DIVISION 2 SITEWORK

02000. GENERAL PROVISIONS

02001. SITE DEFINITION

It is extremely important that the site limits be clearly understood and well delineated on the Site Plans. It is the intent that these limits be fenced during construction and that all construction activities be conducted therein. In defining the site limits, the A/E is to consult with the USF Facilities Planning and Construction Director, Project Manager and staff to ensure that not only programmatic needs will be met but that the entire site development will be in context with the Master Plan’s framework for land use, open space, circulation, parking, and building placement. Staging areas are to be defined and contained within the site limits if at all possible. The site’s current integration with the existing campus is also to be evaluated so adjustments to pedestrian and vehicular circulation patterns can be well planned to mitigate any negative impacts after the site is fenced.

02002. SITE SURVEYS

A Site-specific topographic and utility survey of the property shall be conducted. Limits shall be the full extent of the site and beyond the site limits as necessary to ensure that the site design will fully and completely integrate with the existing surroundings. The A/E is to define the specific requirements needed for this effort, direct, and provide the site survey as an additional service to his contract services. The survey shall be conducted by a professional surveyor licensed in the State of Florida, not only satisfy the minimum statutory requirements, but also field verify (inclusive of using nondestructive subsurface investigative techniques as necessary) the location and depth of the existing utility systems, contour the survey plan, be based on the National Geodetic Vertical Datum (NGVD) Survey of 1929, establish two controlling benchmarks for the project, be signed and sealed, and made a part of the Construction Documents. All surveys shall include contour lines.

02003. ACCESS

Points of ingress/egress shall be determined for the project site. Consideration should be given to minimizing the number of access points, preferably one controlled and lockable entry. Selection shall not be based solely on ease for delivery of materials and equipment, but should seek to minimize conflict with University patrons and services.

02004. UTILITY NEEDS

The University will provide existing available utilities information. The A/E shall determine if additional data is required, which may be processed by the A/E through additional services.

A/E should contemplate and determine utility services needed to the site. Further reference is made to Section 01510. Temporary Utilities. Specific attention is to be directed to ensure ample notification is given, and safe, reliable, and sanitary connections are made to existing systems. (See further Section 02613.) The A/E shall determine and recommend for approval the points of connection to existing site utilities.

02005. FLOOD PROTECTION AND STORMWATER MANAGEMENT

02005.1 A/E, through aid of the site survey, shall evaluate potential for localized flooding. Building elevations shall be established to ensure that the structure is protected from the 100-year base flood. Site design shall also ensure that site alterations do not artificially create a base flood threat to the building or other surrounding buildings.
02005.2 Stormwater Runoff is to be controlled and managed in accordance with the Southwest Florida Water Management District rules 40D-4, 40D-40 and 40D-400 F.A.C. The University's Campus Master Plan has designated the Greenway as the location of its master stormwater management facilities for compliance with the District's rules. Site design is to ensure that any increases in stormwater runoff are collected, conveyed, and managed in accordance with the University's Master Drainage Plan.

02006. SITE PERMIT REQUIREMENTS

02006.1 The A/E is to be authorized through additional services to assist the Owner in acquiring all required permits. The A/E is to take the lead role in determining and advising the Owner of the permits, which are applicable to the project’s activities. The A/E is to consult with the various permit agencies through pre-application meetings to document both applicability and specific permitting criteria. The permits, which are normally required but not necessarily, limited to, are as follows:

02006.1.1 FDEP/HCHD Extension to a Public Drinking Water Distribution System.
02006.1.2 FDEP/HCEPC Extension to a Wastewater Collection/Transmission System.
02006.1.3 S.W.F.W.M.D. Environmental Resource Permit.
02006.1.4 FDEP/ACOE Dredge and Fill Permit.
02006.1.5 State/County/City R/W Use Permits.
02006.1.6 Local utility supplier service commitments.
02006.1.7 Petroleum Storage Systems, USTs greater than 110 gallons and ASTs greater than 550 gallons. See Division 16, Section 16612.2 for Regulatory Compliance of Fuel Storage Systems as applicable to ASTs/USTs for generator tank systems.

02006.2 The A/E is to prepare the applications for Owner’s signature, the supporting documents, make payment of fees where USF purchase order is not accepted (i.e., HCEPC), submit the application(s) on behalf of the Owner and respond to any agency inquiries. The A/E is to not allow any construction, requiring a permit, to commence in advance of the permit issuance. The A/E is to prepare and submit Certificates of Completion and assure that clearance letters are received prior to the placement of new systems into service, and prior to Certificate of Substantial Completion.

2007. NPDES STORM WATER MANAGEMENT FOR CONSTRUCTION ACTIVITIES

02007.1 The A/E shall provide in the drawings and specifications the requirements for the Contractor to develop and manage the construction storm runoff per the State rules and laws at time of permitting as well as any special requirements within USF Storm water Management program.

02007.2 Contractor shall submit Storm Water Pollution Prevention Plan (SWPPP) and NOI as required by State rules and laws. Copies of application and required reports shall be given to USF Construction Coordinator, Project manager, Civil Engineer, FP&C on weekly basis as required to be kept by rules. SWPPP must be reviewed and approved by FP&C prior to application and submission to regulatory agency using the USF Documents review procedure.
2010. SUBSURFACE INVESTIGATION

02010.1 The University will normally furnish subsurface investigations as an Additional Service through the A/E. The A/E shall determine, direct and provide site subsurface investigations judged necessary for the design work as directed in the Professional Services Guide. This will include investigative work, selection of a testing laboratory, test borings, soil analysis including load bearing capabilities and required densities, ground penetrating radar, and other investigations/engineering analysis as may specifically be warranted.

02010.2 Please note that due to the underlying karst topography of the University area there is potential for sinkhole occurrences that could pose a threat to the proposed and surrounding existing improvements. Where subsurface investigations determine that anomalous conditions exist, it is normal and customary that some form or combinations of structural and subsurface mitigation be ensued to reduce the risks. It is the University’s experience that construction activities intended to improve the soil bearing capacity and shoring of excavations such as but not limited to vibratory compaction, vibro-flotation/displacement, subsurface grouting and sheet pile installation also elevate the potential for overburden collapse (sinkhole occurrence). It shall be noted in the contract documents that the affects of these activities can transcend considerable distances and that the contractor is being placed on notice that he is to take measures to prevent, monitor the affects of and be responsible for any damage to University facilities and loss of services caused by construction induced subsidence within and 100’ beyond the limits of the project.

