footing subgrade.

### **1.5 JOB CONDITIONS**

- A. Site Information
  - 1. Data on indicated subsurface conditions is not intended as representation or warranty of accuracy or continuity between soil borings. It is expressly understood that the owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor.
  - 2. Test borings and other exploratory operations may be made by the Contractor at no cost to the Owner.
- B. Existing Utilities
  - 1. Contractor shall notify and secure from the utility company information for location of underground utilities including, but not limited to, staking or other markings of utilities prior to commencement of construction.
  - 2. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
  - 3. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Owner's Representative immediately for directions. Cooperate with utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of Owner's Representative.
- C. Protection of Persons and Property
  - 1. Perform all excavation work and all rough grading work in a manner to avoid and prevent all injuries and damage to persons, existing roads and other property. Repair, replace, and/or restore any existing work and/or property disturbed or otherwise made effective by, during, or as a result of the work under this section. Place all such defective work in a condition at least equal to its' condition immediately prior to being made defective and do so with no extra cost.

2. Properly and adequately protect all trees and shrubs indicated or directed to remain in place. Employ boxing, guys and other approved means of protection as directed and as necessary.
3. The Contractor shall not excavate and shall limit filling within the drip line of existing trees, so as not to damage the root systems. The Contractor shall consult with the Owner's Representative for any clarification needed regarding this matter.
4. Provide and place guard rails, planks, fences, decking, railing and other like items of protection as may be necessary to prevent and avoid accidents, to prevent materials from falling and to prevent entry of persons and vehicles into areas of danger.
5. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
6. Provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the work, and the property at all times, including Saturdays, Sundays and holidays.
7. Be responsible for any and all damages which may arise or occur to any party whatsoever by arson of the neglect in providing proper lights, guards, barriers or any other safeguards to prevent damage to property, life and limb.
8. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

Soil materials shall be as specified in this section and/or as shown on the drawings.

### **2.2 SOIL MATERIALS**

#### **A. Embankment, Fill or Backfill Material:**

1. Obtain material for embankment construction from site or borrow excavations.
2. Less than seven (7%) percent organic material as defined by the loss of ignition test, reasonably free of coal or coal blossom, or other objectionable matter. The material shall be free from stumps, brush, weeds, grass, roots, sod, rubbish, garbage, sewage and other matter that might decay. Material with stone, broken concrete or similar object larger than two (2") inches in any dimension shall not be used within the top thirty (30") inches of the embankment, fill or backfill.

#### **B. Stone Base Course**

1. Obtain material for stone base course from NJDOT approved source.

2. Stone material shall be clean granular material consisting of hard, tough, durable, uncoated particles reasonably free from clay, silt, vegetation or other substances determined to be deleterious. Material to meet the requirements of NJDOT Standard Specification for Road and Bridge Construction Section 901.03 for Coarse Aggregate size number 67.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

##### **A. Coordination, Examination and Verification**

1. Prior to all work in this section, become thoroughly familiar with the site, site conditions and all portions of the work falling within this section. Bring to the attention of the Owner's Representative, any unsatisfactory conditions encountered.
2. The Contractor shall study the drawings and specifications in order to insure completeness of the work required under this section. All work under this section shall be coordinated with the affected trades.
3. During the bidding period, the Contractor shall verify all governing discussions and conditions at the site and shall examine the drawings and all adjoining work on which the work of this Contract is dependent. The submission of a proposal by the Contractor binds him to accept the site as it actually is and will be necessary for him to do all excavations, filling and backfilling and grading required for the completion of the work as shown on the applicable drawings and described in this section of the specifications.

##### **B. Backfilling Prior to Approvals**

1. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections and approvals.
2. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost.
3. After the work has been completely inspected and approved make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost.

#### **3.2 FINISH ELEVATIONS AND LINES**

For setting and establishing finish elevations and lines, secure the services of a registered Professional Engineer or a Licensed Land Surveyor acceptable to the Owner's Representative. Carefully preserve all data and all monuments set by the Professional Engineer or Surveyor and, if displaced or lost, immediately replace to the approval of the Owner's Representative at no additional cost.

##### **A. Finish Grading**



1. Before depositing and spreading topsoil the subsoil surface shall be raked clean of stones, debris, or rubbish and loosened to a depth of four (5:) inches. Topsoil shall not be spread until the subgrade has been approved by the Owner's Representative.
2. Upon approval of the subgrade, topsoil shall be spread, raked, compacted and otherwise manipulated to form a minimum settled thickness of four (4") inches to bring site to required finished elevations. Any excess topsoil may be used in lieu of subsoil fill under lawns on planting areas.

### **3.3 DUST CONTROL**

- A. Use all means necessary to control dust on or near the work.
- B. Thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors, and performance of other work on the site.

### **3.4 EXPLOSIVES**

The use of explosives is not permitted.

### **3.5 EXCAVATING**

#### **A. General**

1. Excavating consists of removal and disposal of material encountered when establishing required grade elevations.
2. Excavate to grades shown on the drawings.
3. Where excavation grades are not shown on the drawings, excavate as required to accommodate the installations.
4. Earth excavation shall be "Unclassified", all material not classified as rock shall be removed as required under the Contract price. All material defined as rock shall be removed on a "Unit Price" basis, if encountered, and if approved by the Owner's Representative and Owner.

#### **B. Earth Excavation**

Earth excavation includes removal and disposal of underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock or unauthorized excavation.

#### **C. Unauthorized Excavation**

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Owner's Representative. Unauthorized excavation, as well as remedial work directed by the Owner's Representative shall be at the Contractor's expense.

2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the Owner's Representative.

D. Additional Excavation

1. When excavation has reached required subgrade elevations, notify the Owner's Representative who will make an inspection of conditions.
2. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Owner's Representative.
3. Removal of unsuitable material and its' replacement as directed will be paid on the basis of Contract Conditions relative to changes of work.

E. Stability of Excavation

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
3. Dispose of excess soil material and waste materials as herein specified.

F. Dewatering

Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding areas. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collection or run-off areas. Do not use trench excavations as temporary drainage ditches.

G. Material Storage

1. Stockpile satisfactory excavated materials where directed, until required for embankment, backfill or fill. Place, grade and shape stockpiles for proper drainage.
2. Materials stockpiles for more than thirty (30) days shall be provided with temporary vegetative cover as indicated on plans. Locate and retain soil materials away from edge of excavations.
3. Do not store within drip line of trees indicated to remain. Dispose of excess soil material and waste materials as herein specified.

H. Excavation for Pavements

Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

I. Cold Weather Protection

Protect excavation bottoms against freezing when atmospheric temperature is less than thirty-five (35) degrees F.

**3.6 COMPACTION**

**A. General**

Control soil compaction during construction, providing minimum percentage of density specified for each area classification.

**B. Percentage of Maximum Density Requirements**

Compact soil to not less than the following percentage of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D1557; and not less than the following percentages of relative density, determined in accordance with ASTM D2049, for soils which will not exhibit a well-defined moisture - density relationship.

**1. Footings**

Compact top twelve (12") inches of subgrade and each layer of backfill or fill material at ninety-five (95%) percent maximum dry density or ninety (90%) percent relative dry density.

**2. Unpaved Areas**

Compact top six (6") inches of subgrade and each layer of backfill or fill material at ninety (90%) percent maximum dry density.

**3. Walkways**

Compact top six (6") inches of subgrade and each layer of backfill or fill material at ninety-five (95%) percent maximum dry density or ninety (90%) percent relative dry density.

**4. Pavements**

Compact top twelve (12") inches of subgrade and each layer of backfill material at ninety-five (95%) percent maximum dry density or ninety (90%) percent relative dry density.

**5. Aggregate Subbase**

Compact the uniformly spread material to not less than one hundred (100%) percent of the maximum dry weight density. When material is too course to

determine dry weight density, determine compaction based on movement of the material under the compaction equipment.

**C. MOISTURE CONTROL**

**1.** Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  - a. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by dicing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

### **3.7 BACKFILL, FILL, SELECT FILL AND BEDDING**

#### **A. General**

Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

1. In unpaved areas use satisfactory embankment/fill material.
2. Under walks or pavements use aggregate subbase material over subgrade of structural fill material.

#### **B. Backfill**

1. Backfill excavations as promptly as work permits, but not until completion of the following:
  - a. Acceptance by Owner's Representative of construction below finished grade.
  - b. Inspection, testing, approval and recording locations of underground utilities.
  - c. Removal of concrete formwork.
  - d. Removal of shoring and bracing and backfilling of voids with satisfactory materials.
  - e. Removal of trash and debris.

#### **C. Ground Surface Preparation**

1. Remove debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills.
2. When existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

#### **D. Placement and Compaction**

1. Place backfill and fill materials in layers not more than eight (8") inches in loose depth for material compacted by heavy compaction equipment, and not more than four (4") inches in loose depth for material compacted by hand-operated tampers.

2. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to require percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
3. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

## **8 GRADING**

### **A. General**

Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

### **B. Grading**

1. Grade areas adjacent to structures to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
  - a. **LANDSCAPED AND PAVED AREAS:** Finish areas to within not more than 0.10' above or below the required subgrade elevations.
  - b. **WALKS:** Shape surface of areas under walks to line and grade, and cross-section with finished surface not more than 0.10' above or below the required subgrade elevation.
  - c. **PAVEMENTS:** Shape surface of areas under pavement to line, grade and cross-section, with finished surface not more than 0.10' above or below the required subgrade elevation.

### **C. Compaction**

After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

### **D. Grade Control**

During construction, maintain lines and grades including crown and cross-slope of subbase course.

### **E. Shoulders**

Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least twelve (12") inches width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

## **3.9 AGGREGATE SUBBASE BELOW WALKS**

- A. Place aggregate subbase material on prepared subgrade in layer of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material to ninety-five (95%) percent maximum dry density.

- B. When a compacted aggregate subbase is shown to be six (6") inches thick or less, place material in single layer.

**3.10 MAINTENANCE**

- A. Protection of Graded Areas

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

- B. Reconditioning Compacted Areas

When completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density to further construction.

- C. Clean Up

Upon completion of the work of this section, remove all excess excavated materials, rubbish, trash, and debris resulting from operations. Remove surplus equipment and tools. Leave the site in a neat and orderly condition acceptable to the Owner's Representative.

