

PARK AVENUE STREETSCAPE RENOVATION

PAVER HARDSCAPE AND LANDSCAPE PLANS FINAL CONSTRUCTION BID PLAN

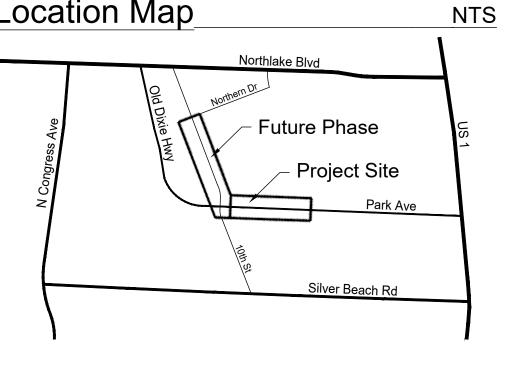
LAKE PARK, FLORIDA



L1.00	Sheet Key Map
H1.01 - H1.02	Paver Hardscape Plan
H1.03	Paver Specifications
H1.04	Paver Sealer Specification
L-1.01 - L1.02	Landscape Plan
L1.03	Plant List and Planting De
1104-1109	Landscape Specifications

Location Map_

Scale: 1' = 150'



SHEET KEY MAP

COVER SHEET

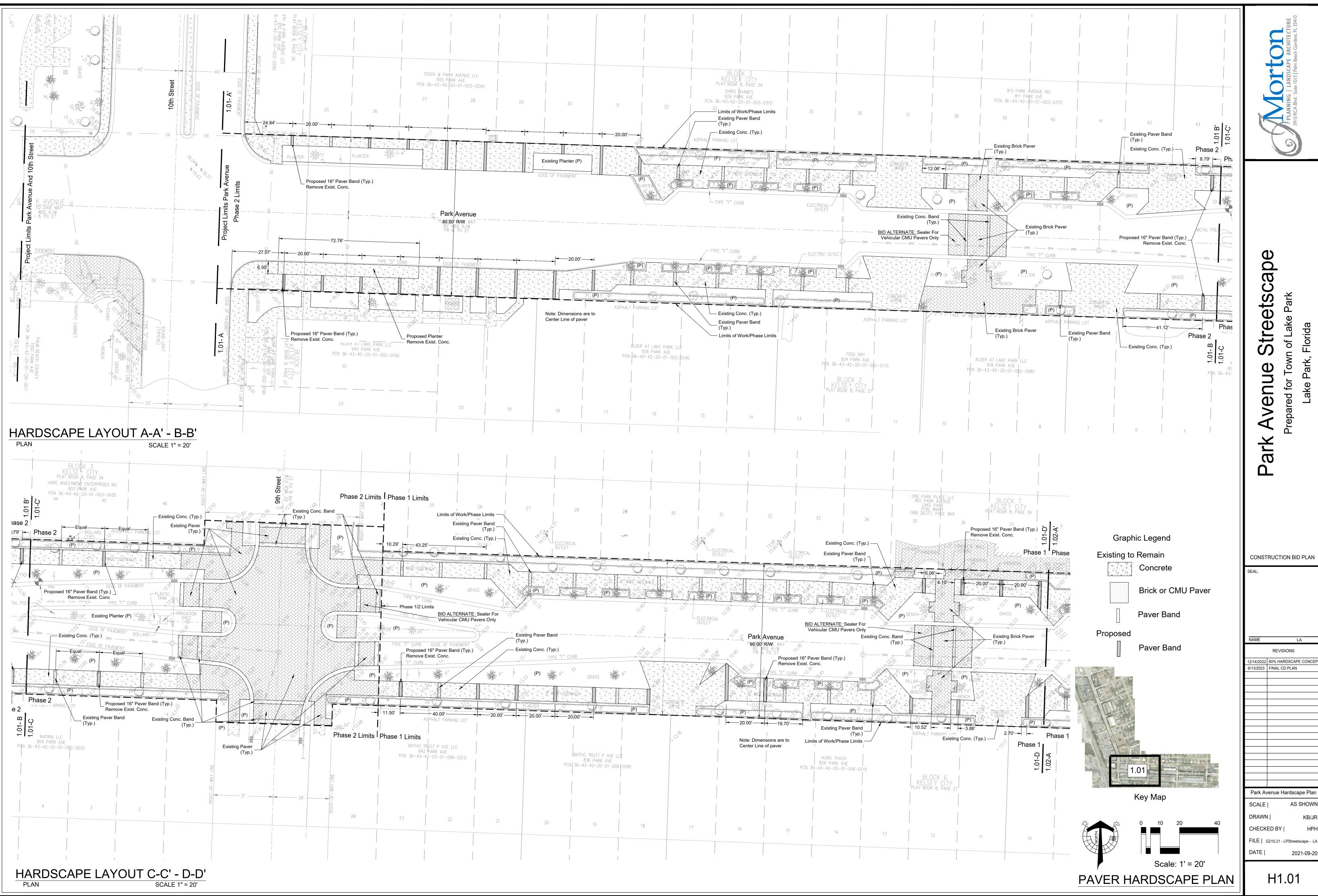
CONSTRUCTION BID PLAN

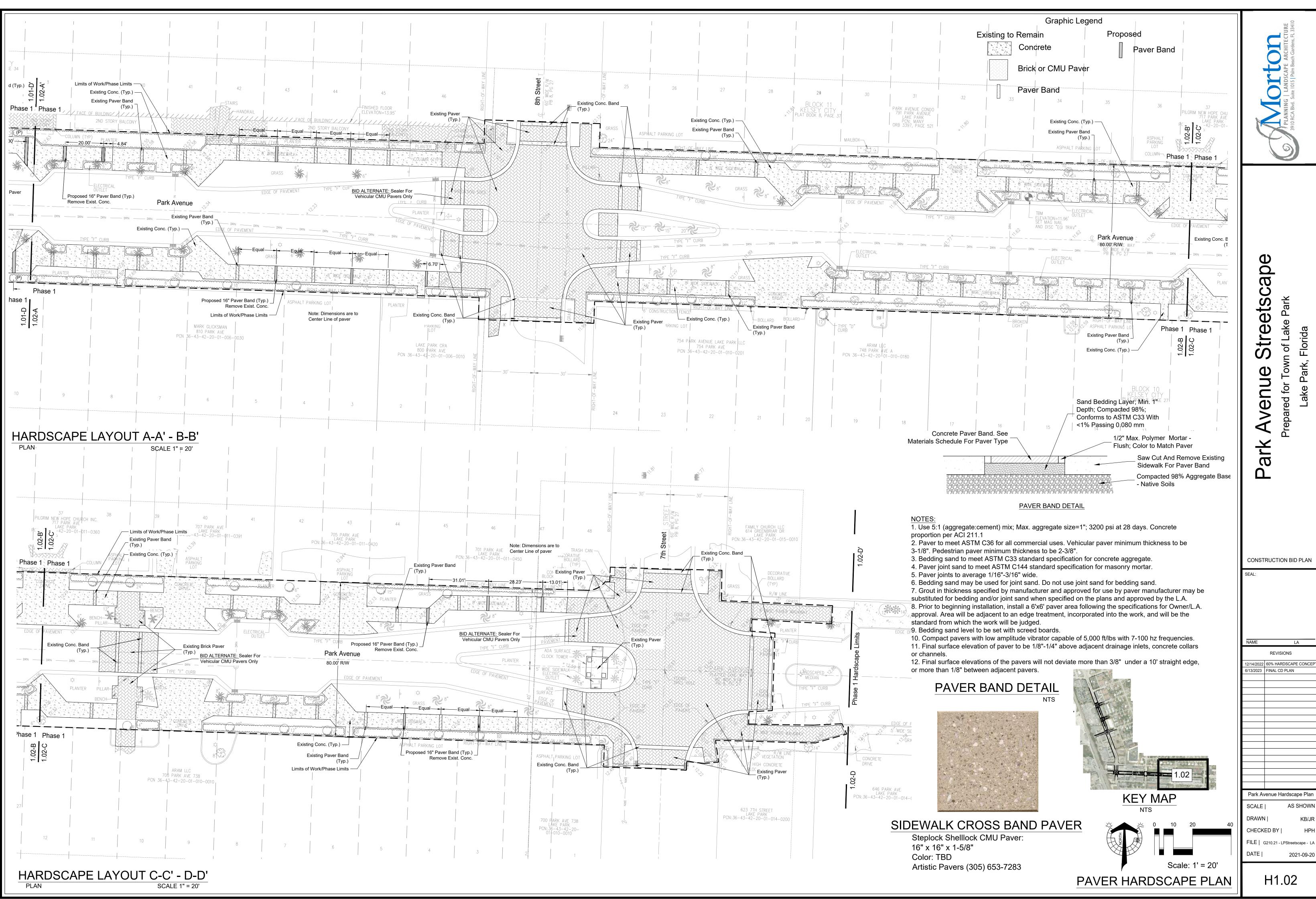
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SECTION 09790

EXTERIOR CLEANING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Cleaning of exterior slab concrete, concrete modular unit and brick pavers and other surfaces by means of pressure washing as specified and shown on the drawings.

1.02 RELATED SECTIONS

- Section 04530 OMIT
- Section 07920 Sealants and Caulking
- Section 09830 OMIT

1.03 SUBMITTALS

- Provide submittals in accordance with Section as provided in Section 1300.
- Product Data: Submit manufacturer's technical information including basic material analysis, installation instructions, Material Safety Data Sheets (MSDS), and color chart for each material specified. Identify by manufacturer's product number and general classification.
- Field Samples: On all different types of surfaces, prepare cleaned samples on each substrate type. Provide 4-foot X 4-foot cleaned sample area for approval by the Town of Lake Park. Sample to be representative of surface preparation to be used in performing all work.

1.04 QUALITY ASSURANCE

- As provided in Section 01400.
- **Qualifications of Manufacturer**
 - Products used in the work included in this section shall be produced by manufacturers regularly engaged in the manufacturing of similar items and with a history of successful production and product installations.

Qualifications of Contractor

Contractor shall be thoroughly trained and experienced in the necessary crafts. Contractor shall be made familiar with any unique requirements specified for proper performance of the work in this section.

D. Rejection

In the acceptance or rejection of work under this section, no allowance will be made for lack of skill or specification understanding on the part of the workmen. It shall be incumbent upon the contractor to use adequate numbers of skilled installers and to instruct them in the requirements of the project specifications as well as maintaining a set of the project specifications and drawings on the site at

Repairs

In the event inadequate or improper cleaning is determined, contractor shall make all repairs and replacements required to render the cleaning compliant with the project specifications. Repairs, due to improper performance shall be at the sole cost of the contractor.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery with Consultant.
- Material containers, mixing, and dilution:
 - Containers shall be closed and sealed except when materials are being removed.
 - Follow Manufacturers' instructions for mixing and stirring.
 - Products which have been diluted or cut-back, after their manufacture shall not be incorporated into the Work unless specified to be cut-back.

1.06 ENVIRONMENTAL REQUIREMENTS

- Work shall not commence during inclement weather.
- Work shall not commence on a day when precipitation is imminent or probable.
- Work shall not proceed over damp substrates.
- Cleaners shall not be applied when the wind velocity is not within the range acceptable under the manufacturer's recommendations.
- Do not begin work if rain is expected within twenty-four hours of application or, if

temperatures are expected to fall below 50° F, during the duration of the job.

Work demolition or removal work shall not commence on a day when the chance of precipitation is 30% or higher as forecast by the National Weather Service or local forecasts.

1.07 SEQUENCING AND SCHEDULING

Coordinate and schedule all phases of the Work of the Contract Documents with the Town of Lake Park, Consultant, Subcontractors, Material Suppliers and other parties as necessary to ensure the smooth and orderly transition of separate phases, or portions, of the Work, the timely placement of components and materials, including the complete cooperation between parties and proper execution of the Work.

Work shall not be performed outside of normal business hours without the prior approval of the Consultant and/or The City of Houston's representative.

1.08 WARRANTY

- General Warranty: Special warranties specified in this Article shall not deprive The Town of Lake Park of other rights The Town of Lake Park may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- Contractor's Warranty: Written warranty, signed by contractor agreeing to repair or replace all work that does not comply with performance and other requirements specified in this Section within specified warranty period.
 - Warranty Period: Five years from date of Substantial Completion.
- Special warranties specified in this Article exclude deterioration or failure of elastomeric PART 1 GENERAL coatings from the following:
 - Movement of the structure resulting in stresses on the coating exceeding coating manufacturer's written specifications for coating limitations caused by structural settlement or errors attributable to design or construction.
- Disintegration of substrates from natural causes exceeding design specifications.
- Mechanical damage caused by individuals, tools, or other outside agents.
- Changes in coating appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.01 CLEANING AGENTS

- General: Except as specifically otherwise directed by the Town. Use only the type of sealants described in this section.
- B. Acceptable Cleaners:
 - Clorox Concentrated Chlorine Bleach (10% sodium chloride concentrate) by Clorox Products Company.

PART 3 - EXECUTION

3.01 GENERAL

3.02 APPLICATION OF CLEANING PRODUCTS

- A. Contractor shall protect all adjacent surfaces as recommended by the manufacturer or required by the Town of Lake Park.
- B. Contractor shall prepare all surfaces to receive cleaning products.
- C. Testing: It is recommended that the contractor test all cleaning processes prior to executing the main body of work so that results can be evaluated and adjusted as necessary. The Town will provide a test site for evaluation purposes.
- Apply un-cut bleach directly to the surfaces to be cleaned with a pump sprayer at the rate of 1-gallon per 100 square feet. Allow to set for a minimum of 20 minutes and remove with hot water pressure sprayer. Re-apply as needed to remove all dirt, debris, mildew, etc., as acceptable to the Town of Lake Park. Where required use a stiff bristle brush to remove stubborn stains. Contractor shall high temperature pressure wash all cleaning agent from surfaces when clean.
- Please see specifications and material Safety Data Sheets for proper use and protection

3.03 PRESSURE WASHING

- A. Pressure Washing: Maximum pressure 2300 psi. Pressure and distance to cleaning surface shall be monitored and modified accordingly to prevent etching or damage to existing surfaces. Contractor will ensure all employees are thoroughly trained in pressure washing so as to minimize the chances of damaging the existing surfaces.
- The contractor shall test all cleaning processes prior to executing the main body of work so that results can be evaluated and approved by the Town of Lake Park prior to proceeding with the work. The Town will provide a test site for evaluation purposes.

3.04 EXTERIOR CLEANING SPECIFICATIONS

- Quality of Work: Concrete and pavers shall be washed clean and free of steaks, smears and visible soap residue. Accumulated dirt, paint specs, or other foreign debris must be removed from surfaces. Edges shall be scrubbed to remove all dried dirt, insects, debris and other materials so as to be considered clean by the building representative.
- Corrective Action: Concrete and pavers that have streaks, spotting, marks, dust, and debris following initial cleaning will be retreated at the expense of the contractor.
- Hot Water Pressure Washing Equipment: Hot water pressure washer may be used to clean concrete and pavers; however, any damage created by the pressure washer such as: water damage to adjacent surfaces or landscape materials will be the sole responsibility of the contractor.

3.05 GENERAL CLEAN UP

- A. Remove all dust, debris, equipment, equipment, etc. created or used during cleaning procedures. Ensure entire site areas are clean on a daily basis.
- Keep adjacent surfaces clean and free from dirt and debris as the cleaning progresses.

END OF SECTION

BID ALTERNATE: CONCRETE SEALER FOR THE EXISITNG VEHICULAR PAVERS ONLY

SECTION 07 19 00

CONCRETE SEALER

1.1 SUMMARY

- Section Includes:
 - Water repellent sealer for concrete surfaces as scheduled.

REFERENCE STANDARDS

- ASTM 413 "Water Absorption of Chemical Resistant Concrete/Masonry"
- B. ASTM C140 "Masonry Absorption Test for Light Weight Block". ASTM requires that water absorption cannot exceed 1% after 2 days of immersion.
- C. ASTM 123D "Penetration Test for Nuclear Power Plant, 8000 psi Concrete Pour"
- D. ASTM 642-82 "Masonry Absorption Test for Brick".
- E. ASTM C672 "Scaling Resistance".
- F. AS 1012.21-1999 "Water Absorption of Hardened Concrete".
- G. NCHRP 244 Cube Test "Accelerated Weathering Test". Standard of not exceeding 25% of untreated cube absorbed chloride.
- H. NCHRP 244 Southern Exposure "Chloride Ion Penetration Test". Product did not allow chloride penetration and thus passed absorbed chloride requirements not to exceed 10% of untreated concrete.
- Blue Dye Test "Blue Dye Absorption Test".
- SUBMITTALS
- A. OMIT
- B. Product Data: Submit manufacturer's technical data sheets and LEED product information for each product.
- 1. LEED, IEQ Credit 3.1 Construction Indoor Air Quality Management Plan.
- 2. LEED, IEQ Credit 4.0 Low Emitting Materials
- C. Submit list of project references as documented in this Specification under Quality Assurance Article. Include contact name and phone number of person charged with oversight of each project.
- D. Quality Control Submittals: 1. Provide protection plan of surrounding areas and non-work surfaces.
- 1.4 QUALITY ASSURANCE

A. OMIT

- B. Qualifications:
 - Manufacturer Qualifications: Company with minimum 5 years of experience in manufacturing of specified products.
 - 2. Applicator Qualifications: Company with minimum of 5 years of experience in application of specified products on projects of similar size and scope, and is acceptable to product manufacturer
 - a. Successful completion of a minimum of projects of similar size and complexity to specified Work.

- 1. If required, install at Project site or pre-selected area for field sample, as directed by the Town of Lake Park.
 - Apply material in accordance with manufacturer's written application
- 2. The Town's representative or designated representative will review technical aspects; surface preparation, application, and workmanship.
- Field sample will be standard for judging workmanship on remainder of Project.
- Maintain field sample during construction for workmanship comparison. Do not alter, move, or destroy field sample until Work is completed and approved by
- 6. Obtain Architect's written approval of field sample before start of material application, including approval of aesthetics, color, texture, and appearance.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store in unopened containers in clean, dry area between 40 and 90 degrees F and out of direct sunlight.
- WARRANTY A. OMIT
- B. Provide manufacturer's standard 15 year warranty protection from the date of application from the original purchaser.