02010.3 In preparation of plans for boring locations, the A/E shall study University records and the site survey for the locations of underground utilities. The boring locations shall be chosen to avoid conflict with these facilities.

02010.4 Plan view of boring locations and sections through borings showing all soil conditions shall be shown on the drawings. Statements are to be made that the soil reports included in the specification and boring information shown on the drawings are provided for the contractor’s use and that the University, shall not be held responsible for the accuracy of the information, or consistency throughout the project site. The offering of such information does not preclude the opportunity of the Contractor of seeking other investigations and analysis of his own.

02100. SITE PREPARATION

02110. CLEARING THE SITE

All objectionable growth within the site area planned for building and landscaping improvements shall be cleared. All debris resulting from any clearing, stripping, grubbing, and demolition activities shall be removed from the University at frequent intervals to prevent unsightly accumulation.

02110.1 Protection of Trees: Trees designated to remain shall be documented on the plans and tagged in the field. The contractor is to be responsible for protecting the top, trunk, and root system of these trees. Protection shall be by barricading with four (4) inch x four (4) inch posts with two (2) inch x four (4) inch rails (two (2) minimum per side), installed at the drip line of the tree. No equipment, stockpiling of materials, work or parking is to be permitted within the barricades. Root zones shall be protected, where determined by arborist or University representative, as necessary by root pruning at outside edge of barricades.
02110.2 Stripping: Remove all organics, grasses, roots and topsoil to its full depth to the limits of the areas to be graded. Topsoil free of tree roots, brush and other debris can be stockpiled within the site for subsequent landscaping needs. All material in excess of subsequent needs shall be removed from the University.

02120. GRUBBING

The removal of trees and shrubs shall include the removal of stumps and roots. No stump or root greater than three (3) inches in diameter shall remain in the areas where underground structures, utility lines, footings and pavements are to be constructed. Grubbing in open areas shall remove stumps and roots greater than three (3) inches in diameter to a depth of two (2) feet below finished grade.

02130. DEMOLITION

02130.1 Structural: Structures to be abandoned along with their foundations shall be removed to a minimum depth of one (1) foot below bottom of new foundation work. Where such is to occur at locations of proposed new structures, A/E is to define the extent of foundation removal on the drawings. If any slab is to remain under fill for new structures, it is to be broken to facilitate groundwater percolation.

02130.2 Selective Removal

02130.2.1 Asbestos: The University may assume the responsibility for asbestos abatement prior to building renovations, or it may be made a part of the construction contract. However if asbestos is encountered as the work progresses, the work must stop in the immediate area until properly abated. Specific reference is made to Section 4 of Appendix A of this manual. The Contractor shall give notice of such occurrence to the Facilities Planning and Construction Project Manager and the USF Division of Environmental Health and Safety.

02130.2.2 Re-locatable Items: A/E is to ensure that special concern is given equipment that is to be removed, relocated, and reinstalled. The work shall be clearly defined in the plans to direct the contractor to:

02130.2.2.1 Disconnect and move to new location(s).
02130.2.2.2 Restore, remove, and/or cap utilities at old location(s).
02130.2.2.3 Schedule work with USF Physical Plant to minimize hardship from any outage. FP&C Construction Coordinator will coordinate and shall be given two (2) weeks notice.
02130.2.2.4 Include in base price scope any and all new piping, valves, fittings, ductwork, and wiring necessary for a complete and satisfactorily working reinstallation.

02200. EARTHWORK

02210. SITE GRADING

02210.1 Rough Grading: Slopes shall not be steeper than one (1) vertical to five (5) horizontal in general open lawn and other grassed areas. Steeper slopes will be permitted only on a case-by-case basis where special need warrants. Tops and bottoms of banks and other break points shall be rounded to provide smooth and graceful transitions.
In areas of walks without ramps, slopes shall not be steeper than one (1) vertical to twenty (20) horizontal. Ensure ramped areas comply with the ADA and Florida Accessibility Code requirements.

02210.2 Finish Grading: This operation shall consist of the final dressing to provide a uniform layer of either the topsoil and nutrients required under Section 02900 Landscape for the placement of plant materials or of the subgrade in preparation of pavement construction. This work shall achieve elevations within 0.1 inches of required elevation so that the proper thicknesses of overlying layers can be provided.

02220. EXCAVATING AND BACKFILL

02221. EXCAVATING

02221.1 General For Site: Excavation is to be unclassified and is to be performed as Authorized Excavation regardless of type, nature or condition of the material encountered as necessary to establish the lines and grades to be shown on the drawings. Once subgrade elevations have been reached, A/E is to inspect and determine suitability of subgrade material for intended purpose. If unsuitable, additional excavation can proceed the same as authorized and paid for at the same unit price established in the bid. It is to be stipulated that excavations beyond the limits needed to establish required grades without the specific direction of the A/E will be regarded as unauthorized. Unauthorized excavations and any required remedial work will be at the contractor’s expense.

Excess excavation and material not suitable for backfill and embankment operations shall be removed from the University with the exception that the University reserves the right to select and claim up to the first 2,000 cubic yards. It is to be stipulated that the contractor shall deposit said material, if owner elects, to a location on the campus designated by the Owner at no additional cost. Provisions for maintaining workmen safety within excavations is the sole responsibility of the Contractor.

02222. EXCAVATING

02222.1 General for Site and Structures: A non-plastic, clean, granular material composed of sand, fractured rock or gravel obtained from the excavation activities or, if necessary, from off site borrow shall be provided. The material shall be substantially free of clays, organics including loam, peats and wooden materials and trash, which may be compressible. Quality backfill shall also be void of masonry, rubble and roadway products. Blending of admixtures to improve gradation uniformity and stability is permissible. Provide laboratory verification that intended backfill materials are suitable for the intended purpose. Backfill materials shall be generally placed in 12-inch
maximum lifts, loose measure. Specify thinner lifts under structures, pads and pavements as appropriate.

02222.2 Trenches: Specify select backfill material of equal quality or better stipulated for general site. Initial placement of material in trenches should be limited to 6-inch lifts to ensure that adequate compaction and support is achieved under the haunches of the pipe to the springline. Placement should then proceed in 6-inch lifts to facilitate proper compaction to 1 foot above the pipe. The remainder of the trench can usually be backfilled and amply compacted in 12-inch lifts. However, the ability to achieve density requirements must be maintained.