END OF SECTION 02200

## **SECTION 02515 – CONCRETE UNIT PAVERS**

### **PART 1 – GENERAL**

#### **1.1 SUMMARY**

The work required under this section consists of furnishing all labor, materials, equipment, services and related items necessary to complete Concrete Unit Pavers installation, and all related work, complete, as indicated on the drawings or specified herein.

#### **1.2 QUALITY ASSURANCE**

##### **A. Paver Manufacturer**

A firm having a minimum of ten (10) years successful experience in the production capabilities can be demonstrated to fulfill the specified requirements, including delivery.

##### **B. Installer**

A firm having a minimum of ten (10) years successful experience in the execution of unit paver type paving systems similar to the work shown and specified and who can demonstrate experience through references.

##### **C. Allowable Tolerances**

###### **1. Pavers**

- a. Length and width: +/- 1/16" (1.6 mm) any edge, +/- 1/8" (3.2 mm) diagonally (corner to corner).
- b. Thickness: +/- 1/8" (3.2 mm).

###### **2. Installation**

All pavers shall be placed to lines and levels shown, using established bench marks and grade elevations. Edge to edge arises not to exceed 1/6" (1.6 mm).

##### **D. Job Mock-Up**

Provide an in-place job mock-up of paver work. Mock-up shall be representative of finished work in all respects, complete with all related work such as a standard of acceptability for materials and workmanship. Accepted mock-up will be allowed to remain as a portion of the completed work. The Contractor shall provide an in-place job mock-up for each type of paver installed.

##### **E. Source Quality Control**

Do not change brands or sources of supply for any paving materials during the course of the work.

#### **1.3 SUBMITTALS**

##### **A. Manufacturer's Data and Certification**

Submit manufacturer's specifications and certifications for each material used in the production and installation of unit pavers.

B. Samples

Submit three (3) full size samples of each unit paver required. Prior to the submission of samples, contact the Construction Manager to determine the required colors. Sample acceptance will be for color.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials, other than bulk materials, to project site in manufacturer's unopened containers, bundles or pallets, fully identified with name, type, grade, color and size. Delivery of bulk materials to project site shall be in accordance with accepted practices and in compliance with all applicable codes and regulations.

B. Protect all material during shipment, storage and construction against wetting and soilage or intermixture with earth or other types of materials.

C. Outside storage of pavers shall be on plank platforms in high, dry locations. Outside storage of bulk materials shall be over protected subgrade and restrained by suitable enclosures.

D. During wet or freezing weather all materials shall be protected with tarpaulins or other suitable material.

1.5 JOB CONDITIONS

A. Existing Conditions

1. Verify dimensions in field before installation, and report any discrepancies to the Construction Manager.

2. Start of work signifies acceptance of job conditions, and proprietary work.

3. All concrete pavers shall be installed on subbase as indicated on plans.

B. Environmental Requirements

1. Comply with recommendations and requirements of applicable standards and manufacturers' recommendation for setting pavers.

2. Provide temporary heat and enclosure for paving work which has been completed less than twenty-four (24) hours when the ambient temperatures is less than forty (40) degrees F [four (4) degree C] and falling.

3. Do not build upon frozen work. Do not lay paver units which are at a temperature of less than thirty-three (33) degrees F [one (1) degree C] or which have a film of frozen water or frost coating them. Remove and replace, as directed, paver work which is observed to be damaged in any way from freezing of frost.

C. Protection

1. Protect the paving work from deterioration, discoloration or damage during construction and until acceptance of the work.



2. Normal weathering of exposed work during construction is permitted, provided other activities and conditions do not interfere with result in an unacceptable condition.
3. Protect the installations from traffic for periods of time as required.

## **PART 2 - PRODUCTS**

### 2.1 MATERIALS

#### A. Crushed Stone Subbase

Crushed stone subbase course shall be as specified under Subbase Course (Comply with all applicable portions of the New Jersey Department of Transportation (NJDOT) Standard Specifications for Road and Bridge Construction, 1998 edition, as amended). Top course of stone shall have keyed aggregate and fines so as to form a solid base surface.

#### C. Concrete Pavers - Standard Units

Concrete pavers shall be furnished by the E.P. Henry Corporation, 4200 S. West Boulevard, Vineland, New Jersey, or approved equal.

1. Manufactured from high density, pigmented concrete.
2. Average absorption of less than five (5%) percent in a twenty-four (24) hour cold water absorption test].
3. Minimum compressive strength: 8,000 psi, for any five (5) pavers tested.
4. Capable of withstanding a minimum of fifty (50) cycles of freeze-thaw conditions (Section 8 of ASTM C-67-73).
5. Permissible tolerances for individual pavers shall conform to ASTM Designation C936-82.
6. ***Color and finish shall be selected by the Owner" Representative.***

7. Standard Paver description and sizes shall be as follows:  
(See Plan for location)

**BRISTOL STONE SMOOTH**

7 3/4" X 7 3/4" X 2 3/8"

7 3/4" X 11 3/4" X 2 3/8"

11 3/4" X 11 3/4" X 2 3/8"

**BRISTOL STONE SMOOTH BORDER (Soldier Course)**

6 1/4" X 9 7/16" X 2 3/8"

#### D. Sand Setting Bed

Sand shall be in accordance with ASTM C14, "Aggregate for Masonry Mortar", and be clean, washed sharp sand compacted to the depths as shown on the drawings.

E. Joint Sealers

Joint Filler shall be Portland Cement with prepared color added shall conform to ASTM C-150.

F. Filter Fabric

1. Filter fabric shall be non-woven polyester filter cloth meeting the following requirements:

TEST	REQUIREMENTS
a. Density (pz./sq.yd.) (ASTM D-1777)	3.5 oz./sq. yd. Minimum
b. Tensile Strength Dry grap and wet grap (ASTM 1682)	100 lb. Minimum each direction
c. Puncture Strength Mullins Burst (ASTM 1117)	140 psi. Minimum
d. Permeability Coefficient CM/SEC	.080 - minimum .120 - maximum

2. Typar by Dupont and Mirafi 140N by Mirafi, Inc. or an approved equal are acceptable materials.

### PART 3 - EXECUTION

#### 3.1 PREPARATION OF SUBGRADE

- A. The complete subgrade shall be parallel to the finished surface and shall be crowned or pitched to an even gradient parallel to finished surface. Do all necessary excavation and trenching for utilities prior to laying of pavers.
- B. All soft and yielding material, and other portions of the subgrade which will not compact readily when rolled or tamped, shall be removed or broken off to a depth of not less than one (1') foot below the finished surface or the surged. All holes shall be filled with suitable material and the whole surface compacted uniformly by rolling the entire area with an approved power roller weighing not less than ten (10) tons. Any portion which is not accessible to a roller shall be thoroughly compacted by hand tamping. Any creepage of the grade while being rolled shall indicate insufficient compaction. All fills to be made of porous material, which is to be puddled in, thoroughly rolled, and tamped.
- C. Precautions shall be taken as necessary to protect the subgrade from damage. Construct and maintain the crown, or pitch, in such a condition that it will drain readily and correctly.
- D. The subgrade shall be compacted to ninety-five (95%) percent of the maximum density, except in areas of fill, the top layer shall be compacted to ninety-eight (98%) percent of maximum density. Subgrade shall be firm and unyielding before application of the stone base course or concrete subbase.

### 3.2 CRUSHED STONE SUBBASE

- A. Install at locations and to desired depths as so indicated on drawings.
- B. Install in lifts insuring that each layer is fully compacted and top surface is tightly knitted with keyed aggregate and fines.

### 3.3 FILTER FABRIC

Compact crushed stone subbase as required and install filter fabric. Fabric shall be laid from rolls and have end laps of at least six (6") inches. Utilize clips, pegs, etc. As recommended by fabric manufacturer for specific type of application.

### 3.4 SAND SETTING BED

- A. Spread uniformly over the crushed stone subbase and filter fabric to a depth as shown on drawings.
- B. Uniformly compact until the appearance and surface texture is uniform and all ridges are removed. Any variation in the setting bed shall be loosened, reshaped and rerolled. The top surface shall be free of all voids.
- C. Once the entire setting bed is compacted, re-screed to loosen the top 1/2" of setting bed to aid in the bedding of unit pavers during compaction of the final laid surface.
- D. Keep setting bed approximately 1/4" higher to allow for final compaction of concrete pavers.

### 3.5 PLACING PAVERS

- A. Once all edge controls are in place a soldier course shall be constructed as shown on the drawings. (Do not disturb the sand setting bed). All newly laid pavers must be protected from continued movement of materials and storage. The finished surface of the pavers shall be true and uniform. All pavers shall be butted. Pavers shall be cut when with a motor driven saw with diamond blade designed to cut masonry with clean, sharp, unchipped edges.
- B. Pavers are to be brought forward to the working edge of the pavement over the already laid pavers, so that the installers are always working on a hard surface. Screed sand should never be walked upon. Tight joints shall be maintained with all sides in firm contact. The pattern should be checked with a line every two (2') foot and corrected if necessary.
- C. The surface edge of one paver shall be level with the next adjacent pavers so that no voids, rocking motions, or tripping hazards are encountered. Edge to edge arises shall not exceed 1/6". Good alignment must be kept, and the laid pattern shall be that shown on the plans.

### 3.6 JOINT TREATMENT

- A. Once the soldier course and all pavers have been laid, all butted joints shall be filled by sweeping dry, clean mason sand into the joints. Pavers shall be vibrated into bedding with a plate vibrator. Finely mist the surface and add appropriate sand as needed to bring the jointing level with paver surface, repeat vibration. Thoroughly clean paving surface upon completion of installation.
- B. Joint Sealant shall be installed in conformance with Sealants & Caulking Section - 07900

3.7 PROTECTION

The Contractor shall take precautions to protect the finished work from damage until accepted.

3.8 CLEAN-UP

- A. Clean surface of pavers and surrounding concrete surfaces.
- B. After completion of work dispose of all debris and excess material to the satisfaction of the Construction Manager.