PREFERRED CMU PAVER



SIDEWALK CROSS BAND PAVER

Steplock Shelllock CMU Paver: 16" x 16" x 1-5/8" Color: TBD Artistic Pavers (305) 653-7283

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CONSTRUCTION BID PLAN

LA REVISIONS 12/14/2022 | 60% HARDSCAPE CONCE 6/13/2023 | FINAL CD PLAN

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2021-09-20

Park Avenue Hardscape Plar

H1.03

DATE |

SECTION 07 19 00

CONCRETE SEALER

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
- A. Subject to compliance with requirements, provide products from the following manufacturer:
 - Eco-Wares/Envirosafe Mfg. 7634-B Progress Circle, West Melbourne, FL. 32904 Service: 866- 874-8070
 - Internet: www.eco-wares.com
- B. Substitutions: Only as allowed in writing per the Town of Lake Park or designated representative.
- C. Specifications and Drawings are based on a minimum levels of material and detailing indicated in Specifications or on Drawings. The Town of Lake Park or the deignated representative will be sole judge of appropriateness of substitutions.

MATERIALS

2.2

- High-performance, penetrating water dispersed polyester polymer and water-borne polyurethane that when dry, fills the voids and coats the interior particles of the matrix on concrete surfaces preventing damage from freeze/thaw cycles. Safe for indoor or exterior
 - Acceptable Product: Trojan Masonry & Concrete Sealer
- B. Sealer shall have the following minimum performance:
 - Flash Point: non-flammable
 - State: Liquid
 - Color: Translucent No color
 - Vapor Pressure: (Air + 1) N/A
 - Solubility in Water: Dilutable
 - Boiling Point: 100 degrees Celsius / 212 degrees Fahrenheit
 - Freezing Point: 0 degrees Celsius / 32 degrees Fahrenheit Water
 - Specific Gravity: (Water=1) 1.10 @ 20 degrees Celsius
 - Evaporation Rate: (BAC=1) Same as Water 10. Percent Solids by Weight: 10.5%

 - 11. pH: 6.8
 - 12. Volatile Organic Compounds: 5.9 g/L
 - 13. Freeze Thaw Resistance: Improved verifiable resistance under test conditions.
- C. Low Gloss Finish Sealer: High-performance, penetrating water dispersed polyester polymer and water-borne polyurethane that when dry, fills the voids and coats the interior particles of the matrix on concrete surfaces with acrylic added to the formula that settles on the surface to provide a low gloss sheen. Safe for indoor or exterior use.
 - 1. Acceptable Product: Trojan Ultra Masonry Sealer
- D. Sealer shall have the following minimum performance:
 - Flash Point: non-flammable
 - State: Liquid
 - Color: Milky in container. Dries with a clear low gloss, satin finish
 - Vapor Pressure: (Air + 1) N/A
 - Solubility in Water: Dilutable
 - Boiling Point: 100 degrees Celsius / 212 degrees Fahrenheit
 - Freezing Point: 0 degrees Celsius / 32 degrees Fahrenheit (Water)
 - Specific Gravity: (Water=1) 1.10 @ 20 degrees Celsius
 - Evaporation Rate: (BAC=1) Same as Water
- 10. Percent Solids by Weight: 29% 11. pH: 6.8
- 12. Volatile Organic Compounds: 54.5g/L
- 13. Freeze Thaw Resistance: Improved verifiable resistance under test conditions.
- E. Color Sealer: High-performance, penetrating water dispersed polyester polymer and waterborne polyurethane that when dry, fills the voids and coats the interior particles of the matrix. Includes UV resistant color stain applied to any porous surface including, concrete surfaces and pavers. Safe for indoor or exterior use.
- Acceptable Product: Trojan Color Sealer
- 2. Color Selection: As approved by the Town of Lake Park or designated representative.
- F. Sealer shall have the following minimum performance:
 - Flash Point: non-flammable
 - State: Liquid
 - Appearance: Colored liquid (various)
 - Vapor Pressure: (Air + 1) N/A
 - Solubility in Water: Infinite
 - Boiling Point: 100 degrees Celsius / 212 degrees Fahrenheit
 - Freezing Point: 0 degrees Celsius / 32 degrees Fahrenheit Water
- Specific Gravity: (Water =1) 1.10
- 9. pH: 6.8
- 10. Volatile Organic Compounds: 5.9 g/L
- 11. Percent Solids by Weight: 12% 19% (Varies by color and finish)
- 12. Freeze Thaw Resistance: Improved verifiable resistance under test conditions.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- A. OMIT
- 3.2 SURFACE PREPARATION
- A. Prepare surfaces in accordance with manufacturer's instructions.
- B. Surfaces shall be clean. Remove dust, dirt, oil, grease, chemical films, coatings and other contaminants before application.
- C. If surface does NOT absorb water, then there is possibly another sealer applied to the surface and sealer should not be applied until original sealer is removed.
- D. Exterior Surfaces: In all cleaning cases rinse well using 3000 psi pressure washer and allow to dry thoroughly before application.
- E. Interior Surfaces: use a wet vacuum to remove excess water.

- APPLICATION
- A. Apply sealer in accordance with manufacturer's instructions.
- Stir material thoroughly before and during application.
- Back-roll to even out the material and to remove any puddles in low spots.
- D. On some historic, old and extremely porous surfaces a second coat of either plain Trojan or Trojan Color may need to be applied to completely seal the surface.
- Surface minimum temperature must be above 45 degrees F before application.
- Allow to dry thoroughly before traffic is allowed onto floor.
- G. Trojan Masonry & Concrete Sealer: To paint over a Trojan treated area use only a good quality acrylic, oil-base, epoxy or urethane paint. Do not use latex paint over a Trojan coated surface since latex paint makes a weak bond especially in exterior applications. On new Concrete, Let dry and cure for 21-28 days depending on temperature and humidity.
- H. Trojan Color Sealer: should not be applied to a hot surface in the sun. Flash drying will occur and the affect will be uneven color with overlap marks. Always maintain a 'wet edge' when applying this product. On new concrete, (under 2 years of age), a pH reading should be taken before starting application to be sure that the pH is between 6 & 8. If it is not, then Enviro Etch should be applied to the surface. Rinse and allow to dry and re-take the pH reading.
 - 1. OMIT
 - Apply Trojan Color Sealer with a low-pressure sprayer. Trojan Color Sealer should be applied liberally to allow the surface to drink as much as possible without leaving puddles.

3.4 SAFETY

A. Safe storage, handling and use dictate that adequate health and safety precautions be observed with this product. User is specifically directed to consult the current Material Safety Data Sheet for this product as well as precautions contained on product labeling.

3.5 **PROTECTION**

A. Protect sealer from damage during construction.

END OF SECTION



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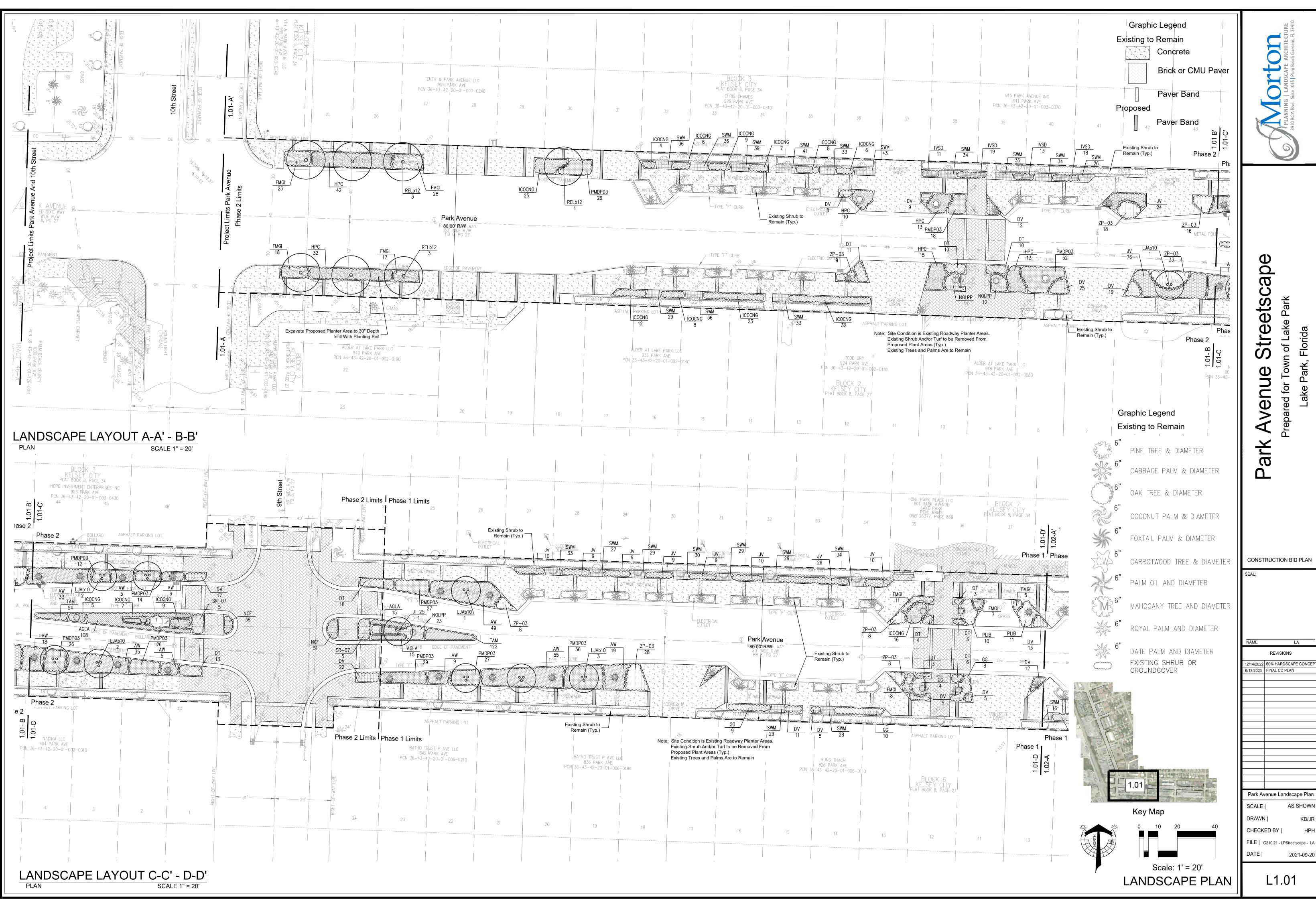
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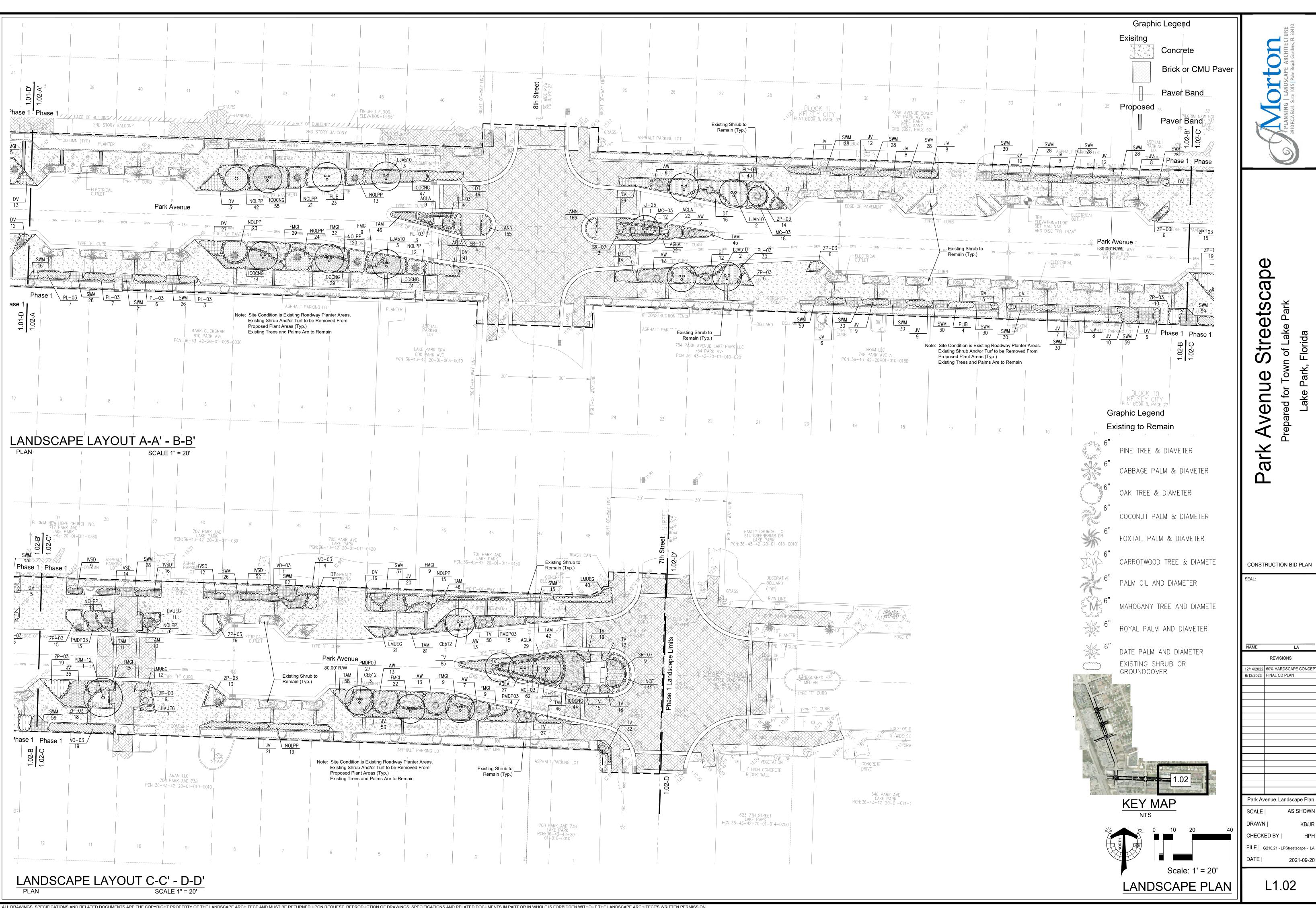
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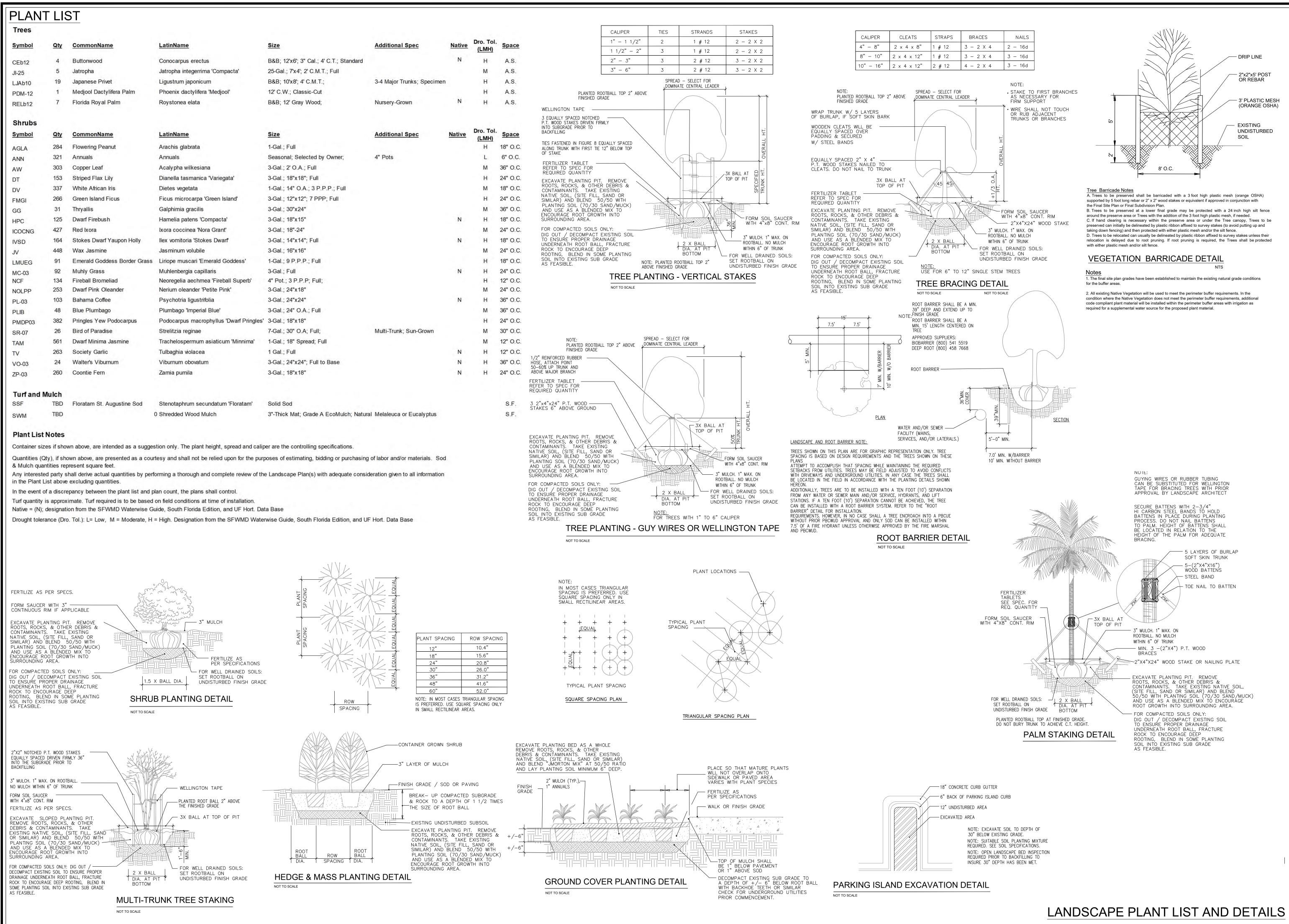
2021-09-20

CONSTRUCTION BID PLAN

PAVER HARDSCAPE SPECIFICATIONS







PLANNING | LANDSCAPE ARCHITECTURE
3910 RCA Blvd. Suite 1015 | Palm Beach Gardens, FL 33410

k Avenue Streetscape
Prepared for Town of Lake Park

CONSTRUCTION BID PLAN

REVISIONS

12/14/2022 60% HARDSCAPE CONCE
6/13/2023 FINAL CD PLAN

Park Avenue Landscape

Park Avenue Landscape Plan

SCALE | AS SHOWN

DRAWN | KB/JR

CHECKED BY | HPH

FILE | G210.21 - LPStreetscape - LA

DATE | 2021-09-20

L1.03

SOIL MOISTURE

A. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

Soil type	Permanent wilting point	Field capacity
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

1. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.

B. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

WATERING

A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Substantial Completion Acceptance. The Contractor shall adjust the automatic irrigation system, if available, and apply additional or adjust for less water using hoses as required.

B. Hand water root balls of all plants to assure that the root balls have moisture above wilt point and below field capacity. Test the moisture content in each root ball and the soil outside the root ball to determine the water content.

SECTION 32 9100

PLANTING SOIL

PART 1 – GENERAL

- 1.1 SUMMARY
 - A. The scope of work includes all labor, materials, tools, supplies, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of Planting Soil and /or the modification of existing site soil for use as Planting Soil, complete as shown on the drawings and as specified herein.
 - B. The scope of work in this section includes, but is not limited to, the following:
 - 1. Locate, purchase, deliver and install Imported Planting Soil and soil amendments.
 - 2. Harvest and stockpile existing site soils suitable for Planting Soil.
 - 3. Modify existing stockpiled site soil.
 - a. Modify existing site soil in place for use as Planting Soil.
 - b. Install existing or modified existing soil for use as Planting Soil.
 - 4. Locate, purchase, deliver and install subsurface Drain Lines.
 - 5. Fine grade Planting Soil.
 - 6. Install Compost into Planting Soil.
 - 7. Clean up and disposal of all excess and surplus material.
- 1.2 CONTRACT DOCUMENTS
 - A. Shall consist of specifications, general conditions, and the drawings. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work. The documents are to be considered as one. Whatever is called for by any parts shall be as binding as if called for in all parts.
- 1.3 RELATED DOCUMENTS AND REFERENCES
 - A. Related Documents:
 - 1. Drawings and general provisions of contract, including general and supplementary conditions and Division I specifications, apply to work of this section.
 - 2. Related Specification Section
 - a. Section 32900 Plantingb. Section 329300 Lawn
 - B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the Specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail.
 - 1. ASTM: American Society of Testing Materials cited section numbers.
 - 2. U.S. Department of Agriculture, Natural Resources Conservation Service, 2003. National Soil Survey Handbook, title 430-VI. Available Online.
 - 3. US Composting Council www.compostingcouncil.org and http://compostingcouncil.org and http://compostingcouncil.org and http://compostingcoun
 - 4. Methods of Soil Analysis, as published by the Soil Science Society of America (http://www.soils.org/).
 - 5. Up by Roots: healthy soils and trees in the built environment. 2008. J. Urban. International Society of Arboriculture, Champaign, IL.
- 1.4 VERIFICATION
 - A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities, and shall immediately inform the Owner's Representative of any discrepancies between the information on the drawings and the actual conditions, refraining from doing any work in said areas until given approval to do so by the Owner's Representative.
- 1.5 PERMITS AND REGULATIONS
 - A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner's Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.
 - B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply, unless otherwise expressly set forth.

- C. In case of conflict among any referenced standards or codes or among any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.
- 1.6 PROTECTION OF WORK, PROPERTY AND PERSON
- A. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to the Contractor's actions.
- 1.7 CHANGES IN WORK
 - A. The Owner's Representative may order changes in the work, and the contract sum adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.
 - B. All changes in the work, notifications and contractor's request for information (RFI) shall conform to the contract general condition requirements.
- 1.8 CORRECTION OF WORK
 - A. The Contractor shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest possible time that can be coordinated with other work and seasonal weather demands but not more than 180 (one hundred and eighty) days after notification.
- 1.9 DEFINITIONS
 - A. Acceptable drainage: Drainage rate is sufficient for the plants to be grown. Typical rates for installed Planting Soil are between 1 5 inches per hour. Turf soils are often higher, but drainage rates above 2 3 inches per hour will dry out very fast. In natural undisturbed soil a much lower drainage rate, as low as 1/8th inch per hour can still support good plant growth.
 - B. Amendment: material added to Topsoil to produce Planting Soil Mix. Amendments are classified as general soil amendments, fertilizers, biological, and pH amendments.
 - C. Biological Amendment: Amendments such as Mycorrhizal additives, compost tea or other products intended to change the soil biology.
 - D. Compacted soil: soil where the density of the soil is greater that the threshold for root limiting, and further defined in this specification.
 - E. Compost: well decomposed stable organic material as defined by the US Composting Council and further defined in this specification.
 - F. Drainage: The rate at which soil water moves through the soil transitioning the soil from saturated condition to field capacity. Most often expressed as saturated hydraulic conductivity (Ksat; units are inches per hour).
 - G. End of Warranty Acceptance: The date when the Owner's Representative accepts that the plants and work in this section meet all the requirements of the warranty. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation (if applicable) work run concurrent with each other, and further defined in this specification.
 - H. Existing Soil: Mineral soil existing at the locations of proposed planting after the majority of the construction within and around the planting site is completed and just prior to the start of work to prepare the planting area for soil modification and/or planting, and further defined in this specification.
 - I. Fertilizer: amendment used for the purpose of adjusting soil nutrient composition and balance.
 - J. Fine grading: The final grading of the soil to achieve exact contours and positive drainage, often accomplished by hand rakes or drag rakes other suitable devices, and further defined in this specification, and further defined in this specification.
 - K. Finished grade: surface or elevation of Planting Soil after final grading and 12 months of settlement of the soil, and further defined in this specification.
 - L. Graded soil: Soil where the A horizon has been stripped and relocated or re-spread; cuts and fills deeper than 12 inches, and further defined in this specification.
 - M. Installed soil: Planting soil and existing site soil that is spread and or graded to form a planting soil, and further defined in this specification.
 - N. Minor disturbance: Minor grading as part of agricultural work that only adjusts the A horizon soil, minor surface compaction in the top 6 inches of the soil, applications of fertilizers, installation of utility pipes smaller than 18 inches in diameter thru the soil zone.
 - O. Owner's Representative: The person or entity, appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.
 P. Planting Soil: Topsoil, or Planting Soil Mixes which are imported or existing at the site, or made from
 - components that exist at the site, or are imported to the site; and further defined in this specification.

 Q. Scarify: Loosening and roughening the surface of soil and sub soil prior to adding additional soil on 1.12
 - top, and further defined in this specification.R. Soil Fracturing: Deep loosening the soil to the depths specified by using a back hoe, and further defined in this specification.
 - S. Soil Horizons: as defined in the USDA National Soil Survey Handbook
 - http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242.
 - T. Soil Tilling: Loosening the surface of the soil to the depths specified with a rotary tine tilling machine, roto tiller, (or spade tiller), and further defined in this specification.
 - U. Subgrade: surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing Planting Soil.
 - V. Substantial Completion Acceptance: The date at the end of the Planting, Planting Soil, and Irrigation installation (if applicable) where the Owner's Representative accepts that all work in these sections is complete and the Warranty period has begun. This date may be different than the date of substantial completion for the other sections of the project, and further defined in this specification.
 - W. Topsoil: naturally produced and harvested soil from the A horizon or upper layers or the soil as further defined in this specification.
 - X. Undisturbed soil: Soils with the original A horizon intact that have not been graded or compacted. Soils that have been farmed, subjected to fire or logged but not graded, and natural forested land will be considered as undisturbed.

SUBMITTALS

- A. See the contract General Conditions for policy and procedures related to submittals.
- B. Submit all product submittals eight weeks prior to the start of the soil work.
- C. Product data and certificates: For each type of manufactured product, submit data and certificates that the product meets the specification requirements, signed by the product manufacturer, and complying with the following:

- C. Product data and certificates: For each type of manufactured product, submit data and certificates that the product meets the specification requirements, signed by the product manufacturer, and complying with the following:
- 1. Submit manufacturers or supplier's product data and literature certified analysis for standard products and bulk materials, complying with testing requirements and referenced standards and specific requested testing.
 - a. For each Compost product submit the following analysis by a recognized laboratory:
 - 1.) pH
 - 2.) Salt concentration (electrical conductivity)3.) Moisture content %, wet weight basis
 - 4.) Particle size % passing a selected mesh size, dry weight basis
 - 5.) Stability carbon dioxide evolution rate mg CO2-C per g OM per day
 - 6.) Solvita maturity test
 - 7.) Physical contaminants (inerts) %, dry weight basis
 - 8.) US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3 levels Chemical Contaminants mg/kg (ppm)
 - b. For Coarse Sand product submit the following analysis by a recognized laboratory:
 1.) pH
 - 2.) Particle size distribution (percent passing the following sieve sizes):
 - 3/8 inch (9.5 mm)
 - No 4 (4.75 mm)
 - No 8 (2.36 mm) No 16(1.18 mm)
 - No 30 (.60 mm)
 - No 50 (.30 mm)
 - No 100 (.15 mm)
- No 200 (.075 mm)
- D. Samples: Submit samples of each product and material, where required by Part 2 of the specification, to the Owner's Representative for approval. Label samples to indicate product, characteristics, and locations in the work. Samples will be reviewed for appearance only.
- 1. Submit samples a minimum of 8 weeks prior to the anticipated date of the start of soil installation
- 2. Samples of all Topsoil, Coarse Sand, Compost and Planting Soil shall be submitted at the same time as the particle size and physical analysis of that material.
- E. Soil testing for Imported and Existing Topsoil, existing site soil to be modified as Planting Soil Mixes
- Planting Soil Mixes.
 Topsoil, existing site soil and Planting Soil Mix testing: Submit soil test analysis report for each sample of Topsoil, existing site soil and Planting Soil from an approved soil-testing laboratory
- and where indicated in Part 2 of the specification as follows:
 a. Submit Topsoil, Planting Soil, Compost, and Coarse Sand for testing at least 8 weeks before scheduled installation of Planting Soil Mixes. Submit Planting Soil Mix test no more than 2 weeks after the approval of the Topsoil, Compost and Coarse Sand. Do not submit to the testing laboratory, Planting Soil Mixes, for testing until all Topsoil, Compost and Coarse Sand have been approved.
- b. If tests fail to meet the specifications, obtain other sources of material, retest and resubmit until accepted by the Owner's Representative.
- c. All soil testing will be at the expense of the Contractor.
- 2. Provide a particle size analysis (% dry weight) and USDA soil texture analysis. Soil testing of Planting Soil Mixes shall also include USDA gradation (percentage) of gravel, coarse sand, medium sand, and fine sand in addition to silt and clay.
- 3. Provide the following other soil properties:
- a. pH and buffer pH.
- b. Percent organic content by oven dried weight.
- c. Nutrient levels by parts per million including: phosphorus, potassium, magnesium, manganese, iron, zinc and calcium. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil for optimum growth of the plantings specified.
- d. Soluble salt by electrical conductivity of a 1:2 soil water sample measured in Milliohm per cm.
- e. Cation Exchange Capacity (CEC).

OBSERVATION OF THE WORK

- A. The Owner's Representative may observe the work at any time. They may remove samples of materials for conformity to specifications. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications shall be paid by the Contractor.
 - 1. The Owner's Representative may utilize the Contractor's penetrometer and moisture meter at any time to check soil compaction and moisture.

PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction meeting with the Owner's Representative at least seven (7) days before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.
- 1.13 QUALITY ASSURANCE
 - A. Installer Qualifications: The installer shall be a firm having at least 5 years of experience of a scope similar to that required for the work, including the preparation, mixing and installation of soil mixes to support planting. The installer of the work in Section: Planting, shall be the same firm installing the work in this section.
 - 1. The bidders list for work under this section shall be approved by the Owner's Representative.
 - 2. Installer Field Supervision: When any Planting Soil work is in progress, installer shall maintain, on site, an experienced full-time supervisor who can communicate in English with the Owner's Representative.
 - 3. Installer's field supervisor shall have a minimum of five years experience as a field supervisor installing soil, shall be trained and proficient in the use of field surveying equipment to establish grades and can communicate in English with the Owner's Representative.
 - 4. The installer's crew shall be experienced in the installation of Planting Soil, plantings, and irrigation (where applicable) and interpretation of planting plans, soil installation plans, and irrigation plans (where applicable).
 - 5. If requested, submit references of past projects and employee training certifications that support that the Contractors meet all of the above installer qualifications and applicable licensures.
 - B. Soil testing laboratory qualifications: an independent laboratory, with the experience and capability to conduct the testing indicated and that specializes in USDA agricultural soil testing, Planting Soil Mixes, and the types of tests to be performed. Geotechnical engineering testing labs shall not be used.
 - C. All delivered and installed Planting Soil shall conform to the approved submittals sample color, texture and approved test analysis.
 - 1. The Owner's Representative may request samples of the delivered or installed soil be tested for analysis to confirm the Planting Soil conforms to the approved material.
 - 2. All testing shall be performed by the same soil lab that performed the original Planting Soil testing.

- 3. Testing results shall be within 10% plus or minus of the values measured in the approved Planting Soil Mixes
- 4. Any Planting Soil that fails to meet the above criteria, if requested by the Owner's Representative, shall be removed and new soil installed.
- D. Soil compaction testing: following installation or modification of soil, test soil compaction with a penetrometer.
- 1. Maintain at the site at all times a soil cone penetrometer with pressure dial and a soil moisture meter to check soil compaction and soil moisture.
 - a. Penetrometer shall be AgraTronix Soil Compaction Meter distributed by Ben Meadows, www.benmeadows.com or approved equal.
- Moisture meter shall be "general digital soil moisture meter" distributed by Ben Meadows, www.benmeadows.com or approved equal.
- 2. Penetrometer readings are impacted by soil moisture and excessively wet or dry soils will read significantly lower or higher than soils at optimum moisture.

1.14 SITE CONDITIONS

- A. It is the responsibility of the Contractor to be aware of all surface and subsurface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.
- 1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Owner's Representative in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Owner's Representative of such conditions, they shall remain responsible for plant material under the warrantee clause of the specifications.
- 2. This specification requires that all Planting Soil and Irrigation (if applicable) work be completed and accepted prior to the installation of any plants.
- 1.15 SOIL COMPACTION GENERAL REQUIREMENTS
 - A. Except where more stringent requirements are defined in this specification. The following parameters shall define the general description of the threshold points of soil compaction in existing, modified or installed soil and subsoil.
 - B. The following are threshold levels of compaction as determined by each method.
 - 1. Acceptable Compaction: Good rooting anticipated, but increasing settlement expected as compaction is reduced and/or in soil with a high organic matter content.
 - a. Bulk Density Method Varies by soil type see Chart on page 32 in <u>Up By Roots</u>.
 b. Standard Proctor Method 75-85%; soil below 75% is unstable and will settle excessively.
 - c. Penetration Resistance Method about 75-250 psi, below 75 psi soil becomes increasingly unstable and will settle excessively.
 2. Root limiting Compaction: Root growth is limited with fewer, shorter and slower growing roots.
 - a. Bulk Density Method Varies by soil type see Chart on page 32 in <u>Up By Roots</u>.
 - b. Standard Proctor Method above approximately 85%.
 c. Penetration Resistance Method about 300 psi.
 - 3. Excessive Compaction: Roots not likely to grow but can penetrate soil when soil is above field
 - a. Bulk Density Method Varies by soil type see Chart on page 32 in <u>Up By Roots</u>.
 - c. Penetration Resistance Method Approximately above 400 psi

b. Standard Proctor Method – Above 90%.

- DELIVERY, STORAGE, AND HANDLINGA. Weather: Do not mix, deliver, place or grade soils when frozen or with moisture above field capacity
- B. Protect soil and soil stockpiles, including the stockpiles at the soil blender's yard, from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Cover stockpiles with plastic sheeting or fabric at the end of each workday.
- sheeting or fabric at the end of each workday.

 C. All manufactured packaged products and material shall be delivered to the site in unopened containers and stored in a dry enclosed space suitable for the material and meeting all environmental regulations. Biological additives shall be protected from extreme cold and heat. All products shall be freshly manufactured and dated for the year in which the products are to be used.
- D. Deliver all chemical amendments in original, unopened containers with original labels intact and legible, which state the guaranteed chemical analysis. Store all chemicals in a weather protected enclosure
- E. Bulk material: Coordinate delivery and storage with Owner's Representative and confine materials to neat piles in areas acceptable to Owner's Representative.
- 1.17 EXCAVATING AND GRADING AROUND UTILITIES
 - A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.B. Determine location of underground utilities and perform work in a manner that will avoid damage.

Hand excavate as required. Maintain grade stakes set by others until parties concerned mutually agree

C. Notification of the utility locate service (811) is required for all planting areas. The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the utility locate

PART 2 – PRODUCTS

- 2.1 IMPORTED TOPSOIL
 - A. Imported Topsoil definition: Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 2 inches in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth. The percent (%) of the above objects shall be controlled by source selection not by screening the soil. Topsoil shall be suitable for the germination of seeds and the support of vegetative growth. Imported Topsoil shall not contain weed seeds in quantities that cause noticeable weed infestations in the final planting beds. Imported Topsoil shall meet the following physical and chemical criteria:
 - 1. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15 and 25%. And a combined clay/silt content of no more than 55%.
 - And a combined clay/silt content of no

color on the inside as is visible on the outside.