02230. EXCESS MATERIAL DISPOSAL

Excess excavation, backfill, and other construction wastes shall be disposed of off campus to a site secured by the contractor. No on-site burning or burying of wastes will be permitted and no additional cost to the Owner for disposal is to be charged. Excess earth materials not needed for other work shall not be stockpiled temporarily on the site and construction rubble and debris shall be placed in Contractor supplied dumpsters to be picked up on regular intervals. Reference is made to Section 02221.1 for Owner’s first option to excess quality fill materials.

02240. SOIL COMPACTION

02240.1 Quality control testing is to be provided to ensure that fill materials are properly placed and compacted to yield the necessary densities for the support capabilities needed. The A/E is to determine the testing program suitable for the work to be pursued and make recommendation to the Owner. A/E is to assist Owner in selecting a qualified testing laboratory to perform the testing activities and evaluation of the contractor’s work. The Owner will pay for all initial tests conducted. It is to be stipulated that where tests indicate work fails to meet the requirements specified, the contractor, at his expense, shall perform remedial work and retest to verify that the material placement meets the specification requirements.

02240.2 Compaction Requirements: Specify that soil compaction be evaluated based on the densities determined by Standard Proctor Tests.

02240.2.1 General Site: Cuts and embankments not intended to support subsequent work or structures should be compacted to a firmness equal to the adjacent undisturbed soils. See Section 02900, Landscaping, for further direction on like areas.

02240.2.2 Under Structures: Soil preparations intended to support site related structures shall be compacted to a density of at least 100% of the maximum laboratory density as determined by AASHTO T-99. Compaction under building foundations and structures shall achieve the density requirements established in the geotechnical evaluations and recommendations.

02240.2.3 Utility Trenches: Compaction of trench backfill shall achieve the density as stipulated for site structures in paragraph 02240.2.2 above.

02240.2.4 Pavements: Areas subject to vehicular traffic shall be prepared in accordance with the provisions of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition. Densities to be achieved shall be at least 98% of the maximum density as determined by AASHTO T-180.

02250. SOIL TREATMENT
02250.1 Provide soil treatment for termite control under all sides of foundation walls, building slabs on grade, and sidewalks that adjoin new or existing buildings.

02250.2 Ensure applicator is a professional pest control operator licensed in the State of Florida in accordance with the regulations governing the application of soil treatment solutions.

02250.3 Treatment materials applied shall be EPA approved for the application of effective termite control. The product shall be applied in accordance with the manufacturer’s recommendations and the technical data and application instructions are to be submitted to the Owner prior to commencing. Ensure that the soil treatment is not applied until all excavation, filling, compacting, and grading operations are complete in the areas to be treated.

02250.4 Treatment warranty shall be for a period of not less than five (5) years from the date applied. A/E is to ensure warranty includes provisions for re-treatment and repair or replacement of any damage caused by infestation or evidence of infestation within the warranty period without cost to the Owner or his successor or assigns.

02300. FOUNDATIONS
02310. FOUNDATION TYPES
The University’s building construction has experienced a wide array of foundation systems to address the various soil and subsurface conditions for cost effective support of the building loads. These systems comprise spread footing, grade beams, mat foundations, precast driven piles, and auger cast piles. No wooden pile systems are allowed except in appropriate marine applications.
02320. DESIGN

02310.1 As part of basic services, the A/E is to provide the foundation system design. The design shall be conducted by a Professional Engineer, registered in the State of Florida, experienced and actively engaged in the practice of Structural Engineering Design. The drawings shall bear the seal and signature of this Engineer.

02310.2 The A/E, along with his structural consultant, shall determine the best-suited foundation system for the building. This determination shall be based on a review and consideration of the subsurface geotechnical reports, foundation systems of adjacent buildings, and potential adverse impacts on neighboring structures imposed by foundation systems installation. Further reference is made to Paragraph 02010.2.

02330. LABORATORY SERVICES

An independent laboratory shall be employed through the A/E Additional Services provisions to perform quality control testing of the foundation system installation. The laboratory, in cooperation with the A/E and A/E’s consultant, shall develop the testing program with costs and make recommendations to the Owner. The testing program shall include continuous inspection services where needed, such as the case of pile driving work.

02340. PAYMENTS

02340.1 Payments for Laboratory Services: The testing laboratory shall be responsible to the A/E, as Additional Service. The Owner will pay all first time costs for the tests and analysis performed from the project funds. The A/E is to present the invoices to the Owner for actual costs without fee mark-up. Invoices are to reference the specific tests performed and the deliverables presented, such as field reports. Copies of the field reports are to be submitted to the A/E, responsible contractor, and the Owner prior to invoicing for those specific services.

02340.2 Payment for Foundation Systems:

02340.2.1 Payment for mat, spread footings, and grade beam systems shall be a lump sum as part of the base bid.

02340.2.2 Payment for subsurface grouting and piling work shall be on a unit cost basis. A base bid amount shall be provided based on a predetermined estimated quantity. The specifications shall state that the predetermined amounts are based on the piling depths and/or grout quantities shown on the drawings and/or soil reports. The proposal form, in addition to lump sum amounts, shall make provisions for per linear foot costs for piling and cubic yard costs for grouting to be added to, or deducted from, the base bid for quantities differing from those predicted. The specifications are also to stipulate that no payment will be made to the contractor for extra work performed for his own use. The specifications shall define the method of calculating the adjusted costs for actual work performed. In the case of driven piles, provisions shall also be included for defining and determining the costs for pile splices, if required. The methods of calculating the actual costs shall be formulated in the best interest of the University, particularly with regard to receiving full value for deleted work.
02500. PAVEMENTS

02510. WALKS AND RAMPS

02510.1 Walks and ramps are normally to be constructed of concrete pavement. Walks, restricted to pedestrian use only, may be a minimum of eight (8) feet wide for high use and six (6) feet wide for low use and a minimum of 4 inches thick, as approved by the Owner. Reinforcement can be fiber mesh in lieu of wire fabric. The concrete shall be of class "C", air entrained, and shall achieve a minimum compressive strength of 3,000 psi in 28 days. Reference is made to Section 02210 regarding other requirements for pedestrian ramps.

02510.2 In addition to pedestrian use, where walks are likely to be subjected to bicycle, cart or service vehicle use, the walks shall be a minimum of ten (10) feet wide and six (6) inches thick. Welded wire fabric shall be included. Concrete used shall be the same as that for pedestrian use, except that the minimum compressive strength shall be 4,000 psi in 28 days. No fly ash is to be utilized. The A/E is to also stipulate in the specifications that all concrete walks are to be kept protected and covered from the effects of rain and vandalism until set hard. Any damage is subject to being replaced at the contractor’s expense.