**TECHNICAL SUBMITTAL REQUIREMENTS  
 SECTION 02515 - CONCRETE UNIT PAVERS**

ITEM	SUBMITTAL	CATEGORY		
		A	I	S
1	Manufacturer's data	•		
2	Manufacturer's certification		•	
3	Materials			•
<p><b>A</b> = For Approval                      <b>I</b> = For Information                      <b>S</b> = Sample</p>				

**END OF SECTION 02515**

## **SECTION 02521 - PORTLAND CEMENT CONCRETE CURBS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 Specifications sections, apply to work of this section.

#### **1.2 SUMMARY**

- A. The work required under this section consists of furnishing all labor, materials, equipment, services and related items necessary to complete all Portland Cement Concrete Curbs, and all related work, complete, as indicated on the drawings or specified herein.
- B. The following related items of work are included under other sections:
  - 1. Earthwork - Section 02200.
  - 2. Subbase Course - Section 02230.
  - 3. Concrete Work - Section 03310.
  - 4. Sealants & Caulking - Section 07920.

#### **1.3 QUALITY ASSURANCE**

- A. Codes and Standards
  - 1. Comply with all applicable portions of the New Jersey Department of Transportation (NJDOT) Standard Specifications for Road and Bridge Construction, 1989 edition, as amended.
  - 2. Comply with applicable standards of the American Concrete Institute.

#### **1.4 SUBMITTALS**

Furnish samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for Subbase course, Concrete Work, Sealants & Caulking.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Except as specified herein, all materials shall conform to the requirements of local governing regulations. Mixes and properties shall be as specified under Section 03310 - Concrete Work.
- B. Forms
  - Either steel or wood. Use flexible spring-steel forms or laminated boards to form radius bends as required.
- C. Expansion Joints

Premolded joint filler, ASTM D1751 or D1752, Type 1, standard, highly resilient.

D. Joint Sealer

Shall be as specified under Section 07920 - Sealants & Caulking.

E. Curing

Membrane-forming curing and sealing compound, mat or impervious sheet curing methods.

F. Mortar

Conform to requirements outlined in New Jersey Department of Transportation (NJDOT) Standard Specifications for Road and Bridge Construction, Section 914, 1989; as amended.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Examine the areas and conditions under which concrete curbs are to be installed. Conditions detrimental to the proper and timely completion of the work shall be corrected before proceeding with the work.
- B. Verify that subgrade is properly compacted and graded. Remove debris and loose materials from area to receive concrete.

#### **3.2 SUBGRADE PREPARATION**

- A. General  
Conform with the requirements specified in Section 02200 - EARTHWORK.
- B. The subgrade shall be thoroughly wetted and then compacted with two (2) passes of a five hundred (500) pound roller.
- C. Yielding material deflecting more than one-half (1/2") inch under the specified roller shall be removed to a depth of not less than four (4") inches below subgrade elevation and replaced with structural fill which shall then be compacted as described above.
- D. The subgrade shall be in a moist condition when the concrete is placed. In cold weather the subgrade shall be prepared and protected so as to provide a subgrade free from frost when the concrete is deposited.

#### **3.3 FORM CONSTRUCTION**

- A. General  
Comply with the applicable requirements of Division 3 sections for concrete work.

- B. Install sufficient quantity of forms to allow continuous progress of the work and so that forms can remain in place at least twenty-four (24) hours after concrete placement.
- C. Check completed form work for grade and alignment to the following tolerances:
  - 1. Top of form: Not more than 1/8" in ten (10') feet.
  - 2. Vertical face: Longitudinal axis not more than 1/4" in ten (10') feet.

### **3.4 EXPANSION JOINTS**

- A. General  
Comply with the applicable requirements of Section 07900 - JOINT SEALER.
- B. Install transverse expansion joints at structures and at the end of the work day.
- C. Install longitudinal expansion joints where curbs and paved areas abut each other; at buildings, other concrete slabs or pads or vertical restraints.
- D. Fill joints with 3/4" thick joint filler strips. Place joint filler with top edge 1/4" below the surface. Hold in place with steel pins or other devices to prevent warping of the filler during floating and finishing.
- E. Immediately after finishing operations are completed, round joint edges with edging tool having a radius of 1/4". Remove concrete over the joint filler.
- F. At the end of the curing period, clean and fill expansion joints with joint sealer. Fill joints flush with concrete surface. Dummy groove joints shall not be sealed.

### **3.5 CONTRACTION JOINTS**

- A. Form or saw contraction joints 3/16" wide and 2" deep. Saw as soon as possible after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage cracking occurs in the concrete. The depth of saw cut may be decreased at the edge adjacent to the pavement to obtain a maximum depth without pavement damage. Tool the edges of construction joints to 1/4" radius.
- B. Install contraction joints at twenty (20') feet o.c. maximum spacing. Space joints in uniform lengths or sections.

### **3.6 CONCRETE PLACEMENT AND FINISHING**

- A. General  
Comply with the requirements of Section 03300 - CONCRETE for mixing and placing concrete, and as specified herein.
- B. Moisten subgrade as required to reduce suction at the time concrete is placed. Do not place concrete around structures until they have been brought to the required grade and alignment.
- C. Deposit and spread concrete in a continuous operation between transverse joints. If interrupted for more than one-half (1/2) hour, place an expansion joint. Sections more than twenty (20') feet in length between transverse joints will not be permitted.

- D. Place the concrete in the forms in layers not exceeding five (5") inches in depth and space sufficiently to eliminate voids. A vibrator may be used. Provide drainage in openings through the curb, at the elevation and size required, where indicated or directed. While the concrete is still plastic, round the edges of the face and back of the curb. Place depressed curbs for drives or handicapped ramps, where indicated or directed.
- E. Automatic machine may be used for curb placement at the Contractor's option, if acceptable to the Project Consultant. If machine placement is to be used, submit revised mix design and laboratory tests results. Machine placement must produce curbs to the required cross-section, lines, grades, finish and jointing as specified for concrete. If results are not acceptable, remove and replace with formed concrete as specified.
- F. After screeding and compacting, finish unformed surfaces with a wood float to produce a uniform texture and finish throughout. Inspect formed surfaces immediately after stripping forms, grind down fins and repair sand runs and honeycombs. Correct irregular surfaces by rubbing with a carborundum stone. Brush finishing or plastering will not be permitted. Fill minor defects with mortar.

### **3.7 CURING AND BACKFILLING**

#### **A. Curing**

Immediately after the finishing operation, the exposed concrete surface shall be cured for seven (7) days by the mat, impervious sheet, or membrane-curing method. Comply with applicable requirements of Division 3 Concrete Sections.

#### **B. Backfilling**

After curing, debris shall be removed and the areas adjoining shall be backfilled, graded and compacted to conform to the surrounding area in accordance with the lines and grades indicated. Use acceptable backfill, fill or structural fill material as specified in Section 02200 - EARTHWORK. Dispose of unsuitable and surplus material.

### **3.8 PROTECTION**

- A. Protect completed work from damage until accepted. Repair damaged concrete and clean concrete discolored during construction. Work that is damaged shall be removed and reconstructed to the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable.

END OF SECTION 02521



## **SECTION 02750 - IRRIGATION SYSTEM**

### **PART 1 - GENERAL**

#### 1.1 SECTION INCLUDES

- A. The work required under this Section consists of furnishing all system design, labor, materials, equipment, services and related items necessary to complete all IRRIGATION SYSTEM installation and all related work complete, which will efficiently irrigate all areas of planting as indicated on the drawings.
- B. Major items of work include, but are not limited to, the following:
  - 1. Trenching and backfill.
  - 2. Shop drawings for design of a fully operational, automatically controlled irrigation system.
  - 3. Booster system if needed.
  - 4. Copper risers and associated stabilizing hardware and fittings.
  - 5. Proper backflow protection according to local codes, ordinances and permits.
  - 6. Test all systems and make operative.
  - 7. "As-built" drawings.

#### 1.2 RELATED SECTIONS

- 1. Earthwork
- 2. Mechanical General Requirements
- 3. Ornamental Metal Fences and Gates

#### 1.3 QUALITY ASSURANCE

##### A. Permits and Fees

Obtain all permits and pay required fees to any governmental agency having jurisdiction over the work. Inspections required by local ordinances during the course of construction shall be arranged as required. On completion of the work, satisfactory evidence shall be furnished by the Irrigation Contractor to show that all work has been installed in accordance with the ordinances and code requirements.

##### B. Equipment Manufacturer

- 1. Supply all automatic irrigation equipment specified below, new and in perfect condition, and by a single manufacturer, unless otherwise specified. Any proposal for substitution of materials or equipment shall be submitted ten (10) days prior to the final bid date; otherwise, no substitution will be permitted.

2. The manufacturer (equipment supplier) must currently be in the business of supplying irrigation equipment for not less than (10) years and shall have previously supplied irrigation equipment for at least ten (10) successful projects of similar size and complexity.

C. Installer

A firm having a minimum of ten (10) years successful experience in the execution of irrigation systems similar to the size, scope and complexity of this project as shown and specified and who can demonstrate said experience through documented references.

#### 1.4 SUBMITTALS

- A. Product Data: Submit six (6) copies of and/or samples for all materials and items, as required by the Landscape Architect.
- B. Manuals: Submit six (6) copies of operation and maintenance manuals.
- C. Materials submitted shall include, but are not limited to, the following:

Valves	Pipe (including drip line)
Valve Boxes	Controller (including remote)
Fittings	
Rain Sensor	
Booster Pump	Manufacturer's Information
- D. Shop drawings of system design / layout: Submit six (6) blue-line prints to the Owner's Representative for review and approval.
- E. All product data, manuals, materials shall be submitted together with the shop drawings for review and approval.
- F. Provide the Owner with a projected water consumption estimate for the proposed system. Calculate the annual water usage for a system that will apply two (2) inches of water per watering occurrence an average of four times per week for five (5) months. The Owner will use the information generated and forward the estimated water quantity to the utility authority for a diverted water credit.

#### 1.5 APPROVAL

Wherever the terms "approve", "approval" or "approved" are used in the specifications, they shall mean the approval of the Owner or Project Consultant in writing.

#### 1.6 COORDINATION

- A. Coordinate and cooperate with other contractors to enable the work to proceed as rapidly and efficiently as possible.
- B. Before any work is started, a conference shall be held between the Contractor, the Owners Representative and the Landscape Architect concerning the work under this Contract.