- pH value shall be between 5.5 and 7.0.
 Percent organic matter (OM): 2.0-5.0%, by dry weight
- 4. Soluble salt level: Less than 2 mmho/cm.5. Soil chemistry suitable for growing the plants specified.
- B. Imported Topsoil shall be a harvested soil from fields or development sites. The organic content and particle size distribution shall be the result of natural soil formation. Manufactured soils where Coarse Sand, Composted organic material or chemical additives has been added to the soil to meet the requirements of this specification section shall not be acceptable. Retained soil peds shall be the same
- C. Imported Topsoil for Planting Soil shall NOT have been screened and shall retain soil peds or clods larger than 2 inches in diameter throughout the stockpile after harvesting.

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CONSTRUCTION BID PLAN

NAME LA

12/14/2022 60% HARDSCAPE CONCEPT 6/13/2023 FINAL CD PLAN

REVISIONS

Park Avenue Landscape Plan

DRAWN | KB/JR
CHECKED BY | HPH
FILE | G210.21 - LPStreetscape - LA
DATE | 2021-09-20

L1.04

AS SHOWN

SCALE |

LANDSCAPE SPECIFICATIONS

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SPECIFICATIONS

- D. Stockpiled Existing Topsoil at the site meeting the above criteria may be acceptable.
- E. Provide a two gallon sample from each Imported Topsoil source with required soil testing results. The sample shall be a mixture of the random samples taken around the source stockpile or field. The soil sample shall be delivered with soil peds intact that represent the size and quantity of expected peds in the final delivered soil.

COMPOST

- A. Compost: Blended and ground leaf, wood and other plant based material, composted for a minimum of 9 months and at temperatures sufficient to break down all woody fibers, seeds and leaf structures, free of toxic material at levels that are harmful to plants or humans. Source material shall be yard waste trimmings blended with other plant or manure based material designed to produce Compost high in fungal material.
- 1. Compost shall be commercially prepared Compost and meet US Compost Council STA/TMECC criteria or as modified in this section for "Compost as a Landscape Backfill Mix Component".

http://compostingcouncil.org/admin/wp-content/plugins/wppdfupload/pdf/191/LandscapeArch Specs.pdf

- 2. Compost shall comply with the following parameters:
- a. pH: 5.5 8.0.
- b. Soil salt (electrical conductivity): maximum 5 dS/m (mmhos/cm). c. Moisture content %, wet weight basis: 30 - 60.
- d. Particle size, dry weight basis: 98% pass through 3/4 inch screen or smear.
- e. Stability carbon dioxide evolution rate: mg CO_2 -C/ g OM/ day < 2.
- f. Solvita maturity test: > 6.
- g. Physical contaminants (inerts), %, dry weight basis: <1%.
- h. Chemical contaminants, mg/kg (ppm): meet or exceed US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3 levels
- Biological contaminants select pathogens fecal coliform bacteria, or salmonella, meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) level requirements.
- B. Provide a two gallon sample with manufacturer's literature and material certification that the product meets the requirements

COARSE SAND

- A. Clean, washed, sand, free of toxic materials
- 1. Coarse concrete sand, ASTM C-33 Fine Aggregate, with a Fines Modulus Index of 2.8 and 3.2.
- 2. Coarse Sands shall be clean, sharp, natural Coarse Sands free of limestone, shale and slate particles. Manufactured Coarse Sand shall not be permitted.
- 3. pH shall be lower than 7.0.
- 4. Provide Coarse Sand with the following particle size distribution:

Sieve	Percent passing
3/8 inch (9.5 mm)	100
No 4 (4.75 mm)	95-100
No 8 (2.36 mm)	80-100
No 16 (1.18 mm)	50-85
No 30 (.60 mm)	25-60
No 50 (.30 mm)	10-30
No 100 (.15 mm)	2-10
No 200 (0.75 mm	2-5

- B. Provide a two gallon sample with manufacturer's literature and material certification that the product meets the requirements.
- FERTILIZER, BIOLOGICAL AND OTHER AMENDMENTS

- A. ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: Class T, with a minimum 99 percent passing through No. 8 (2.36-mm) sieve and a minimum 75 percent passing through No. 60 (0.25-mm) sieve.
- 2. Provide lime in form of dolomitic limestone.
- B. Provide manufacturer's literature and material certification that the product meets the requirements

EXISTING SOIL (Acceptable for planting with minimum modifications)

- A. General definition of existing soil: Surface soil in the areas designated on the soils plan as existing soil, that is not altered, compacted to root limiting density, graded or contaminated before or during the construction process and considered acceptable for planting and long term health of the plants specified either as it exists or with only minor modification.
- 1. The Owner's Representative shall verify that the soil in the designated areas is suitable at the beginning of planting bed preparation work in that area. In the event that the work of this project construction has damaged the existing soil in areas designated for use as Planting Soil to the point where the soil is no longer suitable to support the plants specified, the Owner's Representative may require modification of the damaged soil up to and including removal and replacement with soil of equal quality to the soil that existed prior to construction. Examples of damage include further compaction, contamination, grading, creation of hard pan or drainage problems, and loss of the O, and or A horizon.
- a. Do not begin work on additional modifications until changes to the contract price are approved by Owner's Representative.
- B. Protect existing soil from compaction, contamination, and degradation during the construction
- C. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not increase compaction of soil to root limiting levels.
- D. Modifications:
- 1. When results of soil tests recommend chemical adjustments, till surface soil to six inches or greater after chemical adjustments have been are applied.
- 2. Remove existing turf thatch, ground cover plants and weeds.
- 3. Provide pre-emergent weed control if indicated.
- 4. Make chemical adjustment as recommended by the soil test.
- MODIFIED EXISTING SOIL (SOIL SUITABLE FOR PLANTING WITH INDICATED MODIFICATION)
 - A. General definition: Surface soil in the areas designated on the soils plan as Modified Existing So. been altered and or graded before or during the construction process but is still considered accept for planting and long term health of the plants specified with the proposed modifications. Modifications respond to the soil problems expected or encountered.
 - 1. In the event that the work of this project construction has damaged the existing soil in areas designated for modification to the point where the soil is no longer suitable to support the pla specified with the specified modification, the Owner's Representative may require further modification of the damaged soil up to an including removal and replacement with soil of eq quality to the soil that would have resulted from the modification. Damage may include furth compaction, contamination, grading, creation of hard pan or drainage problem, and loss of th and or A horizon.

- 2. General requirements for all soil modifications:
- a. Take soil samples, test for chemical properties, and make appropriate adjustments.
- b. Unless otherwise instructed, remove all existing plants, root thatch, and non-soil debris from the surface of the soil using equipment that does not add to the compaction in the soil.
- c. All soil grading, tilling and loosening must be completed at times when the soil moisture is below field capacity. Allow soil to drain for at least two days after any rain event more than 1 inch in 24 hours, or long enough so that the soil does not make the hand muddy when squeezed.
- d. Provide pre-emergent weed control after the soil work is complete and plants planted but prior to adding mulch to the surface, if indicated by weed type and degree of threat.

B. Modified existing soil – soil removed, stockpiled, and spread

1. Description of condition to be modified: Existing soil that is suitable for reuse as Planting Soil but is in the wrong place of elevation, or cannot be adequately protected during construction. Soil 2.8 is to be harvested, stockpiled and re-spread with or without further modifications as indicated.

2. Modifications:

- a. Excavate existing soil from the areas and to depths designated on the drawings. Stockpile in zones noted on the drawings or in areas proposed by the Contractor.
- 1.) Prepare a soil stock pile plan for approval. b. Excavate soil using equipment and methods to preserve the clumps and peds in the soil. Generally this means using the largest piece of equipment that is practical for the project size
- c. Protect stock piles from erosion by compacting or tracking the soil surface, covering with breathable fabric or planting with annual grasses as appropriate for the season, location, and length of expected time of storage.
- d. Re-spread soil as required in Part 3 of this specification.

C. Modified existing soil – compacted surface soil (Tilling Option)

1. Description of condition to be modified: Surface soil compaction to a maximum of 6 inches deep from traffic or light grading. Original A horizon may be previously removed or graded but lower profile intact with acceptable compaction levels and limited grading. The soil organic matter, pH and chemistry in the A horizon may not be suitable for the proposed plants and may need to be modified as required.

2. Modifications:

- a. Till top 6 inches or deeper of the soil surface, with a roto tiller, spade tiller, ripper or agricultural plow. Spread 2 - 3 inches of Compost on the surface of the tilled soil and make any chemical adjustment as recommended by the soil test.
- b. Till or disk the Compost into the loosened soil. Smooth out grades with a drag rake or drag

D. Modified existing soil – compacted subsoil

1. Description of condition to be modified: Deep soil compaction the result of previous grading, filling and dynamic or static compaction forces. Original A horizon likely removed or buried. The soil organic matter, pH and chemistry in the A horizon is likely not suitable for the proposed plants and should be modified as required.

2. Soil Ripping

- a. Step one: After grading and removing all plants and debris from the surface, using a tracked 3.1 dozer or similar large grading equipment, loosen the soil by dragging a ripping shank or chisel thru the soil to depths of 24 inches with ripping shanks spaced 18 inches or less apart in two directions. The number of shanks per pull is dependent on the degree of soil compaction and the size of the dozer.
- b. Step 2: Spread 3-4 inches of Compost over the ripped area and till into the top 6 inches of the

Soil Fracturing:

- a. Step one: After grading and removing all plants and debris from the surface, spread 2-3inches of Compost over the surface of the soil. Loosen the soil to depth of 18 - 24 inches, using a backhoe to dig into the soil through the Compost. Lift and then drop the loosened soil immediately back into the hole. The bucket then moves to the adjacent soil and repeats the process until the entire area indicated has been loosened.
- b. Step 2: Spread 3-4 inches of Compost over the ripped area and till into the top 6 inches of the soil surface.
- 4. Following soil ripping or fracturing the average penetration resistance should be less than 250 psi to the depth of the ripping or fracturing.
- 5. Do not start planting into ripped or fractured soil until soil has been settled or leave grades sufficiently high to anticipate settlement of 10 - 15% of ripped soil depth.

E. Modified existing soil – low organic matter

- 1. Description of condition to be modified: Low soil organic matter and/or missing A horizon but soil is not compacted except for some minor surface compaction. The soil organic matter, pH and/or chemistry are likely not suitable for the proposed plants and should be modified as
- 2. Modifications:
- a. Spread 3 4 inches of Compost over the surface of the soil and make chemical adjustment as 3 3 recommended by the soil test.
- b. Till Compost into the top 6 inches of the soil.
- F. Modified existing soil soil within the root zone of existing established trees
- 1. Description of condition to be modified: Surface compaction near or above root limited levels in 3.4 the upper soil horizon the result of traffic or other mechanical compaction.

2. Modifications:

a. Remove the tops of all plants to be removed from the root zone. Remove sod with a walk behind sod cutter. Do not grub out the roots of plats to be removed.

- b. Use a pneumatic air knife to loosen the top 9-12 inches of the soil. Surface roots may move and separate from soil during this process but the bark on roots should not be broken 1.) Pneumatic air knife shall be as manufactured by: Concept Engineering Group, Inc., Verona, PA (412) 826-8800
 - Supersonic Air Knife, Inc., Allison Park, PA (866) 328 5723
- c. Make chemical adjustment as recommended by the soil test and add 2 3 inches of Compost d. Using the pneumatic air knife, mix the Compost into the top 6-8 inches of the loosened soil.
- e. Work in sections such that the entire process including irrigation can be completed in one day. Apply approximately one inch of water over the loosened soil at the completion of each day's work. Apply mulch or turf as indicated on the drawings within one week of the completion of work.

PLANTING SOIL MIXES

- A. General definition: Mixes of Existing Soil or Imported Topsoil, Coarse Sand, and or Compost to make a new soil that meets the project goals for the indicated planting area. These may be mixed off site or onsite, and will vary in Mix components and proportions as indicated.
- B. Planting Mix moderately slow draining soil for trees and shrub beds
- 1. A Mix of Imported Topsoil, Coarse Sand and Compost. The approximate Mix ratio shall be: Mix component % by moist volume Imported Topsoil unscreened 45-50% 40-45% Coarse sand Compost
- 2. Final tested organic matter between 2.75 and 4% (by dry weight).
- 3. Mix the Coarse Sand and Compost together first and then add to the Topsoil. Mix with a loader bucket to loosely incorporate the Topsoil into the Coarse Sand/Compost Mix. DO NOT OVER MIX! Do not mix with a soil blending machine. Do not screen the soil. Clumps of Soil, Compost and Coarse Sand will be permitted in the overall Mix.
- 4. At the time of final grading, add fertilizer if required to the Planting Soil at rates recommended by the testing results for the plants to be grown.
- 5. Provide a two gallon sample with testing data that includes recommendations for chemical additives for the types of plants to be grown. Samples and testing data shall be submitted at the

PRE-EMERGENT HERBICIDES

- A. Chemical herbicides are designed to prevent seeds of selective plants from germinating. Exact type of herbicide shall be based on the specific plants to be controlled and the most effective date of application.
- B. Submit report of expected weed problems and the recommendation of the most effective control for approval by Owner's Representative. Provide manufacturer's literature and material certification that the product meets the requirements.

PART 3 - EXECUTION

SITE EXAMINATION

- A. Prior to installation of Planting Soil, examine site to confirm that existing conditions are satisfactory for the work of this section to proceed.
- 1. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope toward the under drain lines as shown on the drawings.
- 2. Confirm that surface all areas to be filled with Planting Soil are free of construction debris, refuse, compressible or biodegradable materials, stones greater than 2 inches diameter, soil crusting films of silt or clay that reduces or stops drainage from the Planting Soil into the subsoil; and/or standing water. Remove unsuitable material from the site.
- 3. Confirm that no adverse drainage conditions are present.
- 4. Confirm that no conditions are present which are detrimental to plant growth.
- 5. Confirm that utility work has been completed per the drawings.
- 6. Confirm that irrigation work, which is shown to be installed below prepared soil levels, has been
- B. If unsatisfactory conditions are encountered, notify the Owner's Representative immediately to determine corrective action before proceeding.

COORDINATION WITH PROJECT WORK

GRADE AND ELEVATION CONTROL

- A. The Contractor shall coordinate with all other work that may impact the completion of the work.
- B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other trades.
- C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Owner's Representative of any conflicts encountered.

A. Provide grade and elevation control during installation of Planting Soil. Utilize grade stakes, surveying equipment, and other means and methods to assure that grades and contours conform to the grades indicated on the plans.

SITE PREPARATION

- A. Excavate to the proposed subgrade. Maintain all required angles of repose of the adjacent materials as shown on the drawings or as required by this specification. Do not over excavate compacted subgrades of adjacent pavement or structures. Maintain a supporting 1:1 side slope of compacted subgrade material along the edges of all paving and structures where the bottom of the paving or structure is above the bottom elevation of the excavated planting area.
- B. Remove all construction debris and material including any construction materials from the subgrade.
- C. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope approximately parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.
- D. In areas where Planting Soil is to be spread, confirm subgrade has been scarified.
- E. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 1/2 inch plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.
- 2. Any damage to the paving or site features or work shall be repaired at the Contractor's expense.

1. At the end of each working day, clean up any soil or dirt spilled on any paved surface.

SOIL MOISTURE

A. Volumetric soil moisture level, in both the Planting Soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilt point and below field capacity for each type of soil texture within the following ranges.

- Soil texture Permanent wilting point | Field capacity Sand, Loamy sand, Sandy loam 12-18% 27-36% Loam, Sandy clay, Sandy clay 11-22% 31-36% Clay loam, Silt loam 22-27% Silty clay, Silty clay loam 38-41%
- B. The Contractor shall confirm the soil moisture levels with a moisture meter (Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent). If moisture is found to be too low, the planting holes shall be filled with water and allowed to drain before starting any planting operations. If the moisture is too high, suspend planting operations until the soi moisture drains to below field capacity.

EXISTING SOIL MODIFICATION

A. Follow the requirements for modifying existing soil as indicated in Part 2 for the different types of soil modifications. The extent of the areas of different soil modification types are indicated on the Soils Plan or as directed by the Owner's Representative.

PLANTING SOIL AND PLANTING SOIL MIX INSTALLATION

- A. All equipment utilized to install or grade Planting Soils shall be wide track or balloon tire machines rated with a ground pressure of 4 psi or less. All grading and soil delivery equipment shall have buckets equipped with 6 inch long teeth to scarify any soil that becomes compacted.
- B. In areas of soil installation above existing subsoil, scarify the subgrade material prior to installing
- 1. Scarify the subsoil of the subgrade to a depth of 3-6 inches with the teeth of the back hoe or loader bucket, tiller or other suitable device.
- 2. Immediately install the Planting Soil. Protect the loosened area from traffic. DO NOT allow the loosened subgrade to become compacted.
- 3. In the event that the loosened area becomes overly compacted, loosen the area again prior to installing the Planting Soil.
- C. Install the Planting Soil in 12 18 inch lifts to the required depths. Apply compacting forces to each lift as required to attain the required compaction. Scarify the top of each lift prior to adding more Planting Soil by dragging the teeth of a loader bucket or backhoe across the soil surface to roughen the surface.
- Phase work such that equipment to deliver or grade soil does not have to operate over previously installed Planting Soil. Work in rows of lifts the width of the extension of the bucket on the loader Install all lifts in one row before proceeding to the next. Work out from the furthest part of each bed from the soil delivery point to the edge of the each bed area.
- E. Where possible place large trees first and fill Planting Soil around the root ball.
- F. Installing soil with soil or mulch blowers or soil slingers shall not be permitted due to the over mixing and soil ped breakdown cause by this type of equipment.
- G. Where travel over installed soil is unavoidable, limit paths of traffic to reduce the impact of compaction in Planting Soil. Each time equipment passes over the installed soil it shall reverse out of the area along the same path with the teeth of the bucket dropped to scarify the soil. Comply with the paragraph "Compaction Reduction" (section 3.9) in the event that soil becomes over compacted.
- H. The depths and grades shown on the drawings are the final grades after settlement and shrinkage of the compost material. The Contractor shall install the Planting Soil at a higher level to anticipate this reduction of Planting Soil volume. A minimum settlement of approximately 10 - 15% of the soil depth is expected. All grade increases are assumed to be as measured prior to addition of surface Compost till layer, mulch, or sod.