02510.3 Where walks are to be featured as part of the building entry or patio areas, paver units such as brick masonry or interlocking pavers can be considered in lieu of concrete. The A/E is to get specific approval for use of this architectural alternative material. If used, the specifications and drawings are to include specific directives and details for the proper preparation and placement of the bedding material and paver.

02510.4 Finishes and Joints: All concrete walks are to receive a medium-heavy broom finish. Joints are to be spaced at equal distance intervals equal to the width of the walk such that square segments are formed. Joints that are considered to be contraction joints can be sawed or tooled. Expansion joints shall be tooled, separated with 1/2 inch asphalt impregnated fiberboard, sealed at the top with an elastomeric sealant, and spaced at the joint interval closest to fifty (50) feet spacing. Joints are to be accurately depicted on the drawings. Where replacement work or new work joins old, make connection at the next full joint in the existing walk. Where walk or ramp surfaces are highlighted for traffic-warning purposes, use “traffic yellow” silicone acrylic concrete stain, as manufactured by H&C; do not use paint.

02520. VEHICLE USE AREAS

02520.1 Design: Roadways, parking lots and service drives are to be designed in accordance with the applicable guidelines and standards:


02520.1.2 Manual of Uniform Traffic Control Devices.

02520.1.3 AASHTO Guidelines.

02520.1.4 FDOT Standard Specifications for Road and Bridge Construction, latest edition.

02520.1.5 FDOT Roadway and Traffic Design Standards (Standard Indexes)

02520.2 Materials.
02520.2.1 General: Except for loading docks, ramps, and aprons which are to be constructed of concrete as outlined in Section 02510.2, roads, parking, and service drives are to be constructed of bituminous flexible pavement.

02520.2.2 Subgrade: Subgrade stabilization is to be provided for all flexible pavement areas. Stabilize subgrades in accordance with FDOT methods A or B. Depth shall be 8” minimum in parking lots and twelve (12) inch minimum under roads and service drives. The lime rock-bearing ratio (LBR) is to be at least 40.

02520.2.3 Base Materials: In high, well drained soils not influenced by the water table, bases are to be constructed of lime rock from an FDOT approved quarry. In other damp soil areas or regions subject to high fluctuations in the water table, the base material shall be either crushed concrete or soil cement. The bearing value (LBR) shall be 100 except for soil cement which shall be designed to have a compressive strength of 300 psi minimum for parking areas and 500 psi minimum for roads and service drives. Base thickness shall be six (6) inches minimum in parking areas and eight (8) inches for roads and service drives.

02520.2.4 Surface Courses: In parking areas, specify Type S-III asphaltic concrete. This material should provide similar stability and gradation to that of Type S-I except that it is lacking the ½ inch stone. This is to promote the ability to achieve a smooth, tight texture in those areas requiring handwork. In roads and service drives where uniform placement can be provided by machine, specify Type S-I. Compacted thickness shall be 1½ inches minimum for parking areas and two (2) inches minimum for roads and service drives.

02520.2.5 Curbs and Gutters: All asphaltic paving is to be contained by a curbing system. Unless matching existing, specify Type “E” for medians, Type “F” for low side pavement edges, and Type “D” where drainage is away from the curb. Where it is preferable to not have a curb back, border the edge of flexible pavements with a flush ribbon curb, or where drainage needs routing use drop or shoulder gutter curb.

02530. CONSTRUCTION

02530.1 Methods: Construction processes for roads and parking lots are to be in strict conformity with FDOT Standard Specifications for Road and Bridge Construction, latest edition. Any deviations will only be considered in advance on a specific case-by-case basis.

02530.2 Quality Control: An independent testing laboratory is to be employed to perform quality control testing to ensure that the roadways and parking lot materials and material placement are in compliance with the plans and specifications. The A/E is to procure this testing service as provided for under Sections 02330 and 02340.1.

02600. SITE UTILITIES

02610. GENERAL

02611. RELATED WORK

02611.1 Refer to Section 02220 for related excavation and backfill requirements.

02611.2 Refer to Section 02240 for related compaction requirements.

02611.3 Refer to Section 02110.1 for protection of trees.
02612. IDENTIFICATION

02612.1 The A/E is to consult with the Owner and review Owner files to establish a general working knowledge of the extent, type, and probable locations of all existing utilities. The A/E is to use this information to help define and direct the scope of the site-specific survey and utility locationing work. All existing utilities, proposed alterations thereto and new utilities lines are to be shown on the Civil Site Plans.

02612.2 The A/E is to ensure that the plans and specifications provide ample notation for the contractor to properly notify all utility owners through the “Sunshine One Call” service and the University directly prior to any digging.

02613. CONNECTION TO EXISTING SYSTEMS

02613.1 Specify that any connection to existing utility systems must first be scheduled with the USF Physical Plant Utilities Department so disruption of services is minimized.

02613.2 It is to be amply noted in the plans and specifications that the Contractor is not authorized to operate any valve of an existing utility system. When needed, such activity is to be requested of the USF Physical Plant Utilities Department who will perform the necessary operation. Ample advanced notice is to be required to schedule this service. Two days is the normal minimum notice period, but could be a lot stronger depending on complexity and extent of impact on services and operations.

02620. MATERIALS

02622. WATER DISTRIBUTION

02622.1 Quality Assurance

02622.1.1 It is required that the design of potable water distribution systems comply with Chapter 62-555, Florida Administrative Code (F.A.C.).

02622.1.2 It is required that all new and relocated water main pipe, fittings, valves, fire hydrants, and related products that will come into contact with drinking water be in conformance with the American National Standards Institute (ANSI)/NSF International Standard 61 and comply with the applicable American Water Works Association (AWWA) Standards.

02622.2 Pipe: Pipe provided is to be Ductile Iron Pipe (DIP) conforming to ANSI A-21.51 and AWWA C-151. For pipe to be buried, provide Pressure Class 350 for less than twelve (12) inches and Pressure Class 250 for pipe equal to and larger than twelve (12) inches. For pipe to be above ground, provide Class 53. The interior of the pipe shall have a standard thickness cement mortar lining with seal coat conforming to ANSI A-21.4 and AWWA C104. The exterior is to have a factory applied bituminous or coal tar varnish coating.

02622.3 Fittings: Fittings are to be either cast iron or ductile iron and of a pressure class compatible with the pipe. Fittings are to also have the same interior and exterior treatments as required for the pipe.
02622.4 Joints: Joints for below grade DIP and fittings shall be push-on or standard mechanical joint type with rubber gaskets complying with AWWA C111. All fitting joints and pipe joints below grade where needed shall be mechanically restrained. Joints for above grade piping shall be flanged.