#### 1.7 EXISTING SITE CONDITIONS

- A. The Contractor shall take necessary precautions to protect existing site conditions. Should damage be incurred, the Contractor shall repair the damage to it's original condition at his own expense.
- B. Contractor shall acquaint himself with all site conditions. Should utilities not shown on the plans be found during excavations, Contractor shall promptly notify the Owner for instructions as to further action. Failure to do so will make Contractor liable for any and all damage thereto arising from his operations subsequent to discovery of such utilities not shown in plans.
- C. Contractor shall make necessary adjustments in the layout as may be required to connect to existing stubouts. Should such stubs not be located exactly as shown, Contractor may be required to work around existing work at no increase in cost to the Owner.

#### 1.8 SUBSTITUTION AND REJECTION

The Project Consultant reserves the right to reject material or work which does not conform to the Contract Documents. Rejected work shall be removed or corrected at the earliest possible time.

#### 1.9 PIPING ARRANGEMENT

Suggestions for changes in location of piping, etc., advisable in the opinion of Contractor, shall be submitted to the Owner for approval before proceeding with the work, with written assurance that such changes will not cause any extra cost on their part or alteration of design requirements.

#### 1.10 PROTECTION

- A. Contractor shall be responsible for work until finally inspected, tested and accepted. After delivery and before and after installation, protect work against theft, injury or damage. Protect open ends of work with temporary covers or plugs during construction, to prevent entry of obstructing material.
- B. Protect work, equipment and material of all other trades from damage that might be caused by this work or workmen and shall pay for all such damage, should it occur.

#### 1.11 GROUNDING OF SYSTEM

Ground controllers to building grounding system and/or according to manufacturers' specifications and recommendations.

### **PART 2 - PRODUCTS**

## 2.1 GENERAL

All materials throughout the system shall be new and in perfect condition. After award of the Contract, and prior to beginning the work, the Contractor shall submit for approval two copies of the complete list of materials which he proposes to install. Quantities of materials and equipment need not be included. No deviations from the specifications shall be allowed.

## 2.2 PLASTIC PIPING

- A. All main line pipe 3" and smaller shall be Class 200: Type 1120-1220 polyvinyl chloride (PVC) pipe and shall conform to US Department of Commerce Commercial Standard (CS-256-63).
- B. Smaller systems requiring less than 40 PSI working pressure with less than 35 GPM demand may use a 100 lb. Polyethylene pipe for unpressurized laterals. Consult Landscape Architect if poly pipe is bid for laterals. Polyethylene pipe shall **never** be considered for main line or pressurized laterals.

## 2.3 PLASTIC FITTINGS

- A. Schedule 40, polyvinyl chloride (PVC) standard weight as manufactured by Sloan, Lasco, or approved equal.
- B. Only solvent weld or insert fittings are acceptable; no saddle type clamping of fittings will be used.
- C. If poly pipe is used for laterals, only PVC insert type fittings and 100% stainless steel clamps are acceptable.

## 2.4 SOLVENT CEMENT

Compatible with PVC pipe and of proper consistency.

## 2.5 ACCESSORIES

- A. Automatic Line Flush Valves shall be utilized at the end of each independent zone area. Valve shall be capable of flushing one gallon at the beginning of each irrigation cycle.
- B. Each independent irrigation zone shall utilize an Air/Vacuum Relief Valve at its high points for the purpose of relieving air pockets at cycle start up or vacuum at system shut down.

## 2.6 PRESSURE REGULATION VALVE

The pressure regulator shall be a piston type unit with an externally accessible regulation unit that can be serviced without removing the valve from the system. The regulator shall have a built in indicator that shows when the proper outlet pressure is reached. It shall be able to respond immediately to any inlet pressure variation and capable of regulating from 15 PSI to 50 PSI using interchangeable color coded springs.

#### 2.7 DISK FILTER

The filter shall be a disc filter (or equal) design with color coded filter elements indicating the mesh size of the element being used. The discs shall be constructed of chemical resistant thermoplastic for corrosion resistance.

#### 2.8 SPRINKLER HEAD RISERS (IF NEEDED)

Schedule 80 PVC for risers. Clean all rough edges or burrs. Utilize "Spears triple swing joint" and anti-theft swivel construction throughout.

#### 2.9 MANUAL VALVES

Valves shall be at each zone, as specified on the drawings and shall be made of brass or bronze of the ball type closure.

#### 2.10 ELECTRIC REMOTE CONTROL VALVES

Electrically operated solenoid valves installed in valve boxes of appropriate size and of a type as detailed on the drawings or as directed by the Landscape Architect with manual shut off valve to match pipe size.

#### 2.11 CONTROL EQUIPMENT-ELECTRO MECHANICAL

Automatic controllers shall be as specified on the drawings or as directed by the Landscape Architect. Each controller location shall be easily accessible for maintenance. It shall be possible to make minor timing adjustments to the controller in the field. There shall be no time lag between sections of stations and the controller will be of a compatible type for operating the automatic control valve. If the timing mechanism of the controller has to be removed from the field for service, the controller shall be capable of continued manual operation, with an A or B Program Switch.

#### 2.12 EXPANSION CURLS

Expansion curls shall be provided within 3 feet of each wire connection to a solenoid and at least every 300 feet in length. (Expansion curls are easily formed by wrapping at least 5 turns of wire around a rod or pipe 1" or more in diameter, then withdrawing rod).

2.13 VALVE BOXES

Valve boxes with underground sectionalizing shall, unless otherwise detailed on Plan, consist of a 12" standard box as manufactured by Ametek, or approved equal. All valve boxes in roadways or sidewalks shall be cast iron construction with lock lid.

2.14 COMMUNICATION CIRCUITRY

Electric control lines (24 volt) from each controller to the automatic valves shall be direct burial UF wire of a different color than the black and white wires used on the 115 volt AC power. All wire shall be furnished in minimum 2,500' reels and spliced only at valve or tee locations. Wire sizing shall be as specified on the drawings.

2.15 CONTROL WIRES

24 volt solid wire UL approved for direct burial in ground. Minimum wire size: 14 gauge.

2.16 SLEEVES FOR CONTROL WIRES

Provide PVC 1220-160 PSI. plastic pipe or galvanized heavy wall steel conduit. under all walks and paving and where indicated on drawings for control wires.

2.17 SLEEVES FOR IRRIGATION PIPE

A. Under all walks and paving and where indicated on drawings for irrigation pipe. Provide Schedule 80 PVC plastic pipe or as otherwise approved by Landscape Architect.

2.18 SPRINKLER HEADS ( Strip Stray, Flood Bubbler, Spray/ Stream) (IF NEEDED)

A. All full and part circle sprinklers shall be of the fixed spray or gear driven variety as is specified on the drawings or as directed by the Project Consultant. Sprinklers shall be of the pop-up type with spring retraction. The body of the sprinkler shall be constructed of Cyclocac Material and be easily serviced from the top. It shall have an accessible screening device and shall perform to the manufacturer's specifications with regard to the diameter of throw and gallonage at a given pressure. All spray heads shall have a pressure compensation device on nozzles.

B. Spacing of heads shall not exceed the manufacturer's maximum recommendation.

2.19 DRAINS

Air hose connections of approved design shall be provided for winterizing at several locations so that the entire system can be drained by blowing it out with compressed air.

2.20 REDUCED FLOW BACKFLOW PREVENTION UNIT (Confirm the existing is working condition and need not be replaced)

In compliance with local codes.

2.21 QUICK COUPLING VALVES

Shall be noted on drawings or as directed by the Landscape Architect.

2.22 RAIN SENSOR

An approved mechanical device shall be installed as specified on the drawings to prevent irrigation cycling during periods of rainfall.

2.23 RUBBER HOSE

One (1) heavy duty, reinforced rubber hose, 50 feet length shall be provided by the Contractor to the Owner for use with Quick Coupling Valves.

2.24 BOOSTER PUMP

A booster pump shall be designed into the irrigation system should the initial system design prove inadequate to supply the necessary water pressure for the entire irrigation system.

**PART 3 - EXECUTION**

3.1 SHOP DRAWINGS

Indicate upon the plan the various types and locations of the water emitting devices, the lines / laterals / sleeves, the valve boxes, the separate watering zones, the water source(s), the controller(s) and a booster pump if needed. Provide an equipment schedule that indicates the manufacturer's various product model numbers proposed for installation.

3.2 PREPARATION

Coordination: Advise installers of other work about specific requirements relating their placement of piping and electrical work which are to be used in this system. Furnish installers of other work with Drawings showing location of such equipment.

3.3 WORKMANSHIP

A. Accuracy:

Lay out work as accurately as possible to the drawings. The drawings, though carefully drawn, are generally diagrammatic to the extent that swing joints, offsets and all fittings are not shown.

B. Coverage:

The Contractor shall be responsible for full and complete coverage of all irrigated areas and shall make any necessary minor adjustments at no additional cost to the Owner. If not specified on the plans, the Contractor shall be responsible for proper nozzle choice and arc adjustment to assure:

1. Matched precipitation of all heads within each area and zone.
2. Proper flow rates not to exceed 7 feet/second in any piping.

C. Revisions:

Any major revisions to the irrigation system must be submitted and answered in written form, along with any negotiated change in contract price.

3.4 INSTALLATION

A. Excavating and Trenching

1. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition and in a manner approved by the Project Consultant.
2. Trenches shall be made wide enough to allow a minimum of 2 inches between parallel pipe lines. Trenches or pipe lines shall be made of sufficient depths to provide minimum cover from finish grade as follows:
  - a. 18" minimum cover over main lines.
  - b. 12" minimum cover over control wires from controller to valves
  - c. 12" minimum cover over lateral lines to leads.
  - d. 24" minimum cover under all paved walks and roads.
3. Maintain all warning signs, shoring barricades, flares and red lanterns as required by the Safety Orders of the division of Industrial Safety and any local ordinances.

B. Pipe Line Assembly

1. Install remote control valves where shown and group together where practical. Place no closer than 6 inches to walk edges, buildings and walls.
2. Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by manufacturer of the pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic bristle brush.
3. Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench bottom to allow for expansion and contraction.
4. Make all connections between plastic pipe and metal valves or steel pipe with threaded fittings using plastic male adapters.