COMPACTION REQUIREMENTS FOR INSTALLED OR MODIFIED PLANTING SOIL

- A. Compact installed Planting Soil to the compaction rates indicated and using the methods approved for the soil mockup. Compact each soil lift as the soil is installed.
- B. Existing soil that is modified by tilling, ripping or fracturing shall have a density to the depth of the modification, after completion of the loosening, such that the penetrometer reads approximately 75 to 250 psi at soil moisture approximately the mid-point between wilting point and field capacity. This will be approximately between 75 and 82% of maximum dry density standard proctor.
- C. Installed Planting Soil Mix and re-spread existing soil shall have a soil density through the required depth of the installed layers of soil, such that the penetrometer reads approximately 75 to 250 psi at soil moisture approximately the mid-point between wilt point and field capacity. This will be approximately between 75 and 82% of maximum dry density standard proctor.
- soil and its moisture level. The same penetrometer and moisture meter used for the testing of the mockup shall be used to test installed soil throughout the work. E. Maintain moisture conditions within the Planting Soil during installation or modification to allow for

satisfactory compaction. Suspend operations if the Planting Soil becomes wet. Apply water if the soil

D. Planting Soil compaction shall be tested at each lift using a penetrometer calibrated to the mockup

- is overly dry. F. Provide adequate equipment to achieve consistent and uniform compaction of the Planting Soils. Use the smallest equipment that can reasonably perform the task of spreading and compaction. Use the same equipment and methods of compaction used to construct the Planting Soil mockup.
- G. Do not pass motorized equipment over previously installed and compacted soil except as authorized

1. Light weight equipment such as trenching machines or motorized wheel barrows is permitted to

pass over finished soil work. 2. If work after the installation and compaction of soil compacts the soil to levels greater than the above requirements, follow the requirements of the paragraph "Over Compaction Reduction"

OVER COMPACTION REDUCTION

- A. Any soil that becomes compacted to a density greater than the specified density and/or the density in the approved mockup shall be dug up and reinstalled. This requirement includes compaction caused by other sub-contractors after the Planting Soil is installed and approved.
- B. Surface roto tilling shall not be considered adequate to reduce over compaction at levels 6 inches or greater below finished grade.

3.10 INSTALLATION OF CHEMICAL ADDITIVES

3.11 FINE GRADING

- A. Following the installation of each soil and prior to fine grading and installation of the Compost till layer, apply chemical additives as recommended by the soil test, and appropriate to the soil and specific plants to be installed.
- B. Types, application rates and methods of application shall be approved by the Owner's Representative prior to any applications.

A. The Owner's Representative shall approve all rough grading prior to the installation of Compost, fine grading, planting, and mulching.

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- B. Grade the finish surface of all planted areas to meet the grades shown on the drawings, allowing the finished grades to remain higher (10 - 15%) of depth of soil modification) than the grades on the grading plan, as defined in paragraph Planting Soil Installation, to anticipate settlement over the first
- C. Utilize hand equipment, small garden tractors with rakes, or small garden tractors with buckets with teeth for fine grading to keep surface rough without further compaction. Do not use the flat bottom of a loader bucket to fine grade, as it will cause the finished grade to become overly smooth and or slightly compressed.
- D. Provide for positive drainage from all areas toward the existing inlets, drainage structures and or the edges of planting beds. Adjust grades as directed to reflect actual constructed field conditions of paving, wall and inlet elevations. Notify the Owner's Representative in the event that conditions make it impossible to achieve positive drainage.
- E. Provide smooth, rounded transitions between slopes of different gradients and direction. Modify the grade so that the finish grade before adding mulch and after settlement is one or two inches below all paving surfaces or as directed by the drawings.
- F. Fill all dips and remove any bumps in the overall plane of the slope. The tolerance for dips and bumps in shrub and ground cover planting areas shall be a 2 inch deviation from the plane in 10 feet. The tolerance for dips and bumps in lawn areas shall be a 1 inch deviation from the plane in 10 feet.
- 3.12 INSTALLATION OF COMPOST TILL LAYER
 - A. After Planting Soil Mixes are installed in planting bed areas and just prior to the installation of shrub or groundcover plantings, spread 3 – 4 inches of Compost over the beds and roto till into the top 4 - 6 inches of the Planting Soil. This step will raise grades slightly above the grades required in paragraph "Fine Grading". This specification anticipates that the raise in grade due to this tilling will settle within a few months after installation as Compost breaks down. Additional settlement as defined in paragraph "Planting Soil and Planting Soil Mix installation" must still be accounted for in the setting of final grades.
- 3.13 CLEAN-UP
 - A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.
 - 1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring
 - B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative seals are to remain on the trees and removed at the end of the warranty period.
 - 1. Make all repairs to grades, ruts, and damage to the work or other work at the site.
 - 2. Remove and dispose of all excess Planting Soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.
- 3.14 PLANTING SOIL AND MODIFIED EXISTING SOIL PROTECTION
 - A. The Contractor shall protect installed and/or modified Planting Soil from damage including contamination and over compaction due to other soil installation, planting operations, and operations by other Contractors or trespassers. Maintain protection during installation until acceptance. Utilize fencing and matting as required or directed to protect the finished soil work. Treat, repair or replace damaged Planting Soil immediately.
 - B. Loosen compacted Planting Soil and replace Planting Soil that has become contaminated as determined by the Owner's Representative. Planting Soil shall be loosened or replaced at no expense
 - a. Till and restore grades to all soil that has been driven over or compacted during the installation of plants.
 - b. Where modified existing soil has become contaminated and needs to be replaced, provide imported soil that is of similar composition, depth and density as the soil that was removed.
- 3.15 PROTECTION DURING CONSTRUCTION
 - A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers.
 - 1. Maintain protection during installation until the date of plant acceptance (see specifications section – Planting). Treat, repair or replace damaged work immediately.
 - 2. Provide temporary erosion control as needed to stop soil erosion until the site is stabilized with mulch, plantings or turf.
 - B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property. shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative shall determine when such cleaning, replacement or repair is satisfactory. Damage to existing trees shall be assessed by a certified arborist.
- 3.16 SUBSTANTIAL COMPLETION ACCEPTANCE
 - A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete.
 - B. The date of substantial completion of the planting soil shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is
- 3.17 FINAL ACCEPTANCE / SOIL SETTLEMENT
 - A. At the end of the plant warrantee and maintenance period, (see Specification section Planting) the Owner's Representative shall observe the soil installation work and establish that all provisions of the contract are complete and the work is satisfactory.
 - 1. Restore any soil settlement and or erosion areas to the grades shown on the drawings. When restoring soil grades remove plants and mulch and add soil before restoring the planting. Do not add soil over the root balls of plants or on top of mulch.
 - B. Failure to pass acceptance: If the work fails to pass final acceptance, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged 1.11 to the Contractor at the prevailing hourly rate of the Owner's Representative.

END OF SECTION 32 9100

SECTION 329200

TURF AND GRASS WORK

PART 1: GENERAL

- 1.1 SCOPE
 - A. The work consists of performing all grass sodding and related work as indicated on drawing and described in this section.
 - B. Unless otherwise indicated, the Contractor is responsible for the repair of any existing lawn areas disturbed during the construction process
 - C. The Contractor is responsible for the irrigation of all lawn areas on the project, including those not covered by an irrigation system. There are lawn areas on the project that are not provided with an irrigation system

- REFERENCES AND RELATED DOCUMENTS
 - A. ASPA (American Sod Producers Association) Guideline Specifications to Sodding. B. FS O-F-241 - Fertilizers, Mixed, Commercial.
 - C. Section 02200, Earthwork.
 - D. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under, Division 1, General Requirements, are included as part of his section.

DEFINITIONS

- A. Weeds: Include, but are not limited to, Crab Grass, Bermudagrass (when not planted as sports turf), Johnson Grass, Poison Ivy, Nut Sedges, Bindweed, Goose Grass. Crowfoot Grass, Torpedo Grass, Spurges, Spreading Dayflower, Guinea Grass, Bull Paspalum, Sandbur, Love Grass, Finger Grass, Panicum Grasses, Foxtail, Smut Grass, Amaranth, Chickweeds, Ragwood, Spanish Needles, Thistle, Horseweed, Dogfennel, Cudweed, Hawksbeard, Dollarweed, Pepperweed, Beggarweeds, Sida, Oxalis, Pusley, Penneywort, Matchweed, and Punctureweed.
- SUBMITTALS
- A. Provide submittals per section 01340.
- B. Provide submittals for the following products for the Architect's approval of prior to start of work on the sodding.
- 1. Fertilizer
- 2. For all turf areas, submit planting soil analyses of the completed mixture of existing and imported soils (top 6") for approval at no additional cost to the Owner. The analysis shall show percent of organic material in the soil through the Weight Loss on Ignition soil test method, indicate the soil pH, and contain 2.3 recommendations from the testing laboratory for additional topsoil, fertilizer type and application rate, and other soil amendments necessary to bring the top 6" of soils to the following specified levels:
- a. Percolation rate: minimum 8" per hour in the top eight inches of soil
- b. PH level: 6.5 7.5
- c. Soil Organic Content 5% minimum/10% maximum (test by Weight Loss on 2.5 Ignition method)
- d. Major and Minor nutrients as recommended by the laboratory for the growing of Argentine Bahia turf.
- e. Agricultural testing laboratories acceptable to the Engineer and the Owner shall perform all testing and make all soil amendment recommendations. Test results for the soil properties, and recommendations for soil amendments based on the soil properties may be generated by more than one testing laboratory.
- 3. Herbicides
- 4. Fire ant certification from the sod supplier
- Section 01700 Contract Closeout: Procedures for submittals Operation Data: Submit for continuing Owner maintenance.
- Maintenance Data: Include maintenance instructions, cutting method and maximum grass height, types, application frequency, and recommended coverage of fertilizer.
- 1.5 (OMIT)
- QUALITY ASSURANCE
 - A. Bahiagrass and/or St Augustine Sod: Minimum age of 18 months, with root development own weight without tearing, when suspended vertically by holding the upper two corners.
 - B. Submit sod certification for grass species and location of sod source.
 - C. Bahiagrass and/or St Augustine Sod Producer: Company specializing in sod production and
 - minimum five years' experience and certified by the State of Florida.
- D. Installers: Company approved by the sod producer.
- REGULATORY REQUIREMENTS
 - A. Comply with regulatory agencies for fertilizer and herbicide composition.
 - B. Provide certificate of compliance from authority having jurisdiction indicating approval of fertilizer and herbicide mixture.
 - C. Contractor shall follow all regulations, ordinance, and code governing the work, including but not limited to permitting and inspections.
- DELIVERY, STORAGE, AND PROTECTION
- A. Section 01600 Material and Equipment: Transport, handle, store, and protect products.
- B. Deliver sod on pallets. Protect exposed roots from dehydration.
- C. All sod delivered to the site, shall be laid within 8 hours.
- PROJECT CONDITIONS
 - A. Contractor shall inspect the site and plans to become aware of the project conditions and requirements before submitting a bid.
 - B. Section 01041 Project Coordination.
 - C. Sequence installation to ensure orderly and expeditious utility connections.
 - D. Coordinate with installation of underground sprinkler system pipe and watering
- 1.10 CONTRACTOR SUPERVISION
 - E. The Contractor shall provide a competent superintendent and any necessary assistants on the project when work is in progress.
 - F. The superintendent shall not be changed during the project without the consent of the Engineer unless the superintendent leaves the Contractor's employment.
 - G. The superintendent shall represent the Contractor and in the Contractor's absence all directions given to him by the Engineer shall be binding as if given to the Contractor.
 - H. The Contractor's superintendent shall supervise the Contractor's employees on the job site and be responsible for their actions and conduct on the job site.
 - PROTECTION OF WORK AND PROPERTY
 - I. The Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Owner's property from injury or loss arising in connection with his
 - J. The Contractor is responsible for contacting the necessary entities to determine the locations of all underground utilities on the site.
 - K. The Contractor shall take care to avoid damage to any existing buildings, equipment, piping, pipe coverings, electrical systems, sewers, sidewalks, landscaping, grounds, aboveground or underground installations or structures of any kind, and shall be responsible for any damage that occurs as a result of his work.
 - L. Contractor shall adequately protect his work and all adjacent property as provided and required by law. M. Utilities noted on the plans are anticipated locations only. The utilities shown may not
 - include all underground utilities on the site, and the locations indicated may not be as

PART 2: PRODUCTS

- 2.1 GRASS SOD
- A. Sod shall be the recognized Argentine Bahia, St. Augustine 'Floratam' or whichever is called for on the drawings.
- B. Sod shall be well matted with roots; shall be of firm tough texture having a compact top growth and heavy root development. All sod shall be sand based. Sod shall contain no significant amounts (more than 1% of canopy) of bermudagrass, weeds or any other objectionable vegetation. The soil embedded in the sod shall be free from fungus, vermin and other diseases and shall have been mowed at least three times with an approved lawn mower with final mowing not more than 7 days before the sod is cut. The sod shall be taken up in commercial size rectangles measuring 16" x 24". The soil base of the sod shall be of a uniform thickness.
- C. Sod shall be sufficiently thick to insure a dense stand of live grass. Sod shall be live, fresh, and uninjured at the time of planting. Plant sod within 48 hours after harvesting.
- D. Use only sod certified free of fire ants. Before delivering any sod to the project, the Contractor shall furnish to the Owner and the Engineer written certification from the supplier that the sod is free of fire ants.
- COMMERCIAL FERTILIZERS
- A. Commercial fertilizer shall comply with the State Fertilizer Laws. Numerical designation for fertilizer indicates the minimum percentage respectively of (1) total nitrogen, (2) available phosphoric acid, and (3) water soluble potash contained in the fertilizer.
- B. Fertilizer shall be 8-8-8-with appropriate minor nutrients applied at the rate of 16 pounds per 1000 square feet.
- A. Contractor shall supply and apply all water.
- ROLLER
- A. Contractor shall use a roller(s) appropriately sized to achieve the required lawn surface grade.
- FERTILIZER SPREADER
- A. Contractor shall use a device for spreading the fertilizer capable of uniformly distributing the material at required rates.
- A. The Contractor shall select, provide, and apply all herbicides as required.
- A. The Contractor shall apply a minimum 2" thick layer of topsoil consisting of thoroughly mixed weed free 60% coarse sand and 40% Florida peat.

PART 3: EXECUTION

- A. The Contractor and his sod installer shall verify that prepared soil base is ready to receive the work of this section.
- GENERAL: The order of work for sod installation shall be as follows: A. Bahiagrass Lawns:
 - 1. Removal of debris and existing vegetation not noted to remain.
 - 2. Roto-tilling of all compacted areas.
 - 3. Subgrading. 4. Removal of additional debris as required.
 - 5. Fine grading.
 - 6. Placement of sod. 7. Cut in or patch gaps between or within the turf pieces or as needed to provide a unifor 3.13
 - walking surface and to remove any potential tripping hazard. 8. Gaps 2" or less in any direction may be filled with coarse sand.
 - 9. Clean up.
 - 10. Watering.
 - 11. Rolling of sod as soon as practical, and topdressing 12. Maintenance (including watering of all areas regardless of whether or not a sprinkler 3.14 system has been installed).
 - 13. Application of fertilizer 30 days after installation of sod.
- 3.2 **ROTO-TILLING:**
 - A. Kill by herbicide and remove all weeds or existing grasses from areas to be roto-tilled.
 - B. Roto-till all lawn areas that have become compacted during the construction process as required assuring adequate percolation of water through the soil.

3.3 SUBGRADING:

- Kill by herbicide and remove all weeds or existing grasses from areas to be subgraded. Subgrade all areas to be sodded as required to produce the finish grades indicated on the
- grading plans and specifications. Remove all existing shell rock or other road base that encroaches more than 12" into any lawn area, and fill any voids cause by road base removal with clean, well-draining, and
- properly compacted planting soil D. Roto-till all topsoil and amendments into the existing soil until the top 6" of soil is a homogeneous mixture.
- E. Test completed soil mix samples to verify that they meets the requirements of paragraph 1.06(B)(2). Do not proceed with additional work until the Owner and the Engineer have approved the soils tests and reports from the approved testing laboratories.

- A. Clean areas to receive grass of all stones larger than 1" in diameter, sticks, stumps, paper, glass, and other debris. Kill by herbicide and remove all weeds or existing grasses from areas to be sodded.
- - After removal of debris and the eradication of any existing weeds, perform fine grading as required to bring all areas to receive grass to a smooth, even, and finished grade. Use a laser grader to fine grade areas receiving Bermudagrass. Fine grade other areas receiving grass by raking to eliminate wind rows, ridges, depressions and other irregularities. The Contractor shall fine grade areas to be sodded as necessary to achieve a finished grade (top of the sod) as specified in this section.
 - B. All sodded areas bordered by sidewalks, asphalt pavement, or curbs shall have a finished grade (top of the sod's soil) that is flush (or less than ½" below) with the grade of the adjacent sidewalk, asphalt pavement, or curb.
 - All sodded areas bordered by planting areas shall have a finished grade (top of the sod's soil) that is $1\frac{1}{2}$ " above the soil level in the adjacent planting bed.

- 3.6 PLACING OF SOD
 - A. Sod size shall be as previously specified. The setting of pieces shall be staggered in such a grade of sod does not vary more than 1" from a 10' long straight edge.
 - Sod shall be laid for the turf areas as required to produce a smooth and even surface conforming to the grades indicated on the project civil engineering plans. The Contractor shall ensure that the finished grade of sod does not vary more than 1" from a 10' long
 - C. Sod located on slopes should be placed carefully enough so that rolling with a power roller is mowing of, the sodded areas.

 - Turf shall be set abutting to sidewalks, terraces and other hardscape finishes so the top of the turf rootzone is 1/4" below the adjacent hardscape and does not impede surface flow.