02622.5 Valves:

02622.5.1 Gate Valves: For valves three (3) inches and larger, provide resilient seat gate valves complying with AWWA C509 such as U.S. Pipe Metroseal. Minimum working pressure shall be 150 psi. The interior and exterior shall be epoxy coated in compliance with AWWA C550. Where installation is below grade, valves are to have a two (2) inch operating nut housed in a cat iron slip sleeve valve box.

02622.5.2 Check Valves: Provide Iron-body, bronze mounted swing check, horizontal installation conforming to AWWA C508.

02622.6 Backflow Preventers: Backflow preventers are to be provided in accordance with the University’s Cross-Connection Control Policy. Specify, double check valve assembly for low hazard applications and reduced pressure (RP) assemblies for high hazard conditions. A/E is to consult with Owner to determine the degree of hazard. Acceptable manufacturers: Conbraco Industries, Watts Industries.

02622.7 Water Meters: Each new build service connection shall include an inline, full flow meter for measuring domestic consumption. The meter is to be ahead of and coupled with the backflow prevention assembly. The design of the full assembly is to give due regard to subsequent maintenance operations including ease of disassembly via use of unions, couplings or other appropriate fittings. A/E is to confirm meter size and type with the USF Physical Plant Utilities Department. Acceptable manufacturers: Water Specialties, Schlumberger Water-Neptune Series.

02622.8 Water Sampling Ports: For new and extended potable water distribution systems requiring permit and Health Department clearances, A/E is to specify and show on the drawings the locations of all required sample ports. A/E is also to verify if any of the sample ports are to remain as permanent installations. In such cases, A/E is to confirm size, type, and configuration with the USF Physical Plant Utilities Department.

02623. SANITARY SEWERS

02623.1 Quality Assurance: It is required that the design of wastewater collection and transmission systems be in accordance with the standards and criteria set forth in the Florida Administrative Code, F.A.C. 17-604.

02623.2 Pipe and Fittings:

02623.2.1 Gravity Systems: Gravity sewer piping and fittings are to be plastic polyvinyl chloride (PVC) conforming to the requirements of ASTM Designation D3034, SDR-35. Joints for gravity systems are to be push-on elastomeric gasket type.

02623.2.2 Force Mains: For sanitary force mains, provide ductile iron pipe, DIP, conforming to the requirements of ANSI A21.51 and Class 50. The pipe and fittings shall have a minimum pressure rating of 150 psi, utilize standard push-on or mechanical gasket sealed joints and be coated inside and out with a factory applied bituminous or coal tar epoxy sealant.

02623.3 Valves: Valves are to be acid resisting bronze body eccentric plug valves as manufactured by DeZurik, Series 100. The plug shall be resilient (NBR) rubber
coated suited for wastewater applications. Sizes three (3) inches and smaller shall have lever actuators and NPT connections. Sizes four (4) inches and larger shall have gear reduced handwheel actuators and be flanged or mechanical joint connected. Below grade installations shall be placed in a vault.

02623.4 Manholes: Specify manholes to be precast concrete manholes conforming to ASTM Designation C478. Wall thickness shall be eight (8) and the bottom barrel section is to be monolithic with the bottom. Pipe connections shall be made watertight with rubber boots casted integral into the wall sections. Specify an asphaltic seal coating to be applied to the interior and exterior surfaces. Invert channels are to be provided to facilitate smooth directional changes in flow. Provide details in the plans and also show the manholes to be properly bedded on gravel consisting of crushed granite or blast slag stone.

02624. STORM SEWER SYSTEM

02624.1 Pipe: Stormwater drainage pipe shall be either round reinforced concrete culvert pipe conforming to ASTM Designation C76, or reinforced concrete horizontal elliptical pipe conforming to ASTM Designation C507. The pipe joints are to be rubber o-ring gasket type. Specify special bedding requirements where warranted.

02623.2 Structures: Specify stormwater structures at all changes in pipe direction, points of drainage entry and connection points of branch piping. Stormwater structures are to be constructed of either precast or cast-in-place reinforced concrete conforming to FDOT Roadway and Traffic Design Standards, Standard Indexes. Where grating is required in bicycle and pedestrian use areas, stipulate that the grating shall be reticuline steel. Cast iron grates are to be used in all other areas outside of pedestrian and bicycle ways. When structures are placed in vehicle use areas, grating, if used, is to be specified as traffic bearing. Also specify, where steel grating is used, it shall be hot dipped galvanized coated.

02625. GAS SERVICE

Where gas services are required for laboratory, food preparation, and hot water needs, the A/E is to consult with the franchised gas service supplier. A/E is to advise Owner, and show the proposed gas service lines on the Civil Site Plans to ensure coordination with other site improvements and prevention of conflict. The associated work is to be indicated as provided by others on the plans.

02626. HOT/CHILLED WATER

See Division 15 for specific requirements regarding piping, valves, fittings, manhole materials, and placement. Show all site related mechanical improvements on the Civil Site Plans for proper coordination with other utilities and resolution of conflicts.

02627. SITE ELECTRICAL

See Division 16 for specific requirements regarding conduits, cabling, manholes, site lighting, transformers and switching materials, and placement. Show all site related electrical improvements on the Civil Site Plans for proper coordination and resolution of conflicts.

02630. EXECUTION

02630.1 Develop installation specifications for all utility systems satisfying manufacturer's recommendations and other related Division 2 requirements.
02630.2 Specify that dry trench conditions are to be maintained to facilitate effective installations by well pointing where needed.

02630.3 Systems Testing and Connection

02630.3.1 Pressure Pipe Installations: Stipulate that all pressure pipe systems are to be hydrostatically tested to verify integrity of piping materials and installation. Develop and specify testing procedures consistent with AWWA Standard C600-93. Test pressures should be set at the rated working pressure of the piping material for a duration of two (2) hours. A/E is to witness the testing conducted by the contractor, record the results in acceptable format, and certify the test results to the appropriate regulatory authorities for clearance to place the system into service.

02630.3.2 Gravity Pipe Installations: Stipulate that all gravity piping systems are to be inspected/tested to verify material and material installations are sound and suitably leak free. Develop infiltration/exfiltration-testing procedures consistent with respective regulatory requirements. A/E is to witness the testing activities to be conducted by the contractor, record the results in acceptable format, and certify the test results to the appropriate regulatory authorities for clearance to place the system into service.