C. Sprinkler Heads (Bubblers if needed)

Install all sprinklers as detailed on drawings or specifications. Use only Teflon tape on all threaded connectors.

D. Closing Pipe and Flushing Lines

1. Cap or plug all openings as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
2. Thoroughly flush out all water lines before installing heads, valves and other hydrants.
3. Test in accordance with specified procedures for Hydrostatic Tests.
4. Upon completion of the testing, the Contractor shall complete assembly and adjust sprinkler heads for proper distribution.

E. Hydrostatic Tests

1. Request the presence of the Owner or Project Consultant in writing at least 48 hours in advance of testing.
2. Testing to be accomplished at the expense of the Contractor and in the presence of the Owner or Project Consultant.
3. Center load piping with small amount of backfill to prevent arching or slipping under pressure.
4. Apply a continuous and static water pressure of 60 PSI. when welded plastic joints have cured at least 24 hours and with the risers capped as follows:
  - a. Main lines and sub mains to be tested for 1 hour.
  - b. Lateral liens to be tested for 1 hour. (If laterals and individual sub-mains downstream of control valves have less than 90 PSI working pressure or less than 10 GPM flow, hydrostatic tests are waived for these laterals).
5. Repair leaks resulting from tests.

F. Automatic Controllers

Connect remote control valves to controller in a logical sequence to correspond with specification of the Owner or the Landscape Architect.

G. Automatic Control Wiring

1. Install control wires, sprinkler mains and laterals in common trenches wherever possible.
2. Install control wires at least 18 inches below finish grade and lay to the side and below main line. Provide looped slack at valves and snake wires in trench to allow for contraction of wires. Tie wires in bundles at ten foot intervals.

3. Control wire splices will be allowed only in runs more than 500 feet. Any splices must be installed in an existing valve box or separate valve box installed flush with finished grade.
4. All wire passing under existing or future paving, construction, etc., shall be encased in plastic or galvanized steel conduit extending at least 12 inches beyond edges of paving or construction.
5. Make connections to the building electrical system as is required for the proper operation of the automatic control system.

H. Backfill and Compacting

1. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of rubbish.
2. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 90% density.
3. Compact trenches in areas to be planted by thoroughly flooding the backfill.
4. Dress off all areas to finish grades.

3.5 COOPERATION AND CLEAN-UP

Cooperate fully with the other Contractors on the job site in a clean and safe condition. At the end of each days work, store all of tools, equipment and materials and clean debris from the job. Upon the completion of the job, immediately remove all tools, equipment and any surplus materials and all debris caused by this work.

3.6 "AS-BUILT" DRAWINGS

Prepare an "As-Built" drawing on a blueline print which shall show deviations from the bid documents made during construction affecting the main line pipe, controller locations, remote control valves, quick-coupling valves and all sprinkler heads. The drawing shall also indicate and show approved substitutions of size, material and manufacturer's name and catalog name and catalog number. The drawings shall be delivered to the Owner's Representative before final acceptance of work.

3.7 FINAL ACCEPTANCE

Final acceptance of the work shall be obtained from the Owner's Representative and Landscape Architect upon the satisfactory completion of all the work and training by the Irrigation Contractor of key individuals associated with the maintenance and/or management of the finished system.

**3.8 GUARANTEE**

- A. Guarantee all work for one year from date of acceptance against all defects in material, equipment and workmanship. Guarantee shall cover repair of damage to any part of the premises resulting from leaks or other defects in material, equipment and workmanship to the satisfaction of the Owner. Repairs, if required, shall be done promptly at no cost to the Owner.
- B. Guarantee will include spring start-up and winterizing of system within the one (1) year time and development of approved water application. Winter damage due to improper winterization is the responsibility of the Contractor.
- C. All repairs and servicing required under the guarantee period shall be made under the observation of the Owner's maintenance crew to help train them for the proper operation of the system.

**TECHNICAL SUBMITTAL REQUIREMENTS  
 SECTION 02750 - IRRIGATION SYSTEM**

ITEM	SUBMITTAL	CATEGORY		
		A	I	S
1	Manufacturer's product data	●		
2	Manufacturer's manuals/catalogue cuts	●		
3	Shop drawings for system design	●		
4	System water consumption estimate		●	
5	Suggested changes to system	●		
<b>A</b> = For Approval		<b>I</b> = For Information		<b>S</b> = Sample

**END OF SECTION 02750**

## **SECTION 02925 - TOPSOIL**

### **PART 1 - GENERAL**

#### 1.1 SECTION INCLUDES

- A. The work under this Section shall include all labor, material, equipment, and all else necessary for full compliance with the applicable drawings, specifications and other contract requirements for the preparation and fine grading of topsoil and subgrade, the spreading and testing of topsoil and humus.

#### 1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork – Section 02200
- B. Planting - Section 02955.

#### 1.3 QUALITY ASSURANCE

- B. Topsoil, whether stockpiled or furnished to the site shall be tested by a recognized independent soil testing organization and the results submitted in writing to the Landscape Architect. If the test shows that the topsoil does not conform to the requirements herein specified under "MATERIALS", the Contractor shall be responsible for adjusting the pH range and/or percent of organic matter by means of approved additives in order to conform to the specified requirements.

#### 1.4 GUARANTEE

- A. The Contractor shall guarantee that upon completion of the work all portions thereof will be in accordance with the Contract and Specifications and that the same will so remain for a period of one (1) year, or for not less than two (2) full planting seasons, which ever period is greater.
- B. The Contractor shall further guarantee that during the period of the guarantee he will make good any defects to the work and all damage caused to property of the Owner by such defects or by the work required to remedy such defects.

### **PART 2 - PRODUCTS**

#### 2.1 TOPSOIL

- A. Topsoil as shall be necessary to complete the planting shall be obtained from approved off-site sources.
  - 1. Topsoil shall be natural topsoil sandy loam free from subsoil and obtained from an area which has never been stripped. Topsoil shall be of uniform quality, free from hard clods, roots, stiff clay, hardpan, stones larger than one (1") inch, lime, cement, ashes, slag, concrete, tar residues, tarred paper, boards, chips, stocks, or any other undesirable material.
  - 2. Topsoil shall meet the following requirements:
    - a. pH - 5.5 to 7.0 inclusive
    - b. Organic Matter - seven (7%) percent (loss on ignition)

- c. Salt Concentration (ECe) - 0.2 to 0.5 mhos/cm for a 1=2 soil:water ratio.
- d. Texture - sandy loam
- e. Good internal rate of percolation
- f. Clay content - ten to twenty (10-20%) percent
- g. Sieve analysis:

<b><u>SIEVE SIZE</u></b>	<b><u>% PASSING</u></b>
1"	100%
1/2"	97%
#10	60-80%
#40	40-60%
#60	40-60%
#100	10-30%
#200	10-20%

**B. Topsoil Tests**

1. All topsoil shall be tested by a recognized independent soil testing organization and the results submitted in writing to the Landscape Architect. If the tests show that the topsoil does not conform to the requirements herein specified under "MATERIALS", the Contractor shall be responsible for adjusting the pH range and/or percent of organic matter by means of approved additives in order to conform to the specified requirements.
2. All soil tests shall provide the following information:
  - a. Color
  - b. pH
  - c. Specific Conductance - micromhos/cm
  - d. Organic Matter (loss on ignition)
  - e. Texture
  - f. Mechanical analysis - % passing 1", 1.2", #10, #40, #60, #100 and #200 sieves
  - g. Available nutrients
  - h. Corrective recommendations in pounds square foot for nutrients and pH.
2. The Contractor shall submit a minimum of three (3) samples taken randomly at different locations throughout the borrow area to a testing laboratory selected by the Owner and shall have the above specified tests performed on each sample.

Should the Contractor obtain topsoil from several locations, each borrow location shall have a minimum of three (3) tests performed. Test results shall be submitted to the Landscape Architect for approval.
4. Additional tests shall be taken by the Owner at the site during the spreading operations. Should the on-site tests differ from the approved tests to an extent that would indicate the topsoil delivered to the site is of poorer quality (higher clay content, lower organic matter, lower or higher pH, lower permeability) than the approved tests, the Contractor shall be responsible for its removal and replacement or for incorporating corrective measures and/or directed by the Landscape Architect, at no additional cost to the Owner.

5. The cost of the initial tests from the borrow site shall be paid for by the Contractor. The costs for the tests on the delivered topsoil shall be paid for by the Owner.

C. Lime

1. Lime shall be dry and free flowing ground dolomitic limestone not less than ninety (90%) percent total carbonates, ground so that fifty (50%) percent passes through a one hundred (100) mesh sieve and ninety (90%) percent through a twenty (20) mesh sieve.
2. The Contractor must furnish a delivery slip indicating weight of material delivered and a certified analysis of the physical and chemical composition at time of delivery.

D. Commercial Fertilizer

1. The Contractor shall provide two basic commercial formulation -- 0-20-20 and 10-6-4 -- and shall conform to the applicable State Fertilizer Law. Any other fertilizer formulation with a 0-1-1 ratio for the 10-6-4 with the approval of Turfcon or its designated representative.
2. The fertilizer must be dry, free-flowing, delivered to the site in the original properly labeled containers, and protected from moisture damage. The Contractor shall furnish the Landscape Architect with a delivery slip for each delivery indicating the formulations, number of bags and weight of each bag.

E. Water

Water suitable for irrigation will be furnished by the Owner. The Contractor shall supply the appropriate watering equipment including water trucks where hose bibs are not available.

F. Organic Compost

Organic compost shall be derived from the natural biological breakdown via storage of organic materials such as leaves, grass clippings, yard waste and vegetative material into an end product. Manufactured by the Atlantic County Utilities Authority as "EcoSoil", or approved equal.

G. Topsoil Grub Treatment

Diazinon [five (5%) percent].

### **PART 3 - EXECUTION**

#### **3.1 WORKMANSHIP**

A. Preparation of Subgrade

1. In areas to be seeded or sodded, the soil shall be excavated to four to six (4"-6") inches below finished grade; the subgrade soil below that level shall then be loosened to a depth of four to six (4"-6") inches and graded to remove all ridges and depression so that it will everywhere be parallel to proposed finished grade. The purpose is to break up hardpan or soils compacted by construction activity.