F. On a daily basis, all debris, fertilizer bags, pallets etc. shall be removed from the site

- G. Upon completion of the work, all debris, fertilizer bags, pallets etc. shall be removed from
- A. Watering of the sodded areas will be the responsibility of the Contractor.
- C. In areas where a permanent irrigation system is not to be installed under this contract, the Contractor shall provide necessary temporary irrigation facilities for performing watering as required to establish and maintain turf areas in a healthy and green condition. The Contractor

- A. Fertilizer shall be as previously specified. The rate of application for grass shall be approximately 16 pounds per 1000 sq. ft. Fertilizer shall be spread uniformly over the area to receive grass by using an approved distribution device calibrated to distribute the appropriate quantity. Fertilizing operations shall not be performed when the wind velocity exceeds 15
- B. Bahiagrass and St. Augustinesod shall be fertilized 30 days after installation. The Contractor
- C. Bermudagrass sod shall be fertilized both 30 and 60 days after installation. The Contractor

3.12 ROLLING AND TOPDRESSING OF THE SOD

- A. Where ever possible, within one month of the laying of the sod pieces, the sod shall be pressed firmly into contact with the sod bed by rolling with a suitably sized mechanical roller or other approved equipment. The rolling operation shall provide a smooth and even surface conforming to the grades shown on the grading plan, and insure knitting of sod
- B. All developed unevenness or depressions in the lawn surfaces shall be top dressed as required to achieve a smooth and even finish. Top dressing shall not be applied more than 1" thick. In the case that the lawn surface requires more than 1" of correction, the uneven areas

A. All sod work shall be guaranteed up until the end of the maintenance period. Replacement of defective or distressed grass materials shall be performed at no additional cost to the Owner. During the guarantee period, it shall be the Contractor's responsibility to immediately replace any dead material.

- 3.16 MAINTENANCE PROVISIONS BAHIAGRASS A. The Contractor shall be responsible for complete maintenance of all grass lawn areas until "Substantial Completion" of the project or final acceptance of the landscape and irrigation work by the Owner and the Engineer, whichever is later. Maintenance shall include, but not
 - be limited to: 1. Mowing all lawn areas, no less than every other week, and the removal of all visible amounts of grass clippings from the lawn areas. The lawn shall never be allowed to
 - exceed 8" in height for bahiagrass or 4" in height for St. Augustine truf.
 - 2. Edging of all walks, roadways, and planting beds no less than every other week.
 - 3. Eradication of all harmful insects (including ants). 4. Control of all lawn and soil diseases.
 - good condition for plant growth. Grass is required to be in a healthy and green condition at the time of final acceptance.
 - 6. Eradication of all weeds in the lawns as necessary for the grass to conform to the specification in paragraph 2.01.

3. Eradication of all harmful insects (including ants).

- 1. Mowing all lawn areas no less than every week, and the removal of all visible amounts of grass clippings from the lawn areas. Do not cut the lawn in more than
- condition at the time of final acceptance. 6. Eradication of all weeds in the lawns as necessary for the grass to conform to the
- 7. All other work as necessary for the specialty Contractor to ensure a high-quality turf

END OF SECTION

- manner as to avoid continuous seams. Sod shall be moist and shall be placed on a moist earth bed. Carefully place sod by hand, edge to edge in rows at right angles to the slope, starting at the base of the area and working upward. Install only full size (16" x 24") pieces of sod (except for cutting-in purposes). There shall be no voids between sod pieces, no overlapping of the edges of sod pieces, and the finished grade of all sodded areas smooth and even. Use clean sand to fill any developing voids or unevenness in the sod surface. Unless otherwise indicated by the grading plans, the Contractor shall ensure that the finished
- not necessary. Sod located around retention areas, along pavement areas or in swales may be staked at the discretion of the Contractor. The repair of any erosion or sod relocation necessary prior to the sod becoming firmly rooted to the existing soil will be the responsibility of the Contractor. Stakes, if used, shall not interfere with walking on, or the
- D. The Contractor shall ensure that the finished grade of sod placed directly adjacent to buildings or other walls does not vary more than 2" from a 10' long straight edge.

- the site. Any paved areas including curbs and sidewalks shall be thoroughly swept. 3.10 WATERING
 - B. Sources from which water will be available shall be installed prior to sodding and shall be in operation for watering sodded areas.
 - shall note that there are areas of this work that are not to be irrigated by an irrigation system.

APPLICATION OF FERTILIZER

- shall request an inspection so that the application of the fertilizer can be verified
- shall request an inspection each time so that the application of the fertilizer can be verified.
- without displacement of sod or deformation of the surfaces.
- must be removed, re-graded and re-sodded.

GUARANTEE AND REPLACEMENT

- COMPLETION AND ACCEPTANCE A. Completion of work shall mean full compliance and conformity with the provisions expressed or implied in drawings and in the specifications. Upon satisfactory completion of the work, the Engineer will perform an inspection of the work to determine if the sodding
- work is ready for acceptance.

- 5. Watering and fertilizing as specified, and as required to maintain all lawn areas in a

4. Control of all lawn and soil diseases.

- B. Maintenance shall include, but not be limited to:
- 1/4" increments. 2. Edging of all pavements and curbs no less than every week. Maintain the line between the St. Augustine, Bermudagrass or Bahia grass every other week.

5. Watering and fertilizing as required to maintain all lawn areas in an excellent condition

for plant growth and sports field use. Grass is required to be in a healthy and green

specification in paragraph 2.01. Lawns shall be weed-free upon the final acceptance of

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CONSTRUCTION BID PLAN

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Park Avenue Landscape Plan

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PART 1 - PART 1: GENERAL

1.1 SUMMARY

- A. The scope of work includes all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of plant (also known as "landscaping') complete as shown on the drawings and as specified herein.
- B. The scope of work in this section includes, but is not limited to, the following:
- 1. Locate, purchase, deliver and install all specified plants.
- 2. Water all specified plants.
- 3. Mulch, fertilize, stake, and prune all specified plants.
- 4. Maintenance of all specified plants until the beginning of the warranty period.
- 5. Plant warranty.
- 6. Clean up and disposal of all excess and surplus material.
- 7. Maintenance of all specified plants during the warranty period.
- CONTRACT DOCUMENTS
 - A. Shall consist of specifications and general conditions and the construction drawings. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work. The documents are to be considered as one. Whatever is called for by any parts shall be as binding as if called for in all parts.
- RELATED DOCUMENTS AND REFERENCES
 - A. Related Documents:
 - 1. Drawings and general provisions of contract including general and supplementary conditions and Division I specifications apply to work of this section
 - 2. Related Specification Sections a. Section 329223 – Lawn
 - b. Section 329100 Planting Soil
 - B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail or as determined by the Owners Representative.
 - 1. ANSI Z60.1 American Standard for Nursery Stock, most current edition.
 - 2. ANSI A 300 Standard Practices for Tree, Shrub and other Woody Plant Maintenance, most current edition and parts.
 - 3. Florida Grades and Standards for Nursery Stock, current edition (Florida Department of Agriculture, Tallahassee FL).
 - 4. Interpretation of plant names and descriptions shall reference the following documents. Where the names or plant descriptions disagree between the several documents, the most current document shall prevail.
 - a. USDA The Germplasm Resources Information Network (GRIN) http://www.arsgrin.gov/npgs/searchgrin.html
 - b. Manual of Woody Landscape Plants; Michael Dirr; Stipes Publishing, Champaign, Illinois: Most Current Edition.
 - 5. Pruning practices shall conform to recommendations "Structural Pruning: A Guide For The Green Industry" most current edition; published by Urban Tree Foundation, Visalia,
 - 6. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign IL, most current edition.
- VERIFICATION
 - A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities, and shall immediately inform the Owner's Representative of any discrepancies between the information on the drawings and the actual conditions, refraining from doing any work in said areas until given 1.10 approval to do so by the Owner's Representative.
 - B. In the case of a discrepancy in the plant quantities between the plan drawings and the plant call outs, list or plant schedule, the number of plants or square footage of the planting bed actually drawn on the plan drawings shall be deemed correct and prevail.
- PERMITS AND REGULATIONS
- A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner's Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.
- B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply, unless otherwise expressly set forth.
- C. In case of conflict among any referenced standards or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.
- PROTECTION OF WORK, PROPERTY AND PERSON
 - A. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to his/her actions.
- CHANGES IN THE WORK
 - A. The Owner's Representative may order changes in the work, and the contract sum should be adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.
 - B. All changes in the work, notifications and contractor's request for information (RFI) shall conform to the contract general condition requirements.
- CORRECTION OF WORK
 - A. The Contractor, at their own cost, shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest as possible time that can be coordinated with other work and seasonal weather demands.

- DEFINITIONS
 - All terms in this specification shall be as defined in the "Glossary of Arboricultural Terms" or as
 - A. Boxed trees: A container root ball package made of wood in the shape of a four-sided box.
 - B. Container plant: Plants that are grown in and/or are currently in a container including boxed
 - C. Defective plant: Any plant that fails to meet the plant quality requirement of this specification.
 - D. End of Warranty Final Acceptance: The date when the Owner's Representative accepts that the plants and work in this section meet all the requirements of the warranty. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation work run concurrent with each other.
 - E. Field grown trees (B&B): Trees growing in field soil for at least 12 months prior to harvest.
 - F. Healthy: Plants that are growing in a condition that expresses leaf size, crown density, color; and with annual growth rates typical of the species and cultivar's horticultural description, adjusted for the planting site soil, drainage and weather conditions.
 - G. Kinked root: A root within the root package that bends more than 90 degrees.
 - H. Maintenance: Actions that preserve the health of plants after installation and as defined in this specification.
 - Maintenance period: The time period, as defined in this specification, which the Contractor is to provide maintenance.
 - J. Normal: the prevailing protocol of industry standard(s).
 - K. Owner's Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.
 - L. Reasonable and reasonably: When used in this specification relative to plant quality, it is intended to mean that the conditions cited will not affect the establishment or long term stability, health or growth of the plant. This specification recognizes that it is not possible to produce plants free of all defects, but that some accepted industry protocols and standards result in plants unacceptable to this project.

When reasonable or reasonably is used in relation to other issues such as weeds, diseased, insects, it shall mean at levels low enough that no treatment would be required when applying recognized Integrated Plant Management practices.

This specification recognizes that some decisions cannot be totally based on measured findings and that professional judgment is required. In cases of differing opinion, the Owner's Representative's expert shall determine when conditions are judged as reasonable.

- M. Root ball: The mass of roots including any soil or substrate that is shipped with the tree within the root ball package.
- N. Root ball package. The material that surrounds the root ball during shipping. The root package may include the material in which the plant was grown, or new packaging placed around the root ball for shipping.
- O. Root collar (root crown, root flare, trunk flare, flare): The region at the base of the trunk where 1.14 PLANT WARRANTY the majority of the structural roots join the plant stem, usually at or near ground level.
- P. Shrub: Woody plants with mature height approximately less than 15 feet.
- Q. Spade harvested and transplanted: Field grown trees that are mechanically harvested and immediately transplanted to the final growing site without being removed from the digging machine.
- R. Stem: The trunk of the tree.
- S. Substantial Completion Acceptance: The date at the end of the Planting, Planting Soil, and Irrigation installation where the Owner's Representative accepts that all work in these sections is complete and the Warranty period has begun. This date may be different than the date of substantial completion for the other sections of the project.
- T. Stem girdling root: Any root more than ¼ inch diameter currently touching the trunk, or with the potential to touch the trunk, above the root collar approximately tangent to the trunk circumference or circling the trunk. Roots shall be considered as Stem Girdling that have, or are likely to have in the future, root to trunk bark contact.
- U. Structural root: One of the largest roots emerging from the root collar.
- V. Tree: Single and multi-stemmed plants with mature height approximately greater than 15 feet. **SUBMITTALS**
- A. See contract general conditions for policy and procedure related to submittals.
- B. Submit all product submittals 8 weeks prior to installation of plantings.
- C. Product data: Submit manufacturer product data and literature describing all products required by this section to the Owner's Representative for approval. Provide submittal eight weeks before the installation of plants.
- D. Plant growers' certificates: Submit plant growers' certificates for all plants indicating that each meets the requirements of the specification, including the requirements of tree quality, to the Owner's Representative for approval. Provide submittal eight weeks before the installation of plants.
- Samples: Submit samples of each product and material where required by the specification to the Owner's Representative for approval. Label samples to indicate product, characteristics, and locations in the work. Samples will be reviewed for appearance only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- F. Plant sources: Submit sources of all plants as required by Article "Selection of Plants" to the Owner's Representative for approval.
- G. Close out submittals: Submit to the Owner's Representative for approval.
- 1. Plant maintenance data, requirements and warranties.
- H. Installation plan submitted a minimum of 14 days prior to the scheduled installation. Plan should describe the methods, activities, materials and schedule to achieve installation of plants. OBSERVATION OF THE WORK
- A. The Owner's Representative may observe the work at any time. They may remove samples of materials for conformity to specifications. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications shall be paid by the Contractor.
- B. The Owner's Representative shall be informed of the progress of the work so the work may be observed at the following key times in the construction process. The Owner's Representative shall be afforded sufficient time to schedule visit to the site. Failure of the Owner's Representative to make field observations shall not relieve the Contractor from meeting all the requirements of this specification.
- 1. SITE CONDITIONS PRIOR TO THE START OF PLANTING: review the soil and drainage conditions.
- 2. COMPLETION OF THE PLANT LAYOUT STAKING: Review of the plant layout.

- 3. PLANT QUALITY: Review of plant quality at the time of delivery and prior to installation. 1.15 Review tree quality prior to unloading where possible, but in all cases prior to planting.
- 4. COMPLETION OF THE PLANTING: Review the completed planting.
- PRE-CONSTRUCTION CONFERENCE
- A. Schedule a pre-construction meeting with the Owner's Representative at least seven (7) days before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.

QUALITY ASSURANCE

- A. Substantial Completion Acceptance Acceptance of the work prior to the start of the warranty
- 1. Once the Contractor completes the installation of all items in this section, the Owner's Representative will observe all work for Substantial Completion Acceptance upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of the observation.
- 2. Substantial Completion Acceptance by the Owner's Representative shall be for general conformance to specified size, character and quality and not relieve the Contractor of responsibility for full conformance to the contract documents, including correct species.
- 3. Any plants that are deemed defective as defined under the provisions below shall not be accepted.
- B. The Owner's Representative will provide the Contractor with written acknowledgment of the date of Substantial Completion Acceptance and the beginning of the warranty period and plant maintenance period (if plant maintenance is included).
- C. Contractor's Quality Assurance Responsibilities: The Contractor is solely responsible for quality control of the work.
- D. Installer Qualifications: The installer shall be a firm having at least 5 years of successful experience of a scope similar to that required for the work, including the handling and planting of large specimen trees in urban areas. The same firm shall install planting soil (where applicable) and plant material.
- 1. The bidders list for work under this section shall be approved by the Owner's Representative.
- 2. Installer Field Supervision: When any planting work is in progress, installer shall maintain, on site, a full-time supervisor who can communicate in English with the Owner's Representative.
- 3. Installer's field supervisor shall have a minimum of five years experience as a field supervisor installing plants and trees of the quality and scale of the proposed project, and can communicate in English with the Owner's Representative.
- 4. The installer's crew shall have a minimum of 3 years experienced in the installation of Planting Soil, Plantings, and Irrigation (where applicable) and interpretation of soil plans, planting plans and irrigation plans.
- 5. Submit references of past projects, employee training certifications that support that the Contractors meets all of the above installer qualifications and applicable licensures.
- A. Plant Warranty:
- 1. The Contractor agrees to replace defective work and defective plants. The Owner's Representative shall make the final determination if plants meet these specifications or that
- Plants warranty shall begin on the date of Substantial Completion Acceptance and continue for the following periods, classed by plant type:
- a. Trees -1 Year. b. Shrubs -6 Months.
- c. Ground cover and perennial flower plants 6 Months.
- d. Bulbs, annual flower and seasonal color plants for the period of expected bloom or primary display.
- 2. When the work is accepted in parts, the warranty periods shall extend from each of the partial Substantial Completion Acceptances to the terminal date of the last warranty period. Thus, all warranty periods for each class of plant warranty, shall terminate at one time.
- All plants shall be warrantied to meet all the requirements for plant quality at installation in this specification. Defective plants shall be defined as plants not meeting these requirements. The Owner's representative shall make the final determination that plants are
- 4. Plants determined to be defective shall be removed immediately upon notification by the Owner's Representative and replaced without cost to the Owner, as soon as weather conditions permit and within the specified planting period.
- Any work required by this specification or the Owner's Representative during the progress of the work, to correct plant defects including the removal of roots or branches, or planting plants that have been bare rooted during installation to observe for or correct root defects shall not be considered as grounds to void any conditions of the warranty. In the event that the Contractor decides that such remediation work may compromise the future health of the plant, the plant or plants in question shall be rejected and replaced with plants that do not contain defects that require remediation or correction.
- 6. The Contractor is exempt from replacing plants, after Substantial Completion Acceptance and during the warranty period, that are removed by others, lost or damaged due to occupancy of project, lost or damaged by a third party, vandalism, or any natural disaster.
- 7. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.
- 8. The warranty of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended warranty period, the Owner's Representative may elect one more replacement items or credit for each item. These tertiary replacement items are not protected under a warranty period.
- 9. During and by the end of the warranty period, remove all tree wrap, ties, and guying unless 1.18 agreed to by the Owner's Representative to remain in place. All trees that do not have sufficient caliper to remain upright, or those requiring additional anchorage in windy locations, shall be staked or remain staked, if required by the Owner's Representative.
- B. End of Warranty Final Acceptance Acceptance of plants at the end of the warranty period.
- 1. At the end of the warranty period, the Owner's Representative shall observe all warranted work, upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date for final observation.
- 2. End of Warranty Final Acceptance will be given only when all the requirements of the work under this specification and in specification sections Planting Soil and Irrigation have been

- SELECTION AND OBSERVATION OF PLANTS
- A. The Owner's Representative may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant quality changes or previously existing defects become apparent that were not observed.
- B. Plant Selection: The Owner's Representative reserves the right to select and observe all plants at the nursery prior to delivery and to reject plants that do not meet specifications as set forth in this specification. If a particular defect or substandard element can be corrected at the nursery, as determined by the Owner's Representative, the agreed upon remedy may be applied by the nursery or the Contractor provided that the correction allows the plant to meet the requirements set forth in this specification. Any work to correct plant defects shall be at the contractor's
- 1. The Owner's Representative may make invasive observation of the plant's root system in the area of the root collar and the top of the root ball in general in order to determine that the plant meets the quality requirements for depth of the root collar and presence of roots above the root collar. Such observations will not harm the plant.
- 2. Corrections are to be undertaken at the nursery prior to shipping.
- C. The Contractor shall bear all cost related to plant corrections.
- D. All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no cost to the Owner.
- E. Submit to the Owner's Representative, for approval, plant sources including the names and locations of nurseries proposed as sources of acceptable plants, and a list of the plants they will provide. The plant list shall include the botanical and common name and the size at the time of selection. Observe all nursery materials to determine that the materials meet the requirements of
- 1. Trees shall be purchased from the growing nursery. Re-wholesale plant suppliers shall not be used as sources unless the Contractor can certify that the required trees are not directly available from a growing nursery. When Re-wholesale suppliers are utilized, the Contractor shall submit the name and location of the growing nursery from where the trees were obtained by the re-wholesale seller. The re-wholesale nursery shall be responsible for any required plant quality certifications.
- F. The Contractor shall require the grower or re-wholesale supplier to permit the Owner's Representative to observe the root system of all plants at the nursery or job site prior to planting including random removal of soil or substrate around the base of the plant. Observation may be as frequent and as extensive as needed to verify that the plants meet the requirements of the specifications and conform to requirements.
- G. Each tree shall have a numbered seal applied by the Contractor. The seal shall be placed on a lateral branch on the north side of the tree. The seal shall be a tamper proof plastic seal bearing the Contractors name and a unique seven-digit number embossed on the seal.