02630.3.3 Potable water system preparation and connection: where health codes and permits require bacteriological testing for clearance approval to utilize a new or modified water system, the A/E is to specify that the Contractor is to provide, setup, and conduct all operations in accordance with University guidelines, to sterilize, flush, make the system ready for sampling and connecting. The University will collect and transport the samples to the laboratory. These guidelines, established to protect the public’s health and facilitate statutory compliance, are provided under separate publication titled, “USF Water Tie-In Procedures.” The A/E is to reference and reiterate these procedures in the Contract Documents.

02630.3.4 The A/E is to make sure that any new or modified system is not put into service until the agency approval/clearance letter has been received.

02810. IRRIGATION SYSTEM

02811. General Provisions

02811.1 General - SYSTEM WILL BE ON RAW WATER.

02811.2 DESCRIPTION OF WORK:

02811.2.1 Extent of underground irrigation system is shown on drawings.

02811.3 QUALITY ASSURANCE:

02811.3.1 Manufacturer Qualification: Provide underground irrigation system as a complete unit produced by acceptable manufacturer, including heads, valves, controls, and accessories.

02811.4 WARRANTY AND GUARANTEE:

02811.4.1 The Contractor shall furnish a certificate of warranty registration and written guarantee of work and materials and a one-year period from the date of final acceptance of the Site Irrigation System by the Owner or his representative.
02811.5 SUBMITTAL:

02811.5.1 Product Date: Submit manufacturer’s technical data and installation instructions for underground sprinkler system. Include catalogue cuts of controller, valves, sprinkler heads, and valve boxes.

02811.5.2 As-Built Drawing: After completion of piping installation, the irrigation contractor shall furnish the Owner’s representative a reproducible “as-built” drawing showing all sprinkler heads, valves, and the zone numbers with GPM, manual drains and pipelines to reasonable scale, and provide a minimum of two dimensions taken from fixed, obvious objects to each automatic and manual control valve will be presented to the Owner’s representative at the time of walk-through for acceptance and testing for proper operation.

Instruction sheets and parts’ lists covering all operating equipment will be bound into a folder as an Operations and Maintenance Manual, and furnished to the Owner or his representative in two (2) copies.

02811.5.3 The valve boxes will have a number on each valve to match the number, which is in the controller which should also match the as-built drawing.

02812. PRODUCTS

02812.1 ACCEPTABLE MANUFACTURERS:

02812.1.1 Manufacturer: Subject to compliance with requirements, provide products with one of the following:

1. Rain Bird Sprinkler Manufacturing Company
2. Hunter Industries

02812.2 MATERIAL:

02812.2.1 Pressure Pipe: PVC plastic pipe, ASTM D 1785, Schedule 40, four (4) inches or smaller, four (4) inches or larger Class 200.

02812.2.2 Circuit Pipe (downstream from circuit valves): PVC plastic pipe, ASTM D 1785, Schedule 40, not to be smaller than ¾ inch in size - reduce if required at the swing joint at the head.

02812.2.3 Pipe Fittings: ASTM D 2466 socket fittings with ASTM D 2564 solvent cement.

02812.2.4 Valves: Manufacturer’s standard, of type and size indicated, and as follows:

02812.2.4.1 Automatic Circuit Valves: Glove valves operated by low-power solenoid, normally closed, manual flow adjustment.

02812.2.5 Sprinkler Heads: Manufacturer’s standard unit designed to provide uniform coverage over entire area of spray shown on drawings at available water pressure, as follows:

02812.2.5.1 Pop-Up Spray: Fixed pattern, with screw-type flow adjustment and stainless steel retraction spring. 1800 series plastic nozzles shall be used.
02812.2.5.2 Pop-Up Rotary Spray: Gear drive, full circle and adjustable part-circle type.

02812.2.5.3 Bubblers: Adjustable, point source flooding emitter, on flexible pipe. Bubblers to be on zone separate from sprays or rotors.

02812.2.6 Valve Box: South Eastern Meter Boxes or equal. Metal box two (2) inches x ten and a half (10 ½) inches x ten (10) inches (2" x 10 ½" x 10") with a foundation of cement block or equal. (Carson boxes acceptable.)

02812.2.7 Controllers to be Rain Bird ESP-24 SAT.

02812.2.8 Electrical Piping, purple pipe of reclaimed water pipe to be used with electrical fittings and junction boxes.

02812.2.9 Wire connectors to be weatherproof wire connectors when two or more wires connect.

02812.3 AUTOMATIC CONTROL SYSTEM:

02812.3.1 General: Furnish low-voltage system manufactured expressly for control of automatic circuit valves of underground irrigation system. Provide unit of capacity to suit number of circuits as indicated, plus 20% extra stations for future use. (Not to exceed 80% of capacity.)

02812.3.2 Controller to be connected to telephone lines back to the CCU for the area.

02812.3.3 Rain Check: Auto interruption of watering cycle installed on timing device.

02813. EXECUTION

02813.1 SYSTEM DESIGN:

02813.1.1 Design Pressures: As indicated on drawings, at connection to raw water system.

02813.1.2 Location of Heads: Design location is approximate. Make minor adjustments as necessary to avoid plantings and other obstructions.

02813.1.3 Minimum Water Coverage: Layout as necessary to obtain full head to head coverage. Do not decrease number of heads indicated unless otherwise acceptable to Owner.

02813.2 TRENCHING AND BACKFILLING:

02813.2.1 General: Excavate straight and true with bottom uniformly sloped to low points.

02813.2.2 Underground Utilities: All underground utilities are to be located and marked before trenching.

02813.2.3 Minimum Cover: Provide eighteen (18) inches minimum cover over top of main and twelve (12) inches cover over the lateral piping.

02813.2.4 Backfill: Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 1” diameter. Place acceptable backfill material in 6” lifts, compacting each lift.

02813.2.5 At Walkways: Jack piping under paving material as necessary.
02813.3 INSTALLATION:

02813.3.1 General: Unless otherwise indicated, comply with requirements of Uniform Plumbing Code.

02813.3.2 Connection to Main: Manual valve at point of connection to main.

02813.3.3 Circuit Valves: Install in valve box, arranged for each adjustment and removal. A manual valve must be in front of each automatic valve.

02813.3.4 Wiring: Use multi-strand with a separate, 14-gauge neutral. Maintain a color coded wire to be run in purple or reclaimed water pipe with electrical type fittings and electrical type junction boxes or valve boxing.

02813.3.5 Connections: Use recommended weatherproof type wire connections.

02813.3.6 Piping: Lay pipe on solid subbase, uniformly sloped without humps or depressions.

02813.3.6.1 Install PVC pipe in dry weather when temperature is above 40 degrees F (4 degrees C) in strict accordance with manufacturer's instructions using purple primer on all pipes and fittings.