This procedure shall only be utilized where excavation will not effect the root systems of existing trees. The Contractor shall utilize other methods, under the direction of the Landscape Architect, to achieve the desired results. All stones over one (1") inch in any dimension, sticks, rubbish and other extraneous matter shall be removed. No heavy objects shall be moved over areas to be seeded after the soil has been scarified and graded. Seeding over compacted areas will not be permitted. For existing lawn areas designated for topdressing and reseeded, instead of scarification, the surface shall be hand raked and aerated prior to the application of the topsoil topdressing.

**B. Spreading Topsoil and Fertilizer**

**1. Topsoil**

a. After the subgrade soil has been prepared, topsoil shall be spread evenly thereon and the area then rolled with a 200 pound roller so as to produce a compacted depth of six (6") inches of topsoil. No topsoil shall be spread in frozen or muddy conditions. In all lawn areas, the finished surface of the topsoil shall conform to the finished grade and shall be free from hollows or other inequalities, stones over one (1") inch every dimension, sticks and other extraneous matter.

**2. Commercial Fertilizer**

- a. The fertilizer shall be applied as specified herein, uniformly at a rate for each formulation conforming to soil test results and in strict accordance with the manufacturer's specifications. Commercial fertilizer shall be placed around all planting material prior to final backfilling and tamping.
- b. The Contractor shall thoroughly incorporate the lime and 0-20-20 fertilizer into the topsoil to a depth of 4 to 6 inches.
- c. The 10-6-4 fertilizer applied after final grading shall be lightly incorporated with the soil to a depth of one inches.

**C. Mixing Topsoil and Organic Compost**

Topsoil and organic compost shall be thoroughly mixed prior to planting operations for use as a backfill mixture for all trees, shrubs, groundcovers, and bedding plants. Refer to PLANTING - Section 02955, for specific mix ratios and related items.

**3.2 FINAL ACCEPTANCE**

- A. After completion of all work and after all defects in the work have been remedied by the Contractor and the work has been accepted by the Landscape Architect and concurred by the Owner, the Landscape Architect will issue a Certificate of Final Acceptance. A copy thereof shall, upon filing, be forwarded by the Landscape Architect to the Contractor. The guarantee period shall commence with the date of filing of the Certificate of Final Acceptance.

**TECHNICAL SUBMITTAL REQUIREMENTS  
SECTION 02925 - TOPSOIL**

ITEM	SUBMITTAL	CATEGORY		
		A	I	S
1	Topsoil test data	•		
2	Soil samples for testing			•
3	Lime delivery slip		•	
4	Fertilizer delivery slip		•	

**A** = For Approval      **I** = For Information      **S** = Sample

**END OF SECTION 02925**



## SECTION 02931 – TEMPORARY PROTECTION OF EXISTING PLANT MATERIAL

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. General Conditions, Special Contract Requirements and Division 01 Specification sections are a part of and govern work under this section.

#### 1.2 SCOPE OF WORK

- A. The work required under this Section consists of furnishing all labor, materials, equipment, services and related items necessary to existing plant material as indicated on the drawings and described in the specifications.
- B. Work includes, but is not limited to the following:
  - 1. Protection for plant material that is to remain.

#### 1.3 JOB CONDITIONS

- A. Protection of Existing Plant Material to Remain
  - 1. All Groundcover to remain shall be protected against damage during construction operations. No construction equipment shall be stored within 12 inches of plant material designated to be saved.
  - 2. Before starting work, protect groundcover indicated to be saved by snow fencing, staked securely in place at the limit of the drip lines.
  - 3. The Contractor shall take whatever precautions necessary during construction to ensure that no damage is done to the existing groundcover designated to remain; this shall include, but not be limited to, the use of construction equipment of size and weight which will not injure root systems.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

Products and materials utilized in this item of work shall be subject to the approval of the Project Consultant

**PART 3 - EXECUTION**

**3.1 GENERAL**

**A. Inspection**

Visit the premises and verify all conditions covering the work of this section and verify all dimensions. Examine all drawings covering the work of this section and refer to all other drawings which may affect the work of this section or require coordination with other trades. Before starting the work of this section, make a thorough examination of all portions of the premises in which the work of this section is to be performed. Check all of the work adjoining, adjacent to and underlying the locations where the work of this section is to be installed. Report to the Project Consultant any and all conditions which might interfere with or otherwise affect or prevent the proper execution and/or completion of the work of this section. Do not commence work until any and all such conditions have been corrected by the trade or trades responsible.

**C. Clean-Up**

1. Execute work in such a manner as to avoid interference with, or use of, passage to and from adjoining spaces and facilities.

Do not burn materials or debris on premises. Remove from the site all rubbish and debris resulting from work of this section.

2. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

**3.7 REPLACEMENT OF DAMAGED FACILITIES**

- A. It shall be the Contractor's responsibility to verify the condition of the project site with the Owner's authorized agent. They shall agree on all pre-existing conditions.
- B. The Contractor shall be responsible for the replacement in kind, at the option of the Owner, of any damaged to groundcover during construction.

END OF SECTION 02931

## **SECTION 02955 - PLANTING**

### **PART 1 - GENERAL**

#### **1.1 SECTION INCLUDES**

- A. The work under this Section shall include all labor, material, equipment, and all else necessary for full compliance with the applicable drawings, specifications and other contract requirements for the installation of plants related materials.
- B. All topsoil, furnished to the site, shall be tested by a recognized independent soil testing organization and the result submitted in writing to the Landscape Architect. If the tests show that the topsoil does conform to the requirement as specified in Section 02925 - TOPSOIL, the Contractor shall be responsible for adjusting pH range and/or percent of organic matter by means of approved additives in order to conform to the specified requirements.

#### **1.2 RELATED WORK SPECIFIED ELSEWHERE**

- A. Earthwork
- B. Topsoil - Section 02925.

#### **1.3 QUALITY ASSURANCE**

- A. Qualification of Workmen:
  - 1. Provide at least one person who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of materials being installed and the best methods for this installation and who shall direct all work performed under this Section.
  - 2. Standards:
    - a. All plants and planting materials shall meet or exceed the specification of Federal, State, and County laws requiring inspection for plant disease and insect control.
    - b. Quality and size shall conform with the current edition of "Horticultural Standards" for number one grade nursery stock as adopted by the American Association of Nurserymen.
    - c. All plants shall be true to name and one or each bundle or lot shall be tagged with the name and size of the plants in accordance with the standards of practice of American Association of Nurserymen. In all cases, botanical names shall take precedence over common names.

#### **1.4 SELECTION OF PLANT MATERIAL**

- A. The Contractor or a member of his firm, not the nurseryman or wholesaler, shall select and tag all plant material.

- B. The Contractor shall submit photographs of plant material for preliminary approval by the Landscape Architect.
- C. The Contractor or a member of his firm shall be present when the Landscape Architect inspects the plant material at the nursery.

## 1.5 GUARANTEES

### A. Length of Guarantee

The Contractor shall guarantee all plant material installed under this Contract for a period of not less than one (1) year after the Owner's acceptance.

- 1. Fall planting guarantee shall extend for a minimum of one (1) year after the date of acceptance.
- 2. Spring planting guarantee shall extend for a minimum of one (1) year after the date of acceptance, but in no case shall the guarantee expire before June 1 of the following year.

### B. Cause for Replacement

- 1. The Contractor shall replace all trees, shrubs, groundcovers, or vines that are dead or that are, in the opinion of the Landscape Architect, unhealthy or unsightly, or that have lost their design value or natural shape because of dead branches, excessive pruning or inadequate or improper maintenance by the Contractor.  
The Contractor shall remove dead plants and make replacements on a continuing basis as they appear.
- 2. During the period not recommended for planting, the Contractor shall notify the Landscape Architect prior to removing dead plants so that he may record the plants which are removed. Replacements for the removed plants shall be planted no later than the following planting season.

### C. Guarantee of Replacement Plants

All replacement plants shall be guaranteed as herein before described not less than one (1) year from the date of replacement. There shall be no limit to the number of replacements.

## **PART 2 - PRODUCTS**

### 2.1 MATERIALS

#### A. Topsoil

Topsoil shall conform to the requirement as specified in Section 02925.

#### B. Sand

The mound at the base of each tree pit shall be clean, washed, sharp, coarse masonry sand conforming to ASTM C936-82.

C. Lime

Lime shall be ground dolomitic limestone not less than eight-five (85%) percent total carbonates, ground so that fifty (50%) percent passes one hundred (100) mesh sieve and ninety (90%) percent passes twenty (20) mesh sieve.

D. Commercial Fertilizers

1. Fertilizer for planting shall be a complete fertilizer, at least fifty (50%) percent of the elements of which are derived from organic sources, and shall contain the following percentages by weight: Nitrogen five (5%) percent; Phosphoric Acid ten (10%) percent; Potash five (5%) percent. It shall be uniform in composition, dry, free-flowing and shall be derived to the site in the original unopened containers, all bearing the manufacturer's guaranteed analysis.
2. Fertilizer for trees shall be 38-0-0 slow release fertilizer spikes, quantities as specified recommended by the manufacturer.

E. Bone Meal

Bone Meal shall be finely ground and have a minimum analysis of two (2%) percent Nitrogen and twenty (20%) percent Phosphoric Acid.

F. Organic Compost

Organic compost shall be derived from the natural biological breakdown via storage of organic materials such as leaves, grass clippings, yard waste and vegetative material into an end product. Manufactured by the Atlantic County Utilities Authority as "EcoSoil", or approved equal.

G. Water

Water suitable for irrigation will be furnished by the contractor until acceptance by the Owner. The Contractor shall supply the appropriate watering equipment including water trucks where hose bibs are not available.

H. Peat Moss

Peat Moss shall be Michigan Peat Moss or approved equal in color and consistency.

I. Shredded Hardwood Bark Mulch

Shredded hardwood bark mulch shall have no leaves, young green growth, wood shavings, sawdust or foreign materials of any nature mixed with the bark. Size shall not exceed two (2") inches in the greatest dimension. Samples shall be submitted to the Landscape Architect for approval, before purchase or delivery.