1. Do not place seals on branches that are so large that there is not sufficient room for the

- branch growth over the period of the warranty. H. The Owner's Representative may choose to attach their seal to each plant, or a representative sample. Viewing and/or sealing of plants by the Owner's Representative at the nursery does not preclude the Owner's Representative's right to reject material while on site. The Contractor is responsible for paying any up charge for the Owner's Representative to attach their seal to
- Where requested by the Owner's Representative, submit photographs of plants or representative samples of plants. Photographs shall be legible and clearly depict the plant specimen. Each submitted image shall contain a height reference, such as a measuring stick. The approval of plants by the Owner's Representative via photograph does not preclude the Owner's Representative's right to reject material while on site.

1.16 PLANT SUBSTITUTIONS FOR PLANTS NOT AVAILABLE

A. Submit all requests for substitutions of plant species, or size to the Owner's Representative, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Requests shall also include sources of plants found that may be of a smaller or larger size, or a different shape or habit than specified, or plants of the same genus and species but different cultivar origin, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution.

SITE CONDITIONS

specific plants.

- Left. It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.
- 1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Owner's Representative in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Owner's Representative of such conditions, he/she shall remain responsible for plant material under the warranty clause of the
- B. It is the responsibility of the Contractor to be familiar with the local growing conditions, and if any specified plants will be in conflict with these conditions. Report any potential conflicts, in writing, to the Owner's Representative.
- and accepted prior to the installation of any plants. 1. Planting operations shall not begin until such time that the irrigation system is completely operational for the area(s) to be planted, and the irrigation system for that area has been

C. This specification requires that all Planting Soil and Irrigation (if applicable) work be completed

D. Actual planting shall be performed during those periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practices.

preliminarily observed and approved by the Owner's Representative.

1. Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, cold or windy conditions.

PLANTING AROUND UTILITIES

- A. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.
- B. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.
- C. Notification of Local Utility Locator Service, 811, is required for all planting areas: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the Local Utility Locator Service.

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Park Avenue Landscape Plan

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- 2.1 PLANTS: GENERAL
 - A. Standards and measurement: Provide plants of quantity, size, genus, species, and variety or cultivars as shown and scheduled in contract documents.
 - 1. All plants including the root ball dimensions or container size to trunk caliper ratio shall conform to ANSI Z60.1 "American Standard for Nursery Stock" latest edition, unless modified by provisions in this specification. When there is a conflict between this specification and ANSI Z60.1, this specification section shall be considered correct.
 - 2. Plants larger than specified may be used if acceptable to the Owner's Representative. Use of such plants shall not increase the contract price. If larger plants are accepted the root ball size shall be in accordance with ANSI Z-60.1. Larger plants may not be acceptable if the resulting root ball cannot be fit into the required planting space.
 - 3. If a range of size is given, no plant shall be less than the minimum size and not less than 50 percent of the plants shall be as large as the maximum size specified. The measurements specified are the minimum and maximum size acceptable and are the measurements after pruning, where pruning is required.
 - B. Proper Identification: All trees shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by genus, species, variety and cultivar.
 - C. Compliance: All trees shall comply with federal and state laws and regulations requiring observation for plant disease, pests, and weeds. Observation certificates required by law shall accompany each shipment of plants.

D. Plant Quality:

1. General: Provide healthy stock, grown in a nursery and reasonably free of die-back, disease, insects, eggs, bores, and larvae. At the time of planting all plants shall have a root system, stem, and branch form that will not restrict normal growth, stability and health for the expected life of the plant

Plant quality above the soil line: All plants shall conform to the Florida Grades and Standards for Nursery Plants and specify tree grades as either Florida #1 or Florida Fancy Grades if noted in the plant list. Latest Edition.

- a. Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified. Tree quality above the soil line shall comply with the project Crown Acceptance details (or Florida Grades and Standards, tree grade Florida Fancy or Florida #1) and the following:
 - 1.) Crown: The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.
 - a.) Crown specifications do not apply to plants that have been specifically trained in the nursery as topiary, espalier, multi-stem, clump, or unique selections such as contorted or weeping cultivars.
 - 2.) Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or over watering as indicated by wilted, shriveled, or
 - 3.) Branches: Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.
 - a.) Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.
 - b.) Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 1 inch above the branch union.
 - c.) The attachment of the largest branches (scaffold branches) shall be free of
 - 4.) Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).
 - 5.) Temporary branches, unless otherwise specified, can be present along the lower trunk below the lowest main (scaffold) branch, particularly for trees less than 1 inch in caliper. These branches should be no greater than 3/8-inch diameter.
- b. Trees shall have one central leader. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present. 1.) All trees are assumed to have one central leader trees unless a different form is
- specified in the plant list or drawings. c. All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line.
- d. Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stake may be used to maintain a straight leader in the upper half of the tree.

2. Plant quality at or below the soil line:

- a. Plant roots shall be normal to the plant type specified. Root observations shall take place without impacting tree health. Root quality at or below the soil line shall comply with the project Root Acceptance details and the following:
 - 1.) The roots shall be reasonably free of scrapes, broken or split wood.
 - 2.) The root system shall be reasonably free of injury from biotic (e.g., insects and pathogens) and abiotic (e.g., herbicide toxicity and salt injury) agents. Wounds resulting from root pruning used to produce a high quality root system are not considered injuries.
 - 3.) A minimum of three structural roots reasonably distributed around the trunk (not clustered on one side) shall be found in each plant. Root distribution shall be uniform throughout the root ball, and growth shall be appropriate for the species. a.) Plants with structural roots on only one side of the trunk (J roots) shall be rejected.
 - 4.) The root collar shall be within the upper 2 inches of the substrate/soil. Two structural roots shall reach the side of the root ball near the top surface of the root ball. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removes all stem girdling roots above the structural roots across the top of the root ball.
 - 5.) The root system shall be reasonably free of stem girdling roots over the root collar or kinked roots from nursery production practices.
 - a.) Plant Grower Certification: The final plant grower shall be responsible to have determined that the plants have been root pruned at each step in the plant production process to remove stem girdling roots and kinked roots, or that the previous production system used practices that produce a root system throughout the root ball that meets these specifications. Regardless of the work of previous growers, the plant's root system shall be modified at the final production stage, if needed, to produce the required plant root
 - 6.) At time of observations and delivery, the root ball shall be moist throughout. Roots shall not show signs of excess soil moisture conditions as indicated by stunted, discolored, distorted, or dead roots.

- E. Submittals: Submit for approval the required plant quality certifications from the grower where plants are to be purchased, for each plant type. The certification must state that each plant meets all the above plant quality requirements.
- 1. The grower's certification of plant quality does not prohibit the Owner's Representative from observing any plant or rejecting the plant if it is found to not meet the specification requirements.
- ROOT BALL PACKAGE OPTIONS: The following root ball packages are permitted. Specific root 3.1 ball packages shall be required where indicated on the plant list or in this specification. Any type of root ball packages that is not specifically defined in this specification shall not be permitted.

A. BALLED AND BURLAPPED PLANTS

- 1. All Balled and Burlapped Plants shall be field grown, and the root ball packaged in a burlap and twine and/or burlap and wire basket package.
- 2. Plants shall be harvested with the following modifications to standard nursery practices.
- a. Prior to digging any tree that fails to meet the requirement for maximum soil and roots above the root collar, carefully removed the soil from the top of the root ball of each plant, using hand tools, water or an air spade, to locate the root collar and attain the soil depth over the structural roots requirements. Remove all stem girdling roots above the root collar. Care must be exercised not to damage the surface of the root collar and the top of the structural roots.
- b. Trees shall be dug for a minimum of 4 weeks and a maximum of 52 weeks prior to shipping. Trees dug 4 to 52 weeks prior to shipping are defined as hardened-off. Digging is defined as cutting all roots and lifting the tree out of the ground and either moving it to a new location in the nursery or placing it back into the same hole. Tress that are stored out of the ground shall be placed in a holding area protected from extremes of wind and sun with the root ball protected by covering with mulch or straw and irrigated sufficiently to keep moisture in the root ball above wilt point and below saturation
- c. If wire baskets are used to support the root ball, a "low profile" basket shall be used. A low profile basket is defined as having the top of the highest loops on the basket no less than 4 inches and no greater than 8 inches below the shoulder of the root ball package.
- 1.) At nurseries where sandy soils prevent the use of "low profile baskets", baskets that support the entire root ball, including the top, are allowable.
- d. Twine and burlap used for wrapping the root ball package shall be natural, biodegradable material. If the burlap decomposes after digging the tree then the root ball shall be re-wrapped prior to shipping if roots have not yet grown to keep root ball intact during shipping.
- spade machine until planted.
- B. CONTAINER (INCLUDING ABOVE-GROUND FABRIC CONTAINERS AND BOXES) **PLANTS**
- 1. Container plants may be permitted only when indicated on the drawing, in this specification, or approved by the Owner's Representative.
- 2. Provide plants shall be established and well rooted in removable containers
- 3. Container class size shall conform to ANSI Z60.1 for container plants for each size and type 3.6
- 2.3 ANNUAL FLOWERING AND SEASONAL COLOR PLANTS
 - A. Container or flat-grown plants should be sized as noted in the planting plan. Plants shall be well-rooted and healthy.

- A. Except as modified below or where the requirements are not appropriate to the specification of palms, palms shall meet all the requirements of the plant quality section above.
- B. Defronding, tying, and hedging:
- 1. In preparing palm trees for relocation, all dead fronds shall be removed.
- 2. All remaining fronds above horizontal shall be lifted up and tied together around the crown in an upright position. Up to 2/3 of the oldest live fronds can be removed; all fronds can be 3.7 removed on Sabal palms. Do not tie too tightly, bind or injure the bud. Jute binder twine shall be used in tying up the fronds; wire will not be permitted. Fronds shall be untied immediately after planting.
- C. Digging the root ball:
- 1. When digging out the root ball, no evacuation shall be done closer than 8 Inches to the trunk at ground level and the excavation shall extend below the major root system to a minimum depth of 3.5 feet. The bottom of the root ball shall be cut off square and perpendicular to the trunk below the major root system.
- D. The Contractor shall not free-fall, drag, roll or abuse the tree or put a strain on the crown (bud area) at any time. A protective device shall be used around the trunk of the tree while lifting and relocating so as not to injure the bud, or scar or skin the trunk in any way.

2.5 PLANTING SOIL

A. Planting Soil as used in this specification means the soil at the planting site, or imported as modified and defined in specification Section Planting Soil. If there is no Planting Soil specification, the term Planting Soil shall mean the soil at the planting site within the planting

2.6 MULCH

- A. Mulch shall be "Walk on" grade, coarse, ground, from tree and woody brush sources. The size range shall be a minimum (less than 25% or less of volume) fine particles 3/8 inch or less in size, and a maximum size of individual pieces (largest 20% or less of volume) shall be approximately 1 to 1-1/2 inch in diameter and maximum length approximately 4 to 8". Pieces larger than 8 inch long that are visible on the surface of the mulch after installation shall be
- 1. It is understood that mulch quality will vary significantly from supplier to supplier and region to region. The above requirements may be modified to conform to the source material from locally reliable suppliers as approved by the Owner's Representative.
- B. Submit supplier's product specification data sheet and a one gallon sample for approval.
- 2.7 TREE STAKING AND GUYING MATERIAL
 - A. Tree guying to be flat woven polypropylene material, 3/4 inch wide, and 900 lb. break strength. Color to be Green. Product to be ArborTie manufactured by Deep Root Partners, L.P. or approved equal.
 - B. Stakes shall be lodge pole stakes free of knots and of diameters and lengths appropriate to the size of plant as required to adequately support the plant.
 - C. Below ground anchorage systems to be constructed of 2 x 2-dimensional untreated wood securing (using 3 inch long screws) horizontal portions to 4 feet long vertical stakes driven straight into the ground outside the root ball.
 - D. Submit manufacturer's product data for approval.

2.8 TREE BARK PROTECTOR

- A. Tree Bark Protectors shall be black extruded resin mesh, 4 inches in diameter, 5 feet long. As manufactured by Industrial Netting, Minneapolis, MN, USA or approved equal.
- B. Fasten the split side of the Tree Bark Protector together in three places with black plastic tape.
- C. Submit manufacturers' product data for approval.

PART 3 – EXECUTION

- SITE EXAMINATION
- A. Examine the surface grades and soil conditions to confirm that the requirements of the Specification Section – Planting Soil - and the soil and drainage modifications indicated on the Planting Soil Plan and Details (if applicable) have been completed. Notify the Owner's Representative in writing of any unsatisfactory conditions.

DELIVERY, STORAGE AND HANDLING

- A. Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of heat and cold temperatures. If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind. Provide adequate water to the root ball package during the shipping and storage period.
 - 1. All plant materials must be available for observation prior to planting.
 - 2. Using a soil moisture meter, periodically check the soil moisture in the root balls of all plants to assure that the plants are being adequately watered. Volumetric soil moisture shall be maintained above wilting point and below field capacity for the root ball substrate or
- B. Do not deliver more plants to the site than there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.
- 1. The Owner's Representative or Contractor shall approve the duration, method and location of storage of plants.
- C. Provide protective covering over all plants during transporting.

PLANTING SEASON

- A. Planting shall only be performed when weather and soil conditions are suitable for planting the materials specified in accordance with locally accepted practice. Install plants during the planting time as described below unless otherwise approved in writing by the Owner's Representative. In the event that the Contractor request planting outside the dates of the planting season, approval of the request does not change the requirements of the warranty.
- ADVERSE WEATHER CONDITIONS
- A. No planting shall take place during extremely hot, dry, windy or freezing weather.

COORDINATION WITH PROJECT WORK

- A. The Contractor shall coordinate with all other work that may impact the completion of the work.
- B. Prior to the start of work, prepare a detailed schedule of the work for coordination with other
- C. Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the Owner's Representative of any conflicts encountered.

LAYOUT AND PLANTING SEQUENCE

- A. Relative positions of all plants and trees are subject to approval of the Owner's Representative.
- B. Notify the Owner's Representative, one (1) week prior to layout. Layout all individual tree and shrub locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint for the Owner's Representative's approval. Secure the Owner's Representative's acceptance before digging and start of planting work
- C. When applicable, plant trees before other plants are installed.
- D. It is understood that plants are not precise objects and that minor adjustments in the layout will be required as the planting plan is constructed. These adjustments may not be apparent until some or all of the plants are installed. Make adjustments as required by the Owner's Representative including relocating previously installed plants.
- SOIL PROTECTION DURING PLANT DELIVERY AND INSTALLATION
- A. Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.
- 1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling. Where possible, restrict the driving lanes to one area instead of driving over and compacting a large area of soil.
- 2. Till to a depth of 6 inches, all soil that has been driven over during the installation of plants. SOIL MOISTURE
- A. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

Soil type	Permanent wilting point	Field capacity
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

- 1. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.
- B. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.
- INSTALLATION OF PLANTS: GENERAL
- A. Observe each plant after delivery and prior to installation for damage of other characteristics that may cause rejection of the plant. Notify the Owner's Representative of any condition
- B. No more plants shall be distributed about the planting bed area than can be planted and watered
- C. The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality in Part 2 Products: Plants General: Plant Quality. The Contractor shall undertake at the time of planting, all modifications to the root system required by the Owner's Representative to meet these quality standards.
- 1. Modifications, at the time of planting, to meet the specifications for the depth of the root collar and removal of stem girdling roots and circling roots may make the plant unstable or stress the plant to the point that the Owner's Representative may choose to reject the plant rather than permitting the modification.
- 2. Any modifications required by the Owner's Representative to make the root system

- conform to the plant quality standards outlined in Part 2 Products: Plants General: Quality, or other requirements related to the permitted root ball package, shall not be considered as grounds to modify or void the plant warranty.
- 3. The resulting root ball may need additional staking and water after planting. The Owner's Representative may reject the plant if the root modification process makes the tree unstable or if the tree is not healthy at the end of the warranty period. Such plants shall still be covered under the warranty
- 4. The Contractor remains responsible to confirm that the grower has made all required root modifications noted during any nursery observations.
- D. Container and Boxed Root Ball Shaving: The outer surfaces of ALL plants in containers and boxes, including the top, sides and bottom of the root ball shall be shaved to remove all circling, descending, and matted roots. Shaving shall be performed using saws, knives, sharp shovels or other suitable equipment that is capable of making clean cuts on the roots. Shaving shall remove a minimum of one inch of root mat or up to 2 inches as required to remove all root segments that are not growing reasonably radial to the trunk.
- Exposed Stem Tissue after Modification: The required root ball modifications may result in stem tissue that has not formed trunk bark being exposed above the soil line. If such condition occurs, wrap the exposed portion of the stem in a protective wrapping with a white filter fabric. Secure the fabric with biodegradable masking tape. DO NOT USE string, twine, green nursery ties or any other material that may girdle the trunk if not removed.
- Excavation of the Planting Space: Using hand tools or tracked mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing or as noted below.
- 1. For trees and shrubs planted in soil areas that are NOT tilled or otherwise modified to a depth of at least 12 inches over a distance of more than 10 feet radius from each tree, or 5 feet radius from each shrub, the soil around the root ball shall be loosened as defined below or as indicated on the drawings.
 - a. The area of loosening shall be a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.
- b. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand
- 2. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened as defined above for trees and shrubs planted in soil areas that are NOT tilled or
- 3. The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.
- 4. If motorized equipment is used to deliver plants to the planting area over exposed planting beds, or used to loosen the soil or dig the planting holes, all soil that has been driven over shall be tilled to a depth of 6 inches.
- G. For trees to be planted in prepared Planting Soil that is deeper than the root ball depth, compact the soil under the root ball using a mechanical tamper to assure a firm bedding for the root ball. If there is more than 12 inches of planting soil under the root ball excavate and tamp the planting soil in lifts not to exceed 12 inches.
- H. Set top outer edge of the root ball at the average elevation of the proposed finish. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.
- The Owner's Representative may request that plants orientation be rotated when planted based on the form of the plant.