02813.3.6.2 Allow joints to cure at least twenty-four (24) hours at temperature above 40 degrees F (4 degrees C) before testing, unless otherwise recommended by the manufacturer.

02813.3.6.3 Piping not to be within one foot of sidewalks or curbing.

02813.3.7 Sprinkler Heads: Flush circuit lines with full head of water and install after hydrostatic test is completed.

02813.3.7.1 Install lawn spray heads at manufacturer’s recommended heights, using flex pipe. An eighteen (18) inch length of flex pipe shall be used for each head to allow adjustments (swing joint).

02813.3.7.2 Locate all heads to maintain a minimum distance of four (4) inches from walls and four (4) inches from other boundaries, unless otherwise indicated.

02813.3.7.3 Spray heads on risers – exposed risers to be painted black.

02813.3.7.4 Install rotor type sprinklers at manufacturer’s recommended heights, using flex pipe. A twenty-four (24) inch length of flex pipe shall be used for each head to allow adjustments (swing joint).

02813.4 TESTING:

02813.4.1 General: Notify owner or his representative in writing when testing will be conducted. Conduct tests in their presence.

02813.4.2 Hydrostatic Test: Test water piping and valves before backfilling trenches to a hydrostatic pressure of not less than 150 PSI. Piping may be tested in sections to expedite work. Remove and repair piping, connections, valves that do not
pass hydrostatic testing. Test pressure must be held for a minimum of two (2) hours.

02813.4.3 Operational Testing: Perform operational testing after backfill and sod is in place, and sprinkler heads are adjusted to their final position.

02813.4.3.1 Demonstrate to Owner or his representative that system meets coverage requirements and automatic control function properly. Provide drawing to assist in demonstration.

02813.4.3.2 Head to head coverage requirements are based on operation of one circuit at a time and the GPM of the valve system to maintain recommended five (5) feet per second. Maintain head to head coverage.

02813.4.4 Upon completion of grading, sodding, and rolling of sod areas, carefully adjust lawn sprinkler heads so they will be flush with or not more than ½ inch above finish grade.

02900. LANDSCAPING

02901. GENERAL PROVISIONS

02902. WORK INCLUDED:

02902.1 LANDSCAPING

02902.1.1 Describe work to be done usually stated to include all labor, materials, services, equipment, and facilities required to complete work indicated on the Drawings and written Specifications, including maintenance and guarantee. Generally show work items in list form.

02902.1.2 Pre-Construction Meeting - State requirements for and who must attend meeting.

02903. RELATED WORK SPECIFIED ELSEWHERE

02903.1 Assure that landscape work is cross-referenced by listing related sections in written specifications such as those for irrigation, sidewalks, site grading, and tree preservation, as well as general provisions, including general and supplemental conditions and Division 1, General Requirements.

02903.2 List related drawings, which must be coordinated with landscape drawings and landscape work, such as demolition, site plan, site utilities, lighting, grading, and irrigation plans.

02904. SUBMITTALS

02904.1 List all required material lists, schedules, certifications, shop drawings, material sources, etc., and state when and how information is to be provided.

02905. COORDINATION: Require and list related contractors with whom landscape work must be coordinated.

02907. SUBSTITUTIONS

02907.1 Establish requirements for requests for substitutions and for verification of material availability prior to bidding by the Contractor.
02907.2 Establish requirement that presentation of written proof of non-availability is required by the Owner or Owner’s representative before any substitution is approved.

02908. QUALIFICATIONS

02908.1 Require that all landscape work shall be undertaken by a licensed and experienced landscape contractor as outlined in Division 1.

02909. INSPECTIONS OF TREES AND PLANT MATERIAL

02909.1 Require and establish procedure for the accomplishment of approval of pre-tagged or pre-selected material at nursery or growing site.

02909.2 Give parameters for on-site inspections of plant material prior to planting and removal of sub-standard material.

02910. TOPSOIL

02910.1 Establish conditions under which new topsoil must be provided and installed.

02910.2 State requirements for soil tests on samples of existing soil to establish final specification for soil amendments when requested by Owner.

02910.3 Provide for inspection of sample of topsoil at the project site, including certified lab analysis, for approval by Owner or Owner’s representative.

02911. GRADES AND STANDARDS OF PLANT MATERIAL

02911.1 Specify that all plant material is subject to rules and regulations of “Grades and Standards for Nursery Plants” as published by the Division of Plant Industry, Florida Department of Agriculture and Consumer Services.

02911.2 Establish procedure for inspection for compliance with specified grade and standard for plantings.

02912. WARRANTY

02912.1 Specify period and conditions of warranty for all trees, palms, and other plant material, including sod.

02913. PRODUCT DELIVERY, STORAGE AND HANDLING

02913.1 Packaged materials such as fertilizers and soil amendments - specify how to be delivered, and what information is required to identify products and assure that quality is protected in handling and storage.

02913.2 Sod: Requirements of holding time, methods of handling and shipping. Specify sand grown sod.

02914. TRANSPORTATION

02914.1 Requirements for protection of plant material during transportation and prohibition against improper handling during transport.
02915. SITE CONDITIONS

02915.1 Requirement for the excavation of unsuitable soil, such as rubble fill, which would be detrimental to plant growth, would prevent proper drainage conditions, or would cause obstructions to roots.

02915.2 Coordination of site grades - plantings coordinated with the schedule for finish grading and sodding operations.

02915.3 Method and requirement for the protection of new or existing lawns to avoid damage by landscape operations.

02915.4 Specify that planting operations are not to commence until irrigation is operable or watering is otherwise arranged and assured. Assure continuous control of and access to irrigation controller or water source.

02916. SOIL AMENDMENTS

02916.1 Conditioners - specify grade and percentage of elements derived from organic sources, and in available form, by weight.

02916.1.1 Fertilizers - Requirement for manufacturer's statement of analysis to be provided. Specify that analysis shall be as required per use for trees, shrubs and lawn.

02916.1.2 Trees and large shrubs may specify "The Pill" by Agriform or equivalent.

02916.1.3 Where requested by owner, soil shall be amended by incorporation of Mycorrhizal inoculation with Endo/Ectomycorrhizal Transplant Inoculant by Mycor Tree, Tree Saver or approved equal.

02917. HERBICIDES, INSECTICIDES, FUNGICIDES AND OTHER PESTICIDES

Specify that contents shall contain no chemicals or ingredients harmful to landscape plants.