J. Preparation of Tree Ball, Guying, Staking, and Wrapping Material

1. Materials for preparing the tree balls shall be first quality burlap and hemp twine. No plastic burlap or nylon twine will be accepted.

2. Wire for tree guys shall be pliable #12 gauge galvanized annealed steel wire, twisted.
3. Turnbuckles shall be galvanized and have four and one-half (4-1/2") inches lengthwise openings, threaded ends 5/16" diameter, fitted with screw eyes.
4. Tubing shall be new, clear, plastic, flexible tubing not less than one-half (1/2") inch inside diameter.
5. Wrapping for tree trunks shall be of burlap, first quality, at least eight (8) ounces in weight. No plastic or paper materials will be permitted.
6. Deadmen shall be at least eight (8") inches diameter by three (3'0") feet long of cedar.
7. Stakes shall be a minimum of three (3") inches diameter by eight (8'0") feet long, three (3) stakes per tree.
8. Vinyl tubing, white, shall be supplied to enclose all wire of the tree guys for their full length.

K. Plant Material

1. References

- a. Plant names used in the plant list conform to "Standardized Plant Names", second edition, 1942.
- b. Plant materials shall conform to the "American Standard for Nursery Stock" of the American Association of Nurserymen, Inc., 230 Southern Building, Washington, D.C., 20005, unless otherwise specified herein or shown on the drawings.

2. Size

- a. All plants shall equal or exceed measurements specified in the plant list which are the minimum acceptable. Plants shall be measured before pruning with branches in normal position; necessary pruning shall be done at the time of planting. A plant shall be dimensioned as it stands in its' natural position.
- b. Trees under four (4") inches caliper shall be measured one (1'-0") foot above ground.
- c. All plants - specified as being heavy specimens shall be specified in the plant list in both height and coliper. Should this be omitted on the plant list, the Contractor shall question the Landscape Architect prior to submitting his bid. .

3. Quality

- a. Whether indicated or not on the drawings, all plant material shall be graded specimen. Plants shall be typical of this species. They shall be sound, healthy and vigorous, free from defects, disfiguring knots, sunscale injuries, abrasions of the bark, plant diseases, insect eggs,

borers, and forms of infestation they shall have been growing under the same climatic conditions as location of this project for at least two (2) years prior to date of planting on this project.

- b. Plants held in storage will be rejected if they show signs of growth during storage.
- c. Plants selected shall be well matched as to height, spread and general conformation. The following general descriptions shall be used by the Contractor as a guide in selecting plant materials.

4. Conformation

- a. Shade & Flowering Trees: Trees shall be selected for straight trunks, symmetrical, full heads with no open areas and with one straight leader. Trees with a crotch or forked trunk shall be rejected.
- b. Multi-Stem & Clump Trees: Trees having multiple trunks arising from the root crown each with branching typical for the species.
- c. Deciduous Shrubs: Plants shall have full, dense heads and shall be branched to the ground. They shall have sufficient well spaced side branches to give it weight and good bud qualities.
- d. Vines: Plants shall have heavy well branched tops with not less than three (3) runners, eighteen (18") inches and up; and vigorous well developed root systems.
- e. Ground Covers: Plants supplied in pots or similar containers shall be thrifty, well balanced plants, well established in their containers with well developed root systems.
- f. Perennials: Plants shall be thrifty, well balanced plants, well established in their well developed root systems.

5. Anti-desiccant Spray: Shall be an emulsion which will provide a protective film over plant surfaces, permeable enough to permit transpiration such as "Wilt-Pruf" manufactured by DowElanco Chemical Company, Midland, Michigan; "Protex" manufactured by Protex Industries, Inc., New York, New York, or approved equal. It shall be delivered in containers of the manufacturer and mixed according to manufacturer's directions.

6. Filter Fabric: Shall be geotextile material conforming to NJDOT Standard Specifications for Roads and Bridges.

7. Steel Edging: Commercial steel edging with loops pressed from or welded to face of sections at 2'-06" o.c. to receive steel staples 18 inches long for each loop. 3/16 inch thick by 4 inches high by 20 feet long. Ryerson landscape divider of equal

8. Gravel Mulch: Shall be Washed River Stone graded 1/4" to 3/8" diameter. Stone shall be clean and free from silt.

**PART 3 - EXECUTION**

3.1 INSTALLATION

A. Selection of Plant Material

1. Prior to bidding, the Contractor shall ensure that all plant material specified is available at the sizes and quantity specified and submit certification as herein before specified.
2. The Contractor, not the nurseryman or wholesaler, shall pre-tag the plants in the nursery and shall submit clear photographs of typical plants to the Landscape Architect for preliminary approval. Plants photographed shall be easily distinguished in the photograph. All photographs must indicate the scale of the plant material by means of a human subject or yardstick, etc.
3. Upon approval of the photographs by the Landscape Architect when all the plants have been tagged by the Contractor, the Landscape Architect will be notified so that he may schedule his inspection of the trees previously selected by the Contractor (upon a minimum of a two (2) week notice). The Contractor shall have located sufficient alternative choices to prevent loss of time in the event that some trees fail to meet with the approval of the Landscape Architect. All plants must be approved in the field by the Landscape Architect before digging begins.
4. Should the photographs misrepresent the types of trees actually found at the nursery, or should the trees upon inspection by the Landscape Architect be diseased, disfigured, undersized or in any way not meet the specifications, it shall be the Contractor's responsibility to reimburse all the expenses to the Owner and the Landscape Architect involved in extra time and travel for this inspection.

B. Preparation of Plant Material

Precautions customary in good trade practice shall be taken in preparing plants for moving, and workmanship that fails to meet highest standards will be rejected. Plants shall be dug immediately before moving unless otherwise specified. Plants shall be dug to retain as many fibrous roots as possible. Balled and burlapped plants shall have a solid ball of earth no less than minimum size as specified in "American Standard for Nursery Stock", securely held in place by burlap and stout rope (no plastic or nylon materials shall be permitted). Oversize or exceptionally heavy plants are acceptable if size of ball or spread of roots is proportionately increased and approved by the Landscape Architect. Loose, broken or manufactured balls will be rejected.

C. Delivery

Plants shall be packed, transported, and handled with utmost care to insure adequate protection against injury. Each shipment shall be certified by state and federal authorities to be free from disease and infestation. Inspection certificates required by law to this effect shall accompany each shipment invoice or other of stock and on arrival, certificates shall be filed with the Landscape Architect. Until planted, material shall be properly protected against the drying action of the sun and wind. Earth balls shall be mulched with salt hay and thoroughly watered at least once daily. Proper care, as outlined above, shall be taken of any plants stored on the site for more than twelve (12) hours.

D. Schedule

1. Following the signing of the Contract and prior to the commencement of planting, the Planting Contractor shall meet with the Landscape Architect to work



out a schedule of mutually agreeable planting dates and to discuss the delivery of groups of plants comprising a planting composition in order that the Landscape Architect shall have a minimum of a full day's work in supervising placement of the material.

2. Planting shall be done during such weather as is suitable for planting. The Landscape Architect reserves the right to halt planting operations because of unsuitable weather conditions. Planting shall be started during the first planting season after site or part of it has been released. No planting operations shall be conducted between December 20 and February 15.

E. Experience

The Planting Contractor shall have at all times on the job site a man knowledgeable in horticultural practice and he is to submit the background of such a foreman to the Landscape Architect for approval.

F. Planting Locations

It is the Contractor's responsibility to inform the Landscape Architect in writing prior to planting, of any conditions existing on the site which could be considered detrimental to the successful planting and growth of any plant material in this Contract. In the event that obstruction are encountered, said obstruction shall be removed or plants relocated at no expense to the Owner, as directed by the Landscape Architect. The location of plants, as shown on the drawings, is intended only as a guide. Plants shall be delivered to the site and set on the ground in the locations as shown on the drawings. The Landscape Architect shall then direct the Contractor in placing the plants at their final location. The Contractor shall have sufficient men and equipment on site to perform this work without delay or damage to the plant material. The Contractor shall in every instance have all plants that comprise a planting composition on the site and in position. Plant pits shall not be dug until final location has been determined by the Landscape Architect.

G. Preparation of Plant Pits

1. Plant pits shall be prepared by hand or mechanical digger. If a mechanical auger is used, the Contractor shall loosen the sides of the pit to ensure that the sides have not been glazed.
2. Tree pits shall be at least twelve (12") inches greater in diameter than their ball of earth or spread of roots. The depth of the pits shall be at least two (2") inches, and as much deeper as it is necessary to accommodate the ball of the tree and to permit the required preparation of the bottom of the pit so that it will not be necessary to raise or lower the tree to bring it to the required grade.
3. All shrubs shall be planted in the planting beds previously prepared or, where freestanding, in individual pits shall be eighteen (18") inches deep and at least one (1'-0") foot wider than the ball of earth or spread of roots. All pits shall be circular in the outline and dug with vertical sides.
4. When plant pits have been dug, the Contractor shall partially fill with water a representative number of pits in each area of the project to determine if there is adequate percolation in the subgrade at each pit. If the plant pit does not adequately percolate, the Contractor shall immediately notify the Landscape Architect before proceeding with the planting operation so that necessary steps

to correct the drainage problem may be reviewed with the Owner. Do not continue with the planting in area of poor percolation until corrective measures have been authorized for the drainage or until alternative locations have been indicated for the planting.

H. Backfill

1. When the pit has been prepared and the Plant placed in the pit, the Plant shall be faced under the direction of the Landscape Architect.
2. Before backfilling, the topsoil backfill mixture shall be prepared and mixed to the following proportions:
  - a. Deciduous Plants: Four parts by volume of topsoil, one part organic compost and five pounds bone meal per cubic yard.
  - b. Evergreen Plants: Three parts by volume of topsoil thoroughly mixed with one part organic compost.
  - c. Fertilizer: To the above topsoil mixtures add three pounds of specified commercial fertilizer for trees up to three (3") inches caliper for larger trees. Shrubs shall be fertilized with six (6) ounces of fertilizer for shrubs four (4'-0") feet or over. Fertilizer spikes shall be used for trees where indicated on the drawings, in conformance with the manufacturer's recommendations.
  - d. Ground Limestone: Limestone shall be added as indicated by the soil tests and plant species.
3. The above items shall be thoroughly mixed by hand or mechanical mixer. Mixing shall not take place within the tree pit.
4. When the topsoil mixture has been thoroughly mixed, the plant shall be backfilled twelve (12") inches at a time and each lift thoroughly watered. Enough topsoil shall be used to bring the surface, when settled, to the required grade. The plant pit shall be ringed with earth at it's edge to form a saucer of at least three (3") inches depth. Excess excavated soil shall be disposed of where and as directed by the Landscape Architect or removed entirely from site. When the backfilling is completed, the Contractor is to mulch all plant materials with three (3") inches shredded bark mulch. All mass plant beds to be entirely mulched with three (3") inches depth shredded hardwood bark, as shown on drawings.