J. Backfill the space around the root ball with the same planting soil or existing soil that was

modify the soil within the planting bed. K. Brace root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. DO NOT over compact the backfill or use mechanical or pneumatic tamping equipment. Over compaction shall be defined as greater than 85% of maximum dry density, standard proctor or

greater than 250 psi as measured by a cone penetrometer when the volumetric soil moisture is

excavated for the planting space. See Specification Section Planting Soil, for requirements to

- lower than field capacity. 1. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.
- Where indicated on the drawings, build a 4 inch high, level berm of Planting Soil around the outside of the root ball to retain water. Tamp the berm to reduce leaking and erosion of the
- M. Thoroughly water the Planting Soil and root ball immediately after planting.
- N. Remove all nursery plant identification tags and ribbons as per Owner's Representative instructions. The Owner's Representative's seals are to remain on plants until the end of the
- O. Remove corrugated cardboard trunk protection after planting.
- P. Follow additional requirements for the permitted root ball packages. PERMITTED ROOT BALL PACKAGES AND SPECIAL PLANTING REQUIREMENTS
- A. The following are permitted root ball packages and special planting requirements that shall be followed during the planting process in addition to the above General planting requirements.
- B. BALLED AND BURLAPPED PLANTS
- 1. After the root ball has been backfilled, remove all twine and burlap from the top of the root ball. Cut the burlap away; do not fold down onto the Planting Soil.
- 2. If the plant is shipped with a wire basket that does not meet the requirements of a "Low Rise" basket, remove the top 6 - 8 inches of the basket wires just before the final backfilling of the tree.
- 3. Earth root balls shall be kept intact except for any modifications required by the Owner's Representative to make root package comply with the requirement in Part 2 Products.
- C. CONTAINER (INCLUDES BOXED AND ABOVE-GROUND FABRIC CONTAINERS) PLANTS

1. This specification assumes that most container plants have significant stem girdling and

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LANDSCAPE SPECIFICATIONS

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SPECIFICATIONS

- circling roots, and that the root collar is too low in the root ball.
- 2. Remove the container.
- 3. Perform root ball shaving as defined in Installation of Plants: General above.
- 4. Remove all roots and substrate above the root collar and the main structural roots according to root correction details so root system conforms to root observations detail.
- 5. Remove all substrate at the bottom of the root ball that does not contain roots.
- 6. Using a hose, power washer or air excavation device, wash out the substrate from around the trunk and top of the remaining root ball and find and remove all stem girdling roots within the root ball above the top of the structural roots.

3.11 GROUND COVER, PERENNIAL AND ANNUAL PLANTS

- A. Assure that soil moisture is within the required levels prior to planting. Irrigation, if required, shall be applied at least 12 hours prior to planting to avoid planting in muddy soils.
- B. Assure that soil grades in the beds are smooth and as shown on the plans.
- C. Plants shall be planted in even, triangularly spaced rows, at the intervals called out for on the drawings, unless otherwise noted. The first row of Annual flower plants shall be 6 inches from the bed edge unless otherwise directed.
- D. Dig planting holes sufficiently large enough to insert the root system without deforming the roots. Set the top of the root system at the grade of the soil.
- E. Schedule the planting to occur prior to application of the mulch. If the bed is already mulched, pull the mulch from around the hole and plant into the soil. Do not plant the root system in the mulch. Pull mulch back so it is not on the root ball surface.
- F. Press soil to bring the root system in contact with the soil.
- G. Spread any excess soil around in the spaces between plants.
- H. Apply mulch to the bed being sure not to cover the tops of the plants with or the tops of the root
- I. Water each planting area as soon as the planting is completed. Apply additional water to keep the soil moisture at the required levels. Do not over water.

3.12 PALM PLANTING

- A. Palm trees shall be placed at grade making sure not to plant the tree any deeper in the ground than the palm trees originally stood.
- B. The trees shall be placed with their vertical axis in a plumb position.
- C. All backfill shall be native soil except in cases where planting in rock. Water-settle the back fill.
- D. Do not cover root ball with mulch or topsoil.
- E. Provide a watering berm at each palm. Berms shall extend a minimum of 18 inches out from the 3.22 trunk all around and shall be a minimum of (6) inches high.
- F. Remove twine which ties fronds together after placing palm in planting hole and securing it in the upright position.

3.13 STAKING AND GUYING

- A. Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees
- 1. The Owner's Representative shall have the authority to require that trees are staked or to reject staking as an alternative way to stabilize the tree.
- 2. Trees that required heavily modified root balls to meet the root quality standards may become unstable. The Owner's Representative may choose to reject these trees rather than utilize staking to temporarily support the tree.
- B. Trees that are guyed shall have their guys and stakes removed after one full growing season or at other times as required by the Owner's Representative.
- C. Tree guying shall utilize the tree staking and guying materials specified. Guying to be tied in such a manner as to create a minimum 12-inch loop to prevent girdling. Refer to manufacturer's recommendations and the planting detail for installation. 1. Plants shall stand plumb after staking or guying.
- 2. Stakes shall be driven to sufficient depth to hold the tree rigid.
- D. For trees planted in planting mix over waterproofed membrane, use dead men buried 24 inches to the top of the dead man, in the soil. Tie the guy to the dead man with a double wrap of line around the dead man followed by a double half hitch. When guys are removed, leave the dead men in place and cut the guy tape 12 inches above the ground, leaving the tape end covered in

3.14 TREE BARK PROTECTION

A. For all street trees in commercial areas where indicted on the drawings, apply a Tree Bark Protector to each tree.

3.15 STRAIGHTENING PLANTS

- A. Maintain all plants in a plumb position throughout the warranty period. Straighten all trees that move out of plumb including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled.
- B. Do not straighten plants by pulling the trunk with guys.
- 3.16 INSTALLATION OF FERTILIZER AND OTHER CHEMICAL ADDITIVES
 - A. Do not apply any soluble fertilizer to plantings during the first year after transplanting unless soil test determines that fertilizer or other chemical additives is required. Apply chemical additives only upon the approval of the Owner's Representative.
 - B. Controlled release fertilizers shall be applied according to the manufacturer's instructions and standard horticultural practices.

3.17 PRUNING OF TREES AND SHRUBS

- A. Prune plants as directed by the Owner's Representative. Pruning trees shall be limited to addressing structural defects as shown in details; follow recommendations in "Structural Pruning: A Guide For The Green Industry" published by Urban Tree Foundation, Visalia CA.
- B. All pruning shall be performed by a person experienced in structural tree pruning.

C. Except for plants specified as multi-stemmed or as otherwise instructed by the Owner's

- Representative, preserve or create a central leader. D. Pruning of large trees shall be done using pole pruners or if needed, from a ladder or hydraulic
- lift to gain access to the top of the tree. Do not climb in newly planted trees. Small trees can be structurally pruned by laying them over before planting. Pruning may also be performed at the nursery prior to shipping.
- E. Remove and replace excessively pruned or malformed stock resulting from improper pruning that occurred in the nursery or after.
- F. Pruning shall be done with clean, sharp tools.
- G. No tree paint or sealants shall be used.

3.18 MULCHING OF PLANTS

- A. Apply 4 inches of mulch before settlement, covering the entire planting bed area. Install no more than 1 inch of mulch over the top of the root balls of all plants. Taper to 2 inches when
- B. For trees planted in lawn areas the mulch shall extend to a 5 foot radius around the tree or to the extent indicated on the plans.
- C. Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if

PLANTING BED FINISHING

- A. After planting, smooth out all grades between plants before mulching.
- B. Separate the edges of planting beds and lawn areas with a smooth, formed edge cut into the turf with the bed mulch level slightly lower, 1 and 2 inches, than the adjacent turf sod or as directed by the Owner's Representative. Bed edge lines shall be a depicted on the drawings.

3.20 WATERING

- A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Substantial Completion Acceptance. The Contractor shall adjust the automatic irrigation system, if available, and apply additional or adjust for less water using hoses as required.
- B. Hand water root balls of all plants to assure that the root balls have moisture above wilt point and below field capacity. Test the moisture content in each root ball and the soil outside the root ball to determine the water content.

3.21 CLEAN-UP

- A. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no
 - 1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring
- B. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative's seals are to remain on the trees and removed at the end of the warranty period.
- C. Make all repairs to grades, ruts, and damage by the plant installer to the work or other work at
- D. Remove and dispose of all excess planting soil, subsoil, mulch, plants, packaging, and other

PROTECTION DURING CONSTRUCTION

material brought to the site by the Contractor.

- A. The Contractor shall protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers. Maintain protection during installation until Substantial Completion Acceptance. Treat, repair or replace damaged work immediately
- B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including roots, trunk or branches of large existing trees, soil, paving, utilities, lighting, irrigation, other finished work and surfaces including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative shall determine when such cleaning, replacement or repair is satisfactory.

PLANT MAINTENANCE PRIOR TO SUBSTANTIAL COMPLETION ACCEPTANCE

- A. During the project work period and prior to Substantial Completion Acceptance, the Contractor shall maintain all plants.
- B. Maintenance during the period prior to Substantial Completion Acceptance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead material, repairing and replacing of tree stakes, tightening and repairing of guys, repairing and replacing of damaged tree wrap material, resetting plants to proper grades and upright position, and furnishing and applying such sprays as are necessary to keep plantings reasonably free of damaging insects and disease, and in healthy condition. The threshold for applying insecticides and herbicide shall follow established Integrated Pest Management (IPM) procedures. Mulch areas shall be kept reasonably free of weeds, grass.

SUBSTANTIAL COMPLETION ACCEPTANCE

- A. Upon written notice from the Contractor, the Owners Representative shall review the work and make a determination if the work is substantially complete. 1. Notification shall be at least 7 days prior to the date the contractor is requesting the review.
- B. The date of substantial completion of the planting shall be the date when the Owner's Representative accepts that all work in Planting, Planting Soil, and Irrigation installation sections is complete.
- C. The Plant Warranty period begins at date of written notification of substantial completion from the Owner's Representative. The date of substantial completion may be different than the date of substantial completion for the other sections of the project.

3.25 MAINTENANCE DURING THE WARRANTY PERIOD BY OTHERS

- A. After Substantial Completion Acceptance, the Contractor shall make sufficient site visits to observe the Owner's maintenance and become aware of problems with the maintenance in time END OF SECTION 32 9300 to request changes, until the date of End of Warranty Final Acceptance.
- 1. Notify the Owner's Representative in writing if maintenance, including watering, is not sufficient to maintain plants in a healthy condition. Such notification must be made in a timely period so that the Owner's Representative may take corrective action.
- a. Notification must define the maintenance needs and describe any corrective action
- 2. In the event that the Contractor fails to visit the site and or notify, in writing, the Owner's Representative of maintenance needs, lack of maintenance shall not be used as grounds for voiding or modifying the provisions of the warranty.
- 3.26 MAINTENANCE DURING THE WARRANTY PERIOD BY THE PLANT INSTALLER
 - A. During the warranty period, provide all maintenance for all plantings to keep the plants in a healthy state and the planting areas clean and neat.

B. General requirements:

being undertaken.

- 1. All work shall be undertaken by trained planting crews under the supervision of a foreman with a minimum of 5 years experience supervising commercial plant maintenance crews.
- 2. All chemical and fertilizer applications shall be made by licensed applicators for the type of chemicals to be used. All work and chemical use shall comply with all applicable local, provincial and federal requirements.
- warning barriers and other procedures to maintain the site in a safe manner for visitors at all 4. All workers shall wear required safety equipment and apparel appropriate for the tasks

paths or be placed in a manner that may create tripping hazards. Use standard safety

3. Assure that hoses and watering equipment and other maintenance equipment does not block

- 5. The Contractor shall not store maintenance equipment at the site at times when they are not in use unless authorized in writing by the Owner's Representative.
- 6. Maintenance vehicles shall not park on the site including walks and lawn areas at any time without the Owner's Representative's written permission.
- 7. Maintain a detailed log of all maintenance activities including types of tasks, date of task, types and quantities of materials and products used, watering times and amounts, and number of each crew. Periodically review the logs with the Owner's Representative, and submit a copy of the logs at the end of each year of the maintenance agreement.
- 8. Meet with the Owner's Representative a minimum of three times a year to review the progress and discuss any changes that are needed in the maintenance program. At the end of the warranty period attend a hand over meeting to formally transfer the responsibilities of maintenance to the Owner's Representative. Provide all information on past maintenance activities and provide a list of critical tasks that will be needed over the next 12 months. Provide all maintenance logs and soil test data. Make the Contractor's supervisor available for a minimum of one year after the end of the warranty period to answer questions about past maintenance.

C. Provide the following maintenance tasks:

- Watering; Provide all water required to keep soil within and around the root balls at optimum moisture content for plant growth.
- a. Maintain all watering systems and equipment and keep them operational.
- b. Monitor soil moisture to provide sufficient water. Check soil moisture and root ball moisture with a soil moisture meter on a regular basis and record moisture readings. Do
- Soil nutrient levels: Take a minimum of 4 soil samples from around the site in the spring and fall and have them tested by an accredited agricultural soil testing lab for chemical composition of plant required nutrients, pH, salt and % organic matter. Test results shall include laboratory recommendations for nutrient applications. Apply fertilizers at rates recommended by the soil test.
- a. Make any other soil test and/or plant tissue test that may be indicated by plant conditions that may not be related to soil nutrient levels such as soil contaminated by other chemicals or lack of chemical uptake by the plant.
- 3. Plant pruning: Remove cross over branching, shorten or remove developing co dominant leaders, dead wood and winter-damaged branches. Unless directed by the Owner's Representative, do not shear plants or make heading cuts.
- 4. Restore plants: Reset any plants that have settled or are leaning as soon as the condition is
- 5. Guying and staking: Maintain plant guys in a taught position. Remove tree guys and staking after the first full growing season unless directed by Owner's Representative.
- 6. Weed control: Keep all beds free of weeds. Hand-remove all weeds and any plants that do not appear on the planting plan. Chemical weed control is permitted only with the approval of the Owner's Representative. Schedule weeding as needed but not less 12 times per year.
- 7. Trash removal: Remove all trash and debris from all planting beds and maintain the beds in a neat and tidy appearance on a daily basis.
- 8. Plant pest control: Maintain disease, insects and other pests at manageable levels. Manageable levels shall be defined as damage to plants that may be noticeable to a professional but not to the average person. Use least invasive methods to control plant disease and insect outbreaks.
- a. The Owner's Representative must approve in advance the use of all chemical pesticide applications.
- 9. Plant replacement: Replace all plants that are defective as defined in the warranty provisions, as soon as the plant decline is obvious and in suitable weather and season for planting as outlined in above sections. Plants that become defective during the maintenance period shall be covered and replaced under the warranty provisions.
- 10. Mulch: Refresh mulch once a year to maintain complete coverage but do not over mulch. Typical mulch depth for trees, shrubs and groundcovers is 3 inches. At no time shall the overall mulch thickness be greater that 4 inches. Do not apply mulch within 6 inches of the trunks or stems of any plants. Replacement mulch shall meet the requirements of the original approved material. Mulch shall be no more than one inch on top of the root ball
- 11. Bed edging: Check and maintain edges between mulch and lawn areas in smooth neat lines as originally shown on the drawings.
- 12. Leaf, fruit and other plant debris removal: Remove fall leaf, spent flowers, fruit and plant part accumulations from beds and paved surfaces. Maintain all surface water drains free of debris. Debris removal shall be undertaken at each visit to weed or pick up trash in beds.
- 13. Damage from site use: Repair of damage by site visitors and events, beyond normal wear, are not part of this maintenance. The Owner's Representative may request that the Contractor repair damage beds or plantings for an additional cost. All additional work shall be approved in advance by the Owner's Representative.

END OF WARRANTY FINAL ACCEPTANCE / MAINTENANCE OBSERVATION

- A. At the end of the Warranty and Maintenance period the Owner's Representative shall observe the work and establish that all provisions of the contract are complete and the work is
- 1. If the work is satisfactory, the maintenance period will end on the date of the final
- 2. If the work is deemed unsatisfactory, the maintenance period will continue at no additional expense to the Owner until the work has been completed, observed, and approved by the Owner's Representative.
- B. FAILURE TO PASS OBSERVATION: If the work fails to pass final observation, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Owners Representative.



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