02917.1 HERBICIDE CONTROL

02917.1.1 Pre-emergent - describe acceptable products and procedures.

02917.1.2 Post-emergent - describe acceptable products and procedures.

02917.2 INSECT CONTROL

02917.2.1 Pre-emergent - describe acceptable products and procedures.

02917.2.2 Post-emergent - describe acceptable products and procedures.

02917.3 FUNGICIDE

02917.3.1 Pre-emergent - describe acceptable products and procedures.

02917.3.2 Post-emergent - describe acceptable products and procedures.

02918. MULCH

02918.1 Describe general requirements of mulch.

02918.2 List acceptable mulches.
02930. SODDING: Give requirements and instructions on the following:

02930.1 Confirm with USF Landscape Architect areas to be irrigated versus non-irrigated and select sod species accordingly.

02930.2 Preparation of ground - requirements for top dressing or addition of planting soil.

02930.3 Protection of sod before planting - moisture content, allowed time of holding before planting.

02930.4 Placement and Watering - How sod is transported over other laid sod, tamping and rolling, placement for tight joints, watering of soil immediately before sod laying, plugging of holes or gaps.

02930.5 Water for minimum of sixty (60) days or final acceptance whichever is first.

02930.6 Fertilizer - Specify application rate, and analysis per sod species.

02930.7 Maintenance of sod - Contractor to maintain for sixty (60) days.

02930.8 Products – All sod shall be sand grown.

02950. PLANT MATERIALS

02950.1 Describe what is to be provided, such as - plants of the species and the specification, and in the quantities necessary as shown on the drawings at the required spacing.

02950.1.1 NOMENCLATURE: Require that all material shall be true to named genus, species, and variety as established by the American Joint Committee on Horticultural Nomenclature publication “Standard Plant Names” as per the recommendations and requirements of ANSI Z60.1, “American Standard for Nursery Stock”. Designate the authority for the identification of all material.

02950.1.2 GRADE STANDARDS AND QUALITY

02950.1.2.1 Establish acceptable general sources of plant material. All plants, shall be nursery grown, unless otherwise approved by the University.

02950.1.2.2 All material shall be Florida Number 1 grade or better.

02950.1.2.3 All material shall comply with standard for individual species and size.

02950.1.2.4 Describe General Condition and form, and criterion for Specimen Quality.

02950.1.2.5 Minimum Acceptable Sizes - Establish measurement criteria.

02970. LANDSCAPE MAINTENANCE

02970.1 Specify the length of time contractor is to maintain installed landscape, what maintenance includes, and that written maintenance instructions and a record of fertilization, pesticides, etc., applied to material by contractors shall be provided to owner for a smooth takeover at end of contractor's maintenance period.

02970.2 Specify start and end of maintenance period, and what operations maintenance includes.
02970.3 SPECIFY WATERING REQUIREMENTS, when watering is to start, and frequency or volume of water per planting.

02980. MISCELLANEOUS LANDSCAPE MATERIALS: Describe and give required information on materials, manufacturers, and performance standards on materials such as:

- 02980.1 Plastic Drainage Pipe.
- 02980.2 Solvent Cement.
- 02980.3 Anti-Desiccant.
- 02980.4 Staking and Guying Material.
  - 02980.4.1 Anchors.
  - 02980.4.2 Stakes and Guys.
    - 02980.4.2.1 Wire.
    - 02980.4.2.2 Turnbuckles.
    - 02980.4.2.3 Fagging.
    - 02980.4.2.4 Hose.
- 02980.5 Wrapping.

02990. SITE PREPARATION

- 02990.1 Utilities and Underground Obstruction - Describe Contractors responsibility for becoming acquainted with existing conditions of site and related adjacent areas.
- 02990.2 Layout - Establish procedures for obtaining the owners approval of locations staked by the contractor for site improvements.
- 02990.3 Planting - Establish requirements of pre-planting operations and procedure for approval for planting.
- 02990.4 Assign responsibility for repair of damage or disruption caused by construction activity.

02991. PREPARATION OF PLANTING SOIL BACKFILL

- 02991.1 Parameters for new soil and re-use of existing topsoil.
- 02991.2 Requirement for the disposition of unsuitable soil material such as clay or muck.

02992. SOIL PREPARATION

- 02992.1 Specify how soil is to be prepared for sod, shrubs, and groundcover areas.
- 02992.2 Requirement for finish grading. Standard for finish grade elevation relative to adjacent paving, curbs, walks, etc.
02993. EXCAVATION FOR TREES AND SHRUBS

02993.1 Planting Pits - Specify size, shape, etc. for various types of plant material.

02993.2 Subsoil Disposal - Establish how and where contractor is to dispose of unwanted subsoil.

02994. PLANTING TREES, PALMS AND SHRUBS:

02994.1 Describe procedures for planting all types of trees and shrubs whether container grown, balled and burlaped, or collected stock, including removal of shipping protections, backfilling, watering, fertilizing, pruning and staking, and application of pre-emergent weed killers. Instructions shall include but not be limited to the following:

02994.1.1 Remove wire and burlap from tops of root balls of trees and large shrubs.

02994.1.2 Do not mound mulch up around tree trunks.

02994.1.3 Provide mulch ring in 6” high saucer around all trees and large shrubs.

02994.1.4 Prune trees only as directed by owner or owner’s representative. All pruning shall be done in accordance with ANSI A300. Pruning shall be done with sharp instruments. No flush cuts are allowed.

02994.1.5 Trees shall be set on undisturbed existing ground at bottom of planting pit.

02995. PLANTING GROUND COVER

02995.1 Spacing - Triangular unless shown otherwise on drawings. Equally spaced.

02995.2 Backfilling - Requirement for soil, soil amendments, mulch, and grades relative to adjacent areas.

02995.3 Planting & Holes - Hole size, requirements for handling ground cover plants and for watering at planting.

02996. MULCHING

02996.1 Mulch ring for individual trees including diameter and depth.

02996.2 Shrub and Ground Cover beds mulching requires minimum three (3) inches depth. Elevation of mulch flush with adjacent walks, curbs and other improvements.

02997. INSPECTION AND ACCEPTANCE: Final Acceptance - Define terms of final inspection and acceptance.

02998. PROJECT WARRANTY

02998.1 Define length of warranty period, procedure for inspections and conditions for owner’s approval at end of period.

02999. PROJECT CLEAN UP ADJUSTMENT AND RESTORATION

02299.1 Site Clean-Up - Require contractor to keep site clean during construction and to carry out final clean-up and restoration or adjustment of any disturbed areas upon completion of the project at his own expense.