I. Pruning

Pruning shall be carefully done at the option of the Landscape Architect in accordance with each plant species requirements and/or as directed by the Landscape Architect.

J. Staking

Stakes shall be placed outside of the rootball and shall be driven thirty-six (36") inches into the ground for trees under three and one-half (3-1/2") inches in caliper and shall be driven forty-eight (48") inches into the ground for larger trees; use three (3) stakes per tree, 120 degrees apart. Stakes shall be fastened to the tree with double strand guy wire.

K. Guying and Wrapping

As indicated in the drawings, trees shall be guyed immediately after planting. Pieces of plastic tubing through which the guy wires are passed shall be used where the guy wires are attached to the trees. All guy wires extending to the ground in pedestrian areas shall be enclosed with white vinyl tubing for their full length. Wrapping material shall be wound spirally from the ground line of the trunk to twenty-four (24") inches above the lowest main branches (second Branch) with fifty (59%) percent overlap. The wrapping shall be tied with twine at not less than five (5) places including the bottom, middle and top. The wrapping shall be done as soon as practical after planting, but not before the condition of the trunks of the trees has been inspected and approved by the Landscape Architect.

L. Watering Plant Material

If planting precedes installation of automatic irrigation equipment, manual watering shall be performed as described below at one-week intervals.

1. A hose without nozzle should be inserted into the soil just beyond the earth ball and water allowed to run at a moderate rate until it bubbles to the surface. Remove hose and place at a new location diametrically opposite; allow the water to run until the earth saucer provided by the Contractor is filled to the brim. If this water is absorbed before fifteen minutes have elapsed, this indicated that the procedure outlined above should be repeated immediately and again for as many times as necessary to retain water for more than fifteen minutes.
2. During the month commencing with the third week in August and terminating with the third week in September, the interval between waterings should be extended to two weeks, in order to allow the buds to harden so that they will not enter the winter too full of water. After the third week in September, watering should be resumed on a weekly basis until frost.

M. Winter Protection

The Contractor shall spray all groundcovers and needle evergreens with two applications of approved anti-desiccant. First application is to be made by the second week in November and second application in February when the temperature is above forty (40) degrees. See **Inspection For Acceptance**.

N. Clean Up

Soil or other material which has been brought onto paved areas by hauling operations or otherwise shall be removed promptly, keeping these areas clean.

Periodically, or as directed during the process of the work, the contractor will remove and properly dispose of debris, and keep premises reasonably clear of hazardous obstructions. Trash and combustible material shall not be allowed to accumulate. Upon completion of the work, remove temporary construction facilities and unused material provided for the work and put premise in a neat and clean condition.

O. Protection

Adequate protection shall be provided at all times for planted areas against trespassing by any individuals, and damage of any kind. Such protection shall be maintained to the completion of the Contract Work.

P. Maintenance of Planting Until Acceptance

It shall be the Contractor's responsibility to maintain all plant material until the work performed under this Contract has been accepted by the Landscape Architect and Owner. Maintenance shall include the following:

1. Watering of all plant material on a weekly basis regardless of rainfall. Watering on a weekly basis can only be altered with the approval of the Landscape Architect.
2. All plant beds and tree pits shall be kept in a weed free condition on a continuous basis. Herbicides shall not be used without the approval of the Landscape Architect.
3. Plant material shall be pruned of dead branches as they appear.
4. All guy wires shall be kept tight and plants kept vertical. If any tree, shrub or plant bed settles more than three (3") inches below the established grade, it shall be raised to the proper level and not merely filled in with additional topsoil.

3.2 INSPECTION FOR ACCEPTANCE

- A. Upon completion of the project, the Landscape Architect shall inspect the site to insure compliance with the Contract. He shall notify the Contractor in writing that the work has been accepted or provided the Contractor with a list of items either deficient or incomplete. All items found incomplete or deficient are subject to re inspection and shall be corrected before the contract Work can be accepted.
- B. It may be necessary for the Landscape Architect and Owner to accept the project prior to the application of the anti-desiccant. Acceptance of project does not relieve the Contractor from the responsibility of applying the anti-desiccant at the specified times.
- C. During the guarantee period, the Contractor shall, from time to time, inspect the watering, cultivation and other maintenance operations carried on by the Owner or its agents with respect to such work, and promptly report to the Owner any methods, practices or operations considered unsatisfactory, and not in accord with his interests or good horticultural practices. The failure of the Contractor to so report shall be construed as an acceptance by him of the Owner's maintenance operations, and he shall not therefore claim or assert that any defects which may later develop are the results of such methods or practices.

**TECHINICAL SUBMITTAL REQUIREMENTS  
 SECTION 02955 - PLANTING**

ITEM	SUBMITTAL	CATEGORY		
1 2	Plant Certification Pre-tagged plant photographs	A	I	S
		●		
		●		
<p><b>A</b> = For Approval                      <b>I</b> = For Information                      <b>S</b> = Sample</p>				

**END OF SECTION 02955**

## **07920 - SEALANTS AND CAULKING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications sections, apply to work of this section.

#### **1.2 SUMMARY**

- A. The work required under this Section consists of furnishing all labor, materials, equipment, services and related items necessary to provide JOINT SEALERS and all related work complete, as indicated on the drawings and as specified herein.
- B. Major items of work include, but are not limited to, the following:
  - 1. Concrete construction joints.
  - 2. Exterior joints at dissimilar materials.
  - 3. Exterior joints at intersecting planes.
- C. General Performance

Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

#### **1.3 QUALITY ASSURANCE**

- A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

#### **1.4 SUBMITTALS**

- A. Product Data

Submit manufacturer's product specifications, handling/installation/curing instructions, and performance tested data sheets for each elastomeric product required.

- 1. Certified Tests: With product data submit certificate test reports for elastomeric sealants on aged performance as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption and resistance (aging, weight loss, deterioration) and heat and exposure to ozone and ultraviolet. Submit a report from an independent testing laboratory confirming that sealant meets or exceeds requirements of ASTM C 120-79.

#### **1.5 JOB CONDITIONS**

### Weather Conditions

Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

#### A. General

Manufacturers listed in this article include those known to produce the indicated category of prime joint sealer material, either as a nominally pure generic product or as an equivalent-performance modification thereof or proprietary product.

#### B. Manufacturer

Subject to compliance with requirements, provide products of one of the following:

1. Manufacturers of Elastomeric Sealants (Liquid):
  - a. Tremco, Inc., Cleveland, OH
2. Manufacturers of Rubber and polymeric Gaskets (Solid/Cellular):
  - a. Tremco, Inc., Cleveland, OH
  - b. Watson Bowman Associates, Inc., Buffalo, NY

### **2.2 MATERIALS**

#### A. General Sealer Requirements

Provide colors indicated or, if not otherwise indicated, as selected by the Project Consultant from manufacturer's available colors. Select materials for compatibility with joint surfaces and other indicated exposures, and except as otherwise indicated select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated. Where exposed to foot traffic, select non-tracking material of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration of sealer system.

#### B. Elastomeric Sealants

1. Multi-Component Polyurethane Sealant
2. Except as otherwise indicated, provide manufacturer's standard, non-modified, 2-or-more-part, polyurethane-based, elastomeric sealant; complying with either ASTM C920 Type M Class 25 or FS TT-S-00227E Class A; self-leveling grade/type where used in joints of surfaces subject to traffic, otherwise nonsag grade/type.
  - a. Modulus and Hardness: Where self-leveling grade/type is required, provide sealant with cured modulus of elasticity at one hundred (100%) percent elongation of not more than 150 psi (ASTM D 412 test procedure), and Shore A hardness of not less than 55 (ASTM D2240). Where nonsag grade/type is required, provide sealant with cured modulus of elasticity of not more than 75 psi and Shore A hardness of 20 to 30.

- b. Tear Resistance: Not less than fifty (50) pounds per inch (ASTM D 624).
  - c. Bituminous Modification: Where joint surfaces contain or are contaminated with bituminous materials, provide manufacturer's modified type sealant which is compatible with joint surfaces (modified with coal tar or asphalt as required).
- C. Cellular/Foam Joint Fillers and Sealant Backers
- Closed Cell PVC Joint Filler: Provide flexible expanded polyvinyl chloride complying with ASTM C 1667, Grade VE 41 BL (3.0 psi compression deflection); expect provide higher compression deflection grades as may be necessary to withstand installation forces and provide proper support for sealants.
- D. Miscellaneous materials
- 1. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.
  - 2. Bond Breaker Tape: Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
  - 3. Provide other materials: Not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Project Consultant.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Installer must examine substrates (joint surfaces) and conditions under which joint sealer work is to be performed, and must notify the Contractor in writing of unsatisfactory conditions. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- B. Joint Preparation
  - 1. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove dirt, insecure coatings, moisture and other substances which could interfere with seal or gasket or bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.
  - 2. Prime or seal joint surfaces where indicated, and as recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Installation
  - 1. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.



2. Set joint filler units at depth or position in joint as indicated to coordinate with other work, including installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between ends of joint filler units.
3. Install sealant backer rod for liquid-applied sealant, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.
4. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that liquid-applied sealants will perform as intended.
5. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
6. Install liquid-applied sealant to depths as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads; (not applicable to sealants in lapped joints):
  - a. For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to seventy-five (75%) percent of joint width, but neither more than 5/8" deep nor less than 3/8" deep.
7. Spillage: Do not allow sealants, primers, or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage. Repair any stained, damaged, or marred surfaces, using original fabricator if possible, to satisfaction of the Project Consultant.

**D. Cure and Protection**

Cure sealants in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise the Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in a manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION 07900